KITSAP COUNTY PUBLIC WORKS WASTEWATER DIVISION

MANCHESTER PUMP STATIONS
45, 46, & 47 AND
BEACH LINES REHABILITATION

Bid Set

August 2016

FORMAL BID KC CONTRACT #

Volume 1 of 2

Funded in Part by the Washington State Department of Ecology

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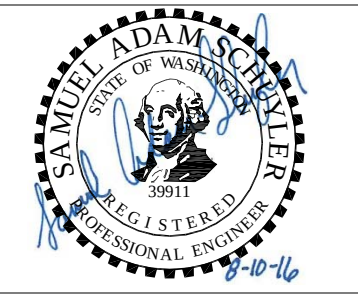
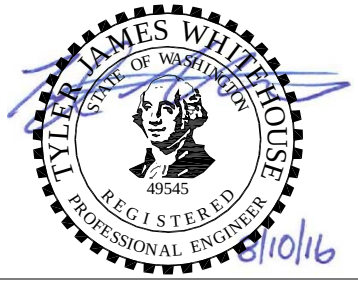
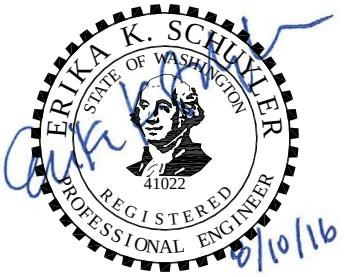
CERTIFICATE PAGE

Kitsap County Public Works Wastewater Division

Manchester Pump Stations
45, 46, & 47 and
Beach Lines Rehabilitation

The engineering material and data contained in the Plans and Specifications were prepared under the supervision and direction of the undersigned, whose seal as a registered professional engineer is affixed below.

	Specifications: Divisions 0, 1, 2, 8, 9, 10, 22, 31, 32, 33, & 41 Samuel Adam Schuyler, P.E. BHC Consultants
	Specifications: Divisions 0, 1, 2, 8, 9, 10, 22, 31, 32, 33, & 41 Tyler James Whitehouse, P.E. BHC Consultants
	Specifications: Division 33 Erika K. Schuyler, P.E. BHC Consultants
	Specifications: Divisions 3, 5, & 7 Kenneth E. Dahl, S.E. BHC Consultants

JEFFREY S. GIBSON STATE OF WASHINGTON 33080 REGISTERED PROFESSIONAL ENGINEER 8/10/16	Specifications: Divisions 26 & 40 Jeffrey S. Gibson, P.E. BHC Consultants
CHRISTOPHER M. DAY STATE OF WASHINGTON 51809 REGISTERED PROFESSIONAL ENGINEER 8/10/2016	Specifications: Division 2 – Shoreline Stabilization and Beach Restoration Christopher M. Day, P.E., D.CE Mott MacDonald

KITSAP COUNTY PUBLIC WORKS WASTEWATER DIVISION

MANCHESTER PUMP STATIONS 45, 46, AND 47 AND BEACH LINES REHABILITATION

FORMAL BID KC CONTRACT

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INVITATION TO BID
FORMAL BID CONTRACT
2016-156

KITSAP COUNTY PUBLIC WORKS WASTEWATER DIVISION

MANCHESTER PUMP STATIONS 45, 46, & 47
AND BEACH LINES REHABILITATION

BID SUBMISSION DATE & TIME	**September 29, 2016 @ 3:00 p.m.** **Purchasing Office** **614 Division Street MS-7** **Port Orchard, Washington 98366**
BID OPENING TIME & LOCATION	**September 29, 2016 @ 3:15 p.m.** **Port Madison Conference Room, 4th Floor Room #416** **Kitsap County Administration Building** **619 Division Street** **Port Orchard, Washington 98366**
MANDATORY PRE-BID MEETING	**September 14, 2016 @ 1:00 p.m.** **Kitsap County** **Manchester Wastewater Treatment Plant** **8020 East Caraway Road** **Port Orchard, WA 98366**
ENGINEERS ESTIMATE:	**$5,000,000**

The Kitsap County Board of Commissioners will receive sealed bids for the construction of the **Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation** until the time and date indicated above. Bids will be received, publicly opened and read aloud at the locations described above. Instructions for the delivery of bids are contained in the Special Provisions for the Project. Prospective Bidders are hereby notified that they are solely responsible for ensuring timely delivery of their bid to the Kitsap County Purchasing Office on or before the bid submission date and time indicated above.

The principal items or elements of construction include:

- Pump station rehabilitations including new submersible wastewater pumps, wet wells, valve/meter vaults, and onsite piping at three existing pump station sites.
- New MCC and main control panels at all three pump stations.
- New standby generators at all three pump stations.
- Elevated concrete slabs, steps and handrails at all three pump stations.
- Associated site work and surface restoration at all three sites.
- Decommissioning and removal of three existing pump stations.
- Shoreline stabilization at two sites.
- Cured-in-place pipe (CIPP) beach line sewer rehabilitation.

A mandatory pre-bid meeting will be held at the location described above. After the meeting, a tour of the sites will be conducted. This will be the only tour of the sites and facilities.

Bid documents may be found on the Kitsap County Web site www.kitsapgov.com/purchasing/bids.htm. Questions regarding the bid process, contract terms and conditions, or how to obtain copies of the bid documents shall be directed to Colby Wattling at 360-337-4410, or email cwattling@co.kitsap.wa.us. Technical questions about the work covered by the bid documents shall be directed to Floyd Bayless, Construction Manager, at (360) 337-5631 or email fbayless@co.kitsap.wa.us.

Kitsap County reserves the right to reject any all bids and to waive informalities or irregularities. Bids received after the time set for submission of bids will not be considered.

Each bid proposal shall be completely sealed in a separate envelope, properly addressed as stated above, with the name and address of the bidder and the name of the project plainly written on the outside of the envelope. All bids shall be accompanied by:

- County Bid Proposal – as published in Invitation to Bid
- Signed acknowledgment of receipt of all addenda
- Surety company Bid Bond on an approved form, certified check, or cashier's check payable to Kitsap county in an amount not less than five percent (5%) of the basic Bid
- Subcontractor's List
- Bidder Information
- Bidder Responsibility Checklist;
- Subcontractor Responsibility Checklist;
- Non Collusion Affidavit

Should the successful bidder fail to enter into such contract in accordance with the Bid and furnish all documents and bonds required within the time frames stated in the specifications, the bid proposal deposit or bond shall be forfeited to Kitsap County.

Bids are likely to be rejected if the lowest, responsible, responsive Bid received exceeds the Engineer's estimate by an unreasonable amount.

Kitsap County hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to the advertisement, Women and Minority Business Enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award. Minority Business Enterprises will be required to meet all requirements of law as related to Public Works contracts, including the provision of the Equal Employment Opportunity and Affirmative Action Plan on the basis of any other bidder.

The Successful bidder will be required to conform to the wage requirements prescribed by the federal Davis-Bacon and Related Acts which requires that all laborers and mechanics employed by contractors and subcontractors performing on contracts funded in whole or in part by SRF appropriations in excess of $2,000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits, and determined by the Secretary of Labor, for corresponding classes of laborers and mechanics employed on similar projects in the area.

It is anticipated that this project will be funded in part by the Washington State Department of Ecology. Neither the State of Washington nor any of its departments or employees are, or shall be, a party to any contract or any subcontract resulting from this solicitation for bids.

Bidders shall comply with the requirements outlined in the Washington State Department of Ecology Water Pollution Control Revolving Fund Specifications Insert included within these Contract Documents. The Contractor shall include the Required Bid Submittals with the bid proposal as required in the specifications insert.

Bidders are encouraged to review and understand the conditions, requirements and Contractor responsibilities of the project's "Permits and Licenses" section outlined in Special Provisions Section 1-07.6(1). In addition, Bidders are encouraged to review and understand the "Construction Sequencing and Constraints" section outlined in Special Provisions Section 1-08.3(2)C which defines specific work windows (i.e. WDFW Fish Window) for Work below the ordinary high water mark.

BID PROCEDURES AND CONDITIONS

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BID PROPOSAL

TO: Kitsap County Board of Commissioners
614 Division Street
Port Orchard, WA 98366

Board of Commissioners:

The undersigned bidder agrees, if this bid is accepted, to enter into a contract with the Contracting Agency, in the form included in the specifications to perform and furnish the work as specified or indicated in the bidding documents for the bid price and within the bid times indicated in this bid and in accordance with the other terms and conditions of the contract documents.

In submitting this bid, bidder represents, as more fully set forth in the contract, that:

1. This bid will remain subject to acceptance for 60 days after the day of bid opening. The Contracting Agency retains the right to request the apparent low bidder extend the award period or adjust their price accordingly. If an adjustment is requested, the Contracting Agency reserves the right to request the same adjustment from other bidders.
2. The Contracting Agency has the right to reject this bid.
3. Bidder will sign and submit the contract with the bonds and other documents required by the bidding requirements within 10 days after the date of Contracting Agency's Notice of Award.
4. Bidder has examined copies of all the bidding documents.
5. Bidder has made sufficient examination and has investigated and is satisfied as to the conditions to be encountered, the character, quantity, quality and scope of work, the quantities and qualities of materials to be supplied and equipment and labor to be used, and the requirements of the contract and proposal submitted, including all addenda for performance of the work.
6. Bidder has visited the jobsite and is completely familiar with the existing conditions, concurrently scheduled construction, access, staging and site limitations, and has made allowances for those conditions in the their bid.
7. Bidder is familiar with all federal, state, and local laws, ordinances and regulations, which in any manner might affect those engaged or employed in the work, the materials, equipment, or procedures used in the work, or which in any other way, might affect the conduct of the work. The Bidder is assumed to be familiar with such laws and regulations, and no plea of misunderstanding or ignorance of the law will be considered.
8. Bidder has correlated the information known to bidder, information and observations obtained from visits to the site, reports and drawings identified in the bidding documents and additional examinations, investigations, explorations, tests, studies, and data with the bidding documents.
9. Bidder agrees that the work will be completed within the time period established in the Contract Document (see Section 1-08.5) from the date of Notice to Proceed.
10. The bidder has determined from careful examination the methods; materials, labor and equipment required to perform the work in full and shall reflect the same in his bid price. If, during the performance of the work, methods, materials, labor or equipment required are beyond those anticipated by the bidder, the Bidder will not be entitled to additional compensation except as may be provided for elsewhere in these specifications

It is anticipated that this project will be funded in part by the Washington State Department of Ecology. Neither the State of Washington nor any of its departments or employees are, or shall be, a party to this contract or any subcontract.

Bidder has received the following addenda, receipt of which is hereby acknowledged:

DATE	NUMBER
_____	_____
_____	_____
_____	_____
_____	_____

SUMMARY OF BID DOCUMENTATION:

It is mandatory that each bidder complete and submit with its bid, documentation required by the contract documents, including, but not limited to the following:

1. Bid Proposal
2. Bid Guarantee Bond
3. Subcontractor's List
4. Bidder Information
    a. Bidder Responsibility Checklist
    b. Subcontractor Responsibility Checklist
    c. Project References
5. Non-collusion Affidavit Certificate
6. Washington State Department of Ecology Water Pollution Control Revolving Fund Required Bid Submittals
    a. Certification Of Nonsegregated Facilities (attachment 3)
    b. DBE Subcontractor Utilization Form (EPA Form 6100-4)
    c. One copy of DBE Subcontractor Performance Form (EPA Form 6100-3) for each DBE subcontractor
    d. Complete Bidders List

BASIC BID:

Pursuant to and in compliance with the advertisement for bids and other documents relating thereto, the undersigned Bidder hereby certifies having carefully examined contract documents entitled **Manchester Pump Stations 45, 46, & 47 and Beach Line Rehabilitation** as well as conditions affecting the work, and is familiar with the sites; and having made the necessary examinations, here proposes to furnish all labor, materials, equipment, and services necessary to complete the work in strict accordance with the above named documents for an amount computed upon the basis of the quantity of work actually performed at the Bid prices set forth herein.

PROPOSAL:

The Bidder certifies that the cost of all labor, equipment, plants, materials, including overhead and profit, necessary for proper completion of the work shall be included in the prices for the various bid items. NOTE: UNIT PRICES FOR ALL ITEMS, ALL EXTENSIONS, AND THE TOTAL AMOUNT OF BID MUST BE SHOWN. All prices shall be in legible and written in ink or typed. The proposal shall include: a unit price for each item (omitting digits more than four places to the right of the decimal point); an extension for each unit price (omitting digits more than two places to the right of the decimal point); and the total contract price (the sum of all extensions). Unit prices for all numbers shall be shown in both words and figures. In case of conflict, words shall govern.

The Bidder shall bid on all alternates and/or schedules as they are fully considered in making award. If a bidder fails to bid an alternate or schedule, or if he or she notes “no bid,” it will be construed as meaning that there will be no change in the contract amount and that the alternate or schedule is included in the contract amount. Descriptions for measurement and payment for the following Bid items are included in Section 1-09 of the Special Provisions.

BID SCHEDULE

Schedule A – Pump Station 45 – Daniels Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
1A. Preconstruction Work Phase	1-04	1 LS		$	$
2A. Final Cleanup and Restoration	1-04	1 LS		$	$
3A. Surveying	1-05	1 LS		$	$
4A. Project Record Drawings	1-05	1 LS		$	$
5A. Type B Schedules	1-08	18 Months	Five Hundred Dollars and No Cents	$500.00	$9,000.00
6A. Minor Changes (Allowance)*	1-09	Force Account	Fifty Thousand Dollars and No Cents	$50,000.00	$50,000.00
7A. Mobilization and Demobilization	1-09	1 LS		$	$
8A. Operation and Maintenance Manuals	1-11	1 LS		$	$
9A. Temporary Sewer Bypass Systems	Div. 1	1 LS		$	$
10A. Dewatering	Div. 31	1 LS		$	$
11A. Excavation Support Systems	Div. 31	1 LS		$	$

Schedule A – Pump Station 45 – Daniels Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
12A. Foundation Material (Allowance)*	Div. 31	30 TN	_____	$ _____	$ _____
13A. Temporary Erosion and Sediment Control	Div. 1 & 31	1 LS	_____	$ _____	$ _____
14A. PS 45 Pumps	Div 22	1 LS	_____	$ _____	$ _____
15A. PS 45 Mechanical Work	Varies	1 LS	_____	$ _____	$ _____
16A. PS 45 Electrical Work	Div. 26 & 40	1 LS	_____	$ _____	$ _____
17A. PS 45 Structures (Elevated Slab & Electrical Sla)	Div. 3	1 LS	_____	$ _____	$ _____
18A. PS 45 Demolition Work	Div. 2	1 LS	_____	$ _____	$ _____
19A. PS 45 Miscellaneous Site Work	Varies	1 LS	_____	$ _____	$ _____
20A. PS 45 Shoreline Stabilization and Beach Restoration	Varies	1 LS	_____	$ _____	$ _____
Subtotal of Schedule A Bid Items				**$** _____	
Sales Tax @ 8.7%				**$** _____	
Total for Schedule A				**$** _____	

Schedule B – Pump Station 46 – Caraway Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
1B. Preconstruction Work Phase	1-04	1 LS		$	$
2B. Final Cleanup and Restoration	1-04	1 LS		$	$
3B. Surveying	1-05	1 LS		$	$
4B. Project Record Drawings	1-05	1 LS		$	$
5B. Type B Schedules	1-08	18 Month	Five Hundred Dollars and No Cents	$500.00	$9,000.00
6B. Minor Changes (Allowance)*	1-09	Force Account	Fifty Thousand Dollars and No Cents	$50,000.00	$50,000.00
7B. Mobilization and Demobilization	1-09	1 LS		$	$
8B. Operation and Maintenance Manuals	1-11	1 LS		$	$
9B. Temporary Sewer Bypass Systems	Div. 1	1 LS		$	$
10B. Dewatering	Div. 31	1 LS		$	$
11B. Excavation Support Systems	Div. 31	1 LS		$	$
12B. Foundation Material (Allowance)*	Div. 31	30 TN		$	$

Schedule B – Pump Station 46 – Caraway Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
13B. Temporary Erosion and Sediment Control	Div. 1 & 31	1 LS	_____	$ _____	$ _____
14B. PS 46 Pumps	Div 22	1 LS	_____	$ _____	$ _____
15B. PS 46 Mechanical Work	Varies	1 LS	_____	$ _____	$ _____
16B. PS 46 Electrical Work	Div. 26 & 40	1 LS	_____	$ _____	$ _____
17B. PS 46 Structures (Elevated Slab & Electrical/Generator Slab)	Div. 3	1 LS	_____	$ _____	$ _____
18B. PS 46 Demolition Work	Div. 2	1 LS	_____	$ _____	$ _____
19B. PS 46 Miscellaneous Site Work	Varies	1 LS	_____	$ _____	$ _____
20B. PS 46 Shoreline Stabilization and Beach Restoration	Varies	1 LS	_____	$ _____	$ _____
21B. Cellular Concrete Backfill (Allowance)*	Div. 03	30 CY	_____	$ _____	$ _____
Subtotal of Schedule B Bid Items				**$** _____	
Sales Tax @ 8.7%				**$** _____	
Total for Schedule B				**$** _____	

Schedule C – Pump Station 47 – Hemlock Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
1C. Preconstruction Work Phase	1-04	1 LS		$	$
2C. Final Cleanup and Restoration	1-04	1 LS		$	$
3C. Surveying	1-05	1 LS		$	$
4C. Project Record Drawings	1-05	1 LS		$	$
5C. Type B Schedules	1-08	18 Month	Five Hundred Dollars and No Cents	$500.00	$9,000.00
6C. Minor Changes (Allowance)*	1-09	Force Account	Fifty Thousand Dollars and No Cents	$50,000.00	$50,000.00
7C. Mobilization and Demobilization	1-09	1 LS		$	$
8C. Operation and Maintenance Manuals	1-11	1 LS		$	$
9C. Temporary Sewer Bypass Systems	Div. 1	1 LS		$	$
10C. Dewatering	Div. 31	1 LS		$	$
11C. Excavation Support Systems	Div. 31	1 LS		$	$
12C. Foundation Material (Allowance)*	Div. 31	30 TN		$	$

Schedule C – Pump Station 47 – Hemlock Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
13C. Temporary Erosion and Sediment Control	Div. 1 & 31	1 LS	_____	$ _____	$ _____
14C. PS 47 Pumps	Div 22	1 LS	_____	$ _____	$ _____
15C. PS 47 Mechanical Work	Varies	1 LS	_____	$ _____	$ _____
16C. PS 47 Electrical Work	Div. 26 & 40	1 LS	_____	$ _____	$ _____
17C. PS 47 Structures (Elevated Slab)	Div. 3	1 LS	_____	$ _____	$ _____
18C. PS 47 Demolition Work	Div. 2	1 LS	_____	$ _____	$ _____
19C. PS 47 Miscellaneous Site Work	Varies	1 LS	_____	$ _____	$ _____
21C. Cellular Concrete Backfill (Allowance)*	Div. 03	200 CY	_____	$ _____	$ _____
Subtotal of Schedule C Bid Items				**$** _____	
Sales Tax @ 8.7%				**$** _____	
Total for Schedule C				**$** _____	

Schedule D – Beach Lines Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
1D. Preconstruction Work Phase	1-04	1 LS		$	$
2D. Final Cleanup and Restoration	1-04	1 LS		$	$
3D. Surveying	1-05	1 LS		$	$
4D. Project Record Drawings	1-05	1 LS		$	$
5D. Type B Schedules	1-08	4 Month	Five Hundred Dollars and No Cents	$500.00	$2,000.00
6D. Minor Changes (Allowance)*	1-09	Force Account	Fifty Thousand Dollars and No Cents	$50,000.00	$50,000.00
7D. Mobilization and Demobilization	1-09	1 LS		$	$
9D. Temporary Sewer Bypass Systems	Div. 1	1 LS		$	$
10D. Dewatering	Div. 31	1 LS		$	$
11D. Excavation Support Systems	Div. 31	1 LS		$	$
13D. Temporary Erosion and Sediment Control	Div. 1 & 31	1 LS		$	$
19D. Beach Lines Miscellaneous Site Work	Varies	1 LS		$	$

Schedule D – Beach Lines Rehabilitation

Item No.	Ref. Section	Est. Quantity	Unit Price (in words)	Unit Price (in Numbers)	Extended Amount (Qty x Unit Price) (in numbers)
22D. Cured-In-Place Pipe (CIPP)	Div. 33	3,300 LF	_____	$ _____	$ _____
23D. Sewer Lateral Rehabilitation	Div. 33	10 EA	_____	$ _____	$ _____
24D. Beach Lines Manhole Rehabilitation	Varies	1 LS	_____	$ _____	$ _____
25D. Beach Debris Removal (Allowance)*	Div. 2	10 TN	_____	$ _____	$ _____
Subtotal of Schedule D Bid Items				**$** _____	
Sales Tax @ 8.7%				**$** _____	
Total for Schedule D				**$** _____	
TOTAL FOR SCHEDULES A, B, C & D WITH SALES TAX				**$** _____	

*Allowance - For the purpose of establishing a common basis for evaluating bids, an arbitrary quantity for this item has been shown on the bid form and does not necessarily represent the quantity that may be necessary for the work. The Variation in Estimated Quantities provisions of Section 1-04.6 of the Standard Specifications shall not apply to this item. Quantities will be determined in the field as work progresses.

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SALES TAX:

All work identified in the bid schedule is subject to collection of Washington State sales tax on the Contract Price. Bidders should contact the Washington State Department of Revenue for further clarification of sales tax rules. If the project extends through a sales tax increase, the Contractor will be allowed a commensurate increase in the sales tax and adjustment in the contract amount. However, the Contracting Agency will not adjust payment if the Bidder bases a Bid on a misunderstood tax liability.

AWARD OF SCHEDULES:

The Proposal contains multiple schedules to assist the County in tracking the costs associated with separate components of the overall project. The intent of the County is to award a Contract for all schedules to the lowest responsive and responsible bidder provided the Bid has been submitted in accordance with the requirements of these specifications. However, the County reserves the right to award any of the schedules singularly or in combination thereof. Failure to complete all schedules in their entirety will result in the bid being non-responsive. The sum of all schedules will be used to determine the lowest responsible bidder.

OPENING OF BIDS:

Bids received prior to the time of opening will be kept unopened and secured until the time of the bid opening as specified in the Advertisement for Bids. No bid received thereafter will be considered. No responsibility will attach, and bidders waive any and all complaints against the County for premature opening of an improperly addressed or identified bid.

At the time and place fixed for the opening of bids, every bid received within appropriate time will be opened and publicly read aloud.

The Contracting Agency reserves the right to postpone the date and time for receiving and/or opening of bids at any time prior to the date and time established in the Advertisement for Bid. Postponement notices shall be mailed to bidders in the form of addenda.

The Contracting Agency may reject all bids if they exceed budgeted cost or the Contracting Agency may negotiate bid pricing with the apparent low responsive bidder including changes in the contract plans and specifications, to bring the bid within budgeted cost.

CONTRACT AND BOND:

If notified of the acceptance of this bid within sixty (60) days of the time set for opening of bids, the undersigned agrees to execute a contract for the above work, for a compensation computed from the above-stated sums, on the Contract Form bound with the specifications and to furnish a bond as required by the specifications on the form bound therein.

BID GUARANTEE:

It is agreed that if the undersigned fails to execute said Contract and furnish said Bond within ten (10) days after written notice of award of Contract, then the Bid Guarantee shall be retained by the County as liquidated damages. If this bid is not accepted within sixty (60) days after the time set for the opening of bids, or if the undersigned delivers said Contract and Bond in a timely manner, then the check or cash shall be returned, or the Bid Bond shall become void.

SIGNATURE

Signed By:_____ Date: _____

Please Print Name:_____ Title: _____

Name of Firm: _____

Address:_____

Telephone: (_____) _____ Fax: (_____)_____

END OF BID PROPOSAL

BID GUARANTY BOND
KC CONTRACT

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____, hereinafter called the Principal, and _____, hereinafter called the Surety, are jointly and severally held and firmly bound unto the Kitsap County Department of Public Works, hereinafter called the Obligee, each in the penal sum of five percent (5%) of the total amount of the Bid of the Principal for the work, this sum not to exceed _____ dollars ($_____) of lawful money of the United States for the payment thereof unto the Obligee, the Principal, and Surety jointly and severally bind themselves forever firmly by these presents.

WHEREAS, the Principal is herewith submitting its offer for the fulfillment of Obligee's contract for construction of: **Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation**.

NOW, THEREFORE, the condition of this obligation is such that if the Principal is awarded the contract, and if the Principal, within the time specified in the bid for such contract, enters into, executes, and delivers to the Obligee an agreement in the form provided herein complete with evidences of insurance, and if the Principal within the time specified in the bid gives the Performance and Payment Bond on the form provided herein to the Obligee, then this obligation shall be void; otherwise, the Principal and Surety will pay unto the Obligee the difference in the money between the total amount of the Bid of the Principal and the amount for which the Obligee legally contracts with another party to fulfill the Contract if the latter amount be in excess of the former, but in no event shall the Surety's liability exceed the penal sum hereof.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable under this obligation as Principal, and that nothing of any kind or nature whatsoever that will not discharge the Principal shall operate as a discharge or a release of liability of the Surety.

IT IS HEREBY FURTHER DECLARED AND AGREED that this obligation shall be binding upon and inure to the benefit of the Principal, the Surety, and the Obligee and their respective heirs, executors, administrators, successors, and assigns.

SIGNED AND SEALED this _____ day of _____, 2016.

Contractor's Corporate Seal

_____
Principal

_____
Signature for Principal

_____
Title of Signatory

Surety's Corporate Seal

_____
Surety

_____
Signature for Surety

_____
Title of Signatory

END OF BID GUARANTEE BOND

SUBCONTRACTORS LIST

Each Bidder is advised of the requirements of Washington Law, RCW 39.30.060. Pursuant to Title 39 of the Revised Code of Washington, each bidder is required to submit as part of the bid or within one hour after the published bid submittal time, the names of the subcontractors with whom the bidder, if awarded the contract, will subcontract for performance of the work of heating, ventilation and air conditioning; plumbing as described in RCW 18.106 and electrical as described in RCW 19.28 or to name itself for the work. The Bidder shall not list more than one subcontractor for each category of work identified, unless subcontractors vary with bid alternates, in which case the bidder must indicate which subcontractor will be used for which alternate. Failure of the bidder to submit the names of such subcontractors or to name itself to perform such work or the naming of two or more subcontractors to perform the same work shall render the bidder's bid non-responsive and, therefore, void.

List subcontractors appropriately

HEATING, VENTILATION AND AIR CONDITIONING

Subcontractor Name: _____

PLUMBING

Subcontractor Name: _____

ELECTRICAL

Subcontractor Name: _____

CURED-IN-PLACE PIPE (CIPP) LINING (Note: This is required by this contract and not RCW 39.30.060)*

Subcontractor Name: * _____

OTHER SUBCONTRACTORS (whose work is equal to or greater than 10% of the bid)
(Note: This is required by this contract and not RCW 39.30.060)

_____

_____

_____

_____

[THIS FORM SHALL BE COMPLETED IN FULL AND SUBMITTED WITH THE BID PROPOSAL]

END OF SUBCONTRACTORS LIST

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BIDDER INFORMATION

Contracting Firm Name:
Number of Years Contractor has been in the construction business under its present firm name:
Present gross dollar amount of work under contract:
Present gross dollar amount of contracts not yet completed:
General type of work performed by firm:

List the five major pieces of equipment to be used on this project:	Owned	Leased	Rented
1.			
2.			
3.			
4.			
5.			

List the name of the Project Manager and Superintendent responsible for this project	# of Years with Firm
Name of Project Manager:	
Name of Superintendent:	

Bank Reference:
Have you changed bonding companies within the last three years?
If so, why? (Optional)

Have you ever been sued by the client or have you ever sued the client on any public works contract for a special purpose district, municipality, county, or state government? _____

For what reason? _____

_____

Disposition of case, if settled: _____

_____

Do you have any outstanding payments due to the Department of Revenue? _____

If yes, describe the plan to address those payments_____

_____

_____

Bidder agrees that the County shall retain the right to obtain any and all credit reports?

(_____) _____
Yes Signature

In the last 5 years, has the Bidder had a three-year average Experience Modification Rate (EMR) no greater than 1.1 (Include EMR documentation)?

(_____) _____
Yes/No Signature

Does the Bidder have sufficient bonding capacity?

(_____) _____
Yes/No Signature

The Bidder shall include with their Bid a notarized statement from an admitted and Washington State approved surety insurer, which states that Bidder's current bonding capacity is sufficient for this project.

In the last five (5) years, has the Bidder had their Contractor's license revoked?

(_____) _____
Yes/No Signature

In the last five (5) years, has the Bidder been "defaulted" or "terminated" by an owner (other than for convenience of the owner)?

(_____)_____
Yes/No Signature

In the last five (5) years, has the Bidder been convicted of a crime involving the awarding of a contract of a government (local, state, or federal) construction project or the bidding or performance of a government construction contract?

(_____)_____

Yes/No Signature

In the last five (5) years, has the Bidder been found guilty in a criminal action, for making any false claim or material misrepresentations to any public agency or entity?

(_____)_____

Yes/No Signature

In the last five (5) years, has the Bidder been convicted of a crime involving any federal, state or local law related to construction, including acts of dishonesty?

(_____)_____

Yes/No Signature

[THIS FORM SHALL BE COMPLETED IN FULL AND SUBMITTED WITH THE BID PROPOSAL]

BIDDER RESPONSIBILITY CHECKLIST

The following checklist will be used to document that the Bidder meets the bidder responsibility criteria. Please print a copy of documentation from the appropriate website to be included with the submittal.

General Information	
Project Name: Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation	Project Number: KC Contract #
Bidder's Business Name:	Bid Submittal Deadline:
Contractor Registration	
License Number:	Status: Active: Yes ☐ No ☐
Effective Date (must be effective on or before Bid Submittal Deadline):	Expiration Date:
Contractor Infraction List	
Is Bidder on Infraction List? Yes ☐ No ☐	
Current UBI Number	
UBI Number:	Account Status: Open ☐ Closed ☐
Industrial Insurance Coverage	
Account Number:	Account Current: Yes ☐ No ☐
Employment Security Department Number	
Employment Security Department Number:	
Provide a copy of latest correspondence containing bidder's account number with Employment Security Department. Do not provide document containing personal information such as social security numbers.	
State Excise Tax Registration Number	
Tax Registration Number:	Account Status: Open ☐ Closed ☐
Not Disqualified from Bidding	
Has the Bidder been listed on the "Contractors Not Allowed to Bid" list of the Department of Labor and Industries in the last two (2) years? Yes ☐ No ☐	
Bankruptcy	
Has the Bidder declared Bankruptcy in the last five (5) years? Yes ☐ No ☐	
Information Supplied by:	
Print Name of Bidder Representative:	Date:

[THIS FORM SHALL BE COMPLETED IN FULL AND SUBMITTED WITH THE BID PROPOSAL]

SUBCONTRACTOR RESPONSIBILITY CHECKLIST

The following checklist will be used to document that the Bidder meets the mandatory bidder responsibility criteria. Please print a copy of documentation from the appropriate website to be included with the submittal.

General Information	
Project Name: Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation	Project Number: KC Contract #
Subcontractor's Business Name:	Subcontract Execution Date:
Contractor Registration	
License Number:	Status: Active: Yes ☐ No ☐
Effective Date (must be effective on or before Subcontract Bid Submittal Deadline):	Expiration Date:
Contractor Infraction List	
Is Subcontractor on Infraction List? Yes☐ No☐	
Current UBI Number	
UBI Number:	Account Status: Open ☐ Closed ☐
Industrial Insurance Coverage	
Account Number:	Account Current: Yes ☐ No ☐
Employment Security Department Number	
Employment Security Department Number:	
Please provide a copy of latest correspondence containing subcontractor's account number with Employment Security Department. Do not provide document containing personal information such as social security numbers.	
State Excise Tax Registration Number	
Tax Registration Number:	Account Status: Open ☐ Closed ☐
Not Disqualified from Bidding	
Is the Subcontractor listed on the "Contractors Not Allowed to Bid" list of the Department of Labor and Industries? Yes ☐ No ☐	
Contractor Licenses	
Electrical: If required by Chapter 19.28 RCW, does the Subcontractor have an Electrical Contractor's License? Yes☐ No☐	Elevator: If required by Chapter 70.87 RCW, does the Subcontractor have an Elevator Contractor's License? Yes☐ No☐
Checked by:	
Name of Employee:	Date:

[THIS FORM SHALL BE COMPLETED IN FULL FOR EACH SUBCONTRACTOR AND SUBMITTED WITH THE BID PROPOSAL]

PROJECT REFERENCES

Using the following form (use additional forms as needed), the Bidder shall describe projects that meet the similar size and scope criteria of Section 1-02.1.

Project Name: _____

Project Manager: _____ Project Superintendent: _____

Public Agency Name: _____

Contact Person: _____ Phone No: _____

Awarded Contract Amount: _____ Final Contract Amount: _____

Project Start Date: _____ Project Completion Date: _____

Project Location: _____

Project Scope: _____

_____

_____

_____

_____

_____

_____

_____

Claims, if any, filed by the Contractor and the basis for the claims: _____

_____

_____

_____

_____

_____

_____

[This form(s) shall be completed in full and submitted within 48 hours of the bid submittal deadline by the two lowest bidders and other bidders as requested by the Contracting Agency.]

END OF BIDDER INFORMATION

NON-COLLUSION AFFIDAVIT

The undersigned, being duly sworn, deposes and says that the person, firm, association, co-partnership or corporation herein named, has 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 the preparation and submission of this proposal to Kitsap County for its consideration in the award of the contract.

_____ Sole Proprietorship _____
Legal Name of Bidder

Partnership _____

_____ Corporation _____
By (Signature)

Other _____

_____
Street Address

_____
City State Zip

_____
Telephone

_____
State of Washington Contractor's Number

STATE OF WASHINGTON)
( ) SS.
COUNTY OF KITSAP)

On this day personally appeared before me _____ to me known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that _____ signed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this _____day of _____, 2016

_____Notary Public in and for the State of Washington, residing at

_____

My Commission Expires:_____

[THIS FORM SHALL BE COMPLETED IN FULL AND SUBMITTED WITH THE BID PROPOSAL]

END OF NON-COLLUSION AFFIDAVIT

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BIDDER'S CHECKLIST

NOTE: The purpose of this checklist is to serve as a reminder of major items to be addressed in submitting a bid and by the Successful Bidder after notification of award, and is not intended to be all-inclusive. It does not alleviate the Bidder from the responsibility of becoming familiar with all aspects of the Project Manual and proper completion and submission of the Bid.

1. Contract Documents thoroughly read and understood. _____
2. Attend pre-bid conference. _____
3. All blank spaces in proposal filled in, preferably in black ink. _____
4. Receipt of all addenda acknowledged. _____
5. Review of geotechnical information acknowledged. _____
6. Bid Form and other documents are signed by authorized officer. _____
7. Prices computed and presented correctly. _____
8. Subcontractors are named as indicated in the Contract Documents. _____
9. The following documents, to be submitted with the bid, completed, signed, and dated as applicable. _____
    a. Bid Proposal _____
    b. Bid Guaranty Bond _____
    c. Subcontractors List _____
    d. Bidder Information _____
        i. Bidder Responsibility Checklist _____
        ii. Subcontractor Responsibility Checklist _____
        iii. Project References _____
    e. Non-Collusion Affidavit Certificate _____
    f. Washington State Department of Ecology Water Pollution Control Revolving Fund Required Bid Submittals
        i. Certification Of Nonsegregated Facilities (attachment 3) _____
        ii. DBE Subcontractor Utilization Form (EPA Form 6100-4) _____
        iii. One copy of DBE Subcontractor Performance Form (EPA Form 6100-3) for each DBE subcontractor _____
        iv. Complete Bidders List _____
10. Bid documents submitted in sealed envelope and properly labeled. _____
11. The following documents shall be executed and complied with after the contract is awarded:
    a. Capital Projects Contract Agreement _____
    b. Performance and Payment Bond _____
    c. Insurance Certificates _____

END OF BIDDER'S CHECKLIST

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CONTRACT REQUIREMENTS

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CAPITAL PROJECTS CONTRACT AGREEMENT
KC CONTRACT

This Contract is made and entered into this _____ day of _____, 2016 between KITSAP COUNTY, with its principal offices at 614 Division Street, Port Orchard, Washington 98366, hereinafter called the Contracting Agency, and _____, a general Contractor licensed in the State of Washington, with its principal offices located at _____ _____, hereinafter the Contractor.

WITNESSETH:

WHEREAS, the Contracting Agency desires to construct the **Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation** and

WHEREAS, the Contractor has been selected by competitive bid as the "lowest responsible bidder submitting the lowest responsive bid" as that term is defined in RCW 43.19.1911:

NOW THEREFORE, the Contracting Agency and Contractor mutually agree as follows:

1. CONTRACT DOCUMENTS

The Agreement between the parties is expressed in the Contract Documents, which include the Invitation to Bid; the accepted Bid Proposal; the Bid Guaranty Bond; the Subcontractor's List; the Bidder Information; the Non-Collusion Affidavit; the Performance and Payment Bond; the Special Provisions; the Project Drawings; the Standard Specifications and Standard Plans; the Storm Water Pollution Prevention Plan; the Project Permits; and this Agreement.

2. DESCRIPTION OF THE WORK

This contract provides for the construction of three wastewater pump stations, associated gravity sewer and force main construction, beach gravity sewer main rehabilitation and miscellaneous site and beach restoration in accordance with the Contract Documents entitled "Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation." Contractor agrees to furnish all material, labor, carriage, tools, equipment, apparatus, facilities and anything else necessary to complete the work in a professional and workmanlike manner.

The Contractor shall complete its Work in a timely manner and in general accordance with the agreed schedule submitted by the Contractor and approved by the Contracting Agency.

3. CONTRACT REPRESENTATIVES

Each party to this Contract shall have a representative. Each party may change its representative upon providing written notice to the other party. These representatives will be:

CONTRACTING AGENCY:

Name of Representative:	Barbara Zaroff
Title:	Project Manager
Mailing Address:	614 Division Street MS #27
City, State, and Zip Code:	Port Orchard, WA 98366
Telephone Number:	360-337-5777
Email Address:	bzaroff@co.kitsap.wa.us

CONTRACTOR:

Name of Representative: _____

Title: _____

Mailing Address: _____

City, State, and Zip Code: _____

Telephone Number: _____

Fax Number: _____

Email Address: _____

All instructions, modifications, and changes to the Contract shall be conveyed to the Contractor through the Contracting Agency's Representative. Any work executed upon the direction of any person or entity other than the Contracting Agency's Representative may be considered defective and will be performed without reimbursement for said work to the Contractor. The Contracting Agency's Representative shall have the authority to reject any and all nonconforming or defective work under the Project Documents.

4. CONTRACT AMOUNT

The Contracting Agency hereby agrees to pay the Contractor according to the Contractor's Bid in the amount of $_____ (including accepted alternates and Washington State Sales Tax (WSST)), at the time and manner and upon the conditions provided for in this Contract.

5. CONTRACT TIME

Time is of the essence in the performance of this Contract. The Contractor agrees to work promptly and fully complete the work within the limits as described in the Contract Documents. Failure to complete the work within the allowed time limit as described in Section 1-08.5 of the Special Provisions will subject the Contractor to the payment of liquidated damages as described in Section 1-08.9 of the Standard Specifications and the Special Provisions.

6. PREVAILING WAGES

Contractor shall be responsible for complying with the prevailing wage requirements associated with RCW Chapter 39.12 and WAC 296-127 as further described in Section 1-07.9 of the Standard Specifications and the Special Provisions.

7. PERFORMANCE AND PAYMENT BOND

Contractor agrees to provide a Performance and payment Bond as described in Section 1-03.4 of the Standard Specifications as amended by the Special Provisions.

8. HOLD HARMLESS AND INDEMNIFICATION

The Contractor shall hold harmless, indemnify and defend the Contracting Agency, Engineer, its officers, officials, employees and agents, from and against any and all claims, actions, suits, liability, loss, expenses, damages, and judgments of any nature whatsoever, including, but not limited to, reasonable costs and attorneys' fees in defense thereof, for injury, sickness, disability or death to persons or damage to property or business, caused by or arising out of the performance of the services rendered under this contract by the Contractor, its employees, agents, or subcontractors or anyone for whose acts any of them may be liable. Provided however, that the Contractor's obligation hereunder shall not extend to injury, sickness, death or damage caused by or arising out of the sole negligence of the Contracting Agency, its officers, officials, employees or agents. Provided further, that in the event of the concurrent negligence of the parties, the Contractor's obligations hereunder shall apply only to the percentage of fault attributable to the Contractor, its employees, agents, or subcontractors.

In any and all claims against the Contracting Agency, Engineer, its officers, officials, employees and agents by any employee of the Contractor, 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 subcontractor under Worker's Compensation acts, disability benefit acts, or other employee benefit acts, it being clearly agreed and understood by the parties hereto that the Contractor expressly waives any immunity the Contractor might have had under such laws. By executing the Contract, the Contractor acknowledges that the foregoing waiver has been mutually negotiated by the parties and that the provisions of this Section shall be incorporated, as relevant, into any contract the Contractor makes with any subcontractor or agent performing Work hereunder.

The Contractor's obligations hereunder shall include, but are not limited to, investigating, adjusting and defending all claims alleging loss from action, error or omission, or breach of any common law, statutory or other delegated duty by the Contractor, the Contractor's employees, agents or subcontractors.

9. INSURANCE

Contractor agrees to comply with the insurance requirements described in Section 1-07.18 of the Special provisions.

10. TERMINATION

This contract may be terminated by the officials or agents of the County authorized to contract for or supervise the execution of such work in accordance with Section 1-08.10 of the Standard Specifications as amended by the Special Provisions.

11. NON-WAIVER OF RIGHTS

The parties agree that the excuse or forgiveness of performance or waiver of any provisions of this Contract does not constitute a waiver of such provisions for future performance, or prejudice the right of the waiving party to enforce any of the provisions of this Contract at a later time.

12. INDEPENDENT CONTRACTOR

The Contractor shall perform this Contract as an Independent Contractor and not as an agent, employee or servant of the Contracting Agency. The parties agree that the Contractor is not entitled to any benefits or rights enjoyed by employees of the County. Contractor shall comply with all laws regarding workers' compensation.

The Contractor specifically has the right to direct and control Contractor's own activities in providing the agreed services in accordance with the specifications set out in this Contract. Furthermore, the Contractor shall have and maintain complete responsibility and control over all of its subcontractors, employees, agents, and representatives. No subcontractor, employee, agent, or representative of the Contractor shall be or deem to be or act or purport to act as an employee, agent, or representative of the Contracting Agency, unless otherwise directed by the terms of this Contract.

The Contractor agrees to immediately remove any of its employees or agents from assignment to perform services under this Contract upon receipt of a written request to do so from the Contracting Agency's Representative or designee.

13. NONDISCRIMINATION

The Contractor, its assignees, delegates, or subcontractors shall not discriminate against any person in the performance of any of its obligations hereunder on the basis of race, color, creed, religion, national origin, age, sex, marital status, veteran status or the presence of any disability. Implementation of this provision shall be consistent with Initiative 200, Sec. 1 (Effective 12/3/98).

14. CHOICE OF LAW, JURISDICTION AND VENUE
Any action at law, suit in equity, or judicial proceeding for the enforcement of this contract or any provisions thereof shall be instituted and maintained only in the court of the State of Washington, County of Kitsap. It is mutually understood and agreed that this contract shall be governed by the laws of the State of Washington, both as to interpretation and performance.

15. SUCCESSORS AND ASSIGNS
The Contracting Agency, to the extent permitted by law, and the Contractor each bind themselves, their partners, successors, executors, administrators, and assigns to the other Party to this Contract and to the partners, successors, administrators, and assigns of such other party in respect to all covenants of this Contract.

16. SEVERABILITY
If a court of competent jurisdiction holds any part, term or provision of this Contract to be illegal, or invalid in whole or in part, the validity of the remaining provisions shall not be affected, and the parties' rights and obligations shall be construed and enforced as if the Contract did not contain the particular provision held to be invalid.

If it should appear that any provision of this Contract is in conflict with any statutory provision of the United States or the State of Washington, said provision which may conflict therewith shall be deemed inoperative and null and void insofar as it may be in conflict therewith, and shall be deemed modified to conform to such statutory provision.

17. ENTIRE AGREEMENT
The parties agree that this Contract is the complete expression of its terms and conditions. Any oral or written representations or understandings not incorporated in this Contract are specifically excluded.

18. NOTICES
Any notices shall be effective if personally served upon the other party or if mailed by registered or certified mail, return receipt requested, to the addresses set out in Section 3. Notice may also be given by facsimile with the original to follow by regular mail. Notice shall be deemed to be given three days following the date of mailing or immediately if personally served. For service by facsimile, service shall be effective upon receipt during working hours. If a facsimile is sent after working hours, it shall be effective at the beginning of the next working day.

19. THIRD PARTY BENEFICIARY
All parties agree that the State of Washington shall be, and is hereby, named as an express third-party beneficiary of this contract, with full rights as such.

This Contract shall take effect this _____ day of _____, 2016.

CONTRACTOR:

Firm _____

By _____

Signature: _____
(Authorized Representative)

Title
_____

Address: _____

_____

Contractor Registration No. _____

Federal Tax ID No. _____

BOARD OF COUNTY COMMISSIONERS
Kitsap County, Washington

_____
Charlotte Garrido, Commissioner

_____
Robert Gelder, Commissioner

_____
Edward E. Wolfe, Commissioner

Attest:

_____
Opal Robertson, Clerk of the Board

Approved as to form by the Prosecuting Attorney's Office.

END OF CAPITAL PROJECTS CONTRACT AGREEMENT

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PUBLIC WORKS PAYMENT BOND
TO KITSAP COUNTY, WA

Bond No. _____

Kitsap County, Washington, (County) has awarded to _____ (Principal), a contract for the construction of the project designated as **Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation**, Project No. **<Contract>**, in Kitsap County, 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 County, in the sum of _____ _____US Dollars ($_____) 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 39.08 and 39.12 including all workers, laborers, mechanics, 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 if such payment obligations have not been fulfilled, this bond shall remain in full force and effect.

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.

PRINCIPAL	SURETY
_____	_____
Principal Signature Date	Surety Signature Date
_____	_____
Printed Name	Printed Name
_____	_____
Title	Title

Name, address, and telephone of local office/agent of Surety Company are:

Approved as to form:

_____

Signature Title Date

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PERFORMANCE BOND
TO KITSAP COUNTY, WA

Bond No. _____

The Kitsap County, Washington, (County) has awarded to _____ (Principal), a contract for the construction of the project designated as **Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation**, Project No.**<Contract>**, in Kitsap County, Washington (Contract), and said Principal is required 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 County, in the sum of _____ _____US Dollars ($_____) 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 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.

PRINCIPAL	SURETY
_____	_____
Principal Signature Date	Surety Signature Date
_____	_____
Printed Name	Printed Name
_____	_____
Title	Title

Name, address, and telephone of local office/agent of Surety Company are:

Approved as to form:

_____

Signature Title Date

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WASHINGTON STATE DEPARTMENT OF ECOLOGY WATER POLLUTION CONTROL REVOLVING FUND SPECIFICATIONS INSERT

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

WATER POLLUTION CONTROL REVOLVING FUND

SPECIFICATIONS INSERT

Revised 3/4/14

The following clauses will be incorporated into construction contracts receiving financial assistance from the Washington State Department of Ecology Water Pollution Control Revolving Fund. In the event of conflict within the contract these clauses shall take precedence

Required Bid Submittals

The following submittals are required to be submitted with the bid proposal:

- Certification Of Nonsegregated Facilities (attachment 3)
- DBE Subcontractor Utilization Form (EPA Form 6100-4)
- One copy of DBE Subcontractor Performance Form (EPA Form 6100-3) for each DBE subcontractor.
- Complete Bidders List.

Compliance with State and Local Laws

The Contractor shall assure compliance with all applicable federal, state, and local laws, requirements, and ordinances as they pertain to the design, implementation, and administration of the approved project.

State Interest Exclusion

It is anticipated that this project will be funded in part by the Washington State Department of Ecology . Neither the State Of Washington nor any of its departments or employees are, or shall be, a party to this contract or any subcontract.

Third Party Beneficiary

Partial funding of this project is being provided through the Washington State Department of Ecology Water Pollution Control Revolving Fund. All parties agree that the State of Washington shall be, and is hereby, named as an express third-party beneficiary of this contract, with full rights as such.

Access to the construction site and to records

The contractor shall provide for the safe access to the construction site and to the contractor's records by Washington State Department of Ecology and Environmental Protection Agency (EPA) personnel.

The Contractor shall maintain accurate records and accounts to facilitate the Owner’s audit requirements and shall ensure that all subcontractors maintain auditable records.

These Project records shall be separate and distinct from the Contractor's other records and accounts.

All such records shall be available to the Owner and to Washington State Department of Ecology and EPA personnel for examination. All records pertinent to this project shall be retained by the Contractor for a period of three (3) years after the final audit.

Protection of the Environment

No construction related activity shall contribute to the degradation of the environment, allow material to enter surface or ground waters, or allow particulate emissions to the atmosphere, which exceed state or federal standards. Any actions that potentially allow a discharge to state waters must have prior approval of the Washington State Department of Ecology.

Funding Recognition

All site-specific projects must have a sign of sufficient size to be seen from nearby roadways acknowledging department financial assistance and left in place throughout the life of the project. Department logos must be on all signs and documents. Logos will be provided as needed.

Inadvertent Discovery Of Archeological Resources

The contractor shall obtain a copy of the Inadvertent Discovery Plan from the Project Owner. The contractor shall keep a copy of the inadvertent discovery plan for the project on the work site at all times. The contractor shall immediately stop all work if human remains, cultural, or archeological resources are discovered in the course of construction. The contractor shall follow the inadvertent discovery plan in dealing with the human remains, cultural, or archeological resources.

Use Of American Iron And Steel

This provision applies to projects for the construction, alteration, maintenance, or repair of a "treatment works" as defined in the Federal Water Pollution Control Act (33 USC 1381 et seq.). This provision does not apply if the engineering plans and specifications for the project were approved by the Ecology prior to January 17, 2014.

The Contractor acknowledges to and for the benefit of the Project Owner and the State of Washington that it understands the goods and services under this Agreement are being funded with monies made available by the Water Pollution Control Revolving Fund which contains provisions commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project be produced in the United States ("American Iron and Steel Requirements") including iron and steel products provided by the Contactor pursuant to this Agreement. "Iron and Steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

The Contractor hereby represents and warrants to and for the benefit of the Project Owner and the State that:

(a) the Contractor has reviewed and understands the American Iron and Steel Requirements,
(b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirements, unless a waiver of the requirements is approved, and
(c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirements, as may be requested by the Project Owner or the State.

Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Project Owner or State to recover as damages against the Contractor any loss, expense or cost (including without limitation attorney's fees) incurred by the Project Owner or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Project Owner). While the Contractor has no direct contractual privity with the State, as a lender to the Project Owner for the funding of its project, the Project Owner and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of the Agreement necessary to give this paragraph force or effect shall be amended or waived without the prior written consent of the State.

Prevailing Wage

The work performed under this contract is subject to the wage requirements of the Davis-Bacon Act. The Contractor shall conform to the wage requirements prescribed by the federal Davis-Bacon and Relate Acts which requires that all laborers and mechanics employed by contractors and subcontractors performing on contracts funded in whole or in part by SRF appropriations in excess of $2000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits, and determined by the Secretary of Labor, for corresponding classes of laborers and mechanics employed on similar projects in the area. Attachment 1 to this specification insert and an up to date wage determination shall be included in full into this contract and in any subcontract in excess of $2,000. Wage determinations can be found at http://www.wdol.gov.

The Contractor agrees that the Contractor is legally and financially responsible for compliance with the Davis-Bacon Act wage rules. All laborers and mechanics employed by contractors and subcontractors employed as part of this contract shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code.

Certification Regarding Suspension, Debarment, Ineligibility Or Voluntary Exclusion

1. The CONTRACTOR, by signing this agreement, certifies that it is not suspended, debarred, proposed for debarment, declared ineligible or otherwise excluded from contracting with the federal government, or from receiving contracts paid for with federal funds. If the CONTRACTOR is unable to certify to the statements contained in the certification, they must provide an explanation as to why they cannot.

2. The CONTRACTOR shall provide immediate written notice to the Department if at any time the CONTRACTOR learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.

3. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department for assistance in obtaining a copy of those regulations..

4. The CONTRACTOR agrees it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under the applicable Code of Federal Regulations, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction.

5. The CONTRACTOR further agrees by signing this agreement, that it will include this clause titled "Certification Regarding Suspension, Debarment, Ineligibility Or Voluntary Exclusion" without modification in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

6. Pursuant to 2CFR180.330, the CONTRACTOR is responsible for ensuring that any lower tier covered transaction complies with certification of suspension and debarment requirements.

7. CONTRACTOR acknowledges that failing to disclose the information required in the Code of Federal Regulations may result in the delay or negation of this funding agreement, or pursuance of legal remedies, including suspension and debarment.

8. CONTRACTOR agrees to keep proof in its agreement file, that it, and all lower tier recipients or contractors, are not suspended or debarred, and will make this proof available to the Department upon request. RECIPIENT/CONTRACTOR must run a search in http://www.sam.gov/ and print a copy of completed searches to document proof of compliance.

This term and condition supersedes EPA Form 5700-49, "Certification Regarding Debarment, Suspension, and Other Responsibility Matters."

Disadvantaged Business Enterprises

General Compliance (40 CFR Part 33).
The contractor shall comply with the requirements of the Environmental Protection Agency's Program for Participation By Disadvantaged Business Enterprises (DBE) 40 CFR Part 33.

Non-discrimination Provision (40CFR Appendix A to Part 33).
The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR

part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

The contractor shall comply with all federal and state nondiscrimination laws, including, but not limited to Title VI and VII of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and Chapter 49.60 RCW, Washington's Law Against Discrimination, and 42 U.S.C. 12101 et seq, the Americans with Disabilities Act (ADA).

Six Good Faith Efforts (40 CFR Part 33 Subpart C).
The contractor agrees to make the following good faith efforts whenever procuring subcontracts, equipment, services and supplies. The contractor shall retain records documenting compliance with the following six good faith efforts.

1. Ensuring Disadvantaged Business Enterprises are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing Disadvantaged Business Enterprises on solicitation lists and soliciting them whenever they are potential sources. Qualified Women and Minority business enterprises may be found on the Internet at www.omwbe.wa.gov or by contacting the Washington State Office of Minority and Women's Enterprises at (866) 208-1064.
2. Making information on forthcoming opportunities available to Disadvantaged Business Enterprises and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by Disadvantaged Business Enterprises in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of thirty (30) calendar days before the bid or proposal closing date.
3. Considering in the contracting process whether firms competing for large contracts could subcontract with Disadvantaged Business Enterprises. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by Disadvantaged Business Enterprises in the competitive process.
4. Encourage contracting with a consortium of Disadvantaged Business Enterprises when a contract is too large for one of these firms to handle individually.
5. Using services and assistance of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.
6. If the prime contractor awards subcontracts, requiring the subcontractors to take the six good faith efforts in paragraphs 1 through 5 above.

MBE/WBE Reporting (40 CFR Part 33 Parts 33.302, 33.502 and 33.503).

1. The contractor shall complete the DBE Subcontractor Utilization Form (EPA Form 6100–4).
2. The contractor shall require all DBE subcontractors to complete the DBE Subcontractor Performance Form (EPA Form 6100-3). The DBE Subcontractor Performance Form is only required to be completed by certified DBE subcontractors.

3. The contractor shall submit DBE Subcontractor Utilization Form (EPA Form 6100-4) and all completed DBE Subcontractor Performance Form(s) (EPA Form 6100-3) as part of the bid, or within one hour after the published bid submittal time (consistent with RCW 39.30.060)
4. The contractor shall provide DBE Subcontractor Participation Form (EPA Form 6100-2) to all DBE subcontractors. These subcontractors may submit Subcontractor Participation Form (EPA Form 6100-2) to the EPA Region 10 DBE coordinator in order to document issues or concerns with their usage or payment for a subcontract.

The 6100 forms can be found at:
http://www.ecy.wa.gov/programs/wq/funding/GrantLoanMgmtDocs/Eng/GrantLoanMgmtEngRes.html

Bidders List (40 CFR Part 33 part 33.501)
All bidders shall submit the following information for all firms that bid or quote on subcontracts (including both DBE and non-DBE firms) as part of the bid, or within one hour after the published bid submittal time (consistent with RCW 39.30.060).

1. Firm's name with point of contact;
2. Firm's mailing address, telephone number, and e-mail address;
3. The work on which the firm bid or quoted, and when the firm bid or quoted; and
4. Firm's status as an MBE/WBE or non-MBE/WBE.

Contract Administration Provisions (40 CFR part 33.302).
The contractor shall comply with the contract administration provisions of 40 CFR, Part33.302.

1. The contractor shall pay its subcontractor for satisfactory performance no more than 30 days from the contractor's receipt of payment.
2. The contractor shall notify the owner in writing prior to any termination of a DBE subcontractor.
3. If a DBE subcontractor fails to complete work under the subcontract for any reason, the contractor shall employ the six good faith efforts when soliciting a replacement subcontractor.
4. The contractor shall employ the six good faith efforts even if the contractor has achieved its fair share objectives.

Equal Opportunity (EEO)

If this Contract exceeds $10,000, the Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60.

Contractor's compliance with Executive Order 11246 shall be based on implementation of the Equal Opportunity Clause, and specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4.

Equal Opportunity Clause (41 CFR part 60-1.4(b))
During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
3. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
5. The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
7. The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to

enter into such litigation to protect the interests of the United States.

Federal Equal Employment Opportunity Construction Contract Specifications
(Executive Order 11246 and 41 CFR part 60-4.3)

1. As used in these specifications:
   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
   d. "Minority" includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60–4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction

contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Registerin notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
    b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
    c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
    d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
    e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading

programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60–3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60–4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

Reporting Requirements (EEO-1)
On or before September 30 of each year, a contractor that is subject to Title VII of the Civil Rights Act of 1964, as amended, and that has 100 or more employees, shall file with the EEOC or its delegate an "Employer Information Report EEO-1". Instructions on how to file are available on the EEOC's website at http://www.eeoc.gov/employers/eeo1survey/howtofile.cfm. The contractor shall retain a copy of the most recent report filed.

Segregated Facilities (41 CFR part 60-1.8)
The contractor shall ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. This obligation extends to all contracts containing the equal opportunity clause regardless of the amount of the contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, wash rooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; Provided, That separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

Attachments:

1. Wage Rate Requirements For Subrecipients
2. Current Wage Rate Determination (to be provided by project owner)
3. Certification Of Nonsegregated Facilities
4. Notice To Labor Unions Or Other Organization Of Workers: Non-Discrimination In Employment

   EPA Form 6100-4, EPA Form 6100.3, EPA Form 6100-2

ATTACHMENT 1 - WAGE RATE REQUIREMENTS FOR SUBRECIPIENTS. (To be included in full in any contract in excess of $2,000)

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the FY 2013 Continuing Resolution with respect to State recipients and subrecipients that are governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient may contact Lorraine Fleury at fleury.lorraine@epa.gov or at 215-814-2341 of EPA, Region III Grants and Audit Management Branch for guidance. for guidance. The recipient or subrecipient may also obtain additional guidance from DOL's web site at http://www.dol.gov/whd/

1. **Applicability of the Davis- Bacon (DB) prevailing wage requirements**.

Under the FY 2013 Appropriations Act, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

2. **Obtaining Wage Determinations**.

(a) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the subrecipient shall monitor www.wdol.gov weekly to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.

(ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2012 Appropriations Act , the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.wdol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying

number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/programs/dbra/wh347.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA , the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and

Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. **Contract Provision for Contracts in Excess of $100,000.**

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act.

These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient**,** upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. **Compliance Verification**

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB . Subrecipients shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract . Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at http://www.dol.gov/whd/america2.htm.

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ATTACHMENT 2

DAVIS-BACON WAGE RATE DETERMINATION

General Decision Number: WA160096 07/15/2016 WA96

Superseded General Decision Number: WA20150096

State: Washington
Construction Type: Heavy
Including water and sewer line construction

County: Kitsap County in Washington.

HEAVY CONSTRUCTION PROJECTS (including sewer/water construction).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.15 for calendar year 2016 applies to all contracts subject to the Davis-Bacon Act for which the solicitation was issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.15 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/08/2016
1	02/19/2016
2	06/24/2016
3	07/08/2016
4	07/15/2016

CARP0770-031 06/01/2015

	Rates	Fringes
CARPENTER (Including Formwork)	$ 40.36	13.66
PILEDRIVERMAN	$ 40.61	13.66

(HOURLY ZONE PAY: WESTERN AND CENTRAL WASHINGTON – ALL CLASSIFICATIONS EXCEPT MILLWRIGHTS AND PILEDRIVERS)

Hourly Zone Pay shall be paid on jobs located outside of the free zone computed from the city center of the following listed cities:

Seattle	Olympia	Bellingham
Auburn	Bremerton	Anacortes
Renton	Shelton	Yakima

Aberdeen-Hoquiam	Tacoma	Wenatchee
Ellensburg	Everett	Port Angeles
Centralia	Mount Vernon	Sunnyside
Chelan	Pt. Townsend	

Zone Pay:

0 -25 radius miles	Free
26-35 radius miles	$1.00/hour
36-45 radius miles	$1.15/hour
46-55 radius miles	$1.35/hour
Over 55 radius miles	$1.55/hour

(HOURLY ZONE PAY: WESTERN AND CENTRAL WASHINGTON – MILLWRIGHT AND PILEDRIVER ONLY)

Hourly Zone Pay shall be computed from Seattle Union Hall, Tacoma City center, and Everett City center

Zone Pay:

0 -25 radius miles	Free
26-45 radius miles	$ .70/hour
Over 45 radius miles	$1.50/hour

ELEC0046-006 02/01/2016

	Rates	Fringes
ELECTRICIAN	$ 45.77	3%+17.91

ENGI0302-027 06/01/2013

	Rates	Fringes
Power equipment operators:		
Group 1A	$ 37.39	16.65
Group 1AA	$ 37.96	16.65
Group 1AAA	$ 38.52	16.65
Group 1	$ 36.84	16.65
Group 2	$ 36.35	16.65
Group 3	$ 35.93	16.65
Group 4	$ 33.57	16.65

Zone Differential (Add to Zone 1 rates):

Zone 2 (26-45 radius miles) - $1.00

Zone 3 (Over 45 radius miles) - $1.30

BASEPOINTS: Aberdeen, Bellingham, Bremerton, Everett, Kent, Mount Vernon, Port Angeles, Port Townsend, Seattle, Shelton, Wenatchee, Yakima

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1AAA - Cranes-over 300 tons, or 300 ft. of boom (including jib with attachments)

GROUP 1AA - Cranes 200 to 300 tons, or 250 ft. of boom (including jib with attachments); over crane over 175 ft. in height, base to boom; Excavator/Trackhoe: Over 90 metric tons

GROUP 1A - Cranes, 100 tons thru 199 tons, or 150 ft. of boom (including jib with attachments); Crane-overhead, bridge type, 100 tons and over; Tower crane up to 175 ft. in height base to boom; Loaders-overhead, 8 yards and over; excavator/Trackhoe: over 50 metric tons to 90 metric tons;

GROUP 1 - Cranes 45 tons thru 99 tons, under 150 ft. of boom (including jib with attachments); Crane-overhead, bridge type, 45 tons thru 99 tons; Derricks on building work; Excavator/Trackhoe: over 30 metric tons to 50 metric tons; Loader- overhead 6 yards to, but not including 8 yards; Dozer D-10; Screedman; Scrapers: 45 yards and over; Grader/Blade; Paver

GROUP 2 - Cranes, 20 tons thru 44 tons with attachments; Crane-overhead, bridge type-20 tons through 44 tons; Drilling machine; Excavator/Trackhoe: 15 to 30 metric tons; Horizontal/directional drill operator; Loaders-overhead under 6 yards; Scraper: under 45 tons; Mechanic; Piledriver; Boring Machine

GROUP 3 - Cranes-thru 19 tons with attachments; A-frame crane over 10 tons; Dozers-D-9 and under; Motor patrol grader-nonfinishing; Roller-Plant Mix; Excavator/Trackhoe: under 15 metric tons; Service Oiler; Forklift: 3,000 lbs. and over with attachments; Boom Truck over 10 tons

GROUP 4 - Cranes-A frame-10 tons and under; Roller-other than plant mix; Forklift: under 3,000 lbs. with attachments Grade Checker; Drill Assistant; Boom Truck 10 tons and under

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* IRON0086-010 07/01/2016

	Rates	Fringes
IRONWORKER (Reinforcing, Structural and Ornamental)	$ 40.52	24.71

LABO0001-026 06/01/2014

ZONE 1:

	Rates	Fringes
Laborers:		
GROUP 2	$ 25.79	10.30

GROUP 3 ..... $ 32.29 10.30
GROUP 4 ..... $ 33.08 10.30
GROUP 5 ..... $ 33.62 10.30

ZONE DIFFERENTIAL (ADD TO ZONE 1 RATES):
ZONE 2 - $1.00
ZONE 3 - $1.30

BASE POINTS: BELLINGHAM, MT. VERNON, EVERETT, SEATTLE, KENT, TACOMA, OLYMPIA, CENTRALIA, ABERDEEN, SHELTON, PT. TOWNSEND, PT. ANGELES, AND BREMERTON

ZONE 1 - Projects within 25 radius miles of the respective city hall
ZONE 2 - More than 25 but less than 45 radius miles from the respective city hall
ZONE 3 - More than 45 radius miles from the respective city hall

LABORERS CLASSIFICATIONS

GROUP 2: Flagman
GROUP 3: General Laborer; Mason Tender-Cement/Concrete; Form Stripping
GROUP 4: Grade Checker; Pipe Layer; Handheld Drill; High Scaler; Jackhammer
GROUP 5: Mason Tender-Brick

PAIN0005-008 07/01/2015

	Rates	Fringes
PAINTER (Brush, Roller and Spray)	$ 23.05	10.85

PLAS0528-004 06/01/2016

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 39.52	16.04

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* TEAM0174-006 01/01/2016

	Rates	Fringes
Truck drivers:		
ZONE A:		
GROUP 1	$ 33.38	17.87
GROUP 2	$ 32.54	17.87

ZONE B (25-45 miles from center of listed cities*): Add $.70 per hour to Zone A rates.

ZONE C (over 45 miles from centr of listed cities*): Add $1.00 per hour to Zone A rates.

*Zone pay will be calculated from the city center of the following listed cities:

BELLINGHAM	CENTRALIA	RAYMOND	OLYMPIA
EVERETT	SHELTON	ANACORTES	BELLEVUE
SEATTLE	PORT ANGELES	MT. VERNON	KENT
TACOMA	PORT TOWNSEND	ABERDEEN	BREMERTON

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - Water Truck-3,000 gallons and over; Semi-Trailer Truck

GROUP 2 - Water Truck- less than 3,000 gallons

HAZMAT PROJECTS

Anyone working on a HAZMAT job, where HAZMAT certification is required, shall be compensated as a premium, in addition to the classification working in as follows:

LEVEL C: +$.25 per hour - This level uses an air purifying respirator or additional protective clothing.

LEVEL B: +$.50 per hour - Uses same respirator protection as Level A. Supplied air line is provided in conjunction with a chemical "splash suit."

LEVEL A: +$.75 per hour - This level utilizes a fully-encapsulated suit with a self-contained breathing apparatus or a supplied air line.

SUWA2009-062 08/07/2009

	Rates	Fringes
LABORER: Landscape & Irrigation	$ 13.52	3.35
OPERATOR: Asphalt Plant	$ 34.14	0.68
OPERATOR: Backhoe	$ 27.86	6.92
OPERATOR: Broom/Sweeper	$ 30.39	3.77
OPERATOR: Power Shovel	$ 25.12	7.83
OPERATOR: Skid Steer	$ 10.63	0.00
OPERATOR: Loader	$ 26.46	7.94
TRUCK DRIVER, Includes Dump Truck	$ 25.75	8.38
TRUCK DRIVER: Flatbed Truck	$ 22.74	6.29
TRUCK DRIVER: Lowboy Truck	$ 22.89	5.72

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.
Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

   * an existing published wage determination
   * a survey underlying a wage determination
   * a Wage and Hour Division letter setting forth a position on a wage determination matter
   * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

   Wage and Hour Administrator
   U.S. Department of Labor
   200 Constitution Avenue, N.W.
   Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

   Administrative Review Board
   U.S. Department of Labor
   200 Constitution Avenue, N.W.
   Washington, DC 20210

4) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

ATTACHMENT 3

CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to federally assisted construction contracts and related subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity clause.)

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certified, further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work area, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or area, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed contractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such, certification in this file.

_____ _____

Signature Date

_____

Name and title of signer (please type)

[THIS FORM SHALL BE COMPLETED IN FULL AND SUBMITTED WITH THE BID PROPOSAL]

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ATTACHMENT 4

NOTICE TO LABOR UNIONS OR OTHER ORGANIZATION OF WORKERS: NON-DISCRIMINATION IN EMPLOYMENT

TO: _____
(name of union or organization of worker)

The undersigned currently holds contract(s) with _____
(name of applicant)
_____ involving funds or credit of the U.S. Government or (a) subcontract(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Section 202 of Executive Order 11246 dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, creed, or national origin. This obligation not to discriminate in employment includes, but is not limited to, the following:

EMPLOYMENT, UPGRADING, TRANSFER OR DEMOTION

RECRUITMENT AND ADVERTISING
RATES OF PAY OR OTHER FORMS OF COMPENSATION

SELECTION FOR TRAINING INCLUDING APPRENTICESHIP, LAYOFF OR TERMINATION

This notice is furnished you pursuant to the provisions of the above contract(s) or subcontract(s) and Executive Order 11246.

Copies of this notice will be posted by the undersigned in conspicuous places available to employees or applicants for employment.

_____

_____

_____

_____
(contractor or subcontractor(s)

_____
(Date)

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United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE[1] subcontractor[2] the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

Please use the space below to report any concerns regarding the above EPA-funded project:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Subcontractor Signature	Print Name
Title	**Date**

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services , Equipment or Supplies	Price of Work Submitted to the Prime Contractor

DBE Certified By: ___ DOT ___ SBA ___ Other: _____	Meets/ exceeds EPA certification standards? ___ YES ___ NO ___ Unknown

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

Subcontractor Signature	Print Name
Title	**Date**

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE[1] subcontractors[2] and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.		Email Address
Issuing/Funding Entity:		

I have identified potential DBE certified subcontractors	___ YES	___ NO
If yes, please complete the table below. If no, please explain:		

Subcontractor Name/ Company Name	**Company Address/ Phone/ Email**	**Est. Dollar Amt**	**Currently DBE Certified?**

Continue on back if needed

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

SPECIAL PROVISIONS

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INTRODUCTION TO THE SPECIAL PROVISIONS

The work on this project shall be accomplished in accordance with the Standard Specifications for Road, Bridge and Municipal Construction, 2014 edition, as issued by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter (hereafter "Standard Specifications"). The Standard Specifications, as modified or supplemented by the Amendments to the Standard Specifications and these Special Provisions, all of which are made a part of the Contract Documents, shall govern all of the Work.

These WSDOT Special Provisions are made up of both General Special Provisions (GSPs) from various sources, which may have project-specific fill-ins; and project-specific Special Provisions. Each Provision supplements, modifies, or replaces the comparable Standard Specification, or is a new Provision. The deletion, amendment, alteration, or addition to any subsection or portion of the Standard Specifications is meant to pertain only to that particular portion of the section, and in no way should it be interpreted that the balance of the section does not apply.

The GSPs are labeled under the headers of each GSP, with the date of the GSP and its source, as follows:

(May 18, 2007 APWA GSP)

(August 7, 2006 WSDOT GSP)

Project specific Special Provisions are labeled under the heading of each Special Provision as follows:

(Local Agency SP)

The specifications also include Construction Specification Institute (CSI) formatted specifications Divisions 1 to 41 (6-digit format). The CSI specifications are generally used for pump station specific items such as structures, mechanical equipment, electrical items, etc. The CSI specifications are supplemental to the WSDOT Special Provisions and WSDOT standards.

The project is funded in part by the Washington State Department of Ecology. As such, the work on this project shall be in accordance with the Washington State Department of Ecology Water Pollution Control Revolving Fund Specifications Insert included within these Contract Documents.

Also incorporated into the Contract Documents by reference are:

1. *Manual on Uniform Traffic Control Devices for Streets and Highways*, currently adopted edition, with Washington State modifications, if any
2. *Standard Plans for Road, Bridge and Municipal Construction, WSDOT/APWA, current edition*

Contractor shall obtain copies of these publications, at Contractor's own expense.

END OF INTRODUCTION

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1-01 Definitions and Terms

1-01.3 Definitions

Section 1-01.3 is supplemented as follows:
(Local Agency SP)

All references in the Standard Specifications, Amendments, or WSDOT General Special Provisions, to the terms “State”, “Department of Transportation”, “Washington State Transportation Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and “State Treasurer” shall be revised to read “Contracting Agency”.

All references to “State Materials Laboratory” shall be revised to read “Contracting Agency designated location”.

All references to “final contract voucher certification” shall be interpreted to mean the final payment form established by the Contracting Agency.

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency’s headquarters are located.

Acceptance – Formal action of the Owner in determining that the Contractor's work has been completed in accordance with the contract and in notifying the Contractor in writing of the acceptability of the work.

Act of God – A cataclysmic phenomenon of nature, such as an earthquake, flood or cyclone. Rain, wind, high water, or other natural phenomenon which might reasonably have been anticipated from historical records of the general locality of the work shall not be construed as acts of God.

Additive – A supplemental unit of work or group of bid items, identified separately in the Bid Proposal, which may, at the discretion of the Contracting Agency, 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 Bid Proposal, from which the Contracting Agency may make a choice between different methods or material of construction for performing the same work.

Application for Payment – The form accepted by the Engineer which is to be used by the Contractor in requesting progress and final payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid Proposal Form – Bid Proposal Form shall mean the same as the definition provided for the term “Proposal Form.”

Business Day – A business day is any day from Monday through Friday except holidays as listed in Section 1-08.5.

Construction Manager – The person designated, in writing, by the Owner to act as its representative and to perform administrative functions relating to this contract. Initial contact by the Contractor with the Owner shall be through the Construction Manager.

Contract Bond – The definition in the Standard Specifications for “Contract Bond” applies to whatever bond form(s) are required by the Contract Documents, which may be a combination of a Payment Bond and a Performance Bond.

Contract Documents – See definition for “Contract”.

Contract Drawings – Contract Drawings or Drawings shall mean the same as the definition provided for the term “Contract Plans” or “Plans.”

Contracting Agency – The Contracting Agency shall mean Kitsap County, a municipal corporation, acting and existing under the laws of the State of Washington.

Contract Price – The amount payable to the Contractor under the terms and conditions of the contract provisions based on the lump sum prices, unit prices, or combination thereof, on the Bidding Schedule, with adjustments made in accordance with the Contract.

Contract Time – The period of time established by the terms and conditions of the contract within which the work must be physically completed.

Dates – Delete the heading Completion Dates and the three paragraphs that follow it, and replace them with the following:

Bid Opening Date – The date on which the Contracting Agency publicly opens and reads the bids.

Award Date – The date of the formal decision of the Contracting Agency to accept the lowest, responsible and responsive bidder for the work.

Contract Execution Date – The date the Contracting Agency officially binds the agency to the Contract.

Limited Notice to Proceed with Construction Date – The date stated in the Limited Notice to Proceed on which the Preconstruction Phase contract time begins.

Notice to Proceed with Construction Date – The date stated in the Notice to Proceed with Construction on which the Construction Phase contract time begins.

Substantial Completion Date – The day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the 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 contract.

Physical Completion Date – The day all of the work is physically completed on the project. All documentation required by the Contract and required by law does not necessarily need to be furnished by the Contractor by this date.

Completion Date – The day all the work specified in the contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the contract and required by law must be furnished by the Contractor before establishment of this date.

Final Acceptance Date – The date on which the Contracting Agency accepts the work as complete.

EADOC – The web-based electronic media site that is hosted by EADOC LLC. Information may be obtained at www.EADOCsoftware.com. EADOC is a project management system for facilitating document workflows, communication, and collaboration, which assists in the management of construction projects. It serves as a single source for project information for communication and collaboration among all project participants by automating various tasks in an organization of modules. EADOC provides secure, permissions-based access requiring the identification of all users and their approved access rights.

Electronic Documents – The electronic form or image of Project Communications that can be stored on and retrieved from an electronic storage device through a collaboration system over the Internet. Includes all written and graphic products produced with computer software or converted to electronic form or electronic image by computer software.

Engineer – Engineer shall mean either the Contracting Agency's design engineer or the Contracting Agency's construction administration representative.

Field Directive – A written order issued by Engineer which requires minor changes in the Work, but which does not involve a change in the Contract Price or the Contract Times.

Invitation to Bid – The definition is the same as that provided for the term "Call for Bids."

Limited Notice to Proceed – Written notice from the Contracting Agency informing the successful Bidder to start the Work associated with the Preconstruction Work Phase. See Section 1-04.3 for additional information.

Notice – As defined in the Contract. Notice for documents transmitted through EADOC is the time and date when the document is sent to the other party as recorded in EADOC.

Notice of Award – The written notice from the Contracting Agency to the successful Bidder signifying the Contracting Agency's acceptance of the Bid Proposal.

Notice to Proceed with Construction – The written notice from the Contracting Agency or Engineer to the successful Bidder authorizing and directing the Contractor to proceed with the Construction Work Phase. The Notice to Proceed with Construction establishes the date on which the contract time begins. See Sections 1-04.3 and 1-08.4 for additional information.

Owner – The definition is the same as that provided for the term "Contracting Agency".

Performance and Payment Bond – The definition is the same as that provided for the term "Contract Bond." The Contractor will be required to submit a Performance and Payment Bond on the Contracting Agency provided form within ten (10) calendar days of receipt of Notice of Award.

Project Communications – All written documentation and written communications required by the Contract Documents including, but not limited to: correspondence, reports, notices, submittals, transmittals, RFI's, request for change orders, payment applications, change orders, claims, change proposals, field orders, meeting agendas and minutes, substitutions, test reports, monitoring reports, punchlists, and all other formal Contract communications. Project communications shall also include documents required by the Contract that include written documents, demands, instruments, or directives, unless otherwise indicated in this Section.

Project Data – Samples, certifications, material specifications, installation procedures, catalog data or other materials, equipment, or other information intended to describe items to be furnished by the Contractor for the project and which are identified as required submittals in the Standard Specifications and Special Provisions.

Project Team – The associated members of the Owner, Owner Consultants, Construction Manager, Design Engineer, Contractor, Subcontractors, and Vendors.

Quality Assurance – A program establishing policies, procedures, standards, training, guidelines, testing, and systems necessary to provide quality in the work to meet the project requirements and accepted industry standards.

Quality Control – Those activities that provide confidence that materials and workmanship will meet the requirements of the contract to fulfill the project objectives. The Contractor is responsible for the quality control of the project.

Shop Drawings – Drawings prepared by the Contractor or his/her suppliers or subcontractors to describe detailed dimensions and materials of items to be furnished for the work. Shop drawings are not contract Drawings.

Total Bid Price – The sum of all bid prices offered by the bidder as set forth in the Bidding Schedule on the Bid Proposal form.

Traffic - Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

Work Directive – A written directive to the Contractor, recommended by the Engineer, issued on or after the effective date of the Notice to Proceed and signed by the Contracting Agency's Representative, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed, or to emergencies. A Work Directive may or may not change Contract Price or Contract Time, but is evidence that the parties expect that the change directed or documented by the Work Directive will be incorporated in a subsequently issued Change Order following negotiations of the parties as to its effect, if any, on the Contract Price or Contract Time.

END OF SECTION 1-01

1-02 Bid Procedures and Conditions

1-02.1 Prequalification of Bidders

Section 1-02.1 is deleted and replaced with the following:
(Local Agency SP)

1-02.1 Bidder Responsibility

It is the intent of the Contracting Agency to award a contract to the lowest responsive, and responsible bidder. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder will be required by the Contracting Agency to submit documentation demonstrating compliance with the criteria. The bidder must:

1. Have a current certificate of registration as a contractor in compliance with Chapter 18.27 RCW at the time of bid submittal;
2. Have a current Washington Unified Business identifier (UBI) number;
3. If applicable, have:
   a. Industrial insurance coverage for the bidder's employees working in Washington as required in Title 51 RCW;
   b. A Washington Employment Security Department number per Title 50 RCW;
   c. A Washington Department of Revenue state excise tax registration number as required in Title 82 RCW;
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).
5. Have current bonding capacity adequate for this project.
6. Not have filed for bankruptcy in the last five (5) years.
7. Not have had their Contractor's license revoked in the last five (5) years.

1-02.1(1) Subcontractor Responsibility

The Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontracts to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Contracting Agency, the Contractor shall promptly provide documentation to the Contracting Agency demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this section apply to all subcontractors regardless of tier. The subcontractor shall:

1. Have a current certificate of registration as a contractor in compliance with Chapter 18.27 RCW at the time of subcontract bid submittal;
2. Have a current Washington Unified Business identifier (UBI) number;
3. If applicable, have:
   a. Industrial insurance coverage for the subcontractor’s employees working in Washington as required in Title 51 RCW;
   b. A Washington Employment Security Department number per Title 50 RCW;
   c. A Washington Department of Revenue state excise tax registration number as required in Title 82 RCW; and/or
   d. An electrical contractor license, if required by Chapter 19.28 RCW.
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).

1-02.1(2) Supplemental Bidder Responsibility Criteria

In addition to the bidder responsibility criteria above, the bidder must meet the following relevant supplemental bidder responsibility criteria applicable to the project:

1. Bidder shall not be "inactive" or "not in good standing with the Washington State Secretary of State's Office, the Department of Revenue, or the Department of Labor and Industries.
2. Bidder shall have been in business as an underground pipeline construction contractor under its present name for a minimum of two (2) years;
3. Bidder shall not have been disqualified from entering a construction contract by another governmental agency in the last two (2) years;
4. Bidder shall not have declared bankruptcy or been in receivership in the last five (5) years;
5. Bidder, Bidder's designated project manager, and Bidder's designated superintendent/foreman for this project shall each have successfully completed at least three (3) projects of a similar size and scope as required by the Contract Documents for this project within the last ten (10) years. In evaluating whether the project were "successfully completed," the Contracting Agency may check references for the previous projects and may evaluate the bidder's performance including but not limited to, the following areas:
   a. Quality control;
   b. Safety record;
   c. Timeliness of performance;
   d. Use of skilled personnel, including subcontractors;
   e. Management of subcontractors;
   f. Availability of and use of appropriate equipment;
   g. Compliance with contract documents;
   h. Management of submittals process, change orders and closeout.
6. Bidder shall not owe delinquent taxes to the Washington State Department of Revenue without a payment plan approved by the Department of Revenue.

For purposes of meeting this criterion, the Contracting Agency has determined that "similar size and scope" means municipal public works projects that include pump station installations and/or upgrades with a minimum capacity of 200 gpm. All of the following shall be included on each project: constructing a new wet well, installing new or replacing existing MCC panels, and installing new generators. Separate projects may be used to demonstrate compliance with these installation requirements. Each project shall also have a construction cost in excess of $500,000.

Bidder shall meet Contractor and Manufacturer Qualifications for Cured-in-Place Pipe (CIPP) Lining, as described in Section 33 01 30.72-1.03.

1-02.1(3) Documentation

As evidence the bidder meets the responsibility criteria above, the Bidder shall complete and submit the following documentation as part of the Bidder's Bid Proposal.

1. Bidder Responsibility Checklist.
2. Subcontractor Responsibility Checklist, provide for each subcontractor identified in Bidder's Subcontractors List.

In addition, the two lowest bidders must submit the following documentation for each referenced project to the Contracting Agency within 48 hours of the bid submittal deadline. The Contracting Agency reserves the right to request such documentation from other bidders. In the event a bidder refuses to provide the requested information or fails to provide the requested information within the time periods specified in the Bid Documents, then the Contracting Agency may find the bidder non-responsible.

1. Documented information from the Washington State Secretary of State's Office, the Department of Revenue, or the Department of Labor and Industries providing the date of

incorporation or formation, the state of incorporation or formation, that the bidder is active and in good standing in the State of Washington, State of Washington tax reporting number, and the name and address of the registered agent, general partner, or managing member.

2. Bidder shall not be listed on the Washington State Department of Revenue's "Delinquent Taxpayer List" website: http://dor.wa.gov/content/fileandpaytaxes/latefiling/dtlwest.aspx.

3. List of projects of similar size and scope. This list shall include the following for each project:

   a. Project Name.

   b. Project Manager's Name and Project Superintendent's Name.

   c. Project owner's name and contact information for the project owner's representative.

   d. Awarded contract amount.

   e. Final contract amount.

   f. Project start and completion date.

   g. Location of the project.

   h. A description of the scope of the project and how the project is similar to this project. The description should include, but not be limited to the pump size and capacity, the site work that was required, the ground conditions encountered, and other information relevant to the successful completion of the referenced project.

   i. Claims (either resolved or unresolved) filed by the Contractor and basis for the claims.

The basis for evaluation of Bidder compliance with these supplemental criteria shall be any documents or facts obtained by the Contracting Agency (whether from the Bidder or third parties) which any reasonable owner would rely on for determining such compliance, including but not limited to:

1. Financial, historical, or operational data from the Bidder.

2. Information obtained directly by the Contracting Agency from owners for whom the Bidder has worked, or other public agencies or private enterprises.

3. Any additional information obtained by the Contracting Agency which is believed to be relevant to the matter.

1-02.1(4) Appeals

If the Contracting Agency determines the bidder does not meet the bidder responsibility above and is therefore not a responsible bidder, the Contracting Agency 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 24 hours of receipt of the Contracting Agency's determination by presenting additional information to the Contracting Agency. The Contracting Agency will consider the additional information before issuing its final determination. If the final determination affirms that that bidder is not responsible, the Contracting Agency will not execute a contract with any other bidder until two (2) business days after the bidder determined to be not responsible has received the final determination. For purposes of this section, the date of the Contracting Agency's transmission of the Contracting Agency's determination(s) by facsimile or electronic mail to the bidder at the facsimile number or email address provided by the bidder in its bid shall constitute the date of receipt by the bidder of the written notices provided for herein.

1-02.1(5) Other Conditions

Specialty contractor experience and qualification requirements are specified in other sections of the Special Provisions. While the Contractor will be required to conform to those additional qualifications, they are not criteria that will be evaluated as a condition for determining if the bidder is responsible.

If two or more prospective bidders desire to bid jointly as a Joint Venture on a single contract, each must be deemed qualified, as provided above, and they must also include with the bid proposal packet an agreement to Joint Venture. The Joint Venture is then treated as a new firm and qualified as such. The Joint Venture and any of its members are subject to the conditions as stated elsewhere within these specifications. Any agreement to Joint Venture shall be signed by each of the bidders and must specify each individual who is authorized to execute proposals, contracts, bond and other documents on behalf of the Joint Venture. If any of the bidders is a corporation, the agreement must be accompanied by a resolution of the corporation authorizing such Joint Venture agreement and designating the officer(s) authorized to sign such Joint Venture agreement or contract on behalf of such corporation.

1-02.2 Plans and Specifications

Section 1-02.2 is deleted and replaced with the following:
(Local Agency SP)

Information as to where Bid Documents can be obtained or reviewed will be found in the Invitation to Bid for the work.

After award of the contract, conformed plans and specifications will be issued to the Contractor at no cost as detailed below:

To Prime Contractor	No. of Sets	Basis of Distribution
Reduced plans (11" x 17")	5	Furnished automatically with the limited NTP
Standard plans (22" x 34")	2	Furnished automatically with the limited NTP
Contract Provisions	5	Furnished automatically with the limited NTP

Additional copies of the Contract Plans and Contract Provisions may be purchased by the Contractor by payment of the cost of reproduction.

1-02.4(2) Subsurface Information

The first paragraph of Section 1-02.4(2) is deleted and replaced with the following:
(Local Agency SP)

The Contracting Agency has made limited subsurface investigations and the boring log data and soil sample test data accumulated by the Contracting Agency is available in an appendix in the Bid Documents. This data is informational only and shall not be considered as part of the Contract. The Contracting Agency makes no representation or warranty expressed or implied that:

1. The Bidder's interpretations from the boring logs are correct.
2. Moisture conditions and indicated water tables will not vary from those found at the time the borings were made.
3. The ground at the location of the borings has not been physically disturbed or altered after the boring was made.

The Contractor may not rely upon or make any claim against the Contracting Agency or Engineer with respect to:

1. The completeness of such data and 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 data, interpretations, opinions, and information contained in such reports; or
3. Any Contractor interpretation of, or conclusion, drawn from such technical data or any such other data, interpretations, opinions, or information.

The Contractor is advised that additional geotechnical investigations and engineering could be required and should be considered and taken into account as part of the requirements of the work. Such investigations and engineering could be required to augment or support the available technical data, particularly to assess or verify the in-situ conditions in areas which were not investigated in order to meet the Contractor's needs and requirements for construction, especially for shoring, dewatering, or other special construction that is dependent on, and affected by, site specific in-situ conditions. Contractor shall evaluate his needs for this additional information and all costs for gathering said information shall be incidental to other bid items.

1-02.5 Proposal Forms

Section 1-02.5 is deleted and replaced with the following:
(June 27, 2011 APWA GSP)

The proposal form will identify the project and its location and describe the work. It will also list estimated quantities, units of measurement, the items of work, and the materials to be furnished at the unit bid prices. The bidder shall complete spaces on the proposal form that call for, but are not limited to, unit prices; extensions; summations; the total bid amount; signatures; date; and, where applicable, retail sales taxes and acknowledgment of addenda; the bidder's name, address, telephone number, and signature; the bidder's D/M/WBE commitment, if applicable; a State of Washington Contractor's Registration Number; and a Business License Number, if applicable. Bids shall be completed by typing or shall be printed in ink by hand, preferably in black ink. The required certifications are included as part of the proposal form.

The Contracting Agency reserves the right to arrange the proposal forms with alternates and additives, if such be to the advantage of the Contracting Agency. The bidder shall bid on all alternates and additives set forth in the proposal forms unless otherwise specified.

Section 1-02.5 is supplemented with the following:
(Local Agency SP)

The Contracting Agency has elected to purchase the Pumps (Specification Section 22 13 29.16) on a sole source basis and has received a "not to exceed" price. A copy of the Manufacturer's "not to exceed" quote is included in Appendix E.

The form of the Bid Proposal shall not be altered by interlineations, erasures, or by any other method whatsoever.

1-02.6 Preparation of Proposal

The second paragraph of Section 1-02.6 is supplemented with the following:
(June 27, 2011 APWA GSP)

4. If a minimum bid amount has been established for any item, the unit or lump sum price must equal or exceed the minimum amount stated.
5. Any correction to a bid made by interlineation, alteration, or erasure, shall be initialed by the signer of the bid.

The last paragraph of Section 1-02.6 is deleted and replaced with the following:
(June 27, 2011 APWA GSP)

The Bidder shall make no stipulation on the Bid Form, nor qualify the bid in any manner.

A bid by a corporation shall be executed in the corporate name, by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign).

A bid by a partnership shall be executed in the partnership name, and signed by a partner. A copy of the partnership agreement shall be submitted with the Bid Form if any D/M/WBE requirements are to be satisfied through such an agreement.

A bid by a joint venture shall be executed in the joint venture name and signed by a member of the joint venture. A copy of the joint venture agreement shall be submitted with the Bid Form if any D/W/MBE requirements are to be satisfied through such an agreement.

1-02.7 Bid Deposit

Section 1-02.7 is supplemented with the following:
(Local Agency SP)

Bid bonds shall contain the following:

1. Contracting Agency-assigned number for the project;
2. Name of the project;
3. The Contracting Agency named as obligee;
4. The amount of the bid bond stated either as a dollar figure or as a percentage which represents five percent of the maximum bid amount that could be awarded;
5. Signature of the bidder's officer empowered to sign official statements. The signature of the person authorized to submit the bid should agree with the signature on the bond, and the title of the person must accompany the said signature;
6. The signature of the surety's officer empowered to sign the bond and the power of attorney.

Bid bonds shall be issued by a surety company licensed to do business in the State of Washington. Bidder shall use the bond form included in the Contract Provisions.

Bid bonds and checks will be returned to all except the three lowest bidders within ten (10) days after the bid award. Bid bonds or checks of each of the three lowest bidders will be returned within three (3) days after execution of the Contract, and after the Contract has been executed and approved by Kitsap County.

1-02.9 Delivery of Proposal

The first and second paragraphs of Section 1-02.9 are deleted and replaced with the following
(Local Agency SP)

Each Bid Proposal shall be submitted in a sealed envelope, with the Project Name and Project Number as stated in the Invitation to Bid clearly marked on the outside of the envelope, or as otherwise stated in the Bid Documents, to ensure proper handling and delivery.

The Contracting Agency will not open or consider any Bid Proposal that is received after the time specified in the Invitation to Bid for receipt of Bid Proposals, or received in a location other than that specified in the Call for Bids.

1-02.10 Withdrawing, Revising, or Supplementing Proposal

The second paragraph of Section 1-02.10 is deleted and replaced with the following:
(Local Agency SP)

The bidder has no right to withdraw or modify the bid for any reason whatsoever after the time set for the opening thereof, unless the award of the contract is delayed for a period exceeding sixty (60) days from the time set for opening of the bids.

Prior to the time set for opening of bids, a bidder may withdraw or revise his bid proposal, provided that an individual authorized to sign proposals files the request for withdrawal or revision with the County

Purchasing Office in writing. The original proposal, as modified in writing by an attached revision filed before the time set for opening of bids will be considered as the bid proposal by the bidder. No oral, fax, telephone, or telegraphic Bid Proposals or modifications will be considered or accepted.

1-02.13 Irregular Proposals

Item 1 in Section 1-02.13 is revised to read as follows:
(Local Agency SP)

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 Contracting Agency 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, as required in Section 1-02.6.

   h. The bidder fails to submit or properly complete a Disadvantaged Business Enterprise Certification, if applicable, as required in Section 1-02.6;

   i. The Bidder fails to submit written confirmation from each DBE firm listed on the Bidder's completed DBE Utilization Certification that they are in agreement with the bidders DBE participation commitment, if applicable, as required in Section 1-02.6, or if the written confirmation that is submitted fails to meet the requirements of the Special Provisions;

   j The Bidder fails to submit DBE Good Faith Effort documentation, if applicable, as required in Section 1-02.6, or if the documentation that is submitted fails to demonstrate that a Good Faith Effort to meet the Condition of Award was made;

   k. The bid proposal does not constitute a definite and unqualified offer to meet the material terms of the bid invitation, or

   l. More than one proposal is submitted for the same project from a Bidder under the same or different names.

   m. The bidder fails to submit or properly complete a Bidder Responsibility Checklist as required in Section 1-02.1(3).

   n. The bidder fails to submit or properly complete a Subcontractor Responsibility Checklist for each subcontractor as required in Section 1-02.1(3).

Item 2 in Section 1-02.13 is supplemented with the following:
(Local Agency SP)

   f. If the County, for good cause, deems the bid bond inadequate or improper.

1-02.14 Disqualification of Bidders

Section 1-02.14 is supplemented with the following:
(Local Agency SP)

A Bidder will be deemed not responsible if:

1. The Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended; or
2. The Bidder fails to meet the Project-specific supplemental bidder responsibility criteria listed in Section 1-02.1.

1-02.15 Pre Award Information

Section 1-02.15 is revised to read as follows:
(August 14, 2013 APWA GSP)

Before awarding any contract, the Contracting Agency may require one or more of these items or actions of the apparent lowest responsible bidder:

1. A complete statement of the origin, composition, and manufacture of any or all materials to be used,
2. Samples of these materials for quality and fitness tests,
3. A progress schedule (in a form the Contracting Agency requires) showing the order of and time required for the various phases of the work,
4. A breakdown of costs assigned to any bid item,
5. Attendance at a conference with the Engineer or representatives of the Engineer,
6. Obtain, and furnish a copy of, a business license to do business in the city or county where the work is located.
7. Any other information or action taken that is deemed necessary to ensure that the bidder is the lowest responsible bidder.

1-02.16 Addenda

Section 1-02.16 is added as the following:
(Local Agency SP)

Where appropriate, responses to questions, inquiries or requests for additional information or for substitution of proposed material will be issued in the form of Addenda, and copies of each addendum will be issued to all prospective bidders of record. Additionally, addenda are on file at the Kitsap County Purchasing Office. During the bidding period, prospective bidders will be advised by Addendum of additions to, deletions from or changes in the requirements of the contract documents.

Kitsap County will not be responsible for the authenticity or correctness of oral interpretations of contract documents or for information obtained in any other manner than through the media of Addenda. Bidders shall acknowledge receipt of Addendum in their bid proposals and each Addendum shall be considered a part of the Contract Documents. Failure to acknowledge receipt of any Addenda issued will invalidate a

Should a bidder have a Request for Clarification or find discrepancies, ambiguities or omissions in the drawings or specifications, or should a bidder be in doubt as to their meaning, bidder shall at once notify Floyd Bayless, Construction Manager, at (360) 337-5631 or email fbayless@co.kitsap.wa.us. If appropriate, the Contracting Agency will send a written instruction to all bidders in the form of an Addendum. Neither the Contracting Agency nor the Engineer may be held responsible for any oral instruction. Questions received by the Contracting Agency less than seventy-two (72) hours before bids close may not be answered. All addenda issued prior to the time of bid closing are incorporated into the contract.

Interpretations, corrections and changes of the Bidding documents will be made by addendum only through the Kitsap County Purchasing Office. Interpretations, corrections and changes in the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

Any variances to the contract documents shall not be accepted unless agreed to by the County in writing. Substitutions will not be considered until after award of contract.

END OF SECTION 1-02

1-03 Award and Execution of Contract

1-03.1 Consideration of Bids

The first paragraph of Section 1-03.1 is revised to read as follows:
(January 23, 2006 APWA GSP)

After opening and reading proposals, the Contracting Agency 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 will control. If a minimum bid amount has been established for any item and the bidder's unit or lump sum price is less than the minimum specified amount, the Contracting Agency will unilaterally revise the unit or lump sum price, to the minimum specified amount and recalculate the extension. The total of extensions, corrected where necessary, including sales taxes where applicable and such additives and/or alternates as selected by the Contracting Agency, will be used by the Contracting Agency for award purposes and to fix the Awarded Contract Price amount and the amount of the contract bond.

Section 1-03.1 is supplemented with the following:
(January 23, 2006 APWA GSP)

The Contracting Agency will consider all material submitted by the bidder to determine whether the bidder's offering is in compliance with the Contract Documents. The Contracting Agency will consider all material submitted by the bidder, and evidence it may obtain otherwise, to determine whether the bidder, its key personnel, and proposed subcontractors have the qualifications and experience to successfully complete contracts of this type. Such evaluation will include, but not be limited to, the following factors: 1) whether the bidder has adequate financial resources to complete the work; 2) whether the bidder has the necessary experience and organization to perform the work; 3) whether the bidder has a satisfactory record of performance, integrity, experience, and skills to perform and complete the work; 4) whether the bidder has a history of completing, failing to complete, defaulting on or otherwise not completing construction contracts; and 5) whether the bidder's proposed major subcontractors appear capable of and have histories of successfully completing construction contracts.

1-03.3 Execution of Contract

Section 1-03.3 is revised to read as follows:
(Local Agency SP)

Copies of the Contract Provisions, including the unsigned Form of Contract, will be available for signature by the successful bidder following award. The number of copies to be executed by the Contractor will be determined by the Contracting Agency.

Within fourteen (14) calendar days after receipt of the Contracting Agency-prepared contract, the successful bidder shall return the signed Contracting Agency-prepared contract, an insurance certification as required by Section 1-07.18, and a satisfactory bond as required by law and Section 1-03.4. Before execution of the contract by the Contracting Agency, the successful bidder shall provide any pre-award information the Contracting Agency may require under Section 1-02.15.

Until the Contracting Agency executes a contract, no proposal shall bind the Contracting Agency nor shall any work begin within the project limits or within Contracting Agency-furnished sites. The Contractor shall bear all risks for any work begun outside such areas and for any materials ordered before the contract is executed by the Contracting Agency.

If the bidder experiences circumstances beyond their control that prevents return of the contract documents within the calendar days after the award date stated above, the Contracting Agency may grant up to a maximum of fourteen (14) additional calendar days for return of the documents, provided the Contracting Agency deems the circumstances warrant it.

1-03.4 Contract Bond

The first paragraph of Section 1-03.4 is revised to read as follows:
(October 1, 2005 APWA GSP)

The successful bidder shall provide an executed contract bond for the full contract amount. This contract bond shall:

1. Be on a Contracting Agency-furnished form;
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;
4. Guarantee that the surety shall indemnify, defend, and protect the Contracting Agency 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, material person, or any other person who provides supplies or provisions for carrying out the work;
5. Be accompanied by a power of attorney for the Surety's officer empowered to sign the bond; and
6. 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).

END OF SECTION 1-03

1-04 Scope of the Work

1-04.1(2) Bid Items Not Included in the Proposal

Section 1-04.1(2) is deleted and replaced with the following:
(Local Agency SP)

When the Contract specifies Work that has no Bid Item in the Bid Proposal, that work shall be considered incidental to other items in the Bid Proposal whether specified as incidental or not in the measurement and payment descriptions for the individual Bid Items.

1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda

The second paragraph of Section 1-04.2 is revised to read as follows:
(Local Agency SP)

Any inconsistency in the parts of the contract shall be resolved by following this order of precedence (e.g., 1 presiding over 2, 2 over 3, 3 over 4, and so forth):

1. Change Orders,
2. Work Directives,
3. Addenda,
4. Proposal Form,
5. CSI Special Provisions,
6. WSDOT Special Provisions,
7. Contract Plans,
8. Amendments to the Standard Specifications,
9. Standard Specifications,
10. Contracting Agency's Standard Plans or Details (if any), and
11. WSDOT Standard Plans for Road, Bridge, and Municipal Construction.

1-04.3 Preconstruction Work Phase

Section 1-04.3 is added as follows:
(Local Agency SP)

This Section specifies planning and work included within the Preconstruction Work Phase that takes place during the period after the Limited Notice to Proceed and prior to the start of the work authorized by the Notice to Proceed with Construction. The planning effort includes identifying and organizing the Contractor's work team, attending a preconstruction public meeting whose purpose is to introduce the Contractor to the public impacted by the project, planning the construction activities with Kitsap County, the Construction Manager, and Design Engineer, establishing the initial survey control, preparing and delivering priority submittals for equipment, and other activities related to planning activities identified herein.

To accomplish the preconstruction activities, the Contractor shall provide staff to meet on the project site as needed and shall establish and maintain an office in the Puget Sound region to accomplish the work. Satisfactory completion of the Preconstruction Work Phase activities will be a prerequisite to the Notice to Proceed with Construction for the Construction Work Phase.

Submittal information shall be provided in sufficient detail to verify compliance with the specifications during the Preconstruction Work Phase and shall be provided prior to Notice to Proceed with Construction for the Construction Work Phase. The Contractor shall make arrangements with subcontractors and suppliers for the preparation and submittal of required documentation.

1-04.3(1) Activities

The following is a list of the activities to be included in the Preconstruction Work Phase. Each of the activities and required work products are defined either within this specification or in specification sections in the Special Provisions.

1. Contractor's Management and Work Plan
2. Project Safety and Accident Prevention Program
3. Onsite Investigations
4. Preconstruction Photographs
5. Submittals
    a. Submittal Plan and Schedule
    b. Priority or Long Lead Time Material Submittals
    c. Priority Technical Submittals
        a. Dewatering Plan(s)
        b. Erosion Control Plan(s)
        c. Sheeting, Shoring, and Bracing Plan(s)
        d. Spill Prevention, Control, and Countermeasures Plan
        e. Temporary Sewage Bypass Plan(s)
6. Apply for and Obtain Contractor Furnished Permits
7. Spill Prevention, Control, and Countermeasures Plan
8. Schedules
    a. Contractor's Scheduler Qualifications
    b. Schedule of Values for Lump Sum Bid Items
    c. Contractor's Construction Schedule
9. Traffic Control Plan(s)
10. Attend Public Meeting
11. Attend EADOC Training

1-04.3(2) Contractor's Management and Work Plan

Contractor shall prepare and submit a plan describing in detail the approach and methods for prosecuting the work in accordance with the contract. The Management Plan shall include the following:

1. An organizational chart describing:
    a. The hierarchy and relationship of the Contractor's project staff;
    b. The hierarchy of subcontractors and suppliers including the trade(s) or portion(s) for which each is responsible; and
    c. A resume for the proposed Project Manager and/or site superintendent.
2. An address and phone directory of the Contractor, Subcontractor, and priority equipment suppliers.
3. A narrative describing how the Contractor intends to staff, equip, and supply the job by trade in order to meet the contract work sequence and schedule constraints. Include the size of the work crew, description of on-site equipment, working hours, and requirements for material and equipment procurement, lay down, and storage.

4. Provide rates for craft labor likely to be used to complete the Work in accordance with Section 1-07.9(1). At a minimum, provide basic wage and benefits cost, worker's insurance costs, federal insurance costs, safety costs, and travel allowance costs, if applicable. Craft labor cost for the Contractor and all his subcontractors shall be provided.

5. Provide rates for equipment likely to be used to complete the Work. At a minimum, provide complete equipment description, hourly cost, operating cost per hour, and operated cost per hour. Equipment cost for the Contractor and all his subcontractors shall be provided.

1-04.3(3) Project Safety and Accident Prevention Program

Contractor shall prepare and submit a Safety and Accident Prevention Program. This program shall outline the anticipated hazards and safety controls necessary to safeguard Contractor's employees, the public, Kitsap County staff and Kitsap County representatives. It shall be specific to the job and site and meet federal, state and local jurisdictional requirements. The program will be reviewed for compliance with this Section prior to the start of work.

1-04.3(4) Onsite Investigations

The Contractor shall perform on-site investigations in support of technical submittal preparation. See Section 1-02.4(2) for additional information. Activities include but may not be limited to the following:

Survey Control

The Contractor shall establish sufficient survey control to identify vertical and horizontal location of features identified during these on-site investigations. A minimum of two vertical control, temporary benchmarks (TBMs) shall be established for each Schedule for the entire duration of the project. Maintain and place TBMs to prevent disturbance. A registered surveyor employed by the Contractor shall be responsible for setting the TBMs.

Utility Locations

Perform utility excavations to support collection of the as-built location of existing utilities that may impact or be impacted by the Work under this Contract. Locations of excavations shall be in coordinated and identified jointly by the Contractor and the Construction Manager. Proper equipment, labor, trench support methods, backfill, and asphalt patching materials shall be made available to support the operations. The Contractor shall be prepared to repair any damage caused during exploratory activities. Prior to any utility excavations, provide the Construction Manager advance notice of at least four (4) working days. All information from exploratory excavations shall be submitted to the Construction Manager within two working days after completion of said excavation. See Section 1-07.17 for further information regarding utilities and similar facilities.

1-04.3(5) Preconstruction Photographs or Video

Contractor shall perform preconstruction photo or video documentation in accordance with Section 1-05.4(6) Construction Photographs or Video.

1-04.3(6) Submittals

Prepare and submit the Submittal Control Document in accordance with Section 1-06.1.

Contractor shall provide submittals in accordance with Section 1-06.1 for all priority materials or materials that may take more than six (6) weeks to be obtained. Prior to submission of these priority or long lead time material submittals, Contractor shall attend pre-submittal meetings with the Construction Manager and Design Engineer as deemed appropriate for particular submittals.

Priority Technical Submittals:

Priority technical submittals have been identified which have an impact on work activities starting immediately following Notice to Proceed for construction. The list includes but may not be limited to the following items. Should the Contractor's schedule identify a critical submittal not listed, preparation and submittal shall be performed during the preconstruction period:

1. Provide an Erosion Control Plan identifying erosion control measures to be used by the Contractor, including those already shown and specified. The Erosion Control Plan shall employ best management practices. Refer to requirements in Section 31 25 14 and Section 1-07.15 as amended by the Special Provisions.
2. Provide a Dewatering Plan, including drawings and complete design data showing methods and equipment to be utilized in dewatering, including relief of hydrostatic head, and in maintaining the excavation in a dewatered and in a hydrostatically relieved condition. The Dewatering plan shall address excavation operations for new structures and pipelines and shall comply with Section 31 23 43.
3. Provide a Sheeting, Shoring, and Bracing Plan. Information to be provided shall be prepared in accordance with Section 31 41 00 and shall, at a minimum, include the following:
    a. Design calculations and method of installation and removal of all Sheeting, Sheet Piling, Shoring, and Bracing. Calculations shall be made by a Washington State registered structural or civil engineer and shall comply with applicable requirements of the Washington State Safety Code and the rules of the WISHA Department of Labor and Industries with respect to excavation and construction.
    b. Detailed excavation support drawings.
4. Provide a Spill Prevention, Control and Countermeasures Plan per Section 1-07.15(1) as amended by the Special Provisions.
5. Provide Temporary Sewage Bypass Plan(s) in accordance with Section 01 59 00, including drawings and complete design data showing methods and equipment to be utilized to temporarily bypass sanitary sewage systems while making connections to the existing system and/or installing new facilities that require the temporary bypass of the existing facilities.

1-04.3(7) Contractor Furnished Permits

The Contractor shall apply for and obtain the Contractor Furnished Permits per Section 1-07.6(2) during the Preconstruction Work Phase.

1-04.3(8) Schedules

The Contractor shall submit the Contractor's scheduling qualifications including the resume(s) of the designated person(s) responsible for schedules and reports (the "Contractor's Scheduler"). The Contractor's Scheduler shall have demonstrable capability to plan, coordinate, execute, and monitor a CPM schedule as required for this Project. The Construction Manager will approve or reasonably disapprove the Contractor's proposed scheduler. In the event of disapproval, a new scheduler shall be proposed within one week and be subject to the same consideration criteria as noted above. In addition, the Contractor shall prepare and submit the following schedule information:

1. Schedule of Values for the lump sum Bid items included in the Bid Proposal.
2. Contractor's Construction Schedule (CPM) prepared in accordance with Section 1-08.3.

1-04.3(9) Traffic Control Plan(s)

Contractor shall provide traffic control plan(s) in accordance with Section 1-10.2.

1-04.3(10) Attend EADOC Training

Contractor shall attend EADOC training in accordance with Section 1-12.8.

1-04.3(11) Attend Public Meeting

Contractor shall attend one evening public meeting during the Preconstruction Work Phase to be introduced to the public that may be impacted by the project and answer general construction related questions.

1-04.4 Changes

The seventh paragraph of Section 1-04.4 is revised to read as follows:
(Local Agency SP)

The Contractor shall proceed with the Work upon Receiving:

1. A written change order approved by the Engineer, or
2. A work directive from the Engineer before actually receiving the written change order.

1-04.4(2) Work Directives

Section 1-04.4(2) is added as the following:
(Local Agency SP)

Where situations involve changes in the Work that might delay the Project, if not processed expeditiously, the changed work shall be initiated through use of a Work Directive. The Work Directive is not a Change Order, but only a directive issued by the Engineer to proceed with work that may be included in a subsequent Change Order.

The Engineer initiates the form which shall include the project name, number, contract number, and Contractor name. In addition, the reason for the change and a description of the desired Work shall be included in sufficient detail to fully describe the required Work and necessity for the change. A method of payment and estimated cost shall be included along with any modifications to the Contract Time.

Once the Engineer has completed and signed the form, copies of the form and any supporting design criteria, sketches, modified drawings, or specifications attached to the form will be sent to the Contracting Agency's representative for approval. Once authorized by the Contracting Agency's representative, the Work Directive will be forwarded to the Contractor for signature and returned to the Engineer. The Contractor shall then perform the work described in the work directive.

As Work directed by the Work Directive progresses, Contractor shall submit to the Engineer any documentation required by the Work Directive on the day that work is performed for inclusion in a subsequent Change Order. Documentation may include records of force account work, material invoices, as-built data or quality control documentation.

1-04.4(3) Requests for Information

Section 1-04.4(3) is added as the following:
(Local Agency SP)

Requests for Information (RFIs) will be used by the Contractor where necessary to provide written direction to clarify or provide additional information or direction regarding the Plans and Specifications. Unless otherwise approved, the Contractor shall use a form provided by the Engineer. While the Engineer will attempt to respond to RFIs in an expeditious manner to avoid impacting the Contract Time, the Engineer shall have a minimum of five (5) working days to review and respond to RFIs. RFIs shall be used if the matter could result in a change in the contract price or time.

1-04.6 Variation in Estimated Quantities

The first paragraph of Section 1-04.6 is deleted and replaced with the following:
(May 25, 2006 APWA GSP)

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 proposal 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 proposal quantity, and if the total extended bid price for that item at time of award is equal to or greater than 10 percent of the total contract price at time of award. In that case, payment for Contract Work may be adjusted as described herein.

Section 1-04.6 is supplemented with the following:
(Local Agency SP)

For certain items, quantities have been entered into the Bid Proposal only to provide a common Bid Proposal for bidders. Actual quantities will be determined in the field as the work progresses, and will be paid at the original unit bid price, regardless of final quantity. These bid items, identified by the term "allowance" in their title, shall not be subject to the price adjustment provisions of 1-04.6 of the Standard Specifications.

1-04.11 Final Cleanup

Section 1-04.11 is deleted and replaced with the following:
(Local Agency SP)

1-04.11 Cleanup

The Contractor shall be responsible for ongoing and final cleaning of the project site. The Contractor shall continually, from the first day of work on the project to the last, include in his operations sufficient personnel, equipment, and materials specifically assigned to cleanup all areas which are affected or disturbed by the work operations.

1-04.11(1) Daily Cleanup

The Contractor shall cause all disturbed areas to be cleaned of all debris and excess construction materials, to be temporarily or permanently graded and finished to smooth lines and grades, to be maintained free of dust, to control surface runoff such that there is no soil erosion or contaminated runoff onto adjacent areas or drainages, and to not have any detrimental impacts. All such cleanup shall be conducted to the satisfaction of the Contracting Agency.

The Contractor shall clean all roadways, streets, sidewalks, and other facilities of all material and debris that are dropped or otherwise deposited thereon as a result of the Contractor's operations. All such areas shall be cleaned at the conclusion of each day's operations and at such other times as ordered by the Contracting Agency.

In addition, the Contractor shall use water for dust control on paved, surfaced, or unimproved streets or roadways as may be required to prevent inconvenience to the public. The Contractor shall also use water, if necessary, to remove mud and other debris from streets and roadways.

If the roadways and facilities are not properly or promptly cleaned and the conditions so warrant, as determined by Contracting Agency, the Contractor shall provide facilities to remove soil from truck or other equipment tires or between dual wheels or outside of truck beds before trucks or equipment may be allowed to travel over streets.

1-04.11(2) Final Cleanup

The Contractor shall perform final cleanup of the project site to the satisfaction of the Contracting Agency after completion of all work and prior to Final Acceptance. Such cleanup shall include, but not be limited to, removal of all rubbish, surplus materials, construction materials, equipment, and debris. Oversize rock, stumps, brush, and other extraneous materials shall be removed from the project site and disposed of in a lawful manner.

Roadway surfaces shall be thoroughly broom cleaned and washed to remove all material or debris which was deposited on the surfaces.

Any existing fencing removed or damaged by the Contractor shall be replaced in kind and to the satisfaction of the property owner.

The Contractor shall not remove temporary warning, regulatory or guide signs until authorized to do so by the Contracting Agency.

1-04.11(3) Corrective Action

Any violation of the above requirements, as determined by the Contracting Agency, will be sufficient grounds for the Contracting Agency to order the cleanup work to be performed by others. The costs for such corrective action shall be deducted from any monies due or to become due to the Contractor.

1-04.12 Temporary Facilities

Section 1-04.12 is added as the following:
(Local Agency SP)

The Contractor shall furnish, for the duration of the project, a temporary field trailer(s) for his use as well as the Contracting Agency's use within a reasonable distance of the project site. Temporary facility installation shall meet the construction safety requirements of OSHA, State, and other governing agencies and the noise limitations shall meet the requirements in Section 1-07.5(5) in the Special Provisions. Contractor shall be responsible for providing telephones, fax machines, and copier and shall pay for installation and monthly service charges for all utilities, including telephone, copy machines, and fax machines. Provide and pay for equipment service contracts for all furnished equipment.

Upon completion of the work, and subject to approval of the Engineer, the Contractor shall completely remove all temporary facilities. Temporary utilities shall be removed to the temporary service connection point, and capped or terminated.

All disturbed surfaces shall be restored to the condition which existed prior to installation of temporary facilities or utilities. All roadway surfaces or other improvements which have been damaged by construction activities shall be repaired or replaced by the Contractor, as directed.

1-04.12(1) Space Allocation

On-site space is limited. Arrangements for additional space required for Contractor's staging and storage of materials and equipment (in addition to that allocated), shall be made for locations off site as described below.

Due to the limited space available outside project limits (and within the existing right of way and temporary construction easements), the Contractor shall make the necessary arrangements with nearby property owner(s) in order to establish an area(s) for the temporary facilities and storing of equipment and materials. All costs associated with third parties arrangements shall be considered incidental to the construction and shall be included in the costs of other items of work involved in the project.

1-04.12(2) Contractor's Work Area

Contractor shall limit operations and storage of equipment and materials to the areas designated on the Plans, unless written agreements have been obtained from third parties that allow the use of areas outside those described on the Plans. Contractor shall provide a copy of all such third party agreements to the Owner prior to using areas described by the agreement. All such agreements shall contain provisions that hold the Owner harmless from any and all damages and costs associated with the use of said areas. Contractor shall be solely responsible for the use of said areas.

Contractor shall maintain the area(s) during construction and shall proceed with the work in an orderly manner, maintaining the construction site free of debris and unnecessary equipment or materials. Material shall be stored on pallets or racks off the ground and in a manner to allow access for inspection.

1-04.12(3) Temporary Water for Construction and Testing

Contractor shall be responsible for obtaining a source of temporary water for construction and testing and potable water required by construction personnel. Provide water from off-site sources as necessary. Contractor shall determine availability and make arrangements, and pay all costs, with the local utility for temporary construction water, including metering equipment.

1-04.12(4) Temporary Electric Power

Contractor shall verify existing electric service and provide temporary electric power, if required, for use during construction. Electric power should be available at or near the site. The Contractor shall determine the type and amount available and make arrangements with the local utility for obtaining

temporary electric power service, including metering equipment. The Contractor shall provide temporary lighting at least to meet all applicable safety requirements to allow erection, application or installation of materials and equipment, and observation or inspection of the Work. Meet safety requirements of OSHA, State and other governing agencies for electrical installations. Facilities for providing temporary electric power shall meet all noise restriction requirements of Section 1-07.5(5) in the Special Provisions.

The Contractor shall provide all electrical power required for construction, testing, general and security lighting, and all other purposes whether supplied through temporary or permanent facilities.

1-04.12(5) Sanitary Facilities

The Contractor shall provide suitable chemical toilets or water closets at appropriate locations within the site of the work in compliance with the requirements of Section 1-07.4 of the Standard Specifications. Secondary containment shall be provided for each chemical toilet or water closet. At the end of the job such toilets shall be removed.

1-04.12(6) Temporary Telephone Service

Contractor shall furnish onsite telephone service to the temporary field trailer, including fax, for the duration of construction of the Contract and shall be responsible for verifying existing service and making all arrangements with the local telephone utility for providing service as required. Said services shall be provided to the construction trailer(s).

1.04.12(7) Site Access and Parking

All vehicles shall be parked in such a manner so as to not encroach on public right-of-way or be a traffic hazard. Ready access to and through the site by emergency vehicles shall be maintained at all times. The Contractor shall be responsible for control of parking by all of the Contractor's and subcontractor's work force to assure compliance. The Contractor shall anticipate that there may not be sufficient parking space for all of the work force in the construction project area. If this is the case, Contractor shall arrange for carpooling and/or off-site parking and shuttle service, as necessary.

1.04.12(8) Removal of Temporary Facilities

Upon completion of the work, and subject to approval of the Engineer, the Contractor shall completely remove all temporary facilities. Temporary utilities shall be removed to the temporary service connection point, and capped or terminated.

All disturbed surfaces shall be restored to the condition which existed prior to installation of temporary facilities or utilities. All roadway surfaces or other improvements which have been damaged by construction activities shall be repaired or replaced by the Contractor, as directed.

END OF SECTION 1-04

1-05 Control of Work

1-05.2 Authority of Assistants and Inspectors

Section 1-05.2 is supplemented with the following:
(Local Agency SP)

The Contracting Agency or the Contracting Agency's Representatives shall have the right to inspect and obtain copies of all written licenses, permits, or approvals issued by any governmental entity or agency to the Contractor, its delegates, or subcontractors, which are applicable to the performance of this Contract, and to inspect all Work and Materials for conformity with the Contract terms. The Contractor shall be responsible for ensuring the Work and materials conform to the Contract terms even if the Contracting Agency or the Contracting Agency's Representative conducts any inspection of the same.

1-05.4 Conformity With and Deviations from Plans and Stakes

Section 1-05.4 is supplemented with the following:
(Local Agency SP)

1-05.4(1) Contracting Agency-Furnished Reference Points and Surveying

The Contracting Agency has established survey control for construction purposes. This survey control information is provided on the drawings.

The Contractor shall protect and preserve survey control points and property corners. If these points or corners are disturbed by the Contractor, the Contractor shall pay all costs associated for re-establishment of the control points and property corners. The Contractor shall have the work performed by the Contractor's surveyor. Delays resulting from the destruction and re-establishment of survey control points and property corners shall not constitute the basis for additional compensation or extensions to the Contract Time.

1-05.4(2) Contractor-Furnished Surveying

The Contractor shall provide all necessary construction surveys to complete the Work as required by the Contract Documents. The Contractor shall use competent and experienced survey personnel, and suitable equipment necessary for establishing, checking, and maintaining points, lines and grades. Survey shall provide sufficient alignment and off-set control points for proper vertical and horizontal alignment, grade, station and construction of the facilities. In addition, the center point and/or corners of all structures shall be staked. Survey work shall be within the following tolerances:

1. Stationing, +/- 0.01 feet
2. Alignment +/- 0.01 feet
3. Structure elevation +/- 0.01 feet

Contractor shall employ or retain a registered Washington Land Surveyor to perform and/or oversee and direct construction surveys, as well as surveys to verify/document locations and elevations of all completed facilities for record drawings. Minor surveying, such as grade staking may be performed by the Contractor's personnel with approval of the Engineer. Contractor shall be responsible for detailed dimensions, elevations, and excavation measured from the construction staking.

The Engineer may verify the Contractor's work with spot-checks. These spot-checks do not change the requirements for normal checking and testing as specified elsewhere or the Contractor's responsibility for the work and producing a finished product that is in accordance with the Contract Documents. If errors are found, the Contractor shall correct the errors, which may include removal and replacement of incorrectly installed improvements. All costs in correcting work shall be at the Contractor's expense in accordance with Section 1-05.7.

In the event the Engineer determines the survey work is insufficient, the Contractor shall provide suitable and acceptable corrective measures immediately at no additional expense to the Contracting Agency.

1-05.4(3) Survey Submittals

Contractor shall submit the qualifications and resume(s) of the proposed survey firm and surveyor(s) along with a description of the survey efforts to be performed. Cut-sheets shall be provided to the Engineer for review a minimum of five (5) working days in advance of construction.

1-05.4(4) Survey Records

Field books shall be hard-back field books, such as K&E 82-0056 or similar. The Contractor shall maintain on-site a copy of all field surveying records prepared by surveyor. These records shall be available for review by the Engineer upon request. At the conclusion of the work, the Contractor shall provide the Contracting Agency with a copy of the surveying records.

1-05.4(5) Resurveys

The Contractor shall direct all questions regarding interpretation of provided survey data to the Engineer. Failure to correctly interpret and utilize survey control data or plans as provided by the Engineer shall not constitute justification for a claim of extra work. The Contractor shall immediately notify the Engineer of any survey data discrepancies.

Any claim by the Contractor for extra compensation by reason of alterations or reconstruction work allegedly due to error in Contracting Agency-Furnished survey control, will not be allowed unless the original control points still exist and are proven to be incorrect, or unless other satisfactory substantiating evidence to prove the error is furnished to the Engineer.

1-05.4(6) Construction Photographs or Video

Prior to and after construction, the Contractor shall provide still photos, or alternatively, audio color video of project area and adjacent site conditions. Filming plan shall be coordinated with the Contracting Agency's Representative. Filming shall be done at reasonable intervals along the project so sufficient detail and coverage of the area is provided (e.g. approximately every 100 feet, intersections, staging areas, pump station sites, etc). Filming shall be done from differing directions, spacing, and angles to sufficiently show/depict the project area's conditions.

Photographs shall be done by a qualified commercial professional photographer. Photos shall be taken with a high-quality digital camera, with minimum 8-mega-pixel resolution.

Photographs shall be 3-inch by 5-inch color matte prints mounted on 8-1/2" by 11" cardstock, enclosed within plastic film folders, or other approved mounting. Pictures shall be logically arranged and bound in a 3-ring D binder. Photographs shall also be provided on CDs. Pictures shall have the date, location, description, direction of filming and other pertinent reference information (e.g., facing east, facing south, etc.) on or below each image. Submit sample for review and approval in advance of producing bound document.

Video shall be done by qualified commercial professional photographer. Video equipment shall be a high quality digital recorder. The video shall contain an audio track which narrates the progression of the video through the project area/site. Recording shall display index counter, date and time of recording.

The pre-construction photos or video shall be performed prior to commencement of the work and after initial staking of the project and construction limits. Post construction photos shall be taken at final completion of the work. Post construction filming locations shall be similar to preconstruction filming locations. Submit 1 copy of photographs and CDs to the Engineer.

1-05.4(7) Existing Markers and Monuments

Contractor shall take necessary precautions to locate and protect existing markers, property corners, monuments, section corners, subdivision corners, plat markers, bench marks, and all other reference points that may be affected by construction. All markers that may be disturbed by construction shall be identified, referenced, and replaced if disturbed in accordance with recognized surveying practices. Property corners, fences and other indications of property lines shall be referenced by the Contractor prior to construction and reset after completion of the construction operations in accordance with recognized survey practices.

Contractor shall not knowingly remove or disturb any such marker before a licensed land surveyor can reference such marker. Contractor shall be responsible for providing said survey services and shall be responsible for all costs for replacing markers and recording of surveys. Contractor will not be entitled to any delay costs for referencing an existing marker.

In the event that any of these items are not replaced by the Contractor, they shall be replaced by Engineer and the cost of this work shall be billed to the Contractor by the Contracting Agency.

1-05.4(8) Re-establishment of Existing Markers and Monuments

If a marker or monument must be disturbed, Contractor shall follow these steps in accordance with recognized survey practices:

1. Survey work associated with WAC 332-120 shall be performed for the removal and resetting of monuments.
2. Before Contractor disturbs monument(s), surveyor shall establish reference points to perpetuate the position of the monument(s) and an Application For Permit to Remove or Destroy a Survey Monument shall be filed with the Department of Natural Resources (DNR) as set forth in WAC 332-120, for all existing monuments that are subject to being disturbed, prior to construction of improvements.
3. Once a permit has been authorized by DNR, the Contractor may excavate monument(s).
4. The Contractor shall provide replacement monuments as shown on the Plans or as required by the County.
5. The Contractor shall set replacement monument, case, and cover in position.
6. Surveyor shall verify the position and punch mark the brass cap.
7. Surveyor shall file Completion Report for Monument Removal and Destruction with the Department of Natural Resources upon completion of monument replacement.

The Contractor shall be responsible for removal and resetting of markers and monuments.

1-05.5 Project Record Drawings

Section 1-05.5 is added as the following:
(Local Agency SP)

The Contractor shall maintain two sets of full size drawings and specifications for the Contract on site during the construction that shall be accessible for review by the Contracting Agency and the Engineer at all times. The Contractor's superintendent or authorized representative shall update the documents with clear and accurate red-lined field revisions and record information on a daily basis and within two (2) business days after receipt of information that a change in Work has occurred. The quality of the Record Drawings, in terms of accuracy, clarity, and completeness, shall be adequate to allow the Contracting Agency to modify the computer-aided drafting (CAD) Contract Drawings to produce a complete set of Record Drawings for the Contracting Agency without further investigative effort by the Contracting Agency.

The Record Drawing markups shall document all changes in the Work, both concealed and visible and shall be legible and accurately marked to indicate modifications in the completed work that differ from the design information shown on the Contract Plans. The Contractor shall not conceal any Work until the required information is recorded. Items that must be shown on the markups include, but are not limited to:

1. Actual dimensions, arrangement, and materials used when different than shown in the Plans.
2. Changes made by Change Order or Work Directive.
3. Changes made by the Contractor.

4. Accurate locations of storm sewer, sanitary sewer, water mains, and other water appurtenances, underground power and telephone, gas lines, structures, conduits, light standards, vaults, width of roadways, sidewalks, landscaping areas, building footprints, channelization and pavement markings, etc. Include pipe invert elevations, top of castings, (manholes, inlets, etc.).

As-built surveying/staking provided by the Contractor shall meet the following tolerance limits:

	Vertical	Horizontal
As-built sanitary & storm invert and grate elevations	± 0.01 foot	± 0.01 foot
As-built monumentation	± 0.001 foot	± 0.001 foot
As-built waterlines, inverts, valves, hydrants	± 0.10 foot	± 0.10 foot
As-built ponds/swales/water features	± 0.10 foot	± 0.10 foot
As-built buildings (fin. Floor elev.)	± 0.01 foot	± 0.10 foot
As-built gas lines, power, TV, Tel, Com	± 0.10 foot	± 0.10 foot
As-built signs, signals, etc.	N/A	± 0.10 foot

Redline entries on the Record Drawings shall conform to the following standard:

1. Use erasable colored pencil (not ink) for all markings on the Record Drawings, conforming to the following color code:
2. Additions - Red
3. Deletions - Green
4. Comments - Blue
5. Dimensions - Graphite
6. Provide the applicable reference for all entries, such as the change order number, the request for information (RFI) number, or the approved shop drawing number.
7. Date all entries.
8. Clearly identify all items in the entry with notes similar to those in the Contract Drawings (such as pipe symbols, centerline elevations, materials, pipe joint abbreviations, etc.).

The Record Drawings shall be used for this purpose alone, shall be kept separate from other Plan sheets, and shall be clearly marked as Record Drawings. One set shall be submitted to the Engineer monthly along with the Contractor's request for progress payments. Failure to supply the record drawings each month or failure of the record drawings to reflect the above information in a clear and concise manner shall be basis for withholding the Contractor's Progress Payments until such time as they are completed to the satisfaction of the Engineer. Upon completion of review of the drawings, the Engineer shall either return the set of record drawings to the Contractor for continued use or may provide a new, unused set of documents for the Contractor's use.

Upon completion of all the work and prior to final acceptance, one or both of the sets of record drawings and specifications shall be delivered to the Engineer along with a copy of all supporting information. The Contractor shall certify on the Record Drawings that said drawings are an accurate depiction of built conditions, and in conformance with the requirements detailed above.

1-05.5(1) Project Electronic Data and Information

Electronic submittals shall conform to Section 1-12. This may include RFIs, Work Directives, Project Data Submittals/Shop Drawings, and other project correspondence. Protocol and requirements shall be discussed and worked out with the Contracting Agency and Engineer in advance. Electronic data and information shall be in a PDF format that conforms to Section 1-06.1(3). Due to security and other IT

system constraints, file sizes may be limited. Contractor shall provide paper copies at the request of the Contracting Agency or Engineer.

Once the Contract is awarded, the Contracting Agency will grant the Contractor access to their EADOC software for the Contractor's use on this project. No user fees will be charged to the Contractor for this software. All costs for the training and use of this software shall be considered incidental to the Contract.

1-05.7 Removal of Defective and Unauthorized Work

Section 1-05.7 is supplemented with the following:
(October 1, 2005 APWA GSP)

If the Contractor fails to remedy defective or unauthorized work within the time specified in a written notice from the Engineer, or fails to perform any part of the work required by the Contract Documents, the Engineer may correct and remedy such work as may be identified in the written notice, with Contracting Agency forces or by such other means as the Contracting Agency may deem necessary.

If the Contractor fails to comply with a written order to remedy what the Engineer determines to be an emergency situation, the Engineer may have the defective and unauthorized work corrected immediately, have the rejected work removed and replaced, or have work the Contractor refuses to perform completed by using Contracting Agency or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.

Direct or indirect costs incurred by the Contracting Agency 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 Engineer 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.

No adjustment in contract time or compensation will be allowed because of the delay in the performance of the work attributable to the exercise of the Contracting Agency's rights provided by this Section.

The rights exercised under the provisions of this section shall not diminish the Contracting Agency's right to pursue any other avenue for additional remedy or damages with respect to the Contractor's failure to perform the work as required.

1-05.8 Coordination with Owner and Adjacent Homes

Section 1-05.8 is added as the following:
(Local Agency SP)

Access to homes and business shall be maintained at all times. To maintain access to homes and businesses during the contract, the contractor shall observe the following requirements:

1. Post signs and notify homes and businesses at least five (5) working days ahead of any construction that may impact their access.
2. Provide alternate access as required to affected homes and businesses.
3. Provide a Traffic Control Plan prior to construction as described in Section 1-10 and keep it updated as construction progresses.

Maintaining access to homes and businesses shall be considered incidental to the Contract and included in other bid items. No separate payment shall be made.

1-05.10 Guarantees

Section 1-05.10 is deleted and replaced with the following:
(Local Agency SP)

In addition to any special warranties provided elsewhere in the Project Documents, the Contractor warrants to the Contracting Agency that materials and equipment furnished under the Contract will be of

good quality and new unless otherwise required or permitted by the Project Documents, and that the Work will conform to the requirements of the Project Documents as described herein. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective and may be rejected. The Contractor's warranty excludes remedy for damage caused by abuse, improper or insufficient maintenance, or improper operation. If required by the Contracting Agency's Representative or Contracting Agency, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment provided.

Neither final acceptance by the Contracting Agency nor partial and final payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship.

If, prior to the expiration of one year after the date of final acceptance of all work or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any work (including materials and equipment) that is found to be defective or not in compliance with the Contract Documents, the Contractor shall promptly, without cost to Contracting Agency, either correct such work, or, if it has been rejected by Contracting Agency, remove and replace it with acceptable work. If the Contractor does not promptly comply with the notification issued by the Contracting Agency for correction of defective and/or non complying work, the Contracting Agency may have the Work corrected or removed and replaced and all direct and indirect costs of such removal and replacement, including costs of all professional services, shall be paid by Contractor as provided for herein.

Actual or alleged knowledge by the Contracting Agency, Engineer and/or inspector(s), prior to acceptance of all work by the Contracting Agency, of defects or deficiencies in the Work shall not, in any way, affect or diminish the guarantee by the Contractor. The guarantee shall apply to all elements and parts of the Work, regardless of knowledge by the Contracting Agency, Engineer and inspector(s) of defects or deficiencies and regardless of failure of the Contracting Agency, Engineer and/or inspector(s) to inform the Contractor of known or suspected defects or deficiencies prior to final acceptance of the Work by the Contracting Agency.

All subcontractor's, manufacturers', and suppliers' warranties and guarantees, express or implied, for any part of the Work, materials and equipment shall be deemed obtained and shall be enforced by the Contractor for the benefit of the Contracting Agency without the necessity of formal transfer or assignment thereof. Warranties and guarantees by subcontractors, manufacturers, and suppliers shall begin on and extend for one year after the date of final acceptance by the Contracting Agency of all work.

All work (including materials and equipment) repaired or replaced in accordance with this Section shall be guaranteed for a period of one year after the date of acceptance by the Contracting Agency of the repair/replacement work.

Nothing contained in these provisions shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection, or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Contracting Agency.

These guarantee provisions shall be inserted in all subcontracts and material contracts, and notice of these provisions shall be given to all persons furnishing materials for the Work when no formal contract is entered into for such materials.

1-05.11 Final Inspection

Section 1-05.11 is deleted and replaced with the following:
(Local Agency SP)

1-05.11 Facility Startup, Testing and Training

Contractor shall provide complete startup and testing/commissioning to ensure that equipment and mechanical, electrical, controls and special controls and instrumentation systems are properly installed and function, operate, and perform as intended and required. Contractor shall submit a startup and testing plan showing how the testing will be accomplished for review and acceptance by the Engineer prior to commencing startup and testing of the facilities.

All mechanical and electrical equipment shall be tested by the Contractor before any system is put into operation. Testing procedures shall be designed to duplicate as nearly as possible all conditions of operations and shall be carefully selected to ensure that the equipment is not damaged. Tests shall be as specified herein and shall be made to determine whether the equipment has been properly assembled, aligned and connected. Any changes, adjustments or replacements required to make the equipment operate as required shall be carried out by the Contractor or a qualified technician of the seller or equipment representative as part of the work.

Before startup, the Contractor shall properly lubricate all bearings and other items which normally require lubrication and fill each gear case and oil reservoir to the proper operating level, using the equipment manufacturer's supplied lubricant. If any equipment or system does not operate properly, the Contractor shall immediately replace or repair components until it operates properly. When the equipment start-up is complete, the Contractor shall submit a start-up and testing report to the Engineer.

Copies of field test reports shall be signed by the Contractor and provided to the Engineer along with the testing report.

Initial start up and testing or commissioning services shall include a minimum of one (1) 8-hour day(s).

System Startup and Testing General Requirements shall include the following:

1. Following initial start up and testing, the entire system shall be required to undergo a 10-day startup period in the presence of the Contracting Agency and Engineer. Any equipment failing or malfunctioning during this 10-day period shall be repaired or replaced, and when it is once again operational, shall be required to undergo a full 10-day startup period. Acceptance of the work and equipment will occur only after successful completion of the 10-day startup period.
2. The Contractor will supervise and be responsible for the proper maintenance and care of the equipment during the startup period and a succeeding 10-day period after successful startup.
3. When a motor, pump, valve, meter, instrument, or other item of equipment does not operate properly, adjustments shall be made by an experienced technical representative of the manufacturer.
4. If adjustments fail to correct the operation of a piece of equipment, remove and replace it with a suitable replacement that meets the operating requirements.

All components shall be calibrated by the Contractor after completion of installation. Components that cannot be properly calibrated or are found to exceed the specified range or accuracy shall be removed and replaced.

Contractor is responsible for determining that all equipment and all systems are functioning properly by start-up time. Prior to startup, the Contractor shall furnish documentation that the equipment provided is installed and is functioning in compliance with the manufacturer's recommended specification and instructions.

The Contractor shall anticipate that the Contracting Agency may delay acceptance of all work under the Contract if, in the judgment of the Contracting Agency, malfunctions or failures in operation of the system repeatedly occur after startup. The Contractor shall not be entitled to an extension of time or to any claim for damages because of hindrances, delays, or complications caused by or resulting from delay by the Contracting Agency in accepting the work because of malfunctions or failures in operation of the system.

Immediately prior to final acceptance, Contractor shall make a final check of all lubrication requirements and leave all equipment properly lubricated, ready for Contracting Agency's use.

The Contractor shall demonstrate to the Contracting Agency's personnel, the proper manner of maintaining the equipment, making adjustments, and maintaining the system. Work performed by the manufacturer's representative required for startup will not be considered as operator training even if the operators are present and witnessing the adjustments. Equipment startup will be completed before the

required on-the-job operator training begins. Operator training services shall include a minimum of two (2) 8-hour days.

1-05.11(1) Substantial Completion

When the Contractor considers the work to be substantially complete, the Contractor shall so notify the Engineer and request the Engineer establish the Substantial Completion Date. The Contractor's request shall list the specific items of work that remain to be completed in order to reach physical completion. The Engineer will schedule an inspection of the work with the Contractor to determine the status of completion and prepare a punch list of unresolved items. If the number of unresolved items exceeds 20, the Engineer may stop the inspection and notify the Contractor that the project is not ready for the Substantial Completion Inspection. The list of unresolved items shall be provided by the Engineer to the Contractor within 10 working days of the Contractor's request for Substantial Completion. The Engineer may also establish the Substantial Completion Date unilaterally. The Contractor will not be allowed an extension of contract time because of a delay in the performance of the work attributable to the exercise of the Engineer's right hereunder.

If the Engineer concurs with the Contractor that the work is substantially complete and the facilities can be used safely and are ready for the intended use, the Engineer, by written notice to the Contractor, will set the Substantial Completion Date. If, after this inspection the Engineer does not consider the work substantially complete and ready for its intended use, the Engineer will, by written notice, so notify the Contractor giving the reasons therefore.

Upon receipt of written notice concurring in or denying substantial completion, whichever is applicable, the Contractor shall pursue vigorously, diligently and without unauthorized interruption, the work necessary to reach Substantial and Physical Completion. The Contractor shall provide the Engineer with a revised schedule indicating when the Contractor expects to reach substantial and physical completion of the work.

The above process shall be repeated until the Engineer establishes the Substantial Completion Date and the Contractor considers the work physically complete and ready for final inspection.

1-05.11(2) Operational Testing

It is the intent of the Contracting Agency to have a complete and operable system prior to establishing the Substantial Completion Date. Therefore, when the work involves the installation of process, mechanical and electrical systems, the Contractor will be required to operate and test these systems for a period of time prior to the Substantial Completion Date. Process and mechanical equipment, electrical controls, meters, or other devices and equipment to be tested during this period, shall be tested under the observation of the Contracting Agency or Engineer. Where such operational testing is required, the systems shall be tested under operating conditions for a reasonable period of time, but no less than the number of days stipulated, to assure their proper operation and function prior to establishing the Substantial Completion Date. During and following the test period, the Contractor shall correct any items of workmanship, materials, or equipment which do not meet the requirements of the Contract Documents, prove faulty, or that are not in good operating condition. Equipment that repeatedly breaks down or fails to operate or perform properly during this operational testing period will be cause to extend the testing period. The Substantial Completion Date will not be established until the necessary corrections and tests have been completed to the satisfaction of the Engineer and Contracting Agency.

The costs for equipment, labor, materials, supplies, power, gas, water, and everything else needed to successfully complete operational testing shall be included in the unit contract prices related to the system being tested, unless specifically set forth otherwise in the proposal.

Operational and test periods shall not affect a manufacturer's guaranties or warranties furnished under the terms of the contract.

1-05.11(3) Final Inspection and Physical Completion

When the Contractor considers the work physically complete and ready for final inspection, the Contractor, by written notice, shall request the Engineer to schedule a final inspection. The Engineer will set a date for final inspection. The Engineer and the Contractor will then make a final inspection and the

Engineer will notify the Contractor in writing of all particulars in which the final inspection reveals the work incomplete or unacceptable. If the number of unresolved items exceeds 20, the Engineer may stop the inspection and notify the Contractor that the project is not ready for the Physical Completion Inspection.

The Contractor shall immediately take such corrective measures as are necessary to remedy the listed deficiencies. Corrective work shall be pursued vigorously, diligently, and without interruption until physical completion of the listed deficiencies. This process will continue until the Engineer is satisfied the listed deficiencies have been corrected.

If action to correct the listed deficiencies is not initiated within 7 days after receipt of the written notice listing the deficiencies, the Engineer may, upon written notice to the Contractor, take whatever steps are necessary to correct those deficiencies pursuant to Section 1-05.7.

The list of unresolved items shall be provided by the Engineer to the Contractor within 10 working days of the Contractor's request for Physical Completion. The Contractor will not be allowed an extension of contract time because of a delay in the performance of the work attributable to the exercise of the Engineer's right hereunder.

Upon correction of all deficiencies, the Engineer will notify the Contractor and the Contracting Agency, in writing, of the date upon which the work was considered physically complete. That date shall constitute the Physical Completion Date of the contract, but shall not imply acceptance of the work or that all the obligations of the Contractor under the contract have been fulfilled.

1-05.12 Final Acceptance

The first paragraph of Section 1-05.12 is deleted and replaced with the following:
(Local Agency SP)

The Contractor must perform all the obligations under the contract before a completion date and final acceptance can occur. Failure of the Contractor to perform all the obligations under the contract shall not bar the Contracting Agency from unilaterally accepting the contract as provided in Section 1-09.9. The Contracting Agency, or a duly authorized representative, accepts the completed contract and the items of work shown in the Comparison of Quantities by signature of the Notice of Completion and Acceptance. The date of that signature constitutes the acceptance date. Progress estimates or payments shall not be construed as acceptance of any work under the contract.

1-05.12(1) One-Year Guarantee Period

Section 1-05.12(1) is added as the following:
(Local Agency SP)

The Contractor shall return to the project and repair or replace all defects in workmanship and material discovered within one year after Final Acceptance of the Work, except that the submersible pumps' guarantee shall be for five years as stipulated in Section 22 13 29.16 of these specifications. The Contractor shall start work to remedy any such defects within 7 calendar days of receiving Contracting Agency's written notice of a defect, and shall complete such work within the time stated in the Contracting Agency'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 Contracting Agency'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 one year after acceptance of the corrections by Contracting Agency.

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 Contracting Agency.

1-05.13 Superintendents, Labor and Equipment of Contractor

Delete the sixth and seventh paragraphs of Section 1-05.13 is revised to read as follows:
(August 14, 2013 APWA GSP)

1-05.13(1) Emergency Contact List

The second sentence in the first paragraph of Section 1-05.13(1) is revised to read as follows:
(Local Agency SP)

The list shall include, at a minimum, the Prime Contractor's Project Manager, or equivalent, the Prime Contractor's Project Superintendent, and the Erosion and Sediment Control (ESC) Lead.

1-05.14 Cooperation with Other Contractors

Section 1-05.14 is supplemented with the following:
(Local Agency SP)

The Contractor shall not cause unnecessary hindrance or delay to others working in the project area. If the performance of any contract for the project is likely to be interfered with by the simultaneous performance of other contracts, the Contracting Agency and Engineer will decide which Contractor shall cease work temporarily and which Contractor shall continue, or whether the work under the contracts can be coordinated so that the contractors may proceed simultaneously.

On questions concerning conflicting interest of contractors performing related work, the decision of the Contracting Agency and Engineer shall be binding upon all contractors concerned and the Contracting Agency, the Engineer, the Contracting Agency's Representative, and their consultants shall not be responsible for damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the award, performance, or attempted performance of other contracts in the project area or caused by a decision or omission of the Contracting Agency and Engineer regarding the order of precedence in the performance of the contracts.

If, through acts of neglect on the part of the Contractor, other parties suffer loss or damage in their Work, the Contractor agrees to settle with such others by agreement or arbitration, if such others will so settle. If such others assert any claim against the Contracting Agency, the Engineer, the Contracting Agency's Representative, or their consultants on account of damage alleged to have been so sustained, the Contracting Agency shall notify the Contractor, who shall hold harmless, indemnify, and defend the Contracting Agency, Engineer, the Contracting Agency's Representative, and their consultants, and each of their directors, officers, employees, and agents against any such claim, including all attorney's fees and any other costs incurred by the indemnified parties relative to any such claim.

The Contractor shall coordinate his work with other contractors, public agencies, property owners, and utility companies which may have facilities or be working in the project area to minimize mutual interference. The Contractor shall cooperate with the utility companies and/or their subcontractors and conduct his operations in a manner that the necessary construction of their facilities can be accomplished to the mutual satisfaction of the Contracting Agency and the utility companies.

He shall also coordinate his activities with the Contracting Agency; and no water or sewer mains, individual water or sewer services, street, or private driveways may be closed off without a minimum five (5) working days notice to the Contracting Agency and the private property owner. Should the property owner or the Contracting Agency have reasonable reason, as determined by the Engineer, to avoid access or water or sewer service shutoff at the scheduled time, the Contractor shall reschedule his work to meet the new condition.

The Contractor shall maintain overall coordination for the execution of the work. Based on the Construction Schedule prepared in accordance with these Specifications, the Contractor shall obtain from each subcontractor a similar schedule and shall be responsible for all parties maintaining these schedules or for coordinating required modifications.

1-05.15 Method of Serving Notices

The second paragraph of Section 1-05.15 is revised to read as follows:
(March 25, 2009 APWA GSP)

All correspondence from the Contractor shall be directed to the Project Engineer. 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, must be in paper format, hand delivered or sent via mail delivery service to the Project Engineer's office. Electronic copies such as e-mails or electronically delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract.

1-05.17 Oral Agreements

Section 1-05.17 is added as the following:
(October 1, 2005 AWPA GSP)

No oral agreement or conversation with any officer, agent, or employee of the Contracting Agency, 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 Contracting Agency, unless subsequently put in writing and signed by the Contracting Agency.

END OF SECTION 1-05

1-06 Control of Materials

1-06.1 Approval of Materials Prior to Use

Section 1-06.1 and its associated subsections are deleted and replaced with the following: (Local Agency SP)

All equipment, materials, and articles incorporated into the permanent work:

1. Shall be new, unless the Special Provisions permit otherwise;
2. Shall meet the requirements of the Contract Documents and be reviewed by the Engineer prior to use;
3. May be inspected or tested at any time during their preparation and use; and
4. Shall not be used in the work if they become unfit even after being previously approved.

Prior to use, the Contractor shall assemble and submit to the Contracting Agency, Project Data and Shop Drawings for all proposed materials. The Contractor shall prepare and update on at least a monthly basis a submittal control document that indicates the status of all submittals. The status report shall be initially developed to identify all shop drawing and submittal data to be assembled and submitted by Contractor for Engineer's review.

The Contractor is cautioned that equipment and materials for which submittals are required, and which are constructed, installed, or incorporated prior to Engineer's review is at Contractor's risk. Such equipment or materials may be rejected by the Contracting Agency, and if rejected, shall be removed and replaced by the Contractor if so ordered by the Engineer at the Contractor's expense.

1-06.1(1) Contractor Responsibility for Submittals

The Contract Drawings were developed to provide a general description of the work. These drawings do not and are not intended to provide all the details of each and every element of the work. The Contractor shall be responsible for, and prepare (or have prepared), all shop and working drawings required to supplement the Contract Drawings to establish the necessary details for construction.

Supplemental shop and working drawings shall be prepared by the Contractor as required by these Special Provisions. Supplemental shop and working drawings shall include, but not be limited to: metal fabrication plans and details, erection plans and details, masonry layout plans and details, reinforcing steel plans and details, shoring plans and details, concrete formwork plans and details, equipment installation plans and details, piping layout and support plans and details. The Contractor shall be fully and completely responsible for the accuracy of the dimensions and details of the supplemental shop and working drawings, including those prepared by subcontractors, suppliers, and detailers and for full and complete conformity with the defined and implied intent of the Contract Documents. The Contractor shall check all shop drawings to make sure they conform with the Contract Documents, and in the case of re-submittals, that all review comments have been addressed prior to transmittal.

The Contractor shall coordinate between suppliers to verify that equipment, mechanical, electrical, structural elements, and other parts of the work correctly interface. The Contractor shall check and verify field dimensions of new and existing work as needed to ensure that shop drawings and other submittals are correctly dimensioned. Catalog cut sheets shall be clearly marked or notated as to which items are intended to be supplied. The Contractor's shop drawings and submittals that have been carelessly or improperly prepared and clearly not reviewed by the Contractor will be returned un-reviewed.

The Contractor shall prepare and timely transmit submittals so as not to delay the construction schedule. The Contractor is responsible for the timeliness of submittals prepared by his suppliers and subcontractors. The Contractor shall anticipate the time required for review and possible re-submittals, and shall include reasonable amounts of time for preparation, distribution and review of submittals in the construction schedule. The Contracting Agency and Engineer shall process submittals expeditiously and endeavor to complete reviews as quickly as possible, but is under no obligation to waive procedures or expedite processing because of untimely submittals by the Contractor.

By approving and submitting shop drawings, product data and samples, the Contractor represents that he/she has determined and verified all materials, field measurements, and field construction criteria related thereto, and that he/she has checked and coordinated the information contained within such submittals with the requirements of the work and Contract Documents, including with associated subcontractors, and is fully satisfied that they conform to the Contract Documents.

The Contract Price shall include the cost of furnishing all shop drawings, product data and samples, and the Contractor will be allowed no extra compensation for such drawings, product data or samples.

1-06.1(2) Limitations of Engineer's Submittal Reviews

Engineer's review and acceptance will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

Engineer's review and acceptance will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and acceptance of a separate item as such will not indicate acceptance of the assembly in which the item functions.

Engineer's review and acceptance of required Shop Drawings or Samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Section 1-06.1(4) of the Special Provisions, and Engineer has given written acceptance of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and acceptance shall not relieve Contractor from responsibility for complying with the requirements of Section 1-06.1(3) of the Special Provisions.

Engineer's check and review of Shop Drawings and Samples, Standard Specifications and descriptive literature submitted by Contractor will be only for general conformance with design concept, except as otherwise provided, and shall not be construed as:

1. Permitting any departure from the Contract Requirements;
2. Relieving the Contractor of the responsibility for any error in details, dimensions or other issues that may exist in such submittals;
3. Constituting a blanket acceptance of dimensions, quantities, or details of the material or equipment shown; or
4. Approving departures from additional details or instructions previously furnished by Engineer. Such check or review shall not relieve Contractor of the full responsibility of meeting all of the requirements of the Contract Documents.

1-06.1(3) Submittal Procedures and Requirements

The Contractor shall transmit each submittal to the Engineer using a transmittal form provided by the Engineer. The Contractor shall certifying that the contents of the submittal have been checked by the Contractor for conformance with the requirements of the Contract Documents. Submittals will not be reviewed without this certification. If it appears to the Engineer that the submittal has not been checked by the Contractor, no further review will occur and it will be deemed incomplete and returned to the Contractor with a determination of "Revise and Resubmit".

Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

1. All field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
2. The suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

3. All information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

4. Shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

A separate form shall be used for a given specification section. That is, only an item or items that pertain to a given section shall be listed. Different items within a given section shall be listed.

All submittals shall be transmitted to the Engineer via the Contractor. Submittals direct from subcontractors or suppliers will not be accepted. Any communications which may occur between the Engineer and subcontractors and suppliers shall not be construed as binding on the Engineer, Contracting Agency or Contractor unless formalized in accordance with procedures set forth in the Contract Documents.

Approved File Formats

Submittals shall be Adobe PDF file format, version 8.0 or greater.

1. Bookmark all chapters, sections, and drawings.
   a. Bookmarks shall include a logical description of the chapter or section or the title and number of the drawing.
2. Format shall be standard letter 8.5" x 11" for text and/or 11" x 17" landscape for drawings.
3. Acceptable fonts include:
   a. Arial
   b. Verdana
   c. Helvetica,
   d. Times New Roman
4. Font sizes for text based documents must be no less than 10 pt and no greater than 14 point for general text and no less than 12 pt and no greater than 18 pt for headers.
5. Font color must be black.
6. Text decoration, such as bold and italic, may only be used to emphasize key points.
7. Hyperlinks and graphics within the file is encouraged when appropriate.
8. Hyperlinks must use relative addressing.
9. Hyperlinks to information outside the primary domain of the client's intranet are unacceptable.
10. File names shall be in English, clearly convey the information contained in the file, and shall not exceed 100 characters in length. Only standard abbreviations may be used in file names.
11. Scanned documents are unacceptable.
12. Files shall not be password protected.

Each submittal shall be numbered consecutively, i.e. 1, 2, 3, etc. Assign re-submittals the same number as the original with a suffix of a sequential letter to denote it as a re-submittal. For example, the first re-submittal of submittal 25 would be 25A. Include only those items previously issued under the original submittal in re-submittals. Do not combine new submittals with re-submittals.

Where contents of submitted literature from manufacturers include data not pertinent to the submittal, the Contractor shall clearly indicate which item(s) or portion of the contents is provided and is to be reviewed by the Engineer.

The project data must be submitted in accordance with the instructions or the submittal may be returned without review, and the Contractor will not be entitled to any increase in Contract time. The Engineer will, upon completion of the review, return the transmittal form and a PDF copy of the submittal project data to the Contractor.

Engineer's review will be completed within ten (10) working days after receipt by Engineer of each complete submittal in proper sequence and will be returned to Contractor with one of the following markings:

1. "No Exceptions" indicates submittal has been reviewed and appears to be in conformance with requirements of the Contract Documents.
2. "Make Corrections Noted" indicates submittal appears to be in general conformance with requirements of the Contract Documents, but requires some corrections. Contractor shall incorporate the corrections noted. No re-submittal is required.
3. "Revise-Resubmit" indicates submittal does not appear to be in conformance with the Contract Documents. Engineer's comments will be noted on the submittal or in a separate letter. Contractor shall recheck, make necessary revisions, and resubmit.
4. "Reference" or "For Information Only" indicates submittal gives general information incidental to, but not required for, review or acceptance by the Engineer.
5. "Submittal Not Required-No Action Taken" indicates that the submittal is not called for by the Contract Documents and that no action was taken by Engineer on the submittal.

The Contractor shall submit to the Contracting Agency, to demonstrate compliance with applicable safety and environmental regulations, copies of any safety and accident prevention or pollution control and/or environmental monitoring plans applicable to the project and required of the Contractor by law, as well as any on-site safety program measures applicable to the Contracting Agency or its agents or members of the public visiting the work area. When such documents require approval by a government agency, the Contractor shall also furnish evidence of approval. These submittals are informational and any comment or lack of comment by the Contracting Agency or Engineer thereon shall not be construed as either acceptance or rejection of these documents, which shall be a matter for agencies having jurisdiction.

If the Contractor fails to make the proper changes to the submittal and the Engineer is required to review a submittal more than three (3) times, the Contracting Agency may deduct the costs for subsequent reviews from the Contract Price.

1-06.1(4) Submittal Variations

Variations from the Contract Document are not allowed without prior acceptance by the Engineer and shall be made at no additional cost to the Contracting Agency or extension of the contract time unless accepted by a change order. Contractor shall give Engineer specific written notice of any such variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. The variations shall be specifically identified on each Shop Drawing or Sample submitted to Engineer for review and acceptance and shall direct specific attention to each deviation from the Contract Documents and state any trades, dimension, functions or other aspects of the work that will be affected by the proposed change. Otherwise, the Contractor will not be relieved of the responsibility of executing the Work in accordance with the Contract Documents, even though such Shop Drawings or Samples have been otherwise reviewed.

The Contractor is responsible for the design of any construction changes resulting from any such deviation, for dimensions which shall be confirmed and coordinated at the job site, for fabrication processes and techniques of construction, for coordination of the work with that of all trades and for a complete installation which will function as intended and originally specified.

If a Shop Drawing or Sample, as submitted, indicates a variation from the Contract Requirements as set forth in the Contract Documents, Contractor shall identify the cost of the variation on the Shop Drawing or Sample. If the Engineer finds the variation to be in the interest of Contracting Agency and the variation involve no change in the Contract Price or time for performance, Engineer may approve the Shop Drawings or Samples.

1-06.1(5) Re-submittals

Contractor shall make corrections required by Engineer and shall return corrected copies in accordance with procedures described in Special Provision 1-06.1(3). Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

1-06.4 Handling and Storing Materials

Section 1-06.4 is supplemented with the following:
(Local Agency SP)

1-06.4(1) Pipe

Pipe and appurtenances shall be handled, stored, and installed as recommended by the manufacturer. Pipes with soft coatings such as coal tar enamel, paint, or the like shall be stored to protect the coating from physical damage or other deterioration and shall only be handled with padded, wide slings. Pipes shipped with interior bracing shall have the bracing removed only when recommended by the pipe manufacturer.

1-06.4(2) Equipment and Devices

All equipment shall be adequately and effectively protected against damage from moisture, dust, handling, or other causes during transport from manufacturer's premises to the site. Each item or package shall be clearly marked with the number unique to the specification reference covering the item.

Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Parts of equipment shall be delivered in assembled or sub-assembled units where possible.

All equipment items and valves with an assigned equipment number in this Project Manual shall have affixed to them in a prominent location, a label or tag displaying the assigned equipment number. Equipment item and valves lacking a number shall have a similar tag providing a unique description of the item. Markers shall be of stainless steel or aluminum, affixed to the item with stainless steel fasteners, or as otherwise approved by the Engineer. Plastic labels will not be acceptable.

During the interval between delivery and installation, all equipment shall be stored in enclosed, weather-tight licensed commercial warehouses. Environmental controls such as heaters or protective encapsulation shall be provided to ensure against condensation and moisture damage. In the event prolonged (more than 90 days) storage is required for any item of rotative equipment, the Contractor shall institute a preventive maintenance program that shall include grease protection of bare metal surfaces, periodic indexing of rotating parts, renewal of grease in bearings, and any procedures recommended by the manufacturer. The Contractor shall maintain adequate records to demonstrate full compliance with these requirements. All equipment shall be available for inspection by the Engineer.

After installation, all equipment shall be protected from damage, including but not limited to moisture, dust, abrasive particles, debris, and dirt generated by the placement, chipping, sandblasting, cutting, finishing, and grinding of new or existing concrete, terrazzo, and metal; and the fumes, particulate matter, and splatter from welding, brazing, and painting of new and existing piping and equipment. The Contractor is advised that as a minimum, vacuum cleaning, blowers with filters, protective shielding, and other dust-suppression methods will be required at all times to adequately protect all equipment. During concreting, including finishing, all equipment that may be affected by cement dust must be completely covered. During painting operations, all grease fittings and similar openings shall be covered to prevent the entry of paint. Electrical switch gear, unit substation, and motor load centers shall not be installed until all concrete work and sandblasting in those areas have been completed and accepted.

1-06.4(3) Delivery of Material or Equipment

The Contracting Agency's or Engineer's personnel or representatives of the Contracting Agency or Engineer will not accept materials or equipment deliveries for the Contractor.

1-06.6 Substitutions

Section 1-06.6 is added as the following:
(Local Agency SP)

Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review.

"Or Equal Items"

"Or Equal" Items: If, in Engineer's sole discretion, an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or equal" item, in which case review and acceptance of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if; in the exercise of reasonable judgment Engineer determines:

1. The proposed item is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
2. The proposed item will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
3. Operation and maintenance costs and requirements are reasonably similar; and
4. The proposed item has a proven record of performance and comparable availability of service and parts.

Contractor shall also certify that, if approved and incorporated into the Work:

1. No increase in cost to the Contracting Agency or increase in Contract Times will result, and
2. The proposed item will conform to the detailed requirements of the item named in the Contract Documents.

If requested by the Engineer, Contractor shall furnish additional information for the Engineer's review and consideration. Insufficient or inadequate information to substantiate an "or equal" determination by the Engineer will be grounds for rejection.

Substitute Items

If, in Engineer's sole discretion, an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

The requirements for review by Engineer will be as set forth herein and as Engineer may decide is appropriate under the circumstances. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1. Shall certify that the proposed substitute item will:
    a. Perform adequately the functions and achieve the results called for by the general design,
    b. Be similar in substance to that specified, and
    c. Be suited to the same use as that specified;
2. Will state:
    a. The extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;
    b. Whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Contracting Agency for other work on the Project) to adapt the design to the proposed substitute item; and
    c. Whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
3. Will identify:
    a. All variations of the proposed substitute item from that specified;
    b. Available engineering, sales, maintenance, repair, and replacement services; and
    c. Schedule impacts and changes to the construction schedule
4. Shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

Contractor shall supply three (3) copies of data substantiating compliance of proposed product or supplier with Contract Documents on all requests for acceptance of change of any product or manufacturer. Each copy shall include:

1. Detailed description of the proposed change, including:
    a. Product identification, including manufacturer's name and address;
    b. Manufacturer's identification, including manufacturer's name and address;
    c. Samples of proposed products;
    d. Name, address, and telephone number of contact persons for similar projects on which product was used and date of installation; and
    e. Drawings indicating and vertical details of all architectural, structural, mechanical and electrical elements of proposed change.
2. Itemized comparison of proposed substitution with product or supplier specified;
3. Relation to separate subcontracts and trades;
4. Cost data on proposed substitution in comparison with product or supplier specified; and
5. Operation and maintenance requirements and costs;

Requests for change of product or design shall include certification by the Contractor that:

1. The Contractor has personally investigated the proposed product or design deviation and has determined that it is equal or superior in all respects to that specified;
2. The Contractor will provide the same guarantee for product or design deviation as for product or design specified; and

3. The Contractor will coordinate installation of accepted product or design deviation into work, making such changes as may be required for work to be complete in all respects.

Requests for change of products will not be considered if:

1. They are indicated or implied on project data submittals without a formal request having been submitted; and/or
2. Acceptance will require substantial revision to the Contract Documents.

Substitute Construction Methods or Procedures

If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those required for substitute items.

Engineer's Evaluation

Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made. Engineer may require Contractor to furnish additional data about the proposed substitute item, method or procedure. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order or an approved Shop Drawing. Engineer will advise Contractor in writing of any negative determination. The Engineer may elect to reject any or all requests for deviation at his sole discretion without cause or justification. The Contractor shall immediately proceed with the Work in accordance with the Contract Documents upon notification of rejection of any request for deviation.

Special Guarantee

Contracting Agency may require Contractor to furnish, at Contractor's expense, a special performance guarantee or other surety with respect to any substitute, change in construction methods or procedures, or change in design.

Engineer's Cost Reimbursement

Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, the Contracting Agency may subtract said costs from payments due to the Contractor. The Contracting Agency may also subtract any charges of the Engineer associated with making changes in the Contract Documents (or in the provisions of any other direct contract with Contracting Agency) resulting from the acceptance of each proposed substitute.

Contractor's Expense

Contractor shall provide all data in support of any proposed substitute or "or equal" at Contractor's expense. The Contractor shall be responsible for and assume all costs of all elements involving implementing and completing approved deviations including, but not limited to, coordination, confirming dimensions at the job site, design, preparation of plans, procurement of materials and equipment, fabrication, construction, installation and instigation of service. If, in the opinion of the Engineer, the completed improvements of each deviation do not fulfill, provide and meet the defined and implied intent of the Contract Documents, the Contractor shall provide the labor, materials, and equipment required to modify the Work to the satisfaction of the Engineer.

The Contractor shall be responsible for modifications to electrical, structural, mechanical, or other aspects of the work or design as required to install or incorporate materials or equipment selected by the Contractor.

Regardless of the method of specification or selection, any product which is installed or incorporated into the work without prior acceptance of the Engineer may not be accepted by the Contracting Agency.

When material or equipment is specified by performance requirement or reference to specifications, standards, or publications of organizations, the Contractor shall select material or equipment which the Contractor considers to comply with the specified reference standard. The Contractor shall submit a request for acceptance of the selected product in accordance with these Special Provisions.

1-06.7 Testing and Quality Control

Section 1-06.7 is added as the following:
(Local Agency SP)

Contracting Agency-Furnished Testing and Inspections

The Contracting Agency will retain a qualified independent testing laboratory to perform the laboratory and field tests listed below:

1. Testing of backfill materials (e.g., sieve analysis, sand equivalent)
2. Moisture-density relationships of backfill materials
3. In-place soil density of trench backfill
4. In-place soil density of structure backfill
5. In-place soil density of paving sub-base and structural section, including asphalt concrete
6. Concrete slump and compressive strength on field placed cement concrete
7. Special inspections

The Contractor shall fully cooperate with Contracting Agency-Furnished Testing and Inspections. Contractor shall provide Contracting Agency's Representative timely notice on the readiness of work for required inspections, tests or acceptance. The Contractor shall provide access to the work for testing personnel. Where testing is to be performed in a potentially unsafe or confined work area, the Contractor shall stop work and provide all required safety measures to assure the safety of testing personnel.

The Contracting Agency will provide one copy of test results to the Contractor as soon as they are available. The Contractor shall anticipate that extensive laboratory and/or field testing will be performed by the laboratory retained by the Contracting Agency.

The Contractor shall anticipate that such testing may hinder, delay, or complicate execution of the work. The Contractor shall not be entitled to an extension of Contract Time or to any claim for damages because of hindrances, delays, or complications caused by or resulting from laboratory and/or field testing performed by the Contracting Agency.

Special inspection by certified inspectors and a certified testing lab may be required on the following, but not limited to:

1. Structural steel
2. Structure concrete reinforcement and concrete
3. Masonry
4. Structure excavation/fill
5. Anchor bolts

The Contractor shall coordinate with the Contracting Agency's Representative and fully cooperate with the testing services company for the above testing and special inspections and other testing and special inspections as may be specified elsewhere in the Special Provisions. The Contractor shall provide access to the work for testing personnel. Where testing is to be performed in a potentially unsafe or confined work area, the Contractor shall stop work and provide all required safety measures to assure the safety of testing personnel. Contractor shall furnish Engineer copies of all agency inspection reports or approvals.

Correction of Defective Work

If test or operational results indicate that the work performed, or materials or equipment furnished, by the Contractor does not comply with the Contract Documents, the Contractor shall immediately take all necessary measures to correct the defective work, and/or replace defective materials or equipment. Depending on the situation, an independent testing firm may be retained to test the corrected work to determine if the corrections are satisfactory. All costs that are incurred by the Contracting Agency and Engineer as a result of the defective work, materials or equipment, including retesting, shall be borne by the Contractor and will be deducted from progress payments.

END OF SECTION 1-06

1-07 Legal Relations and Responsibilities to the Public

1-07.1 Laws to be Observed

Section 1-07.1 is supplemented with the following:
(October 1, 2005 APWA GSP)

In cases of conflict between different safety regulations, the more stringent regulation shall apply.

The Washington State Department of Labor and Industries shall be the sole and paramount administrative agency responsible for the administration of the provisions of the Washington DOSH.

The Contractor shall maintain at the project site office, or other well known place at the project site, all articles necessary for providing first aid to the injured. The Contractor shall establish, publish, and make known to all employees, procedures for ensuring immediate removal to a hospital, or doctor's care, persons, including employees, who may have been injured on the project site. Employees should not be permitted to work on the project site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor's care.

The Contractor shall have sole responsibility for the safety, efficiency, and adequacy of the Contractor's plant, appliances, and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The Contractor shall be solely and completely responsible for the conditions of the project site, including safety for all persons and property in the performance of the work. This requirement shall apply continuously, and not be limited to normal working hours. The required or implied duty of the Engineer to conduct construction review of the Contractor's performance does not, and shall not, be intended to include review and adequacy of the Contractor's safety measures in, on, or near the project site.

Section 1-07.1 is further supplemented with the following:
(Local Agency SP)

The Contractor shall be responsible to immediately report to the Engineer any deviation from the contract provisions pertaining to environmental compliance, including but not limited to spills, unauthorized fill in waters of the State, including wetlands, water quality standards, noise, air quality, etc.

1-07.2 State Taxes

Section 1-07.2 is deleted, including its sub-sections, and replaced with the following:
(June 27, 2011 APWA GSP):

1-07.2 State Sales Tax

The Washington State Department of Revenue has issued special rules on the State sales tax. Sections 1-07.2(1) through 1-07.2(4) are meant to clarify those rules. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The Contracting Agency 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 1-07.2(2) describes this exception.

The Contracting Agency will pay the retained percentage (or release the Contract Bond if a FHWA-funded Project) 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 Contracting Agency 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 this contract or not. Any amount so deducted will be paid into the proper State fund.

1-07.2(1) 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.

1-07.2(2) 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 Contracting Agency, retail sales tax on the full contract price. The Contracting Agency 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 Contracting Agency 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.

1-07.2(3) Services

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

1-07.5(3) State Department of Ecology

Section 1-07.5(3) is supplemented with the following:
(Local Agency SP)

The Contractor shall provide for safe access to the construction site and to the Contractor's records by the Washington State Department of Ecology personnel.

1-07.5(5) Noise Restrictions

Section 1-07.5(5) is added as the following:
(Local Agency SP)

The Contractor shall comply with all local controls and noise level rules, regulations and ordinances which apply to any work performed pursuant to the Contract. If the requirements of this Section are more restrictive than those of the local regulations, the requirements of this Section shall govern.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be enclosed and be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler and enclosure.

Noise levels for scrapers, pavers, graders and trucks shall not exceed 90 dBA and pile drivers shall not exceed 95 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA. Equipment that cannot meet these levels shall be quieted by the use of improved exhaust mufflers, portable acoustical screens, or other means. Equipment not modified to meet these requirements shall be removed from the project.

Where feasible, the Contractor shall use electric rather than diesel or gas-powered equipment.

1-07.6 Permits and Licenses

Section 1-07.6 is deleted and replaced with the following:
(Local Agency SP)

1-07.6(1) Contracting Agency-Furnished Permits

The Contracting Agency is responsible for obtaining the following permits:

1. SEPA Mitigated Determination of Non-Significance.
2. Hydraulic Project Approval.
3. Section 10/Section 404 Nationwide Permit, including Coastal Zone Management Act Consistency and Section 401 Water Quality Certification.
4. Section 106 Letter of Concurrence.
5. Section 7 Endangered Species Act Letters of Concurrence.
6. Shoreline Permit.
7. Building Permits.
8. Retaining Wall Permits.
9. State of Washington Department of Ecology Construction Stormwater General Permit – Contracting Agency will transfer to Contractor at start of construction.

Copies of these Contracting Agency-Furnished permits are available at the Kitsap County Sewer Utilities Construction Management offices, 12351 Brownsville Hwy NE, Poulsbo, WA 98370.

The Contractor shall comply with all conditions and requirements of the Contracting Agency-Furnished Permits. The Contractor shall provide access to the project by regulatory officials for determination of compliance. The Contractor shall anticipate that compliance with the permits and any necessary corrective action may result in delay or hindrance of the Contractor's prosecution of the work. The Contractor shall not be entitled to any additional compensation or extension of Contract Time for delays or additional work resulting from compliance with Contracting Agency-Furnished Permits.

1-07.6(2) Contractor-Furnished Permits

The Contractor shall apply for, and pay all costs associated with all other required permits not listed as Contracting Agency-Furnished Permits in Section 1-07.6(1) above. Failure of the Contractor to identify and obtain all required permits shall not relieve the Contractor of the responsibility of compliance with all applicable regulatory requirements.

The Contractor shall comply with all conditions and requirements of the Contractor-Furnished Permits. The Contractor shall provide safe access to the project by regulatory officials for determination of compliance. The Contractor shall anticipate that compliance with the permits and any necessary corrective action may result in delay or hindrance of the Contractor's prosecution of the work. The Contractor shall not be entitled to any additional compensation or extension of Contract Time for delays or additional work resulting from compliance with Contractor-Furnished Permits.

The Contractor shall furnish all bonds and insurance required by the controlling agencies, and shall, if requested, pay for any inspection and testing.

The Contractor shall furnish the Engineer with one copy of each permit issued for borrow, fill, or waste material required for or generated by the contract work. The Contractor shall notify the Engineer in writing of the location of all borrow, fill, and waste sites regardless of whether a permit is required.

All costs incurred by the Contractor in procuring permits and complying with stipulations in the permits and approvals shall be incidental to and included in the various items of work in the project; and no additional compensation will be made.

Anticipated Contractor-Furnished Permits include:

1. State of Washington Department of Ecology Construction Stormwater General Permit – Contracting Agency will obtain and transfer to Contractor at start of construction.
2. Encroachment/ROW/Roadway Permit.
3. Demolition Permit.
4. Electrical Permit.

A draft Storm Water Pollution Prevention Plan (SWPPP) has been included in Appendix C. Contractor may modify this SWPPP to address the Contractor's means and methods or prepare a new SWPPP as required by the Construction Stormwater General Permit.

1-07.6(3) Business and Contracting Licenses

At a minimum, the Contractor and his subcontractors shall have the following licenses and shall submit proof of such licensing to the Contracting Agency upon request:

1. Kitsap County Business License
2. Washington State Contractor License

1-07.9(1) General

Section 1-07.9(1) is supplemented with the following:
(Local Agency SP)

Workers shall be paid at least the wages printed in the current prevailing wage rates at the time of the bid opening as prepared by the Department of Labor and Industry. A copy of the journey level rates for Kitsap County rates is included in Appendix A and is made a part of the Contract. The Contractor is referred to the Department of Labor and Industries website stated below for information regarding apprentice level rates. Contractor shall be responsible for checking and obtaining any updates or corrections to these wage rates and complying with any modifications prior to bidding. Contractor shall account for increased labor costs in his bid and no additional payment shall be made for increases in the prevailing wage rates for the project's duration. Prevailing wage rates can be obtained from the Industrial Statistician upon request at the following address:

Department of Labor and Industries
Prevailing Wage Office
P.O. Box 44540
Olympia, WA 98504-4540
Telephone: (360) 902-5335
Fax: (360) 902-5300
http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates

Contractors may also contact the Kitsap County Purchasing Office at the contact information contained in the Invitation to Bid to view or obtain a hard copy of the applicable wage rates.

Before payment is made by or on behalf of the Contracting Agency of any sums due under this Contract, the Contractor and each subcontractor shall submit a Statement of Intent to Pay Prevailing Wages and an Affidavit of Wages Paid. It shall be the responsibility of the Contractor to require all subcontractors to complete Affidavits of Wages Paid and to make the proper filing of same.

A fee per each Statement of Intent to Pay Prevailing Wages and Affidavit of Wages Paid is required to accompany each form submitted to the Department of Labor and Industries. The Contractor is responsible for payment of these fees and shall make all applications directly to the Department of Labor and Industries with a copy of all said applications being provided to the Contracting Agency. These fees shall be incidental to and included in the Contract Price.

1-07.13(1) General

Section1-07.13(1) is supplemented with the following:
(Local Agency SP)

The Contracting Agency reserves the right to use and/or occupy any portion of the project or it's improvements which have been completed sufficiently to permit use and occupancy and such use shall not be construed as an acceptance of the work or any part thereof, and any claims which the Contracting Agency may have against the Contractor shall not be deemed to have been waived by such use and/or occupancy.

1-07.14 Responsibility for Damage

Section 1-07.14 is supplemented with the following:
(Local Agency SP)

The Contractor shall protect, defend, indemnify, and save harmless the Contracting Agency, its officers, officials, employees, agents, and Engineer from any and all claims, demands, suits, penalties, losses, damages, judgments, or costs of any kind whatsoever (hereinafter "claims"), arising out of or in any way resulting from the Contractor's officers, employees, agents, and/or subcontractors of all tiers, acts or omissions, performance or failure to perform this Contract, to the maximum extent permitted by law or as defined by RCW 4.24.115, now enacted or as hereinafter amended.

The Contractor's obligations under this section shall include, but not be limited to:

1. The duty to promptly accept tender of defense and provide defense to the Contracting Agency at the Contractor's own expense.
2. The duty to indemnify and defend the Contracting Agency and Engineer from any claim, demand, and/or cause of action brought by or on behalf of any of its employees, or agents. The foregoing duty is specifically and expressly intended to constitute a waiver of the Contractor's immunity under Washington's Industrial Insurance Act, RCW Title 51, as respects the Contracting Agency with a full and complete indemnity and defense of claims made by the Contractor's employees. The parties acknowledge that these provisions were mutually negotiated and agreed upon by them.
3. To the maximum extent permitted by law, the Contractor shall indemnify and defend the Contracting Agency and Engineer from and be liable for all damages and injury which shall be caused to owners of property on or in the vicinity of the work or which shall occur to any person or persons or property whatsoever arising out of the performance of this Contract, whether or not such injury or damage is caused by negligence of the Contractor or caused by the inherent nature of the work specified.

The Contracting Agency may, in its sole discretion, withhold amounts sufficient to pay the amount of any claim for injury, and/or pay any claim for injury of which the Contracting Agency may have knowledge, regardless of the formalities of notice of such claim, arising out of the performance of this Contract.

An amount withheld will be held until the Contractor secures a written release from the claimant, obtains a court decision that such claim is without merit, or satisfies any judgment on such claim. In addition, the Contractor shall reimburse and otherwise be liable for claims costs incurred by the Contracting Agency, including, without limitation, costs for claims adjusting services, attorneys, engineering, and administration.

In the event the Contracting Agency incurs any judgment, award, and/or costs arising, including attorneys' fees, from enforcing the provisions of this provision, all such fees, expenses, and costs shall be recoverable from the Contractor.

1-07.15 Temporary Water Pollution/Erosion Control

Section 1-07.15 is supplemented with the following:
(Local Agency SP)

The Contractor shall submit bi-weekly updates of the temporary water pollution/erosion control plan. These updates shall include, but are not limited to, sketches showing location of control facilities such as straw bales, silt fences, and areas to be covered at end of shift. These updates shall be submitted to the Engineer for review every other week unless otherwise directed by the Engineer. The Engineer will review the updated plan and provide comments to Contractor.

The Contractor shall be responsible throughout the life of the project to take all necessary precautions to prevent pollution, erosion, siltation, and related damage to property caused by any water leaving work areas, including borrow and stockpile areas. All silt shall be contained within the construction area. Required temporary water pollution control measures shall be in accordance with the requirements of Section 31 25 14.

The Contractor shall pay all fines and citations charged to the Contracting Agency for discharging turbid water from the site during the life of the project. In addition, the Contractor shall pay all costs for repair to property damaged (onsite and offsite) by water discharged from work areas used in this Contract.

Construction and maintenance of erosion control measures shall be performed according to the Contract Documents and applicable permits. Other or additional temporary water pollution/erosion control measures may be required at the discretion of the Engineer. Costs for temporary water pollution/erosion control shall be in accordance with that specified in Section 8-01 as amended in the Special Provisions.

The Contractor shall meet all federal, state and local pollution control regulations for all work performed under this contract. No lime, wet concrete, petroleum products, silts, organic material or other deleterious materials are allowed to fall, flow, leach, or otherwise enter public waters.

The Contractor shall observe all statutes, ordinances and regulations pertaining to the prevention of environmental pollution and the preservation of public natural resources. All such statutes, ordinances, regulations or portions thereof pertaining to work under this contract are hereby incorporated with and made part of this contract.

The Contractor shall be aware of these provisions and coordinate with the specific controlling agencies.

The Contractor shall furnish all bonds and insurance required by the controlling agencies and shall, if requested, pay for any inspections and testing accomplished or furnished by them.

1-07.15(1) Spill Prevention, Control and Countermeasures Plan

Section 1-07.15(1) is supplemented and modified as follows:
(Local Agency SP)

All costs associated with this work shall be considered incidental to the construction and included in other items of work.

1-07.16(1) Private/Public Property

Section 1-07.16(1) is supplemented with the following:
(Local Agency SP)

The Contractor shall restore all roads and streets in which the surface is removed, broken or damaged, or in which the ground has caved or settled, due to hauling of materials, equipment and/or supplies and installation of the improvements covered by this contract, to the original grade and crown section unless otherwise indicated. Contractor shall match the existing surfacing for depth, materials and surface finish, including striping and pavement markings, except as otherwise specified.

At all times during work, the Contractor shall keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free from all rubbish and excess material of any kind.

The Contractor shall reconstruct all curbs, driveways, sidewalks and similar structures and utilities, which are broken or damaged during construction. Reconstruct with the same kind of material with the same finish, and in not less than the same dimensions as the original work. Remove and replace the entire portions between joints or scores and not merely by refinishing the damaged part. Match the appearance of the existing improvements as nearly as possible.

The Contractor shall be fully responsible for the prevention of damage to the City's, County's or State's roads. Prior to beginning construction, the Contractor shall obtain any and all licenses or permits required for the travel on, and work within, the Road Right-of-Way.

Paved areas including adjacent or haul route streets shall be maintained for the duration of the Contract. Street sweeping shall be performed as required and at the direction of the Engineer using a self-propelled vehicle outfitted with rotating brushes and a filtered vacuum system to collect sediment, dust, and debris from paved road surfaces. The vehicle shall store street sweepings internally. Collected street sweepings shall be disposed of by approved disposal method(s) in accordance with the Contract. The Contractor shall provide a wheel wash, if necessary, to prevent tracking of mud and dirt onto paved roads. Wheel wash water shall not be discharged to any storm drain or stream. Thoroughly clean all spilled dirt, gravel, or other material caused by the construction activities from all roads and streets at the end of each day.

The Contractor shall at all times maintain the integrity of the existing pavement, shoulder, culverts, and roadside ditches. If the existing pavement or shoulder is removed, broken, or damaged as a result of the construction of the improvements covered by this Contract, the Contractor shall restore the damaged area to the original grade and crown sections in accordance with the Standard Specifications. New surfacing shall match the existing surfacing for depth, materials and surface finish, including striping and pavement markings. Restore all culverts equal to existing condition or better.

Vehicles leaving the site shall be cleaned and loads secured to prevent the deposition of muds, silts, sands and construction materials on roads or highways. Any such degradation of roads or highways shall be corrected by the end of each working day so that the road is in a clean state. Tracked vehicles shall be constrained to paved or unpaved areas that will be restored.

1-07.16(2) Vegetation Protection and Restoration

Section 1-07.16(2) is supplemented with the following:
(Local Agency SP)

Restore all areas that are disturbed or damaged by actions of the Contractor to their original condition. Remove ornamental trees and shrubbery with earth surrounding the roots wrapped in burlap, and replant in their original positions, or, as an alternative, replace with equal material.

For lawn areas, cut sod, roll and replace after the excavation has been properly compacted or, as an alternative, cover the excavated area with top soil to the depth of the original top soil and reseed, water and maintain as directed.

The materials storage areas shall be re-graded and seeded at the conclusion of the project. Any damage to fences, walks, curbs, driveways, etc. shall be handled in accordance with the applicable sections of these specifications.

The Contractor shall obtain a signed release from all property owners whose property is impacted by the construction stating that the restoration has been done to the property owner's satisfaction. If the Contractor cannot obtain such a release, and the restoration has been done to what should be acceptable, the Contractor shall notify the Engineer and explain why a signed release cannot be obtained. Engineer shall then judge whether Contractor may be released from this requirement for that property.

1-07.16(4)A Inadvertent Discovery of Human Skeletal Remains

The first paragraph of Section 1-07.16(4)A is revised to read as follows:
(Local Agency SP)

If human skeletal remains are encountered by the Contractor, they shall not be further disturbed. The Contractor shall immediately notify the Engineer of any such finds, and shall cease all work in the area of, and adjacent to, the discovery, in an area adequate to provide for the total security and protection of the integrity of the skeletal remains. The Contractor shall comply with the Plan and Procedures for the Unanticipated Discovery of Cultural Resources and Human Skeletal Remains included in Appendix G. In accordance with RCW 27.44.055 (Duty to Notify section of Indian Graves and Records Act), the Engineer will notify the Contracting Agency who will then be responsible for making the necessary notifications and ensuring that the appropriate actions are taken to secure and protect the discovery site and remains. The Engineer or Contracting Agency may require the Contractor to suspend work in the vicinity of the discovery until final determinations are made and removal of the skeletal remains is completed.

1-07.16(6) Interfering Structures

Section 1-07.16(6) is added as the following:
(Local Agency SP)

The Contractor shall take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Drawings. The completeness and accuracy of information shown however, cannot be guaranteed. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the Contracting Agency. Where such existing fences, gates, barns, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the Contractor's own expense. Notify the Engineer of any damaged underground structure, and make repairs or replacements before backfilling.

If existing structures are encountered which prevent the construction, and which are not properly shown on the Drawings, notify the Engineer before continuing with the construction in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures. It is expected that minor relocations of the work will be necessary during the progress of construction. If the Contractor fails to notify the Engineer when an existing structure is encountered, and proceeds with construction despite this interference, the Contractor shall do so at the Contractor's own risk and expense.

1-07.17 Utilities and Similar Facilities

Section 1-07.17 is supplemented with the following:
(Local Agency SP)

The information shown or indicated in the Contract Documents with respect to existing underground facilities at or contiguous to the site is based on available information furnished to the Contracting Agency or Engineer by the owners of such Underground Facilities without necessarily uncovering, measuring or other verification of the utilities. The depth of existing utilities, if indicated, may only be an approximation. Additional utilities may be encountered and the actual locations of the utilities indicated on the Plans may vary from the locations indicated. The information is provided for the convenience of the Contractor only, and no responsibility is assumed by either the Contracting Agency or the Engineer for its accuracy or completeness. The Contractor shall have full responsibility for reviewing and checking utility information, locating all underground facilities, and coordinating work with the owners of such underground facilities. The Contractor shall take the necessary precautionary measures to protect the existing utilities and structures indicated and any other utilities or structures which may be encountered during construction and shall be responsible for the repair of any damage thereto resulting from the work if:

1. The utility owner has field located and marked its facilities and the actual location of any portion of the utility is within two feet horizontally either side of said location mark; or
2. The utility system is visible or has become visible or can be reasonably assumed to exist at the location due to visible evidence prior to the damage; or

3. The Contractor failed to provide the required notification to the utility owner prior to the damage to the utility; or

4. The actual depth is different by more than one (1) foot from than that indicated on the Plans.

Existing underground utilities, whether public or private, which are damaged by the Contractor, will be repaired by the utility owner or as directed by the utility owner.

All existing utilities shall be maintained in continuous operation and properly protected during the Contractor's operations, unless the Contractor receives written approval from the utility owner for interruption of service. In addition, all work by the Contractor adjacent to, or in the vicinity of, existing utilities shall be performed in accordance with the requirements of the utility owners. The Contractor shall pay all permit, inspection, and other fees levied by the utility owners. Where the Contractor's operations could damage or inconvenience other utility systems or services, the operations shall be suspended until all arrangements necessary for the protection or relocation of these utilities and services have been made by the Contractor. Notify all utility offices, which are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

The Contractor shall anticipate that service lines between utility systems and private residences will be encountered and no additional compensation shall be made with work associated with crossings of any service lines. Service lines may not be shown on the Plans and may not be field located by the utility. The Contractor shall determine the actual location and protect from damage all service lines. If any utilities or service lines are damaged by the construction operations, Contractor shall promptly notify the proper authority and begin or cause the repair as required by the utility so that the utility or service is back in service as promptly as possible. In no case shall interruption of any water, sewer, or other utility service be allowed to exist outside working hours unless prior approval is granted.

In the event the Contractor encounters water service lines that interfere with trenching, the Contractor may, by obtaining prior approval of the property owner, Water Department and the Engineer, cut the service, dig through, and restore the service with similar and equal materials at the Contractor's sole expense. In the event the Contractor encounters water service lines that interfere with new improvements, the Contractor shall notify the Engineer.

Some existing utility poles, lines, piping and/or appurtenances may need to be held in place, removed or relocated as part of this project. If said work is required, the Contractor shall coordinate and schedule all such work with the respective utilities so that the Contractor's work and schedule are not impacted. Public and private utilities, or their contractors, will furnish all work necessary to hold, adjust, relocate, replace, or construct their facilities unless otherwise provided for in the Plans or these Special Provisions. Such work, if required, will be done during the prosecution of the work for this project. The Contractor's attention is directed to the fact that significant lead times may potentially be required to coordinate and schedule with the utility companies to perform the work.

Removal, relocation, and adjustment of existing utilities where shown on the Plans or where it could reasonably be foreseen to accommodate the work by the Contractor shall be ordered and paid for by the Contractor. If or when utility conflicts occur, the Contractor shall continue construction on other aspects of the project. Any change to the operation necessary to work around the conflicts shall be incidental to the various bid items of the contract and no further compensation will be made.

The Contractor shall anticipate that the owners of existing utilities may choose to modify and/or improve the existing systems at the time that the Contractor is working. The Contractor shall perform any and all work required to accommodate concurrent work by the owners of existing utilities. The Contractor shall coordinate his activities with those of the utility owners to enable both activities to proceed without delay.

The Contractor shall call the Utilities Underground Locate Center (One Call Center) for field location of utilities not less than two or more than ten business days before the scheduled date for commencement of excavation which may affect underground utility facilities. Notice shall be provided individually to those owners who are not members of the one-number locator service and are known to or suspected of having

underground facilities within the area of proposed excavation. The Washington State Department of Transportation is not a participant in the One Call Center and shall be contracted directly for any work that may impact utilities in the State right of way.

The Contractor shall anticipate that work may be hindered or delayed by:

1. The removal, relocation and adjustment of any utility;
2. Maintenance operations of existing utility systems; or
3. The requirements of the owners of existing utility systems.

The Contractor shall not be entitled to an extension of time or to any claim for damages because of hindrances or delays caused by these activities.

The following addresses and telephone numbers of utility companies known or suspected of having facilities within the project limits and other pertinent contacts are supplied for the Contractor's convenience:

Kitsap County Public Works
614 Division Street
Port Orchard, WA 98366
(360) 337-5777
Dave Marquis

Manchester Water District
PO Box 98
Manchester, Washington 98353
(360) 871-0500
Dennis O'Connell

Cascade Natural Gas
6313 Kitsap Way
Bremerton, WA 98312
(360) 373-1405
Rick Coy or Chris Bassard

Puget Sound Energy
10885 NE 4th St.
P.O. Box 97034
Bellevue, WA 98009
(888) 225-5773
Victor Ibarra

Comcast
1225 Sylvan Way
Bremerton, WA 98310
(360) 377-8528, Office
(877) 824-2288, Service
(800) 424-5555, Buried Cable Location

Kitsap Transit
60 Washington Avenue, Suite 200
Bremerton, WA 98337
(360) 479-6966
Kathryn Jordan

Qwest/Century Link
(360) 478-5930
Roy Klein or Dan O'Tool

Paratransit Services
4810 Auto Center Way, Ste Z
Bremerton, WA 98132
(800) 933-3468
Colleen Clark

1-07.18 Public Liability and Property Damage Insurance

Section 1-07.18 is deleted and replaced with the following:
(Local Agency SP):

1-07.18 Insurance

1-07.18(1) General Requirements

The Contractor shall obtain the insurance described in this section from insurers that are licensed to do business in the state of Washington with a rating of A-: VII or higher in the A.M. Best's Key Rating Guide. The Contracting Agency 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.

The Contractor's insurance shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the limits of the insurer's liability.

The insurance limits mandated for any insurance coverage required by this Contract are not intended to be an indication of exposure nor are they limitations on indemnification.

The Contractor shall keep this insurance in force during the term of the contract and for thirty (30) days after the Physical Completion date, unless otherwise indicated. Certificates, policies, and endorsements expiring before completion of services shall be promptly replaced as well as the verification sent to the Contracting Agency.

If any insurance policy is written 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. The policy shall state that coverage is claims made, and state the retroactive date. Claims-made form coverage shall be maintained by the Contractor for a minimum of 36 months following the Final Completion or earlier termination of this contract, and the Contractor shall annually provide the Contracting Agency with proof of renewal. If renewal of the claims made form of coverage becomes unavailable, or economically prohibitive, the Contractor shall purchase an extended reporting period ("tail") or execute another form of guarantee acceptable to the Contracting Agency to assure financial responsibility for liability for services performed.

The insurance policies shall contain a "cross liability" or "separation of insureds" provision.

The Contractor's and all subcontractors' insurance coverage shall be primary and non-contributory insurance as respects the Contracting Agency's insurance, self-insurance, or insurance pool coverage.

The Contractor shall provide written notice to the Contracting Agency and all Additional Insureds of any policy cancellation, expiration, or material reduction in coverage within two (2) business days of the Contractor's receipt of such notice.

Written notice of any cancellations or changes in coverage shall be mailed to the Contracting Agency at the following address:

Attn: Risk Manager
Department of Administrative Services
614 Division Street
Port Orchard, Washington 98366

Upon request, the Contractor shall forward to the Contracting Agency a full and certified copy of the insurance policy(s).

The Contractor shall not begin work under the contract until the required insurance has been obtained and approved by the Contracting Agency.

Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract, upon which the Contracting Agency may, after giving five 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 Contracting Agency on demand, or at the sole discretion of the Contracting Agency, offset against funds due the Contractor from the Contracting Agency.

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.

1-07.18(2) Additional Insured

All insurance policies, with the exception of Professional Liability and Workers Compensation, shall name the following listed entities as additional insured(s) with respect to performance of services:

1. The Contracting Agency and its officers, elected officials, employees, agents, and volunteers;
2. The Contracting Agency's consultant, BHC Consultants, LLC and its subconsultants;
    a. Landau Associates, Inc.

b. AES Consultants, Inc.

c. Cascadia Archaeology, LLC

d. Mott MacDonald

3. The Contracting Agency's construction observation consultant.

The above-listed entities shall be additional insureds for the full available limits of liability maintained by the Contractor, whether primary, excess, contingent or otherwise, irrespective of whether such limits maintained by the Contractor are greater than those required by this Contract, and irrespective of whether the Certificate of Insurance provided by the Contractor pursuant to 1-07.18(3) describes limits lower than those maintained by the Contractor.

A failure to comply with reporting provisions of the policies shall not affect coverage provided to the above listed entities.

1-07.18(3) Subcontractors

Contractor shall ensure that each subcontractor of every tier obtains and maintains at a minimum the insurance coverages listed herein. Upon request of the Contracting Agency, the Contractor shall provide evidence of such insurance.

1-07.18(4) Evidence of Insurance

The Contractor shall deliver to the Contracting Agency a properly executed Certificate(s) of Insurance and/or signed policy 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 must conform to the following requirements:

1. An ACORD certificate or a form determined by the Contracting Agency to be equivalent.
2. Copies of all endorsements naming Contracting Agency and all other entities listed in Section 1-07.18(2) as Additional Insured(s), showing the policy number. The Contractor may submit a copy of any blanket additional insured clause from its policies instead of a separate endorsement. A statement of additional insured status on an ACORD Certificate of Insurance shall not satisfy this requirement.
3. Any other amendatory endorsements to show the coverage required herein.
4. Certificates of Insurance shall show the Certificate Holder as Kitsap County and include c/o of the Office or Department issuing the Contract. The address of the Certificate Holder shall be shown as the current address of the Office or Department.

1-07.18(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 must be disclosed and are subject to approval by the Contracting Agency. The cost of any claim payments falling within the deductible shall be the responsibility of the Contractor.

1-07.18(5)A Commercial General Liability

Contractor shall maintain a policy of Commercial General Liability Insurance, including:

1. Per project aggregate
2. Premises/Operations Liability
3. Products/Completed Operations – for a period of one year following final acceptance of the work.
4. Personal/Bodily/Advertising Injury
5. Property damage

6. Contractual Liability
7. Independent Contractors Liability
8. Stop Gap / Employers' Liability

Such policy must provide the following minimum limits:

$2,000,000	Each Occurrence
$5,000,000	General Aggregate
$4,000,000	Products & Completed Operations Aggregate
$2,000,000	Personal, Bodily, & Advertising Injury, each offence

Stop Gap / Employers' Liability

$1,000,000	Each Accident
$1,000,000	Disease - Policy Limit
$1,000,000	Disease - Each Employee

The Commercial General Liability coverage shall not exclude any activity to be performed in fulfillment of this Contract and shall contain no special limitations on the scope of protection afforded any additional insured(s). Specialized forms specific to the industry of the Contractor will be deemed equivalent provided coverage is no more restrictive than would be provided under a standard Commercial General Liability policy, including contractual liability coverage. Coverage shall include liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; or premises owned, leased, or used by the Contractor.

1-07.18(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) must provide the following minimum limit:

$1,000,000 combined single limit per occurrence for Bodily Injury and Property Damage

1-07.18(5)C Workers' Compensation

The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington. Contractor shall also maintain Employees Liability Coverage with a limit of not less than $1 million. Contractor shall provide evidence of all coverage to the Contracting Agency.

Contractor shall request that their Washington State Department of Labor and Industries, Workers Compensation Representative send written verification to Kitsap County, within ten (10) calendar days after the effective date of the Contract, that the Contractor is currently paying Workers Compensation.

If work is to be performed on or near any navigatable waterway, the Contractor shall be responsible for determining if United States Longshore and Harbor Workers Insurance is applicable for this project and shall be responsible for procuring such if the insurance is determined to be applicable. At no time shall the Contracting Agency or the Engineer be responsible for making this determination.

1-07.18(5)D Builder's Risk

Contractor shall purchase and maintain Builder's Risk insurance covering interests of the Contracting Agency, the Contractor, and Subcontractors of every tier, as Named Insureds, in the Work. An Installation Floater instead of Builders Risk is acceptable for renovation projects. Builder's Risk insurance shall be on a special form policy, and shall insure against the perils of fire and extended coverage and physical loss or damage, theft, vandalism, malicious mischief and collapse; and flood and earthquake when shown below. The Builder's Risk insurance shall include coverage for temporary buildings, debris removal, and damage to materials in transit or stored off-site. Such insurance shall cover resulting "soft

costs" including but not limited to design costs, licensing fees, architect's and engineer's fees, and costs due to delay in completion.

Builder's Risk insurance shall be written in the amount of the completed value of the project, with no coinsurance provisions. Such policy must provide coverage and deductibles that comply with the following:

Coverage:

Total Cost of Project to be Insured: $5,000,000
Soft Costs: $2,000,000
Flood: $2,000,000
Earthquake: $3,000,000

Deductibles not to exceed:

Earthquake and Flood: 5% of the Value at Time of Loss, subject to a $250,000 Minimum
Earth Movement: 5% of the Value at Time of Loss, subject to a $250,000 Minimum
All Other Perils: $50,000
Soft Costs: $50,000, with no more than 7-day waiting period

The Builders Risk insurance covering the work shall have maximum deductibles as listed above for each occurrence. The deductible(s) shall be the responsibility of the Contractor.

The Contractor shall provide the Contracting Agency with a full and certified copy of the insurance policy when the Contractor delivers the signed Contract for the work. Failure of Contracting Agency to demand such verification of coverage with these insurance requirements or failure of Contracting Agency to identify a deficiency from the insurance documentation provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

The Builders Risk insurance shall be maintained until final acceptance of the Work by the Contracting Agency.

The Contractor and the Contracting Agency waive all rights against each other and any of their Subcontractors of every tier, agents, and employees, officers, and officials, for damages caused by fire or other perils to the extent covered by Builder's Risk insurance or other property insurance applicable to the work. The policies shall provide such waivers by endorsement.

1-07.18(5)E Excess or Umbrella Liability

The Contractor shall provide Excess or Umbrella Liability insurance with limits of not less than 1 million each occurrence and annual aggregate. This excess or umbrella liability coverage shall be excess over and as least as broad in coverage as the Contractor's Commercial General and Auto Liability insurance.

All entities listed under 1-07.18(2) of these Special Provisions shall be named as additional insureds on the Contractor's Excess or Umbrella Liability insurance policy.

This requirement may be satisfied instead through the Contractor's primary Commercial General and Automobile Liability coverages, or any combination thereof that achieves the overall required limits of insurance.

1-07.18(5)F Pollution Liability

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:

1. Contractor's operations related to this project; and/or
2. Remediation, abatement, repair, maintenance or other work with lead-based paint or materials containing asbestos; and/or

3. Transportation of hazardous materials away from any site related to this project.

All entities listed under 1-07.18(2) of these Special Provisions shall be named by endorsement as additional insureds on the Contractors Pollution Liability insurance policy.

Such Pollution Liability policy shall provide the following minimum coverage:

$1,000,000 each loss and annual aggregate

This policy shall be endorsed so that "pollutants" definition includes sewage and/or reclaimed water as well as any sewage and/or reclaimed water byproducts. The policy shall also include property damage coverall for natural resource damages (NRD).

1-07.18(5)G Professional Liability

The Contractor and/or its Subcontractors 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 must 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 this insurance policy is written 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. The policy shall state that coverage is claims made, and state the retroactive date. Claims-made form coverage shall be maintained by the Contractor for a minimum of 36 months following the Final Completion or earlier termination of this contract, and the Contractor shall annually provide the Contracting Agency with proof of renewal. If renewal of the claims made form of coverage becomes unavailable, or economically prohibitive, the Contractor shall purchase an extended reporting period ("tail") or execute another form of guarantee acceptable to the Contracting Agency to assure financial responsibility for liability for services performed.

1-07.18(5)H LHWCA Insurance

If this 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

1-07.18(5)I Protection & Indemnity Insurance Including Jones Act

If this 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 1-07.18(2) of these Special Provisions 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

1-07.18(5)J Hull and Machinery

If this 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.

1-07.18(5)K Marine Pollution

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

1-07.23 Public Convenience and Safety

Section 1-07.23 is supplemented with the following:
(Local Agency SP)

The Contractor shall be responsible to notify, in writing, local fire, school, law enforcement authorities, or other affected persons, not less than ten (10) working days prior to construction operations that will deviate and/or delay traffic from the existing traffic pattern, so that these agencies may reroute emergency or other vehicles as necessary.

The Contractor shall at all times conduct the work as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the Engineer and proper governmental authority. Contractor shall be aware that any road closures that last more than 12 hours will require approval by the County Commissioners prior to the closure. Obtaining that approval can take up to 8 weeks.

Fire hydrants on or adjacent to the work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the use of sidewalks and private and public driveways, and the proper functioning of all gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses. Access must be maintained for foot and bus traffic to nearby schools.

The Contracting Agency and controlling public authorities shall be notified at least 24 hours in advance of any actions by the Contractor which may affect the functions of the police or fire departments, school system, or water and sewer districts.

The Contractor shall conduct the work and take preventative measures such that dust in the project area shall not become objectionable to the adjacent property owners. Should the Contracting Agency determine the Contractor is not fulfilling this obligation; the Contracting Agency reserves the right to take such action as may be necessary and to charge the Contractor for any costs that may be incurred in such remedial action.

All work shall be conducted with due regard for the safety of the public. Open trenches shall be completely backfilled or covered prior to the stop of work each day and provided with barricades of a type that can be seen at a reasonable distance, and at night they shall be distinctly indicated by adequately placed lights. Safety instructions received from the Engineer, Controlling Agency, or the Contracting Agency shall be observed, but the following of such instructions shall in no way relieve the Contractor of his responsibility or liability should any accident or loss occur as the result of the construction operations. Flaggers shall be provided by the Contractor as required to direct traffic.

It shall be the Contractor's responsibility to see that all requirements of the Federal William-Stieger Occupational Safety and Health Act as well as the State of Washington Industrial Safety and Health Act, are observed and enforced to protect all the workmen on the project as well as the general public.

Complaints received by the Contracting Agency concerning public inconvenience or safety hazards will be referred to the Contractor for immediate corrective action. In addition to normal work hours, corrective

actions may need to be taken on Saturdays, Sundays, holidays, and at times other than normal work hours.

1-07.23(1) Construction under Traffic

The second paragraph of Section 1-07.23(1) is revised to read as follows:
(Local Agency SP)

To disrupt public traffic as little as possible, the Contractor shall permit traffic to pass through the work with the least possible inconvenience or delay. The Contractor shall maintain existing roads, streets, sidewalks, and paths within the project limits, keeping them open, and in good, clean, safe condition at all times. If there is need to temporarily block access, such blockages shall be coordinated with the Contracting Agency, the affected property owners, and the Engineer. Deficiencies caused by the Contractor's operations shall be repaired at the Contractor's expense. Deficiencies not caused by the Contractor's operations shall be repaired by the Contractor when directed by the Engineer, at the Contracting Agency's expense. The Contractor shall also maintain roads, streets, sidewalks, and paths adjacent to the project limits when affected by the Contractor's operations. Snow and ice control will be performed by the Contracting Agency on all projects. Cleanup of snow and ice control debris will be at the Contracting Agency's expense. The Contractor shall perform the following:

1. Remove or repair any condition resulting from the work that might impede traffic or create a hazard.
2. Keep existing traffic signal and highway lighting systems in operation as the work proceeds. The Contracting Agency will remain responsible for the routine maintenance on such systems.
3. Maintain the striping on the roadway. The Contractor shall be responsible for scheduling when to renew striping, subject to the approval of the Engineer. When the scope of the project does not require work on the roadway, the Contracting Agency will be responsible for maintaining the striping.
4. Maintain existing permanent signing. Repair of signs will be at the Contracting Agency's expense, except those damaged due to the Contractor's operations.
5. Keep drainage structures clean to allow for free flow of water. Cleaning of existing drainage structures will be at the Contracting Agency's expense except when flow is impaired due to the Contractor's operations. Contractor shall be responsible for cleaning existing drainage structures that have been impaired by the Contractor's work.
6. All trenches within the right of way shall be backfilled completely and the surface restored to a good, clean, safe and drivable condition before leaving the site after each day's work. The Contractor may leave the trench open if steel sheets coated with asphalt are installed and properly wedged with cold mix to provide a smooth transition.

Contractor shall maintain pedestrian and vehicular traffic around the work areas at all times. The Contractor shall also maintain ingress and egress to local businesses at all times. The Contractor shall submit a traffic control plan for review and acceptance prior to construction. The traffic control plan shall clearly show the type, location and spacing of all traffic control devices. The traffic control plan shall be updated as needed as work progresses. The Contractor shall be held liable for all claims resulting from the improper installation and/or maintenance of the detour and traffic control plans.

1-07.24 Rights of Way

Section 1-07.24 is supplemented with the following:
(Local Agency SP)

Street right of way lines, limits of easements, and limits of construction permits are indicated on the Plans. The Contractor's construction activities shall be confined within these limits, unless arrangements for use of private property are made by Contractor.

Generally, the Contracting Agency has obtained, prior to bid opening, all rights of way and easements, both permanent and temporary, necessary for carrying out the work. Exceptions to this are noted herein or will be brought to the Contractor's attention by a duly issued Addendum.

Whenever any of the work is accomplished on or through property other than public right of way, the Contractor shall meet and fulfill all covenants and stipulations of any easement agreement obtained by the Contracting Agency from the owner of the private property. Copies of the easement agreements are included in Appendix F. The following table summarizes the easements that have been acquired and any special conditions. This information is provided for convenience, and the Contractor shall be aware of, and comply with all special conditions contained in the easement documents whether they are listed in this table or not.

Owner	Parcel No.	Special Conditions
Pump Stations Rehabilitation		
Kleitsch	4522-001-010-0007	No Special Conditions Noted
Willey	4522-003-007-0008	No Special Conditions Noted
Keskula	4690-000-026-0106	Provide 4'-0" opening between edge of rockery and structure. Grade opening at constant slope to transition from proposed to existing grades.
Williams	4690-000-026-0007	No Special Conditions Noted
Kowalski	4524-004-001-0000	No Special Conditions Noted
Oster	4524-001-006-0100	No Special Conditions Noted
Beach Lines Rehabilitation		
Muth	222402-2-001-2005	No Special Conditions Noted
Guariz	222402-2-056-2009	No Special Conditions Noted
Dykes	4579-000-006-0205	Provide prior notification and approximate duration of limited beach access during construction.
Jackley	4579-000-002-0001	No Special Conditions Noted
Cohrs	222402-2-039-2001	No Special Conditions Noted
Clark	222402-2-022-2000	All work shall be confined to the manhole and lid. No beach surface outside this area shall be disturbed and no bulkhead structures or debris may be moved or removed from where they are now located.
Hayford	222402-2-059-2006	No Special Conditions Noted

Owner	Parcel No.	Special Conditions
Akenson	222402-2-055-2000	1. No private improvements shall be disturbed, including existing sea wall. 2. Provide before and after photos of existing sea wall with accurate precise measurements for proof of "No Movement" after Construction.
Shirley	4579-000-005-0107	No Special Conditions Noted
Brown	222402-3-065-2006	No Special Conditions Noted
Preuss Trustees	222402-3-051-2002	No Special Conditions Noted
Chase	4516-001-001-0006	No Special Conditions Noted
Cook	4522-003-006-0009	No Special Conditions Noted
Daeley	222402-2-045-2003	No Special Conditions Noted

Each property owner shall be given 48 hours notice prior to entry by the Contractor. This includes entry onto easements and private property where private improvements must be adjusted.

The Contractor shall be responsible for providing, without expense or liability to the Contracting Agency, any additional land and access thereto that the Contractor may desire for temporary construction facilities, storage of materials, treatment/disposal of dewatering water, or other Contractor needs. However, before using any private property, whether adjoining the work or not, the Contractor shall file with the Engineer a written permission of the private property owner, and, upon vacating the premises, a written release from the property owner of each property disturbed or otherwise interfered with by reasons of construction pursued under this contract. The statement shall be signed by the private property owner, or proper authority acting for the owner of the private property affected, stating that permission has been granted to use the property and all necessary permits have been obtained or, in the case of a release, that the restoration of the property has been satisfactorily accomplished. The statement shall include the parcel number, address, and date of signature. Written releases must be filed with the Engineer before the Final Completion Date will be established.

1-07.28 Haul Route Restrictions

Section 1-07.28 is added as the following:
(Local Agency SP)

The Contractor shall contact all governing control agencies who have jurisdiction over proposed routes that will be used for the delivery and removal of materials for the project prior to bid. The Contractor shall follow the requirement(s) of the controlling agency and shall include the cost of complying with any such requirements in the applicable unit price per or lump sum bid item. No separate or additional payment will be made for regulatory agencies request for vehicle routing.

The Contractor shall submit a traffic control plan to all appropriate controlling agencies for hauling of import materials and excavation materials. The Contractor shall amend and abide by comments on the approved traffic control plan.

All roads shall be open to vehicular traffic after the completion of each day's construction activity. Steel plates, temporary fill, barricades and other measures shall be used to make disturbed roads safe and passable. Road closures (if allowed) shall be posted at least one week prior to the start of construction.

END OF SECTION 1-07

1-08 Prosecution and Progress

1-08.0 Preliminary Matters

Section 1-08.0 and its subsections are added as the following:
(Local Agency SP)

1-08.0(1) Preconstruction Public Meeting

Prior to the Contractor beginning work, the Contracting Agency will hold a public meeting for property owners that will or may be affected by the project. Contracting Agency representatives, the Engineer, and the Contractor (project manager and superintendent) will attend this preconstruction public meeting. The purpose of this meeting is to introduce the project team; discuss the project; listen to, and address the public's concerns; and obtain input and answer the public's questions,

1-08.0(2) Preconstruction Conference

Prior to the Contractor beginning the work, a preconstruction conference will be held between the Contractor, Contracting Agency, Engineer and such other interested parties as may be invited. The purpose of the preconstruction conference will be:

1. To review the initial progress schedule;
2. To establish a working understanding among the various parties associated or affected by the work;
3. To establish and review procedures for progress payment, notifications, approvals, submittals, etc.;
4. To establish normal working hours for the work;
5. To review safety standards and traffic control; and
6. To discuss such other related items as may be pertinent to the work.

The Contractor shall prepare and submit at the preconstruction conference the following:

1. A breakdown/schedule of values for all lump sum items;
2. A preliminary schedule of shop drawings and submittals;
3. A preliminary construction schedule. See Section 1-08.3
4. A preliminary dewatering plan. See Section 7-08.
5. A list of material sources for acceptance if applicable.

1-08.0(2) Hours of Work

Except in the case of emergency or unless otherwise approved by the Contracting Agency, or shown on the Drawings 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 72 hours 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 additional noise control requirements. Approval to continue work during these hours may be revoked at any time the Contractor exceeds the Contracting Agency's noise control regulations or complaints are received from the public or adjoining property owners regarding the noise from the Contractor's operations.

During the Bald Eagle nesting season (January 1 through August 15), construction hours are constrained to no earlier than one hour after dawn and no later than one hour before dusk.

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 Contracting Agency or Engineer. These conditions may include but are not limited to:

1. 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 Contracting Agency's material testing lab; inspectors; and other Contracting Agency employees when in the opinion of the Engineer, such work necessitates their presence.
2. Requiring the Contractor to reimburse the Contracting Agency for the costs in excess of straight-time costs for Contracting Agency during such times.
3. Considering the work performed on Saturdays, Sundays, and holidays as working days with regards to the contract time.
4. 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.

1-08.0(3) Reimbursement for Overtime Work of Contracting Agency Employees

Where the Contractor elects to work on a Saturday, Sunday, or holiday, or longer than an 8-hour work shift on a regular working day, as defined in the Standard Specifications, such work shall be considered as overtime work. On all such overtime work, a construction observer may be present, and possibly others may be required at the discretion of the Contracting Agency and Engineer. In such case, the Contracting Agency may deduct the costs in excess of the straight-time costs incurred by the Contracting Agency for the overtime hours. The Contractor authorizes the Engineer to deduct such costs from the amount due or to become due to the Contractor.

1-08.3 Progress Schedule

1-08.3(1) General Requirements

Section 1-08.3(1) is supplemented with the following:
(Local Agency SP)

Contractor shall solicit input on manufacturing and delivery times from critical, long-lead and/or significant equipment and material suppliers and subcontractors. Critical and long-lead equipment or materials shall be identified and scheduled, and will include, but not be limited to, the following:

1. Pumps
2. Electrical panels
3. Generators
4. Custom vaults and wet well structures

Once the preliminary schedule is accepted by the Engineer, all subcontractors shall be made aware and sign off on the schedule. This will be done and documented early on at a weekly construction meeting.

To accommodate the desired information and the required schedule updates, Contractor shall use the latest revision of Primavera systems (Primavera P6) to perform scheduling functions. The Contractor's attention is directed to the format/content of the schedule of values. Given appropriate consolidation and expansion, this list shall serve as a starting point. The project schedule shall be in sufficient detail that progress of the Work can be evaluated accurately at any time during the performance of the contract.

The Contractor shall employ a person or firm with at least ten years of construction and scheduling experience who is qualified to prepare detailed construction schedules. Evidence of construction

experience and successful scheduling (i.e., work completed on schedule) on at least three (3) projects in the last five years shall be provided. Provide schedules and contact information for each of the projects. Contractor shall provide Engineer with resume and other pertinent information on the proposed scheduler. If the Engineer determines that the qualifications are not met, the Engineer can direct the Contractor to provide a different scheduler that meets the qualifications at no additional cost to the Contracting Agency.

The schedule shall begin with the date of issuance of the Notice to Proceed and conclude with the date of the final completion. The total float belongs to the project and shall not be for the exclusive use or benefit of any party.

The project schedule shall be updated monthly and the Contractor shall submit one (1) PDF copy and one (1) backup copy of the schedule using the backup routine provided in the scheduling software. Processing of pay requests will be contingent upon receipt of updated schedules. In addition to the project schedule, the Contractor shall submit a written two week outlook activity schedule to the Engineer at the weekly progress meetings. The activity schedule shall indicate the Contractor's proposed activities for the forthcoming two weeks. Submittal of the weekly schedule does not relieve the Contractor of the requirement to submit and update the project schedule as required herein.

Time is of the essence on this project. Therefore, should schedule slippage occur, the Contractor is required to take appropriate measures to get the project back onto the approved schedule. The Contractor will not be allowed to continually let the schedule slip. Contractor shall adjust his forces, equipment and work schedules as may be necessary to get the project back on schedule to ensure completion of the work within the prescribed contract time. Contractor shall provided a plan of action and execute it accordingly to the satisfaction of the Engineer. Failure to do so will result in delay of progress payment(s) and/or a reduction in progress payment(s).

1-08.3(2)A Type A Progress Schedule

Section 1-08.3(2)A is revised to read as follows:
(Local Agency SP)

A Type A progress schedule will not be accepted by the Engineer.

1-08.3(2)B Type B Progress Schedule

The first paragraph and the first sentence of the second paragraph of Section 1-08.3(2)B are revised to read as follows:
(Local Agency SP)

The Contractor shall submit a preliminary Type B Progress Schedule depicting the entire project prior to the preconstruction conference. The preliminary Type B Progress Schedule shall comply with all of these requirements and the requirements of Section 1-08.3(1).

The Contractor shall submit four (4) hard copies, one (1) PDF copy and one (1) backup copy using the backup routine provided in the scheduling software of the revised Type B Progress Schedule depicting the entire project no later than 21-calendar days after the preconstruction conference. Contractor shall address all of the Engineer's comments on the preliminary Type B Progress Schedule.

The last paragraph of Section 1-08.3(2)B is revised to read as follows:
(Local Agency SP)

The Engineer will evaluate the Type B Progress Schedule and accept or return the schedule for corrections within 15 calendar days of receiving the submittal. The accepted Type B Progress Schedule shall establish the baseline schedule. The preliminary construction schedule shall remain in effect until the baseline schedule is accepted by the Engineer. Acceptance of the Type B Progress Schedule is for general compliance of the contract requirements and does not impose upon the Contracting Agency any warranty that all contract requirements have been addressed, met, or modified in the schedule. If it is determined that the schedule did not include modified contract requirements, the Contractor will modify its schedule without affecting the Contract Time at no additional cost to the Contracting Agency.

1-08.3(2)C Construction Sequencing and Constraints

Section 1-08.3(2)C is added as the following:
(Local Agency SP)

Continuous operation of the Contracting Agency's facilities is of critical importance. The Contractor shall schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified. The Contractor shall not proceed with work affecting a facility's operation without obtaining Contracting Agency's and Engineer's advance written approval of the need for, and duration of, such work.

Where existing facilities are to be modified during the course of work, the Contractor shall obtain Engineer's review of submittals for temporary shutdown, demolition, modification, connections between new and existing work, and other related work and shall conform to other Contract conditions as applicable.

The Contractor shall be responsible for developing the sequence of the work and for ensuring that current operations are not interrupted or compromised.

At least two weeks prior to starting the work, Contractor shall coordinate with the Engineer and Contracting Agency's representative to develop a work schedule which will permit facilities to function as normally as practical. A portion of the construction work will be required outside normal working hours to avoid undesirable conditions. The Contractor shall do this work at such times and at no additional cost to the Contracting Agency. Connections between existing facilities and new work shall not be made until all necessary inspection and tests have been completed on the new work and the new work is found to conform in all respects to the requirements of the Contract Documents.

Connection to existing services or utilities, or other work that requires temporary shutdown of any existing operations or utilities, shall be planned in detail with appropriate scheduling of the work and coordinated with the Contracting Agency or Engineer. The approved schedule for shutdown or restart shall be indicated on the Contractor's Progress Schedule, and at least seven (7) calendar days of advance written notice shall be given to the Contracting Agency and Engineer so that they may witness the shutdown, tie-in, and startup.

The Contracting Agency and Engineer consider the Contractor's schedule and construction sequencing to be paramount to ensure that the work is properly planned, coordinated, and executed. A number of pump stations feed or are fed by the facilities that will be replaced by the work under this contract. Those pump stations are currently and continuously receiving and pumping sewage and their functions shall not be interrupted except as specified herein or as specifically allowed by Contracting Agency. The Contractor shall properly coordinate and execute the work to avoid interference with normal operations. Work during low flow periods (between the hours of 12 am and 5 am) and sewer bypassing will be required to complete portions of the work. Such work shall be minimized to the extent possible through proper sequencing and execution of the work.

Specific Work Constraints are as follows:

1. Any and all Work conducted below the Ordinary High Water (OHW) mark delineated on the Drawings shall be performed between **August 1** and **August 31** in accordance with the project's Hydraulic Project Approval (HPA) permit, unless otherwise approved by the Washington State Department of Fish and Wildlife (WDFW) and Kitsap County. This restrictive time period shall be termed the WDFW Fish Window within these Contract Documents.
    a. The project shall be physically completed utilizing a maximum of two (2) WDFW Fish Windows, to occur in Years 2017 and 2018.
    b. The following Work at a minimum shall be completed within the 2017 WDFW Fish Window:
        i. Install Beach Manhole SSMH C11-2051 and 8-inch gravity sewer outlet to above the OHW mark (reference Drawing C45-1).

ii. Install Beach Manhole SSMH C11-2047 and 8-inch gravity sewer outlet to above the OHW mark (reference Drawing C46-1).

iii. Install Beach Manhole SSMH C11-2049 and 8-inch gravity sewer inlet to above the OHW mark (reference Drawing C46-1).

c. All other Work below OHW mark shall be sequenced by the Contractor such that a maximum of two (2) WDFW Fish Windows are utilized to physically complete all project Work. Other Work to be completed during WDFW Fish Window(s) generally includes, but may not be limited to, the following:

i. Beach line CIPP rehabilitation.

ii. Beach line manhole rehabilitation.

iii. Existing pump stations removal and abandonment.

iv. Installation of PS-47 Beach Manhole SSMH C11-3030.

v. Installation of storm drain piping.

vi. Removal of beach debris.

vii. Shoreline stabilization.

d. Contractor shall obtain accurate tide tables and shall familiarize themselves with the tidal variations during this time period to adequately plan and sequence the Work.

e. In accordance with the HPA permit, work below the OHW mark will be allowed from August 31st through February 15th of any calendar year if a biologist approved by the WDFW does not detect surf smelt eggs during a beach survey. The Contractor shall begin Work within seventy-two hours of the survey and shall complete the Work within two weeks of the survey. The Contractor shall pay for all costs to obtain an approved biologist and conduct the survey in accordance with the HPA permit. Since Work between August 31st and February 15th is dependent on the non-detection of surf smelt eggs, no assurance or guarantee is made that Work below the OHW mark will be allowed between August 31st and February 15th. The Contractor will not receive additional compensation or claim for delay for any Work below the OHW mark scheduled to be performed within this time period.

Should the Contractor require a barge or floating vessel to perform the Work, all local, State and other applicable permitting approvals and requirements, insurance and all costs associated shall be the responsibility of the Contractor.

1-08.3(2)E Weekly Progress Meetings

Section 1-08.3(2)E is added as the following:
(Local Agency SP)

To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Engineer will conduct weekly progress meetings with the Contractor throughout the construction period. The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling and resolve other problems that may develop.

Agenda Items

The Contractor shall, to the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding items to be added to the agenda.

Minutes

The Engineer will compile a summary of the discussion of each project meeting and will furnish copies to the Contracting Agency and Contractor. Recipients of copies may make and distribute copies as they deem necessary.

Attendance

These meetings shall be conducted by the Engineer and shall be attended by the Contractor's superintendent and representatives of electrical subcontractors, utilities and/or others that are active or critical in the planning or execution of the pending work. The Contractor may invite subcontractors, materials or equipment suppliers, and others to attend project meetings in which their aspect of the work is involved.

Meeting Schedule and Location

Progress meetings will be held weekly. Engineer and Contractor will establish a mutually acceptable day and time for meetings. Meetings will be held at the **[Manchester Wastewater Treatment Plant]** unless mutually agreed upon otherwise.

Agenda

A minimum agenda for these meetings is as follows:

1. Review, and revise as necessary, minutes of previous meetings and status of previously identified action items.
2. Review progress of the work since last meeting, including status of submittals for review.
3. Discuss any issues or deficiencies with the work and necessary corrective action.
4. Discuss scheduling of any required Special Inspections or tests associated with work to be completed.
5. Review status of equipment and materials fabrication/shipments.
6. Identify issues that impede planned progress, or which impact operations of existing facilities.
7. Compare status of completion to detailed schedule and identify any activities that are behind schedule. Discuss corrective measures and procedures to regain schedule.
8. Review temporary water pollution/erosion control.
9. Review outstanding contract change issues and claims.
10. Review design modifications and documentation for change orders. Discuss any cost or schedule impacts.
11. Verify Contractor's record drawings are current.
12. Review progress payment requests.

Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the discussions and decisions of the meeting.

Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.

Challenges to minutes shall be settled as a priority portion of “old business” at the next regularly scheduled meeting.

1-08.3(3) Schedule Updates

The first paragraph of Section 1-08.3(3) is revised to read as follows:
(Local Agency SP)

Contractor shall submit updated schedules on a monthly basis. In addition, the Engineer may request a schedule update when any of the following events occur:

1. The project has experienced a change that affects the critical path.
2. The sequence of work is changed from that in the approved schedule.

3. The project is significantly delayed.
4. Upon receiving an extension of Contract time.

1-08.4 Prosecution of Work

Section 1-08.4 is revised to read as follows:
(June 27, 2011 APWA GSP)

1-08.4 Notice to Proceed and Prosecution of the Work

Limited Notice to Proceed will be given after the Contract has been executed and the contract bond and evidence of insurance have been approved and filed by the Contracting Agency. The Contractor shall not commence with the Preconstruction Phase Work until the Limited Notice to Proceed has been given by the Contracting Agency or the Engineer. The Contractor shall commence activities associated with the Preconstruction Phase Work within ten days of the Limited Notice to Proceed Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work associated with the Preconstruction Phase so that it is completed within the time specified in the contract. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the contract.

Notice to Proceed with Construction will be given after the Preconstruction Phase Work has been satisfactorily completed. The Contractor shall not commence with the Construction Phase Work until the Notice to Proceed with Construction has been given by the Contracting Agency or the Engineer. The Contractor shall commence construction activities on the project site within ten days of the Notice to Proceed with Construction Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work to the physical completion date within the time specified in the contract. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the contract.

1-08.5 Time for Completion

The first paragraph of Section 1-08.5 is supplemented with the following:
(Local Agency SP)

If the Contractor performs work on a day that is classified as a non-working day, then that day shall be reclassified as a working day and counted towards the Contract time.

The third and fourth paragraphs of Section 1-08.5 are deleted and replaced with the following:
(Local Agency SP)

Contract time for the Preconstruction Phase Work shall begin on the working day identified in the Limited Notice to Proceed. Each working day shall be charged to the contract as it occurs, until the Preconstruction Phase work is physically complete. Each week the Engineer will provide the Contractor a statement that shows the number of working days: (1) charged to the contract the week before; and (2) specified for the completion of the Preconstruction Phase work. The statement will also show the nonworking days and any partial or whole day the Engineer declares as unworkable.

Contract time for the Construction Phase Work shall begin on the working day identified in the Notice to Proceed with Construction. Each working day shall be charged to the contract as it occurs, until the Construction Phase contract work is physically complete. Each week the Engineer will provide the Contractor a statement that shows the number of working days: (1) charged to the contract the week before; (2) specified for the physical completion of the contract; and (3) remaining for the physical completion of the contract. The statement will also show the nonworking days and any partial or whole day the Engineer declares as unworkable.

The statements shall be deemed accepted and correct unless the Contractor files a written protest of any alleged discrepancies in the statement within 10 calendar days after the date of each statement. To be considered by the Engineer, the protest shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of time disputed. If the Contractor elects to work 10 hours a day and 4 days a week (a 4-10 schedule) and the fifth day of the week in which a 4-10 shift is worked would ordinarily be charged as a working day then the fifth day of that week will be charged as a working day whether or not the Contractor works on that day.

The sixth paragraph and the subparagraphs of Section 1-08.5 are deleted and replaced with the following:
(Local Agency SP)

The Engineer will give the Contractor written notice of the completion date of the contract after all the Contractor's obligations under the contract have been performed by the Contractor. The following events must occur prior to establishing the Completion Date:

1. The physical work on the project must be complete; and
2. The Contractor must furnish all documentation required by the contract and required by law, to allow the Contracting Agency to process final acceptance of the contract. The following documents must be received by the Project Engineer prior to establishing a completion date:
    a. Final Contract Voucher Certification
    b. Copies of the approved "Affidavit of Prevailing Wages Paid" for the Contractor and all Subcontractors.
    c. Property owner releases per Section 1-07.24

Section 1-08.5 is supplemented with the following:
(Local Agency SP)

The project has the following critical completion date milestones:

1. <u>Completion of Preconstruction Phase Work</u>. All work under the Preconstruction Phase of this Contract shall be completed within **60** working days after the Limited Notice to Proceed Date.

2. Substantial Completion. All work under this Contract shall be substantially complete within **400** working days after the Notice to Proceed Date.

3. Physical Completion. All work under this Contract shall be physically complete within **430** working days after the Notice to Proceed Date.

The Contractor is cautioned that part of the work in this Contract may be performed only during certain periods of the day (e.g., connections to the existing sanitary sewer system, bald eagle nesting restrictions established by permit conditions), certain times of the year (e.g., WDFW Fish Window restrictions established by permit conditions) and favorable weather conditions, and as such, the Contractor shall plan and execute the work accordingly. Liquidated damages will be applied to any working days that exceed the time frames stipulated above.

1-08.8(1) Abnormal Weather Conditions

Section 1-08.8(1) is added as follows:
(Local Agency SP)

Precipitation as rain, hail or snow, low temperature, a windstorm, ice, snow and other weather conditions which could reasonably have been anticipated from the National Weather Service historical records of the general locality of the work shall not be construed as abnormal. It is hereby agreed that precipitation greater than the following, temperatures less than the following, and wind velocities greater than the following, cannot be reasonably anticipated. For each day determined to be abnormal as determined by the Construction Manager and approved by the Owner, one day shall be added to the contract duration at no additional cost to the Owner by written change order.

1. Daily rainfall equal to or greater than 0.50 inches during a month when the monthly rainfall exceeds the normal monthly average by 15 to 100 percent.

2. Daily rainfall equal to or greater than 0.20 inches during a month when the monthly rainfall exceeds the normal monthly average by more than 100 percent.

3. Daily rainfall equal to or greater than 1.0 inch at any time.

4. Daily maximum temperature equal to or less than 20 degrees F during a week when the maximum daily temperature never exceeds 35 degrees F.

5. Daily maximum temperature equal to or less than 25 degrees F during a week when the maximum daily temperature never exceeds 30 degrees F.

6. Daily maximum temperature equal to or less than 15 degrees F at any time.

7. Daily maximum wind velocity equal to or greater than 50 mph at any time.

Ice, snow and other weather conditions may be considered as abnormal in the sole discretion of the Construction Manager upon written request by the Contractor. Such written request shall describe in detail the weather condition, identify the specific impacts resulting from the weather condition, and be submitted to the Construction Manager within five days of the onset of the weather condition.

To preclude the difficulties of actual measurement, the parties hereto agree that weather data at the site of the work shall be expressly deemed to be the same as that measured at the Seattle-Tacoma International Airport by the Environmental Data and Information Service of the National Oceanic and Atmospheric Administration ("NOAA") of the U.S. Department of Commerce.

For the purposes of this section, a "month" shall mean a calendar month and a "week" shall mean a calendar week of Sunday through Saturday.

1-08.9 Liquidated Damages

The third paragraph of Section 1-08.9 is revised as follows:
(Local Agency SP)

Replace all references to “Physical Completion” with the words “Substantial Completion.”

The fourth paragraph of Section 1-08.9 is deleted and replaced with the following:
(Local Agency SP)

When the Contract Work has progressed to the extent that the Engineer has determined the Contract Work is substantially complete, the Engineer will notify the Contractor in writing of the Substantial Completion Date. For overruns in contract time occurring after the substantial completion date, the formula for liquidated damages shown above will not apply. Liquidated damages shall be assessed at one thousand five hundred ($1,500) dollars per day until substantial completion is achieved. When the Contract Work is physically complete, the Engineer will notify the Contractor in writing of the Physical Completion Date. For overruns in contract time occurring after the physical completion date, actual damages will be assessed based on the direct engineering, Contracting Agency, and other related costs assignable to the project that are incurred by the Contracting Agency until the Contractor has fulfilled all the obligations under the Contract and submitted all documentation required by the Contract and the law and the Engineer establishes the Final Completion Date. The Contracting Agency may offset these costs against any payment due Contractor. Contractor shall complete the remaining work that is subject to liquidated damages as promptly as possible. Upon request by the Engineer, the Contractor shall furnish a written schedule for completing the remaining physical work on the Contract.

1-08.10 Termination of Contract

Section 1-08.10 is supplemented with the following:
(Local Agency SP)

In the event that funding for this project is withdrawn, reduced or limited in any way after the effective date of this Contract, the Contracting Agency may summarily terminate this Contract notwithstanding any other termination provision of this Contract. Termination under this paragraph shall be effective upon the date specified in the written notice of termination sent by the Contracting Agency to the Contractor. After the effective date, no charges incurred under this Contract are allowable.

END OF SECTION 1-08

1-09 Measurement and Payment

1-09.1 Measurement of Quantities

Section 1-09.1 is revised with the following:
(Local Agency SP)

Delete the tenth paragraph beginning with the words “Linear Foot…” and replace with the following:

Linear Foot - Linear feet shall be measured along the pipe alignment and shall include the length through the elbows, tees, and fittings for the pay limits as shown on the Drawings. No adjustments will be made in the length for the slope, uneven contours, overlap of materials, repairs or wasted material.

1-09.2(1) General Requirements for Weighing Equipment

Section 1-09.2(1) is supplemented with the following:
(Local Agency SP)

The Contractor shall notify the Engineer not less than one working day prior to delivering materials which are measured and paid for by weight on the project. Certified weights must be issued at the source.

The Contractor shall provide a licensed public weigh master. The licensed weigh master shall issue weight tickets to the truck driver for acceptance of the material on the project by the Engineer. No materials measured and paid for by weight will be accepted without certified weight tickets from a platform scale in accordance with Section 1-09.2(3). The certified weight tickets shall be given to the Project Inspector on the day of delivery for each truckload delivered. Pay quantities will be prepared on the basis of these weight tickets, and tickets not received by the Inspector will not be honored for payment.

Truck loads must conform to legal load limits. In case of overload, the difference between overload and maximum legal load will not be paid for. If there are repeated instances of overloading, the proper enforcement authorities will be notified.

1-09.2(7) Bid Item Descriptions for Measurement and Payment

Section 1-09.2(7) is added as follows:
(Local Agency SP)

The unit or lump sum Contract Prices shall constitute full payment for furnishing all labor, equipment, materials, permits and agreements, overhead and profit, and performing all operations required to complete the Work as defined in the Contract Documents. Notwithstanding the omission or mention of any incidental Work, the Contract Price and payment shall also constitute full compensation for all Work incidental to completion of item, unless such Work is otherwise specifically mentioned for separate payment under another Bid Item. Payment shall only be made for those items included in the Proposal and all Work required by the Contract shall be included in those Bid Items.

All measurements and computations shall be made by the Engineer or the Owner's Representative. The Contractor may perform quantity surveys for comparison at the Contractor's sole expense. If there is a discrepancy where the measured quantity cannot be agreed upon, the Engineer or Owner's Representative measurements shall be used.

Measurement and Payment shall be made in accordance with Section 1-04.6 for the following bid items:

Bid Items	Bid Item Name	Measurement/Payment Description
1A,1B, 1C, 1D	Preconstruction Work Phase	The lump sum shall include all work required during the Preconstruction Work Phase as described in Section 1-04.3(1).

Bid Items	Bid Item Name	Measurement/Payment Description
2A, 2B, 2C, 2D	Final Cleanup and Restoration	The lump sum shall include the daily and final cleanup and restoration of all paved and unpaved surfaces and areas disturbed by construction to conditions equal to, or better than existing. Restoration detailed on the Drawings shall be included under Bid Item 19, Miscellaneous Site Work.
3A, 3B, 3C, 3D	Surveying	The lump sum shall include all survey efforts required to locate and construct the improvements, perform settlement monitoring during excavation and dewatering activities, as well as asbuilt the completed work.
4A, 4B, 4C, 4D	Project Record Drawings	The lump sum shall include all work associated with maintaining, updating, modifying the Contract Drawings to reflect modifications in the completed work that differ from the design information shown on the Contract Drawings. Incremental payments, determined by dividing the working days in each pay period by the total working days under the contract and then multiplying by 60% of the lump sum amount, will be paid for each monthly update. No more than 60% of the total lump sum amount will be paid for monthly updates. The balance of the lump sum will be paid upon delivery and approval of acceptable record drawings by the Engineer near the end of physical construction.
5A, 5B, 5C, 5D	Type B Schedules	The unit price per month shall include all work associated with furnishing progress schedules, weekly look-ahead schedules, and schedule updates. Payment shall be made on a monthly basis for approved schedules. Progress payments will be contingent upon receipt and approval of the monthly schedule updates. Engineer has entered a minimum amount in the bid schedules for this bid item. Contractor's bid amount shall not be less than this amount. No payment shall be made for the draft or baseline construction schedules as these shall be considered incidental to the contract. Payment for approved monthly schedule updates shall be based on the amount shown in the bid schedule.
6A, 6B, 6C, 6D	Minor Changes (Allowance)*	This item is reserved as a construction contingency for "Minor Changes" which may occur during the course of the work. This budget will facilitate minor additional work without the need for a contract amendment. The Engineer will still prepare a work change directive and the Contractor will still prepare cost proposals for work that is agreed to be out of scope. The Contracting Agency's approval will be obtained prior to authorization of such work. See Section 1-09 for additional information.

Bid Items	Bid Item Name	Measurement/Payment Description
7A, 7B, 7C, 7D	Mobilization and Demobilization	The lump sum shall include preconstruction expenses and the cost of preparatory work and operations performed by the Contractor, excluding work included in Bid Item 1, Preconstruction Work Phase. This work shall include but not be limited to the work identified in Section 1-09.7 of the Special Provisions. Mobilization and demobilization shall not exceed 10% of the total contract amount. Payment for mobilization and demobilization will be limited to 70% and 30%, respectively, of the total bid amount.
8A, 8B, 8C	Operation and Maintenance Manuals	The lump sum shall include all work required to prepare and submit operations and maintenance data. Payment for the initial submittal and any subsequent re-submittals shall not exceed 50% of the total bid amount. The remaining amount will be paid upon receipt and approval of the final operation and maintenance manual.
9A, 9B, 9C, 9D	Temporary Sewer Bypass Systems	The lump sum shall include all work associated with temporary sewage bypass systems including all related labor, materials, design, engineering, submittals, pumps, hoses, fuel, piping, power, fittings, appurtenances and other equipment required to furnish, install, monitor, protect, maintain, remove, etc. temporary sewer bypass systems necessary to complete the work. All work associated with maintaining and/or providing temporary service to the existing pump station(s) during construction shall be included in this bid item.
10A, 10B, 10C, 10D	Dewatering	The lump sum shall include all work required to adequately dewater excavations in accordance with the requirements of the Contract Documents. Work shall include but not be limited to preparing the dewatering plan and providing all labor, materials, equipment, mobilization, quality control and water quality treatment work associated with dewatering during construction. All work associated with settlement monitoring shall be included under Bid Item 3, Surveying.

Bid Items	Bid Item Name	Measurement/Payment Description
11A, 11B, 11C, 11D	Excavation Support Systems	The lump sum shall include all work required to comply with all requirements of the Washington State Safety Code relating to excavation, trenching, and shoring: "Safety Standards for Construction Work", Chapter 295-155 WAC Part N. The lump sum shall also include all temporary sheeting, shoring and bracing or equivalent methods, including design and engineering fees associated thereof, as well as furnishing, constructing, removing, and disposing of all temporary sheeting, shoring, and bracing. The lump sum shall be full compensation for all excavation, backfilling, compaction, and other work required when extra excavation is used in lieu of shoring. If select or imported backfill material is required for backfilling within the neat line trench limits excavation, it shall also be required as backfill material for the extra excavation and overbreak at the Contractor's expense. All work associated with settlement monitoring shall be included under Bid Item 3, Surveying.
12A, 12B, 12C	Foundation Material (Allowance)*	The unit price shall include all work associated with excavation, loading, hauling, temporary stockpiling, and disposal of unsuitable material from the foundation zone of excavation; furnishing, hauling, placing and compacting imported foundation material. Cellular Concrete Backfill required for foundation material will be paid under separate bid item.
13A, 13B, 13C, 13D	Temporary Erosion and Sediment Control	The lump sum shall include preparing the temporary erosion and sediment control (TESC) plan and updating it when necessary as well as furnishing, installing, maintaining, and removing the TESC measures as appropriate and required.
14A, 14B, 14C	PS 45 Pumps, PS 46 Pumps, PS 47 Pumps, respectively	The lump sum shall include purchase of the pumps, excluding tax and installation. The Contracting Agency has elected to purchase the pumps on a sole source basis and has received a “not to exceed” price. A copy of the Manufacturer’s “not to exceed” price is included in Appendix E.

Bid Items	Bid Item Name	Measurement/Payment Description
15A, 15B, 15C	PS 45 Mechanical Work, PS 46 Mechanical Work, PS 47 Mechanical Work, respectively	The lump sum shall include all work associated with the pump station mechanical activities, including but not limited to, all work required to provide and install the pumps, valves, piping (force mains, gravity sewers, storm drains, drains, etc.), pipe supports, below ground structures (wet well, valve vault, and manholes), pipe and structure coatings, water and natural gas services and connection fees, connections to the existing sewer system, and all associated necessary items including excavation, removal, haul and disposal of excavated material, and providing, installing, and compacting structural/trench backfill. This lump sum also includes equipment start-up and training, exclusive of startup services supplied with the pumps. Cellular Concrete Backfill required for foundation or structural/trench backfill will be paid under Bid Item 21, Cellular Concrete Backfill (Allowance).
16A, 16B, 16C	PS 45 Electrical Work, PS 46 Electrical Work, PS 47 Electrical Work, respectively	The lump sum shall include all work associated with the pump station electrical and instrumentation and control activities (Divisions 26 and 40), including but not limited to, all work required to provide and install motor starters, control panel, incoming power, standby generator, flow meter, conduits/wires, terminal box, existing telemetry panel and antenna, automatic transfer switch, programming, and all associated electrical and instrumentation appurtenances.
17A, 17B, 17C	PS 45 Structures (Elevated Slab & Electrical Slab), PS 46 Structures (Elevated Slab & Electrical/Generator Slab), PS 47 Structures (Elevated Slab), respectively	The lump sum shall include all work associated with construction of the new reinforced elevated concrete slab and separate concrete equipment slabs. Work shall include framing and pouring of reinforced concrete slab, footing, walls, stairs, etc., insertion of hatches, connection to valve vault and wet well, piping and appurtenances interface, hand railing, and concrete textured finishes. PS-45 shall include all work associated with construction of the new electrical equipment slab. PS-46 shall also include all work associated with construction of the new electrical/generator slab and retaining wall.
18A, 18B, 18C	PS 45 Demolition Work, PS 46 Demolition Work, PS 47 Demolition Work, respectively	The lump sum shall include all demolition work including but not be limited to: excavation, grading, removal, haul and disposal of existing: site material to be removed to construct new improvements not included in other bid items, pump station facilities and appurtenances, concrete/rock groins, fencing, creosote-treated wood pilings, trees, shrubbery, concrete bulkhead, etc. and pipe removal and abandonment as shown on the Drawings. Note, removed items may be hazardous waste material and require special handling and disposal techniques.

Bid Items	Bid Item Name	Measurement/Payment Description
19A, 19B, 19C, 19D	PS 45 Miscellaneous Site Work, PS 46 Miscellaneous Site Work, PS 47 Miscellaneous Site Work, Beach Lines Miscellaneous Site Work, respectively	The lump sum for PS bid items shall include all work required to construct the upgrades and modifications to the respective pump station that are not specifically included in other Bid Items. This shall include but not be limited to: site grading, fencing, site restoration above ordinary high water mark as detailed on the Drawings, planting and maintenance, miscellaneous painting, facility startup, testing and training, and other miscellaneous work. At least one (1) percent of the total bid amount for each of the three pump station Schedules shall be allocated for payment of facility startup, testing and training activities and included in this Bid Item. Restoration below ordinary high water mark for PS 45 and PS 46 shall be included in Bid Item 20. The lump sum for Beach Lines bid item shall include all Work required to construct the upgrades and modifications to the beach lines rehabilitation that are not specifically included in other Bid Items. This shall include but not be limited to: beach restoration with Beach Backfill to match existing conditions. The removal, haul and disposal of miscellaneous non-native material identified to be removed on the Drawings shall be included in Bid Item 25D.
20A, 20B	PS 45 Shoreline Stabilization and Beach Restoration, PS 46 Shoreline Stabilization and Beach Restoration, respectively	The lump sum shall include all work required to construct the shoreline stabilization and beach restoration improvements including but not be limited to: all work required to provide and install the rockery wall and other shoreline protection features, and beach restoration below ordinary high water mark including imported gravel and beach materials and finished grading.
21B, 21C	Cellular Concrete Backfill (Allowance)*	The unit price shall include all work associated with furnishing, hauling, testing, and placing Cellular Concrete Backfill as shown on the Drawings and/or as directed by the Engineer.

Bid Items	Bid Item Name	Measurement/Payment Description
22D	Cured-In-Place Pipe (CIPP)	The unit price shall include all work, materials, tools, labor and equipment necessary and incidental to furnishing, installing and placing in approved service a CIPP in accordance with the specifications. Measurement for length shall be made along the centerline of the pipe from inside edge to inside edge of manhole. Items of the work include, but are not limited to safety measures and traffic control, pre-installation cleaning and Closed Circuit Television (CCTV) inspection of sewer main to be lined, root cutting and clearing sewer main of any protrusion/obstruction that might prevent the insertion of the liner, interior pipe repair to enable insertion of the liner, trimming of CIPP at manholes, installation of a Top Hat at each service connection, as well as and the reinstatement and reconnection of the service connections, all testing and CCTV inspection of all CIPP installed.
23D	Sewer Lateral Rehabilitation	The unit price shall include all work, materials, tools, labor and equipment necessary to rehabilitate an existing sewer lateral with CIPP starting from the new Top Hat connection at the existing beach sewer main and including but not limited to, a new cleanout at the home, above-ground locates, CCTV inspection, digs/repair of lateral prior to lining, temporary sewer bypassing if required by specifications, and CIPP lining of lateral (assume 100 LF per lateral, 6-inch diameter lateral).
24D	Beach Lines Manhole Rehabilitation	The lump sum shall include all work, materials, tools, labor and equipment necessary and incidental to furnishing, installing and placing in approved service rehabilitated beach line manholes, in accordance with the specifications and details on the Drawings. Items of work include, but are not limited to replacing concrete flat tops on nine (9) existing beach manholes with new precast concrete flat top with watertight manhole frame and lid, raising three (3) existing beach manholes to grade with new risers, retrofitting one (1) existing beach manhole with a fiberglass bottom liner, preparing and coating the interior concrete surface of all nine (9) existing beach manholes, and watertight sealing of all rehabilitated manhole sections. Also included shall be the careful removal, haul and disposal of existing manholes that are to be rehabilitated. Manholes shall be rehabilitated or reinstalled prior to daily high tide, any and all reinstallation costs shall be the responsibility of the Contractor.

Bid Items	Bid Item Name	Measurement/Payment Description
25D	Beach Debris Removal (Allowance)*	The unit price shall include all work, materials, tools, labor and equipment necessary to remove, haul and legally dispose of non-native material (i.e. concrete chunks, basalt rock, quarry spalls, broken pipe, miscellaneous metals, etc.) scattered on the beach within 25 feet of surfaces impacted by construction activity as directed by the Construction Manager. Costs for temporary beach access at the pump station sites and beach backfill necessary to restore disturbed areas and fill voids to existing grades shall be considered incidental and included within the unit bid price. Refer to Section 02 41 10 for example photos of scattered beach debris.

* Allowance - For the purpose of establishing a common basis for evaluating bids, an arbitrary quantity for this item has been shown on the bid form and does not necessarily represent the quantity that may be necessary for the work. The Variation in Estimated Quantities provisions of Section 1-04.6 of the Standard Specifications shall not apply to this item. Quantities will be determined in the field as work progresses.

1-09.6 Force Account

Section 1-09.6 is supplemented with the following:
(Local Agency SP)

The Contracting Agency has estimated and included in the Proposal, a dollar amount for the Bid item "Minor Changes (Allowance)" (also referenced as Force Account), only to provide a common proposal for Bidders. This dollar amount shall become a part of Contractor's total bid. However, the Contracting Agency does not warrant expressly or by implication that the actual amount of work will correspond with the estimate. Payment will be made on the basis of the amount of work actually authorized by Engineer through Work Directives.

A complete list including name, labor classification and weighted wage rate of all personnel to be performing "Minor Changes" work shall be given to the Engineer before "Minor Changes" work starts. A list including all pertinent information, such as equipment name and model, year, engine size, bucket size, capacity, etc., for all equipment to be used for performance of "Minor Changes" work shall also be furnished to the Engineer prior to beginning "Minor Changes" work.

1-09.7 Mobilization

The second and third paragraphs and the associated subparagraphs of Section 1-09.7 are deleted and replaced with the following:
(Local Agency SP)

"Mobilization and Demobilization" shall include but not be limited to the following items:

1. Movement of Contractor's personnel, equipment, supplies, and incidentals to the project site;
2. The establishment of onsite trailer, including procurement of all utilities to serve the offices such as power, telephone, fax, high speed internet, etc.;
3. Securing suitable storage area(s), staging area(s), parking area(s) and other facilities necessary for work on the project;
4. Providing sanitary facilities for Contractor and Contracting Agency personnel;

5. Securing private agreements for temporary land use on adjacent properties as needed and providing a copy of all such agreements to the Engineer as required by Section 1-07.24;
6. All other pre-construction expenses and costs for preparatory work and operations performed by the Contractor; and
7. All demobilization costs, including removal of equipment, excess materials, trailer and general cleanup.

1-09.9 Payments

Delete the first four paragraphs of Section 1-09.9 and replace them with the following: (March 13, 2012 APWA GSP)

The basis of payment will be the actual quantities of Work performed according to the Contract and as specified for payment.

The Contractor shall submit a breakdown of the cost of lump sum bid items at the Preconstruction Conference, to enable the Project Engineer to determine the Work performed on a monthly basis. A breakdown is not required for lump sum items that include a basis for incremental payments as part of the respective Specification. Absent a lump sum breakdown, the Project Engineer will make a determination based on information available. The Project Engineer's determination of the cost of work shall be final.

Progress payments for completed work and material on hand will be based upon progress estimates prepared by the Engineer. A progress estimate cutoff date will be established at the preconstruction conference.

The initial progress estimate will be made not later than 30 days after the Contractor commences the work, and successive progress estimates will be made every month thereafter until the Completion Date. Progress estimates made during progress of the work are tentative, and made only for the purpose of determining progress payments. The progress estimates are subject to change at any time prior to the calculation of the final payment.

The value of the progress estimate will be the sum of the following:

1. Unit Price Items in the Bid Form — the approximate quantity of acceptable units of work completed multiplied by the unit price.
2. Lump Sum Items in the Bid Form — based on the approved Contractor's lump sum breakdown for that item, or absent such a breakdown, based on the Engineer's determination.
3. Materials on Hand — 100 percent of invoiced cost of material delivered to Job site or other storage area approved by the Engineer.
4. Change Orders — entitlement for approved extra cost or completed extra work as determined by the Engineer.

Progress payments will be made in accordance with the progress estimate less:

1. Retainage per Section 1-09.9(1);
2. The amount of Progress Payments previously made; and
3. Funds withheld by the Contracting Agency for disbursement in accordance with the Contract Documents.

Progress payments for work performed shall not be evidence of acceptable performance or an admission by the Contracting Agency that any work has been satisfactorily completed. The determination of payments under the contract will be final in accordance with Section 1-05.1.

1-09.9(2) Contracting Agency's Right to Withhold and Disburse Monies Due

Section 1-09.9(2) is added as the following:
(Local Agency SP)

In addition to monies retained pursuant to RCW 60.28 and subject to RCW 39.04.250, RCW 39.12, and RCW 39.76, the Contractor authorizes the Engineer to withhold progress payments due or deduct an amount from any payment or payments due the Contractor which, in the Engineer's opinion, may be necessary to cover the Contracting Agency's costs for or to remedy the following situations:

1. Work not in accordance with the Contract Documents;
2. Defective work or equipment cost or liability that may occur to Contracting Agency as a result of Contractor's, Subcontractors or Suppliers failure to perform;
3. Damage to another contractor when there is evidence thereof and a claim has been filed;
4. Where the Contractor has not paid fees or charges to public authorities or municipalities which the Contractor is obligated to pay;
5. Utilizing material, tested and inspected by the Engineer, for purposes not connected with the Work (See Section 1-05.6);
6. Landscape damage assessments (See Section 1-07.16;
7. For overtime work performed by the Engineer or Contracting Agency personnel (See Section 1-08.1(4).
8. Liquidated damages associated with exceeding the Contract Time (See Section 1-08.9 Liquidated Damage); or
9. Failure of the Contractor to perform any of the Contractor's other obligations under the contract, including but not limited to:
    a. Failure of the Contractor to protect survey stakes, markers, etc., or to provide adequate survey work as required by Section 1-05.5.
    b. Failure of the Contractor to correct defective or unauthorized equipment or work (Section 1-05.8).
    c. Failure of the Contractor to furnish a Manufacture's Certificate of Compliance in lieu of material testing and inspection as required by Section 1-06.3.
    d. Failure to submit Intent to Pay Prevailing Wage forms, or correct underpayment to employees of the Contractor or subcontractor of any tier as required by Section 1-07.9.
    e. Failure of the Contractor to pay worker's benefits (Title 50 and Title 51 RCW) as required by Section 1-07.10.
    f. Failure of the Contractor to submit and obtain acceptance of a progress schedule per Section 1-08.3.

Lack of construction progress based upon the Engineer's review of the Contractor's approved progress schedule which indicates the Work will not be completed within the Contract Time may also be a basis for withholding progress payments due or to deduct an amount from any payment or payments due the Contractor. The amount withheld under this subparagraph will be based upon the liquidated damages amount per day set forth in Contract Documents multiplied by the number of working days the Contractor's approved progress schedule, in the opinion of the Engineer, indicates the Contract may exceed the Contract Time.

The Contractor authorizes the Contracting Agency to act as agent for the Contractor disbursing such funds as have been withheld pursuant to this section to a party or parties who are entitled to payment. Disbursement of such funds, if the Contracting Agency elects to do so, will be made only after giving the Contractor fifteen (15) calendar days prior written notice of the Contracting Agency's intent to do so, and if

prior to the expiration of the 15-calendar day period, no legal action has commenced to resolve the validity of the claims, and the Contractor has not protested such disbursement.

A proper accounting of all funds disbursed on behalf of the Contractor in accordance with this section will be made. A payment made pursuant to this section shall be considered as payment under the terms and conditions of the Contract. The Contracting Agency shall not be liable to the Contractor for such payment made in good faith.

If legal action is instituted to determine the validity of the claims prior to expiration of the 15-day period mentioned above, the Engineer will hold the funds until determination of the action or written settlement agreement of the parties.

1-09.11(1) Disputes Review Board

Delete Sections 1-09.11(1,) 1-09.11(1)A, and 1-09.11(1)B and replace with the following:
(Local Agency SP)

The formation and use of a dispute resolution board is not included in this Contract.

1-09.13(3)A Administration of Arbitration

The third paragraph of Section 1-09.13(3)A is revised to read as follows:
(October 1, 2005 APWA GSP)

The Contracting Agency and the Contractor mutually agree to be bound by the decision of the arbitrator, and judgment upon the award rendered by the arbitrator may be entered in the Superior Court of the county in which the Contracting Agency's headquarters are located. The decision of the arbitrator and the specific basis for the decision shall be in writing. The arbitrator shall use the contract as a basis for decisions.

END OF SECTION 1-09

1-10 Temporary Traffic Control

1-10.2(1) General

Section 1-10.2(1) is supplemented with the following:
(Local Agency SP)

The primary and alternate TCS shall be certified by one of the following:

1. The Northwest Laborers-Employers Training Trust
   27055 Ohio Avenue
   Kingston, WA 98346
   (360) 297-3035

2. Evergreen Safety Council
   401 Pontius Avenue North
   Seattle, WA 98109
   (206) 382-4090 or
   1-800-521-0778

1-10.2(1)A Traffic Control Management

The fifth item of the first paragraph of Section 1-10.2(1)A is revised to read as follows:
(Local Agency SP)

5. Coordinating the project's activities (such as ramp closures, road closures and lane closures) with appropriate police, fire control agencies, city, or county engineering, medical emergency agencies, school districts, and transit companies at least ten (10) working days prior to beginning the work.

1-10.2(2) Traffic Control Plans

Supplement Section 1-10.2(2) with the following:
(Local Agency SP)

As a minimum, the Contractor's traffic control plan(s) shall include:

1. Drawings showing vehicular, bicycle, and pedestrian routing during each phase of the work, including permanent and temporary routing of traffic on all roadways.

2. Drawings showing the location of barricades, lighting, signing, and any other vehicular, bicycle, and pedestrian traffic control devices anticipated to be used during each phase of the work.

3. Anticipated traffic blockages resulting from construction activities.

4. Anticipated locations where temporary pipes, cables, or hoses will be placed across or parallel to roadways. Drawing details of ramps over utilities or shallow burial placement and protection cover shall be included.

5. Projected volumes of truck traffic over designated truck haul routes.

1-10.3(2)F Public Convenience and Safety

Section 1-10.3(2)F is added as the following:
(Local Agency SP)

The Contractor shall conduct all operations with the least possible obstruction and inconvenience to the local public. The Contractor shall have under construction no greater amount of work than can be prosecuted properly with due regards to the rights of the public. To the extent possible, the Contractor shall finish each section before beginning work on the next.

To disrupt local access traffic as little as possible, the Contractor shall:

1. Permit local access traffic to pass by the work zone with the least possible inconvenience or delay.
2. Maintain existing roads and streets that lie next to or inside the project limits, keeping them open and in good, safe condition at all times.
3. Remove or repair any condition resulting from the work that might impede traffic or create a hazard, and
4. Keep existing traffic signal and highway lighting systems in operation as the work proceeds. (The Contracting Agency will continue the routine maintenance on such systems).
5. Provide provisions for access by buses and emergency vehicles to streets adjacent to the work zone.

To protect the rights of abutting property owners, the Contractor shall:

1. Conduct the construction so that the least inconvenience as possible is caused to abutting property owners.
2. Maintain ready access to driveways, houses, buildings, and mailboxes along the line of work. Should it be necessary to close an individual driveway for purposes of construction, the Contractor shall present an access plan to limit the driveway closure to less than 24-hours, unless otherwise indicated on the Drawings. Within 48-hours of the construction impeding the driveway, a drivable gravel surface shall be placed and compacted.
3. Provide ready access to pump stations and treatment facilities for operation and maintenance by Kitsap County.
4. Provide temporary approaches to crossing or intersecting roads and keep these approaches in good condition, and
5. Provide another access before closing an existing one whenever the Contract calls for removing and replacing an abutting owner's access.

The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, and any other needed actions to protect property in connection with the performance of the work covered by the Contract. The Contractor shall perform any measures or actions the Engineer may deem necessary to protect the public and property. The responsibility and expense to provide this protection shall be the Contractor's except that which is to be furnished by the Contracting Agency as specified in other sections of the Specifications.

Emergency traffic such as police, fire, and disaster units shall be provided access through the work site and to public and private properties at all times. The Contractor shall coordinate and perform all work in accordance with the requirements of police, fire, and other emergency services agencies.

The Contractor shall coordinate and perform all work in accordance with the requirements of all public transit and school bus service which may be operating in the project area. Safe and convenient access to the bus zones shall be provided and maintained at all times by the Contractor. The Contractor shall be liable for any damages which may result from failure to provide reasonable access or coordination.

The Contractor shall perform the work and provide access to enable solid waste pickup by solid waste collection firms at their regularly scheduled times. Contractor shall also provide access to mailboxes to enable Postal Service pickup and delivery at their regularly scheduled times.

1-10.3(2)G Construction and Maintenance of Detours

Section 1-10.3(2)G is added as the following:
(Local Agency SP)

Streets shall be closed to traffic only upon specific approval of the jurisdictional agency. Prior to the closure of any streets or roads, the Contractor shall prepare a written plan for detouring of traffic and shall

submit such plan to the jurisdictional agency for acceptance. Details shall be in accordance with the requirements of the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways and such additional requirements as may be imposed by the Contracting Agency or other jurisdictional agency. Contractor is hereby informed that proposed road closures greater than 12 hours require approval by the County Council, which may take 4 to 6 weeks to process and will require specific time frames for the proposed closures. Contractor shall submit his/her traffic control plan as an early submittal at the Preconstruction Conference.

All detours, both inside and outside of the work area as required by the Contractor's operations, shall be the sole responsibility of the contractor. The design, construction and maintenance of detours and all temporary facilities required for detours shall be the sole responsibility of the Contractor.

END SECTION 1-10

1-11 Operations and Maintenance Data

Section 1-11 and its subsections are added as the following:
(Local Agency SP)

1-11.1 Schedule of O&M Data Required

The Contractor shall arrange for, and pay all costs associated with the services of the manufacturer's representative and/or others to provide and prepare operation and maintenance data for the system and/or equipment listed below:

1. Submersible sewage pumps and associated mechanical and electrical systems.
2. Flow meters.
3. Valves.
4. Pressure sensor assemblies.
5. Power generation, and pump control systems.
6. Other systems or equipment that may need maintenance.

1-11.2 Initial Submittal

The Contractor shall submit a draft bookmarked and searchable PDF copy of the Operations and Maintenance Manual to the Engineer for review. The PDF shall comply with Section 1-06.1(3). The initial submittal shall be received by the Engineer at least twenty (20) Working Days prior to placement of the system and/or equipment in operation. The initial submittal may be delivered in multiple parts to the Engineer.

All information shall be specifically for the installed components. Data sheets which cover multiple equipment or list options shall be marked to indicate the installed equipment, including provided options. All other equipment or options shall be crossed out. Each item in the submittal shall include, but not be limited to the following information:

1. Fly sheet indicating: Contracting Agency's name; description of equipment; manufacturer's name, address, and telephone number; and local supplier/ representative's name, address, and telephone number.
2. Detailed index indicating submittal contents, with major headings related to tabbed dividers.
3. Assembly drawings.
4. Parts list and/or bill of materials.
5. Wiring diagrams.
6. Lubrication instructions, including type and frequency.
7. Preventative and periodic maintenance summary.
8. Operating instructions.
9. Overhaul and parts replacement instructions.
10. Source for parts.
11. Testing and troubleshooting procedures.
12. Performance curves.
13. Factory and field test data.
14. List of recommended spare parts.
15. List of expendable parts (i.e., air or oil filters).

16. Warranty.

The Engineer will review the initial submittal and return it to the Contractor for incorporation of review comments.

1-11.3 Final Submittal

After the Contractor has addressed the Engineer's comments on the initial submittals, the Contractor shall assemble all components into an integrated document. The final submittal shall include two final bookmarked hard copies and one bookmarked and searchable PDF copy that reflects the corrections. Each hard copy shall be bound in vinyl covered, three-ring binders. The integrated document shall consist of as many volumes as necessary to contain the data. Individual binders for each component of the submittal are not required. The binder shall be organized in a consistent format with tabbed dividers for each item. Each volume shall include, but not be limited to, the following:

1. The front cover and binding edge shall have typed labels identifying the project, Contracting Agency, and volume number;
2. Detailed index indicating the contents of the volume by major headings; and
3. Oversize (larger than 11"x17") prints shall be inserted in bound-in Kraft or Kevlar envelopes, placed at the end of the applicable area or subarea.

The integrated document shall be submitted to the Engineer within ten (10) Working Days after Substantial Completion of the work. If the integrated document does not meet the requirements of this Section, the Engineer may return the copy to the Contractor for corrections. The submittal process shall be repeated until the integrated document is acceptable. The Contractor shall anticipate that Final Acceptance may be delayed by the Contracting Agency if the integrated document is not acceptable to the Engineer.

END OF SECTION 1-11

1-12 Internet-Based Project Management Requirements

Section 1-12 and its subsections are added as the following:
(Local Agency SP)

1-12.1 Summary

This Section specifies an Internet-based project management system, EADOC, required for use by the Contractor and the Owner for collaboration and communications of all Contract related work.

1.12.2 Submittals

Submit the following for each proposed authorized EADOC user within ten days of the effective date of the Notice to Proceed:

1. Name, title and company affiliation.
2. Address, phone number, email address and fax number.
3. Specific job related functions.
4. Level of authority within the Contractor's organization.
5. Level of permissions access requested for each user for accessing each EADOC module.

Submit an updated list of authorized users on a quarterly basis or more frequently as needed, to indicate users to be added or removed.

1.12.3 Project Communications

All official Project Communication and collaboration will take place in EADOC by creating and distributing documents directly within the system, or by scanning and/or uploading project documents into the system for distribution. Unless otherwise indicated, no other form of written Project Communication will be recognized.

Create submittals in EADOC's submittal module. Distribute reports, documents, samples, etc. that cannot be processed through EADOC per Section 1-06. Use EADOC to track and expedite processing submittals. Scan and/or upload support documentation into EADOC and attach to the main submittal document.

The Construction Manager or Engineer will respond to all documents using the appropriate EADOC module. All documents requiring formal signatures will be printed out in EADOC and hard copies signed and distributed. Otherwise, documents distributed electronically via EADOC will be considered official documentation. Documents requiring formal signature include:

1. Change Orders.
2. Construction Change Directives.
3. Others as determined by Owner.
4. Pay applications.

All documents will be electronically submitted to the Owner as an attachment to a transmittal created in EADOC transmittal module.

This Section shall not relieve the Contractor of its obligations to provide the Owner with Record Drawings in the physical form specified in Section 1-05.5.

1.12.4 Access Requirements

Contractor shall maintain the list of authorized users to reflect current authorized users of EADOC.

Contractor shall protect the security of the EADOC system by limiting access to authorized users only. Do not allow 'sharing' of usernames. Take appropriate precautions to maintain the security of the system.

Ensure that Owner is notified immediately of any user who is no longer authorized to use the system so that their user account can be de-activated by the EADOC Administrator.

Access will only be permitted to certain modules, in accordance with permission levels configured by the EADOC Administrator. Requests to change permission levels must be submitted to the Construction Manager.

1.12.5 Use Requirements

EADOC shall be used as the Project file storage system with a file folder structure created by the Owner to organize the Project documents.

The use of EADOC is intended to expedite and improve collaboration and written contract communication and to accurately record the flow of Contract documentation.

Contractor shall encourage its major subcontractors to utilize the Internet-based project management system, as appropriate, to improve communications and coordination within the Contractor's team.

Contractor shall abide by all policies, procedures, and standards established by the Owner for the use and application of EADOC.

Contractor shall comply with applicable laws and regulations regarding electronic transmission of documents requiring professional engineering stamps or signatures, including provision of hard copies of such documents as appropriate.

Project Communications that require the signature of authorized persons will use either:

1. An approved "image" of the official signature affixed to the document. Also provide Owner with the original signed hard copy/paper document.
2. An electronic copy or electronic image of a fully executed document containing the required signatures. Also provide Owner with the original signed hard copy/paper document.

1.12.6 Downtime

In the event that the EADOC system is temporarily unavailable, continue with Project Communications utilizing other electronic means (email) or hard copies to transmit and receive Project Communications.

Maintain records of all Project Communication during the EADOC downtime and upload the records to EADOC when it is operational.

Notify the Owner's EADOC Administrator by telephone or email when EADOC is not functional.

1.12.7 EADOC Training

Submit a proposed schedule of attendance for the EADOC training sessions including a list of back up personnel. EADOC training is mandatory for listed users of EADOC prior to use, including any training sessions scheduled by the Owner. Contractor shall provide for up to 12 hours of EADOC training for up to 3 staff. The Contractor is not required to pay EADOC for the training sessions, but shall pay for the required Contractor staff to attend the training.

1.12.8 Project Management System Requirements

Provide computer hardware and software that meet the requirements of the EADOC project management software at both field office and home office location(s) where Project Communications on this Contract are generated or processed.

1.12.8(1) Modifications:

EADOC is continually modified and improved in order to enhance the product and provide additional functionality. EADOC has many methods of alerting clients to changes and providing support to the end users.

1-12.8(2) Software, Hardware, and Internet Access:

Minimum software requirements are as follows:

1. An Operating system such as Windows 2000 or later.
2. An Internet browser Explorer Version 6.1 or later.

Minimum hardware requirements are as follows:

1. Pentium-based (or equivalent) workstation or laptop with a minimum of 64 MB of RAM.
2. A scanning device capable of scanning a minimum of 11-inch x 17-inch color document into electronic Portable Document Format (PDF) with a minimum density of 300 dpi.
3. A full-size plan scanner.

Minimum access requirements are as follows:

1. Broadband connection using integrated Services Digital Network (ISDN), Digital Subscriber Line (DSL), or better.

Contractor shall be responsible for his costs associated with the provisions, maintenance, and upgrade of the hardware, software, and Internet access needed for using EADOC for the duration of the Contract.

Contractor shall be responsible for all software necessary to create documents in format compatible with EADOC or to convert non-electronic documents to such formats. Compatible formats include: Word, Excel, AutoCAD, and PDF.

1.12.9 Restrictions and Limitations

All Project Communications submitted to the Owner through EADOC after 3:00 PM, Monday through Friday, will be acknowledged no earlier than the following business day. For Project Communication purposes, business days and hours are defined in Section 1-01.3.

User access rights to the EADOC site will restrict access to this Contract only. Access permission levels will be established by the Owner and Construction Manager.

1.12.10 Owner Responsibility

Owner shall:

1. Provide the Contractor with EADOC Use Guidelines within seven days of the effective date of Notice to Proceed.
2. Provide user access to the EADOC system for the duration of the Contract.
3. Manage the permissions level for all users of the system.
4. Provide EADOC training for personnel using the system for each EADOC user identified by the Contractor.
5. Provide technical support (administration) for EADOC, acting solely through and at the request of the Owner.
6. Provide guidelines regarding the organization and format of the EADOC modules and the access permission requirements for each module or element thereof.
7. Allow users to upload, download, view, and markup files, based on permissions.
8. Track history of revisions and activities with respect to each document submitted or managed within EADOC.
9. Adjust and revise the folder structure as necessary to facilitate management of Project Communications.

With the prior approval of Owner, exceptions may be made to allow specific items to be transmitted, submitted, responded to, or distributed in hard copy only. In these instances, EADOC shall be used to track and expedite processing of these items. Refer to Section 1-12.5 above.

END OF SECTION 1-12

SECTION 01 59 00
TEMPORARY SEWER BYPASS SYSTEMS

PART 1 : GENERAL

1.01 SUMMARY

Work covered in this section includes the requirements for temporary sewer bypass systems. The means and methods of accomplishing and maintaining the bypassing shall be the sole responsibility of the Contractor.

The Contractor shall anticipate that multiple temporary sewer bypass systems will be required over the duration of construction to construct the proposed improvements given the specified work constraints and separated project site locations.

The Interim Operation Plan developed for the Washington State Department of Ecology is included for information only as Appendix H.

1.02 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Submit details of proposed temporary sewer bypass system(s).

1. Bypass Plan: detailed explanation of the proposed sewer bypass system(s), including project specific plans, details, sequencing, duration and assistance required of the Owner. Bypass Plan shall be stamped and signed by a professional engineer registered in the State of Washington.
2. Proposed pumping equipment.
3. Engineering analysis and calculations for each sewer bypass system.
4. Spillage cleanup plan.

C. Temporary Bypass Qualifications.

1.03 CONTRACTOR RESPONSIBILITY

A. BYPASS SYSTEM REQUIREMENTS

1. Bypassing of untreated or partially treated wastewater to surface waters or drainage courses is prohibited during construction. In the event accidental bypassing is caused by the Contractor, the Owner shall immediately be entitled to employ others to stop the bypassing in accordance with the General Conditions.
2. Penalties imposed on the Owner as a result of any bypass caused by the actions of the Contractor, its employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the Owner resulting directly or indirectly from the bypass.

3. Precautions and Protective Measures:
    a. Review existing sewer system plans with the Engineer and Owner.
    b. Verify the size and location of connecting laterals and side sewers.
    c. Provide pumps with sufficient capacity and head.
    d. Provide pumping equipment redundancy and/or standby equipment that can be readily deployed.
    e. Investigate upstream manholes.
    f. Check and test pumping equipment and bypass system(s).
    g. Provide suitably experienced person(s) and training personnel (more than one individual) for operation and maintenance of the system(s), including dealing with emergencies.
    h. Check upstream manhole surcharging after bypassing operations have commenced.
    i. Properly monitor and maintain system during operation.
4. Customer Sewer Service Interruption:
    a. The project will require interruption in sewer service for several customers at different time periods during construction. The Contractor shall notify the County Construction Manager and affected customer(s) not less than 48 hours in advance of service interruption and shall indicate the estimated length of time the service will be interrupted. Temporary sewer bypass systems for an individual customer or customers are not required provided the following conditions are met:
        1) Interruption in service shall be minimized and shall be limited to a maximum 6-hour period, to occur during the hours of 9 AM to 3 PM.
        2) One (1) interruption in service is allowed per day, with a maximum of two (2) interruptions in a week for the same customer.
        3) A customer's service shall not be interrupted more than three (3) separate times during the project.
    b. The Contractor shall provide and bear all costs for temporary sewer bypass systems in accordance with this Section if the above conditions cannot be met, unless otherwise approved by the County Construction Manager.
5. Quality Assurance:
    a. Temporary sewer bypass systems shall be designed, stamped and signed by a registered professional engineer in the State of Washington. Engineer shall have demonstrated experience in the design of pumping systems of comparable size and complexity.

b. Before commencement of any bypassing operation, the Contractor shall obtain the Engineer's acceptance of the Bypass Plan including design, equipment and materials, installation, operation and maintenance.

c. Temporary Bypass Qualifications: Contractor shall have a minimum of five years experience in performing substantially similar temporary bypass operations, and shall submit evidence of satisfactory operation of temporary bypass facilities similar to those specified for at least five projects in accordance with the Specifications.

6. Sewer Bypass System Description:

a. Contractor shall provide a suitable and reliable temporary sewer bypass system around the existing pump stations to perform the work indicated on the Drawings. Temporary piping shall be provided and protected at all times during operation of the temporary bypass system. Two pumps and standby power shall be provided at all times. Pumping system shall have automatic start/stop controls.

b. Pumps shall be solids handling type, suitable for raw sewage application.

c. Contractor will be responsible for properly operating, protecting, maintaining and servicing the bypass equipment for the duration of the temporary bypass. Contractor shall be responsible for bypass pumping equipment, electrical service, fuel, and all other appurtenances and consumables required for operation of the temporary sewer bypass system.

d. Noise levels of equipment shall meet the requirements of Kitsap County and Washington State noise level requirements. Depending on the pumping equipment that is used, meeting this requirement may require the use of sound attenuating enclosures as well as other provisions and measures. If possible, existing power supplies should be used to power the bypass pumping equipment so as to avoid engine-driven pumping units or engine generators. If engine-driven pumps or engine generators are used, equipment shall be located as far from residences as possible. Depending on the situation and subject to the approval of the Owner, the only possible exception or relaxation of this requirement will be in cases where the bypassing equipment will only be operated: 1) during the work week; 2) during normal working hours and; 3) period of bypass operation will be less than one week.

e. Temporary bypassing systems shall be continuously provided from the time that the existing pumping system is made inoperable, until such time as the new pump station (including automatic controls and alarms) is substantially complete, reliable, and accepted by the Owner.

f. The temporary sewer bypass system for each pump station shall be designed to handle a minimum capacity of 100 gpm. If a temporary pumping system is used to bypass, a minimum 100 gpm shall be provided with the largest pump out of service. The pump capacity shall be increased to maintain adequate cleaning velocities (>3.5 fps) within the temporary piping as required.

g. Maintain on-site sufficient equipment, parts, materials and fuel to ensure continuous and uninterrupted operation of the bypass system(s). A minimum of 24-hours of fuel shall be maintained on-site. Standby pumps and generators shall be fueled and operational at all times. Contractor's personnel shall be knowledgeable and trained on how to operate and maintain the bypass equipment.

h. All monitoring shall be fully functional during bypassing.

i. If the bypass system is to be operated when the Contractor is not on-site, the system shall be provided with a monitoring and alarm system that notifies the Contractor and Owner 24 hours a day of a system failure. In the event of a failure, Contractor shall respond immediately and fix the cause of the problem. Contractor shall be on-call 24 hours a day and be able to respond within 30 minutes at all times during sewer bypassing. The Contractor will be required to demonstrate to the satisfaction of the Owner that this requirement can be met and that responsible and appropriately trained personnel will be able to deal with emergencies that could arise. The Contractor is encouraged to consider retaining a company or individual(s) that specialize in the operation and maintenance of bypass sewer systems that require unattended operation.

j. Sewer bypassing shall not cause backup of sewage into residences. Depth of surcharge upstream shall be kept to the minimum necessary. The Contractor will be responsible for repairing any damage to upstream property due to surcharging of the system.

k. All sewer pipes and manholes that were surcharged shall be properly flushed to remove accumulated sewage material.

l. If damaged, restore bypass areas to pre-existing conditions in accordance with the requirements of the Contract Documents.

7. Spills:

a. Contractor is fully responsible for any damage that may result from an inadequate or improper installation, maintenance or operation, or failure of any kind of the bypass system. That responsibility includes but is not limited to the costs associated with cleanup and repair of property damage.

b. Spills or bypasses of sewage to surface waters or drainage courses is prohibited. In the event of sewage spills, the Contractor shall immediately take whatever actions are deemed necessary to stop a spill. Should the Contractor not take immediate action, the Owner will be entitled to take whatever actions are deemed necessary to stop a spill.

c. Costs incurred by the Contractor or Owner, including penalties imposed on the Owner as a result of any sewage spill caused by the Contractor, its employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the Contractor or Owner resulting directly or indirectly from the spill.

8. Work and Assistance by Owner:

a. Operation of the existing pump station facilities, including those operations which may be necessary to facilitate the Contractor's work will be provided by the Owner.

b. For minor assistance and operations, the Contractor shall provide a minimum of 3 days advance notice to the Owner. For more major assistance, Contractor shall provide a minimum of 14 days advance notice to the Owner.

END OF SECTION

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SECTION 02 22 26
CONSTRUCTION MONITORING PROGRAM

PART 1 : GENERAL

1.01 SUMMARY

A. The work in this Section includes, but is not limited to, providing all labor, materials, tools, equipment, and incidentals necessary for Construction Monitoring Program, in accordance with the Contract Documents.

B. The work of this Section includes, but is not limited to, the following activities:

1. Interior and Exterior Pre-Construction Inspection Reports. Construction Activity Reports.
2. Installing and monitoring crack monitors.
3. Interior and Exterior Post-Construction Inspection Reports.

1.02 SUBMITTALS

A. Qualifications of independent engineering firm and their Independent Professional Engineer who will perform the pre-and post-construction inspections. Note that several western Washington firms that provide construction vibration monitoring/instrumentation services (as Required in Section 01860) also provide pre-construction inspections.

B. Submit a sample for each report described in this Section for review and approval by the Engineer before beginning the work.

C. Pre-construction Inspection Reports: Prepare a separate report for each structure. Structures shall be selected be the Independent Professional Engineer, and may include but are not limited to:

1. PS 47 Site
   a. 8193 East Hemlock Street
   b. 8168 East Hemlock Street
   c. 2163 Nubling Avenue North
   d. 2179 Nubling Avenue North
2. PS 46 Site
   a. 8675 East Caraway Road
   b. 8682 East Caraway Road
3. PS 45 Site
   a. 8135 East Daniels Loop
   b. 8137 East Daniels Loop
   c. 8139 East Daniels Loop

d. 8165 East Daniels Loop

Submit 3 copies of each report, including drawings, photos, and videos. Complete the pre-construction inspection reports at least 3 weeks before beginning any construction work. Allow 2 weeks for review by the Engineer.

D. Construction Activity Reports: Submit descriptions of the work performed according to the following schedule: daily during shoring installation; otherwise, weekly. Include:

1. Summary of construction activities performed. Include sketches on copies of the construction plan drawings showing the locations, limits, and dates of work performed.
2. Description of any unusual events that may have caused unusual vibrations (e.g. difficult driving, hit obstruction, etc.), settlement of or potential damage to a building or other structure. Describe any remedial or precautionary measures that were implemented in response to the unusual event or instrumentation data during the period covered by the report. Include when, where, and why the measures were implemented. Include a description of any future remedial or precautionary measures that are planned in response to existing instrumentation.
3. Crack monitor measurements.

E. Post-construction inspection reports for each building or structure for which a pre-construction inspection report was prepared, including additional specific focus on portions of buildings or structures where damage is alleged to have occurred, if any. Submit 3 copies of each report, including drawings, photos, and videos. Post-construction inspection reports shall be prepared by the same firm who prepared the pre-construction inspection reports.

1.03 QUALIFICATIONS

Employ an independent Professional Engineer, with at least 5 years of experience in performing condition surveys to perform the preconstruction inspections.

PART 2 : PRODUCTS

2.01 CRACK MONITOR

Provide a calibrated direct read building crack monitor consisting of overlapping glass or acrylic plates. The crack monitor shall be waterproof and weather resistant and shall be capable of being read to a resolution of 0.02 inch with a maximum horizontal range of at least 0.75 inch and a vertical range of at least 0.375 inch.

PART 3 : EXECUTION

3.01 PRECONSTRUCTION INSPECTIONS

A. Perform interior and exterior preconstruction inspections on the buildings referenced in Section 1.2.C and any other structures or site features deemed necessary by the independent Professional Engineer. Videotape all relevant features including curbs, sidewalks, parking areas, and landscaping features associated with the buildings described above.

B. Obtain permission to perform the surveys from building owners and tenants in coordination with Kitsap County or the Engineer. Document all interactions with the building owners and tenants.

C. Notify the Engineer at least 1 week before conducting each preconstruction survey.

D. Include the following, as a minimum, for each survey:

1. Conduct a detailed examination of the portions of the buildings or structures identified above.
2. Document the examinations with color still photographs and videotapes. The scope and number of photographs and videos shall be sufficient to document all pre-existing conditions, at the opinion of the Independent Professional Engineer.
3. Document the conditions observed in writing or by verbal description on the videotape1 by time stamp. Note evidence of damage or defects, including, but not limited to:
   a. Damaged, cracked, spalled 1 or delaminated concrete.
   b. Sheared or bent bolts.
   c. Distortion of the structural members or elements.
   d. Cracked, loose, or missing plaster, wall board, or other wall finishing.
   e. Damaged masonry or roofing.
   f. Displacements or separations in materials or caulking.
   g. Windows and doors that stick or do not fit properly in their frames.
   h. Walls or floors that are not vertical or horizontal.
   i. Evidence of water seepage into the building.
   j. Cracked or peeling paint, flooring, ceiling tiles, or interior finishes.
4. Interview building/structure personnel regarding existing conditions, known damage or defects, and historical building/structure damage or repairs. Video or audio record the interviews.
5. Recommend crack monitoring locations for existing cracks in each building or structure for approval by the Engineer.

3.02 CRACK MONITOR INSTALLATION AND MONITORING

A. Install crack monitors on existing cracks in each building or structure at locations recommended by the independent Professional Engineer and approved by the Engineer. Install crack monitors in accordance with the manufacturer's recommendations.

B. After installation, submit a sketch and photograph showing the as-installed locations in the horizontal position and elevation, measured from physical features in the field, to an accuracy of+/- 1 foot.

C. Within 3 days of installing the crack monitor and after the epoxy has set, perform a first initial reading (FIR). The FIR for a crack monitor will be the reading of the cross hairs on the crack monitor when the tape connecting the two plates is cut after the monitor has been installed and/or the epoxy has set. Reading accuracy shall be +/-0.02 inch. Submit the FIR to the Engineer.

D. Read the crack monitors weekly and submit readings with the Construction Monitoring Reports. Reading accuracy shall be +/-0.02 inch.

3.03 POST-CONSTRUCTION INSPECTIONS

Contractor shall prepare a Post-Construction Inspection Report as directed by the Engineer for each building or structure for which a Pre-Construction Inspection Report was prepared. Perform and document the inspections, and provide reports, as described above. Document any changes from the pre- construction conditions. If at any time after the beginning of construction, a building or structure owner or tenant makes a claim for damages or alleged damages, the Contractor shall immediately inform the Engineer of such claim. In addition, the Contractor shall immediately act to have the Independent Professional Engineer perform further inspections of the alleged damage and report its findings to the Engineer within 5 days of receiving the notice of claim.

END OF SECTION

SECTION 02 22 29
CONSTRUCTION NOISE AND VIBRATION CONTROL

PART 1 : GENERAL

1.01 SUMMARY

A. The work of this Section includes, but is not limited to, providing all labor, materials, tools, equipment, and incidentals necessary for construction noise and vibration control, in accordance with the Contract Documents.

B. The work of this Section includes, but is not limited to, the following activities:

1. Construction Noise and Vibration Monitoring and Control Plan.
2. Noise and Vibration Monitoring.
3. Monitoring Reports.
4. Complaint Resolution.

1.02 REFERENCES

A. FTA, "Transit Noise and Vibration Impact Assessment"

B. AASHTO

C. ANSI

1. ANSIS1.4 Specification for Sound Level Meters

D. (IEC)

1. 1 EG 179 Precision Sound Level Meters

E. (SAE)

1. SAE J366 Exterior Sound Level for Heavy Trucks and Buses
2. SAE J952 Sound Levels for Engine Powered Equipment
3. SAE JAG Exterior Sound Level Measurement Procedure for Earthmoving Machinery

1.03 SUBMITTALS

A. Before beginning work that may cause noise or vibrations, submit a Construction Noise and Vibration Monitoring and Control Plan (CNVMC Plan) including:

1. Instrument specifications and calibrations
2. Table of expected noise and vibration producing activities including:
   a. description of activity, location, and anticipated dates and times of activities

3. Table of structures and other noise and/or vibration sensitive receptors that may be impacted by noise and vibration including:

   a. structure description (construction type, age, foundation type, etc.), street address, name and address of owner, and names of occupants

4. Proposed monitoring locations.

5. A Construction Vibration Assessment performed in accordance with the guidance in Chapter 12 of the FTA Transit Noise and Vibration Impact Assessment Manual (April 1995) for construction activities. The assessment shall include the independent Professional Engineer's recommendations for vibration level restrictions, specific to each structure/feature being monitored.

6. A Construction Noise Assessment performed in accordance with the guidance in Chapter 12 of the FTA Transit Noise and Vibration Impact Assessment Manual (April 1995) for construction activities. The assessment shall include the independent Professional Engineer's recommendations for noise level restrictions.

7. Preliminary evaluation of structure susceptibility to vibration-induced damage

8. Monitoring program procedure including reporting procedures

9. Noise and Vibration Mitigation Plan (including damage prevention)

10. Sample Noise and Vibration Data Report

11. Plan to deal with and resolve complaints

B. Before beginning work that may cause noise or vibrations, initiate a Construction Noise and Vibration Monitoring and Control Program. The Contractor shall perform the following actions:

1. Within 2 workdays of receipt of each seismograph and noise meter at the site, submit a copy of specifications, manual, and factory calibration and manufacturer's test equipment certification.

2. Submit background noise and vibration data reports for each structure in accordance with this specification.

3. Submit weekly Noise and Vibration Data Reports, within 3 days of the end of each week.

4. Submit Noise and Vibration Data Reports within 1 working day of requests by the Engineer in response to complaints by adjacent property owners.

1.04 QUALIFICATIONS

Contractor shall employ an independent Professional Engineer, with at least 5 years of experience in preparing CNVMC Plans and monitoring. Submit qualifications to the Engineer for approval.

PART 2 : PRODUCTS

2.01 EQUIPMENT

A. Noise Meters: Provide and operate Type 1 or Type 2 sound level meters consistent with ANSI and ASTM requirements for monitoring noise levels from construction activities and equipment:

1. Noise level range: 40 to 120 decibels (dB), or mid-scale
2. Metric: Leq, 1-hour average
3. A-weighted frequency response
4. Response time: slow setting for continuous or intermittent noise; fast setting for impulsive noise (a momentary sound such as a horn)
5. Windscreen: place factory-supplied windscreen over microphone during all measurement periods.
6. Position: the meter microphone should be positioned at a height of 4 feet above ground level and at least 10 feet away from a reflecting surface (such as a wall). The microphone can be handheld or tripod mounted.
7. Data shall be collected either by manually reading and recording noise levels or by storing and downloading the data remotely depending on the capabilities of the meters used. The date, time, monitoring location and nature of construction activities shall be reported with the data.
8. Field calibration: Noise meters shall be field-calibrated before and after each measurement, or at least once per hour, whichever is more frequent, using a calibrator specified for use with the meter and the manufacturer's instructions for calibration.

B. Seismographs: Provide portable seismographs for monitoring the velocities of ground vibrations resulting from construction activities, with the following minimum features:

1. Seismic range: 0.01 to 8 inches per second with an accuracy of 5% and no more than a 3 db roll off at the low frequency end.
2. Flat frequency response: 2 to 200 Hertz.
3. Three-component sensor.
4. Fourth channel for air blast monitoring.
5. Two power sources: Internal rechargeable battery and charger and 115 volts AC. Battery must be capable of supplying power to monitor vibrations continuously for at least 24 hours.
6. Direct writing to printer and to either USB flash drive or CD.
7. Instruments must be capable of producing strip chart recordings of readings on site within one hour of obtaining the readings. Provide computer software to perform frequency analyses of data.

8. Continuous mode and histogram mode capabilities for recording vibrations. Histogram mode must include frequencies of each peak vibration.

9. Capability of downloading data remotely via wireless connection, and/or wireless notification of when threshold values have been exceeded.

C. Factory calibration: provide factory calibrations for each instrument. Perform seismograph calibrations using a shake table and a reference sensor traceable to the national institute of standards and technology. Perform noise meter calibrations using a calibrator traceable to the national institute of standards and technology. Recalibrate the instruments at least once every 12 months.

PART 3 : EXECUTION

3.01 GENERAL

A. The Contractor shall submit to the Engineer for approval a CNVMC Plan at least 3 weeks prior to the onset of construction.

1. The Contractor shall monitor construction activity noise for two one hour periods each week when Contractor's activities are most noise intensive, unless additional monitoring intervals are required by the CNVMC Plan.

2. The Contractor shall monitor construction activity noise at actual or representative sensitive receptor locations, consistent with his CNVMC Plan. The selected monitoring locations and ·rationale for selection shall be identified in the CNVMC Plan and used throughout the monitoring program.

B. The Contractor shall execute a Construction Noise and Vibration Monitoring and Control Program. The Program shall be performed consistent with the requirements and conditions specified in the CNVMC Plan.

C. The Contractor shall use every effort and every means possible to minimize noise caused by its operations. The Contractor shall provide working machinery and equipment designed to operate with the least possible noise, including the use of shields, soundproof housings, enclosures, or other physical barriers to restrict the transmission of noise. Compressors shall be equipped with silencers or mufflers on intake and exhaust lines. Wherever practicable, electricity shall be used for power to reduce noise. Where required by agencies having jurisdiction, certain noise producing work may have to be performed during other than regular working hours or at specified periods only.

D. If the need arises, the Contractor will be required to assist the Engineer and with community coordination activities relative to public noise exposure.

3.02 GENERAL NOISE LEVEL RESTRICTIONS

A. As part of the CNVMC Plan, the Contractor must determine the potential for construction noise impacts on noise sensitive receptors, develop noise level restrictions and limits, and develop a mitigation plan to prevent impacts to the maximum extent practicable.

B. Contractor assumes all responsibility and liability for any noise impacts on sensitive receptors.

C. Maximum acceptable noise levels must be developed in the CNVMC Plan.

D. Contractor shall take ambient noise measurements and shall identify and implement mitigation measures to ensure compliance with the maximum acceptable construction noise levels.

E. Noise monitoring shall not be conducted during precipitation events or in winds greater than 12 miles per hour.

F. If a maximum acceptable construction noise level is reached:

1. Immediately notify the Engineer.
2. Meet with the Engineer to discuss response action(s).
3. Submit an up-to-date report within 24 hours for all instruments for which the maximum level was reached, as well as on any other instruments requested by the Engineer.

G. In addition to the above steps, if a maximum acceptable construction noise level is reached, initiate the following response actions, as directed by the Engineer.

1. Increase instrument monitoring frequencies.
2. Install and monitor additional instruments.
3. Modify construction procedures.
4. Implement mitigation measures identified in the CNVMC Plan so that the maximum level is not exceeded.

H. If the maximum level is reached, the Contractor may be directed to suspend activities in the affected area with the exception of those actions necessary to avoid exceeding the maximum level.

I. If complaints about noise are received, the Contractor shall promptly conduct additional monitoring at additional times, locations and frequencies, as directed by Engineer, and immediately inform Engineer of the results of such monitoring, at no additional cost to County.

3.03 SPECIFIC NOISE LEVEL RESTRICTIONS

A. Identified noise-sensitive receptors likely to be impacted by construction may include, but are not limited to:

1. PS 47 Site
   a. 8193 East Hemlock Street
   b. 8168 East Hemlock Street
   c. 2163 Nubling Avenue North
   d. 2179 Nubling Avenue North

2. PS 46 Site
   a. 8675 East Caraway Road
   b. 8682 East Caraway Road
3. PS 45 Site
   a. 8135 East Daniels Loop
   b. 8137 East Daniels Loop
   c. 8139 East Daniels Loop
   d. 8165 East Daniels Loop

B. The Contractor shall ensure that appropriate measures will be in place during construction to protect the sensitive receptors to the maximum extent practicable. These measures shall be identified within the approved CNVMC Plan.

3.04 GROUND VIBRATION LIMITS

A. As part of the CNVMC Plan, the Contractor shall prepare a Construction Vibration Assessment in accordance with the guidance in Chapter 12 of the FTA Transit Noise and Vibration Impact Assessment Manual for construction activities, and to the current standard of engineering practice. The assessment must determine the potential for construction vibration impacts on vibration sensitive features, develop a mitigation plan to prevent impacts to the maximum extent practicable, and monitor construction activity vibration as needed.

B. Contractor assumes all responsibility and liability for any vibration damage to surrounding buildings and structures as a result of the Contractor's activities.

C. Threshold and limiting vibration values specific to structure/receptor type and location must be developed in the CNVMC Plan.

D. If a threshold value is reached:

1. Immediately notify the Engineer.
2. Refer to the CNVMC Plan.
3. Meet with the Engineer to discuss response action(s).
4. Submit an up to date report within 24 hours for all instruments for which the threshold value was reached, as well as on any other instruments requested by the Engineer. Continue to submit daily reports until all instrument readings fall below the specified threshold values, or unless otherwise directed by the Engineer.

E. In addition to the above steps, if a threshold value is reached, initiate the following response actions, as directed by the Engineer.

1. Increase instrument monitoring frequencies.
2. Install and monitor additional instruments.
3. Modify construction procedures.

4. Implement mitigation measures as specified in the CNVMC Plan.

F. If complaints about vibration are received, the Contractor shall promptly conduct additional monitoring at additional times, locations and frequencies, as directed by Engineer, and immediately inform Engineer of the results of such monitoring, at no additional cost to the County.

3.05 SPECIFIC VIBRATION LEVEL RESTRICTIONS

A. Identified ground vibration sensitive receptors likely to be impacted by construction may include, but are not limited to:

1. PS 47 Site
   a. 8193 East Hemlock Street
   b. 8168 East Hemlock Street
   c. 2163 Nubling Avenue North
   d. 2179 Nubling Avenue North
2. PS 46 Site
   a. 8675 East Caraway Road
   b. 8682 East Caraway Road
3. PS 45 Site
   a. 8135 East Daniels Loop
   b. 8137 East Daniels Loop
   c. 8139 East Daniels Loop
   d. 8165 East Daniels Loop

The approved CNVMC Plan shall be the final basis of determining ground vibration sensitive receptors.

B. The Contractor shall ensure that appropriate measures will be in place during construction to protect the sensitive receptors from damage and foundation cracking to the maximum extent practicable. These measures shall be identified within the approved Construction Noise and Vibration Mitigation Plan.

3.06 SEISMOGRAPH INSTALLATION

A. Install seismographs in accordance with Manufacturer's installation instructions.

B. Firmly mount seismographs on the surface slab of concrete or asphalt, firmly set them in undisturbed soil, or rigidly attach them to the structure of buildings.

3.07 PROTECTION OF INSTRUMENTS

A. Protect all instruments and appurtenant fixtures, leads, connections, and other components of instrumentation systems from damage due to construction operations, weather, traffic, and vandalism.

B. If an instrument is damaged, repair or replace the damaged instrument at no additional cost to the County, including damage resulting from Contractor's actions to instruments installed by others.

3.08 DATA COLLECTION

Comply with the schedule in Table X, or a modified schedule provided in the approved CNVMC Plan.

Table X - Monitoring Schedule

Instrument	Schedule
Noise Meters	Obtain noise measurements during the designated one-hour daytime monitoring period, in the Leq metric, and the designated one-hour nighttime monitoring period one week before construction begins at the selected noise monitoring locations to establish background noise levels. Obtain noise measurements during the designated one-hour daytime monitoring period, in the Leq metric, and the designated one-hour nighttime monitoring period each week during construction activities at the selected noise monitoring locations. Submit data reports weekly.
Seismographs	Continuously, in histogram mode (5 minute intervals), for one week before construction begins, to obtain background vibration levels. At the start of vibration-inducing construction activities, determine peak particle velocity and corresponding frequencies produced by vibration-producing activities to establish the maximum energy which can be used without surpassing acceptable vibration levels in nearby structures. Perform separate tests for each building. Continuously in histogram mode (5 minute intervals) during vibration-producing construction activities within 300 feet of seismograph location. Submit reports weekly.

3.09 DATA REPORTS

Submit reports weekly to Include complete electronic data and plots showing peak particle velocity for each 5-minute interval.

3.10 MITIGATION MEASURES

A. As part of the CNVMC Plan, the Contractor shall prepare a Noise and Vibration Mitigation Plan. The plan shall identify potential noise and vibration impacts during construction activities, and the measures the Contractor will use to minimize those impacts.

B. Measures to minimize construction noise and vibration impacts must be evaluated for effectiveness by the Contractor. Such measures may include, but are not limited to:

1. Minimize pile driving and the use of other loud construction equipment during work hours.
2. Sequence operations, combining noisy events to occur at the same time in order to reduce the total length of the noise generating activity.
3. Use alternative construction shoring methods such as hydraulic press, pre-drilled holes, auger-cast sheets, or drilled piles to reduce vibration.
4. Use shields, impervious fences or other physical barriers to inhibit the transmission of noise.
5. Use sound retardant housings or enclosures around noise producing equipment.
6. Use effective intake and exhaust mufflers on internal combustion engines and compressors.
7. Use electric instead of diesel powered equipment.
8. Use covered hoppers, storage bins, and chutes with sound deadening material.
9. Use hydraulic tools and equipment instead of pneumatic impact tools and equipment.
10. Minimize use of air or gasoline driven saws.
11. Conduct truck loading, unloading, and hauling operations so that noise and vibration are minimized.
12. Place operation limitations on machines and trucks.
13. Site stationary equipment to minimize noise and vibration impact on nearby buildings.
14. Plan noisier operations during times of highest ambient noise levels.
15. Keep noise levels relatively uniform, avoid peak and impulse noises.
16. Turn off idling equipment.
17. Phase in startup and shutdown of equipment.

3.11 NOISE AND VIBRATION COMPLAINT RESOLUTION

As part of the CNVMC Plan, the Contractor shall prepare and implement a plan for responding to and resolving noise and vibration complaints that may arise during construction activities.

END OF SECTION

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SECTION 02 22 30
SETTLEMENT MONITORING PROGRAM

PART 1 : GENERAL

1.01 SUMMARY

A. The work of this Section includes, but is not limited to, providing all labor, materials, tools, equipment, and incidentals necessary for settlement monitoring, in accordance with the Contract Documents.

B. The work of this section includes, but is not limited to, the following activities

1. Instrumentation installation.
2. Instrumentation baseline readings.
3. Routine instrumentation monitoring.
4. Instrumentation removal and related site restoration.

1.02 SUBMITTALS

A. Within 21 days after the Notice to Proceed, submit a Settlement Monitoring Plan as specified herein for approval by the Engineer.

B. Within 21 days after the Notice to Proceed, submit qualifications for the following:

1. Resume of Instrumentation Supervisor.
2. Resume of the Chief Surveyor.
3. Resume of the Field Survey Party Chief.

C. Within 5 days of installing each instrument, submit the as-installed instrument location and corresponding installation record sheet, for approval by the Engineer.

D. Weekly, submit data collected in accordance with the schedule detailed herein. The submittals shall include:

1. Raw and reduced data for the week both printed and electronically on either CD or flash drive.
2. Updated plots of data. On plots of data versus time, show key construction activities and other events that could influence changes in the data.
3. A statement to indicate whether any Response Value has been reached.

1.03 QUALIFICATIONS

A. Instrumentation Supervisor: The Instrumentation Supervisor shall be in charge of the instrumentation installation and monitoring program and be full-time on site during the installation. The Instrumentation Supervisor shall have at least 3

years of direct field experience in installation and monitoring of the instrument types specified herein, and shall have supervised two instrumentation programs of similar magnitude in similar subsurface conditions.

B. Chief Surveyor: The Chief Surveyor shall be a Registered Land Surveyor with a minimum of 5 years of experience in displacement measurements of the types and accuracies specified in accordance with this Section.

C. Field Survey Party Chief: The Field Survey Party Chief shall have a minimum of one year of experience in displacement survey measurement of the types and accuracies specified herein in accordance with this Section.

PART 2 : PRODUCTS

2.01 GENERAL

A. Furnish all installation tools, materials, and miscellaneous instrumentation components.

B. All graduations shall be in U.S. Customary Units, (for example U.S. Survey feet, hundredths of a foot, and pounds).

C. The horizontal reference datum shall be NAD83/91. The vertical reference datum shall be NAVD88. Both the horizontal and vertical datums will be referenced to two or more County control points.

D. Specific instrument measurement shall include instrument and associated equipment purchase, instrument installation, post-installation acceptance tests, formal initial readings, and all related submittals.

2.02 DEFORMATION MONITORING POINTS

A. Deformation monitoring points shall consist of one of the following:

1. DMP-Type 1 consists of a masonry nail. The nail shall be manufactured from hardened, zinc-plated steel, have ribbed threads along its shank, and a conical point. It shall also have an indent in the center of its head to receive a surveyor's plumb bob.

2. DMP-Type 2 shall consist of a 3/8-inch-diameter by minimum 2-inch long, stainless steel, socket head cap screw with stainless steel washer, screwed into a 3/8-inch machine screw anchor such as the Tamp-in brand anchor from Interstate Screw Corporation of Hialeah, FL; Concrete Machine Screw Anchor from Concrete Fastening Systems of Cleveland, Ohio; Shallow Hole Internally Threaded Anchors For Concrete, Solid Block & Brick from McMaster-Carr Supply Company; or approved equal. Where removal and patching is not required after construction, the bolts may be installed with epoxy or polyester adhesive in lieu of tamp-in screw anchors. Where DMP-Type 2 is installed in steel column members, the Contractor may install by drilling and tapping. DMP-Type 2 shall typically be installed into vertical surfaces of buildings and structures.

3. DMP-Type 3 shall consist of a 3/8-inch-diameter by 2-inch long punch marked stainless steel round-head bolt screwed into a 3/8-inch machine screw anchor such as the Tamp-in brand anchor from Interstate Screw Corporation of Hialeah, FL; Concrete Machine Screw Anchor from Concrete Fastening Systems of Cleveland, Ohio; Shallow Hole-For Concrete, Solid Block & Brick anchor from McMaster-Carr Supply Company; or approved equal. Where removal or patching is not required after construction, the bolts may be 3/8-inch-diameter by 2-inch-long punch-marked stainless steel carriage bolts installed with epoxy or polyester adhesive in lieu of tamp-in screw anchors. DMP-Type 3 shall typically be installed into horizontal concrete and rock surfaces (e.g., sidewalks, granite curbstones).
4. DMP-Type 4 shall consist of an observable point, punch-marked on the top horizontal surface. The point shall also be clearly identified using fluorescent spray paint or other marking method approved by the Engineer. The point shall be punch marked such that it can be consistently surveyed to the accuracy specified herein.
5. DMP-Type 5 shall consist of a contractor-designed deformation monitoring point. The DMP shall be capable of being consistently surveyed to the accuracy specified herein. The DMP-Type 5 details shall be submitted to the Engineer for approval.

PART 3 : EXECUTION

3.01 GENERAL

A. The Settlement Monitoring Program shall provide pre-construction baseline data, construction data, and post-construction data for comparison to determine whether settlements have occurred as a result of construction activities, and to provide warning of conditions that may require remedial or precautionary measures.

B. Settlement monitoring shall be performed on, but not limited to, the following structures:

1. PS 47 Site
   a. 8193 East Hemlock Street
   b. 8168 East Hemlock Street
   c. 2163 Nubling Avenue North
   d. 2179 Nubling Avenue North
2. PS 46 Site
   a. 8675 East Caraway Road
   b. 8682 East Caraway Road
3. PS 45 Site
   a. 8135 East Daniels Loop
   b. 8137 East Daniels Loop

c. 8139 East Daniels Loop

d. 8165 East Daniels Loop

Along the top of sheet pile or other shoring walls

Settlement monitoring points shall be installed on the face of the building closest to the work and shall be located along the face(s) of the building at a maximum spacing of 30 feet on center. The maximum 30 ft spacing also applies to monitoring points along the top of sheet pile or other shoring walls.

C. The Contractor shall develop a Settlement Monitoring Plan and submit the monitoring plan for approval. At a minimum, the Settlement Monitoring Plan shall include:

1. The proposed type(s) of instruments to be used.
2. A review of the CNVMC Plan, and, if applicable, a rationale of those receptors are not included in the settlement instrumentation locations.
3. The proposed instrument locations in plan and elevation. Sketches or drawings shall be provided showing the locations in plan.
4. Detailed step-by-step installation procedures, including post installation acceptance tests, and sample installation record sheets.
5. The installation schedule.
6. The monitoring schedule.

D. The Contractor shall:

1. Furnish components of instrumentation to be installed during construction.
2. Install instruments.
3. Protect and maintain all instruments. Repair or replace damaged or inoperative instruments.
4. Collect, reduce, plot, and report data.
5. Interpret data.
6. Implement response actions based on interpretations of monitoring program data. Response actions shall consist of modifications to means and methods as needed to reduce vibrations and settlements.
7. Provide safe access to all of the instruments for the Engineer to perform confirmatory readings independent of the Contractor's monitoring program.
8. Remove identified instruments at the end of construction and restore site of instrumentation installation.

E. Maintain and protect all instruments. Repair or replace damaged instruments at no additional cost to the County.

F. Do not disclose instrumentation data to third parties and do not publish the data without the prior acceptance and written consent of the County.

3.02 SCHEDULING WORK

Obtain formal initial readings for the newly installed DMPs within 45 days of the notice to proceed and at least 14 days before construction activities come to within 100 feet the instruments.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Notify the Engineer at least 24 hours prior to installing each instrument.

B. As each instrument is installed, prepare an installation record sheet including appropriate items from the following list:

1. Project name.
2. Contract name and number.
3. Instrument type and number.
4. Planned horizontal position and elevation.
5. Personnel responsible for installation.
6. Date and time of start and completion.
7. Measurements or readings taken during installation.
8. As-installed location in horizontal position and elevation.
9. Weather conditions at the time of installation.
10. Problems encountered, delays, unusual features of the installation and details of any events that may have a bearing on instrument behavior.

3.04 INSTALLATION OF DEFORMATION MONITORING POINTS

A. Install the DMPs in accordance with the approved Settlement Monitoring Plan.

B. Where the DMP is to be installed in masonry construction, locate the DMP in the mortar between masonry units.

C. Determine the as-installed location in horizontal position to an accuracy of+/- 0.03 foot and in elevation to an accuracy of+/- 0.01 foot.

D. Obtain formal initial readings (FIRs) on all installed instruments for use as the baseline reference for the instrument. The FIR for a DMP will consist of the average of two survey measurements of elevation or horizontal offset with two independent set-ups. Where applicable, the initial readings shall be taken after allowing sufficient time for the grout or epoxy to set. Each reading other than the FIR shall consist of a single set of survey measurements. Reference all elevation readings to the same benchmark. Reading accuracy shall be +/-0.01 foot. Report elevations to the nearest 0.001 foot.

3.05 DATA COLLECTION

A. At a minimum, the monitoring schedule for each DMP shall include:

1. FIR
2. Monthly until construction begins within 100 feet of the DMP.
3. Perform one reading immediately prior to start of construction within 100 feet of the DMP.
4. After construction beings with 100 feet of the DMP, the reading frequency shall be as follows:
   a. Twice daily (midway through the shift and end of shift) for points within 50 feet of sheet pile or shoring installation.
   b. Daily for points greater than 50 feet but less than 100 feet of sheet pile or shoring installation, and points along the sheet pile or shoring wall.
   c. Monthly for points more than 100 feet from sheet pile or shoring installation.
5. If readings exceed the threshold values provided in this Section, readings shall be taken at least twice daily until the readings have stabilized to the satisfaction of the Engineer.
6. Final readings for an instrument shall not be taken until all construction within 200 feet of the instrument has been completed for at least 30 days.

B. Maintain safe access to the instrumentation at all times.

C. Immediately after taking a reading, compare it with the previous reading of that instrument. If a significant change has occurred, take a second reading for verification.

D. Record data on field data records including at least the following:

1. Project name.
2. Contract name and number.
3. Instrument type.
4. Date and time.
5. Observer.
6. Instrument number.
7. Readings.
8. Remarks.
9. Visual observations including instrument condition or damage.

E. Other data including weather, temperature, and construction activities.

F. Documentation of any instruments replaced or repaired.

3.06 DATA PROCESSING, PLOTTING AND REPORTING

A. Provide all data in the form of both daily hard copy data reports and electronic data and plot files no later than 4:00p.m. P.S.T. on the day after the data are collected.

B. If data indicates that a response value (threshold or limiting value) has been exceeded, notify the Engineer immediately and initiate the response action(s).

C. All plots shall conform to the following guidelines:

1. Choose scales so that observations fill the space available, but do not use exaggerated scales that would magnify minor changes to make them appear alarmingly large.
2. Plots shall be slightly darker than the underlying grid, so that when copied both are visible but the plot stands out. Data points shall be visible.
3. Plot elevations and depths on the vertical axis.
4. Plots shall be self-explanatory. Show project name, contract name and number, the type of instrument, the instrument identification, the scale and units of measurement, and the time of measurement.
5. All instruments installed on the same building shall be included on the same plot.
6. Maintain consistency of scales so that plots can be compared.
7. Use symbols, distinguishable when copied in black and white, to distinguish between different instruments on the same plot.
8. Whenever possible, summary plots shall be on a single sheet of 8-1/2-inch by 11-inch paper.

D. Plots of DMPs shall show the change in vertical or horizontal displacement versus time. Identify the meaning of sign conventions (i.e., "-" indicates settlement,"+" indicates heave) on the plots.

3.07 INTERPRETATION AND IMPLEMENTATION OF DATA

A. The Contractor shall make its own interpretation of the data.

B. The threshold value and limiting value shall be defined collectively as response values. Response values for DMPs on buildings include:

1. Buildings Threshold Value - 0.3 inch horizontal or vertical displacement
2. Buildings Limiting Value - 0.5 inch horizontal or vertical displacement
3. Sheet Pile/Shoring Wall Threshold Value - 1.0 inch horizontal or vertical displacement
4. Sheet Pile/Shoring Wall Limiting Value - 1.5 inch horizontal or vertical displacement
5. Response values are subject to adjustment by the Engineer as indicated by prevailing conditions or circumstances.

C. If the threshold value is reached:

1. Immediately notify the Engineer.
2. Meet with the Engineer to discuss response action(s).
3. Provide the Engineer with an up-to-date report within 24 hours of obtaining a reading indicating that the threshold value has been reached. Include raw, reduced and plotted data for all instruments for which the threshold value has been reached, and for any other instruments requested by the Engineer.
4. Provide a daily report to the Engineer until all instrument readings fall below the specified threshold values, or unless otherwise directed by the Engineer.

D. The Engineer may require the Contractor to initiate one or more of the following response actions if the threshold value is reached:

1. Increase instrument monitoring frequencies.
2. Install and monitor additional instruments.
3. Modify construction procedures.

E. If the limiting value is reached:

1. Immediately notify the Engineer.
2. Meet with the Engineer to discuss response action(s).
3. Implement the agreed-upon response actions.

F. If a limiting value is reached, the Contractor may be directed to suspend activities in the affected area with the exception of those actions necessary to avoid exceeding the limiting value.

G. The Engineer may also interpret instrumentation data and make interpretations available to the Contractor. This does not relieve the Contractor from the requirement to make its own interpretation, notify the Engineer, and take steps to protect persons and property. Do not wait for, or rely on, receipt of the Engineer's interpretation to identify when threshold or limiting values have been exceeded, or to begin preparations for response actions.

3.08 DISPOSITION OF INSTRUMENTS

All instrument shall be removed and the instrumentation location shall be restored and repaired within 60 days of completing final readings as specified herein.

END OF SECTION

SECTION 02 41 00
DEMOLITION, CUTTING, AND PATCHING

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Demolition, cutting and patching of existing facilities where shown on Drawings, or as required to accommodate new work shown or specified.
2. Abandoning existing pipes, utilities, vaults, and structures.
3. Removing and disposing of demolished equipment, asphalt concrete and other materials. The removed equipment and materials shall be properly disposed of at Contractor's expense.
4. Cleaning, packaging and loading salvaged items onto Owner's trucks for removal by the Owner.

1.02 SUBMITTALS

A. See Division 1 for requirements for the mechanics and administration of the submittal process.

B. Demolition Schedule: Indicate overall schedule and interruptions impacting utility and facility services.

C. Indicate manufacturer and type of proposed materials and methods to be used for matching and repairing existing construction.

D. Indicate demolition and removal sequence, location of items designated for Owner's retention, and location and construction of temporary work.

1.03 QUALITY ASSURANCE

Conform to applicable codes and OSHA requirements for demolition work, dust control, products requiring electrical disconnection and reconnection, and mechanical system decommissioning.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Salvage designated items as a functional unit, including auxiliary or associated equipment required for operation.

B. Clean, list, and tag for storage.

C. Protect from damage and deliver to location designated.

1.05 PROJECT CONDITIONS

A. Perform preliminary investigations as required to ascertain extent of work.

B. Conduct demolition to minimize interference with adjacent areas.

1.06 SEQUENCING AND SCHEDULING

A. Coordinate and reschedule work as required to preclude interference with other operations.

B. Do not remove or abandon existing sanitary sewer facilities until the new sanitary sewer systems or temporary pumping systems are fully operational, unless noted otherwise on the Drawings.

PART 2 : PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following products and manufacturers are acceptable:

B. Non-shrink grout:

1. Supreme Grout by Gifford Hill.
2. Masterflow 713 Plus by BASF Building Systems.
3. Sika Grout 212 by Sika.
4. Five Star Grout by Five Star Products, Inc.

C. Epoxy bonding adhesive:

1. Euco No.452 MV by Euclid Chemical Co.
2. Sikadur 32, Hi-Mod by Sika Corporation.

D. Epoxy patch:

1. Depth of patch:
   a. Greater than 3/4 IN: Five Star MP Epoxy Patch.
   b. Between 1/8 IN and 3/4 IN: Five Star Fluid Epoxy.

E. Submit request for substitution in accordance with Division 1.

2.02 MATERIALS

A. Non-shrink grout:

1. Nonmetallic, noncorrosive and non-staining.
2. Premixed with only water to be added in accordance with manufacturer's instructions at jobsite.
3. Grout to produce a positive but controlled expansion:
   a. Mass expansion not to be created by gas liberation or by other means.

4. Minimum compressive strength at 28 days to be 6500 psi.
5. Coat exposed edges of grout with a cure/seal compound recommended by grout manufacturer.

B. Epoxy bonding adhesive:

1. Two component, moisture insensitive adhesive manufactured for the purpose of bonding fresh concrete to hardened concrete.

C. Controlled density fill (CDF):

1. See Specification Section 31 23 33 for requirements for CDF.

PART 3 : EXECUTION

3.01 PREPARATION

A. Notify affected utility companies before starting work and comply with their requirements.

B. Mark location and termination of utilities.

C. Provide covered passageways where necessary to ensure safe passage of persons in or near areas of work.

D. Provide substantial barricades and safety lights as required.

E. Provide temporary dustproof partitions where indicated or necessary.

F. Prevent infiltration of dust into occupied areas.

G. Provide temporary weather protection as necessary.

3.02 INSTALLATION

A. Cutting and removal:

1. Remove existing work indicated to be removed, or as necessary for installation of new work.
2. Neatly cut and remove materials, and prepare all openings to receive new work.

B. Abandon structures, manholes, and vaults:

1. Remove equipment to be salvaged, reused or disposed of.
2. Demolish structures, manholes, and vaults as shown on Drawings.
3. Fill remaining structures with CDF, sand or other material approved by the Engineer unless otherwise shown on the Drawings.
4. Backfill and compact excavated areas as shown on Drawings.

C. Abandon pipe:

1. Completely fill pipe to be abandoned with CDF by pumping CDF into the pipes. Cap pipes with concrete plugs, mechanical cap or other method approved by the Engineer.

D. Remove pipe:

1. Where shown on Drawings or at other locations as determined by the County Construction Manager, cut and remove pipe in its entirety regardless of the size or type.
2. Backfill and compact voids left by pipe removal with suitable backfill material.
3. All removed materials shall become property of the Contractor and shall be properly disposed of outside the project limits.

E. Disconnect and abandon existing power and telephone in place in accordance with governing utility authority requirements, unless otherwise indicated on the Drawings.

F. Remove and salvage designated items as a functional unit, including auxiliary or associated equipment required for operation.

G. Modification of existing concrete:

1. Where indicated, remove existing concrete and finish remaining surfaces:
   a. Protect remaining concrete from damage.
   b. Make openings by sawing through the existing concrete.
   c. Break out concrete after initial saw cuts in the event concrete thickness prevents cutting through.
   d. Make openings by drilling holes around perimeter of opening and then chipping out the concrete where sawing is not possible:
      1) Holes shall be sufficient in number to prevent damage to remaining concrete.
2. Oversize required openings in existing concrete 1 IN on all sides and build back to required opening size by means of non-shrink grout epoxy bonded to the existing concrete.
3. Where oversized openings cannot be made, remove the concrete to the required opening size and cut back exposed reinforcing 1 IN from face of concrete and fill resulting holes with non-shrink grout.

H. Removal of existing anchor bolts or other protruding elements:

1. Remove all protruding elements to a depth of 1/4 IN from finished surface.
2. Fill voids with epoxy patch.

I. Matching and patching:

1. Walls, ceilings, floors or partitions:

   a. Repair abutting walls, ceilings, floors or partitions disturbed by removal.

   b. Match and patch existing construction disturbed during installation of new work.

2. Methods and materials:

   a. Similar in appearance, and equal in quality to adjacent areas for areas or surfaces being repaired.

   b. Subject to review of Owner.

3. Reinforcing steel that is cut and exposed:

   a. Remove to a depth of 1/4 IN.

   b. Fill void with epoxy patch.

J. Salvaged items:

1. Thoroughly dry and clean all metal surfaces.
2. Prime all bare metal in accordance with Specification Section 09 96 00.
3. Clean and lubricate motors and other moving parts.
4. Brace motors attached to flexible mountings until reinstallation.
5. Dispose of items or materials not designated for Owner's salvage or reuse:

   a. Promptly remove from site.

6. Do not store or sell Contractor salvaged items or materials on-site.
7. Carefully remove items to be salvaged or reused:

   a. Store and protect items indicated on Drawings or those which have been marked by Owner to be salvaged or to be reused in Work.

   b. Replace any item damaged through carelessness in removal, storage, or handling with new items of same type.

   c. Load salvaged items onto Owner's trucks for removal by Owner.

   d. Do not reuse materials or equipment not specifically indicated or specified to be reused.

8. Preparation of equipment for storage:

   a. Identify each component with markings or tags to show its position in the assembly and the assembly of which it belongs.

   b. Place small parts in wooden boxes and clearly mark contents on the outside.

   c. Remove oil from oil-lubricated bearings and gear boxes and replace with storage oil.

d. Grease grease-lubricated bearings.

e. Replace any breather plug with solid plug.

f. Megger test motor windings: Attach report of the test results to the unit and furnish one (1) copy to the Engineer.

g. Attach unit to suitable crate bottom.

h. Enclose unit in polyethylene film and seal all seams and the film to the base of the unit with tape.

i. Construct crate of wooden slats around top and sides of unit.

j. Attach permanent instruction tag to outside of crate stating "This unit has been prepared for storage--replace oil, vent plugs, and lubricant in accordance with manufacturer's instructions before start-up."

K. Clean up: transport debris and legally dispose of off-site.

3.03 ASPHALT AND CONCRETE REMOVAL AND REPLACEMENT

A. All concrete and asphalt requiring removal and replacement shall be neatly saw cut full depth prior to removal.

B. Debris resulting from the above operations shall be removed, hauled off-site and disposed of at the Contractor’s expense.

3.04 GRAVEL SURFACED DRIVES AND ROADWAYS

Contractor shall restore all damaged gravel surfaced drives and roadways to a condition equal to or better than original.

3.05 TREES

Do not remove trees without written instructions from the Engineer unless tree removal is shown on Drawings.

3.06 FENCES, SIGNS, MAILBOXES, ETC.

Restore all damaged fences, signs, mailboxes, etc., to their original conditions.

3.07 SCHEDULE

Items to be salvaged to Owner shall be as designated on the Drawings.

END OF SECTION

SECTION 02 41 10
SHORELINE STABILIZATION AND BEACH RESTORATION

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Removing and disposing of existing rock, concrete, and other material within the rock removal areas near Pump Stations (PS) 45 and 46 as shown on the Drawings.
2. Removing and disposing of existing beach debris identified on the BL Drawings and specified herein.
3. Shoreline stabilization including construction of new rockery wall at PS 45 and PS 46 sites, scour protection for the existing bulkhead north of PS 45, and anchored log bank protection on the south side of PS 45.
4. Beach grading and restoration.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C88-13 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
2. ASTM C127-15 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
3. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
4. ASTM D2938-95 Standard Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens.

B. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

C. Rockery Wall Construction Guidelines, 1999 by Associated Rockery Contractors, Woodinville, WA.

D. CRD-C-148 Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol.

E. AASHTO T-96 Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.

B. The Contractor shall submit to the Engineer sieve analysis for Beach Backfill materials in accordance with ASTM C136.

C. The Contractor shall follow the submittal procedures specified in Division 1 “General Requirements”, Section 1-06.1(3) “Submittal Procedures and Requirements” and Section 1-06.1(5) “Re-submittals”.

1.04 SEQUENCING AND SCHEDULING

All Work below the ordinary high water (OHW) mark shall be performed during the Washington Department of Fish and Wildlife (WDFW) Fish Window as specified in Division 1 “General Requirements”, Section 1-08.3(2)C, “Construction Sequencing and Constraints”.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Rockery Wall:

1. Requirements for All Stones:

a. Stones shall be dense, hard, sound, angular, tightly-grained material free from overburden material that will not slake or deteriorate on exposure to the action of water or atmosphere. Stones shall be free of cracks, joints, faults, flaws, seams, or mineral infillings or other defects that would tend to increase its deterioration from weathering processes or result in breakage during handling or placement.

b. Stones shall not be sourced from marine basalt flows, reefs, shales, or contain chert. All quarried stone shall be cured in the quarry stockpile for a minimum of 48 hours after blasting prior to shipment to the construction site.

c. Stone gradation requirements are based on in-place condition. Breakage of stones during transport, re-handling, or placement at a site may result in stones not conforming to these Specifications and shall not be used in the construction.

d. Stones not meeting these Specifications shall be removed from the project site at the Contractor’s expense and at no additional cost to the Owner.

e. All imported stone material shall conform to the following test requirements for quality:

Test	Test Method	Required Value
Specific Gravity	ASTM C127-15	2.60 min.
Absorption	ASTM C127-15	2% max.
Abrasion	AASHTO T-96	20% max. loss
Soundness (Magnesium Sulphate)	ASTM C88-13	5% max.
Compressive Strength	ASTM D2938-95	>10,000 psi
Accelerated Expansion	CRD C-148	<7%

2. Armor Stone:

   a. Rockery wall armor stones shall be generally cubical or semi-rectangular in shape with the least dimension of any stone not less than one-third of its greatest dimension.

   b. Armor stone shall conform to the following gradation:

Stone Type	Size (feet)	Weight
Armor Stone (Level 1)	3.5	2,200 lb min. 3,500 lb max.
Armor Stone (Level 2)	2.6	850 lb min. 1,350 lb max.

   c. The Contractor shall determine the gradation of the Armor Stones that will be delivered to the project site. Gradation results shall be submitted to the Engineer not less than seven (7) working days in advance of delivery to the site. Gradation test results shall be submitted in tabular form and shall include both individual and cumulative values. Contractor shall consider breakage during material handling, delivery and installation in order to provide the specified in-place stone gradations.

3. Scour Apron:

   a. Minimum allowable weight for any stone is 90 pounds.

   b. Scour apron stone shall conform to the following gradation:

Stone Size	Percent Passing
18-inch (1.5 feet)	100
15-inch (1.25 feet)	70-90
12-inch (1.0 feet)	0

4. Backfill Stone: Backfill stone shall conform to the following gradation:

Particle Size	Percent Passing
6 inch	100
4 inch	0-25
2 inch	0

5. Chinking Stone: Contractor shall determine the size and quantity of stone required for filling voids between armor stones as specified in Part 3: Execution.

6. Foundation Gravel: Foundation gravel shall conform to the following gradation:

Sieve Size	Percent Passing
2”	100
3/4”	80 to 95
1/2”	50 to 80
No. 4	30 to 50
No. 200	6 max

7. Geotextile Fabric: Nonwoven geotextile, Mirafi 180N or approved equal.

B. Toe Protection Stone: size: 2 feet, weight: 1000 lb min. to 1800 lb max.

C. Rounded Igneous Boulders:

1. Splash guard rocks shall be rounded igneous boulders with a size of approximately 2.6 feet and a weight ranging from 850 lb min. to 1700 lb max.

2. The rocks placed between the south end of the new rockery wall at PS 45 and the 2.0 foot diameter logs south of PS 45 shall be rounded igneous boulders with a size of approximately 2.0 feet and a weight ranging from 500 lb min. to 1000 lb max.

D. Beach Backfill: Beach backfill shall conform to the following gradation:

Sieve Size	Percent Passing
2½”	99-100
2”	65 to 95
1”	50 to 85
No. 4	26 to 44
No. 40	16 max.
No. 200	5.0 to 9.0

The portion of sediment retained on the No. 4 sieve shall not contain more than 0.2 percent wood waste.

E. Anchors: Hubbell No-wrench anchor 10146 (galvanized) or approved equal.

F. Logs: Logs shall have a minimum diameter of 24” and shall be no more than 10 feet in length. Logs may be barked or un-barked, and shall not be encrusted with silts or fines. All materials shall be free of any preservative such as creosote.

G. Chains: 1/2 inch galvanized chain, grade 30 proof coil.

H. Shackles: 1/2 inch galvanized anchor shackle with screw pin.

I. Lag Screws: 1/2 inch diameter galvanized hex lag screws, 6 inches long.

J. Dune grass: *Leymus mollis* or *Elymus mollis* only. Other species are not allowed unless approved by the Engineer.

PART 3 : EXECUTION

3.01 GENERAL

All disturbance to the beach area (below OHW shown on the Drawings) from equipment operation and other construction work, including but not limited to tire rutting shall be graded smooth at the end of each work day and prior to submergence from tidal changes. Restore disturbed areas with Beach Backfill to stabilize when directed by the County Construction Manager.

3.02 PREPARATION

A. Removing Existing PS 45 and 46 Groins:

1. The Contractor shall remove and properly dispose of all existing non-native beach material comprising the existing pump station groins prior to construction of the new rockery wall at PS 45 and PS 46 sites. Non-native material includes basalt rock, concrete, and all other materials directed to be removed by the County Construction Manager that are deemed non-native. Non-native material in the immediate vicinity of the pump station shall be removed up to the depth at which native material is encountered, as shown on the Drawings.
2. After the non-native material has been removed, the Contractor shall excavate an additional 9 inches downward within the footprints of the existing groins as shown on the Drawings.
3. Beach Backfill, as specified in Paragraph 2.01.D shall be placed within the footprints of the existing groins, as shown on the Drawings. The amount of Beach Backfill shall be sufficient to refill the footprints of the existing groins up to the grades of the surrounding beach surfaces. The refilled areas shall be graded to achieve smooth transitions with the surrounding beach surface.

B. Removing Existing PS 46 Concrete Bulkhead:

1. The Contractor shall remove and properly dispose of the existing concrete bulkhead as shown on the Drawings, from the crest of the bulkhead to its foundation. The Contractor shall sawcut to remove portions as required.

C. Removing Existing Rock, Concrete, Other Material and Beach Debris:

1. Rock, concrete, and other material located within the Rock Removal Areas shown on the Drawings shall be removed and properly disposed of. Some materials encountered or identified may require special disposal techniques, including hazardous waste disposal. The Contractor will not be compensated for additional disposal costs and shall include appropriate allowances within their bid for the removal and disposal of items requiring special disposal techniques.

2. Non-native beach debris including but not limited to concrete chunks, basalt rock, quarry spalls, broken pipe, miscellaneous metals, etc. located within 25 feet of surfaces impacted by construction activity along the beach shall be removed and properly disposed of as directed by the Construction Manager. Refer to attached photos at the end of this Section for examples of scattered beach debris to be removed.

3.03 INSTALLATION

A. Install shoreline stabilization as shown on the Drawings and specified herein.

1. Control of Work: The Contractor shall erect and maintain all surveying instruments and aids to accurately control the layout and execution of the Work. The Contractor shall submit its control methods for review by the County Construction Representative and shall give the County Construction Representative access to all measurements, calculations, and records in order that the control process can be continuously monitored.

2. Excavation:

   a. The Contractor shall verify the underground utilities and pipes depicted on the Drawings before starting excavation, and prevent damage to above ground and underground utilities as shown on the Drawings. The Contractor shall notify the Engineer if excavation grade lines require adjustment from those on the Drawings prior to starting excavation.

   b. The Contractor shall excavate to the elevations shown in the Drawings +/- 0.2 feet. The Contractor shall grade the ground surface to a smooth plane surface to ensure that continuous contact is achieved between the ground and the geotextile fabric. All ground deformities, roots, grade stakes, and stones that project more than 1 inch above or below the ground surface shall be regraded or removed.

   c. Over-excavation and replacement with fill shall not be allowed.

   d. The Contractor shall comply with WAC 296-155, Part N “Excavation, Trenching, and Shoring”, RCW 39.04.180 “Trench Excavation-Safety Systems Required”, and RCW 49.17 “Washington Industrial Safety and Health Act”.

   e. Dewatering shall be conducted in accordance with Section 31 23 43 to allow shoreline stabilization materials to be placed in the dry as specified. If tidal conditions are such that dewatering is not possible, the Contractor shall notify the Engineer. If the Engineer allows the suspension of dewatering operations due to tidal conditions, the Contractor may suspend dewatering operations.

3. Protection of Existing Bulkheads, Rock Structures, and Sewer Infrastructure: The Contractor shall prevent damage to adjacent bulkheads and rock structures, except as noted on the Drawings. Except as noted on the Drawings, the condition and ground penetration depths of the adjacent bulkheads are unknown. The Contractor shall excavate in a manner so that the condition of the adjacent bulkheads can be examined. The Contractor shall install temporary structural support to prevent collapse or damage to adjacent bulkheads and rock structures. The Contractor shall notify the Engineer as soon as conditions are noted if the conditions of the adjacent bulkheads and rock structures are such that damage to the said structures cannot be prevented.

4. Geotextile Fabric:

   a. The fabric shall be kept dry and wrapped such that it is protected from the elements during shipping and storage. At no time shall the fabric be exposed to ultraviolet (sun) light for a period exceeding fourteen days. The work shall be scheduled so that all of the geotextile that is placed is covered with a layer of the specified material by the end of each workday. Failure to comply shall require replacement of geotextile.

   b. The area to receive the construction geotextile shall be cleared and grubbed of any debris or obstructions that may damage the fabric. If the ground surface consists of stone material exceeding 1 inch diameter, excavate 0.5 foot of the material below the grade lines shown on the Drawings and backfill with Beach Backfill specified in Paragraph 2.01.D and grade to the lines shown on the Drawings.

   c. The geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The geotextile shall be protected at all times during construction to insure that the geotextile's original chemical and physical properties are not changed.

   d. The fabric shall be placed in the manner and at the locations shown on the Drawings. The Contractor shall prepare the surface to receive the geotextile to insure that the surface is relatively smooth and free of obstructions, depressions, debris, or stone that could damage the geotextile during or after placement.

   e. The Contractor shall place fabric directly on the prepared area in continuous contact with the subgrade and free of folds or wrinkles. Longitudinal and transverse joints shall be overlapped at least three (3) feet. All joints shall be oriented vertically (orientation perpendicular to the length of the rockery wall). Horizontal joints (orientation along length of rockery wall) shall not be allowed.

f. All wrinkles and sags shall be stretched out immediately before stone is placed on the fabric. The fabric shall be protected from damage during placement of stone. This shall be accomplished by limiting the height of drop to less than 1 foot. In the event that this damages the fabric, the stone shall be placed directly on the fabric with zero height of drop. Any fabric that is rejected or damaged shall be replaced by the Contractor at no additional cost to the Owner.

g. Fabric shall be temporarily anchored into its final position, using methods that will not rupture the fabric prior to the placement of stone material onto the fabric. Fabric manufacturer recommended anchoring systems shall be utilized to secure the fabric to the excavated slopes prior to the installation of any materials onto the fabric.

h. The Contractor shall repair any damage to the geotextile fabric during installation or placement of stones. The Contractor shall repair or replace torn, punctured, flawed, deteriorated, or otherwise damaged fabric using methods and procedures specified by the manufacturer of the fabric.

5. Placement of Stones:

a. Contractor shall have a large variety of armor stones and chinking stones and sufficient space available to allow selection of stones from the stockpile for each individual space being fitted with a stone. Stones that have shapes that do not match the spaces to be filled shall be set aside or used elsewhere on the rock bulkhead where they fit better.

b. All stone shall be placed by rotating clamshell bucket, stone grab, or by some other method approved by the Engineer that will not drop or cast the stone and which permits placement of stone in a controlled and precise manner. Scour apron stones and backfill stones shall not be dropped more than 1 foot onto geotextile fabric. Armor stones shall not be placed directly on geotextile fabric. Stones shall be handled and placed in such a manner so that they are not cracked or damaged during installation. Rockery wall stones shall be placed in the dry.

c. As determined by the Engineer and at no additional expense to the Owner, the Contractor shall excavate and remove any area of stone in the completed work that contains stones not meeting the Specifications or Drawings. The removed material shall be replaced with material conforming to these Specifications and Drawings.

d. Placing of stone shall be suspended when adverse wave, weather, and tidal conditions do not allow proper placement.

e. The Contractor will not be paid for stone placed outside the allowable tolerance of ± 0.25 feet unless authorized by the Engineer or Owner. The Contractor shall rework the areas having stones lying outside of the allowable tolerance so that they conform to the allowable tolerance.

f. The Contractor shall prevent damage to the constructed work as it progresses until accepted by the Engineer. Any completed work displaced or damaged prior to acceptance shall be repaired or replaced at the Contractor's expense unless the cause was beyond the control of the Contractor.

g. Foundation gravel shall be placed in loose lifts not exceeding the dimensions shown on the Drawings and then compacted. The finished layer shall not yield more than 6 inches penetration by a ½ inch diameter steel rod when pushed smoothly into the subgrade under the body weight of a person weighing not less than 150 pounds. The Engineer will inspect and approve the foundation gravel.

h. Armor stone shall be mechanically placed in such manner that will produce an interlock between armor stone surfaces. Armor stones shall be placed using methods, techniques, and equipment that shall produce a tight-fitting mass of stone. No open voids over six inches across in any direction shall be allowed in the front face or back face of the rockery wall. Each course of stones shall be placed in a manner such that the longest axis of the armor stone shall be horizontal and at right angles to the face of the wall. The stones shall have all inclined faces sloping to the back of the facing, and each course of stone shall be seated as tightly and evenly as possible on the course beneath. The stones shall be placed so that there are no continuous joint planes either horizontally or vertically. After setting each course of stone, all voids between the stones shall be chinked on the backside (landward side) with chinking stones to eliminate any void sufficient to pass a two-inch square probe when inserted from the front face of the bulkhead. Absolutely no chinking shall be done on the seaward side of the rockery wall. The chinking stone shall be firmly supported by the backfill material on the landward side of the bulkhead, and the chinking stone shall be large enough to prevent its movement through the void.

i. Armor stones shall be keyed and interlocked with each other by adjusting the position of the stones accordingly. Isolated, overhanging, protruding, or perched stones shall not be permitted and shall be adjusted to the satisfaction of the Engineer.

j. Backfill stone shall be placed to a 12-inch minimum thickness between the entire landward face of the armor & chinking stones and the cut or fill material. The backfill stone shall be placed in lifts to an elevation approximately six inches below the top of each course of armor stone as they are placed until the uppermost course is placed. Any backfill stone on the bearing surface of one armor stone course shall be removed before setting the next course.

k. Scour apron stones shall be reworked as necessary to achieve a uniform appearing surface without undulations or protrusions exceeding 3 inches from the grade lines shown on the Drawings.

6. Disposal of Material: All rock, concrete, other material, and beach debris excavated or removed as shown on the Drawings shall be disposed of at an approved upland offsite location (or locations) selected by the Contractor at no additional expense to the Owner. Excavated beach material shall be left on site and used to backfill temporary excavations or as fill material as directed by the Engineer. The Contractor shall make arrangements for obtaining a disposal site (or sites) in accordance with Section 2 03.3(7)C "Contractor-Provided Disposal Site" of the Standard Specifications.

7. Equipment Operation: The Contractor shall operate only hand-held construction equipment directly on any stone layers. In no case shall any equipment other than hand-held equipment be operated directly on top of or against the Level 1, Level 2, scour apron, or toe scour protection stones shown on the Drawings.

B. Anchored Log Installation

1. A trench shall be excavated for installation of the helical anchors, to be placed at the locations shown on the contract drawings. Excavated materials satisfactory for backfilling shall be set aside and reused to backfill the trench after anchor installation. If additional material is required to achieve the grades between the logs shown on the plans, it shall conform to the specifications for Beach Backfill in Paragraph 2.01.D.

2. Helical anchors shall be installed a minimum of 5.5 feet below the excavation, directly below bottom of the logs. Choice of driving equipment shall be in accordance with the manufacturer's recommendation.

3. After installation, the helical anchors shall be proof tested to ensure they meet the minimum ultimate capacity of 7000 pounds, as specified by the manufacturer. The anchor must also meet the specified minimum embedment length after the proof test. If the anchor fails the proof test, the client shall be notified. It is suggested that the contractor keep a record of the proof test loads achieved and final embedment lengths of each anchor.

4. Anchor chain shall be secured to the helical anchor with a shackle. Anchor chain to be installed prior to backfilling the excavation and log placement, as shown on the contract drawings.

5. The anchor chains shall be wrapped snugly around the logs two feet in from each end and attached back to itself using a shackle, as shown on the contract drawings. To prevent any slipping, the chain is to be secured with a 1/2 inch galvanized lag screw and washer. The anchor chain shall be installed tight to limit log movement during storm events.

6. The logs shall be placed roughly perpendicular to the edge of the shoreline as shown on the contract drawings. The log shall be buried at least one-quarter of their diameter into the backfill.

7. The Contractor shall plant dune grass (*Leymus mollis* or *Elymus mollis*) in accordance with Section 3.03 E, "Dune Grass", below.

8. The Contractor shall grade the areas surrounding the logs to achieve smooth transitions with the surrounding beach and ground surfaces.

C. The Contractor shall place Topsoil and Hydroseed above the existing ground surface and landward of the rockery wall as shown on the Drawings in accordance with Section 32 91 19, "Topsoiling and Finished Grading". The finished Topsoil surface at the landward edge of the rockery wall shall match the top elevation of the scour apron ± 0.25 feet.

D. The Contractor shall restore the Rock Removal Areas shown on the Drawings with Beach Backfill. The Contractor shall grade disturbed beach areas to match adjacent beach contours.

E. Dune Grass:

1. The Contractor shall prepare a Plant Establishment Plan for approval by the Engineer. The Plan shall show the proposed scheduling of activities, materials, equipment to be utilized for plant establishment, and an emergency contact person. Should the plan become unworkable at any time during the plant establishment, the Contractor shall submit a revised plan prior to proceeding with further planting work.
2. Material displaced by the Contractor's operations that interferes with drainage shall be removed and disposed of as approved by the Engineer. Before planting and final grading takes place, the area shall be cultivated. The areas shall be brought to a uniform finished grade. All excess material and debris, stumps, and rocks larger than 3 inches in the planting area shown on the plans shall be removed and disposed of off the project site or as approved by the Engineer.
3. No plant material shall be planted until it has been inspected and approved for planting by the Engineer. Rejected material shall be removed from the project site immediately. All plants for the project shall be received on site prior to the Engineer beginning inspection of the plants.
4. Under no circumstances will planting be permitted during unsuitable soil or weather conditions as determined by the Engineer. Unsuitable conditions may include frozen soil, freezing weather, saturated soil, standing water, high winds, heavy rains, and high water levels. All planting shall be accomplished between October 1 and March 1, unless otherwise approved by the Engineer.
5. Plants shall not be placed below the finished grade. Any glazed surface of the planting hole shall be roughened prior to planting.
6. Plant material supplied in containers shall not be removed from the containers until the time of planting at the planting location. Roots of bare root stock shall not be bunched, curled, twisted, or unreasonably bent when placed in the planting hole. Root balls shall be loosened prior to planting. All bare root plant material shall be dormant at the time of planting. All cuttings shall be planted immediately if buds begin to swell.

7. All burlap, baskets, string, wire and other such materials shall be removed from the hole when planting balled and burlapped plants. The plant material shall be handled in such a manner that the root systems are kept covered and damp at all times. The root systems of container plant material shall be moist at the time of planting. In their final position, all plants shall have their top true root (not adventitious root) no more than 1 inch below the soil surface, no matter where that root was located in the original root ball or container. The backfill material and root ball shall be thoroughly watered on the same day that planting occurs regardless of season.

8. Upon completion of the initial planting within a designated area, the Engineer will make an inspection of all plant material and notify the Contractor, in writing, of any replacements or corrective action necessary to meet these Specifications. The Contractor shall replace all materials rejected or missing and correct unsatisfactory conditions. Completion of the initial planting within a designated area includes the following:

    a. 100 percent of the plant material has been installed as shown in the Drawings.

    b. The planting area has been cleaned up.

    c. Repairs have been completed for the entire project, including but not limited to all weeds controlled.

Attachments

Beach Debris Example Photos

END OF SECTION

BEACH DEBRIS, TYP

BEACH DEBRIS, TYP

SECTION 03 00 00
CONCRETE GENERAL REQUIREMENTS

PART 1 : GENERAL

1.01 SUMMARY

Section Includes: General requirements and quality assurance provisions for all cast-in-place concrete.

1.02 REFERENCES

A. The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies

B. DEFINITIONS

1. Abbreviations for organizations issuing documents referred to in the specifications are listed below:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CRSI	Concrete Reinforcing Steel Institute
ICC	International Code Council
PTI	Post-Tensioning Institute

2. Architectural concrete: Concrete that is exposed as an interior or exterior surface in the completed structure and is designated as architectural concrete in the Contract Documents; contributes to visual character of the completed structure and therefore requires special care in the selection of the concrete materials, forming, placing, and finishing to obtain the desired architectural appearance.

3. Backshores: Shores placed snugly under a concrete slab or structural member after the original framework and shores have been removed from a small area at a time, without allowing the slab or member to deflect, or support its own weight or existing construction loads from above.

4. Exposed to public view: Situated so that it can be seen from a public location after completion of the building.

5. High early strength concrete: Concrete which, through the use of high early strength cement or admixtures, is capable of attaining specified strength at an earlier age than normal concrete.

6. Lightweight concrete: Concrete of substantially lower unit weight than concrete made using gravel or crushed stone aggregates.

7. Mass concrete: Any volume of concrete with dimensions large enough to require that measures be taken to cope with generation of heat from hydration of the cement and attendant volume change to minimize cracking.
8. Mass concrete, plain: Mass concrete containing no reinforcement or less reinforcement than necessary to be considered reinforced mass concrete.
9. Mass concrete, reinforced: Mass concrete containing adequate reinforcement, prestressed or non-prestressed, designed to act together with the concrete in resisting all forces, including those induced by temperature and shrinkage.
10. Normal weight concrete: Concrete having a unit weight of approximately 150 pounds per cubic foot made with gravel or crushed stone aggregates.
11. Reference standards: Standards of a technical society, organization, or association, including the codes of local or state authorities, which are referenced in the Contract Documents.
12. Reshores: Shores placed snugly under a stripped concrete slab or other structural member after the original forms and shores have been removed from a large area, thus requiring the new slab or structural member to deflect and support its own weight and existing construction loads applied before the installation of the reshores.
13. Sheathing, wood formwork: The materials forming the contact face of forms; also called lagging or sheeting.
14. Shore: A temporary support designed to support formwork, fresh concrete, and construction loads from above for recently built structures that have not developed full design strength.
15. Shrinkage-compensating concrete: A concrete made using an expansive cement that increases in volume after setting, designed to induce compressive stresses in elastically restrained concrete to approximately offset the tensile stresses resulting from drying shrinkage.
16. Strength test: The average of the compressive strengths of two or more 6” diameter x 12” cylinders, or 3 or more 4” diameter x 8” cylinders, made from the same sample of concrete and tested at 28 days or at test age designated for determination of fC′.
17. Structural lightweight concrete: Structural concrete made with lightweight aggregate; the unit weight usually is in the range of 90 to 115 lb/ft3.
18. Submitted: Submitted to the Engineer for review and acceptance.
19. WORK: The entire construction or separately identifiable parts thereof which are required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

1.03 QUALITY ASSURANCE

A. Referenced Standards and Publications: This section incorporates by reference the revision of the following documents in effect 30 days prior to bid. It is part of all sections in Division 3 CONCRETE of the Specifications as referenced or modified. In case of conflict between the requirements of this section and that of the listed documents, the requirements of this section shall prevail:

1. ACI STANDARDS

a.	ACI 117	Specifications for Tolerances for Concrete Construction and Materials
b.	ACI 423.6	Specification for Unbonded Single-Strand Tendons

2. ASTM STANDARDS

a.	A82	Specification for Steel Wire, Plain, for Concrete Reinforcement
b.	A184	Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
c.	A185	Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
d.	A416	Specification for Steel Strand, Uncoated Seven-Wire, for Prestressed Concrete
e.	A421	Specification for Uncoated Stress-Relieved Steel Wire for Prestressed Concrete
f.	A496	Specification for Steel Wire, Deformed, for Concrete Reinforcement
g.	A497	Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
h.	A615	Specification for Deformed and Carbon Steel Bars for Concrete Reinforcement
i.	A706	Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
j.	A722	Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete
k.	A767	Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
l.	A775	Specification for Epoxy-Coated Steel Reinforcing Bars
m.	A779	Specification for Steel Strand, Seven-Wire, Uncoated, Compacted, Stress-Relieved for Prestressed Concrete
n.	A780	Practice for Repair of Damaged Hot-Dip Galvanized Coatings

o.	A882	Specification for Filled Epoxy-Coated Seven-Wire Prestressing Steel Strand
p.	A884	Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
q.	A934	Standard Specifications for Epoxy-Coated Prefabricated Steel Reinforcing Bars
r.	A955	Standard Specification for Deformed and Plain Stainless Steel Bars for Concrete Reinforcement
s.	A970	Standard Specification for Welded or Forged Headed Bars for Concrete Reinforcement
t.	A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
u.	C31	Practice for Making and Curing Concrete Test Specimens in the Field
v.	C33	Specification for Concrete Aggregates
w.	C39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
x.	C42	Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
y.	C94	Specification for Ready-Mixed Concrete
z.	C138	Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
aa.	C143	Test Method for Slump of Hydraulic Cement Concrete
bb.	C150	Specification for Portland Cement
cc.	C171	Specification for Sheet Materials for Curing Concrete
dd.	C172	Practice for Sampling Freshly Mixed Concrete
ee.	C173	Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ff.	C192	Practice for Making and Curing Concrete Test Specimens in the Laboratory
gg.	C231	Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
hh.	C260	Specification for Air-Entraining Admixtures for Concrete
ii.	C309	Specification for Liquid Membrane-Forming Compounds for Curing Concrete
jj.	C330	Specification for Lightweight Aggregates for Structural Concrete

kk.	C387	Specification for Packaged, Dry, Combined Materials for Mortar and Concrete
ll.	C404	Specification for Aggregates for Masonry Grout
mm.	C494	Specification for Chemical Admixtures for Concrete
nn.	C495	Standard Test Method for Compressive Strength of Lightweight Insulating Concrete
oo.	C567	Test Method for Determining Density of Structural Lightweight Concrete
pp.	C595	Specification for Blended Hydraulic Cements
qq.	C597	Test method for Pulse Velocity Through Concrete
rr.	C618	Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ss.	C684	Test Method for Making, Accelerated Curing, and Testing of Concrete Compression Test Specimens
tt.	C685	Specification for Concrete Made by Volumetric Batching and Continuous Mixing
uu.	C796	Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam
vv.	C803	Test Method for Penetration Resistance of Hardened Concrete
ww.	C805	Test Method for Rebound Number of Hardened Concrete
xx.	C845	Standard Specification for Expansive Hydraulic Cement
yy.	C873	Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds
zz.	C878	Test Method for Restrained Expansion of Shrinkage-Compensating Concrete
aaa.	C881	Specification for Epoxy-Resin-Base Bonding Systems for Concrete
bbb.	C900	Test Method for Pullout Strength of Hardened Concrete
ccc.	C928	Specification for Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs
ddd.	C939	Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
eee.	C989	Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
fff.	C1012	Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution

ggg.	C1017	Specification for Chemical Admixtures for Use in Producing Flowing Concrete
hhh.	C1059	Specification for Latex Agents for Bonding Fresh to Hardened Concrete
iii.	C1064	Test Methods for Temperature of Freshly Mixed Portland Cement Concrete
jjj.	C1074	Practice for Estimated Concrete Strength by the Maturity Method
kkk.	C1077	Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
lll.	C1107	Specification for Packaged, Dry, Hydraulic Cement Grout (Nonshrink)
mmm.	C1157	Performance Specification for Hydraulic Cement
nnn.	C1218	Test Method for Water-Soluble Chloride in Mortar and Concrete
ooo.	C1240	Specification for Silica Fume Used in Cementitious Mixtures
ppp.	C1315	Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
qqq.	C1602	Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
rrr.	D98	Specification for Calcium Chloride
sss.	D994	Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
ttt.	D1621	Test Methods for Comprehensive Properties of Rigid Cellular Plastics
uuu.	D1751	Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types)
vvv.	D1752	Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
www.	D3575	Test Methods for Flexible Cellular Materials Made from Olefin Polymers
xxx.	E329	Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
yyy.	E1155	Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers

3. OTHER REFERENCED STANDARDS

a.	AWS D-1.4	Structural Welding Code-Reinforcing Steel

b. CRD C513 Corps of Engineers - Specification for Rubber Waterstops

c. CRD C572 Corps of Engineers - Specification for Polyvinyl-Chloride Waterstops

d. ADOT&PF Standard Specifications for Highway Construction, 2004

4. CITED PUBLICATIONS

a. ACI 318 Building Code Requirements for Reinforced Concrete

b. ACI CP1 ACI Certification Concrete Field Testing Technician – Grade I

c. ACI CP10 ACI Certification Flatwork Technician and Flatwork Finisher

d. ACI SP Field Reference Manual

e. CRSI MSP Manual of Standard Practice

B. GENERAL: Concrete materials and operations will be tested and inspected by the Owner as Work progresses. Failure to detect defective work or material shall not prevent rejection later when a defect is discovered nor shall it obligate Engineer for final acceptance.

C. TESTING RESPONSIBILITIES OF CONTRACTOR

1. Duties and Responsibilities: Unless otherwise specified in the Contract Documents, the Contractor shall assume the following duties and responsibilities:

a. Qualify proposed materials and establish mixture proportions.

b. Qualify proposed batching equipment and operators per Section 03 31 00.

c. Furnish any necessary labor to assist Owner's testing agency in obtaining and handling samples at the project site or at the source of materials.

d. Notify Owner's testing agency at least 24 hours in advance of operations to allow for completion of quality tests and for assignment of personnel.

e. Provide and maintain adequate facilities for safe storage and proper curing of concrete test specimens on the job site for initial curing as required by ASTM C31 for the sole use of the testing agency.

f. Submit data and test documentation on materials and mixture proportions.

g. Submit quality control program of the concrete supplier and provide copies of all test reports.

h. When it is necessary to base concrete acceptance on accelerated strength testing, submit a request to use accelerated testing along with correlation data for the standard 28-day compressive strength based on at least 15 sets of test data in accordance with 1.04.H with concrete made with the same materials providing a range of at least f′cr plus or minus 1000 psi.

D. TESTS REQUIRED OF CONTRACTOR'S TESTING AGENCY: Unless otherwise specified in the Contract Documents, Contractor shall provide at no cost to Owner the necessary testing services for the following:

1. Qualification of proposed materials and establishment of design mixtures.
2. Other testing services needed or required by Contractor.

E. TESTING RESPONSIBILITIES OF OWNER

1. Unless otherwise specified in the Contract Documents, the Owner, or Owner's Testing Agency will provide the necessary services for the following:

   a. Representatives of the Owner will inspect, sample, and test materials and production of concrete required by the Engineer. When it appears that material furnished or work performed by contractor fails to conform to Contract Documents, the Representative will immediately report such deficiency to the Engineer, Contractor, and concrete supplier

   b. Owner's Representative for testing shall report all test and inspection results to Engineer, Contractor, and concrete supplier within seven days after tests and inspections are performed.

2. Other Testing Services As Needed. The Contractor shall pay the expenses for testing services resulting from the following:

   a. Additional testing and inspection required because of changes in materials or mixture proportions requested by the Contractor.

   b. Additional testing of materials or concrete occasioned by failure to meet specification requirements.

F. TESTS ON HARDENED CONCRETE IN PLACE

1. General. Tests on hardened concrete will be performed by the Owner's testing agency when such tests are needed. Testing and core filling shall be at the Contractor's expense when tests are performed to verify the strength of the structure when required by this specification. Owner will pay costs if tests are at his request and not required by this specification.
2. Non-Destructive Tests. Use of the rebound hammer in accordance with ASTM C805, pulse velocity methods in accordance with ASTM C597, or other non-destructive devices may be permitted by the Engineer in evaluating the uniformity and relative concrete strength in place, or for selecting areas to be cored.

3. Core Tests.

   a. Where required by the Engineer, cores shall be obtained and tested in accordance with ASTM C42. Wipe cores surface-dry immediately after coring and allow to dry in air for a period not exceeding one hour after drilling. Seal cores in plastic bags or nonabsorbent containers until testing. End preparation of cores shall be completed within 48 hours after drilling. Test cores not earlier than 48 hours after drilling or last wetting and not later than seven days after the cores were drilled form the structure.

   b. At least three representative cores shall be taken from each area of in-place concrete that is considered potentially deficient. The location of cores as determined by the Engineer shall impair the strength of the structure as little as possible. If, before testing, cores show evidence of having been damaged subsequent to or during removal from the structure, replacement cores shall be taken.

   c. Fill core holes with low slump concrete or mortar of a strength equal to or greater than the original concrete.

G. ACCEPTANCE OF CONCRETE STRENGTH

1. Standard Molded and Cured Strength Specimens. The strength level of concrete will be considered satisfactory when the averages of all sets of three consecutive compressive strength test results, molded and cured in accordance with ASTM C31/C31M, equal or exceed the specified compressive strength fc′ and no individual strength test result falls below the specified compressive strength fc′ by more than 500 psi when fc′ is 5000 psi or less, or by more than 0.10 fc′ when fc′ is more than 5000 psi. These criteria apply also when accelerated strength testing is specified unless another basis for acceptance is specified in the Contract Documents.

2. Nondestructive Tests. Nondestructive tests shall not be used as the sole basis for accepting or rejecting concrete, but may be used when permitted to evaluate concrete where standard molded and cured cylinders have yielded results not meeting the criteria in 1.04.I.

3. Core Tests. Strength level of concrete in the area represented by core tests will be considered adequate when the average compressive strength of the cores are equal to at least 85 percent of specified compressive strength fc′, and if no single core is less than 75 percent of the specified compressive strength fc′.

H. FIELD ACCEPTANCE OF CONCRETE

1. Air Content. Concrete not within the limits of air entrainment indicated in Specification Section 03 31 00, Concrete Mixtures, and tested in accordance with 1.04.F.2.j shall not be used in the Work.

2. Slump. Concrete not within the slump limits of specification section 03 31 00, Concrete Mixtures, at the point of placement shall not be used in the Work.

3. Temperature. Concrete not within temperature limits of Specification Section 03 31 00, Concrete Mixtures, shall not be used in the Work.

1.04 ACCEPTANCE OF STRUCTURE

A. GENERAL: Completed concrete work shall conform to applicable requirements of this Specification and the Contract Documents.

1. Concrete work that fails to meet one or more requirements of the Contract Documents but subsequently is repaired to bring the concrete into compliance may be accepted.
2. Concrete work that fails to meet one or more requirements of the Contract Documents and cannot be brought into compliance will be rejected.
3. Repair rejected concrete work by removing and replacing or by reinforcing with additional construction required by the Engineer. To bring rejected work into compliance, use repair methods that will maintain specified strength and meet all applicable requirements for function, durability, dimensional tolerances, and appearance as determined by the Engineer.
4. Submit for acceptance the proposed repair methods, materials, and modifications needed to assure that concrete work will meet requirements of Contract Documents.
5. Contractor shall pay all costs to bring concrete work into compliance with requirements of the specification.
6. Concrete members cast in the wrong location may be rejected.

B. DIMENSIONAL TOLERANCES

1. Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of ACI 117, may be considered deficient in strength and subject to the provisions of 1.04.D, Strength of Structure.
2. Formed surfaces resulting in concrete outlines larger than permitted by ACI 117 may be rejected. Excess materials will be subject to removal when required by the Engineer.
3. Inaccurately formed concrete surfaces that exceed ACI 117 tolerances may be rejected.
4. Finished slabs exceeding the tolerances in Specification Section 03 30 00, Cast-in-Place Concrete, may be corrected provided they are brought into compliance with 1.04.C, 1.04.D, and 1.04.E below.
5. Concrete with tolerances and defects exceeding the limitations of Specification Section 03 10 00, Concrete Formwork, will be rejected.

C. APPEARANCE

1. Concrete not meeting the requirements of Specification Section 03 30 00 Cast-in-Place Concrete, paragraph 3.03 or 3.04 (finishing of formed and unformed surfaces) shall be brought into compliance in accordance with paragraph 3.07 of Section 03 30 00.

D. STRENGTH OF STRUCTURE

1. Criteria for Determining Potential Strength Deficiency. Strength will be considered deficient and concrete will be rejected when the Work fails to comply with requirements which control the strength of the structure, including but not limited to the following conditions:

   a. Concrete strength failing to comply with requirements of 1.04.I, Acceptance of Concrete Strength.

   b. Reinforcing steel size, quantity, strength, position, or arrangement at variance with the requirements of Specification Section 03 20 00, Concrete Reinforcement, or other Contract Document Requirements.

   c. Concrete elements which differ from the required dimensions or location.

   d. Curing not in accordance with Contract Documents.

   e. Inadequate protection of concrete from extreme temperature and other environmental conditions during early stages of hardening and strength development.

   f. Mechanical injury, construction fires, accidents, or premature removal of formwork resulting in deficient strength.

2. Action Required When Strength is Potentially Deficient. When strength of the structure is considered potentially deficient, the following actions may be required by Engineer:

   a. Structural analysis, additional testing, or both.

   b. Core tests.

   c. If testing is inconclusive or impractical or if structural analysis does not confirm the safety of the structure, load tests may be required and their results evaluated in accordance with ACI 318.

   d. Concrete work rejected by structural analysis or by results of a load test shall be reinforced with additional construction when required by Engineer, or replaced.

   e. The Contractor shall document all repair work proposed to bring strength-deficient concrete work into compliance with Contract Documents, and submit the documentation to Engineer for acceptance.

E. DURABILITY

1. Criteria for Determining Potential Durability Deficiency. Durability of concrete will be considered deficient and the concrete work will be rejected when it fails to comply with the requirements which control durability of the structure, including but not limited to the following conditions:

   a. Strength failing to comply with 1.04.I, Acceptance of Concrete Strength.

b. Materials for concrete not conforming to the requirements in Specification Section 03 31 00, Concrete Mixtures.

c. Concrete not conforming to the air entrainment requirements in Contract Documents or the total air content limits of Specification Section 03 31 00, Concrete Mixtures.

d. Curing not in accordance with Contract Documents.

e. Inadequate protection of concrete from detrimental temperature and other detrimental environmental conditions during early stages of hardening and strength development.

2. Action Required When Durability is Potentially Deficient. When durability of the structure is considered to be potentially deficient, the following actions may be required by the Engineer:

a. Obtain and test samples of the ingredient materials used in the concrete.

b. Obtain samples of concrete from the structure by coring, sawing, or other acceptable means.

c. Laboratory evaluation of concrete and concrete materials to assess the ability of concrete to resist weathering action, chemical attack, abrasion, or other deterioration, and to protect reinforcement and embedments from corrosion.

d. Repair or replace concrete rejected for durability deficiency as directed by Engineer.

e. Document repair work to bring concrete work into compliance with Contract Documents and submit the documentation to Engineer for acceptance.

1.05 PROTECTION OF IN-PLACE CONCRETE

A. LOADING AND SUPPORT OF CONCRETE: Do not allow construction loads to exceed the superimposed load which the structural member, with necessary supplemental support, is capable of carrying safely and without damage or unacceptable deflection. When necessary, the Contractor shall retain a structural engineer to evaluate structural member capacity relative to construction loading.

B. PROTECTION FROM MECHANICAL INJURY: During the curing period, protect concrete from damaging mechanical disturbances, including load-induced stresses, shock, and harmful vibration. Protect concrete surfaces from damage by construction traffic, equipment, materials, rain or running water, and other adverse weather conditions.

1.06 PRECONCRETING CONFERENCE

A. A preconcreting conference shall be held a minimum of 10 working days before placing concrete to discuss construction procedures, personnel, and equipment to be used. Those attending shall include:

1. CONTRACTOR:
   a. Project Manager, Superintendent, and all foremen responsible for placement of reinforcement and concrete and construction of forms, finishing and curing of concrete, including subcontractors with coordinated penetrations and embed attachments, as applicable.
   b. Ready-mix supplier representative and batch plant operator
2. OWNER:
   a. Project Manager/Resident Project Representative.
   b. Engineer.
   c. Owner's Testing Agency including field special inspection personnel supervisor.

PART 2 : PRODUCTS

Not Used.

PART 3 : EXECUTION

Not Used.

END OF SECTION

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SECTION 03 05 10
COLD WEATHER CONCRETING

PART 1 : GENERAL

1.01 SUMMARY

This section covers requirements for cold weather concreting and protection of concrete from freezing during the specified protection period.

1.02 DEFINITIONS

A. COLD WEATHER: A period when for more than 3 successive days the average daily outdoor temperature drops below 40ºF. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50ºF occur during more than half of any 24-hour duration, the period shall no longer be regarded as cold weather.

B. COLD WEATHER CONCRETING: Operations concerning the placing, finishing, curing, and protection of concrete during cold weather.

C. PROTECTION PERIOD: The required time during which the concrete is maintained at or above a specific temperature in order to prevent freezing of concrete or to ensure the necessary strength development for structural safety.

Other definitions shall be as described in Section 03 00 00, Concrete – General Requirements.

1.03 SUBMITTALS

Submit four (4) copies of following Project Data:

A. The Contractor shall submit detailed, written procedures for the production, transportation, placement, protection, curing, and temperature monitoring of concrete during cold weather. In the submittal, include procedures to be implemented upon abrupt changes in weather conditions or equipment failures. Do not begin cold weather concreting until these procedures have been reviewed by the Owner's Resident Project Representative and the Engineer.

B. The details shall include, but not be limited to, the following:

1. Procedures for protecting the subgrade from frost and the accumulation of ice or snow on reinforcement or forms prior to placement.
2. Methods for temperature protection during placement.
3. Types of covering, insulation, housing, or heating to be provided.
4. Curing methods to be used during and following the protection period.
5. Use of strength-accelerating admixtures.
6. Methods of verification of in-place strength.
7. Procedures for measuring and recording concrete temperatures.

8. Procedures for preventing drying during dry, windy conditions.

PART 2 : MATERIALS

2.01 SCHEDULING PROTECTION MATERIALS

All materials and equipment required for protection shall be available at the project site before cold weather concreting.

2.02 CONCRETE

Concrete for slabs and other flatwork exposed to cycles of freezing and thawing in a wet condition during the construction period shall be air entrained as specified in ACI 301, even though the concrete may not be exposed to freezing in service.

PART 3 : EXECUTION

3.01 PREPARATION BEFORE CONCRETING

Remove all snow, ice, and frost from the surfaces, including reinforcement, against which the concrete is to be placed. Before beginning concrete placement, completely thaw the subgrade. Do not place concrete around embedded pipe penetrations identified in the Contract Documents unless such embedments are at a temperature above freezing.

3.02 CONCRETE TEMPERATURE

A. PLACEMENT TEMPERATURE: The minimum temperature of concrete immediately after placement shall be as specified in Column 2 of Table 3.02.A. The temperature of concrete as placed shall not exceed the values shown in Column 2 of Table 3.02.A by more than 20ºF.

Table 3.02.A: Concrete Temperature

(1)	(2)	(3)
Least dimension of section, inches.	Minimum temperature of concrete as placed and maintained during the protection period, ºF.	Maximum gradual decrease in surface temperature during any 24-hour period after end of protection, ºF.
Less than 12	55	50
12 to less than 36	50	40
36 to 72	45	30
Greater than 72	40	20

B. PROTECTION TEMPERATURE: Unless otherwise specified, the minimum temperature of concrete during the protection period shall be as shown in Column 2 of Table 3.02A. Temperatures specified to be maintained during the protection period shall be those measured at the concrete surface, whether the surface is in contact with formwork, insulation, or air. Measure the temperature of concrete in each placement not less than twice daily at regular time intervals, using a surface temperature measuring device having an accuracy of ± 2°F.

C. TERMINATION OF PROTECTION: The maximum decrease in temperature measured at the surface of the concrete in a 24-hour period shall not exceed the values shown in Column 3 of Table 3.02.A. Do not exceed these limits until the surface temperature of the concrete is within 20ºF of the ambient or surrounding temperatures. When the surface temperature of the concrete is within 20ºF of the ambient or surrounding temperature, all protection may be removed.

3.03 CURING OF CONCRETE

Prevent concrete from drying during the required curing period. If water curing is used, terminate use at least 24 hours before any anticipated exposure of the concrete to freezing temperatures.

3.04 PROTECTION OF CONCRETE

A. COMBUSTION HEATERS: Vent flue gases from combustion heating units to the outside of the enclosure.

B. OVERHEATING AND DRYING: Place and direct heaters and ducts to avoid areas of overheating or drying of the concrete surface.

C. MAXIMUM AIR TEMPERATURE: During the protection period, do not expose the concrete surface to air having a temperature more than 20ºF above the values shown in Column 2 of Table 3.02.A, unless higher values are required by an accepted curing method.

D. PROTECTION AGAINST FREEZING: Cure and protect concrete against damage from freezing for a minimum period of 3 days, unless otherwise specified. Maintain the surface temperature of the concrete during that period in accordance with Column 2 of Table 3.02.A, unless otherwise specified. The protection period may be reduced to 2 days if use of one or more of the following to alter the concrete mixture is accepted:

1. Type III portland cement meeting the requirements of ASTM C150.
2. A strength-accelerating admixture meeting the requirements of ASTM C494.
3. 100 lb/yd3 of additional cement.

During periods not defined as cold weather, but when freezing temperatures may occur, protect concrete surfaces against freezing for the first 24 hours after placing.

E. PROTECTION FOR STRUCTURAL SAFETY: If the concrete strength is required for structural safety, extend the duration of the protection period to ensure the necessary strength development.

F. PROTECTION DEFICIENCY: If the temperature requirements during the specified protection period are not met but the concrete was prevented from freezing, continue protection until twice the deficiency of protection in degree-hours is made up. Deficient degree-hours may be determined by multiplying the average deficiency in temperature by the number of hours the temperature was below the values shown in Column 2 of Table 3.02.A.

END OF SECTION

SECTION 03 05 20
HOT WEATHER CONCRETING

PART 1 : GENERAL

1.01 DESCRIPTION OF WORK

This section covers requirements for placement of concrete during hot weather.

1.02 DEFINITION

Hot weather is defined as any combination of high ambient temperature, high concrete temperature, low relative humidity, wind velocity, and solar radiation, tending to impair the quality of fresh or hardened concrete, or otherwise resulting in detrimental concrete properties. During hot weather, any or all of the methods specified herein for temperature control of concrete shall be used as required to maintain the concrete temperature below the limits specified.

1.03 PRODUCT DELIVERY, HANDLING AND STORAGE

A. Aggregate piles, cement bins and batch plant bins shall be shaded from the direct rays of the sun, when possible.

B. Aggregate piles may be cooled by wetting and evaporation. Aggregate wetting shall be performed in such a manner that is accounted for in the total water added to the mix.

1.04 GENERAL PRACTICES AND MEASURES

A. The Contractor shall be responsible for practices and procedures to ensure that concrete quality is not adversely affected by hot weather. Practices and procedures and combinations thereof may include the following:

1. Retarding admixtures.
2. Cooling of aggregates and/or mix water.
3. Reduction in time of discharge and expedited placement.
4. Shading and/or cooling of the placement site.
5. Use of cements with reduced heat of hydration.
6. Reduction of cement content.
7. Placement at night.
8. Cooling coils in the element being constructed.
9. Use of ice as part of the mix water.

1.05 SUBMITTALS

A. Submit seven (4) copies of the following Project Data:

1. The Contractor shall submit detailed, written procedures for the production, transportation, protection, curing, and temperature monitoring of concrete during hot weather. In the submittal, include procedures to be implemented upon abrupt changes in weather conditions or equipment failures. Do not begin hot weather concreting until these procedures have been reviewed by the Engineer and the Owner's Resident Project Representative.
2. Modifications in mix design shall require the approval of the Engineer. No embedding cooling devices may be placed in concrete elements without the approval of the Engineer.

PART 2 : MATERIALS

2.01 CURING COMPOUNDS

Curing compounds, when their use is permitted for hot weather concreting, shall conform to ASTM C309, Type 2, except as follows: Water loss, when tested in accordance with ASTM C156, shall not exceed 0.39 kg/m2 in 72 hours.

PART 3 : CONSTRUCTION

3.01 CONCRETE TEMPERATURE

The temperature of concrete as delivered at the time and location of placement shall not exceed 100ºF under any conditions. The temperature of concrete as delivered at the time and location of placement under the following combined ambient conditions, except concrete that will be deposited within wall or column forms, shall not exceed the following temperatures:

Relative Humidity Less Than %	Ambient Temperature Greater than °F	Maximum Concrete Temperature °F
80	90	100
70	90	95
60	90	90
50	90	85
40	90	80
30	80	75
20	75	70

3.02 DELIVERY

Concrete shall be placed in the Construction within 45 minutes after the completion of mixing.

3.03 PREPARATION FOR PLACING

Elevated forms and reinforcing steel for beams and similar members shall be cooled by fog spraying and evaporation immediately prior to placing concrete. Forms shall be free of standing water when concrete is placed herein. Cooling water shall be disposed of in accordance with applicable local, state, and federal regulations.

3.04 PLACING

Concrete shall be placed in shallower layers than under normal weather conditions if necessary to assure coverage of the previous layer, while it will respond readily to vibration.

3.05 FINISHING

Fog spray shall be used during finishing operations whenever necessary to avoid surface plastic-shrinkage cracking. Fog spray shall also be used after finishing and before the specified curing is commenced to avoid surface plastic-shrinkage cracking.

3.06 PROTECTION AND CURING

A. Wet cure methods shall be used in accordance with Section 03 30 00, Cast-In-Place Concrete. Forms shall be kept covered and continuously moist. Once forms are loosened, and during form removal, concrete surfaces shall be protected from drying and shall be kept continuously wet by fog spraying or other approved means.

B. Curing compounds may be used to augment wet cure methods, but shall not be used in lieu of a wet cure.

END OF SECTION

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SECTION 03 10 00
CONCRETE FORMWORK

PART 1 : GENERAL

1.01 SUMMARY

This section covers design, construction and treatment of formwork to confine and shape concrete to the required dimensions.

1.02 REFERENCES

The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Submit the following project data unless otherwise specified:

   a. Formwork Release Agent. Submit data on formwork release agent proposed for use with each form surface to be used for acceptance.

   b. Shop Drawings. Submit shop drawings for formwork and formwork supports, sealed by a professional Engineer licensed in the state where the work will be done.

   c. Calculations for formwork, reshoring and backshoring, sealed by a professional Engineer licensed in the state where the work will be done.

   d. Manufacturer's data and samples of form ties.

   e. Manufacturer's data and samples of expansion joint materials.

   f. Manufacturer's data and samples of waterstops.

2. Submit the following data when required:

   a. Reshoring. When reshoring or backshoring is required or permitted, submit procedures and plans of operations, before use, sealed by a professional Engineer licensed in the state where work will be performed. Indicate on shop drawings the magnitude of construction loads permitted during reshoring or backshoring.

   b. Form Liners. Submit samples and catalog data for form liner material when specified.

3. Submit the following data when alternatives are proposed:

   a. Formwork Facing Materials. When formwork facing materials other than those specified are proposed for use, submit data for acceptance.

b. Control Joints. If construction or control joints other than those indicated on Contract Drawings are desired, submit request for acceptance.

c. Testing for Formwork Removal. When methods other than test of cylinders are proposed for determining time for formwork removal, submit data as specified in 3.04.B.

1.04 MATERIALS HANDLING

All materials and equipment shall be shipped, stored, handled and installed in such a manner as not to degrade quality, serviceability or appearance.

PART 2 : PRODUCTS

2.01 MATERIALS

A. FORM FACING MATERIALS

1. Materials for form faces in contact with concrete shall meet the requirements of Specification Section 03 30 00, Cast-In-Place Concrete, paragraph 3.03.E, Unspecified Finishes, and the following requirements, unless otherwise specified in the Contract Documents.

a. For Rough Form Finish. No form facing material is specified.

b. For Smooth Form Finish. Use plywood, tempered concrete-form-grade hardboard, metal, plastic, paper or other acceptable materials capable of producing the desired finish for form-facing materials. Form facing materials shall produce a smooth, uniform texture on the concrete. Do not use form-facing materials with raised grain, torn surfaces, worn edges, patches, dents or other defects that will impair the texture of concrete surfaces. Furnish panels in largest practicable sizes to minimize number of joints.

B. FORM TIES

1. General

a. Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling concrete surfaces upon removal.

b. Provide ties so that portion remaining within concrete after removal of exterior parts is at least 1 inch from the outer concrete surface. Provide form ties which will not leave a hole larger than 1-inch diameter in the concrete surface.

c. Provide tie cones at each end.

d. Ties shall positively secure the wall to the required dimension and hold the wall to that dimension prior to and during concrete placement.

e. The use of tie wires as form ties will not be permitted.

2. Snap Ties

   a. Snap ties, if used, shall not be broken until the concrete has reached the design concrete strength. Snap ties, designed so that the ends must be broken off before the forms can be removed, shall not be used.

   b. Ties for liquid containment structures and walls below grade shall have a neoprene waterstop, factory applied at the center of the tie.

3. Taper Ties. Taper ties with plastic or rubber plugs of an approved and proven design may be used. The plugs shall be driven into the hole with a steel rod, placed in a cylindrical recess made therefore in the wall. At no time shall plugs be driven on the flat area outside the cylindrical recess. Plugs shall be A-58 Sure Plug as manufactured by Dayton Superior, or accepted equal.

C. CONCRETE FORM LINER

1. Cast elevated pump station slab with concrete form liner on all four sides of the pump station as shown on the Drawings.

2. Concrete form liner shall be manufactured by Sika Greenstreak No. 439 Sierra Drystack with 1-1/2” maximum relief, or accepted equal.

3. Form liner shall be constructed of thermoformed rigid polymer alloy sheets.

4. Install form liner in accordance with manufacturer’s instructions and with manufacturer’s recommended accessories, including fasteners, sealants, rustication and backing strips, form release agents, and sealers.

D. FORMWORK RELEASE AGENT

1. Use commercially manufactured form release agent that prevent formwork absorption of moisture, prevent bond with concrete, do not stain the concrete surfaces, and do not leave residual matter on surface of concrete or adversely affect proper bonding or subsequent application of other material applied to concrete surface.

2. For concrete surfaces of reservoirs, tanks, or channels used for conveyance, treatment or storage of water for eventual potable use, form release agents shall be listed in National Sanitation Foundation Standard 61, “Drinking Water System Components – Health Effects.”

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

A. Design and engineering of formwork and formwork supports shall be the responsibility of the Contractor. Designs of formwork and preparation of formwork drawings shall be under the supervision of a professional engineer licensed in the state where the work will be done.

B. Design formwork for construction loads, lateral pressure and requirements of the applicable building code, and for construction sequence shown on the Contract Drawings, if applicable. Design formwork to withstand the pressure resulting from placement and vibration of concrete and to maintain specified tolerances.

The design assumptions for form pressure and rate of fill limitations for wall forms shall be stated on the formwork drawings. Wall forms shall be designed so wall sections can be poured full height between joints shown on the Contract Drawings without horizontal cold joints.

C. Do not use earth cuts as forms for vertical or sloping surfaces unless required or permitted by Contract Documents.

D. Maximum deflection of facing materials reflected on concrete surfaces exposed to view shall be 1/240 of the span between structural members of the formwork, except for architectural concrete.

E. Locate and detail formed joints to the following requirements:

1. Locate and form construction joints that least impair strength of the structure and meet the requirements of Specification Section 03 30 00, Cast-In-Place Concrete. In general, locate construction joints in the middle third of the spans of slabs, beams, and girders. When a beam intersects a girder within this region, offset the joint in the girder a distance equal to or greater than twice the width of the beam. Locate joints in walls and columns at the underside of floors, slabs, beams, or girders and at the top of footings or floor slabs. Make joints perpendicular to the main reinforcement. Any construction joints not shown on the Contract Drawings shall require the approval of the Engineer.

2. Provide keyways where indicated on Contract Drawings. Where longitudinal keyways are indicated on the Contract Drawings, make them a minimum of 1½-inch deep in joints in walls and between walls and slabs or footings.

3. Provide construction and contraction (control) joints where indicated on the Contract Documents. The location of control joints other than those indicated on the Contract Documents shall be submitted for acceptance.

F. For a smooth form finish, set the facing materials in an orderly and symmetrical arrangement, and keep the number of seams to a practical minimum. Support facing material with studs or other backing capable of maintaining deflections within the tolerances specified in 2.02.D.

2.03 FABRICATION AND MANUFACTURE

A. Formwork shall be tight to prevent loss of mortar from concrete. Provide watertight formwork when architectural concrete is specified.

B. Place ¾-inch-minimum chamfer strips in the corners of formwork to produce beveled edges on permanently exposed surfaces unless otherwise specified. Do not bevel reentrant corners or edges of formed joints of concrete unless otherwise specified in the Contract Documents.

C. Provide temporary openings at the base of the column and wall formwork and at other points where necessary to facilitate cleaning and inspection. Inspect formwork and remove deleterious material immediately before concrete is placed.

D. Fabricate embedded form ties so ends or end fasteners can be removed with minimum spalling at the faces of concrete.

After the ends or end fasteners of form ties have been removed, terminate the embedded portion of ties not less than 2 diameters, or twice the minimum cross-section dimension of the tie, from the formed concrete surface. In no case shall this distance be less than ¾ inch. Repair tie holes in accordance with Specification Section 03 30 00, Cast-In-Place Concrete.

E. Locate waterstops in joints where indicated on Contract Drawings. Use pieces of premolded waterstop with a maximum practicable length to create the minimum number of end joints. Make joints in waterstops in accordance with the manufacturer's recommendations. Ensure that joints develop effective watertightness equal to the continuous waterstop material, permanently develop not less than 50% of the strength of the parent section and permanently retain flexibility.

PART 3 : EXECUTION

3.01 CONSTRUCTION AND ERECTION OF FORMWORK

A. At construction joints, lap contact surface of the form sheathing for flush surfaces exposed to view over the hardened concrete in the previous placement.

Ensure formwork is held firmly against hardened concrete to prevent offsets or loss of mortar at construction joints and to maintain a true surface.

B. Unless otherwise specified in Contract Documents, construct formwork so concrete surfaces will conform to tolerance limits of ACI 117. The class of surface as given in ACI 117 shall be as follows:

Walls, columns, and elevated slabs:	Class A
Footings:	Class C

C. Provide positive means of adjustment (such as wedges or jacks) of shores and struts. Do not make adjustments in the formwork after concrete has taken its initial set. Brace formwork securely against lateral deflection and lateral instability.

D. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete. Set formwork and intermediate screed strips for slabs accurately to produce designated elevations and contours of the finished surface prior to removal of formwork. Ensure that edge forms and screed strips are sufficiently strong to support vibrating screeds or roller pipe screeds when the finish specified requires the use of such equipment.

E. When formwork is cambered, set screeds to a like camber to maintain required concrete thickness.

F. Fasten form wedges in place after final adjustment of forms and prior to concrete placement.

G. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral movement of the formwork system during concrete placement.

H. The Contractor shall form for and leave all openings in the concrete work where required for the installation of his own work and/or for the work of others. He shall carefully examine all drawings for the need of such openings, and in failing to provide openings as shown on the drawings, he shall cut them at his own expense. Except as otherwise noted or specified, all such openings shall be filled with concrete, after the work to be installed therein has been completed. Construct formwork for wall openings to facilitate removal and to counteract swelling of wood formwork.

I. Provide runways for moving equipment and support runways directly on the formwork or structural member without resting on the reinforcing steel.

J. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work prior to concrete placement.

K. Position and support expansion joint material, waterstops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.

L. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign material before concrete is placed.

M. Cover surfaces of formwork with an acceptable material that will prevent bond with the concrete. A field-applied formwork release agent or a factory-applied liner may be used. If a formwork release agent is used, apply to the surfaces of the formwork in accordance with the manufacturer's recommendations before placing reinforcing steel. Do not allow formwork release agent to puddle in the forms. Do not allow formwork release agent to contact reinforcing steel or hardened concrete against which fresh concrete is to be placed.

N. CLEANOUTS AND ACCESS PANELS

1. Temporary openings shall be provided at the bottom of the wall forms to facilitate cleaning and inspection prior to placing concrete.
2. Shavings, chips and all refuse shall be removed and the forms shall be broom-cleaned before any concrete is placed. Cleanout openings will not be permitted in exposed concrete without the Engineer's approval.

3.02 REMOVAL OF FORMWORK

A. When finishing is required, remove formwork as soon as removal operations will not damage concrete, subject to 3.04, Strength of Concrete Required for Removal of Formwork.

B. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform needed repairs or treatment required at once and follow immediately with specified curing.

C. Loosen wood formwork for wall openings when this can be accomplished without causing damage to concrete.

D. Do not damage concrete during removal of formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete. Perform needed repair and treatment required on vertical surfaces at once and follow immediately with specified curing.

E. Unless otherwise specified, leave formwork and shoring in place to support the weight of concrete in beams, slabs, and in-place structural members until concrete has reached $f'c$, in accordance with 3.04. If a lower compressive strength is proposed for removal of formwork and shoring, submit detailed plans for review and acceptance. When shores and other vertical supports are arranged to allow the form-facing material to be removed without loosening or disturbing the shores and supports, the facing material may be removed at an earlier age unless otherwise specified.

F. FORM REMOVAL SAFETY

1. Forms shall be removed in a manner to ensure complete safety of the structure. In no case shall supporting forms or shoring of slabs or other suspended members be removed until members have acquired sufficient strength to support safely their weight and the load thereon.

2. Care shall be taken by the Contractor to assure that newly unsupported portions of the structure are not subjected to heavy construction or material loading. Additional shores or bracing shall be provided, as required to adequately support the members during the construction period.

3. All responsibility involved in the removal of forms, shores, and bracing shall rest with the Contractor, and he shall be solely responsible for accidents to persons and property of any nature.

G. All parts of removed forms, reserved for reuse shall be inspected, cleaned and repair. Any part or panel which has been dented, deformed or otherwise rendered unfit for reuse shall be discarded.

H. Tie-rod clamps to be entirely removed from the wall shall be loosened 24 hours after concrete is placed, and form ties may be removed at that time.

3.03 RESHORING AND BACKSHORING

A. When reshoring and backshoring is permitted or required, submit for acceptance a plan of reshoring and backshoring procedures and operations prior to their use.

B. While reshoring or backshoring are underway, do not permit any construction load on new construction.

C. During reshoring and backshoring, do not allow concrete in beam, slab, column, or any structural member to be loaded with combined dead and construction loads in excess of the loads permitted by Engineer for the concrete compressive strength at the time of reshoring or backshoring.

D. Place reshores and backshores in sequence with stripping operations.

E. Tighten reshores and backshores to carry the required loads without overstressing the concrete members. Leave them in place until tests required by 3.04, Strength of Concrete Required for Removal of Formwork, indicate that the concrete compressive strength has attained the minimum value specified in 3.02.E.

F. For floors supporting shores under newly placed concrete, either leave in place the original supporting shores or install reshores and backshores. The shoring system and the supporting slabs shall resist the anticipated loads. Locate reshores and backshores directly under a shore position or as indicated on formwork shop drawings.

G. In multi-story buildings, extend reshoring over a sufficient number of stories to distribute the weight of newly placed concrete, forms, and construction live loads.

3.04 STRENGTH OF CONCRETE REQUIRED FOR REMOVAL OF FORMWORK

A. When removal of formwork or reshoring is based on concrete reaching a specified compressive strength, concrete will be presumed to have reached this strength when test cylinders, field cured along with the concrete they represent, have reached the compressive strength specified for removal of formwork or reshoring. Mold cylinders in accordance with ASTM C31/C31M, and cure them under the same conditions for moisture and temperature as used for the concrete they represent. Test cylinders in accordance with ASTM C39/C39M. Contractor is responsible for casting cylinders and performing tests required to determine compressive strength necessary for form removal.

B. Alternatively, when specified or permitted, use of the following methods for evaluating concrete strength for formwork removal is permitted. Prior to using methods in 3.04.B.1 through 3.04.B.4, submit sufficient data using job materials to demonstrate correlation of measurements on the structure with the compressive strength of laboratory-cured molded cylinders or drilled cores. Correlation data for each alternative method for determining strength shall be submitted for acceptance.

1. Tests of cast-in-place cylinders in accordance with ASTM C873. This is limited to slabs with concrete depth from 5 to 12 inches.
2. Penetration resistance in accordance with ASTM C803.
3. Pullout strength in accordance with ASTM C900.
4. Maturity method in accordance with ASTM C1074.

C. MINIMUM STRIPPING TIME: Form removal for elevated slabs and beam or girder soffits shall be based on paragraph A or B, above, with required concrete compressive strength equal to the specified 28-day compressive strength, but in no case less than 7 days.

D. Form removal for columns, walls, and side forms of beams, girders, or footings shall be not less than 12 hours.

3.05 FIELD QUALITY CONTROL

A. Establish and maintain survey controls and benchmarks in an undisturbed condition until final completion and acceptance of the project.

B. Variations from plumb and designated building lines shall not exceed the tolerances specified in ACI 117.

3.06 INSTALLATION OF EMBEDDED ITEMS

A. GENERAL

1. The Contractor shall notify all trades when construction is ready for the setting of anchor bolts, inserts, sleeves, and other built-in equipment, in order that such material shall be set at the proper time. Before placing concrete, care shall be taken to determine that all items to be embedded in concrete are accurately located, firmly secured in place and protected from damage or displacement until securely held by the concrete.
2. All items shall be thoroughly cleaned, free from rust, scale, dirt, grease or other coating. Any wood used for removable keys shall be thoroughly dampened before concrete is placed against the wood. The Contractor shall be responsible for any displacement of the items caused by his workers.

B. Electrical conduit may be embedded in concrete, provided the following conditions are met. Conduit runs which cannot satisfy these conditions shall be done at the Contractor's expense.

1. Outside diameter of conduit shall not exceed 1/3 of the concrete thickness.
2. Individual conduits shall not be placed closer than 3 diameters on center.
3. Conduit shall not be embedded in structural concrete slabs less than 6 inches thick.
4. Only 2 conduits may cross at any point. The sum of the outside diameter of the crossing conduits shall not exceed 1/3 of the concrete thickness.
5. A 1½-inch-minimum concrete cover shall be provided for conduits in structural concrete slabs.
6. Conduit shall not be located between bottom of reinforcing steel and bottom of concrete slab.
7. Conduit is generally not permitted in beams or girders.
8. Aluminum conduit shall not be embedded in concrete.
9. Reinforcing steel and/or post-tensioning ducts shall not be repositioned to clear conduit. Adjust conduit positions to clear reinforcement.

END OF SECTION

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SECTION 03 15 00
CONCRETE ACCESSORIES GENERAL

PART 1 : GENERAL

1.01 SUMMARY

The work and materials specified in this Section include concrete anchors and miscellaneous embedded items.

1.02 REFERENCES

The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Catalog data for all items covered by this section to be incorporated in the Work.

PART 2 : MATERIALS

2.01 ANCHOR BOLTS

A. Anchor bolts shall be either post installed anchors or cast-in-place as shown on the Plans.

1. Post installed anchors shall either be resin capsule, epoxy adhesive type or expansion type, torque-controlled, 316 stainless steel, Hilti, Powers, Rawl, Covert or accepted equal. Hole diameter shall be accordance with manufacturer's instructions. Epoxy for adhesive anchors or dowel embedments shall be a non-sag, two-component epoxy resin conforming to ASTM C881, Type I, IV, or V; Grade 3; Class A, B, C, D, E, or F as required for the temperature of the concrete surface at the time of installation. Rapid setting epoxies shall not be used.

2. Anchors shall be qualified by an IBC or other nationally recognized report as suitable for the application and as required by Contractor's design calculations as provided in other specification sections. When used for seismic loading, provide anchors that are rated for seismic loading as defined in ICC-ERS evaluation reports.

3. Adjustable anchors for equipment shall be floating nut-type which will allow at least ½ inch movement of the fastening stud. The fastening stud shall be 316 stainless steel. Adjustable anchors shall be DECO Manufacturing Co., Decatur Illinois, Standard Anchor or accepted equal.

4. All expansion anchors shall be male-type projecting anchors, unless female-type anchors are specifically called out otherwise. Provide not less than minimum embedment depths where shown on the Contract Drawings, but in no case less than ICC minimums for the size called out. Connected work shall not bear on threads.

5. Cast-in-place anchor rods shall be: ASTM F1554, Grade 36, including ASTM A563, Hex, nuts and ASTM F436 washers.

2.02 METAL FABRICATIONS

Reglets shall be as manufactured by Progress Unlimited, Inc., Heckman, or accepted equal. Reglet shall be of rigid PVC plastic and accurately placed and free from grout to assure an acceptable channel to receive gasket.

2.03 PREFORMED JOINT FILLER

Preformed joint filler material shall be preformed non-extruding type joint filler constructed of cellular neoprene sponge rubber or polyurethane of firm texture. Bituminous fiber type will not be permitted. All non-extruding and resilient-type preformed expansion joint fillers shall conform to the requirements and tests set forth in ASTM D 1752 for Type I, except as otherwise specified herein.

2.04 BACKER ROD

Backer rod shall be an extruded closed-cell, polyethylene foam rod. The material shall be compatible with the joint sealant material used and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at 8 psi. The rod shall be 1/8-inch larger in diameter than the joint width except that a one-inch diameter rod shall be used for a ¾-inch wide joint.

2.05 JOINT SEALANT

A. Joints where indicated on the Drawings, shall be sealed with a mastic joint sealer material of uniform, stiff consistency that does not contain solvents.

B. The mastic shall tenaciously adhere to primed concrete surfaces, shall remain permanently mastic and shall not contaminate potable water.

C. The material shall be of a type that will effectively and permanently seal joints subject to movements in concrete.

D. The mastic joint sealer shall be an acceptable two-part, self-leveling (or gun grade), non-staining, polyurethane elastomeric sealant which cures at ambient temperature. Acceptable sealants shall conform to ASTM C920 or Federal Specification TT-S-00227E.

E. For sloping joints, vertical joints and overhead horizontal joints, only "non-sag" compounds shall be used; all such compounds shall conform to the requirements of ANSI/ASTM C920 Class 12-1/2, or Federal Specification TT-S-0027 E(3), Type II.

F. For plane horizontal joints, the self-leveling compounds which meet the requirements of ANSI/ASTM C920 Class 25, or Federal Specification TT-S-0027 E(3), Type I shall be used. For joints subject to either pedestrian or vehicular traffic, a compound providing non-tracking characteristics, and having a Shore "A" hardness range of 25 to 35, shall be used.

G. Primer materials, if recommended by the sealant manufacturer, shall conform to the printed recommendations of the sealant manufacturer.

H. Acceptable polyurethane materials are:

1. Sikaflex/2C Polyurethane Elastomeric Sealant, as manufactured by SIKA CHEMICAL CORP., Santa Fe Springs, CA (310-941-0231).
2. Accepted equal.

2.06 BOND BREAKER

A. Bond breaker shall be:

1. Super Bond Breaker Water Base as manufactured by Burke Company, San Mateo, California.
2. Select Emulsion Cure 309, as distributed by Select Products Co., Upland, CA (clear or white pigmented).
3. Accepted equal.

B. Fugitive dye may be used in bondbreakers if recommended by manufacturer.

PART 3 : EXECUTION

3.01 ANCHOR BOLTS

A. Notification: Owner’s representative shall be notified prior to placement of drilled anchors to check and verify anchor size and type, hole depth, preparation and placement.

B. INSTALLATION TOLERANCES: Anchor bolts shall be installed with the bolt perpendicular to the concrete surface, +/- 3 degrees. Bolts shall be installed not more than 1/16 inch from their design position measured perpendicular from the centerline of the bolt. Bolt projection from the concrete surface shall be not more than +/- 1/8 inch from their design position, measured in the direction of the bolt axis, for expansion type anchors, nor more than +/- ¼ inch form their design position for expansion anchors or cast-in-place anchor bolts.

C. DRILLED HOLES: Do not drill or install anchors until concrete has reached specified minimum 28 day compressive strength. Drilled holes for expansion or epoxy anchors shall be drilled using rotary driven twist drills of the size and type recommended by the anchor manufacturer. All holes shall be thoroughly cleaned before installation of anchors. Holes for epoxy anchors shall be dry, in accordance with installation instructions requirements of the ICC or other testing agency upon whose tests the bolt capacity is based.

D. LOCATION AND LENGTH: Minimum bolt embedment shall be 8 bolt diameters unless otherwise noted on the Contract Drawings. Do not install anchors closer than 6 bolt diameters to free edge of concrete, or closer than 12 bolt diameters to another anchor unless detailed on the Contract Drawings. Locate to clear reinforcing bars in concrete.

E. PRELOAD: All anchor bolts and anchors for connections to the building structure or large equipment with multiple-bolt base plates shall be preloaded. Cast-in-place anchors shall have bond breaker applied to the shank prior to installation to prevent load transfer to the concrete except at the bolt head or washer. Unless otherwise indicated on the Contract Drawings, drilled anchors shall be preloaded to not less than 50%, nor more than 100% or rated allowable capacity after installation. Cast-in-place anchors shall be preloaded to not less than 10,000 psi, nor more than 20,000 psi tensile stress based on the root area of the thread.

F. Nuts used to attach equipment or fixtures shall be tightened to not less than the manufacturer's recommended installation torque, or in the absence of specific recommendations, to the following torque values (foot-lbs).

Stud Diameter (inches)	Expansion Type Anchors (ft-lbs)	Resin or Cast-in-place Anchors (ft-lbs)
1 ¼	--	550
1	--	300
7/8	--	200
3/4	175	135
5/8	90	80
1/2	50	35
3/8	25	15
1/4	7	5

3.02 JOINT SEALERS

A. Joint areas to be sealed shall be sandblasted or roughened and blown clean of dust and sand with compressed air before the material may be applied.

B. Joints shall be primed (if required) and the sealant shall be applied in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCEMENT

PART 1 : GENERAL

1.01 SUMMARY

This section covers materials, fabrication, placement and tolerances of reinforcement and reinforcement accessories.

1.02 REFERENCES

The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Submit the following project data unless otherwise specified:
   - a. Reinforcement. Submit manufacturer's certified test report.
   - b. Placing Drawings. Submit placing drawings showing fabrication dimensions and locations for placement of reinforcement and reinforcement supports.
   - c. Splices: Submit a list and request to use splices not indicated in Contract Documents.
   - d. Mechanical Splices. Submit request for the use of mechanical splices not shown on the Project Drawings.
   - e. Column Dowels. Submit requests to place column dowels without the use of templates.
   - f. Field Bending. Submit requests and procedures to field bend or straighten reinforcement partially embedded in concrete.
2. Submit the following data when required:
   - a. Welding. Submit description of reinforcement weld locations and welding procedures, when welding is permitted in accordance with 2.2.B.
3. Submit the following data when alternatives are proposed:
   - a. Reinforcement Relocation. Submit request to relocate any reinforcement that exceeds placement tolerances.

1.04 MATERIALS DELIVERY, STORAGE AND HANDLING

Prevent bending, coating with earth, oil or other material, or otherwise damaging the reinforcement.

1.05 SUPPLEMENTAL REINFORCEMENT NOT SHOWN ON THE PLANS

The CONTRACTOR shall provide and install any additional bars required to support primary reinforcement so that primary reinforcement is located as required by the documents.

PART 2 : PRODUCTS

2.01 MATERIALS

A. REINFORCING BARS: Bars used as reinforcement shall be deformed except spirals and welded wire reinforcement, which may be plain unless otherwise designated on the Contract Drawings. Reinforcement shall be grade 60 unless otherwise indicated on the Contract Drawings and shall conform to one of the following:

1. ASTM A615.
2. ASTM A706.

B. EPOXY COATED REINFORCEMENT: Epoxy-coated reinforcement shall conform to ASTM A775. Repair damaged areas with patching material conforming to ASTM A775 and in accordance with the material manufacturer's recommendations.

1. Repair all coating damage due to shipping, handling and placing.
2. The maximum amount of repaired damaged areas shall not exceed 2 percent of the surface area in each linear foot of each bar.
3. Fading of the coating color will not be cause for rejection of epoxy-coated reinforcing bars.

C. BAR MATS: Bar mats shall conform to ASTM A184.

D. WIRE: Use plain or deformed wire as indicated on the Contract Drawings. Plain wire may be used for spirals.

1. Plain wire shall conform to ASTM A82.
2. Deformed wire size D4 and larger shall conform to ASTM A496.
3. For wire with a specified yield strength fy exceeding 60,000 psi, fy shall correspond to a strain of 0.35 percent.

E. WELDED WIRE REINFORCEMENT: Use welded wire reinforcement specified in Contract Documents and conforming to one of the following specifications:

1. Plain Welded Wire Reinforcement. ASTM A185, with welded intersections spaced not farther apart than 12 inches in the direction of principal reinforcement.
2. Deformed Welded Wire Reinforcement. ASTM A497, with welded intersections spaced not farther than 16 inches in the direction of principal reinforcement.

3. For welded wire reinforcement with a specified yield strength fy exceeding 60,000 psi, fy shall correspond to a strain of 0.35 percent.

F. WIRE REINFORCEMENT SUPPORTS: Unless otherwise specified or permitted, use wire reinforcement supports complying with Class 1, maximum protection, or Class 2, moderate protection as indicated in the CRSI Manual of Standard Practice, Chapter 3.

G. PRECAST CONCRETE REINFORCEMENT SUPPORTS: Precast concrete supports for supporting reinforcement shall not be less than 4 square inches having a compressive strength equal to or greater than the specified compressive strength of the concrete being placed.

H. ALL-PLASTIC BAR SUPPORTS: All-plastic bar supports may be used for horizontal and vertical reinforcing steel. They may have a snap-on action or other method of attachment. All-plastic supports shall be non-porous and chemically inert in concrete. All-plastic bar supports shall have rounded seatings so as not to punch holes in the formwork and shall not deform under load when subjected to normal temperatures encountered in use, nor shall they shatter or severely crack under impact loadings when used in cold weather. All-plastic bar supports shall have at least 25% of their gross plane area perforated, and shall not be placed closer than 12 inches apart along a bar.

I. TIE WIRE: No. 16 American Wire Gauge or heavier, black annealed per ASTM A82.

2.02 FABRICATION

A. REINFORCEMENT: Bend all reinforcement cold unless heating is specifically authorized in the Contract Documents or by the Engineer. Fabricate reinforcement in accordance with fabricating tolerances of ACI 117.

B. WELDING

1. When welding of reinforcement is permitted by the Engineer, make all welds in conformance with ANSI/AWS D1.4. Do not weld crossing bars (tack welding) for assembly of reinforcement, supports, or embedded items.

PART 3 : EXECUTION

3.01 PREPARATION

When concrete is placed, reinforcement shall be free of materials deleterious to bond. Reinforcement with rust, mill scale, or a combination of both will be considered satisfactory, provided the minimum nominal dimensions, nominal weight and the minimum average height of deformations of a hand-wire-brushed test specimen are not less than the applicable ASTM specification requirements.

3.02 PLACEMENT

A. TOLERANCES: Place, support, and fasten reinforcement as shown on the Contract Drawings. Do not exceed the placing tolerances specified in ACI 117 before concrete is placed. Placing tolerances shall not reduce cover requirements except as specified in ACI 117.

B. REINFORCEMENT RELOCATION: When necessary to move reinforcement beyond the specified placing tolerances to avoid interference with other reinforcement, conduits or embedded items, submit the resulting arrangement of reinforcement for acceptance.

C. CONCRETE COVER: Minimum concrete cover for reinforcement, unless otherwise indicated in the Contract Drawings, shall be as indicated below:

	Minimum Cover (inches)
Slabs & Joists	
Top & bottom bars for dry conditions	
#11 bars and smaller	¾
#14 and #18 bars	1½
Formed concrete surfaces exposed to earth, water or weather, and over or in contact with sewage and for bottoms bearing on work mat, or slabs supporting earth cover.	
#5 bars and smaller, W31 or D31 wire and smaller	1½
#6 through #18 bars, W45 or D45 wire	2
Beams & Columns, formed	
For dry conditions	
Stirrups, spirals and ties	1½
Principal reinforcement	2
Exposed to earth, water, sewage or weather	
Stirrups, spirals and ties	2
Principal reinforcement	2½
Walls	
For dry conditions	
#11 bars and smaller	¾
#14 and #18 bars	1½
Formed concrete surfaces exposed to earth, water, sewage, weather, or in contact with ground	2
Footings and Base Slabs	
At formed surfaces and bottoms bearing on concrete work mat	2
At unformed surfaces and bottoms in contact with earth	3
Top of footings	same as slabs
Over top of piles	2

For bundled bars, minimum concrete cover shall be equal to the equivalent diameter of the bundle but need not be greater than 2 inches, except the minimum cover shall not be less than specified above. The equivalent diameter of the bundle shall be based on a single bar of a diameter derived from the equivalent total area.

Tolerances on minimum concrete cover shall meet the requirements of ACI 117.

D. REINFORCEMENT SUPPORTS: Size and spacing of reinforcement supports shall conform to the CRSI Manual of Standard Practice. Reinforcement shown on the Contract Drawings shall not be relocated to serve as bolsters for other bars. The Contractor shall provide additional bars if necessary to support the reinforcement shown on the Contract Drawings.

Horizontal bars in slabs and beams shall be supported at intervals not greater than 48 inches.

Wall and column reinforcement shall be laterally supported by side form spacers or other means at intervals not greater than 48 inches horizontally or vertically in the case of walls, and not greater than 48 inches vertically and at not less than 90-degree intervals in the case of columns.

Unless otherwise reviewed by the Engineer, use the following reinforcement supports:

1. Place reinforcement supported from the ground or mud on precast concrete reinforcement supports.
2. Place reinforcement supported from formwork on reinforcement supports made of concrete, metal or plastic.

E. WELDED WIRE REINFORCEMENT: For slabs on grade, extend welded wire reinforcement to within 2 inches of the concrete edge. Lap edges and ends of welded wire reinforcement sheets a minimum of one-mesh spacing or 8 inches, whichever is greater. Welded wire reinforcement may extend through contraction joints only where permitted. Support welded wire reinforcement during placing of concrete to assure required positioning in the slab. Do not place welded wire reinforcement on grade and subsequently raise into position in concrete.

F. COLUMN DOWELS: Furnish and use templates for placement of column dowels unless otherwise permitted.

G. Make splices as indicated on the Contract Drawings unless otherwise reviewed by the Engineer. Mechanical splices for reinforcement not shown on the Contract Drawings may be used only when accepted by the Engineer.

H. FIELD BENDING OR STRAIGHTENING: In accordance with ACI 318, Chapter 7, unless noted on the drawings, no bending or straightening of reinforcement will be permitted after partial embedment in concrete. Heating of reinforcement will be permitted only if the entire operation is submitted and approved by the Engineer.

I. FIELD CUTTING OF REINFORCEMENT: Reinforcement shall not be cut in the field except when specifically permitted.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 : GENERAL

1.01 SUMMARY

This section covers the production of cast-in-place structural concrete. Included are methods and procedures for obtaining quality concrete through proper handling, placing, finishing, curing, and repair of surface defects.

1.02 REFERENCES

The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Submit the following data unless otherwise specified:

   a. Conveying Equipment. Submit description of conveying equipment.

   b. Temperature Measurement. Submit proposed method of measuring concrete surface temperature changes.

   c. Repair Methods. When stains, rust, efflorescence, and surface deposits must be removed as described in 3.07.G, submit the proposed method of removal.

   d. Placement Notification. Submit notification at least 48 hours in advance of concrete placement.

   e. Preplacement Requirements. Submit requests for acceptance of reinforcement and form placement at least 48 hours in advance of concrete placement.

   f. Wet Weather Placement. When placement is scheduled during wet weather, submit request for acceptance of protection.

   g. Cold Weather Placement. When placement of concrete is subject to the requirements of Section 03 00 51 Cold Weather Concreting, submit request for placement along with the submittals required by those sections.

   h. Qualifications of Finishers. Submit qualifications of the finishing contractor and flatwork finishers who will perform the work as stipulated in 3.03.

2. Submit the following data when required:

   a. Matching Sample Finish. When special finishes are required by Contract Documents, submit sample finish described in 3.03.B.

b. Exposed Aggregate Surface. When an exposed aggregate surface is specified and a chemical retarder is proposed to be used, submit specification and data on the retarder and proposed method of use of retarder.

3. Submit the following data when alternatives are proposed:

a. Construction Joints. Submit information for acceptance of proposed location and treatment of construction joints proposed but not indicated on the Contract Drawings. The determination of acceptability of proposed construction joints shall be made solely by the Engineer.

b. Two-Course Slabs. When a bonding agent other than cement grout is proposed, submit specification and data of bonding agent.

c. Saw Cut Joints. When sawcut joints other than those indicated on the Contract Drawings are proposed, submit request of the proposed method.

d. Moisture-Preserving Method. When a moisture-preserving method other than specified in 3.06.C is proposed, submit request of the proposed method.

e. Coated Ties. When coated form ties described in 3.07.B are proposed to preclude the requirement to patch tie holes, submit proposed coated tie description.

f. Repair Material. When repair material described in 2.01.C, Proprietary Patching Materials, is proposed, submit the repair material specification, data on the proposed patching material, and proposed preparation and application procedure.

1.04 DELIVERY, STORAGE, AND HANDLING

A. DELIVERY: Place concrete within the time limits required in Specification Section 03 31 00, Concrete Mixtures.

B. STORAGE AND HANDLING: Store and handle products to retain original quality. Do not use products stored beyond the manufacturer's recommended shelf life.

PART 2 : PRODUCTS

2.01 MATERIALS

A. CURING COMPOUNDS: Where the use of curing compounds is approved by the Engineer, use curing compounds that conform to ASTM C309 or ASTM C1315. Curing compound shall be translucent with fugitive dye. Combination curing compound/sealer products shall not be used unless sealer is part of the specified finish.

B. Where concrete is to be coated with moisture- or waterproofing compound or sealer, curing compounds shall not be used unless certified by the manufacturer as not adversely affecting the bond or performance of subsequently applied coatings, or shall be removed after completion of the cure using light water blast in accordance with manufacturer's recommendations.

C. SHEET MATERIALS FOR CURING CONCRETE: Use sheeting materials that conform to ASTM C171.

D. PROPRIETARY PATCHING MATERIALS: Use acceptable proprietary patching materials complying with 3.07.F, Repair Materials Other Than Site-Mixed Portland Cement Mortar.

E. BONDING GROUT: Use bonding grout in accordance with 3.07.D, Preparation of Bonding Grout.

F. SITE-MIXED PORTLAND CEMENT REPAIR MORTAR: Use repair mortar in accordance with 3.07.E, Site-Mixed Portland Cement Repair Mortar.

G. FLOOR HARDENER: Floor hardener shall be a graded, iron aggregate base compound for dry-shake application and trowel embedment into fresh concrete. The compound shall be packaged in 90-lb, poly-lined bags and shall contain a dispersing agent, Portland cement and a stable lime-proof pigmentation to color the application gray. Wet cure or use curing compound recommended by the hardener manufacturer.

H. FLOOR SEALER: Cresteseal CS2000, Rain Guard Floor-Lok, or accepted equal.

PART 3 : EXECUTION

3.01 PREPARATION

A. Do not place concrete until data on materials and mixture proportions are accepted.

B. Remove hardened concrete and foreign material from the inner surfaces of conveying equipment.

C. Before placing concrete in forms, complete the following:

1. Comply with formwork requirements specified in Section 03 10 00, Concrete Formwork.
2. Remove snow, ice, frost, water, and other foreign material from surfaces, including reinforcement and embedded items, against which concrete will be placed.
3. Comply with reinforcing steel placement requirements in Section 03 20 00, Concrete Reinforcement.
4. Position and secure in place expansion joint material, anchors, and other embedded items.
5. Obtain acceptance of finished preparation.

D. Before placing a concrete slab on grade, clean foreign material from the subgrade and complete the following:

1. Subgrade shall be well drained and of uniform load-bearing nature.
2. In-place density of subgrade soils shall be uniform throughout the area and at least the minimum required by Contract Documents.
3. Subgrade shall be free from frost or ice.
4. Subgrade shall be moist with no free water and no muddy or soft spots.
5. If a slipsheet is indicated on the Contract Drawings, slabs and foundations on grade shall be underlain with two layers of 8 mil. polyethylene sheeting, perforated to allow bleedwater to escape.

E. When high evaporative conditions necessitate protection of concrete immediately after placing or finishing, make provisions in advance of concrete placement for windbreaks, shading, fogging, sprinkling, ponding, or wet covering.

F. During ambient temperature conditions described in Section 03 31 00, Concrete Mixtures, Paragraph 2.02.G, Concrete Temperature, make provisions in advance of concrete placement to maintain the temperature of the concrete as specified in 3.02.A.2. Use heating, covering, or other means adequate to maintain required temperature without overheating or drying of concrete due to concentration of heat. Do not use combustion heaters unless precautions are taken to prevent exposure of the concrete to exhaust gases containing carbon dioxide.

3.02 PLACEMENT OF CONCRETE

A. WEATHER AND EXPOSURE CONSIDERATIONS

1. Wet Weather. Do not begin to place concrete while rain, sleet, or snow is falling unless adequate protection is provided and approval of protection is obtained from the Engineer. Do not allow rain water to increase mixing water or to damage the surface of the concrete.
2. Cold Weather. Concrete temperatures and ambient temperatures shall meet minimum temperature requirements of Section 03 31 00, Concrete Mixtures, Paragraph 2.02.G, Concrete Temperature. During cold weather, concreting procedures shall conform to Section 03 00 51, Cold Weather Concreting.
3. Hot Weather. The temperature of concrete as placed shall not exceed 80º F. Loss of slump, flash set, or cold joints due to temperature of concrete as placed will be rejected.
4. Concrete Placed In Water. No concrete shall be placed underwater or in standing water.

B. CONVEYING:

1. Convey concrete from mixer to the place of final deposit rapidly by methods which prevent segregation or loss of ingredients and will assure the required quality of concrete. Do not use aluminum pipes or chutes.

C. CONVEYING EQUIPMENT:

1. Use acceptable conveying equipment of a size and design that will prevent cold joints from occurring. Clean conveying equipment before each placement.

   a. Use belt conveyors that are horizontal or at a slope that will not cause excessive segregation or loss of ingredients. Project concrete to minimize drying and the effects of temperature rise. Use an acceptable discharge baffle or hopper at the discharge end to prevent segregation. Do not allow mortar to adhere to the return length of the belt.

   b. Use metal or metal-lined chutes having rounded bottoms, and sloped between 1 vertical to 2 horizontal and 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting slope requirements may be used provided the discharge is into a hopper before distributing into the forms.

   c. Use pumping conveying equipment that permits placement rates that avoid cold joints and prevents segregation in discharge of pumped concrete.

D. DEPOSITING:

1. All concrete shall be delivered, discharged, and placed within the time limits specified in Section 03 31 00, Concrete Mixtures, 3.02.B.

2. Deposit concrete continuously in one layer or in layers to have fresh concrete deposited on in-place concrete that is still plastic. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section, unless construction joint requirements of 3.02.F are met.

3. Once concreting is started, it shall be carried on as a continuous operation until the placing of the panel or section is complete. Suspension of operations for more than 1½ hours will not be permitted during a continuous placement, and this limit may be shortened on order by the Engineer.

4. Concrete shall be placed generally in horizontal layers not more than 24 inches thick, except as otherwise specified. Each layer of concrete is to be laid and worked before the succeeding layer can be superimposed in the process of monolithic construction. When a monolithic layer cannot be completed in one operation, it shall be terminated with a vertical bulkhead. Feathering out to less than 6 inches will not be permitted.

5. Concrete shall be placed so as to prevent segregation of the materials and the displacement of the reinforcement. Where placing operations would involve the dropping of concrete through completed forms from heights of 4 or more feet, concrete so placed shall be pumped or discharged into hoppers feeding into flexible drop chutes to within 2 feet of the concrete's final deposition point. Encrustation of installed reinforcement by concrete spilled on it will be tolerated only for a length of time shorter than the encrustating concrete needs for drying out.

6. Do not use concrete that has surface dried, partially hardened, or contains foreign material.

7. When temporary spreaders are used in the forms, remove the spreaders as their service becomes unnecessary. Spreaders made of metal or concrete may be left in place if prior acceptance is obtained.

8. Do not place concrete over columns and walls until concrete in columns and walls is no longer plastic and has been in place at least 1 hour.

9. Do not subject concrete to any procedure that will cause segregation. Deposit concrete as near as practicable to the final position to avoid segregation.

10. Place concrete for beams, girders, brackets, column capitals, haunches, and drop panels at the same time as concrete for slabs.

11. When placing concrete for columns, do not exceed the top-of-pour elevation indicated on the Contract Drawings for the joint between the column and the slab or drop panel it supports.

E. CONSOLIDATING:

1. Consolidate concrete by vibration. Concrete shall be thoroughly worked around reinforcement and embedded items and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Use internal vibrators of the largest size and power that can properly be used in the work. Workers shall be experienced in use of the vibrators. Do not use vibrators to move concrete within the forms.

2. The Contractor shall supply enough vibrators to consolidate the concrete (except that placed underwater) according to the requirements of this Section. Each vibrator must:

   a. Be designed to operate while submerged in the concrete;

   b. Vibrate at a rate of at least 7,000 pulses per minute; and

   c. Receive the Engineer's approval on its type and method of use.

3. Immediately after concrete is placed, vibration shall be applied in the fresh batch at the point of deposit. In doing so, the Contractor shall:

   a. Space the vibrators evenly, no farther apart than twice the radius of the visible effects of the vibration;

   b. Ensure that vibration intensity is great enough to visibly affect a weight of 1 inch slump concrete across a radius of at least 18 inches;

   c. Insert the vibrators slowly to a depth that will effectively vibrate the full depth of each layer, penetrating into the previous layer on multilayer pours;

d. Protect partially hardened concrete (i.e., nonplastic, which prevents the vibrator penetration when only its own weight is applied) by preventing the vibrator from penetrating it or making direct contact with steel that extends into it;

e. Not allow vibration to continue in one place long enough to form pools of grout;

f. Continue vibration long enough to consolidate the concrete thoroughly, but not so long as to segregate it;

g. Withdraw the vibrators slowly when the process is complete; and

h. Not use vibrators to move concrete from one point to another in the forms.

i. Use internal vibrators of the largest size and power than can properly be used in the Work.

j. Use immersion-type vibrators with nonmetallic heads when consolidating concrete around epoxy-coated reinforcement. Workers shall be experienced in use of the vibrators.

4. When vibrating and finishing top surfaces that will be exposed to weather or wear, the Contractor shall not draw water or laitance to the surface. In high lifts, the top layer shall be shallow and made up of a concrete mix as stiff as can be effectively vibrated and finished.

5. To produce a smooth, dense finish on outside surfaces, the Contractor shall hand tamp the concrete.

F. CONSTRUCTION JOINTS AND OTHER BONDED JOINTS:

1. Locate construction joints as indicated per the Drawings or as accepted in accordance with 1.02.C. The use of construction joints not shown on the Drawings is prohibited unless approved by the Engineer. Formed construction joints shall be thoroughly cleaned, laitance removed, and dampened prior to placement of fresh concrete. When bond is required or permitted, it shall be achieved by one of the following:

a. Use an acceptable adhesive applied in accordance with the manufacturer's recommendations.

b. Use an acceptable surface retarder in accordance with the manufacturer's recommendations.

c. Roughen the surface in an acceptable manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface. The joint shall be roughened with a chipping hammer to expose the aggregate of the previous pour. The exposed aggregate shall protrude a minimum of ¼ inch.

d. Use portland cement grout of the same proportions as the mortar in the concrete in an acceptable manner.

G. CONTRACTION/CONTROL JOINTS:

1. The location of contraction or control joints shall be as shown on the plans or as approved by the Engineer. Contraction joints shall be saw cut, preformed, or tooled ¼ inch wide by α of the slab depth, but not less than 1½ inches deep, unless otherwise detailed on the Contract Drawings. Contraction joints shall be finished with backing rod and sealant.

H. PIPE PENETRATIONS:

1. Where pipes pass through the structure, they shall be cast in place, unless permission is given by the Engineer to do otherwise. Whenever these requirements interfere with the placement of reinforcing steel as indicated by the Contract Drawings, the bars shall be spread and rearranged as directed by the Engineer.

3.03 FINISHING FORMED SURFACES

A. GENERAL: After removal of forms, in accordance with Table 3.03.A, give each formed surface one or more of the finishes described in 3.03.B, Matching Sample Finish; 3.03.C, As-Cast Finishes; or 3.03.D, Rubbed Finishes. When Contract Documents do not specify a finish, finish surfaces as required by 3.03.E, Unspecified Finishes.

Table 3.03.A

Location	Finish Type
Backfilled surfaces	Rough form finish
Exposed foundation surfaces where form liner does not exist and exposed face of top slabs	Smooth form finish
All other surfaces	Grout-cleaned finish

B. MATCHING SAMPLE FINISH: When the finish is required by the Contract Documents to match a sample panel furnished to the Contractor, reproduce the sample finish on an area at least 100 square feet in a location designated by the Engineer and obtain acceptance before proceeding with that finish in the specified location.

C. AS-CAST FINISHES

1. Rough Form Finish. Patch tie holes and defects. Chip or rub off fins exceeding ¼ inch in height. Leave surfaces with the texture imparted by the forms.

2. Smooth Form Finish. Patch tie holes and defects. Remove all fins completely.

3. Architectural Finishes. Produce architectural finishes including special textured finishes, exposed aggregate finish, and aggregate transfer finish in accordance with specifications for Architectural Concrete, if included in the Contract Documents.

D. RUBBED FINISHES: Remove forms as early as permitted by Section 03 10 00, Concrete Formwork; 3.02, Removal of Forms. Produce one of the following finishes on concrete specified to have a smooth form finish:

1. Smooth Rubbed Finish. Remove forms as early as permitted by Section 03 10 00, Concrete Formwork, and perform necessary patching. Produce finish on newly hardened concrete no later than the day following form removal. Wet the surface and rub it with carborundum brick or other abrasive until uniform color and texture are produced. Use no cement grout other than cement paste drawn from the concrete itself by the rubbing process.

2. Grout-Cleaned Finish. Begin cleaning operations after all contiguous surfaces to be cleaned are completed and accessible. Do not clean surfaces as Work progresses. Wet the surface and apply grout consisting of 1 part portland cement and 1½ parts fine sand with enough water to produce the consistency of thick paint. Add white cement as needed to match color of surrounding concrete. Scrub grout into all voids, and remove all excess grout. When grout whitens, rub the surface and keep the surface damp for 36 hours afterwards.

3. Cork-Floated Finish. Perform necessary repairs. Remove ties, burrs, and fins. Wet the surface and apply stiff grout of one part portland cement and one part fine sand, filling all voids. Add white cement as needed to match color of surrounding concrete. Use enough water to produce a stiff consistency. Compress grout into voids by grinding the surface with a slow-speed grinder. Produce the final finish with cork float, using a swirling motion.

E. UNSPECIFIED FINISHES: When a specific finish is not specified in the Contract Documents for a concrete surface, apply the following finishes:

1. Rough form finish on all concrete surfaces not exposed to public view.

2. Smooth form finish on all concrete surfaces exposed to public view.

3.04 FINISHING UNFORMED SURFACES

A. PLACEMENT: Place concrete at a rate that allows spreading, straight edging, and darbying or bull-floating before bleed water appears.

Strike smooth the top of walls, buttresses, horizontal offsets, and other similar unformed surfaces, and float them to a texture consistent with finish of adjacent formed surface.

Finish slab surfaces in accordance with one of the finishes in 3.04.B, Finishes, as specified in Table 3.04.A.

Table 3.04.A: Finish Schedule	
Location	**Finish Type**
Interior slabs	Troweled finish (with floor sealer)
Tops of footings or other backfilled surfaces	Floated finish
Exterior slabs, walks, and steps	Broom finish

B. FINISHES

1. Scratched Finish. Place, consolidate, strike off and level concrete, eliminating high spots and low spots. Roughen the surface with stiff brushes or rakes before the final set.

2. Floated Finish. Place, consolidate, strike off and level concrete, eliminating high spots and low spots. Do not work concrete further until it is ready for floating. Begin floating with a hand float, a bladed power float equipped with float shoes, or a powered disk float when the bleed water sheen has disappeared and the surface has stiffened sufficiently to permit the operation. During or after the first floating, check flatness of surface with a 10-foot straightedge applied in two or more directions. Produce a conventional, straightedge finish in accordance with ACI 117, then refloat the slab immediately to a uniform texture.

3. Troweled Finish. Float concrete surface, then power trowel the surface. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a ringing sound is produced as the floor is troweled. Tolerance for concrete floors shall be conventional straightedge in accordance with ACI 117, unless otherwise specified. Concrete surfaces intended to support floor covering shall not have defects that will reflect through floor covering. See Section 3.02.H for floor sealer on interior slabs.

4. Broom or Belt Finish. Immediately after concrete has received a steel-troweled finish, give the concrete surface a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

5. Dry-Shake Finish. Blend metallic or mineral aggregate floor hardener with portland cement in the proportions recommended by the aggregate manufacturer, or use bagged premixed material as recommended by the manufacturer. Float finish the concrete surface. Apply approximately two-thirds of the blended material required for coverage to the surface by a method that ensures even coverage without segregation. Float finish the surface after application of the first dry-shake. Apply the remaining dry-shake material at right angles to the first application and in locations necessary to provide the specified minimum thickness. Begin final floating and finishing immediately after application of the dry-shake.

   After selected material is embedded by the two floating, complete operation with a broomed, floated, or troweled finish, as designated in the Contract Documents.

6. Heavy Duty Topping for Two-Course Slabs. For heavy duty topping mix, use materials and methods specified in Contract Documents. Place and consolidate concrete for the base slab and creed concrete to the specified depth below the top of the finish surface.

   Topping placed the same day as the base slab may be placed as soon as bleed water in the base slab has disappeared and the surface will support a person without appreciable indentation.

   When topping placement is deferred, brush the surface with a coarse wire broom to remove laitance and scratch the surface when concrete is plastic. Wet cure the base slab at least three days. Before placing the topping, clean the base slab surface thoroughly of contaminants and loose mortar or aggregate. Dampen the surface, leaving it free of standing water.

   Immediately before placing topping, scrub into the slab surface a coat of bonding grout consisting of equal parts of cement and fine sand with enough water to make a creamy mixture. Do not allow grout to set or dry before topping is placed. Bonding agents other than cement grout may be used with prior acceptance.

   Spread, compact, and float the topping mixture. Check for trueness of surface and float, trowel, or broom finish as specified.

7. Topping for Two-Course Slab Not Intended for Heavy Duty Service. Preparation of base slab, selection of topping material, mixing, placing, consolidating, and finishing operations shall be as specified in 3.04.B.6, Heavy Duty Topping for Two-Course Slabs, except that the aggregate need not be selected for special wear resistance.

8. Non-Slip Finish. Where a non-slip finish is required, give the surface a broom finish or belt finish or a dry-shake application of crushed aluminum oxide or other abrasive particles, as specified in the Contract Documents. Rate of application shall be not less than 25 pounds per 100 cubic feet.

9. Exposed Aggregate Finish. Immediately after surface of the concrete has been leveled to the specified straightedge method tolerance and the bleed water sheen has disappeared, spread aggregate of the color and size specified in Contract Documents uniformly over the surface to provide complete coverage to a depth of one stone.

   Tamp the aggregate lightly to embed aggregate in the surface. Float the surface until the embedded stone is fully coated with mortar and the surface has been brought to a true plane within the specified straightedge tolerance. After the matrix has hardened sufficiently to prevent dislodgement of the aggregate, apply water carefully and brush the surface with a fine bristle brush to expose the aggregate without dislodging it.

   An acceptable chemical retarder sprayed on freshly floated concrete surface may be used to extend the working time for the exposure of aggregate.

10. Non-Specified Finish. When the type of finish is not specified in Contract Documents, use one of the following appropriate finishes and accompanying tolerances.

    a. *Scratched Finish* — For surfaces intended to receive bonded cementitious mixtures.

    b. *Floated Finish* — For walks, drives, steps, ramps, and for surfaces intended to receive waterproofing, roofing, insulation, or sand-bed terrazzo.

    c. *Troweled Finish* — For floors intended as walking surfaces, floors in manufacturing, storage and warehousing areas, or for reception of floor coverings.

C. FINISHING TOLERANCES FOR SLABS

1. Finish floor slabs to meet the requirements of ACI 117 as specified in 3.04.B. Measure floor finish tolerances within 72 hours after slab finishing.

2. Unless otherwise specified in the Contract Documents, measure floor tolerances in accordance with the “10 ft. straightedge method” in ACI 117.

3.05 SAWED CONTRACTION JOINTS

Where saw cut joints are required or permitted, start cutting as soon as concrete has hardened sufficiently to prevent dislodgement of aggregates. Saw a continuous slot to a depth of one-fourth the thickness of the slab but not less than one inch. Complete sawing within 12 hours after placement.

3.06 CURING AND PROTECTION

A. GENERAL: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Protect concrete during the curing period such that the concrete temperature does not fall below below the requirements of Section 03 31 00, Concrete Mixtures, Paragraph 2.02.G, Concrete Temperature. Cure concrete in accordance with 3.06.C. for 7 days after placement.

Alternatively, moisture retention measures may be terminated when:

1. Tests are made on at least two additional cylinders kept adjacent to the structure and cured by the same methods as the structure, and tests indicate 70 percent of the specified compressive strength fc’, as determined in accordance with ASTM C39/C39M.

2. Temperature of the concrete is maintained at 50ºF or higher for the time required to achieve 85 percent of fc‘ in laboratory-cured cylinders representative of the concrete in place.

3. Strength of concrete reaches fc‘ as determined by accepted non-destructive methods meeting the requirements of Section 03 20 00, Concrete Formwork, 3.04.B.

B. FORMED CONCRETE SURFACES: Keep absorbent wood forms wet until they are removed. After form removal, cure concrete by one of the methods in 3.06.C, Preservation of Moisture.

C. PRESERVATION OF MOISTURE: After placing and finishing, use one of the following methods below to preserve moisture in concrete:

1. Wet Cure Method. Provide continuous moisture by ponding or watering a covering of heavy quilted blankets, by watering and covering with a white reflective-type sheeting, or by wetting the outside surfaces of wood forms. Runoff water shall be collected and disposed of in accordance with all applicable regulations. In no case shall runoff water be allowed to enter any lakes, streams, or other surface waters.

   When curing slabs with wet heavy quilted blankets or burlap, a fog or mist spray of water shall be sprayed on the entire surface before the bleed water has evaporated. As soon as the concrete has achieved initial set, the surface shall be covered with presoaked heavy quilted blankets of burlap. The fog or mist spray shall be applied continuously until the presoaked heavy quilted blankets of burlap are placed. If the fog or mist spray cannot be applied continuously, two coats of curing compound shall be applied after the initial fog or mist spray application and before the presoaked heavy quilted blankets or burlap are placed.

   Ponding may be used for slabs on grade.

2. Curing Compound Method. Application of a curing compound conforming to ASTM C309. Apply the compound in accordance with manufacturer's recommendation after water sheen has disappeared from the concrete surface and after finishing operations. The rate of application shall not exceed 150 square feet per gallon. Apply in two applications at right angles to each other, not to exceed 150 square feet per gallon for each coat. Do not use curing compound on any surface where concrete or other material will be bonded unless the curing compound will not prevent bond or unless measures are to be taken to completely remove the curing compound from areas to receive bonded applications.

   No later than the morning after applying the curing compound, the Contractor shall cover the top surfaces with white, reflective sheeting, leaving it in place for at least 10 days. Throughout this period, the sheeting shall be kept in place by taping or weighting the edges.

3.07 FLOOR SEALER PREPARATION AND APPLICATION

A. GENERAL

1. The Contractor shall provide and utilize all equipment and materials required for proper preparation of the concrete sealer. Sealer shall be applied at the rate and means as specified by the manufacturer. Provide protection of the health and safety of all workers during the application.

2. Adjacent surfaces shall be protected with suitable masking and drop cloths as required.

3. Coating materials shall be applied to surfaces under environmental conditions and within the limitations recommended by the sealer manufacturer. Sealer shall not be applied in areas where dust is being generated.

B. Corrections and Cleanup

1. Upon completion and prior to final acceptance, all equipment and unused materials shall be removed from the site and any spillage other misplaced sealer material shall be removed in a manner which will not damage surfaces. Repair, and cleaning shall be performed to the satisfaction of the Engineer.

3.08 REPAIR OF SURFACE DEFECTS

A. GENERAL: Repair tie holes and surface defects immediately after form removal. Where the concrete surface will be textured by sandblasting or bush-hammering, repair surface defects before texturing.

B. REPAIR OF TIE HOLES

1. Plug tie holes except where stainless steel ties, non-corroding ties, or acceptably coated ties are used, and omission of plugging is approved by the Engineer.
2. When portland cement patching mortar conforming to 3.07.E, Site Mixed Portland Cement Repair Mortar, is used for plugging, clean and dampen tie holes before applying the mortar.
3. When other materials are used, apply them in accordance with Manufacturer's recommendations.
4. Finish tie holes flush with surrounding wall for concealed surfaces and exposed surfaces of tanks and channels. For other exposed surfaces, finish to leave a leave a reveal δ-inch deep, unless otherwise directed by the Engineer.

C. REPAIR OF SURFACE DEFECTS OTHER THAN TIE HOLES: Outline honeycombed or otherwise defective concrete with a ½- to ¾-inch-deep saw cut, and remove such concrete down to sound concrete. When chipping is necessary, leave chipped edges perpendicular to the surface or slightly undercut. Do not feather edges. Dampen the area to be patched, plus another 6 inches around the patch area perimeter. Prepare bonding grout according to 3.07.D, Preparation of Bonding Grout. Thoroughly brush grout into the surface.

When the bond coat begins to lose water sheen, apply patching mortar prepared in accordance with 3.07.E, Preparation of Portland Cement Patching Mortar, and thoroughly consolidate mortar into place. Strike mortar leaving the patch slightly higher than the surrounding surface to permit initial shrinkage. Leave the patch undisturbed for 1 hour before finishing. Keep the patch damp for 7 days.

D. PREPARATION OF BONDING GROUT: For bonding grout, mix approximately one part of cement and one part of fine sand with water to a consistency of thick cream.

E. SITE-MIXED PORTLAND CEMENT REPAIR

1. Mix repair mortar using the same materials as concrete to be patched with no coarse aggregate. Use not more than one part cement to two and one-half parts sand by loose damp volume.
2. For repairs in exposed concrete, make a trial batch and check color compatibility of repair material with surrounding concrete. When the repair is too dark, substitute white portland cement for a part of the gray cement to produce a color closely matching surrounding concrete.
3. Use a repair mortar at a stiff consistency with no more mixing water than is necessary for handling and placing. Mix the repair mortar and manipulate the mortar frequently with a trowel without adding water. Use mortar at a stiff consistency.
4. Repair mortar may be used for holes at least 1 inch deep where the depth is equal to or greater than the smallest surface dimension of the defect, and for narrow slots cut for the repair of cracks. Do not use where lateral restraint cannot be obtained. Place and dry-pack mortar in layers having a compacted thickness of approximately δ inch.
5. Solidly compact each layer over its entire surface by use of a hardwood stick and hammer. Do not use metal tools for compacting. compact surface just flush with adjacent area. Do not use steel finishing tools or water to facilitate finishing.

F. REPAIR MATERIALS OTHER THAN SITE-MIXED PORTLAND CEMENT MORTAR: Materials other than site-mixed portland cement may be used for repair when prepared by the Engineer. Materials include, but are not limited to:

1. Shotcrete
2. Commercial Patching Products. Including:
   a. Portland cement mortar modified with a latex bonding agent, conforming to ASTM C1059 Type II.
   b. Epoxy mortars and epoxy compounds that are moisture-insensitive during application and after curing, which embody an epoxy binder that conforms to ASTM C881/C881M, Type III. The type, grade, and class shall be appropriate for the application as specified in ASTM C881/C881M.
   c. Shrinkage-compensating or non-shrink portland cement grout, conforming to ASTM C1107.
   d. Packaged dry concrete repair materials, conforming to ASTM C928.

G. REMOVAL OF STAINS, RUST, EFFLORESCENCE AND SURFACE DEPOSITS: Remove stains, rust efflorescence and surface deposits considered objectionable by Engineer by acceptable methods.

H. CONCRETE REPLACEMENT: Use concrete replacement for:

1. Holes extending entirely through concrete sections.
2. For holes larger than 1 square foot and deeper than 4 inches in which no reinforcement is encountered.
3. For holes larger than ½ of 1 square foot where reinforcement is exposed.

Concrete used for replacement shall be the same strength and mixture as used in the structure.

END OF SECTION

SECTION 03 31 00
CONCRETE MIXTURES

PART 1 : GENERAL

1.01 SUMMARY

Section Includes: Requirements for materials, proportioning, production and delivery of concrete.

1.02 REFERENCES

The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Mixture proportions: At least 45 days prior to commencing concrete placing operations, submit concrete mixture proportions, characteristics and the results of field data or trial mix results to validate strength and workability for each concrete mix required.
2. Mixture proportion data: Submit field test data or trial mix results used to establish the required average strength. Mix design shall be certified and stamped by a licensed engineer.
3. Concrete materials: Submit the following information for concrete materials, along with evidence demonstrating compliance with 2.01, Materials:
   a. For Cementitious Materials. Types, classes, producers' names, plant locations, and evidence not more than 90 days old demonstrating compliance with 2.01, Materials.
   b. For Aggregates. Types, pit or quarry locations, producers' names, gradations, specific gravities and evidence not more than 90 days old demonstrating compliance with 2.01, Materials.
   c. For Admixtures. Types, brand names, producers, manufacturer's technical data sheets, and certification data.
   d. For Water. Source of supply.
4. Field test data basis: When field test data is used as a basis for selecting proportions for a concrete mixture, submit data on materials and mixture proportions, with supporting test results confirming conformance with specified requirements.
5. Mixture proportion adjustments: Submit any adjustments to mixture proportions or changes in materials, along with supporting documentation, made during the course of the Work.

6. Concrete for floors: Submit evaluations and test results verifying adequacy of concrete to be placed in floors when cementing content is less than the minimum specified in Table 2.02.A.

7. Calcium chloride: Calcium chloride shall not be added to the concrete.

8. Volumetric batching: When it is desired to produce concrete by the volumetric batch method, submit request along with description of proposed method.

9. Time of discharge: When it is desired to exceed time for discharge of concrete required by ASTM C94, submit a request along with a description of the precautions to be taken.

10. Submittal Processing: Initial submittal of above data shall be not less than 40 calendar days before the planned production date.

1.04 QUALITY CONTROL

A. The Contractor shall maintain records verifying materials used are of the specified and accepted types and sizes and are in conformance with the requirements of 2.01, Materials.

B. The Contractor shall ensure that production and delivery of concrete conform to the requirements of 3.01, Measuring, Batching and Mixing and 3.02, Delivery.

C. The Contractor shall ensure that the concrete produced has the specified characteristics in the freshly mixed state and that they are maintained during transport and delivery.

D. Concrete mixing and placement is subject to continuous Special Inspection. The Contractor shall oversee and schedule placement and testing activities with the Special Inspector. Provide ample notice prior to concrete placement (48 hours minimum).

E. Production Facility Certification Requirements:

1. The Concrete Batch Plant and Delivery Vehicles shall be certified in accordance with the National Reinforced Concrete Manufacturer's Association (NRCMA) Certification of Ready Mix Concrete Production Facilities.

2. The Concrete Batch Plant Operator shall be certified by the National Reinforced Concrete Manufacturer's Association as a Ready Mix Concrete Plant Manager.

1.05 MATERIALS STORAGE AND HANDLING

A. Cementitious material: Store cementitious materials in dry, weathertight buildings, bins, or silos which will exclude contaminants.

B. Aggregates: Store and handle aggregate in a manner that will avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates to drain freely. Do not use aggregates that contain frozen lumps.

C. Water: Protect mixing water from contamination during storage and delivery.

D. Admixtures: Protect stored admixtures against contamination, evaporation, or damage. Provide agitating equipment for admixtures used in the form of suspensions or non-stable solutions to ensure thorough distribution of ingredients. Protect liquid admixtures from freezing and from temperature changes which would adversely affect their characteristics.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Cementitious material: Cementitious material shall consist of portland cement conforming to ASTM C150, with or without the addition of cementitious or pozzolanic mineral admixtures conforming to ASTM C618 or ASTM C989, or blended hydraulic cement conforming to ASTM C595. Cementitious material shall conform to ASTM C150, without the addition of cementitious or pozzolanic mineral admixtures. The tricalcium aluminum (Ca3Al) content of the portland cement shall be less than 8 percent in all concrete. In addition, cement shall meet the heat of hydration limits of Table 4 in ASTM C150. Cement for shrinkage compensating concrete shall conform to ASTM C845.

Cementitious material used in concrete shall be the same brand and type, and from the same plant of manufacture as the cementitious material used in the concrete represented by the submitted field test data or used in the trial mixtures.

When specified or permitted in combination with Portland cement, the following cementitious materials may also be used:

1. Fly ash conforming to ASTM C618, Class F, maximum 2% loss on ignition. When fly ash is used, the minimum amount shall be 15% by weight of the total cementitious materials unless otherwise specified.
2. Ground-granulated blast-furnace slag conforming to ASTM C989.
3. Silica fume conforming to ASTM C1240.

B. Aggregates: Aggregates shall conform to ASTM C33 unless otherwise specified. When a single size or a combination of two or more sizes of coarse aggregates are used, the final gradation shall conform to the grading requirements of ASTM C33 unless otherwise specified or permitted. All aggregates used for concrete shall be washed using fresh water and free of chlorides.

Aggregates used in concrete shall be obtained from the same sources and have the same size ranges as the aggregates used in the concrete represented by submitted historical data, or used in trial mixtures.

C. Water: Mixing water for concrete shall meet the requirements of ASTM C1602. Maximum water soluble chlorine ion 0.30 ppm. Under no circumstances shall seawater be used for the making of concrete or the washing of aggregate.

D. Admixtures: Admixtures shall meet the requirements of the following:

1. Provide admixtures produced and serviced by an established, reputable manufacturer, used in compliance with Manufacturer's recommendations. All of the admixtures used shall be from the same manufacturer and compatible with each other.

   a. *Air-entraining admixture*: Conform to ASTM C260. Admixture shall contain no chlorides and shall be capable of maintaining the air percentage as batched, within ±2% at point of placement, for 2 hours.

   b. *Water-reducing set, set-controlling admixture*: Conform to ASTM C494, Type A or D. Admixture shall contain no chlorides, and shall be compatible with the air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the Manufacturer's recommendations to obtain at least 12% water reduction. No retarder shall be used without Engineer's approval. Submit written proposed details of use.

   c. *Non-chloride, non-corrosive accelerators* Conform to ASTM C494, Type E, Admixture, shall be non-chloride and shall not promote corrosion of reinforcing steel in concrete.

   d. *High-range water reducer:* Conform to ASTM C494, Type F or G. The admixture shall be free of chlorides and alkalines. Water reducers shall be batch plant added.

   e. *Chemical admixtures for producing flowing concrete*: ASTM C1017

   f. *Fiber reinforcement:* Fiber reinforcement shall be nominal ½-inch fibrillated polypropylene, Fibermesh, W.R. Grace, or other approved polypropylene product designed specifically for control of shrinkage and drying cracking in portland cement concrete.

   g. *Retarding admixture*: Confirm to ASTM A494, Type B. Admixtures used in concrete shall be the same as those used in the concrete represented by submitted field test data or used in trial mixtures.

E. CHANGE OF MATERIALS: When brand type, size, or source of cementitious materials, aggregates, water, ice, or admixtures are proposed to be changed, new field data or data from new trial mixtures or evidence which indicates that the change will not adversely affect the relevant properties of the concrete shall be submitted for acceptance before changes are made.

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

A. Cementitious material content

1. The cementitious material content shall be adequate for concrete to satisfy the specified requirements for strength, water-cement ratio, and finishing ability. Not more than 20% fly ash may be substituted for portland cement at the Contractor's option. However, mix designs with fly ash shall not be used for floor slabs.

2. For concrete used in floors, cement content shall not be less than indicated in Table 2.02.A unless approved by the Engineer. Acceptance of a lower cement content will be contingent upon verification that concrete mixtures with a lower cement content will meet the specified strength requirements and will produce concrete with equal finish quality, appearance, durability, and surface hardness.

3. When a history of finishing quality is not available, evaluate the proposed mixture by placing concrete in a slab at the job using job materials, equipment, and personnel. The slab shall be at least 8 feet square and have an acceptable thickness. Slump shall not exceed the specified slump. Submit the evaluation results for acceptance.

Table 2.02.A: Minimum Cement Content Requirements for Floors

Nominal Maximum Size of Aggregate (in.)	Minimum Cement Content (lb/yd)
1½	470*
1	520
¾	540
3/8	610

**Minimum cement content shall be 501 lb/yd3 if concrete will be exposed to freezing and thawing in the presence of de-icing chemicals.*

B. Slump: Concrete shall have, at the point of placement, slump in accordance with Table 2.02.B. Determine the slump by ASTM C143. Slump tolerances shall meet the requirements of ACI 117.

When use of a Type I or II plasticizing admixture conforming to ASTM C1017 or when a Type F or G high-range water-reducing admixture conforming to ASTM C494 is permitted to increase the slump of concrete, concrete shall have a slump of 2 to 4 in. before the admixture is added and a maximum slump of 8 in. at the point of delivery after the admixture is added unless otherwise specified. Contractor to test slump at plant and provide information to Special Inspector.

Table 2.02.B: Slump Schedule		
	Maximum	**Minimum**
Slabs	4”	2”
Footings	3”	1”
Walls	5”	2”

C. Size of coarse aggregate: Except when otherwise specified or permitted, nominal maximum size of coarse aggregate shall not exceed 3/4 of the minimum clear spacing between reinforcing bars; 1/5 of the narrowest dimension between sides of forms; or 1/3 of the thickness of slabs or toppings.

D. Air content

1. Unless otherwise specified, concrete shall be air-entrained. Unless otherwise specified, air content at the point of delivery shall conform to the requirements of Table 2.02.C for moderate exposure.
2. Air content shall be measured in accordance with ASTM C138, C173, or C231. ASTM C231 shall be the preferred method.
3. Maximum air entrainment shall not exceed 3 percent for interior floor slabs to receive floor hardener and sealing compound.

Table 2.02.C: Total Air Content* of Concrete for Various Sizes of Coarse Aggregate			
Nominal Max. Size of Aggregate (in.)	**Total Air Content, + Percent**		
	Severe Exposure	**Moderate Exposure**	**Mild Exposure**
Less than 3/8	9	7	5
3/8	7.5	6	4.5
½	7	5.5	4
¾	6	5	3.5
1	6	4.5	3
1 ½	5.5	4.5	2.5
2	5	4	2
3	4.5	3.5	1.5
6	4	3	1.5

* Measured in accordance with ASTM C138, C137 or C231
\+ Air content tolerance is +1% to -1 ½%

E. Admixtures: When admixtures are specified in the Contract Documents for particular parts of the Work, use the types specified.

1. Water-reducing admixtures may be used at the option of the Contractor.
2. Accelerators shall not be used without the approval of the Engineer.
3. Provide fiber reinforcement at an application rate of 1.5 lb/fiber per cubic yard of concrete where fiber reinforcement is specified.

F. Concrete class and location: The proportions of cement, aggregate, and water for concrete shall be determined by the Contractor and subject to the requirements of this Section and the Structural General Notes.

G. Strength and water-cementitious material ratio: When compressive strength and, when required, the water-cementitious material ratio of the concrete is specified the following ratios must be considered in mixture calculations:

1. The maximum weight of fly ash, pozzolan or ground granulated blast-furnace slag that is included in the calculation of water-cementitious material ratio shall not exceed the following percentages of the total weight of cementitious materials given in Table 2.02D.

Table 2.02.D: Maximum Cementitious Material Requirements for Concrete Exposed to Deicing Chemicals

Cementitious Material	Maximum Percent of Total Cementitious Material by Weight *
Fly ash or other pozzolans conforming to ASTM C618	25
Slag conforming to ASTM 989	50
Silica fume conforming to ASTM C1240	10
Total of fly ash or other pozzolans, slag, and silica fume	50 **
Total of fly ash or other pozzolans and silica fume	35 **

Notes:
*Total cementitious material also includes ASTM C150, C595 and C845 cement. The maximum percentages above shall include:
a) Fly ash or other pozzolans present in Type IP or I(PM) blended cement, ASTM C595;
b) Slag used in manufacture of an IS or I(SM) blended cement, ASTM C595; and
c) Silica fume, ASTM C1240, present in blended cement.
**Fly ash or other pozzolans and silica fume shall constitute no more than 25% and 10%, respectively, of the total weight of cementitious material.

2. Unless otherwise specified, strength requirements shall be based on the 28-day compressive strength determined on 4”x8” cylindrical specimens made and test in accordance with ASTM C31 and C39.

2.03 PROPORTIONING

A. Proportion concrete to conform with 2.02, Performance and Design Requirements, to provide workability and consistency so concrete can be worked readily into forms and around reinforcement without segregation or bleeding, and to provide an average compressive strength adequate to meet acceptance requirements.

Select and determine proportions in accordance with ACI 301, Paragraph 4.2.3. Proportion ingredients to produce proper workability, durability, strength, and other required design properties. Mix designs to be used will be determined by either by field test data or trial mix results as specified in ACI 301. Once determined and approved, make no changes to mix without written approval of the Structural Engineer.

B. FIELD VERIFICATION OF ADEQUACY OF SELECTED PROPORTIONS: Using materials accepted for use in the Work, verify in the field the adequacy of the selected proportions to produce concrete with the required total air content and consistency, and with workability compatible with the intended placing method. Make suitable corrections as necessary and submit for acceptance the adjusted proportions.

PART 3 : EXECUTION

3.01 MEASURING, BATCHING AND MIXING

Production facilities shall produce concrete of the specified quality and conforming to the requirements of this Specification.

A. Ready-mixed and site-produced concrete: Unless otherwise specified, measure, batch and mix concrete materials and concrete in conformance with ASTM C94.

B. Concrete produced by volumetric batching and continuous mixing: When concrete made by volumetric batching and continuous mixing is permitted, it shall conform to the requirements of ASTM C685.

C. Prepackaged dry materials used in concrete: If packaged dry combined materials are used, they shall conform to the requirements of ASTM C387.

3.02 DELIVERY

Deliver concrete which will possess the specified characteristics in the freshly mixed state at the point of placing. Transport and deliver concrete in equipment conforming to the requirements of ASTM C94.

A. Slump adjustment: When concrete arrives at the point of delivery with a slump below that which will result in the specified slump at the point of placement and is unsuitable for placing at that slump, the slump may be adjusted to the required value by adding water up to the amount allowed in the accepted mixture proportions when permitted by the Engineer. Addition of water shall be in accordance with ASTM C94. Do not exceed the specified water-cementitious material ratio or slump. Do not add water to concrete containing a plasticizing or a high-range, water-reducing admixture. Do not add water to concrete delivered in equipment not acceptable for mixing.

Measure slump and air content of air-entrained concrete, after slump adjustment, to verify compliance with specified requirements.

B. Time of discharge: Time for completion of discharge shall be within 90 minutes of the first addition of cement to the truck. This length of time may be extended, on a case-by-case basis, an additional 30 minutes at the discretion of the Engineer or the Owner's Resident Project Representative provided the mix remains fluid and placeable and shows no signs of stiffening or set.

If delivery logistics make it impractical to discharge concrete within the above time limits, the Contractor may use an approved retarder admixture, delay the introduction of mixing water until the truck is closer to the job site, or propose other means, subject to approval by the Engineer, to assure that concrete is in acceptable condition at the time of discharge.

C. Batch ticket information:

1. The manufacturer of the concrete shall furnish to the Contractor and to the Owner's Representative with each batch of concrete before unloading at the site, a delivery ticket on which is printed, stamped, or written, information concerning said concrete as follows:

   a. Name of ready-mix batch plant

   b. Serial number of ticket

   c. Date

   d. Truck number

   e. Name of purchaser

   f. Specific designation of job (name and location)

   g. Specific class or designation of the concrete in conformance with that employed in job specifications

   h. Amount of concrete in cubic years (or cubic meters)

   i. Time loaded or of first mixing of cement and aggregates

   j. Water added by receiver of concrete and his initials

   k. Reading of revolution counter at the first addition of water

   l. Type and brand, and amount of cement

   m. Type and brand, and amount of admixtures

   n. Information necessary to calculate the total mixing water added by the producer. Total mixing water includes free water on the aggregates, water, and ice batched at the plant, and water added by the truck operator from the mixer tank

   o. Maximum size of aggregate

   p. Weights of fine and coarse aggregate

   q. Ingredients certified as being previously approved

   r. Signature or initials of ready-mix representative

   The Contractor shall keep a record of where in the work each batch was placed.

END OF SECTION

SECTION 03 31 16
CELLULAR CONCRETE BACKFILL

PART 1 : GENERAL

1.01 SUMMARY

This Section includes specifications for placing cellular concrete backfill where peat is encountered as indicated on the Drawings.

Cellular concrete used on the project shall meet the following criteria:

Cast Density Pcf	Minimum Compressive Strength at 28 days* psi
70-75	50
*Compressive Strength determined using ASTM C 495 as modified herein.	

1.02 REFERENCES

The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Mix Design**:**

   a. Submit a mix design that will produce a cast density at point of placement and a minimum compressive strength for the material specified in this Section. Include laboratory data using the mix design verifying cast density and strength requirements.

   b. Field qualification test reports must be certified with a signature by an official in responsible charge of the laboratory performing the tests.

2. Quality Control and Placement Plan**:**

   a. Submit a cellular concrete Quality Control and Placement Plan (Plan) 10 working days before placement of cellular concrete backfill material. Placement of cellular concrete shall be in accordance with the information provided in the Plan.

   b. The submitted **P**lan shall provide, as a minimum, the following elements:

      1) An organization chart including names, telephone numbers, current certifications and/or titles, and roles and responsibilities of all those involved in the quality control program.

2) The process of communication by which quality control information will be disseminated to the appropriate persons, including materials suppliers.

3) Written evidence that cellular concrete installer is certified by and approved by the foam agent manufacturer**.**

4) Location of equipment and batching areas.

5) Proposed construction sequence and schedule.

6) Type of equipment and tools to be used.

7) Material list of items and manufacturer's specifications**.**

PART 2 : MATERIALS

A. GENERAL: All materials shall be delivered, stored and handled per recommendations of cellular concrete manufacturer.

B. ADMIXTURES: Admixtures for accelerating the set time may be used under the manufacturer's recommendations. A foaming agent must be used and tested in accordance with ASTM C 796.

C. WATER: Mixing water shall be potable and free of deleterious amounts of acids, alkali, salts, oils, and organic materials in accordance with manufacturers' recommendations.

D. PORTLAND CEMENT: Portland cement must comply with ASTM C 150, Types II / V. Pozzolans and other cementitious materials may be used when approved by the manufacturer of the foaming agent. Fly ash and natural pozzolans must comply with ASTM C 618. Ground granulated blast furnace slag must comply with ASTM C 989, grade 100 or 120.

PART 3 : EXECUTION

3.01 SPECIALIZED BATCHING, MIXING, AND PLACING EQUIPMENT

Batching, mixing and placing equipment shall be capable of producing material that meets the requirements of this Section. Cement and water may be premixed and delivered to the site. Foam shall be added and mixed at the site using aforementioned equipment.

3.02 PERSONNEL REQUIREMENTS

A. The cellular concrete installer shall be certified and approved in writing by the foam agent manufacturer. The installer's foreman shall have a minimum of 2 years experience in this work and shall have worked on at least three successful cellular concrete projects.

B. The installer shall use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work.

C. The Contractor's Representative shall be experienced in the placement of cellular concrete and shall be on site full-time during placement.

3.03 QUALITY CONTROL AND QUALITY ASSURANCE TESTING

A. CAST DENSITY: During placement of the initial batch, the installer shall check the density and adjust the mix as required to obtain the manufacturer's specified cast density at point of placement. At the point of placement, the density must comply with the specified cast density. A single cast density test must represent the lesser of 100 CY or 2 hours production.

B. COMPRESSIVE STRENGTH: The compressive strength must be tested under ASTM C 495 except as follows:

1. Furnish a sufficient quantity of molded and cured cylinders specimens. Unless otherwise approved, the specimens must be 3 x 6 inch cylinders. During molding, place the concrete in 2 approximately equal layers and tap the outside of the mold lightly 10 to 15 times with an open hand after placing each layer to close voids and release entrapped air. Overfill the mold when placing the second layer. No rodding is allowed.

2. At a minimum, prepare a set of 4 test cylinders for each 400 CY of cellular concrete placed or a minimum of 2 sets of 4 cylinders each per day (whichever is greater). Specimens must be covered and protected immediately after casting to prevent damage and loss of moisture. Specimens should be cured in the molds for up to 7 days and then removed from the mold and moist cured. Stop moist curing specimens from 24 to 72 hours before the 28 day compressive strength test and allow to air dry. Specimens must not be oven dried.

C. ACCEPTANCE TESTING: At a minimum, provide 3 test cylinders for each 400 CY of cellular concrete placed or a minimum of 2 sets of 4 cylinders each per day (whichever is greater) to Engineer. Specimens must be covered and protected immediately after casting to prevent damage and loss of moisture.

3.04 SITE PREPARATION

Subgrade to receive cellular concrete material must be free of all loose and extraneous material. Subgrade must be uniformly moist, and any excess water standing on the surface must be removed before placing cellular concrete.

3.05 PLACEMENT

A. Cellular concrete shall be a homogeneous mixture and all materials shall be approved prior to use.

B. Cellular concrete must be job site mixed with foaming agent and placed with equipment specialized for cellular concrete material. Cement and water may be premixed and delivered to the job site and foaming agent added on site. Once mixed, the cellular concrete shall be conveyed promptly to the location of placement without excessive handling.

C. Cellular concrete lift thicknesses must not exceed 4 feet, unless otherwise approved by the Engineer. After curing for 12 hours, any crumbling area on the surface must be removed and scarified before the next layer is placed.

D. A minimum 12 hour curing period between lifts is required. If ambient temperatures are anticipated to be below 32 degrees Fahrenheit within 8 hours after cellular concrete placement, mixing water must either be heated as approved by foaming agent the manufacturer or placement must be prohibited. Cellular concrete must not be placed on frozen ground. Cellular concrete shall not be placed in wet ground conditions. Dewatering in accordance with Section 31 23 43 is required where groundwater is present.

E. Any material that does not meet the minimum specified strength within 28 days shall be removed and replaced by the Contractor at no additional cost to the Owner.

F. Heavy construction equipment shall not be permitted on cellular concrete until it has attained the specified 28 days compressive strength.

3.06 ACCEPTANCE

The contractor shall rectify any cellular concrete material rejected by the Engineer that does not meet the minimum required material properties or is not installed in accordance with this specification. Corrective measures are subject to the approval of the Engineer. Accepted corrected measures will be performed by the Contractor at no additional cost to the Owner or extension of the contract time. This includes removal and replacement of rejected cellular concrete material not meeting the minimum material requirements or installed in accordance with this specification.

END OF SECTION

SECTION 03 60 00
GROUT

PART 1 : GENERAL

1.01 SUMMARY

This Section covers the supply of materials, mixing of materials, and the installation of various grades of grouts utilized in the project, for general purposes.

1.02 REFERENCES

A. The ASTM Standards referenced herein are listed by Active Standard. The latest version of the standard applies.

B. Standards and Codes: See Section 03 00 00 Concrete General Requirements for standards referenced in this section.

1.03 SUBMITTALS

A. Submit under provisions of Section 1-06, as follows:

1. Manufacturer's data on all products.

PART 2 : PRODUCTS

2.01 EPOXY-RESIN-BASE BONDING SYSTEM

For all grouted pipe penetrations, where called for on the Drawings and in all cases where less than a 13-inch thickness of grout or mortar overlays existing concrete or green concrete, a bonding system complying with ASTM C881 shall be used, such as Sonobond by Sonneborn or accepted equal.

2.02 PRECISION GROUT

A. Filling of anchor bolt pockets, handrail pockets, and under equipment and column base plates shall be classified as precision grouting. Grout used for precision grouting shall be a pre-packaged, non-shrink grout using a mixture of metallic and natural aggregates, and shall conform to the most current version of ASTM 1107 Grade B or C when tested at a fluid consistency of 25-30 seconds per ASTM C939 at temperature extremes of 45 and 90°F and an extended working time of 30 minutes. Master Builders Embeco 636 or 885 are acceptable brand and grout types conforming to this specification.

B. All material used, including water, mixer and pre-packaged grout must be initially within the 45 and 90° limits when testing is initiated. Manufacturer shall provide independent certification of ASTM C1107, compliance without modification of standard methods, and certify that the grout's post-hardening, non-shrink property is not based on gas expansion.

C. Grout shall have strengths of 3000 psi at 3 days, 5000 psi at 7 days, and 7000 psi at 28 days when cured at 72°F, as well as meet the 3-, 7-, and 28-day strengths when tested and cured at the 45 and 90°F limits, and shall not bleed when placed at a fluid consistency.

2.03 PORTLAND CEMENT GROUT

Portland Cement Grout shall be used to provide flow concentration in channels, at the bottom of high walls, and in other locations where a general purpose grout is required. Portland cement grout shall be mixed with sand on a ratio of one part cement to two parts sand with an expansive agent included to limit drying shrinkage. Sufficient water shall be added for placement while maintaining a minimum 4,500 psi 28-day compressive strength.

2.04 TOPPING COURSE GROUT

This grout shall be used for leveling the bottom of structures. This mix shall contain 6½ sacks of cement per cubic yard of concrete, use sand and 3/8-inch course aggregate, size No. 89 in ASTM C404, and use water-reducing and expansive additives. The minimum compressive strength shall be 4,500 psi in 28 days. Topping grout over floor slabs shall be reinforced with WWR 6x6 W1.4xW1.4.

2.05 RAPID CURE GROUT

Rapid cure grout shall be mixed with aggregate as recommended by the manufacturer. The grout shall be Master Builders Set 45 or accepted equal. The minimum compressive strength shall be 4,500 psi in 28 days.

2.06 SELF-LEVELING UNDERLAYMENT

Self-leveling cement underlayment shall be Ardex K-15. The compressive strength shall be 4,500 psi per ASTM C109 and shall be capable of feather-edge thickness application. Self-leveling cement underlayment shall be used to level floors where noted on the Drawings.

PART 3 : EXECUTION

3.01 MIXING

All parts of the respective grouts shall be proportioned by volume measurement. Mixing shall be accomplished using a mechanical mixer suitable to the required quantities. Each batch shall be mixed for not less than 5 minutes. The respective grouts and mortars shall be mixed with sufficient water to maintain the fluidity required while attaining the minimum compressive strength indicated.

3.02 RETEMPERING AND TIME LIMIT

Do not retemper or use mortar which has become harsh and nonplastic. When mortar has been maintained plastic and grout fluid, they may be used up to, but not more than, one hour after original mixing.

3.01 TEMPERATURE

Grouting operations shall not commence when the ambient temperature has dropped below 45°F or when the surface to which it is being applied is less than 40°F.

3.03 PROTECTION

All grouting operations shall be protected against moisture intrusion and a sealer, linseed oil or Thoroclear 777, shall be applied at the completion of the work.

3.04 SURFACE PREPARATION

A. The existing concrete surface that the respective grout or mortar shall be placed against shall be cleaned as follows:

1. If the existing surface has been exposed to sludge, chlorine, or other solutions, or was previously painted or treated, the surface shall be sandblasted and steam-cleaned, then treated with a diluted solution of muriatic acid neutralized with an alkaline solution and flushed with clean water.
2. If the existing surface was not exposed to solution other than water, then the surface shall be washed with a diluted (2 parts water to 1 part acid) solution of muriatic acid, neutralized with an alkaline solution, and flushed with clean water.

3.05 PRECISION GROUTING

A. This section describes additional special provisions for the grouting of anchor bolts, handrail pockets, and column and equipment baseplates, defined herein as precision grouting.

B. All grout used for precision grouting shall be placed in a fluid consistency, with an efflux time of 25 to 30 seconds through a standard flow cone as defined by ASTM C939. The Contractor shall have a standard flow cone on-site to verify grout consistency prior to placement.

C. Contractor shall not mix more grout than can be placed in approximately 10 minutes. Contractor shall not attempt to retemper grout by adding water or remixing after it stiffens.

D. All grout used for filling under column and machinery base plates shall be placed from one side using a form around the grouted area. A beveled form edge shall be provided on one side to help direct the grout flow under the base plate. Do not vibrate grout. Immediately after placement, trim the surfaces with a trowel and cover the exposed grout with clean, wet rags and maintain this moisture for 4 to 6 hours.

E. Forms and excess grout shall be removed after the grout has achieved initial set. The grout should offer stiff resistance to penetration with a pointed mason's trowel prior to removing the grout forms. Exposed shoulders shall be finished and wet cured immediately after form removal, and until grout has reached final set, but not less than 48 hours, followed by two coats of curing compound.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 : GENERAL

1.01 SUMMARY

Section includes all steel framing and miscellaneous iron, steel, aluminum or other non-ferrous metal work, not specifically described in other sections.

1.02 REFERENCES

A. Unless noted otherwise, this section incorporates by reference the latest revision of the following documents. In case of conflict between the requirements of this section and that of the listed documents, the requirements of this section shall prevail:

1. American Institute of Steel Construction,
   a. "Code of Standard Practice for Steel Buildings and Bridges", 2005, excluding:
      1) Section 4.4 Approval;
      2) Section 7 Erection, and;
      3) Section 9 Contracts.
2. Research Council on Structural Connections
   a. Specification for Structural Joints Using ASTM A325 or A490 Bolts.
3. American National Standards Institute (ANSI):
   a. A14.3, Ladders - Fixed - Safety Requirements.
4. American Welding Society Standards
   a. D1.1/D1.1M Structural Welding Code - Steel.
   b. D1.2/D1.2M Structural Welding Code – Aluminum.
   c. D10.4-86R Recommended Practices for Welding Austenitic Chromium Nickel Stainless Steel Piping and Tubing.
5. ASTM Standards
   a. A6, General Requirements for Rolled Steel, Structural Steel Bars, Plates, Shapes, and Sheet Piling.
   b. A36, Carbon Structural Steel.
   c. A47, Standard Specification for Ferritic Malleable Iron Castings.
   d. A48, Standard Specification for Gray Iron Castings.
   e. A53, Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

f. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

g. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

h. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

i. A194, Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.

j. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

k. A276, Standard Specification for Stainless Steel Bars and Shapes.

l. A307, Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

m. A312, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.

n. A325, Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength.

o. A380, Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems.

p. A496, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.

q. A500, Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

r. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

s. A536, Standard Specification for Ductile Iron Castings.

t. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.

u. A563, Carbon and Alloy Steel Nuts.

v. A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

w. A666, Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

x. A668, Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.

y. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

z. A786, Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.

aa. A967, Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts.

bb. A992, Structural Steel Shapes.

cc. A1011, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy with Improved Formability.

dd. A1064, Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

ee. A1554, Anchor Bolts, Steel, 36, 55 and 105-KSI Yield Strength.

ff. B209, Aluminum and Aluminum-Alloy Sheet and Plate.

gg. B221, Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

hh. F467, Standard Specification for Nonferrous Nuts for General Use.

ii. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.

jj. F593, Stainless Steel Bolts, Hex Cap Screws, and Studs.

kk. F594, Stainless Steel Nuts.

ll. F835, Standard Specification for Alloy Steel Socket Button and Flat Countersunk Head Cap Screws.

mm. F879, Standard Specification for Stainless Steel Socket Button and Flat Countersunk Head Cap Screws.

nn. F959, Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.

oo. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

pp. F1789, Standard Terminology for F16 Mechanical Fasteners.

qq. F1852, “Twist Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

1.03 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Complete detail drawings of all steel framing and miscellaneous metal items specified herein or shown on the Drawings.
2. Certifications of conformance to specifications for nuts and bolts.
3. Certification of conformance with ASTM A380 for handling and cleaning of stainless steel.
4. Welder AWS certifications.
5. Material data and certification for steels and weld electrodes.
6. Product data for manufactured items.
7. Manufacturer's installation instructions.

8. Provide manufacturer's standard allowable load tables for the following:
   a. Grating and checkered plate.
   b. Expansion anchor bolts.
   c. Adhesive anchor bolts.
9. Contractor designed systems and components, including but not limited to, landings and ladders:
   a. Certification that manufactured units meet all design loads specified.
   b. Shop Drawings and engineering design calculations:
      1) Indicate design live loads.
      2) Sealed by a professional structural engineer.
      3) Engineer will review for general compliance with Contract Documents.

1.04 DEFINITIONS

A. Fasteners: As defined in ASTM F1789.

B. Galvanizing: Hot-dip galvanizing per ASTM A123/A123M or ASTM A153/A153M with minimum coating of 2.0 OZ of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by standard.

C. Hardware: As defined in ASTM A153/A153M.

D. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and handle fabrications to avoid damage.

B. Store above ground on skids or other supports to keep items free of dirt and other foreign debris and to protect against corrosion.

PART 2 : PRODUCTS

2.01 GENERAL MATERIALS

A. STRUCTURAL STEEL: ASTM A36 (rolled shapes other than wide flange shapes), ASTM A500 Grade B (tubing), ASTM A53, Grade B (pipe), ASTM A6/A6M (general requirements).

1. Filler metal strength for welding shall be not less than 70 ksi, low hydrogen type.

2. Wide flange shapes and structural tee sections fabricated from wide flange shapes shall be ASTM A992.

3. Structural tee sections shall be straightened after cutting if necessary to meet the tolerances of ASTM A6.

B. MISCELLANEOUS CARBON STEEL SHEET AND STRIP: ASTM A1011/A1011M, “Structural Quality,” Grade 36 or better.

C. ALUMINUM: ASTM B209 or B221, type 6061 or 6063.

1. Welding shall be with an inert gas shielded arc or resistance welding process.

2. No welding process that requires a welding flux shall be used.

3. Weld filler shall conform to type recommended by AWS D1.2 for the alloys joined.

D. STAINLESS STEEL: ASTM A666, type 304 or 316. Use 304L or 316L for shapes to be welded.

1. Filler metals for welding shall be as specified in ANSI/AWS A5.9 Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Bare and Composite Metal Cored and Stranded Welding Electrodes and Welding Rods.

2. Molybdenum content of filler metal shall be not less than 6 percent.

E. IRON:

1. Ductile iron: ASTM A536.

2. Gray cast iron: ASTM A48 (minimum 30,000 psi tensile strength).

3. Malleable iron: ASTM A47, ASTM A197.

F. BOLTS, WASHERS, AND NUTS: Bolts, washer, and nuts shall meet the requirements of the following specifications:

1. Anchor bolts. All anchor bolts, nuts and washers shall be either hot-dip galvanized or stainless steel as called out on the Drawings or specified. Where not indicated on Drawings or in specifications, stainless steel shall be used in all hydraulic structures or buried applications. Galvanized anchor bolts shall conform to ASTM F1554, Grade 36, with ASTM A563 or A194 nuts. Anchor bolts shall be headed stud type . “L” or “J” type bolts shall not be used.

2. Expansion bolts. Bolts, nuts and washers shall be 316 stainless steel; wedges shall be double plated spring steel.

3. Machine bolts. ASTM A307 or stainless steel where called out on the Drawings or specified. All carbon steel bolts, nuts and washers shall be hot dip galvanized unless noted otherwise.

4. High strength bolts. ASTM A325 or F1852. Hot-dip galvanized unless noted otherwise. Pre-tension using ASTM F959 direct tension indicators. ASTM A563 nuts.

5. Special requirements for galvanized nuts and bolts. Galvanized nuts and bolts shall be furnished by a single supplier and shall use the same galvanizing process. Nuts shall come coated with a visible dye lubricant. Galvanized nuts shall be color coded to distinguish nuts that are hot-dipped from mechanically galvanized material.

6. Stainless steel bolts and nuts. Stainless steel bolts shall conform to ASTM F593. Stainless steel nuts shall conform to ASTM F594. Bolts and nuts to be Alloy Group 1 or 2, Condition CW1 if 5/8" or less, otherwise CW2.

7. Washers shall be the same material and alloy as found in accompanying bolts and nuts.

G. METAL TYPE: Unless otherwise specified or noted on the Drawings, metal fabrications exposed to potable water or sewage, shall be 316/316L stainless steel. All carbon steel fabrications shall be galvanized, unless otherwise specified or noted on the Drawings.

2.02 FABRICATION

A. FABRICATION-GENERAL

1. Workmanship. Conform to accepted shop practices.

   a. Form work true to detail, with clean, straight, sharply defined profiles.

   b. Unless otherwise shown or specified, finish exposed welds flush and smooth.

2. Joints and Connections. Weld all joints, unless other fastening methods are shown, specified, or specifically approved.

   a. Close fit exposed joints; make joints where least conspicuous.

   b. Unless otherwise shown or specified, use flat and countersunk headed bolts or screws in exposed connections.

3. Cutting, Drilling. Perform coping, cutting, drilling and punching required for accurate fitting and assembly work.

   a. Perform similar operations as required for attachment of work of other trades, provided that directions for such work are supplied prior to project data approval.

   b. Where galvanized assemblies, punched holes shall be reamed; use flame cutting rather than cold shearing; avoid cold forming to prevent galvanizing vent holes in closed assemblies in accordance with Zinc Institute recommendations.

4. Provisions for Attachment to Structure. Furnish miscellaneous metal items complete with framing, supports, hangers, bracing, anchors and other devices shown, specified or necessary for reinforcement and proper, secure setting or attachment.

5. Dissimilar Materials Protection. Insulate aluminum surfaces in contact with plaster, concrete, or metals other than galvanized or stainless steel. See General Structural Notes for coating requirements.

6. Workmanship. Fabricate all items neatly and rigidly in accordance with the details.

   a. Form curved metal neatly to radii indicated.

   b. Provide members of sizes indicated and weld, bolt or rivet securely together.

   c. Furnish bolts, nuts, washers, and other fastening devices required for anchoring and securing work.

7. Welding. Use electric shielded-arc process in accordance with Welding Specifications of American Welding Society.

   a. Use only welding operators properly trained, highly skilled, and AWS-certified in arc welding.

   b. Grind smooth all surface welds exposed to view.

B. SPECIAL REQUIREMENTS FOR STAINLESS STEEL FABRICATIONS

1. Welds and joint areas shall be cleaned before and after welding in accordance with gross inspection requirements of ASTM A380.

2. Observe precautions against contamination with free iron and protection of cleaned surfaces in accordance with ASTM A380.

C. Fabricate grating, checkered plate, stairs, ladders and accessories using galvanized steel unless shown otherwise on Drawings:

1. Finish:

   a. Mill, unless noted otherwise.

   b. Coat surfaces in contact with dissimilar materials.

2.03 HOT-DIP GALVANIZING

Steel items called out on the Drawings or specified herein, as galvanized, or hot-dip galvanized shall be hot-dip coated in accordance with one or more of the following, as is applicable:

Reference	Title
ASTM A90/A90M	Standard Test Method for Weight (Mass) of Coating on Iron or Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM A123/A123M	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A143/A143M	Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
ASTM A153/A153M	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A384/A384M	Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
ASTM A385	Providing High Quality Zinc Coatings (Hot-Dip)
MILSPEC DOD-P-21035	Paint, High Zinc Dust Content, Galvanizing Repair

2.04 PIPE BOLLARDS

A. As indicated on the Drawings.

B. Hot-dip galvanize, per Paragraph 2.03, after fabrication.

PART 3 : EXECUTION

3.01 PREPARATION

A. Provide items to be built into other construction in time to allow their installation:

1. If such items are not provided in time for installation, cut in and install.

B. Prior to installation, inspect and verify condition of substrate.

C. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation.

3.02 INSTALLATION

A. GENERAL: Install work in strict accordance with the Drawings and manufacturer's installation instructions. Perform cutting, drilling and fitting required. Accurately set, place and properly, securely attach work in true plans, alignment, plumb and level; properly adequately reinforce and stiffen.

B. PRIME COAT TOUCHUP: After installation of steel items, touch up field bolts, field welds, uncoated connections, and abrasions to shop protective coatings. Clean items of mud, dirt and other objectionable foreign matter prior to touching up the prime coat and field painting.

C. GALVANIZED ITEMS: Items that have been drilled, cut, welded, or otherwise damaged shall be touched up using either of the following products:

1. "Galv-Weld," manufactured by Kenco Division of Southern Coating and Chemical Co., Galv-Weld Products, Sumter, South Carolina. Apply in accordance with manufacturer's instructions and to same thickness as specified hot dip coating.
2. Hot stick followed by CRC Zinc Re-nu brush-on cold galvanizing compound with epoxy binder. Apply in accordance with manufacturer's instructions.

D. ALUMINUM ITEMS: Aluminum items in contact with concrete shall have contact surfaces coated to prevent corrosion. Aluminum items in contact with steel shall be electrically isolated with gaskets and fastener sleeves.

E. FIELD MEASUREMENTS:

1. Take field measurements as necessary to verify or supplement dimensions indicated on the Drawings.
2. Contractor is responsible for the accurate fit of the work.
3. Check the elevations of all finished footings or foundations and the location and alignment of all anchor bolts before starting erection:
   a. Use surveyor's level.
   b. Notify Engineer of any errors or deviations found by such checking.
4. Erect plumb and level; introduce temporary bracing required to support erection loads.
5. Use light drifting necessary to draw holes together:
   a. Drifting to match unfair holes is not allowed.

F. Welding:

1. Conform to AWS D1.1 and requirements of Article 2.4.
2. When joining two (2) sections of steel of different ASTM designations, welding techniques shall be in accordance with a qualified AWS D1.1 procedure.
3. Shore existing members when unbolting of common connections is required.
4. Grind welds smooth where field welding is required.
5. Clean stored material of all foreign matter accumulated during erection period.

G. Bolt Field Connections:

1. Where practicable, conceal fastenings.
2. Use new bolts for re-bolting connections.

3. Unless noted or specified otherwise:
   a. Connect steel members to steel members with 3/4 inch DIA ASTM A325 high strength bolts.
   b. Provide washers for all bolted connections.
   c. Where exposed, bolts shall extend a maximum of 3/4 inches and a minimum of 1/2 inches above the top nut:
   d. If bolts are cut off to required maximum height, threads must be dressed to allow nuts to be removed without damage to the bolt or the nuts.
4. Install and tighten ASTM A325 high-strength bolts in accordance with the AISC 325, Allowable Stress Design (ASD).
5. Provide hardened washers for all ASTM A325 bolts:
   a. Provide the hardened washer under the element (nut or bolt head) turned in tightening.
   b. Provide bearing type connection.
6. After bolts are tightened, upset threads of ASTM A307 unfinished bolts or anchor bolts to prevent nuts from backing off.
7. Do not field splice fabricated items unless said items exceed standard shipping length or change of direction requires splicing.
8. Provide full penetration welded splices where continuity is required.

H. Provide each fabricated item complete with attachment devices as indicated or required to install.

I. Anchor such that work will not be distorted nor fasteners overstressed from expansion and contraction:
   1. Fill space between bearing surface and bottom of base plate with nonshrink grout:
      a. Fill space until voids are completely filled and base plates are fully bedded on wedges, shims, and grout.
   2. Do not remove wedges or shims:
      a. Where they protrude, cut off flush with edge of base plate.
   3. Fill sleeves around anchor bolts solid with non-shrink grout.

J. Tie anchor bolts in position to embedded reinforcing steel using wire:
   1. Tack welding prohibited:
      a. Coat bolt threads and nuts with heavy coat of clean grease.
   2. Anchor bolt location tolerance:
      a. 1/16-inch.
      b. Provide steel templates for all column anchor bolts.

K. Install bollards in concrete as detailed on the Drawings.

L. Repair damaged galvanized surfaces in accordance with ASTM A780:

1. Prepare damaged surfaces by abrasive blasting or power sanding.
2. Apply galvanizing repair paint to minimum 6 mils DFT in accordance with manufacturer's instructions.

3.03 CLEANING

A. After erection, installation or application, clean all miscellaneous metal fabrication surfaces of all dirt, weld slag and other foreign matter.

B. Provide surface acceptable to receive field applied paint coatings specified in Section 09 96 00.

END OF SECTION

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SECTION 05 73 16
WIRE ROPE DECORATIVE METAL RAILINGS

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Decorative metal railing around elevated pump station slabs, as shown on the Drawings.

1.02 SUBMITTALS

A. Submit the following manufacturer's data for approval under the provisions of Section 1-06.

1. Product Data: Manufacturer's data sheets on each product to be used, including:
   a. Preparation instructions and recommendations.
   b. Storage and handling requirements and recommendations.
   c. Installation instructions and methods.
   d. Description of materials, components, fabrication, and finishes.
   e. Structural computations and test reports provided by the manufacturer evidencing compliance with the specifications.
2. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating materials, components, sizes, dimensions, tolerances, hardware, fasteners, finishes, options, accessories, and installation. Show details of attaching railing system to supports and identify removable sections as shown on the Drawings. Indicate weight of removable sections. Include gate door details as shown on the Drawings including hinge connections and door swing direction.
3. Manufacturer's structural calculations.
4. Selection Samples: For each finish product specified, two complete sets of color and finish chips representing manufacturer's full range of available colors and finishes.
5. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square that represents actual product, color, and patterns.
6. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
7. Maintenance Instructions: Submit manufacturer's maintenance and cleaning.

PART 2 : PRODUCTS

2.01 RAILING SYSTEM GENERAL

A. Railing shall be colonial; pre-engineered, component based, stainless steel cable railing provided by NW Natural Lighting, or accepted equal.

B. Mounting: Aluminum 6061-T6 fascia mounted as shown on the Drawings.

1. Provide custom two-post mounting brackets where indicated on the Drawings.

C. Anchors: Railing support adhesive anchors shall consist of minimum 3/8-inch size all thread anchor rod, nut, washer and adhesive capsule; Hilti HVU Capsule Adhesive Anchors, HAS anchor rod assembly or accepted equal, with all metal parts being Type 316 stainless steel meeting the requirements of ASTM F593 Condition CW. Embedment depth in concrete shall be 3 ½ inches, minimum. Final anchor size and embedment shall be determined by railing supplier's registered structural engineer.

D. Railing: Aluminum 6063-T5 per ASTM B221.

E. Posts: Aluminum 6005A-5 or T6 per ASTM B221.

F. Cable and Fittings: Type 316 stainless steel.

G. Railing Height: 3 foot 6 inches as shown on the Drawings.

H. Railing sections shall be removable in specific locations as shown on the Drawings.

I. Railing Construction: Railing construction shall be consistent in appearance throughout, whether removable or not. Bottom and top horizontal supports and top rail shall be provided at a minimum.

J. Gate Door: Design and provide in location shown on the Drawings. Provide with self closing hinges and lockable latch constructed of glass-reinforced polymer and stainless steel construction, Tru Close and Lokk Latch, or accepted equal. Gate door shall be constructed with Type 316 stainless steel cable and fittings to match appearance and design of railing system.

K. Stairway Handrail and Height: OSHA compliant, constructed of same material and appearance as railing system.

2.02 DESIGN / PERFORMANCE REQUIREMENTS

A. Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections:

1. Top Rail of Guards: Shall withstand the following loads:

a. Concentrated load of 200 lbf (0.89kN) applied at any point and in

any direction.

b. Uniform load of 50 lbf-ft. (0.07kN-m) applied horizontally and concurrently with uniform load of 100 lbf-ft. (0.14kN-m) applied vertically downward.

c. Concentrated and uniform loads above need not be assumed to act concurrently.

2. Handrails Not Serving As Top Rails: Shall withstand the following loads:

a. Concentrated load of 200 lbf (0.89 kN) applied at any point and in any direction.

b. Uniform load of 50 lbf-ft. (0.07kN-m) applied in any direction.

c. Concentrated and uniform loads above need not be assumed to act concurrently.

3. Guard Infill Area: Shall withstand the following loads:

a. Concentrated horizontal load of 200 lbf (0.89 kN) applied to 1 sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on guard.

B. Handrails and railings shall allow for movements resulting from 120°F changes in ambient and 180°F surface temperatures. Base the engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

C. Separate incompatible materials to prevent galvanic corrosion.

D. A registered structural engineer, licensed in Washington State, shall prepare and sign manufacturer's structural calculations.

2.03 COATING

A. Coat all aluminum railing system materials (including gate doors) with an American Architectural Manufacturers Association (AAMA) 2605 fluoropolymer powder coating in accordance with the manufacturer's requirements. Coating shall be suitable for a marine type environment.

B. Color to be selected by Owner from standard color chart.

PART 3 : EXECUTION

3.01 INSTALLATION

A. Install the railing system in accordance with the approved shop drawings and manufacturer's instructions. Attach railing system securely in place using fasteners as specified herein. Embedded anchor plates and supporting steel shall be provided as necessary to accommodate the specified loads and coordinated with the railing supplier. Exposed metals if required shall be constructed of Type 316 stainless steel.

B. Coat concealed surfaces of aluminum and copper alloys that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint or separate with a EPDM gasket.

C. Protect installed products until completion of project.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 : GENERAL

1.01 SUMMARY

Under-slab vapor retarder for elevated concrete structure.

1.02 REFERENCES

A. Reference Standards shall be latest published edition.

B. American Concrete Institute (ACI):

1. ACI 302.1R, Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.

C. ASTM International (ASTM):

1. ASTM C171, Standard Specification for Sheet Material for Curing Concrete.
2. ASTM E96, Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.
3. ASTM E1643, Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
4. ASTM E1745, Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

1.03 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Manufacturer's installation instructions for placement, seaming and pipe boot installation.

PART 2 : PRODUCTS

2.01 UNDER-SLAB VAPOR RETARDER

A. Extremely low permeance vapor retarders for critically sensitive, low permeance floor coverings. Includes floor coverings of rubber, vinyl, urethane, epoxy and methyl methacrylate, linoleum and wood.

B. Approved Products and Manufacturers:

1. Stego Wrap 15-mil by STEGO INDUSTRIES LLC.
2. Moistop Ultra "A" by Fortifiber Corp.
3. Vaporblock 15 by Raven Industries, Engineered Films Div.
4. Or Accepted Equal.

2.02 ACCESSORIES FOR UNDER-SLAB VAPOR RETARDER

A. SEAM TAPE: High Density Polyethylene tape with pressure sensitive adhesive. Minimum width 4 inches.

B. PIPE BOOTS: Construct pipe boots from vapor retarder material and pressure sensitive tape per manufacturer's printed instructions.

PART 3 : EXECUTION

3.01 PREPARATION

A. Ensure that subsoil is approved by Engineer:

1. Level and tamp or roll aggregate base capillary break to compaction requirements.

3.02 INSTALLATION

A. Under-Slab Vapor Retarder:

1. Install in accordance with manufacturer's printed instructions and ASTM E1643.
2. Unroll vapor retarder with long dimension parallel with direction of the pour.
3. Lap vapor retarder over footings and seal to foundation walls.
4. Overlap joints 6 inches and seal with manufacturer's tape and return up perimeter foundation walls not less than 4 inches.
5. Seal all penetrations (including pipes) with manufacturer's pipe boot.
6. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
7. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches and sealing all four sides with tape.

3.03 ADJUSTMENT

Repair damaged sections of under-slab vapor retarder with same material and seal with seam tape as required.

END OF SECTION

SECTION 08 31 00
ACCESS HATCHES

PART 1 : GENERAL

1.01 SUMMARY

A. Specification section includes:

1. Access Hatches: 300 pounds per square foot (psf) loading.
2. Safety Grating System.
3. Ladder Safety Extension Post.

1.02 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO).

B. ASTM International (ASTM):

1. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
2. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
3. F593, Standard Specification for Stainless Steel Bolts, Hex Caps Screws and Studs.

1.03 QUALITY ASSURANCE

SINGLE SOURCE RESPONSIBILITY: Contractor shall obtain all access hatches and safety grating system from one manufacturer and shall coordinate the design and all associated requirements with the hatch manufacturer and the concrete slab design shown on the Drawings.

1.04 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's technical data and installation instructions.
   c. Schedule, types, locations, finish, latching provisions and other pertinent information.
   d. Manufacturer’s standard warranty on safety grating system.
   e. Manufacturer’s extended guarantee or warranty for access hatches.

f. Access Hatch Gate Stem Access Opening details including location and coordination with Contractor.

2. Operation and Maintenance Manuals.

3. Warranty:

a. Manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee.

b. Special guarantee shall provide for correction, or at option of Owner, removal and replacement of access hatches found defective during a period of five (5) years after date of Substantial Completion.

c. Duties and obligations for correction or removal and replacement of defective Work as specified in Division 1.

4. Certifications for 300 psf loading access hatches.

PART 2 : PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Access Hatches:

a. LW Products.

b. Bilco Company.

c. Or accepted equal.

2. Safety Grating System:

a. Access Hatch manufacturer's standard safety grating system.

3. Ladder Safety Extension Post:

a. Bilco LadderUp.

b. USF Fabrications.

c. Or accepted equal.

2.02 MANUFACTURED UNITS

A. All access doors shall be provided by the same manufacturer when possible.

B. Unless noted otherwise, all access hatches shall be 300 psf rated.

C. Access Hatch:

1. Frame: Extruded aluminum channel frame with a 1-inch anchor flange around the perimeter.

2. Bituminous coated when in contact with concrete.

3. Cover: 3/8 inch mill finished aluminum diamond plate. Provide stiffeners as needed to meet load requirements.

4. Lifting mechanisms: Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the covers when closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed 1/4" gusset support plate. No more than 30 pounds of force shall be required to open hatch cover.

5. Hinges: Shall be specifically designed for horizontal installation and shall be through bolted to the covers with tamperproof Type 316 stainless steel lock bolts and shall be through bolted to the frame with Type 316 stainless steel bolts and locknuts.

6. All hardware:

    a. ASTM F593 Type 316 stainless steel.

    b. Hinges: Stainless steel hinges, each having a minimum 3/8" (9.5mm) diameter Type 316 stainless steel pin, shall be provided and shall pivot so the cover does not protrude into the channel frame.

    c. Covers shall be equipped with a hold open arm that automatically locks the cover in the open position.

    d. Covers shall be fitted with the required number and size of compression spring operators. Springs shall have an electrocoated acrylic finish.

    e. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of the cover.

    f. Compression spring tubes shall be an anti-corrosive composite, all fasteners shall be Type 316 stainless steel material.

7. Grip handle: Vinyl.

8. Fabricate frame with anchor flange around perimeter and 1-1/2 inch diameter drainage coupling. Locate drainage coupling in location shown on the Drawings.

9. Reinforced to accommodate specified loading.

10. Fabricate doors to open 90 degrees with assistance of spring operators and automatically lock into open position.

11. Furnish with slam lock and removable key handle. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the covers and the latch release shall be protected by a flush, gasketed, removable screw plug.

12. Furnish with recessed padlock hasp and padlock. Hold down anchorage for the access doors shall be limited to access hatches larger than 3'-0" x 3'-6"-FT.

13. Furnish with secondary fall through safety grating system and/or ladder safety extension posts where specified in the Access Hatch Schedule.
14. Size(s): Sizes shall be as specified in the Access Hatch Schedule and as shown on the Drawings.
15. Hinge Direction: as shown on the Drawings.
16. EPDM gasket.

D. Access Hatch Gate Stem Access Opening:

1. Provide hinged opening with slam lock and removable key handle.
2. Opening shall be designed by hatch manufacturer and reinforced to maintain same load rating as the hatch.
3. Opening shall be located within the leaf of the hatch.
4. Clear opening size as indicated on the Drawings.
5. Coordinate exact location with Contractor to center opening over gate stem.
6. Materials of construction shall match materials for Access Hatch.
7. Provide at locations as specified in the Access Hatch Schedule.

E. Safety Grating System:

1. Platform:
   a. Aluminum safety grating with 300 psf load rating.
   b. Finish:
      1) Powder coated.
      2) Color: Safety orange or safety yellow.
2. Hardware:
   a. ASTM F593 Type 316 stainless steel.
   b. Tamper proof ASTM F593 Type 316 stainless steel.
3. Provide automatic lock to keep gratings in the open position.
4. Size: size grating platform to allow 6 inches clear space on each unhinged side for visual observation.
5. Provide padlock hasp for Owner provided padlock.
6. Safety grating shall hinge same side as access hatches.
7. Secondary fall through safety grating system shall be installed at the factory per the manufacturer.
8. Provide at locations as specified in the Access Hatch Schedule.

2.03 ACCESSORIES

A. Load Rating Plates:

1. Minimum 18 GA Type 316 stainless steel, ASTM A666.
2. Engraved with maximum design live load allowed for unit on which it will be mounted.
3. Load shall be displayed in English units as well as metric units.
4. Size as required for text as needed.
5. Text:
   a. Font: Helvetica Narrow, all caps.
   b. Size: 1/4 inch height.
   c. Depth of engraving: 3 mils.
6. Finish:
   a. Text:
      1) Black epoxy baked on paint.
      2) Plate to have finish conductive to paint application.
   b. Entire plate shall be coated with baked on clear coat on front and back side.
7. Attach to top of all access hatches using ASTM F593 Type 316 stainless steel screws in location determined by manufacturer:
   a. Provide a neoprene gasket under the plate to separate the stainless steel from the aluminum cover or frame.

B. Ladder Safety Extension Post:

1. Telescoping tubular mill finish aluminum section that automatically locks into place when fully extended.
2. Stainless steel spring and hardware.
3. Factory assembled with all hardware necessary for mounting to ladder.
4. Posts to have adjustable mounting brackets to fit ladder rung spacing and clamp brackets to accommodate ladder rungs up to 1-3/4” in diameter.
5. Balancing spring balances mechanism to provide smooth, easy, controlled operation when raising and lowering the post.
6. Provide at locations as specified in the Access Hatch Schedule.

PART 3 : EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Hatch design and construction requirements shall be coordinated with the concrete slab design shown on the Drawings. Access hatch shall be cast into the concrete slab shown on the Drawings.

C. Hatches and safety grating shall be coordinated with access ladder locations and requirements for entry as shown on the Drawings.

3.02 ACCESS HATCH SCHEDULE

Location	Size/# of Leafs	Ladder Safety Extension Post	Safety Grating System*	Gate Stem Access Opening**
PS-45 Wet Well	60” x 60”/Two Leaf	N/A	Yes	No
PS-45 Valve Vault	60” x 72”/Two Leaf	Yes	No	Yes
PS-46 Wet Well	60” x 60”/Two Leaf	N/A	Yes	No
PS-46 Valve Vault	60” x 72”/Two Leaf	Yes	No	Yes
PS-47 Wet Well	60” x 60”/Two Leaf	N/A	Yes	No
PS-47 Valve Vault	60” x 72”/Two Leaf	Yes	No	Yes

*Coordinate with pump manufacturer so clear opening is adequate to remove pumps.

**Coordinate exact location with Contractor

END OF SECTION

SECTION 09 96 00
PAINTING AND PROTECTIVE COATINGS

PART 1 : GENERAL

1.01 SUMMARY

A. This section specifies high performance industrial coatings and their surface preparation.

B. Definitions: Coating systems include surface description, surface preparation, required dry film thickness (DFT), and the number and application procedure of the prime and finish coatings as specified in the Coating System Specifications Sheets, located in Paragraph 2.02.

Field coating is the application or the completion of application of the coating system after installation of the surface at the site of the work.

Installer or applicator is the person actually installing or applying the product in the field at the Project site. Installer and applicator are synonymous.

1.02 REFERENCES

A. REFERENCES:

1. American Society for Testing and Materials (ASTM).
2. International Concrete Repair Institute (ICRI).
3. National Association of Corrosion Engineers (NACE) International.
4. National Association of Pipe Fabricators (NAPF).
5. NSF International (NSF).
6. The Society for Protective Coatings (SSPC).

B. STANDARDIZATION: Materials, supplies, and articles provided shall be the standard products of manufacturers. Paints in a particular coating system shall be the products of a single manufacturer.

Requests for substitutions, in accordance with Section 1-06, will be considered, provided the following minimum conditions are met:

1. The proposed coating system shall use an equal or greater number of separate coats to achieve the required dry film thickness.
2. The proposed coating system shall use coatings of the same generic type.
3. Requests for substitution shall have directions for application and descriptive literature which includes generic type, nonvolatile content by volume, and information confirming that the substitution is equal to the specified coating system.

1.03 QUALIFICATIONS

A. Coating manufacturer's authorized representative shall provide written statement attesting that applicator has been instructed on proper preparation, mixing and application procedures for coatings specified.

B. Applicators shall have minimum of ten (10) years experience in application of similar products on similar project:

1. Provide references for minimum of three (3) different projects completed in last five (5) years with similar scope of work.
2. Include name and address of project, size of project in value (painting) and contact person.

1.04 SUBMITTALS

A. In accordance with the requirements of Section 1-06, submit the following:

1. Applicator experience qualifications:
   a. No submittal information will be reviewed until Engineer has received and approved applicator qualifications.
2. Manufacturer's specifications for each coating system including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's application instructions.
   c. Manufacturer's surface preparation instructions.
   d. If products being used are manufactured by a Company other than listed in the Paragraph 2.02 of this Section, provide complete individual data sheet comparison of proposed products with specified products including application procedure, coverage rates and verification that product is designed for intended use.
   e. Contractor's written plan of action for containing airborne particles created by blasting operation and location of disposal of spent contaminated blasting media.
   f. Coating manufacturer's recommendation on abrasive blasting.
   g. Manufacturer's recommendation for universal barrier coat.
   h. Manufacturer's recommendation for providing temporary or supplemental heat or dehumidification or other environmental control measures.
   i. A list of materials proposed to be used.
3. Manufacturer’s color charts. Basic colors are indicated in Paragraph 3.05. Final color selection shall be made by the Owner from the submitted color charts.
4. Manufacturer's statement regarding applicator instruction on product use.

5. Informational Submittals:
   a. Approval of application equipment.
   b. Applicator's daily records:
      1) Submit daily records at end of each week in which painting work is performed unless requested otherwise by Engineer's on-site representative.

1.05 DELIVERY AND STORAGE

A. Materials shall be delivered to the job site in their original, unopened containers, labeled as follows:

1. Name or type number of material.
2. Manufacturer's name and item stock number.
3. Date of manufacture.
4. Contents, by volume, of major constituents.
5. Warning labels.
6. VOC content.
7. Storage life.
8. Any special instructions or directions.

B. Paints shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold, and maintained within the storage temperature range recommended by the paint manufacturer, but in no case stored where the temperature is lower than 40ºF or greater than 100ºF.

1. Paint material storage facility shall be monitored with a high-low recording thermometer device.
2. Flammable materials shall be stored in accordance with state and local codes.

C. Materials exceeding storage life recommended by the manufacturer shall be removed from the site.

1.06 SPARE PAINT SUPPLIES

The Contractor shall provide one unbroken gallon container of each color and type of coating, solvent, and thinner required in the specification. These spare paint supplies shall be stored as directed by the County Construction Manager.

PART 2 : PRODUCTS

2.01 MATERIALS

A. GENERAL: Coating system shall not be applied until the Engineer has inspected the surface to be coated.

B. COATING SYSTEMS: Unless otherwise specified, prime coatings may be shop- or field-applied. Shop-applied primer shall be compatible with the specified system. Field coating signifies that coating is applied in place, after installation of the surface. If the shop coating meets the requirements of this section, the field coating may consist of touching up the shop prime coat to achieve the film thickness, continuity, and coating specified in the Coating System Specification sheets. Damaged and poorly applied shop coatings that do not meet the requirements of this section shall be removed and the surfaces recoated in accordance with the Coating System Specification Sheets.

Surface preparation shall be as specified for each paint system and in Paragraph 3.01. Number of coats specified in each system shall be the minimum number of coats applied to provide the required dry film thickness.

For unspecified materials such as thinner, provide manufacturer's recommended products.

C. MANUFACTURERS: As specified for each Coating System or accepted equal.

2.02 COATING SYSTEM SPECIFICATIONS

Coating System	**A**

Coating Material: Modified Polyamine Epoxy

Surfaces: Concrete

Surface Preparation:

1. Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness and prepare concrete surfaces in accordance with NACE 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Moisture vapor transmission should not exceed three lbs per 1,000 sq ft in a 24 hour period (Reference ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"). Relative humidity should not exceed 80% (Reference ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes"). Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 3 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.

Application: Factory – Exterior Surfaces
Field – Interior Surfaces

Coating System:

Primer/Finish: Tnemec Series 141 Epoxoline
One coat, 16 mils DFT

Coating System	**B**
Coating Material:	Modified Polyamidoamine Epoxy and Aliphatic Acrylic Polyurethane
Surfaces:	Metal
Surface Preparation:	1. Bare ferrous metal surfaces shall be prepared in accordance with SSPC SP-6 (Commercial Blast Cleaning). 2. Shop primed surfaces which are to be incorporated in the work shall be prepared in the field by cleaning all surfaces in accordance with SSPC SP-2 (Hand Tool Cleaning). 3. Galvanized or nonferrous surfaces shall be treated with a passivator and vinyl wash primer as recommended by the coating system manufacturer. 4. If smoothing of rough metalwork is necessary, a smoothing cement acceptable to the paint system material manufacturer shall be used.
Application:	Field
Coating System:	
Primer:	Tnemec Series 135 Chembuild One coat, 4.0 to 6.0 mils DTF Color: Off-White
Finish:	Tnemec Series 73 Endura-Shield Two coats, 2.0 to 3.0 mils DFT per coat Color: See Paragraph 3.05

Coating System	**C**
Coating Material:	100% Solids High Build Epoxy
Surfaces:	Concrete
Surface Preparation:	Surfaces must be sound and contaminant-free with a surface profile equivalent to a minimum CSP3 to CSP5 in accordance with ICRI Technical Guideline No. 310.2R-2013. Dry abrasive sand with water blast to surface profile as recommended by the manufacturer.
Application:	Field
Coating System:	
Primer:	As recommended by coating system manufacturer
Finish:	Raven 405 Spray apply two coats, 125 mils DFT total Allowed tolerances of plus 40 miles DFT to minus 0 mils DFT Color: Light Blue

Coating System **D**

Coating Material: Self-priming polyurethane resin

Surfaces: Concrete

Surface Preparation:

1. All surfaces specified to receive a protective coating shall be inspected prior to surface preparation. Applicator shall notify Owner of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair mortar and protective coating.

2. All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.

3. All concrete or metal that is not sound or has been damaged by chemical exposure shall be removed to a sound surface or replaced.

4. Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with profile to meet as a minimum ICRI CSP4 –CSP6 profile and porosity to provide a strong bond between the protective coating and the substrate. Generally, this can be achieved with a high pressure water cleaning using equipment capable of a minimum 4,000 psi at 3.5 gpm with a turbo head jet nozzle. Other methods such as high pressure water jetting (refer to SSPC-SP 13/NACE No.6), abrasive blasting, shotblasting, grinding, scarifying or acid etching may also be used. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface that is not excessively damaged.

5. Infiltration shall be stopped by using a material which is compatible with the specified repair mortar and is suitable for topcoating with the specified protective coating.

6. The area between the manhole and the manhole ring and any other area that might exhibit movement or cracking due to expansion and contraction, shall be grouted with a flexible grout or gel. A termination groove “key” cut into the substrate between the bottom of the manhole frame and concrete is recommended for placement of the flexible grout or gel. The “key” shall be a minimum ¼”w x ¼”d, cut at a minimum 45º angle (60º maximum).

7. Surfaces to receive protective coating shall be dry to the touch and or with no visible dampness. This is to insure maximum adhesion to the substrate. If required, drying may be accomplished by a minimum of 20 minutes of a heated, forced air blower. The drying shall be to the specification dictated by the resin manufacturer and its trained applicator.

Application: Field

Coating System:

Primer: As required by the coating system manufacturer

Finish: SprayWall by Sprayroq, Inc
Spray apply one coat, 125 mils DFT
Color: Gold

Coating System	**E**
Coating Material:	100% Solids Modified Polyamine Epoxy
Surfaces:	Metal
Surface Preparation:	As recommended by coating system manufacturer.
Application:	Field
Coating System:	
Primer:	As recommended by coating system manufacturer
Finish:	Tnemec Series 435 Perma-Glaze Two coats, 12 to 15 mils DFT per coat Color: See Paragraph 3.05

Coating System	**F**
Coating Material:	Epoxy (per Flygt/Xylem)
Surfaces:	Metal
Surface Preparation:	In accordance with SSPC SP-10 (Near white metal blast)
Application:	Factory Curing as required by coating manufacturer
Coating System:	Xylem Standard Code 08 Coating System
Primer:	Temanyl PVB, one coat 1.6 Mil DFT
Finish:	Duasolid 50, 3 coats 4-5 Mil DFT per coat

PART 3 : EXECUTION

3.01 PREPARATION

A. GENERAL: Surfaces to be coated shall be clean. Before applying coating or surface treatments, oil, grease, dirt, rust, loose millscale, old weathered coatings, and other foreign substances shall be removed except as specified. Oil and grease shall be removed before mechanical cleaning is started. Where mechanical cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded, and free of contaminants which might interfere with the adhesion of the coatings.

Clean cloths and clean fluids shall be used in solvent cleaning. Cleaning and painting shall be scheduled so that dust and spray from the cleaning process will not fall on wet, newly painted surfaces.

Contractor shall demonstrate that field coating is compatible with factory coating by applying small test patches of specified coating over shop coating.

The Contractor shall pay special attention to painting of existing surfaces adjacent to the new piping and structures. Care shall be taken in surface preparation and finish work to provide a smooth transition from one surface to the other. If necessary, compatible primer shall be used when painting over existing surface.

B. METALLIC SURFACES: Metallic surfaces shall be prepared in accordance with applicable portions of surface preparation specifications of the SSPC. Specific applicable standards are specified in each coating system. The solvent in solvent cleaning operations shall be as recommended by the manufacturer.

Preparation of metallic surfaces shall be based upon comparison with SSPC-Vis-1-67T (ASTM D220), and as described herein. To facilitate inspection, the Contractor shall, on the first day of sandblasting operations, sandblast metal panels to the standards specified. Plates shall measure a minimum of 82 inches by 11 inches. Panels meeting the requirements of the specifications shall be initialed by the Contractor and the Engineer and coated with a clear non-yellowing finish. One of these panels shall be prepared for each type of sandblasting and shall be used as the comparison standard throughout the project.

Ductile iron pipe and fittings to be painted shall be purchased from the manufacturer <u>without</u> the petroleum asphalt coating normally furnished pursuant to AWWA Standards C110, C115, C151 or C153. Prepare ductile iron pipe in accordance with pipe manufacturer's recommendations and NAPF.

Surface preparation for galvanized metal, aluminum, copper, and brass shall be in accordance with SSPC SP-1 (solvent cleaning) and passivated in accordance with the coating manufacturer’s written instructions.

C. PREPARATION OF CONCRETE, MASONRY, AND PLASTER SURFACES: Unless otherwise specified, surfaces which are to be coated shall be allowed to age for at least 28 days and allowed to dry to the moisture content recommended by the coating manufacturer. Moisture content may be tested by the Engineer with a Delmhorst Instrument Company moisture detector, or accepted equal. In addition, the surfaces shall be brush treated with a 10 percent muriatic acid solution and thoroughly flushed with water after 10 minutes. (Ten percent acid solution is commercial solution; 30 percent is diluted 2 water to 1 acid.) Loose concrete and laitance shall be removed by sandblasting and chipping, and voids and cracks shall be repaired as approved by the coating manufacturer. Concrete masonry units shall incorporate CMU filler as recommended by paint manufacturer.

Plaster surfaces shall be dry and clean and free from grit, loose plaster, and surface irregularities. Cracks and holes shall be repaired with acceptable patching materials, keyed to existing surfaces, and sandpapered smooth. Surfaces to be coated with oil or varnish base paints shall be tested for the presence of alkali. If present, the alkali shall be neutralized with acid solution as above.

Surfaces shall be cleaned with clear water by washing and scrubbing to remove foreign and deleterious substances.

D. PREPARATION OF PLASTIC SURFACES: Plastic surface shall be roughened with sand paper or steel wool and shall be cleaned with solvent compatible with specified primer.

3.02 APPLICATION

A. WORKMANSHIP: Coated surfaces shall be free from runs, drops, ridges, waves, laps, and brush marks. Coats shall be applied so as to produce an even film of uniform thickness completely coating corners and crevices. Painting shall be done in accordance with the requirements of SSPC Paint Application Guide.

Each coat of paint shall be applied evenly and sharply cut to line. Care shall be exercised to avoid overspraying or spattering paint on surfaces not be coated. Glass, hardware, floors, roofs, and other adjacent areas and installations shall be protected by taping, drop cloths, or other suitable measures.

B. PAINT PROPERTIES, MIXING, AND THINNING: Paint, when applied, shall provide a satisfactory film and smooth even surface, and glossy undercoats shall be lightly sanded to provide a surface suitable for the proper application and adhesion of subsequent coats. Paints shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings consisting of two or more components shall be mixed in accordance with the manufacturer's instructions. Where necessary to suit the conditions of the surface, temperature, weather and method of application, the paint may be thinned immediately prior to use by the addition of not more than one pint of the proper thinner per gallon. Unless otherwise specified, paint shall not be reduced more than necessary to obtain the proper application characteristics. Thinner shall be as recommended by the coating manufacturer.

C. ATMOSPHERIC CONDITIONS: Unless otherwise specified or required for certain water-thinned paints, paints shall be applied only to surfaces that are dry, and only under such combination of humidity and temperatures of the atmosphere and surfaces to be painted as well cause evaporation rather than condensation. Paint shall not be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation. During damp weather, when the temperature of the surface to be coated is within 10°F of the dew point, the surfaces shall be heated to prevent moisture condensation thereon. Bare metal surfaces, except those which may be warped by heat, may be dehydrated by flame-heating devices immediately prior to paint application. During painting, and for a period of at least 8 hours after the paint has been applied, the temperature of the surfaces to be painted, the painted surfaces, and the atmosphere in contact shall be maintained at or above 40°F and 10°F above the dew point. Paint, when applied, shall be approximately the same temperature as that of the surface on which it is applied. Fans or heaters shall be used inside enclosed areas where conditions causing condensation are severe.

D. METHOD OF PAINT APPLICATION: Where two or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors. Color additives shall not contain lead or any lead compound which may be destroyed or affected by hydrogen sulfide or any gas likely to be found in wastewater treatment plants.

Electrical and mechanical equipment, on which the manufacturer's coating is acceptable, shall be touch-up primed and painted with two coats of the specified coating system to match the color scheduled. This does not apply to electrical and instrumentation equipment specified in Division 16.

Paint shall not be applied to a surface until it has been prepared as specified. Unless otherwise specified, the primer or first coat shall be applied by brush to ferrous surfaces, except subsequent coats for blast-cleaned ferrous surfaces, which may be either brush- or spray-applied. Unless otherwise specified, prime and finish coats shall be applied at the rate recommended by the manufacturer for the service involved. After the prime coat is dry, suction spots shall be touched up before succeeding coats are applied. Unless otherwise specified, coats for concrete and masonry shall be brushed or rolled.

Unless otherwise specified, finish coats shall not be applied until other work in the area is complete, and until the prime and intermediate coats have been inspected.

E. FILM THICKNESS AND CONTINUITY: Coating system thickness is the total thickness of primer and finish coats and does not include passivators or sealers.

The surface area covered per gallon of paint for various types of surfaces shall not exceed those recommended by the manufacturer. The first coat on metal surfaces refers to the first full paint coat and not to conditioning or other pretreatment applications. Unless otherwise specified, the average total thickness (dry) of any completed protective coating system on exposed metal surfaces shall be not less then 1.25 mils per coat. The minimum thickness at any point shall not deviate more than 25 percent from the required average. Unless otherwise specified, no less than two coats shall be applied.

F. SPECIAL REQUIREMENTS: Hangers and supports shall be coated, except for the final coat, prior to installation. Except for those to be filled with grout, the underside of ungalvanized equipment bases and supports shall be coated with at least two coats of rust inhibiting primer prior to setting the equipment in place. Bolt and bolt holes in flanges (such as those used with couplings or wafer-type valves where holes and bolts as finally installed will be exposed to weather or moisture) shall be painted prior to assembly to prevent rusting of the unprotected metal.

3.03 CLEANUP

Upon completion of painting, the Contractor shall remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray or other paint-related damage.

3.04 COATING SYSTEMS SCHEDULE

A. In the following schedule, coating system letters shall conform to those listed in the Coating System Specification sheets.

B. Unless shown otherwise surface coatings shall be semigloss, except that ceilings shall be coated with flat coatings to match wall areas.

C. Surfaces to be coated and coating systems to be used are described below. The final coat shall be applied only after all other work, including punch list items, has been completed.

Surface	Coating System
1. Metal Work: Equipment, including metal base and guards; conduits, piping; appurtenances, including grilles and louvers; doors; electrical, pneumatic, and instrumentation control panels and stations, including supports. Refer to equipment specifications for exceptions.	
a. Iron and steel (includes galvanized) (except non-ferrous and stainless), exposed above ground or in vault structures (not buried)	B (except as indicated under b. & c.)
b. Iron and steel piping and appurtenances located in the wet well	E (except as indicated under c.)
c. Submersible pumps	F
2. Concrete, Grout, and Masonry:	
a. Exterior concrete exposed slabs and surfaces	Unpainted
b. Exterior concrete buried surfaces of wet wells, manholes, valve vaults	A
c. Interior concrete/grouted surfaces of wet well	C or D
d. Interior concrete/grouted surfaces of manholes	C or D
e. Interior concrete surfaces of valve vault	A, C or D
3. Materials Not Requiring Paint	
a. Rubber, stainless steel, copper pipe, PVC pipe, and fiberglass fabrications.	—
b. Labels and Nameplates: Do not paint over Underwriters Laboratories Factory Mutual, or other code-required labels or equipment name, identification, performance rating, nomenclature plates.	—
c. Pre-Finished Items, except as damaged, including: (1) acoustic materials (2) finished mechanical and electrical equipment (3) light fixtures (4) switchgear (5) distribution cabinets (6) operating louvers	—
d. Metal Surfaces, including: (1) aluminum railing, ladders, hatlines, light poles (2) stainless steel (3) chromium plate (4) copper (5) bronze (6) brass (7) aluminized and galvanized (and vinylized) chainlink fabric fences, gates, and closures (8) Duct silencers and motor-operated dampers	—

Surface	Coating System
e. Moving Parts of Operating Equipment such as the following: (1) valve and damper operators (2) linkages (3) sensing devices (4) motor and fan shafts (5) gears	—

3.05 COLOR SCHEDULE

The following table is a listing of colors for coatings covered in this section and factory-applied finishes. It is intended to provide a general indication of the required color. The final color selection will be made by the Owner from the manufacturer's standard color chart provided by the Contractor. Where an exact match to other surfaces is specified, a custom-mixed color may be required.

Surface	Color
Interior Concrete Wet Well	Light Blue or Gold
Sewage Pump, Piping, Valves and Accessories	Light Gray

For surfaces that require coating but no color is listed, the color shall be selected by the Owner. The Contractor shall anticipate that additional colors (standard or custom-mixed) may be required.

END OF SECTION

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SECTION 10 14 00
SIGNAGE

PART 1 : GENERAL

1.01 SUMMARY

This section includes identifying devices and signage.

1.02 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Drawing showing layout, and letter size and style.
2. Manufacturer's installation instructions.

PART 2 : PRODUCTS

2.01 FIBERGLASS SIGNS (TYPE A)

A. MATERIAL: Three-ply laminated fiberglass, minimum 1/8-inch thick, with contrasting color core message layer between two clear weather-resistant surface layers.

B. MANUFACTURERS

1. SETON, customizable signs.
2. Or accepted equal.

2.02 IDENTIFICATION LABELS

A. PIPE LABELS AND FLOW DIRECTION ARROWS

1. Lettering and Arrows: White print on blue or red background, black print on yellow, green or gray background.
2. Background: Color as indicated on the Piping Specification sheets in Section 22 13 11.
3. Material: Manufacture from or encase in outdoor grade plastic or vinyl that will resist damage or fading from washdown, sunlight, mildly corrosive atmosphere, dirt, grease, and abrasion.
4. Label, Lettering Size, and Color: ANSI A13.1.
5. Message: Legend indicated on the Piping Specification sheets in Section 22 13 11.
6. Labels
   a. *Snap-Around type:* Size for finished outside diameter of pipe and insulation.
   b. Firmly grip pipe so labels remain fixed in vertical pipe runs.

7. Manufacturers and Products
   a. T&B/Westline, Rariton, NJ, Model WSS Snap-Around.
   b. Seton Name Plate Corp., New Haven, CT, Setmark Series.
   c. Or accepted equal.

B. EQUIPMENT LABELS

1. Lettering: Black bold face, ¾-inch minimum height.
2. Background: OSHA safety yellow.
3. Materials: Either of the following:
   a. Aluminum or stainless steel base with a baked-on finish that is suitable for use on wet, oil, exposed, abrasive, and corrosive areas.
   b. Fiberglass with fiberglass-encased lettering.
4. Furnish 1-inch margin on each end of label for mounting. On fiberglass labels, furnish grommets at each end for mounting.
5. Size
   a. 2-inch minimum and 3-inch maximum high by 14-inch minimum and 18-inch maximum long.
   b. Furnish same size base dimensions for all labels.
6. Message: Equipment names.
7. Manufacturers and Products:
   a. T&B/Westline Co., Rariton, NJ, Type KQ.
   b. Seton Name Plat Corp., New Haven, CT, Style EB.
   c. W.H. Brady Co., Milwaukee, WI, Fiber-Shield.
   d. Or accepted equal.

2.03 SIGN SCHEDULE

Provide signs in accordance with the Sign Schedule included herein.

SIGN SCHEDULE									
Sign					Lettering				
Type	**Qty**	**Width**	**Height**	**Color**	**Height**	**Style**	**Color**	**Heading[1]**	**Message**
A	3	10”	7”	Yellow	1” min.	Helvetica	Black	CAUTION	NON-POTABLE WATER DO NOT DRINK
A	3	14”	10”	Yellow	1” min.	Helvetica	Black	CAUTION	THIS EQUIPMENT STARTS AND STOPS AUTOMATICALLY
A	3	14”	10”	White	1” min.	Helvetica	Black	DANGER	HIGH VOLTAGE ELECTRICAL EQUIPMENT
A	3	10”	7”	White	1” min.	Helvetica	Black	DANGER	CONFINED SPACE DO NOT ENTER
A	1	20”	14”	White	1” min.	Helvetica	Black	--	PUMP STATION 45 8141 E DANIELS LOOP
A	1	20”	14”	White	1” min.	Helvetica	Black	--	PUMP STATION 46 8670 E CARAWAY RD
A	1	20”	14”	White	1” min.	Helvetica	Black	--	PUMP STATION 47 8160 E HEMLOCK ST

Notes:
1) Use standard OSHA format for Headings.

PART 3 : EXECUTION

3.01 GENERAL

The location of identifying devices shown on the Drawings is approximate only. The Contractor shall temporarily attach identifying devices using masking tape. The Contractor shall then request a review of the proposed location by the Owner. The Contractor shall anticipate that delays or hindrance may result from this review. The Contractor shall permanently install the identifying devices in the location required by the Owner.

3.02 SIGNS

A. Mounting location to be determined in the field by the Engineer or Owner.

B. Mount signs using stainless steel components (U-bolts, screws, nuts, bolts, etc.), unless indicated otherwise on the Drawings.

3.03 IDENTIFICATION LABELS

A. PIPE LABELS AND FLOW INDICATION ARROWS

1. Locate all connections to equipment, valves, or branching fittings at wall boundaries.
2. At intervals along piping not greater than 18 feet on center, with at least one label applied to each exposed horizontal and vertical run of pipe.
3. At exposed piping not normally in view, such as above suspended ceilings and in closets and cabinets.
4. Supplementary Labels: Provide to Owner those listed on Piping Schedule that do not receive arrows.
5. Application: To pipe only after painting in vicinity is complete, or as approved by Owner's Representative.
6. Installation: In accordance with manufacturer's instructions.

B. EQUIPMENT LABELS

1. Locate and Install: On equipment or concrete equipment base where visible.
   a. Install submersible pump equipment labels in location as directed by Owner in the field.
2. Anchor to equipment or base for easy removal and replacement with ordinary hand tools.

END OF SECTION

SECTION 22 05 00
PLUMBING

PART 1 : GENERAL

1.01 SUMMARY

This Section provides specifications for non-process plumbing systems and miscellaneous plumbing appurtenances.

1.02 REFERENCES

A. GENERAL

1. Any part or all of the system shall be tested as directed by local inspectors or the Engineer, and testing shall be repeated until satisfactory results are obtained. Testing shall be in accordance with the local plumbing code.
2. The Contractor shall refer to structural the Drawings for added details and clearances for piping. Piping shall be arranged as required. The Contractor shall refer to mechanical and electrical drawings for piping, conduit, equipment, etc., and arrange piping to clear.

B. LOCATION REQUIREMENTS

1. Piping, apparatus, and equipment are shown on the Drawings at approximate locations only. Locations shall be changed to suit the job conditions or as directed by the Engineer. All parts of the system shall be installed to avoid obstructions, preserve headroom, and to keep openings and passageways clear.
2. No holes shall be made in any structural member without the Engineer's written consent. Where pipes pass through any structural member, or where notching, boring, or cutting of structure is necessary, the Contractor shall proceed as directed by the Engineer.

C. PROTECTION, CLEANING AND PAINTING

1. All materials shall be protected from damage from any cause and proper storage shall be provided. Fittings, valves, and all copper and brass items shall be wrapped with burlap or building paper. Wrapping shall be removed at completion of the work.
2. All parts of the work shall be left clean and free of foreign materials, grease, and rust; exposed surfaces shall be wire brushed, ready to paint; all fixtures, stainless steel, chrome, or nickel, shall be cleaned and polished.

D. STANDARDS: All plumbing work herein specified shall conform to the current Uniform Plumbing Code and applicable regulatory codes. The plumbing, piping and equipment layout on the Drawings are schematic in nature. The Contractor shall modify piping layout and provide additional piping as required to meet all applicable codes.

1.03 SUBMITTALS

A. In accordance with the requirements of Section 1-06, submit the following:

1. Catalog data on all plumbing equipment to be installed.

PART 2 : PRODUCTS

2.01 GENERAL

GENERAL: Only new materials and equipment without defects shall be used. Materials and equipment shall conform to the requirements of Sections 22 13 00 and 22 13 11, except where there is a conflict with this section, in which case the specifications in this section shall take precedence.

2.02 COUPLINGS, NIPPLES AND UNIONS

A. COUPLINGS: Couplings shall be same material as the adjoining pipe or fittings. Dissimilar metal pipe and fittings shall be jointed with insulated couplings.

B. NIPPLES: Short nipples with MPT threads shall be used as required to facilitate connection of components. Nipples shall be brass for connection of brass or copper components and PVC for connection of PVC components.

C. UNIONS: Unions shall be brass or bronze ground-joint type with solder-joint ends for copper pipe. Unions shall be Schedule 80 PVC with 0-ring joint and solvent weld ends for PVC pipe. PVC unions shall be LASCO Fittings, Inc. Part No. 897-xxx.

2.03 GATE VALVE – 2-INCH AND UNDER

The gate valve shall have a cast bronze body with bronze wedge and iron handle. The valve shall be fitted with a hose adapter suitable for the hose specified in this Section. The gate valve shall be NIBCO Model T-113, or accepted equal.

2.04 HOSE AND ACCESSORIES

A. Provide one (1) hose (3 total) for each pump station. Hoses shall be reinforced 100 percent professional-grade rubber, 1-inch-diameter by 50-foot-long, suitable for a working pressure of 100 pounds per square inch minimum. The hose shall be Swan No. CD0150, or accepted equal.

B. Provide a 1” brass-bodied industrial hose nozzle with adjustable spray pattern and connection to match the 1-inch hose for each hose.

C. Store hose rolled up with Velcro straps in Water Supply Enclosure as shown on the Drawings.

2.05 REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA)

The water system backflow preventer shall be a reduced pressure assembly consisting of independently operating double check valves and a hydraulically dependent differential relief valve. The valve body and caps shall be bronze. RPBA shall be equipped with shutoff ball valves and test cocks. The valve ends shall be threaded union ends. Provide a strainer with blowout tapping ahead of the RPBA. Size to match service piping diameter shown on the Drawings. The RPBA shall be a CMB Industries, FEBCO Model 860U, or accepted equal.

2.06 WATER SUPPLY ENCLOSURE

A. The water supply enclosure shall be a 2-piece molded fiberglass with insulation on the interior. Minimum internal dimensions of enclosure shall be 13 inches by 39 inches. The enclosure shall have a bottom section suitable for mounting on a concrete base slab. Drain ports shall be provided on each end. The top section shall be hinged on the long side with a padlock hasp and staple on the opposite side. Minimum 1-inch thick polyisocyanurate structural foam shall be applied to the interior surfaces of both sections. The exterior color shall be selected by the Owner. A 24-foot long self-regulating heating cable, with 30-inch long cold lead and grounded plug, shall be provided. The enclosure shall be a Hot Box, Inc. Model HB2T, or accepted equal.

B. Install Signage to inside of enclosure as indicated on the Drawings and specified in Section 10 14 00.

2.07 FLOOR DRAINS

A. Floor drains shall be cast into valve vault floor by precast manufacturer and in the concrete slab(s) by the Contractor.

B. Coated cast iron body with polished nickel bronze strainer.

C. 8-inch minimum diameter strainer.

D. Floor drain connection type and size to match pipe diameter and type as shown on the Drawings.

E. Manufacturer: Zurn ZN-415B, or accepted equal.

2.08 CLEANOUTS

A. Cleanouts (CO):

1. As detailed on the Drawings.
2. Constructed on Cast Iron per ASTM A48, Class 30.
3. Olympic Foundry, or accepted equal.

PART 3 : EXECUTION

3.01 GENERAL

A. All plumbing equipment shall be securely mounted.

B. Furnish and install approved dielectric bushings, couplings and/or unions at all connections between ferrous pipe or fittings and pipe or fittings of different materials.

C. The Contractor shall furnish and install all pipe, fittings, valves, specials, and fixtures required to completely connect all equipment and fixtures specified, or as shown on the drawings.

3.02 PIPE INSTALLATION

A. Piping includes pipe, fittings, nipples and valves. All drains and piping shall be installed immediately after excavation or cutting has been done, keeping openings open as short a time as possible; however, piping shall not be permanently closed up, furred in or covered before it has met inspection requirements.

B. Water piping shall be run absolutely level wherever possible, free of traps and unnecessary bends, arranged to conform to building requirements and to clear mechanical work, such as ducts, and conduits. Piping shall be graded and valves supplied to provide for complete drainage and control of system.

3.03 PIPE JOINTS

On steel pipe, the best quality approved pipe joint compound shall be smoothly placed on pipe, not in fittings. On cleanout plugs, graphite shall be used. On copper pipe, joints shall be soldered conforming to Alloy 50B of ASTM B32 and shall be 5 percent antimony and 95 percent tin. Pipe with compression joints or mechanical joints shall be made in strict conformance with the manufacturer's recommendations.

3.04 WATER SUPPLY ENCLOSURE

The water supply enclosure shall be attached to the concrete slab using adjustable anchor clips furnished by the enclosure manufacturer. The clips and attachment bolts, nuts, and washers shall be type 316 stainless steel.

END OF SECTION

SECTION 22 10 00
MECHANICAL GENERAL PROVISIONS

PART 1 : GENERAL

1.01 SUMMARY

Provisions of this Section shall apply to all sections in Division 22.

1.02 REFERENCES

A. Meet requirements of local and state codes.

B. All electrical equipment and materials specified herein shall be approved by Underwriters Laboratories (UL) for the purpose for which they are used and shall bear the UL label. Labels from other electrical testing laboratories will be acceptable if approved by the local electrical inspection authority.

1.03 SUBMITTALS

A. In accordance with the requirements of Section 1-06, submit the following:

1. Descriptive literature or shop drawings for all equipment, plumbing fixtures, floor drains, heaters, etc.
2. Provide complete manufacturer's installation instructions.
3. Provide manufacturer's certification that materials meet or exceed minimum requirements as specified.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Exercise care in transporting and handling to avoid damage to material.

B. Store materials on the site so as to prevent damage or theft.

C. Keep materials clean, dry, and free from deleterious conditions. Do not allow materials to rust.

D. Do not store materials directly on the ground.

E. Repair or replace damaged material or equipment to the satisfaction of Owner.

F. Protect electrical equipment, controls, and insulation against moisture and water damage.

G. The Contractor shall be responsible for the equipment included in this Contract until it has been finally inspected, tested, and accepted in accordance with the requirements of these Specifications.

PART 2 : PRODUCTS

2.01 GENERAL REQUIREMENTS

A. In accordance with applicable Section of Division 22.

B. Pipe fittings, wiring, and supports shall be provided to produce complete, operable systems, with all elements properly interconnected as shown in schematic diagrams, or to provide specified operations.

C. If a specified dimensioned location is not shown for interconnections or smaller system elements, the Contractor shall select appropriate locations and show them on Shop Drawing submittals for review.

D. Equipment and material shall be new and without imperfections and shall be erected in a neat and workmanlike manner; aligned, leveled, cleaned, and adjusted for satisfactory operations; installed in accordance with the recommendations of the manufacturers and the best standard practices for this type of work so that connecting and disconnecting of piping and accessories can be readily made and so that all parts are easily accessible for inspection, operation, maintenance and repair.

E. All equipment and material shall be designed for the service intended; shall be of rugged construction; of ample strength for all stresses which may occur during fabrication, transportation, erection, and during continuous or intermittent operation; shall be adequately stayed, braced, and anchored; and shall be installed in a neat and workmanlike manner.

F. Appearance and safety as well as utility shall be given consideration in the design of details.

G. Materials of construction shall be cathodically compatible.

H. Design, fabricate, and assemble equipment and systems with new materials and in accordance with acceptable modern engineering and shop practices.

I. Manufactured individual parts to standard sizes and gauges so repair parts can be installed in the field. Make like parts of duplicate units interchangeable.

2.02 ANCHOR BOLTS

A. Adequately sized for equipment loads and, in no case, less than the size recommended by the equipment manufacturer.

B. EMBEDDED TYPE: When required by equipment manufacturer or field conditions.

C. CONCRETE ANCHOR TYPE: When allowed by Specifications or shown on Drawings.

D. Anchor bolts and anchor bolt assemblies shall be type 316 stainless steel.

2.03 COATING

A. MANUFACTURED EQUIPMENT

1. Protect all steel and iron surfaces by suitable coatings applied in shop.
2. Protect for life of equipment surfaces which will be inaccessible after assembly.
3. Finish smooth, thoroughly clean, and fill exposed surfaces as necessary to provide smooth, uniform base for coating.
4. Surfaces to be coated after installation shall receive 1 or more coats of primer to protect equipment until finish coats are applied.
5. Shop finish electric motors, speed reducers, starters, and other self-contained or enclosed components with oil-resistant enamel.
6. Apply rust preventative compound to all machined, polished, and non-ferrous surfaces that are not be painted.
7. Furnish at least 1 quart of finish coat material with equipment for field touchup.
8. Apply field coatings as required in accordance with Section 09 96 00.

PART 3 : EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENT

A. In accordance with applicable Section of Division 22.

B. Cooperate with all trades in furnishing material and information for correct location, in proper sequence, of all sleeves, inserts, foundations, wiring, etc.

C. Piping connections to equipment shall be made with unions or flanges to permit dismantling. Flanges and unions shall also be installed in the piping systems to permit disassembly consistent with good installation practice and as required for the removal of connected equipment from place of installation.

D. Belt drives, flexible couplings, and other exposed rotating or reciprocating parts shall be covered with approved safety covers. Covers shall be permanent type and easily removable.

E. Motor and bearings shall be covered with watertight and dustproof covers during construction period.

3.02 COORDINATION OF WORK

A. Plan all work so that it proceeds with a minimum of interference with other trades.

B. Openings required in the construction for the installation of the work under this division of these Specifications shall be coordinated with the work of all other trades.

C. Contractor shall pay for all extra cutting and patching made necessary by his failure to properly direct such work at the correct time.

3.03 INTERFERENCE

A. Contractor shall arrange the run of the piping in such a manner that it does not interfere with other piping and equipment and/or normal maintenance operations.

B. Pipe shall normally be run parallel to walls, ceiling, or floor.

3.04 INSULATING COUPLING

A. Furnish and install at all interconnections between piping systems of dissimilar materials and at all connections of piping systems to equipment where piping and equipment are of dissimilar materials.

B. Couplings shall be specifically designed for the purpose of electrically isolating pipe lines from other piping systems or equipment.

3.05 WELDED INSTALLATION

A. Shop fabricated to maximum extent possible.

B. Use welders certified in accordance with the latest requirements of the American Welding Society “Standard Qualifications Procedures.”

C. Repair protective coating and linings to a condition equivalent to the factory-applied coating or lining.

D. Install coupling at ends of pipe to be welded to provide access for replacing protective lining.

3.06 PIPE OPENINGS

Openings in pipes shall be kept closed during the progress of the work.

3.07 VALVES AND VALVE DESIGNATION

A. Provide valves at each piece of equipment to provide for isolation of the equipment from its connected system.

B. Valves shall not be placed with stems below horizontal.

C. Provide chain wheel operators for all valves greater than 5 feet above finished grade.

3.08 ACCESS TO EQUIPMENT

A. All motors, valves, control devices, specialties, etc., shall be so located as to provide for easy access for operation, repair, and maintenance.

B. Concealed access doors shall be provided.

3.09 LUBRICATION

A. Provide lubrication for the operation of all equipment until acceptance.

B. Provide a chart listing each piece of equipment, the proper type of oil or grease required, and recommended frequency of lubrication.

C. Contractor shall be required to run in all bearings and, after they are run in, shall drain and flush bearings and refill with a new oil change.

D. Oil and lubrication fittings shall be located within reach from the operating surface.

END OF SECTION

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SECTION 22 13 00
PIPE

PART 1 : GENERAL

1.01 SUMMARY

This Section specifies pipe materials and methods and shall be used in conjunction with Section 22 13 11 and other sections of Division 22 which specify piping components.

1.02 REFERENCES

All pipe materials and methods shall conform to applicable requirements of documents of latest edition listed hereafter. In case of conflict between this section and the listed documents, the requirements of this Section shall prevail.

ANSI A13.1	Piping and Piping Systems
ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings
ANSI B16.5	Pipe Flanges and Flanged Fittings, Class 150 (Flat Face Flange)
ANSI B16.9	Factory-Made Wrought Steel Butt-Welding Fittings
ASTM A47	Malleable Iron Castings
ASTM A74	Cast Iron Soil Pipe and Fittings
ASTM A120	Pipe, Steel, Pipe, Black and Hot-Dip Zinc-Coated (Galvanized), Welded and Seamless for Ordinary Uses
ASTM A234	Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperature
ASTM A283	Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A312	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
ASTM A351	Standard Specification for Castings, Austenitic, for Pressure-Containing Parts
ASTM A536	Ductile Iron Castings
ASTM B32	Solder Metal
ASTM B43	Standard Specification for Seamless Red Brass Pipe, Standard Sizes
ASTM B88	Seamless Copper Water Tube
ASTM D1784	Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds

ASTM D1785	Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2513	Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings
ASTM D2467	Socket-type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2564	Solvent Cements for Polyvinyl Chlorine (PVC) Plastic Pipe and Fittings
ASTM D3034	Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ANSI/AWWA C104/A21.4	Standard for Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water
ANSI/AWWA C105/A21.5	Standard for Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids
ANSI/AWWA C110/A21.10	Standard for Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
ANSI/AWWA C111/A21.11	Standard for Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings
ANSI/AWWA C115/A21.15	Standard for Flanged Ductile Iron Pipe with Threaded Flanges
ANSI/AWWA C150/A21.50	Standard for Thickness Design of Ductile Pipe
ANSI/AWWA C151/A21.51	Standard for Ductile Iron Pipe, Centrifugally cast, in Metal Molds or Sand Lined Molds for Water and Other Liquids
AWWA C200	Standard for Steel Water Pipe, Six Inches and Larger
AWWA C206	Standard for Field Welding of Steel Water Pipe
AWWA C208	Standard Dimensions for Steel Water Pipe
AWWA C600	Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
AWWA C601	Standard for Disinfecting Water Mains
CISPI 301	Standard for Cast Iron Soil Pipe
NFPA 54	National Fuel Gas Code
UPC	Uniform Plumbing Code (latest edition)

Standard Specifications - 2014 WSDOT Standard Specifications for Road, Bridge, and Municipal Construction.

1.03 SUBMITTALS

A. In accordance with the requirements of Section 1-06, submit the following:

1. Manufacturer's technical data for all piping, and documentation of conformance with appropriate standards and these specifications.
2. Detailed drawings of all interior piping requirements, prepared in conformance with the following:
   a. Plan drawings shall be prepared for all areas involving piping and equipment at a scale not less than 1-inch equals 1 foot. Plan drawings shall be prepared for all work areas that contain new piping. Sections shall be cut as required to clearly show piping in each of the plan drawings.
   b. Drawings shall be dimensioned to show the location of all new piping, pipe joints, pipe supports, pipe penetrations, valve end connections, and all other piping appurtenances.
   c. Drawings shall clearly show the methods of pipe joint connections, pipe support, pipe penetrations, valve end connections, and all other piping appurtenances.
   d. Piping support structural requirements, calculations, manufacturers, spacing, and detailed drawings as required to establish that the proposed piping support and restraints meet the requirements of the specifications, drawings, and piping manufacturer.
   e. Drawings shall show structural and mechanical components of the piping systems separately if required for clarity.
   f. Drawings shall indicated field verified elevations/dimensions for existing facilities and connections, in addition to any dimensions identified on the Drawings.

1.04 QUALITY CONTROL

A. The Contractor shall utilize quality control procedures acceptable to the Engineer and the Owner for the following:

1. Inspection of pipe before installation.
2. Pipe unloading, storage, installation, and jointing.

B. Tests performed by the Contractor shall include, but not be limited to, the following:

1. Hydrostatic Pressure Test.
2. Air Pressure Test.

PART 2 : PRODUCTS

2.01 GENERAL

A. Materials required for all piping and connections shall be as specified herein and in Section 22 13 11. All pipe sizes shall be as shown on the Drawings.

B. All pipe sizes as shown on the Drawings and as specified herein are in reference to “nominal” diameter, unless otherwise indicated.

C. The piping systems shown on the Drawings indicate the appropriate horizontal and vertical configuration required. The Contractor shall determine the exact layout of piping, fittings, and joints necessary to fit actual field conditions.

D. Gasket type or material used shall be appropriate for each pipe system and service intended, and shall be as specified in Section 22 13 11, Piping System Specifications.

PART 3 : EXECUTION

3.01 GENERAL

A. LOCATION: The Contractor shall be responsible for checking and verification of all existing piping and appurtenances whether or not they are shown on the Drawings. The Contractor shall excavate and locate all existing pipes, appurtenances, and points of connection. The Contractor shall check and verify or modify horizontal and vertical locations of each and every exposed piping run, with Engineer approval. The Contractor shall be responsible for the protection of all existing piping, appurtenances, and structures during construction and shall take care not to damage them or impair the operation in any way.

B. PIPING SIZES: Where the size of piping is not specified, the Contractor shall provide piping of the sizes required by UPC. Unless specified otherwise, small piping (less than 1 inch in diameter) required for service not described by UPC shall be ½ inch.

C. PIPE SUPPORTS: Piping hangers and structural attachments shall be as specified in Section 22 13 13 and shall be designed in conjunction with pipe to be supported and shall be installed in accordance with the approved submittal design and drawings. The Contractor shall install piping support such that line and grade requirements are satisfied.

D. RESTRAINT: Piping under pressure shall be restrained at all bends, tees, pipe joints and couplings, unless otherwise indicated.

E. LINE AND GRADE DEVIATIONS

1. Buried, Bedded, and Encased Pipe. Variance from required line shall not exceed ½ inch. Variance from grade shall be in accordance with Section 7-08.3(2)B of the Standard Specifications.

2. Exposed Pipe. Variance from required line and grade shall not be greater than ¼ inch. All pipe shall be laid in straight runs with fittings as required for bends. Gravity flow pipe shall be laid at constant slope.

F. BURIED PIPE LAYING: Preparation of bedding and backfill shall be as specified in Section 31 23 33 and as indicated on the Drawings. Pipe shall be laid with uniform bearing under the full length of the barrel of the pipe.

G. PIPE PENETRATIONS: Pipe penetrations into structures shall be as shown on the Drawings.

H. ELECTRICAL ISOLATION: All connections between dissimilar metal pipe, such as copper or bronze to steel, coated to uncoated metallic piping, or piping with different types of coatings, shall be electrically isolated with an electrically insulating fitting. Fittings shall be unions, couplings, or flange sets for the service intended unless specified otherwise.

I. INSULATING FITTINGS: All metallic piping shall be isolated from all structures with appropriate insulating flanges, insulating flexible couplings, or insulating unions. New pipe shall be isolated from existing piping. Pipe at transitions from concrete encasement to soil shall be provided with insulating fittings.

Insulating fittings shall be placed at transitions between pipelines with dissimilar coatings.

3.02 TESTING

A. PIPE PRESSURE TESTING: Pipe shall be pressure tested to the test pressure indicated in Section 22 13 11. Hydrostatic pressure testing shall be in accordance with Section 7-09.3(23) of the Standard Specifications and as specified herein. Low pressure air testing shall be in accordance with Section 7-17.3(2)F of the Standard Specifications and as specified herein. Pressure testing shall be in accordance with the Uniform Plumbing Code and NFPA where indicated in Section 22 13 11.

1. The Contractor is responsible for conveying the water used for testing. Water for testing will be supplied by the Owner. Raw sewage shall not be used as the testing media.
2. Contractor shall perform all tests specified. Provide all test equipment including test pumps, gauges, volumetric measuring equipment, and other equipment required. Pressure gauges used shall be graduated in increments not greater than 5 psi and shall have a range of approximately twice test pressure. Use only gauges and instruments recently calibrated.
3. Completed installation shall comply with designated requirements. Provide replacement materials as may be required to accomplish this compliance.

4. Remove from systems, during testing, all equipment which would be damaged by test pressure. Replace removed equipment after testing. Systems may be tested in sections as work progresses; however, any previously tested portion shall become a part of any later test of composite system. Where new pipe connects to existing piping, the joint between the two pipes shall be tested. Correct leaks by remaking joints with new material; makeshift remedies will not be permitted. Test time will be accrued only while full test pressure is applied to system.

5. The Contractor shall be responsible for providing all temporary fittings, plugs, and thrust blocking for all testing at the specified pressure.

6. Perform all testing before backfilling, concealing, insulating, or painting.

7. CORRECTION: Each section of pipeline which fails the pressure test and connection pipe and fittings that are observed to leak shall be removed and either properly reinstalled, or replaced with new materials. Reinstalled and replaced pipeline sections shall be pressure tested after completion of backfilling.

8. VALVES: Test valve bonnets for tightness. Test operate valves from closed-to-open-to-closed positions while valve is under piping pressure. Test automatic valves by actuating from fully open to fully closed position.

B. HANGERS AND SUPPORTS: With systems in normal operation, test hangers, supports, and rods to ensure they are plumb and support proper share of load. Additionally support, as required, systems and equipment that sway, crawl, and vibrate.

C. OTHER MATERIALS AND EQUIPMENT: Test other materials and equipment as specified, as recommended by equipment manufacturer, or directed to assure they are complete, operable, and ready for use.

3.03 CLEANING

A. Clean equipment and materials. Remove foreign materials including dirt, grease, and other matter.

B. Clean by flushing interior of wastewater piping with water after pressure testing.

3.04 FLUSHING AND DISINFECTION OF WATER LINES

Flushing and disinfection of water lines shall be in accordance with Section 7-09.3(24) of the Standard Specifications.

END OF SECTION

SECTION 22 13 11
PIPING SYSTEMS

PART 1 : GENERAL

1.01 SUMMARY

This section describes the requirements for each of the piping systems included in the work. Each of the forms at the end of the Section describes a separate piping system, including the following: service; piping color; pipe identification legend; piping system abbreviation; gaskets; testing requirements; service pressure; service temperature; and pipe, fitting, and valve specifications for each pipe size required.

1.02 REFERENCES

A. As indicated in Section 22 13 00.

B. Standard Specifications - 2014 WSDOT Standard Specifications for Road, Bridge, and Municipal Construction.

1.03 GENERAL REQUIREMENTS

All pipe and fittings shall be in accordance with the requirements of Section 22 13 00, and as specified herein. All piping appurtenances shall be in accordance with the requirements of Section 22 13 19. All valves shall be in accordance with the requirements of Section 22 13 15 and individual valve Sections.

PART 2 : PRODUCTS

2.01 PIPING SYSTEMS

Each piping system shall be composed of the pipe, piping appurtenances, and/or valves specified by the forms included hereinafter. The forms are included by the abbreviations shown on the Drawings and as follows:

System Abbreviation	System
D	Drain
NG	Natural Gas
NPW	Non-potable Water
SSFM	Sanitary Sewer Force Main (pressure)
SS	Sanitary Sewer (gravity)
V	Vent
W	Potable Water

PIPING SYSTEM SPECIFICATIONS

System	Background Color	Legend	Abbreviations
Sanitary Sewer Force Main (pressure)	Green	SSFM	SSFM
Gasket: As specified	**Test Medium:** ☐ Air ☒ Water		**Duration:** _*_ Min

Pressure — PSIG			Temperature — °F	
Work: 10-15	Max: 40	Test: 100	Normal: 65	Max: 85

Pipe Size	Exposure	Item	Description
All	BURIED	Pipe	Ductile iron pipe in accordance AWWA C151/A21.51 with 350 psi Pressure Class.
		Lining	Protecto 401 Ceramic Epoxy Lining, or accepted equal. Apply in accordance with manufacturer's instructions.
		Coating	Asphaltic (bituminous) per AWWA C151/A21.51.
		Fittings	As indicated on the Drawings. Lined and coated same as pipe. Mechanical Joint: Mechanical joint fittings conforming to AWWA C110/A21.10 with mechanical joint restraint assemblies Ebba Iron Series 1100 Megalug, or accepted equal. Joint restraint assemblies shall be rated for 350 psi working pressure.
		Joints	Proprietary restrained push-on type. American Cast Iron Pipe Company – Flex-Ring; U.S. Pipe – TR Flex; or accepted equal.
		Couplings	As indicated on the Drawings and specified in Section 22 13 19.
		Bolting	Mechanical and Push-on Joints: Manufacturer's standard.
		Gaskets	Push-on and Mechanical: Rubber conforming to AWWA C111/A21.11. Gasket pressure rating to equal or exceed the system hydrostatic test pressure.
		Joint Lubricant	Manufacturer's standard.
All	EXPOSED	Pipe	Ductile iron pipe in accordance AWWA C151/A21.51 with Special Thickness Class 53.
		Lining	Protecto 401 Ceramic Epoxy Lining, or accepted equal. Apply in accordance with manufacturer's instructions.
		Coating	Provide ductile iron pipe and fittings bare (without exterior asphaltic coating) where sandblasting and painting of the pipe and fittings is specified in Section 09 96 00.

PIPING SYSTEM SPECIFICATIONS

System	Background Color	Legend	Abbreviations
Sanitary Sewer Force Main (pressure)	Green	SSFM	SSFM
Gasket: As specified	**Test Medium:** ☐ Air ☒ Water		**Duration:** _*_ Min

Pressure — PSIG			Temperature — °F	
Work: 10-15	Max: 40	Test: 100	Normal: 65	Max: 85

Pipe Size	Exposure	Item	Description
All	EXPOSED CONT.	Fittings	As indicated on the Drawings. Lined and coated same as pipe. Flanged: AWWA C110/A21.10 and ANSI B16.1, ductile iron, faced and drilled, 125-pound flat face. Gray cast iron will not be allowed. Grooved End: AWWA C606 and C110/A21.10, ductile iron, 250 psi minimum working pressure. Victaulic, or accepted equal.
		Joints	As indicated on the Drawings, or same as specified for fittings. Grooved End: Rigid type radius cut conforming to AWWA C606, 250 psi minimum working pressure.
		Couplings	As indicated on the Drawings and specified in Section 22 13 19.
		Bolting	125-Pound Flat Faced Flange ANSI Template: ASTM A193/A193M Type 316 stainless steel Grade B8M hex head bolts and ASTM A194/A194M Grade 8M hex head nuts. Washers shall be same material as nut. Nuts shall be Heavy hex-head, Type 2H. Grooved End Joints: Type 316 stainless steel Grade B8M, Class 2.
		Gaskets	Flanged: 1/8-inch thick, red rubber (SBR), hardness 80 (Shore A) rated for 200 degrees F, conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges. Grooved End Joints: Halogenated butyl conforming to ASTM D2000 and AWWA C606. Gasket pressure rating to equal or exceed the system hydrostatic test pressure.
		Joint Lubricant	Manufacturer's standard.

Remarks: *in accordance with Section 7-09.3(23) of the Standard Specifications.

PIPING SYSTEM SPECIFICATIONS

System	Background Color	Legend	Abbreviations
Drain	—	—	D

Gasket: As specified	**Test Medium:** ☐Air ☒ Water	**Duration:** _*_ Min

Pressure — PSIG			Temperature — °F	
Work: __—__	Max:__—__	Test:_*_	Normal: __65__	Max: __85__

Pipe Size	Exposure	Item	Description
All	BURIED EXPOSED	Pipe	As indicated on the Drawings. Cast iron soil pipe (CISP): ASTM A74, service weight. PVC: Schedule 80, Type I, Grade I or Class 12454-B conforming to ASTM D1784 and ASTM D1785. Threaded Nipples: Schedule 80 PVC. Perforated per AASHTO M278 where noted "Perforated" on the Drawings.
		Lining	None.
		Coating	None.
		Fittings	CISP: ASTM A74. PVC: Schedule 80 as specified under Pipe above, ASTM D2466 and ASTM D2467 for socket-weld type and ASTM D2464 for threaded type.
		Joints	CISP: Hub and spigot per ASTM A74. Service weight. PVC: Solvent socket-weld, except where connection to valves and equipment may require future disassembly.
		Couplings	As indicated on the Drawings and specified in Section 22 13 19.
		Gaskets Solvent Cement	CISP: Compression type, molded one-piece gasket made of an elastomer per ASTM C564. PVC: As recommended by the pipe and fitting manufacturer conforming to ASTM D2564.
		Joint Lubricant	CISP: Manufacturer's standard. PVC: Teflon tape for threaded joints.

Remarks: *in accordance with the Uniform Plumbing Code.

PIPING SYSTEM SPECIFICATIONS

System	**Background Color**	**Legend**	**Abbreviations**
Sanitary Sewer (gravity)	—	—	SS
Gasket: —.	**Test Medium:** ☒ Air ☐ Water		**Duration:** _*_ Min

Pressure — PSIG			**Temperature — °F**	
Work: __—__	Max:__—__	Test:___*___	Normal: __65__	Max: __85__

Pipe Size	**Exposure**	**Item**	**Description**
8”	BURIED	Pipe	Ductile iron pipe in accordance AWWA C151/A21.51 with minimum 350 psi Pressure Class.
		Lining	Protecto 401 Ceramic Epoxy Lining, or accepted equal. Apply in accordance with manufacturer’s instructions.
		Coating	Asphaltic (bituminous) per AWWA C151/A21.51.
		Fittings	As indicated on the Drawings. Lined and coated same as pipe. Mechanical Joint: Mechanical joint fittings conforming to AWWA C110/A21.10.
		Joints	Non-restrained push-on type per C111/A21.11. American Cast Iron Pipe Company - Fastite Joint; U.S. Pipe - Tyton Joint; or accepted equal.
		Gaskets	Rubber conforming to AWWA C111/A21.11.
		Joint Lubricant	Manufacturer’s standard.

Remarks: *in accordance with the Section 7-17.3(2)F of the Standard Specifications.

PIPING SYSTEM SPECIFICATIONS

System	**Background Color**	**Legend**	**Abbreviations**
Vent	—	—	V
Gasket: —	**Test Medium:** ☒ Air ☐ Water		**Duration:** _*_ Min

Pressure — PSIG			**Temperature — °F**	
Work: ___—_	Max:___—_	Test: ____*_	Normal: ___70_	Max: ___95_

Pipe Size	**Exposure**	**Item**	**Description**
4”	BURIED	Pipe	PVC: Schedule 80, Type I, Grade I or Class 12454-B conforming to ASTM D1784 and ASTM D1785. Threaded Nipples: Schedule 80 PVC.
		Lining	None.
		Coating	None.
		Fittings	PVC: Schedule 80 as specified under Pipe above, ASTM D2466 and ASTM D2467 for socket-weld type and ASTM D2464 for threaded type.
		Joints	PVC: Solvent socket-weld, except where connection to valves and equipment may require future disassembly.
		Solvent Cement	PVC: As recommended by the pipe and fitting manufacturer conforming to ASTM D2564.
		Joint Lubricant	Teflon tape for threaded joints.
6”	EXPOSED	Pipe	Stainless Steel (SST): Schedule 40, Type 316L per ASTM A312.
		Fittings	SST: Butt-weld.
		Joints	SST: Butt-weld.
		Lining	None.
		Coating	None.
Remarks:	*in accordance with the Section 7-17.3(2)F of the Standard Specifications.		

PIPING SYSTEM SPECIFICATIONS

System	**Background Color**	**Legend**	**Abbreviations**
Potable Water Non-Potable Water	Blue (Potable) Gray (Non-Potable)	See Note 1	W NPW
Gasket: —	**Test Medium:** ☐ Air ☒ Water		**Duration:** 120 Min

Pressure — PSIG			**Temperature — °F**	
Work: 60	Max: 90	Test: 150	Normal: 50	Max: 70

Pipe Size	**Exposure**	**Item**	**Description**
All	EXPOSED	Pipe	Stainless Steel (SST): Schedule 80, Type 316L per ASTM A312.
		Fittings	SST: Threaded, Class 150 pound per ASTM A351, Type to match Pipe specified.
		Joints	SST: Threaded to match Pipe specified.
		Lining	None.
		Coating	None.
All	BURIED	Pipe and Fittings	Polyethylene in accordance with Section 9-30.6(3)B of the Standard Specifications. Fittings shall be in accordance with Section 9-30.6(4) of the Standard Specifications.
		Lining	None.
		Coating	None.
		Joints	Butt heat fusion welded in accordance with pipe manufacturer's recommendation.

Remarks: 1. Potable Water: Water. Non-Potable Water: Non-Potable Water

PIPING SYSTEM SPECIFICATIONS			
System Natural Gas	**Background Color** —	**Legend** —	**Abbreviations** NG
Gasket: —	**Test Medium:*** ☐ Air ☐ Water		**Duration:** *

Pressure — PSIG			**Temperature — °F**	
Work: 0.25 – 0.5	Max: 0.5	Test: 3*	Normal:	Max:

Pipe Size	Exposure	Item	Description
All	EXPOSED	Pipe	Black Steel, ASTM A53, Schedule 40, Type E or S, Grade B.
		Lining	None.
		Coating	As specified in Section 09 96 00.
		Fittings	Malleable Iron Threaded, ASME B16.3, Class 150.
		Joints	Welded or threaded to match pipe specified.
All	BURIED	Pipe	Polyethylene in accordance with ASTM D2513, SDR 11.
		Lining	None.
		Coating	None.
		Fittings	ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
		Transition Fittings	Factory fabricated fittings with PE pipe complying with ASTM 2513, SDR 11 and pipe material to match connecting pipe.
		Joints	Butt heat fusion welded in accordance with pipe manufacturer's recommendation.

Remarks: *Test in accordance with NFPA 54.

END OF SECTION

SECTION 22 13 13
PIPE SUPPORT SYSTEMS

PART 1 : GENERAL

1.01 SUMMARY

This section specifies pipe hangers, brackets, and supports. Pipe support system shall be furnished complete with all necessary inserts, bolts, nuts, rods, washers, structural attachments, and other accessories necessary for a complete installation and specified herein.

1.02 REFERENCES

All pipe support materials and methods shall conform to the latest, applicable requirements of documents listed hereafter. In case of conflict between this section and the listed documents, the requirements of this section shall prevail.

ANSI A13.1	Piping and Piping System
ANSI B31.1	Power Piping
ASME	Boiler and Pressure Vessel Code
ANSI/MSS SP-58	Pipe Hangers and Supports C Materials, Design, and Manufacture
ANSI/MSS SP-69	Pipe Hanger and Supports C Selection and Application
SMACNA	Seismic Restraint Manual C Guidelines for Mechanical Systems
UPC	Uniform Plumbing Code

1.03 SUBMITTALS

A. In accordance with the requirements of Section 1-06, submit the following:

1. Manufacturer's technical data for all hangers, brackets, supports and documentation of conformance with appropriate standards and these specifications.
2. Location of pipe supports, including type of structural and pipe attachments, shown on the Drawings and/or specified under Paragraph 1.03 of Section 22 13 00.

PART 2 : PRODUCTS

2.01 GENERAL

A. The Contractor shall provide, and install pipe support systems which include hangers, brackets, supports, anchors, expansion joints, and structural attachments. The support system shall be pipe rack, trapeze pipe hangers or individual pipe clamps, hangers, supports and structural attachments as specified herein and as shown in the Drawings. The support system shall be provided in conjunction with the pipe to be supported. Seismic restraints shall be provided in accordance with SMACNA Manual as referenced in paragraph 1.03, and as required by building codes.

B. In certain locations, pipe supports, anchors, and expansion joints have been indicated on the Drawings, but no attempt has been made to indicate every pipe support, anchor, and expansion joint. It shall be the Contractor's responsibility to provide a complete system of pipe supports.

C. All pipe support systems, including all accessories shall be type 316 stainless steel.

2.02 PIPE RACKS AND TRAPEZE HANGERS

All components for pipe rack and trapeze shall be Unistrut or accepted equal.

2.03 ADJUSTABLE PIPE SUPPORT

As indicated on the drawings.

2.04 PIPE CLAMPS AND HANGERS

A. In areas where pipe racks and trapezes are not used, pipe shall be supported with clamp hanger support system. The clamps and hangers shall be fastened to threaded rods hanging from structural attachments. Pipe supports shall be selected for the size and type of pipe to which they are applied. Strap hangers will not be acceptable. Threaded rods shall have sufficient threading to permit the maximum adjustment available in the support item.

B. Pipe clamps and hangers shall be as manufactured by B-line by Eaton, or accepted equal.

2.05

2.05 STRUCTURAL ATTACHMENTS

Structural attachments shall be concrete insert channels or individual inserts for new concrete, surface-mounted channel or individual inserts for existing concrete. All structural attachments including all accessories shall be Type 316 stainless steel, and shall be provided by a single manufacturer. Structural attachments shall be as manufactured by Unistrut Corporation or accepted equal.

2.06 CHANNEL-TYPE PIPE CLAMP ASSEMBLY

A. Channel-type pipe clamp assembly shall consist of a channel section, pipe clamp or clamps, and channel attachment bolts. The channel shall be Unistrut Corp, P1000, $1^5/_8$-inch Single Channel. Length shall be as required to accommodate the pipe clamp or clamps, and anchor bolts. Length shall be pipe outside diameter plus 6 inches minimum.

B. The pipe clamp shall be Unistrut, P1100 Series (Conduit) or P2000 Series (Pipe).

C. Anchor bolts shall be type 316 stainless steel, type as required for mounting surface. A minimum of two bolts shall be used for each channel. Bolt size shall be ½-inch diameter.

PART 3 : EXECUTION

3.01 DESIGN

A. Pipe support system shall be designed in accordance with applicable reference standards specified in paragraph 1.03. Pipe supports shall be designed and selected to withstand seismic loads per the UBC, and shall adhere to the following:

1. Weight balance calculations shall be made to determine the required supporting force at each pipe support location and the pipe weight at each equipment location. Design loads for inserts, clamps, and other support items shall not exceed the manufacturer's recommended loads.
2. Pipe supports shall be able to support the pipe in all conditions of operation. They shall allow free expansion and contraction of the piping, and prevent excessive stress resulting from transferred weight being induced into the pipe or connected equipment. Allow clearances for pipe expansion and contraction.
3. Wherever possible, pipe attachments for horizontal and vertical piping shall be channel-type pipe clamp assemblies, or as shown on the pipe support detail sheet. Horizontal or vertical pipes should be supported preferably at locations of least vertical movement.
4. All pipe supports shall provide a means of vertical adjustment after erection.
5. Where practical, riser pipe shall be supported independently of the connected horizontal piping. Pipe support attachments to the riser piping shall be riser clamps.

3.02 INSTALLATION

A. Pipe support system shall be installed strictly in accordance with standards and codes referenced in paragraph 1.03, and recommendations of the piping support system manufacturer and piping manufacturer.

B. All piping shall be rigidly supported and anchored so that there is no movement or visible sagging between supports.

C. Contact between dissimilar metals, including contact between stainless steel and carbon steel, shall be prevented. Supports for brass or copper pipe or tubing shall be copper-plated. Those portions of pipe supports which contact other dissimilar metals shall be rubber- or vinyl-coated.

D. Anchorage shall be provided to resist thrust due to temperature changes, changes in diameter or direction, or dead ending. Anchors shall be located as required to force expansion and contract movement to occur at expansion joints, loops, or elbows, and as required to prevent excessive bending stresses and opening of mechanical couplings. Anchorage for temperature changes shall be centered between elbows and mechanical joints used as expansion joints.

E. Pipe supports and expansion joints are not required in buried piping, but concrete thrust blocking or other approved anchorage shall be provided as indicated on the Drawings or specified in other sections.

END OF SECTION

SECTION 22 13 15
VALVES: BASIC REQUIREMENTS

PART 1 : GENERAL

1.01 SUMMARY

A. Section Includes:

1. General requirements for valves, actuators, and valve appurtenances.

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):
   a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASTM International (ASTM):
   a. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. American Water Works Association (AWWA):
   a. C507, Standard for Ball Valves, 6 IN through 48 IN.
   b. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.
   c. C550, Standard for Protective Coatings for Valves and Hydrants.
4. American Water Works Association/American National Standards Institute (AWWA/ANSI):
   a. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

1.03 DEFINITIONS

A. The following are definitions of abbreviations used in this Specification Section or one (1) of the individual valve sections:

1. CWP: Cold water working pressure.
2. WOG: Water, oil, gas working pressure.
3. WWP: Water working pressure.

1.04 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
   c. Valve pressure and temperature rating.
   d. Valve material of construction.
   e. Special linings.
   f. Valve dimensions and weight.
   g. Valve flow coefficient.
2. Test reports.
3. Operation and Maintenance Manuals:

PART 2 : PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to individual valve Specification Sections for acceptable manufacturers.

B. Submit request for substitution in accordance with Division 1.

2.02 MATERIALS

Refer to individual valve Specification Sections.

2.03 VALVE ACTUATORS

A. Valve Actuators - General:

1. Provide actuators as shown on Drawings or specified.
2. Counter clockwise opening as viewed from the top.
3. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.
4. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.
5. Unless otherwise specified, actuators for valves to be buried, submerged or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.

6. Extension stem:
   a. Install where shown or specified.
   b. Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft.
   c. Pin all stem connections.
   d. Center in valve box or grating opening band with guide bushing.

B. Buried Valve Actuators:

1. Valve boxes shall be installed on all buried valves. Provide valve boxes with heavy top sections with drop in covers. Valve boxes shall be screw or slide type adjustable cast iron valve box, 5-1/4 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover rated for traffic load or as shown on the Drawings. Cover shall have applicable service designation (i.e. WATER, SEWER, etc.) cast in it. All parts of the valve boxes, bases, and covers shall be coated with hot bituminous varnish, except the parts set in concrete shall be galvanized.
2. Box base to enclose buried valve gear box or bonnet.
3. Provide 2 IN standard actuator nuts complying with AWWA C500, Section 3.16.
4. Provide at least two (2) tee handle keys for actuator nuts, with 5 FT extension between key and handle.
5. Extension stem:
   a. Provide for buried valves greater than 4 FT below finish grade.
   b. Extend to within 6 IN of finish grade.
   c. Properly support shafts.
6. Provide concrete pad encasement of valve box as shown for all buried valves, unless shown otherwise.

C. Exposed Valve Manual Actuators:

1. Provide for all exposed valves not having electric or cylinder actuators.
2. Provide handwheels for gate valves:
   a. Size handwheels for valves in accordance with AWWA C500.
3. Provide nut operator as specified above for exposed gate valves where shown on the Drawings.
4. Provide lever actuators for ball valves 3 IN DIA and smaller:
   a. Provide at least two (2) levers for each type and size of valve furnished.
5. Gear actuators required for ball valves 4 IN DIA and larger.
6. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.

2.04 FABRICATION

A. End Connections:

1. Provide the type of end connections for valves as required in the Piping System Specifications presented in Section 22 13 11 or as shown on the Drawings.
2. Comply with the following standards:
   a. Threaded: ASME B1.20.1.
   b. Flanged: ASME B16.1, Class 125 unless otherwise noted or AWWA C207.
   c. Bell and spigot or mechanical (gland) type: AWWA/ANSI C111/A21.11.
   d. Soldered: ASME B16.18.
   e. Grooved: Rigid joints per Table 5 of AWWA C606.
3. Refer to individual valve Specification Sections for specifications of each type of valve used on Project.
4. Nuts, Bolts, and Washers:
5. Wetted or internal to be bronze or stainless steel:
   a. Exposed to be zinc or cadmium plated.

B. Epoxy Interior Coating: Provide epoxy interior coating for all ferrous surfaces in accordance with AWWA C550.

PART 3 : EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Painting Requirements: Comply with Specification Section 09 96 00 for painting and protective coatings.

C. Setting Buried Valves:

1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.
2. Set valves and valve boxes plumb.
3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.
4. Install in closed position.
5. Place valve on concrete footing in trench to prevent settling and excessive strain on connection to pipe.
6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.

D. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.

E. For grooved coupling valves, install rigid type couplings or provide separate support to prevent rotation of valve from installed position.

F. For threaded valves, provide union on one (1) side within 2 FT of valve to allow valve removal.

G. Install valves accessible for operation, inspection, and maintenance.

3.02 ADJUSTMENT

A. Adjust valves, actuators and appurtenant equipment to comply with Division 0/1:

1. Operate valve, open and close at system pressures.

END OF SECTION

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SECTION 22 13 15.13
GATE VALVES

PART 1 : GENERAL

1.01 SUMMARY

A. Section Includes:

1. Resilient wedge gate valves for water and wastewater service.

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
   a. D429, Standard Test Methods for Rubber Property - Adhesion to Rigid Substrates.
2. American Water Works Association (AWWA):
   a. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.
   b. C515, Standards for Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Systems.
   c. C550, Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.
3. Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):
   a. SP-9, Spot Facing for Bronze, Iron and Steel Flanges.

1.03 DEFINITIONS

A. OS&Y: Outside Screw and Yoke.

B. NRS: Non-rising Stem.

C. RS: Rising Stem.

1.04 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Product technical data per Specification Section 22 13 15.
2. Operation and Maintenance Manuals.

PART 2 : PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.

B. Submit request for substitution in accordance with Division 1.

2.02 VALVES: POTABLE AND WASTEWATER

A. Resilient Wedge Gate Valves, 2 to 18 IN (Water, Wastewater Application):

1. Comply with AWWA C509 or AWWA C515.
2. Materials:
   a. Stem and stem nut: Bronze:
      1) Wetted bronze parts in low zinc bronze.
      2) Aluminum bronze components: Heat treated.
   b. Body, gate: Ductile iron.
   c. Resilient wedge: Fully encapsulated rubber wedge per ASTM D429.
   d. Seating rubber: EPDM elastomer.
   e. Nuts and bolts for connecting bonnet and body shall Type 304 stainless steel. Bolts may be regular square or hexagonal heads confirming to ANSI B18.2.1. Metric size socket head cap screws are not allowed.
   f. Interior lining and exterior coating shall be fusion bonded epoxy meeting the requirements of AWWA C550.
3. Design requirements:
   a. Minimum 150 psig cold water working pressure.
   b. Buried: NRS, O-ring stem seal, 2 IN square operating nut.
   c. Exposed: NRS, O-ring, stem seal, handwheel.
   d. Counter clockwise open rotation.
   e. Fusion bonded epoxy coating interior and exterior except stainless steel and bearing surfaces:
      1) Comply with AWWA C550.
      2) Wetted bronze parts in low zinc bronze.
      3) Aluminum bronze components: Heat treated.
   f. Ends to match connecting piping.
4. Acceptable manufacturers:
   a. Kennedy.
   b. M & H.

2.03 ACCESSORIES

Refer to Section 22 13 15 for actuator requirements.

2.04 FABRICATION

A. Provide valves with clear waterways the full diameter of the valve.

B. Spot valves in accordance with MSS SP-9.

C. Valves shall be supplied with O-rings at all pressure retaining joints. No flat gaskets shall be allowed.

D. Stem O-rings above thrust collar shall be fully replaceable with the valve fully opened and subject to full pressure.

E. Valve waterways shall be smooth, unobstructed, and free of all pockets, cavities, and depressions in the seat area.

PART 3 : EXECUTION

3.01 INSTALLATION

See Specification Section 22 13 15.

END OF SECTION

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SECTION 22 13 15.23
CHECK VALVES

PART 1 : GENERAL

1.01 SUMMARY

A. Section Includes:

1. Swing and duckbill type check valves for wastewater service.

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. American Water Works Association (AWWA):
   a. C508, Standard for Swing-Check Valves for Waterworks Service, 2 IN through 24 IN NPS.
2. Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):
   a. SP-80, Bronze Gate, Globe, Angle and Check Valves.

1.03 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. See Specification Section 22 13 15.

B. Operation and Maintenance Manuals.

PART 2 : PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, manufacturers listed under the valve with types are acceptable.

B. Submit request for substitution in accordance with Division 1.

2.02 SWING CHECK VALVES

A. Swing Check Valves (Wastewater):

1. Comply with AWWA C508.
2. Acceptable manufacturers:
   a. M&H.
   b. Kennedy.
   c. Clow.

3. Materials:
   a. Body and cover: Cast iron, ASTM A126, Class B.
   b. Seat ring, hinge: Bronze, AWWA C508.
   c. Disc: Cast iron, ASTM A126, Class B with rubber face.
   d. Hinge shaft: Stainless Steel, ASTM 276, type 304.
   e. Stuffing box, follower and gland: Bronze, AWWA C508.
   f. Interior lining and exterior coating shall be fusion bonded epoxy meeting the requirements of AWWA C550.
4. Design requirements:
   a. Integral flanged ends, flat faced and drilled per ANSI B16.1 Class 125.
   b. 175 psig working pressure and 350 psig hydrostatic pressure.
   c. Valves shall be provided with one outside lever and spring. Spring tension shall be adjustable. The valve design shall permit mounting levers and springs on either side of the valve body.
   d. Valve shall be provided with a clear opening equal to or greater than the connection piping, with no raised seating surface. Seats shall be threaded onto the body and shall be replaceable.
   e. Constructed to permit top entry for complete removal of internal components without removing the valve from the line.

2.03 DUCKBILL TYPE CHECK VALVE

A. Elastomeric valves shall be rubber, flow operated check type. The port area shall contour down to a duckbill which shall allow passage of flow in one direction while preventing reverse flow.

B. When line pressure inside the valve exceeds the backpressure outside the valve by 1-inch of water, the line pressure shall force the bill of the valve open, allowing flow to pass. When backpressure exceeds the line pressure by the same amount, the bill of the valve shall be forced closed. The valve shall be capable of withstanding 8-feet of backpressure without leakage.

C. Valves shall be slip on, flat bottom, offset –bill design and attach to a plain end pipe with type 316 stainless steel mounting bands.

D. Valves shall be sized in accordance with the pipe size and type as shown on the Drawings.

E. All elastomeric check valves shall be Series TF-1 as manufactured by Red Valve Company, or accepted equal.

PART 3 : EXECUTION

3.01 INSTALLATION

A. See Specification Section 22 13 15.

B. Install in accordance with manufacturer's instructions.

END OF SECTION

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SECTION 22 13 19
PIPE APPURTENANCES

PART 1 : GENERAL

1.01 SUMMARY

Piping appurtenances include, but are not limited to mechanical couplings, unions, sleeves, transition fittings, link type wall seals, flexible boot connections, drop bowl assembly, odor control cartridges, tracer wire, and grooved couplings.

1.02 REFERENCES

ASTM A 276	Standard Specification for Stainless Steel Bars and Shapes
ASTM A 536	Standard Specification for Ductile Iron Castings
ASTM F 593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
AWWA C207	Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)

Standard Specifications - 2014 WSDOT Standard Specifications for Road, Bridge, and Municipal Construction

1.03 SUBMITTALS

A. In accordance with the requirements of Section 1-06, submit the following:

1. Catalog information.
2. Manufacturer's installation instructions.

PART 2 : PRODUCTS

2.01 SLEEVE-TYPE (FLEXIBLE) COUPLINGS

A. Manufacturers, one of the following or equivalent.

1. Dresser, Inc. Style 253.
2. Romac Industries, Inc. Style 501.

B. Material: Ductile iron in accordance with ASTM A 536.

C. Bolts and Hex Nut Material: Type 316 stainless steel in accordance with ASTM F 593.

D. Coating and Lining: Manufacturer's standard fusion bonded epoxy.

E. Sleeve Length: 7 inches for pipe 4 to 8 inches in diameter.

2.02 RESTRAINED FLEXIBLE COUPLINGS

A. Manufacturers, one of the following or equivalent.

1. Romac Industries, Inc. Alpha.

B. Design: Accommodate 4 degrees working deflection per end of coupling.

C. Rated Working Pressure: 350 psi.

D. Material: Ductile iron in accordance with ASTM A 536.

E. Bolts and Hex Nut Material: Type 304 stainless steel in accordance with ASTM F 593.

F. Coating and Lining: Manufacturer's standard fusion bonded epoxy.

2.03 RESTRAINED FLANGED COUPLING ADAPTER

A. Manufacturers, one of the following or equivalent.

1. Romac Industries, Inc. Style RFCA.
2. Star Pipe Products, StarFlange Series 3200.

B. Flange, Body, Follower Ring, Restraining Lug and Restraining Bolt Material: Ductile iron in accordance with ASTM A 536.

C. Bolt heads shall be designed to twist off when proper torque has been applied.

D. Bolts and Hex Nut Material: Type 316 stainless steel in accordance with ASTM F 593.

E. Flange Design: Class D steel ring flange in accordance with AWWA C207 compatible with ANSI Class 125 and 150 bolt circles.

F. Coating and Lining: Manufacturer's standard fusion bonded epoxy.

G. Coupling shall allow angular deflection after assembly.

2.04 TRANSITION FITTINGS

A. Natural Gas:

1. Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
2. Transition Service-Line Risers:
   a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.

b. Outlet shall be threaded or flanged or suitable for welded connection.

c. Bridging sleeve over mechanical coupling.

d. Factory-connected anode.

e. Tracer wire connection.

f. Ultraviolet shield.

g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

h. Factory fabricated and leak tested.

B. Potable Water:

1. HDPE to 316 Stainless Steel – butt fusion x male threaded connection.
2. Match pressure rating and material types of connecting piping.
3. Suitable for potable water.

2.05 UNIONS

Unions 2 inches and smaller shall be threaded joint, malleable iron type. Unions 2½ inches and larger shall be flanged type, 150-pound flanges.

2.06 DIELECTRIC UNIONS

A. Provide between ferrous and nonferrous piping and where otherwise required for electrically insulated connection, as shown.

B. MATERIALS: Galvanically compatible with piping to which attached and pressure ratings suitable for system working pressures.

C. UNIONS 2 INCHES AND SMALLER: Screwed or solder-joint type.

D. UNIONS 2½ INCHES AND LARGER: Flanged type, complete with bolt insulators, dielectric gasket, bolts, and nuts.

2.07 LINK TYPE WALL SEALS

A. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.

B. Fabrication: Assemble interconnected rubber links with ASTM A276, Type 316 stainless steel bolts, nuts, and pressure plates.

C. Size: According to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening, and to withstand a hydrostatic head of 40 feet of water.

D. Manufacturer: Thunderline Link-Seal, or accepted equal.

2.08 MECHANICAL JOINT RESTRAINT COUPLINGS

A. For use on Ductile Iron Pipe:

1. Manufacturer: Manufacturer: EBBA Iron, MEGALUG Series 1100 Mechanical Joint Restraint, or accepted equal.

B. For use on HDPE Pipe:

1. Manufacturer: Manufacturer: EBBA Iron, Series 2000PV HDPE Restraint, or accepted equal.

   a. Install with internal type 316 stainless steel stiffener, sized to encompass the full bearing length of the restraint device.

2.09 FLEXIBLE BOOT CONNECTION

A. Flexible rubber pipe to manhole connector in accordance with ASTM C923.

B. Suitable for raw sewage application.

C. Stainless steel band construction.

D. Manufacturer: Trelleborg, Kor-N-Seal, or accepted equal.

2.10 DROP BOWL ASSEMBLY

A. The drop bowl assembly shall be a plastic composite collection device that facilitates the controlled drop of wastewater into a wet well or manhole.

1. Drop bowl and drop pipe size shall be based on inlet sewer size as recommended by the manufacturer.
2. Drop pipe shall be SDR 35 PVC, Schedule 40.
3. Connect drop pipe to drop bowl with flexible coupler, Fernco type coupling with stainless steel hardware, or accepted equal.
4. Bevel cut outlet of drop pipe at 45 degree angle for wet well use as shown on the Drawings.
5. Provide 45 degree, solvent weld bend at outlet for manhole use as shown on the Drawings.
6. Provide each drop bowl with a hood designed for higher velocity flows. Drill and attach to drop bowl with manufacturer’s standard stainless steel hardware in accordance with manufacturer’s instructions.
7. Support drop bowl assembly to concrete wall with manufacture’s standard stainless steel hardware, anchors and recommended spacing.

   a. Provide two additional supports and mounting hardware (in additional to manufacturer’s recommended minimum) per drop bowl for drop bowls installed in a wet well. Contractor shall install additional supports for drop bowls in the wet wells as directed by the County Construction Manager.

8. Manufacturer shall be RELINER/Duran Inc., or accepted equal.

2.11 ODOR CONTROL CARTRIDGE

A. BioVent Cartridge by EZ Vent, LLC, or accepted equal.

1. Suitable for mounting inside Schedule 40 PVC pipe as shown on the Drawings.
2. 12-inch cartridge length.
3. Stainless steel construction with handle for removal.
4. 1 year worth of odor eliminating carbon.

2.12 TRACER WIRE

A. Wire:

1. 12 GA AWG.
2. Solid.
3. High density polyethylene insulation.
4. Suitable for wet, buried applications.

B. Wire nuts: Waterproof type.

C. Split bolts: Brass.

2.13 GROOVED COUPLINGS

A. Provide where shown on the Drawings.

B. Material: Ductile iron per ASTM A-536.

C. Rigid type.

D. Type 316 stainless steel bolts and nuts.

E. Gasket suitable for raw wastewater applications.

F. Grooved couplings shall be manufactured by Victaulic Style 31, or accepted equal.

PART 3 : EXECUTION

3.01 GENERAL

A. Install in accordance with manufacturer’s instructions.

B. Install centered without angular deflection, unless shown otherwise on the Drawings.

3.02 SLEEVE-TYPE COUPLINGS

A. Sleeve-type couplings shall be employed where shown on the Drawings or specified herein, as takedown couplings on large diameter pipelines, to provide flexibility in buried piping systems at connections to structures, and as a general pipe coupling where required or permitted by Section 22 13 00.

B. Sleeve-type couplings shall be installed in accordance with the specifications and the manufacturer's instructions.

3.03 RESTRAINED FLANGE COUPLING ADAPTERS

Restrained flange coupling adapters shall be installed in accordance with manufacturer's recommendations.

3.04 UNIONS

Unions shall be used as shown on the Drawings and, if not shown, shall be provided to permit easy assembly/disassembly of equipment and removal of valves.

3.05 DIELECTRIC UNIONS

Dielectric unions shall be used whenever two dissimilar pipe materials are joined.

END OF SECTION

SECTION 22 13 29
EQUIPMENT GENERAL PROVISIONS

PART 1 : GENERAL

1.01 SUMMARY

This Section specifies general requirements which are applicable to all equipment. The Contractor is responsible for ensuring that the equipment meets the requirements of this Section in addition to the specific requirements of each individual equipment Specification Section.

1.02 SUBMITTALS

A. In accordance with the provisions of Section 1-06 and Section 26 00 00, submit the following:

1. DRAWINGS AND DATA: Submit complete assembly, foundation, and installation drawings, together with detailed specifications and data describing materials, parts, devices, and other accessories used to manufacture each equipment item.
2. OPERATIONS AND MAINTENANCE MANUALS: Submit operation and maintenance manuals prepared by equipment manufacturers. The operation and maintenance manuals shall be in addition to shop drawings and any instructions or parts packed with or attached to the equipment when delivered.
3. ELECTRICAL CERTIFICATIONS: Refer to paragraph 2.07 – Electrical Labeling Requirements. Provide certifications that equipment and associated materials and devices are listed and labeled by a recognized independent testing laboratory and suitable for the intended use and/or classified area as shown on the electrical Drawings.

1.03 WARRANTY

A. The Contractor shall warrant to the Owner both the equipment construction, the functioning of the equipment system, and the equipment performance, as specified herein. The Contractor shall warrant the equipment for a minimum of twelve (12) months following successful acceptance testing, or eighteen (18) months following delivery, whichever is less.

B. The Contractor shall guarantee the equipment and control system to be free of defects in design, materials, and workmanship. As part of the guarantee, the Contractor shall indemnify and hold harmless the Owner and Engineer and their officers, agents, and employees against and from all claims and liability arising from all damage and injury due to defects in the equipment and related systems.

C. The Contractor shall make any and all repairs, replacements, modifications, and adjustments necessary to eliminate any and all defects in design, materials, and workmanship which are disclosed within the one-year warranty period. All repairs, replacements, modifications, and adjustments shall be started within twenty-four (24) hours of notification by telephone from the Owner, and shall be completed within a reasonable period of time. Should the Contractor fail to begin the work within 24 hours, or to complete the work within a reasonable period, the Owner may proceed to undertake or complete the work. In such event, the Contractor and his surety shall be liable for all costs incurred by the Owner.

1.04 PROTECTION

A. The Contractor will be responsible for the equipment in this Contract until it has been inspected, tested and accepted in accordance with the requirements of these specifications.

B. Box, crate, or otherwise completely enclose and protect all equipment during shipment, handling and storage.

C. Make provisions to protect all material and equipment against theft, injury or damage. Damaged goods will not be used in this work.

D. Protect equipment from exposure to elements and keep all items thoroughly dry at all times.

E. Store motors, electrical equipment, and other equipment with moving parts in weather tight warehouses at maintained temperature of 60ºF minimum.

F. Protect painted surfaces against impact, abrasion, discoloration and other damage. Repaint to original factory specifications all painted surfaces which are damaged prior to acceptance of equipment.

G. Protect electrical equipment, controls, and insulation against moisture or water damage.

1.05 ADAPTATION OF EQUIPMENT

A. Furnish equipment readily adaptable for installation and operation in the structure shown on the Drawings. Equipment furnished shall be compatible with all other equipment furnished.

B. Assume full responsibility for alteration of the planned structure to accommodate other types of equipment. Assume full responsibility for all modifications of mechanical and electrical controls, equipment, wiring, piping, as required to accomplish function contemplated by the Contract Documents.

C. Equipment which requires alteration of the structure, piping, and/or electrical work will be considered only if the Contractor assumes all responsibility for making and coordinating all necessary alterations.

D. Provide all such alterations free of extra cost to the Owner.

PART 2 : PRODUCTS

2.01 EQUIPMENT

A. Provide equipment in accordance with applicable sections of these Specifications.

B. Furnish each piece of equipment complete including other appurtenances which are specified or required for proper and safe operation.

C. All railings, stairs, guards, and platforms required to access equipment for operation and maintenance shall meet or exceed the most recent federal OSHA and state requirements.

D. Fabricate, assemble, erect, place and test all specified materials and equipment in full conformity with all contract document and manufacturer's recommendations.

E. Furnish any special tools or equipment required for proper maintenance, testing, or adjusting.

2.02 EQUIPMENT FOUNDATIONS, BASES AND PADS

A. All floor or floor stand-mounted equipment specified in Division 22 shall be set on concrete housekeeping pads.

1. The height of the pads shall be as recommended by the equipment manufacturer, as required to connect to piping, or as shown on the Drawings.
2. The height shall be sufficient to accommodate required anchorage devices.
3. The pads shall extend 2-inch minimum and 4 inches maximum beyond the machine base in all directions unless otherwise indicated on the Drawings or by the equipment manufacturer.
4. The top edges of the pads shall be chamfered.

B. Concrete work shall be in accordance with Section 03 00 00.

C. Anchor bolts shall be in accordance with Division 5.

2.03 NAMEPLATES

A. Nameplates shall be provided on each item of equipment and shall contain the specified equipment name or abbreviation and equipment number.

B. Equipment nameplates shall be engraved or stamped on corrosion resistant material and fastened to the equipment in an accessible location with No. 4 or larger oval head stainless steel screws or drive pins.

2.04 LUBRICANTS

A. Equipment shall be furnished with proper lubricants in sufficient quantities to allow for the startup and testing period. The type of lubricant shall be as specified.

B. With the equipment manufacturer's approval, the Contractor shall minimize the number of different types and brands of lubricants by consolidating the lubricants into the least number of different types required to adequately service the equipment.

C. Not less than 90 days before the date indicated for starting, testing, and adjusting equipment, the Contractor shall provide the Owner with five (5) copies of a list indicating the required lubricants, after consolidation, for each item of equipment.

D. The list shall show estimated quantity of lubricant needed for a full year's operation, assuming continuous operation.

2.05 NOISE REQUIREMENTS AND CONTROLS

A. Unless otherwise specified, the maximum permissible noise level for a complete piece of equipment shall not exceed 85 dbA at 3 feet and comply with local ordinances.

1. A complete piece of equipment includes the driver and driven equipment plus any intermediate couplings, gears and auxiliaries.

B. Provide sound attenuating enclosure with easy access to regularly used components.

2.06 ELECTRICAL LABELING REQUIREMENTS

A. Electrical equipment and associated devices and materials shall be listed and labeled for the purpose and/or classified area (as shown on the plans) in which they are to be used by a recognized independent testing laboratory.

1. Three such organizations are:

   a. Underwriters Laboratories (UL).

   b. Canadian Standards Association (CSA).

   c. Electrical Testing Laboratories (ETL).

2. Independent testing laboratory shall be acceptable to the inspection authority having jurisdiction.

B. When a product does not have or is not available with a testing laboratory listing or label for the purpose and/or classified area for which it is used, the product may be required by the inspection authority to undergo a special inspection and certification. Coordination and all costs and expenses for such inspections and certification will be considered the responsibility of the supplier/contractor and included in the contract price.

PART 3 : EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Equipment shall be installed in accordance with the equipment manufacturer's written installation instructions and the requirements of these specifications. The Contractor shall provide and pay for the services of a manufacturer's service engineer to review the installation and make final adjustments to the equipment unless the specifications specifically state that such services are not required.

B. Attention shall be given to design loadings of floors to assure that design loadings are not exceeded during installation of equipment. The Contractor shall be responsible for devising and maintaining installation procedures and techniques which will not overstress structural components.

C. The Contractor shall cover openings in equipment prior to, during and following installation to prevent dirt, rubbish or water from entering.

D. Equipment shall not be subject to electrical or mechanical shock. Damaged, dented or marred equipment shall be replaced or repaired in a manner satisfactory to the Owner, at the option of the Owner, at no additional cost to the Owner.

E. Miscellaneous materials shall be furnished and installed as required to provide a complete, operable equipment installation. Such miscellaneous materials shall include, but not be limited to, the following:

1. Stainless steel and brass shim stock.
2. Thread lubricants, pipe dope, gasket compounds, and sealers.
3. Non-hazardous solvents and cleaning compounds.
4. Welding rod and other expendable construction materials.
5. Paint for touchup of shop coatings.
6. Cribbing, jacks, slings, rigging, blocking, scaffolding, lifting eyes, and other erection materials.
7. Grout, grout forms and blocking.

8. Bolts, studs, nuts, and gaskets for makeup of connections to the equipment, securing the equipment to its supports, and to replace manhole gaskets damaged or misplaced during storage, inspection, cleaning, filling or placing into service.

F. Welding shall be performed as required to ensure complete and proper installation of the equipment. The following requirements shall apply:

1. The shielded metallic-arc welding process shall be used.
2. Welders and welder operators shall be certified as qualified by the ANSI, ASME, or AWS codes as applicable.
3. Welding procedures shall be in accordance with the following:
   a. ANSI – Code for Power Piping B31.1.
   b. ASME – Boiler and Pressure Vessel Code.
   c. AWS – Structural Welding Code D1.1.
4. Welding to equipment shall be in accordance with the equipment manufacturer's recommended procedures.

G. Grouting of equipment shall be in accordance with the provisions specified in Section 03 60 00 and as may be shown on the Drawings.

H. Cleaning and touchup of equipment shall be performed as follows:

1. Temporary protective coatings and foreign materials shall be completely removed prior to assembly and installation.
2. Shop-applied compounds shall be completely removed.
3. Compressed air shall be used to completely remove foreign materials from equipment components and interconnecting piping.
4. Weld spatter, burrs on cut surfaces, and sharp protrusions shall be removed to the satisfaction of the Engineer.
5. Loose paint shall be removed by sandpaper, wire brush, or paint scraper to the satisfaction of the Engineer.
6. Factory-applied prime coats shall be touched up in the field after installation is complete using touchup paint furnished by the equipment manufacturer.
7. Paint shall be applied by brush or spray and in accordance with the paint manufacturer's recommendations. Paint shall not be applied at temperatures below 50°F.

3.02 EQUIPMENT MAINTENANCE PRIOR TO INITIAL OPERATION

A. Mechanical equipment and appurtenances shall be properly oiled and lubricated prior to being operated.

B. The equipment installation shall include furnishing and installing oil, grease, and protective fluids required for initial operation.

C. The Contractor shall record the date, type, and quantity of lubricant and/or oil initially installed.

D. Such records shall be submitted to the Owner prior to initial operation of the equipment.

3.03 PAINTING

A. Equipment shall be painted in accordance with Section 09 96 00, except as specified herein.

B. Equipment with approved factory finish shall not be painted.

C. Electrical equipment, as listed below, with standard factory-applied enamel coating systems shall not be painted:

1. Panel boards
2. Electrical panels
3. Switchboards
4. Switchgear
5. Safety switches
6. Motor starter equipment
7. Motor control centers
8. Raceways and cable trays
9. Transformers
10. Power circuit breakers

3.04 SPARE PARTS STORAGE AND MARKING

A. Spare parts shall be wrapped in weatherproof material and packed in painted wooden boxes with hinged cover and hasp lock.

B. Each box shall be clearly labeled on the front and top as to its contents.

C. No box shall weigh more than 150 pounds when full.

3.05 TESTING AND STARTUP

Preoperational checkout, operational testing and startup shall be performed in accordance with Section 1-05.11 and as may be specified for each equipment item.

3.06 CONTINUING ADJUSTMENTS

The Contractor shall provide such continuing adjustments as are necessary to insure proper operation of all equipment after occupancy of the project and for a period of one year after Date of Substantial Completion.

3.07 OPERATOR TRAINING

A. The Contractor shall provide and pay for the services of qualified representatives of the equipment, provided under this contract, to instruct the Owner's personnel in the proper operation and maintenance of the equipment.

B. Training time shall be as specified in individual Specification Sections.

C. Instruction time shall be in addition to, and shall not be done simultaneously with, equipment startup and acceptance testing.

END OF SECTION

SECTION 22 13 29.16
SUBMERSIBLE WASTEWATER PUMPS

PART 1 : GENERAL

1.01 SUMMARY

A. This Section specifies submersible non-clog pumps for municipal sewage.

B. The Owner has negotiated a “not to exceed” price for procuring the equipment and Source/Field Quality Control services associated with this Specification Section. A copy of the Manufacturer’s “not to exceed” price is included in Appendix E.

C. In addition to the “not to exceed” price, the Contractor shall include in its Bid, all additional costs for work required by the Contractor which is not included in the “not to exceed” price, but is required to provide a complete operating system and administer the Manufacturer’s “not to exceed” price including, but not necessarily limited to:

1. Coordination of the submittals.
2. Equipment unloading.
3. Handling, storing, installing, starting-up, testing, demonstrating, and all other incidentals required to place the pre-negotiated equipment into service.

1.02 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Technical literature, bulletins, and/or catalog cuts of the equipment.
2. Performance curves.
3. Quality control test results.
4. Materials of construction.
5. Complete installation instructions, including electrical and mechanical requirements.
6. Operations and Maintenance Manuals.

B. Pump Manufacturer’s recommendation of wet well filleting and extent of flat area as shown on the Drawings.

1.03 WARRANTY

A. The pump manufacturer shall warrant the pumps, including components and motor, against defects in workmanship and materials for a period of five (5) years under normal use and service.

B. The pump manufacturer shall warrant the guide system (including guide, cables or rails, and brackets) against defects in workmanship and materials for a period of ten (10) years under normal use and service.

C. The pump manufacturer shall fully warrant the impeller against clogging for a period of one year under normal use and service.

D. Pump manufacturer warranties shall be in published form, and shall apply to all similar units.

1.04 QUALITY CONTROL

A. Perform equipment tests in accordance with the Hydraulic Institute's - Submersible Pumps for Hydraulic Performance, Hydrostatic Pressure, Mechanical and Electrical Acceptance Tests.

1. Tests shall be performed on the actual assembled pumps to be supplied; prototype model tests are not acceptable.
2. Tests shall cover a range from shut-off to a minimum 20 percent beyond specified design capacity.

B. Conduct test per above specifications on all supplied pumps, generating a curve showing actual flow, head, BHP, and hydraulic efficiency.

C. Obtain the submersible sewage pumps from one source and a single manufacturer.

PART 2 : PRODUCTS

A. Subject to conformance with the Contract Documents, the following manufacturers are acceptable:

1. Flygt.
2. No substitutions.

B. PERFORMANCE AND CONDITIONS OF SERVICE: The pumps shall operate over the range of flows and heads specified below. Motor horsepower shall not exceed the values specified, and the hydraulic efficiency shall be equal to or higher than those listed. A separate table is provided for each of the three pump stations.

Submersible Pumps – Pump Station 45	
Number of Pumps (1 plus 1 standby)	2
Design Point – One Pump Operation (gpm/ft)	210/34
Minimum Hydraulic Efficiency (One Pump)	50%
Max. Motor Horsepower	4
Max. Speed, RPM	3,415
Variable Speed	No
Voltage/Cycle/Phase	230/60/3
Nominal Discharge Diameter, inches	3
Impeller Type	Semi-open, non-clog, adaptive
Material Pumped	Raw Municipal Sewage

Submersible Pumps – Pump Station 46	
Number of Pumps (1 plus 1 standby)	2
Design Point – One Pump Operation (gpm/ft)	265/21
Minimum Hydraulic Efficiency (One Pump)	44%
Max. Motor Horsepower	4
Max. Speed, RPM	3,415
Variable Speed	No
Voltage/Cycle/Phase	230/60/3
Nominal Discharge Diameter, inches	3
Impeller Type	Semi-open, non-clog, adaptive
Material Pumped	Raw Municipal Sewage

Submersible Pumps – Pump Station 47	
Number of Pumps (1 plus 1 standby)	2
Design Point – One Pump Operation (gpm/ft)	195/37
Minimum Hydraulic Efficiency (One Pump)	52%
Max. Motor Horsepower	4
Max. Speed, RPM	3,415
Variable Speed	No
Voltage/Cycle/Phase	230/60/3

Submersible Pumps – Pump Station 47	
Nominal Discharge Diameter, inches	3
Impeller Type	Semi-open, non-clog, adaptive
Material Pumped	Raw Municipal Sewage

C. The total heads specified herein do not include internal pump losses.

D. Pumps shall operate without cavitation or vibration within the manufacturer's allowable operating range, with a submergence of one (1) foot above the impeller centerline.

2.02 PUMP DESIGN

A. The pumps shall be submersible non-clog type that is suitable for the application, each connected to a discharge connection of a minimum diameter as specified herein.

B. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal-to-metal watertight contact.

2.03 PUMP CONSTRUCTION

A. Provide pumps fabricated of the following materials:

Pump Components	Material
Pump Case	Cast Iron, ASTM A48, Class 35B
Motor Housing	Cast Iron, ASTM A48, Class 35B
Impeller	Duplex Stainless Steel, AISI 329
Intermediate Housing (Backplate)	Cast Iron, ASTM A48, Class 35B
Discharge Base Elbow	Cast Iron, ASTM A48, Class 35B
Pump/Motor Shaft	Stainless Steel, ASTM A479 S43100-T
Shaft Sleeve	Not allowed
Wear Ring, Case	Cast Iron, ASTM A48, minimum 200 Brinell
O-Rings	Nitrile Rubber (NBR)
Fasteners	Stainless Steel, Type 316
Mechanical Seal – Lower	Tungsten Carbide
Mechanical Seal – Upper	Tungsten Carbide
Guide Rails	Stainless Steel, ASTM A276 Type 316L
Lifting Chains	Stainless Steel, ASTM A276 Type 316L

Pump Components	Material
Oil – All Uses (Seal Lubrication, Motor Cooling, etc.)	FDA Approved, Ecologically Safe
Power/Control Cable Jacket	Chlorinated Polyethylene Rubber

B. Furnish pump case, impeller, intermediate housing, and motor housing with smooth surfaces devoid of blow holes and other irregularities.

C. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory-applied polyamidoamine epoxy protective spray coating on the exterior of the pump.

D. Sealing design shall incorporate metal-to-metal contact between machine surfaces.

E. All major castings shall be produced in the manufacturer's own foundry, under the manufacturer's direct supervision.

2.04 COMPONENTS

A. General:

1. Provide pumps capable of handling solids, fibrous materials, sludge and other matter found in raw, unscreened municipal wastewater.
2. Where watertight sealing is required, machine and fit mating surfaces with O-rings.
3. Provide with heavy duty lift lugs or hoisting bail designed for lifting the entire pump and motor assembly.

B. Impeller and Wear Rings:

1. Provide semi-open, multi-vane, back-swept, non-clog type impeller.
2. Statically and dynamically balance impeller.

C. Shaft:

1. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings are not acceptable.

D. Mechanical Seal:

1. Provide two totally independent mechanical shaft seals, installed in tandem, each with its own independent spring system acting in a common direction.
2. Install the upper seal in an oil-filled chamber with drain and inspection plug (with positive anti-leak seal) for easy access from external to the pump.

3. Provide seals requiring neither routine maintenance nor adjustment, but capable of being easily inspected and replaced.
4. Do not provide seals with the following characteristics:
   a. Conventional double mechanical seals with single or multiple springs acting in opposed direction.
   b. Cartridge-type mechanical seals.
   c. Seals with materials other than those specified.
   d. Seals using the impeller hub as a mounting surface.

E. Bearings:

1. Furnish upper and lower bearings, single row (preferred) or double row as needed to provide a B10 life of, at minimum, 50,000 hours at anticipated axial and radial loadings.
2. Provide sealed, shielded (permanently lubricated) bearings.

F. Motor:

1. Provide a motor that is squirrel cage, induction in design, housed in completely water-tight and air filled chamber, with a minimum 1.15 service factor.
2. Insulate the motor stator and stator leads with, at minimum, Class H insulation rated for 180 degrees C total temperature.
3. Provide motor cooling by the following method:
   a. Provide adequately rated motor with sufficient surface area for ambient only cooling.
4. Provide motors that are capable of operating for at least 2 hours in a dry mode without damage to motor or seals.
5. Provide motors that are designed, rated, and warranted for continuous operation at 40 degrees C, temperature rise not to exceed 80 degrees C, capable of 30 evenly spaced starts per hour.
6. Do not provide motors that contain in excess of 2 gallons of oil (combined total for cooling and seals), or that contain other than an FDA approved, ecologically safe oil.
7. Pump and motor package to be FM approved, Class 1, Division 1, Group C & D service for hazardous locations as defined by the National Electric Code (NEC).

G. Thermal/Leakage Relay:

1. Provide MiniCAS thermal/leakage relay with mounting socket for each pump installed.

H. Protection:

1. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. Set temperature monitors at levels recommended by pump manufacturer. When activated, switches shall activate an alarm and the pump shall shut down.
2. Leak detection sensors shall be provided to detect water in the stator chamber, cable entry chamber, and mechanical seal oil chamber. The leak sensors shall utilize a float switch to detect the presence of water. When activated, the sensors shall activate an alarm only. The pump shall not be shut down.

2.05 APPURTENANCES

A. Guide System:

1. Pumps to allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts, or other fasteners.
2. Pumps shall connect to permanently mounted discharge connections by simple downward motion, without rotation; guided by at least two (per pump) non-load-bearing, Type 316L stainless steel, non-sparking, guide rails permanently installed in the wet well extending from the top of the station to the discharge connection. Final connection shall ensure zero leakage between the pump and discharge connection flange.
3. Pumps shall automatically connect to the discharge elbow when lowered and sealed by a profile gasket or machined metal-to-metal watertight contact.
4. Discharge connection/guide system shall be such that no part of the pump bears directly on the floor of the wet well.
5. Each pump shall be fitted with a Type 316L stainless steel chain and cable guide line with grip-eye lifting device of adequate strength and sufficient length for raising and lowering pumps. The working load of the lifting system shall be at least 50 percent greater than the pump unit weight.
6. Cable holder with safety hook for each pump to be Type 316L stainless steel.

B. Power and Control Cable:

1. Combined power cable and control cable of adequate length to allow a unit to be wired as shown on the Drawings without splicing. Cables should be suitable for the application, sized in accordance with NEC requirements.
2. Cable entry sealing system:
   a. Cable terminal box on side of motor housing, with cable entry sealed to ensure that no entry of moisture is possible into the motor terminal area even if the cable is damaged or severed below water level.

b. Control cable shall contain the required conductors for the temperature and seal leak detection systems.

C. Spare Parts: supply the following.

1. Basic Repair Kit (Mechanical seals, O-rings, Bearings, etc.) – 1 set
2. Sleeve Assembly – 3 sets
3. N-Impeller and Insert Ring – 3 sets

2.06 COATINGS

Factory coat pumps in accordance with Section 09 96 00.

2.07 CONTROLS

Pump control requirements in Section 40 90 10.

PART 3 : EXECUTION

3.01 INSTALLATION

A. See Equipment General Provisions, Section 22 13 29.

B. Install pumps as shown on the Drawings and as recommended by the manufacturer.

C. Pumps shall be set plumb with no stresses on the pump discharge. Vibration of the complete pump assemblies shall be within the limits recommended by the applicable standards of the Hydraulic Institute.

3.02 START-UP AND TRAINING SERVICE

A. The equipment manufacturer shall furnish the services of a qualified factory-trained field service representative for three (3) days (1 day per pump station) site visit to inspect, check, service, adjust and make corrections to the installation. Additionally, after the pumps have been completely installed and wired, the Contractor shall have the manufacturer do the following:

1. Megger stator and power cables.
2. Check seal lubrication.
3. Check for proper rotation.
4. Check power supply voltage.
5. Measure motor operating load and no-load current.
6. Check level control operation and sequence.

B. Service representative shall submit a written report certifying that the equipment has been properly installed and checked.

C. Field test all pumps after installation to demonstrate satisfactory operation. See Section 1-05.11 – Facility Startup, Testing and Training.

1. Furnish all labor, materials, tools, equipment, incidentals and services for developing a sufficient supply of potable water for functional testing. No extra payment will be made for delivering or placing the water, or for the quantity used. Sufficient quantities of water shall be available to test the full range of the equipment.
2. Testing shall be done in the presence of the Engineer.
3. Furnish all labor, materials, tools equipment, instruments, and services necessary.
4. Any pump that fails to meet the requirements, will be modified, repaired or replaced.

D. Instruct the Owner's personnel on the operation and maintenance of the pumping units for all three pump stations. This shall be deemed to be a separate one-day visit to the site, independent of visits required for equipment checkout, testing, and startup unless noted otherwise or prior concurrence of the Engineer and Owner are received.

3.03 CLEANING

A. All materials and equipment shall be new and, therefore, shall require only a minimum amount of routine cleaning during or after installation.

B. All debris, grit, petroleum products, rust scale, construction by-products, and foreign matter shall be removed and damaged coatings shall be repaired prior to final acceptance. All cleaning regimen suggested by the manufacturer shall be done.

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SECTION 26 00 00
ELECTRICAL GENERAL

PART 1 : GENERAL

1.01 SUMMARY

This Section specifies general requirements for electrical work. Detailed requirements for specific electrical items are specified in other sections but are subject to the general requirements of this Section. The electrical Drawings and schedules included in this project manual are functional in nature and do not specify exact locations of equipment or equipment terminations.

1.02 DEFINITIONS

A. The word "**provide**" shall be interpreted to mean furnish and install.

B. "**Owner**": Kitsap County

C. "**Contractor**" is the party who furnishes and installs all materials and equipment. This includes the Prime Contractor, Electrical Contractor, Control System Integrator, and all other Contractors and Sub Contractors.

D. "**Control System Integrator**" also referred to as the System Integrator or Integrator or control system manufacturer is the Party that furnishes all control components and designs the detailed control wiring diagrams plus the layout and assembly of the custom control panels.

E. "**Control System**" includes all equipment, instruments, computers and wiring for control and monitoring of all operating pumps and equipment. This includes custom control panels, motor control center, packaged control panels, and control equipment furnished with other systems and mechanical equipment. All sensing, transmitting, indicating, control and recording of all functions as specified and shown are also included in the control system.

1.03 GENERAL DESCRIPTION OF WORK

A. The Contractor shall:

1. Provide all labor, material, tools, equipment and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the Drawings and these specifications.
2. Provide identification (nameplates and wire tags) of all electrical equipment and wiring.
3. Complete the wiring to, connection to, adjustment and calibration of, testing of equipment having electric motors and/or built-in or furnished electrical components. Install electrical components that are furnished with mechanical equipment.

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

5. Provide the size, type and rating of motor control devices, equipment and wiring necessary to match the ratings of motors furnished with mechanical equipment.

6. Provide adequate space for the electrical installation, including but not limited to, determination of access-ways and doorways, shipping sections, wall and floor space, and space occupied by mechanical equipment. Provide electrical equipment that fits in the areas shown on the Drawings. All equipment shall be readily accessible for maintenance, shall have electrical clearances in accordance with NEC and shall be installed in locations that will provide adequate cooling.

7. Provide detailed wiring diagrams showing all equipment and instrumentation connections and terminations.

8. Check electrical equipment prior to installation so that defective equipment is not installed. Acceptance testing for electrical equipment shall be performed as discussed in Sections 26 32 00 & 26 36 00.

9. Provide start-up, follow-up and training of the Owner's personnel for electrical systems. Make all corrective measures required during start-up. See specific requirements for training and start-up in other specification sections.

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

11. The RTU's, control panels, and instrumentation shall be supplied through the Control System Integrator and shop tested in the integrator's shop.

1.04 EQUIPMENT COORDINATION

A. The Contractor is responsible to coordinate the equipment supplied from other manufacturers. This includes but is not limited to:

1. Obtaining specific information on equipment ratings and sizes and verifying the electrical components supplied meet, or match the requirements such as voltage, phase, frequency, starter types, etc.

2. Verifying the equipment supplied will fit within the space allocated.

3. Coordination of equipment and the electrical power and control requirements. Provided in all sections of the specifications and Drawings.

4. Providing power and control equipment, wiring, and raceways to meet the requirements of the mechanical equipment supplied.

5. Providing all necessary control wiring and components for any special requirements from an equipment manufacturer.

B. The Contractor shall verify as a minimum:

1. Correct voltage, phase and frequency.
2. Size and space requirements.
3. Mounting requirements.
4. Correct motor starter type.
5. Proper coordination with the controls and control system Integrator.

C. Any discrepancies between the electrical and other equipment shall be brought to the immediate attention of the Engineer.

1.05 PROJECT DESCRIPTION

A. In general the project consists of electrical upgrades to three existing wastewater pump stations: 45, 46 and 47.

1. PS-45, 46 and 47 are all new duplex submersible pump stations with above grade electrical enclosures and on-site generators.

B. The following statements highlight the main portion of the electrical work for all sites.

1. Coordinate with the local power utility and coordinate modifications to the existing power service to the sites
2. Provide temporary power and controls for existing pump stations during construction, including relocation of existing electrical and telemetry equipment.
3. Demolish all existing equipment except for telemetry panels after new equipment is accepted. Relocate existing telemetry equipment.
4. For all three sites:
   a. Provide service entrance equipment standby generator and automatic transfer switch (ATS).
   b. Provide motor controls and power distribution equipment and motor starters as shown on the Drawings.
   c. Provide a MCP – Main Control Panel with PLC for control and monitoring and alarming of all equipment.
   d. Reinstall existing telemetry panel, radio modem and antenna. Provide new antenna mast and antenna cable per the Drawings.
   e. Provide wet well floats.
   f. Provide all programming at the stations.
   g. Provide new instrumentation.
   h. Provide lighting and receptacles for the site.
   i. Provide wire and raceways for all equipment power and control circuits.

j. Provide O&M, record drawings and training.

1.06 TEMPORARY OPERATION AND CONSTRUCTION POWER

A. Facility Operation Power:

1. If necessary, provide temporary power service for facility operation and bypass pumping system during construction. Provide power and control systems, circuits and components, and connections for all motors and equipment that remains in operation during construction. The Contractor shall pay for all coordination with the utility and associated construction costs for temporary facility power.
2. Any necessary modifications and utility construction costs to the existing electrical system for construction power shall be coordinated and paid for by the Contractor.
3. The Owner shall pay for the energy costs as billed by the utility and these costs shall not be included in the Contractors bid price.

B. Construction Power:

1. If the existing service is adequate for facility operation, temporary pumping system, and construction power, then the existing service may be used for construction power and the Owner shall pay all energy costs as billed by the utility on the existing meter.
2. Any necessary modifications to the existing electrical system for construction power shall be coordinated and paid for by the Contractor.

1.07 REFERENCES

A. Permits, licenses, approvals and other arrangements for work shall be obtained and paid for by the Contractor and included in the bid price.

B. Electrical work shall be executed in strict accordance with the latest edition of the National Electrical Code and local ordinances and regulations.

C. All electrical equipment, materials, construction methods, tests and definitions shall be in strict conformity with the established standards of the following in their latest adopted revision:

1. Underwriters' Laboratories, Inc. (UL)
2. National Electrical Manufacturers Association (NEMA)
3. Canadian Standards Association (CSA)
4. Electrical Testing Laboratories (ETL)
5. Factory Mutual (FM)
6. All applicable Washington State Codes and local County Codes.

D. All materials and equipment specified herein shall, within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.

E. All materials shall be new, free from defects, of current manufacture, of quality specified or shown. Each type of material shall be of the same manufacturer throughout the work.

1.08 CONTRACT DOCUMENTS

The electrical layouts are generally diagrammatic. The location of equipment is approximate unless dimensioned. Exact locations and routing of conduits shall be governed by structural conditions and physical interference's and by locations of electrical terminations on equipment.

1.09 REFERENCE DOCUMENTS

The Contractor shall refer to the Drawings, project data and shop drawings of other trades for additional details, which affect the proper installation of the work. Diagrams and symbols showing electrical connections are diagrammatic only, and so do not necessarily show the exact physical arrangement of the equipment.

1.10 SITE FAMILIARIZATION

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

1.11 GROUND SYSTEM

A. Provide grounding and ground system per the NEC.

B. Provide a minimum of two 10 foot x ¾" copper coated steel ground rods or more if required by the Drawings. Use pressure type connectors for underground connections and bolted type for exposed.

C. Construct metallic raceways to provide a continuous ground path.

D. Connect all electrical equipment enclosures to the ground system.

E. Nonelectrical equipment with metallic enclosures and metallic piping shall be connected to the grounding system as required by NEC.

F. Ground system shall be tested per IEEE standard 81. If greater than 2 ohms then additional ground rods shall be added and paid for as extra work.

G. Bond ground system to metallic piping as required by NEC.

H. Bond ground system to foundation steel in at least one location and at other locations as shown on the Drawings.

1.12 PRE-SUBMITTAL CONFERENCE

A. In addition to the Pre-construction Meeting, The Contractor shall arrange and conduct a Pre-submittal Conference within 30 Days after award of the Contract. The purpose of the Pre-submittal Conference is to review and approve the manner in which the Contractor intends to carry out its responsibilities for Electrical and I&C submittals and Shop Drawing submittals and the Work to be provided under division 26 and 40 specifications. The General Contractor, the Electrical Contractor, the System Integrator, and the Engineer shall attend. Both the Contractor and the Engineer may invite additional parties at their discretion.

B. The Contractor shall allot 4 hours (minimum) for the Conference. The conference shall take place at the Owner's office.

C. The Contractor shall present the following for discussion at the Conference:

1. Discussion of submittal documents and format.
2. Discussion of submittal schedule and critical path and long lead items and any concerns about lead times for any of the products.
3. A sample of submittal control wiring diagrams (equipment, instruments, PLC I/O cards) panel, equipment drawings to be provided.
4. A sample of each type of submittal.
5. A list of clarifications (RFQs) to the Contract Documents along with a brief explanation of each. Resolution shall be subject to a separate formal submittal and review by the Engineer.
6. Discussion of nameplates.
7. A list of proposed modifications, deviations from specified components and anticipated change orders.
8. Proposed shop and field testing procedures for electrical equipment and instrumentation and controls.
9. An overview of the proposed plan for maintaining the operations of the station during construction.
10. A preliminary schedule for the following activities:
    a. Electrical equipment submittals.
    b. Control Panel submittal.
    c. I&C submittal.
    d. Factory testing.
    e. Field I/O testing.
    f. Startup.
    g. System testing.

1.13 SUBMITTALS

A. Project data shall be submitted in accordance with the general requirements in Section 1-06.

B. Separate Submittals shall be provided for each specification section. All products for each spec section shall be included in a single PDF document including the cover sheet and index in **one single document**. Submittals shall be indexed and identified as follows:

1. Email subject line shall be "project name, EI&C submittal submittal #, spec section# - description."
2. Cover sheet with:
   a. the project name and submittal #.
   b. Contractor's and sub-contractor's name, phone number, and email address.
   c. index sheet showing each product being submitted.
3. PDF index tabs per the electrical specifications by section and paragraph or equipment name e.g. provide a minimum of one tab section for each piece of equipment in all of the PART 2 PRODUCT Sections 2.01 - 2.
4. Label each equipment submittal sheet with equipment name and number. Indicate location where each item of equipment submitted will be used on the job. Use equipment numbers when available.
5. Identify specific options and cross hatch out any information that is not a part of the specific information for the submitted component.

C. Submittals shall include the manufacturer's name, address, trade name, catalog model or number, nameplate data, size, layout dimensions, project specification and paragraph reference. Include other information necessary to establish contract compliance of each item proposed to furnish.

D. Long lead items may be submitted separately if pre-approved by the Engineer.

E. Each item shall be clearly marked and provided with adequate sales and technical information to clearly show conformance with all aspects of the specification. Packages not provided as described above or largely incomplete shall be returned to the Contractor, without comment.

F. I&C (Instrument & Control) submittals shall be provided with a Bill of Materials showing quantity, manufacturer's name, catalog number, and supplier name and phone number.

G. Certify on all submittals that the material being proposed conforms to the contract requirements. In the event of any variance, state specifically which portions vary and request a variance in writing.

H. Certify that all furnished equipment is able to be installed in the allocated spaces by stating on each item: "This equipment will be able to be installed in the spaces allocated."

I. Shop Drawings shall be provided on 11” x 17” sheets maximum size, and shall be scaled using standard engineering or architectural scales. Wiring diagrams shall identify circuit terminals, and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment.

J. NOTE: submittals received that do not meet the requirements outlined above and in the individual spec sections will be returned without review.

K. Contractor should anticipate in the schedule that submittals will take a minimum of 4 weeks for comments to return.

L. The engineer will have a minimum of 2 weeks to review submittals and a minimum of 3 weeks to review I&C submittals.

PART 2 : PRODUCTS

2.01 NAMEPLATES

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

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

C. All nameplates shall include the equipment name and number (circuit number and function, if applicable).

D. Nameplates of all powered equipment (including instruments, motors, control panels, HVAC, etc.) and all switches, disconnects, and receptacles shall have included on the nameplate the power source (circuit and panel number, MCP/control panel and circuit #, or MCC and unit number, etc.) that the equipment is fed from.

E. Nameplates on light switches and receptacles shall include the panel and circuit and also include application such as outdoor lights, computer receptacle, etc. if relevant. Nameplates on switches and receptacles can be printed thermal tape.

F. All motors shall have nameplates secured to the terminal box with 1/2” lettering or larger.

G. Nameplates shall be made of 1/16" thick machine engraved laminated phenolic having black letters not less than 3/16" high on white background or as shown on the Drawings or other sections of the specifications. Nameplates on the interior of panels and on light switches and receptacles shall be White Polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; TYTON 822 or accepted equal.

H. All nameplates shall include the equipment name and number (and function, and circuit number if applicable).

I. Provide warning nameplates on all panels and equipment, which contain multiple power sources. Lettering shall be white on red background.

J. Provide information or warning nameplates as required by the NEC or electrical inspector for identification of service disconnects, multiple service disconnects etc

K. Nameplates shall be secured to equipment with stainless steel screws/fasteners/straps. Epoxy glue may be used where fasteners are not practical if first approved by the Engineer.

2.02 WIRE MARKERS

A. Each power and control conductor shall be identified at each terminal to which it is connected. Conductors size No. 10 AWG or smaller shall have identification sleeves. Conductors shall be identified in accordance with Section 26 05 00.

B. The letters and numbers that identify each wire shall be machine printed on sleeves with permanent black ink. The figures shall be 1/8 inch high. Sleeves shall be white tubing, sized to fit the conductor insulation. The sleeves shall be shrunk to fit the conductor with hot air after installation.

C. They shall be TMS Thermofit Marker System by Raychem Co., sleeve style wire marking system by W. H. Brady Co., or accepted equal. Adhesive strips are not acceptable. Conductors No. 8 AWG and larger shall use cable markers of the locking tab type. Tabs shall be white plastic with conductor identification number permanently embossed.

2.03 RACEWAY MARKERS

Raceway markers shall be non metallic with raceway number stamped in 3/16-inch minimum height characters. Tags shall be attached to the raceway with 316 stainless steel wire.

2.04 THERMAL (TEMPERATURE) RATINGS OF EQUIPMENT TERMINATIONS

A. Wiring and circuit breakers on this project are designed for 75°C operation above 30 amperes; 60°C for 30 amperes and below.

B. All products furnished on this project shall have electrical terminations rated for 60°C for ampacities of 30 amperes or less and rated for 75°C for ampacities above 30 amperes.

PART 3 : EXECUTION

3.01 STORAGE AND INSTALLATION ENVIRONMENT

All electrical equipment shall be stored in a dry environment free from dust, moisture, sprays or vapors, which may be detrimental to their new condition. After installation of equipment, care shall be taken to protect all equipment from all dust, moisture, paint and other spray, harmful vapors, etc. until final acceptance and certificates of occupancy have been obtained.

3.02 SITE INSPECTIONS

A. Prior to final acceptance the Engineer will perform one or more site observation trips to develop a “punch list” of items deemed incomplete.

B. Each punch list item shall be completed by the Contractor and checked off of the list. When all of the items on the list are completed or commented on, the list shall be signed by the Contractor and returned to the Engineer for verification.

3.03 FINAL ACCEPTANCE

A. When all work is complete, the Contractor shall call the Engineer for the final acceptance testing inspections. The Electrical Contractor and System Integrator shall be present while these inspections are taking place and shall be available for opening cabinets and operating and adjusting the system as is necessary for the Engineer to verify all equipment is installed and operates to the requirements of the contract documents.

B. The contractor shall anticipate a minimum of 8 hours for each pump station to complete the final acceptance testing.

C. Prior to the Contractor calling for this observation, the Contractor shall have completed all items of work, including wire markers, nameplates, final tests and final test reports. All equipment shall be checked for proper operation and all signals verified for correct calibration and wiring.

D. Final acceptance will not be given until:

1. All work is complete
2. All “site inspection” punch-lists are checked off and returned to the Engineer
3. All test reports are received
4. All O&M manuals are received
5. All spare parts are received
6. All instrument test forms are received
7. All project record drawings are received

3.04 PROJECT RECORD DRAWINGS

A set of drawings shall be maintained at the job site (by the Electrical Contractor) showing any deviations in the electrical systems from the original design. These drawings shall conform to the requirements for Project Record Drawings in Division 01.

3.05 GUARANTEE

The Contractor shall guarantee his work per the requirements in Division 01.

3.06 CLEANUP

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

B. All motor control equipment and control panels shall be cleaned inside and out at the completion of the project.

3.07 TESTS

A. Testing for installed feeder cables and motors is required as specified in other Sections. Test reports shall be submitted to the Engineer prior to final acceptance. All tests shall be performed in accordance with the applicable sections of NETA.

B. Where specified in the individual product specification section, factory tests shall be performed at the place of fabrication and performed on completion of manufacture or assembly. The costs of factory tests shall be included in the contract price.

3.08 MAINTAINED OPERATION REQUIREMENTS

A. The pump stations are existing and operating facilities. The pump stations must remain fully operational during construction. The following are the base requirements.

1. Two sources of power must always be available and connected for automatic transfer – utility power and existing standby generator or new standby generator or contractor furnished trailer mounted generator.
2. Remote alarm and monitoring (telemetry) system must stay operational. The existing telemetry system must remain operational until the new system is installed and inspected and passes testing.
3. Three pumps and associated power and control system must be operational for the triplex stations and two pumps for the duplex station, utilizing all of the existing pumps or a combination of the new and existing pumps or temporary pumps.

B. The Contractor shall submit a detailed plan with timelines and dates for the transition of equipment at each pump station showing how 1, 2, & 3 above will be accomplished.

C. The temporary control system shall be tested by the Contractor with the Owner and Engineer present for approval.

D. Existing electrical power and control equipment may be relocated and reconnected to the existing equipment for temporary operation during construction.

E. The following are critical alarm points that must remain operational during construction and shall be tested at least weekly for correct operation. During times of installation of equipment directly related to these alarm points, these alarms shall be tested at the end of each working day.

1. Wet well high level float -. local alarm and autodialer/telemetry
2. Pump fail
3. Power fail – autodialer/telemetry alarm

F. All changes in pump stations operations shall be directly coordinated with the County. All power outages shall be coordinated with the County and the Utility.

G. The Contractor shall test the high level float and power fail alarms through the telemetry system every night before leaving the site and verify with the County office that the alarm is functioning. The telemetry must always be connected to the primary power source.

3.09 OPERATION AND MAINTENANCE MANUALS

The Contractor shall prepare and assemble detailed operation and maintenance and repair manuals as described in Division 01.

3.10 TRAINING

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

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

END OF SECTION

SECTION 26 05 00
MISCELLANEOUS ELECTRICAL

PART 1 : GENERAL

1.01 SUMMARY

This Section covers furnishing and installing miscellaneous electrical devices and equipment and other wiring devices indicated on the Drawings.

1.02 REFERENCES

A. All materials and equipment specified herein shall within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.

B. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.

C. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code, N.E.C.

1.03 COORDINATION

A. The Contractor is responsible for coordination of mechanical equipment, fans, louvers, heaters, motors, starters, etc. and the electrical power and control requirements. Provided in this section and other sections of the specifications and Drawings.

B. The Contractor shall provide power and control equipment, wiring, and raceways to meet the requirements of the mechanical equipment supplied.

C. The Contractor shall verify as a minimum:

1. Correct voltage, phase and frequency
2. Correct motor starter type
3. Proper coordination with the controls and control system Integrator

D. The Contractor shall provide all necessary control wiring and components for any special requirements from an equipment manufacturer.

E. Any discrepancies between the electrical and mechanical equipment shall be brought to the immediate attention of the Engineer.

1.04 SUBMITTALS

A. In accordance with the “submittals” requirements in Section 1-06 and Section 26 00 00, submit catalog data showing material information and conformance with specifications. The intended use of each item shall be indicated.

B. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (√) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

C. Provide all electrical information – wire diagrams, terminal information and numbering and electrical / power data.

D. Submit verification that 316 stainless steel hardware will be used as required by this specification.

PART 2 : PRODUCTS

2.01 RACEWAYS

A. GENERAL

1. All wiring shall be installed in raceways.
2. Ground Conductor:
   a. All raceways shall contain a minimum of one continuous copper equipment grounding conductor sized in accordance with the N.E.C.

B. Area Classifications:

1. The following classification of areas shall be used as a reference in determining application of material covered by this Section unless specifically shown otherwise on the Drawings. Areas which fall under two or more of the following classifications shall conform to the minimum requirements of all of the area classifications listed for that area.
2. Hazardous area classifications shall be defined by:
   a. NEC Article 500.
   b. NFPA 820 for all wastewater facilities.

3. Hazardous Areas:
   a. Wet Well and Valve Vault.
      1) Hazardous areas shall have electrical installations which conform to Class and Division as shown on the Drawings or as defined by the NEC and NFPA 820. Provide seal fittings per NEC requirements.
      2) Raceway shall be Aluminum.
      3) Raceway supports such as channel, clamps and brackets shall be 316 stainless steel. Threaded fastening hardware and rods shall be 316 stainless steel.
      4) Equipment and products used shall be provided and installed in conformance to the applicable sections of NEC Chapter 5.
4. Outdoor and Damp Areas:
   a. All outdoor areas.
      1) Raceway shall be Aluminum. Conduit entrances shall be threaded and fittings shall have gasketed covers.
      2) Threaded fastening hardware and rods shall be 316 stainless steel. Raceway supports such as channel, clamps, and brackets shall be 316 stainless steel or aluminum or non-metallic.
      3) Panels and boxes shall be NEMA 3R - aluminum, 316 stainless steel or non-metallic (or as shown on the Drawings). Device boxes shall be cast, copper free aluminum.
5. Corrosive Areas:
   a. Wet well and Valve Vault.
      1) Raceway shall be Aluminum.
      2) Raceway supports such as channel, clamps and brackets shall be 316 stainless steel. Threaded fastening hardware and rods shall be 316 stainless steel.
      3) Enclosures shall be NEMA 4X 316 stainless steel, aluminum or non-metallic (or as shown on the Drawings).

C. Raceway Application:

1. ABOVE GRADE CONDUITS shall meet the requirements of the “area classification” listed above and shall be:
   a. Aluminum for power and control wiring.
   b. Aluminum for signal & communications wiring.

2. CONDUITS BELOW GRADE shall be:
   a. Schedule 40 PVC for power and control wiring.
      1) Sweeps and risers for transition of PVC from below grade to above grade shall be aluminum.
      2) Aluminum for signal and communications wiring.
3. ALL CONNECTIONS TO VIBRATING EQUIPMENT or motors shall be:
   a. Connections to equipment outdoors or in corrosive areas shall be with non metallic liquidtight flexible conduit.

D. Conduit:

1. Nonmetallic Conduit (PVC):
   a. Nonmetallic conduit shall be rigid PVC, Schedule 40 or 80. PVC installed above grade shall be UV resistant schedule 80. Fittings shall be of the same material as the raceway and installed with solvent per the manufacturer's instructions. Conduit, fittings and solvent shall all be manufactured by the same manufacturer.
2. Aluminum Conduit:
   a. Shall be rigid aluminum conduit: ANSI C80.5; aluminum, threaded.

E. Boxes and Fittings:

1. General:
   a. Materials for fittings shall be chosen to satisfy the requirements of - Area Classification described above.
   b. Junction boxes, terminal boxes, device boxes, fixture support boxes, oblong, round and rectangular conduit fittings (condulets) shall be of the same material as required by the Area Classification for the raceway.
   c. Boxes larger than 9”x9” shall be hinged.
   d. Cast fittings and boxes shall be:
      1) Zinc electroplated cast ferrous alloy.
      2) Integrally cast threaded hubs or bosses shall be provided for all conduit entrances and shall provide for full 5 thread contact on tightening. Drilling and threading shall be done before finishing.
      3) The cover plate shall be of similar cast ferrous alloy material and finish. A full body neoprene gasket shall be provided with the cover. 316 stainless steel screws shall be provided for all covers.
   e. All screws, nuts, bolts, and other hardware used with fittings and boxes shall be 316 stainless steel.

F. Hand Holes and Vaults:

1. Handholes and vaults shall be 24” X 36” X 36” deep minimum size or minimum dimensions as shown on Drawings. All handholes and vaults shall be minimum 3000 psi pre-cast, reinforced concrete construction and shall have concrete bottoms with sumps.
2. Walls shall be provided with boxouts with waterstops on all sides of each boxout. Boxouts shall be sized to accommodate the penetrating underground duct banks
3. Covers shall be hinged diamond plate galvanized steel with H20 loading and latch and lifting handles. Covers shall open 180 degrees. Utility Vault 3030-P, 2436-P or accepted equal.
4. Wire Racks – Provide wire racks for all wiring inside handholes and vaults so that all wiring is supported above the bottom of the handhole.
5. Handholes and vaults and covers shall constructed per standards and quality of Utility Vault Company 233-LA, 444 LA or accepted equal. Covers shall be chosen to fit the handhole or vault provided.
6. Provide drain pipe for water tight covers from cover drain to nearest sump, drain, or as recommended by the manufacturer. If no drain area is nearby, provide a 3’ cubic area of drain rock and run cover drains to the area.
7. Wiring of different classes or that must be in separate raceway systems (in accordance with the NEC) in the same handhole shall be separated by continuing raceways inside the handhole and installing a non-metallic NEMA 4X pull box in the handhole.

G. Conduit & Cable Supports:

1. Rivet-type or Zamac fasteners are not allowed. All fasteners between channel, strut, etc. and walls shall be removable with a screwdriver.
2. Support materials in general purpose areas may be hot-dip or electro-galvanized. All support materials used in corrosive areas shall be NEMA 4x Aluminum, 316 stainless steel, or non-metallic.
3. All screws, nuts, bolts and other hardware used with conduit and cable supports shall be 316 stainless steel.

2.02 CONDUCTORS

All conductors shall be stranded copper. Insulation shall be THW, THWN, or THHN, chosen to satisfy environmental conditions. Conductors used for power circuits shall not be smaller than No. 12. Control conductors may be No. 14.

2.03 SHIELDED SIGNAL CABLE

A. Signal conductor cable shall be AWG #16 individually twisted, shielded pairs. BELDEN #8719, or accepted equal. Conductors shall be tinned copper with color coded 90 degrees C PVC insulation and individual conductor jacket of nylon. Shielding shall be aluminum polyester 100% shield coverage with drain wire. The cable shall have an overall PVC jacket. The insulation system shall be rated for 300 volts.

B. For applications where 600 volt insulation is required, use:

1. BELDEN 1120A.
2. #18 TWSP, stranded wire.

C. 600 volt insulated signal wire shall only be used where required by Code.

2.04 CONNECTORS

A. All wiring shall be continuous from point to point – no splices of any kind are allowed. All control and signal wire shall land on numbered terminals.

B. Ideal Industries "Wing Nut" or 3M Company "SCOTCHLOCK" pre-insulated connectors may be used for general purpose lighting and receptacle circuits for splices and taps in conductors No. 10 AWG and smaller. For No. 8 AWG and larger conductors, utilize T&B compression connectors. Compress using recommended die and tools.

C. For connections of wire to cord to removable equipment provided with integral cords (such as floats, transmitters, limit switches, aerators, submersible pump motors, etc.) Provide junction box with terminals and spade/lug type terminations and coat with liquid insulation – Performix Liquid Tape or accepted equal.

D. For connections of wire to cord to Submersible motors of all size wire use a water proof motor stub insulator. Thomas and Betts multi splice insulator MSLT112-4 or accepted equal.

2.05 SPLICE INSULATION

A. Splice insulation shall be equal to the conductor utilized.

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

2.06 MOTOR TERMINAL SPLICE INSULATION

Provide motor terminal splice insulation in the motor connection box that will withstand constant vibration and abrasion without degrading the insulation of the splice. A product shall be used that is specifically designed for the purpose of motor terminations.

2.07 WIRE MARKERS

Field installed wire markers shall be pre-printed, heat shrink type sleeves, Thomas & Betts Type HVM, Tyton Type THS or accepted equal. See paragraph below for marking requirements.

2.08 SWITCHES AND RECEPTACLES

A. Standard wall switches shall be single-pole, or double-pole, three-way, as shown on the Drawings or as required for the application. Switches shall be AC quiet type rated 20 amp, 125/277 volt with screw terminals. Wiring devices shall be ivory colored for general use office areas, and black when installed in mechanical rooms or when mounted on dark walls. Receptacles on emergency or backup power shall be labeled or color coded. ARROW HART, BRYANT, HUBBELL, P&S or accepted equal.

B. Weather proof switches for use in damp, corrosive or outdoor applications shall be:

1. Die cast aluminum housing with lever type switch CROUSE-HINDS, DS185, or;
2. Non metallic, UL marine listed, CARLON, E98TSC or accepted equal.

C. Weather proof receptacles for use in damp, corrosive or outdoor applications shall be:

1. Die cast aluminum with spring and gasketed covers CROUSE-HINDS, WL series, or;
2. Non metallic, CARLON or accepted equal.

D. Provide GFI receptacles where required by the NEC.

E. Per the nameplate requirements, provide circuit and panel data labels on all switches and receptacles and label all light switches with function.

F. Plates:

1. Scope: Provide plate for each wiring device, for each signal or communication outlet.
2. Device plates on flush devices, in general, shall be satin finish 316 stainless steel Sierra 302 316 stainless steel line or accepted equal, modern classic design, corrosion resistant. Special finish plates shall be provided to match special paneled walls as directed by Architect.
3. Device plates for switches and receptacles in outdoor areas shall have weatherproof plates with hinged cover and 316 stainless steel screws. Sierra Electric WP series or accepted equal.
4. Plates on exposed wiring shall be of metal, of the same manufacture as the conduit fittings; specifically suited for device and fitting used.

5. Blank, Bushed or Special Outlet Plates: Provide for all signal communication system outlets as required.

G. Special Accessories:

1. Provide accessories such as junction boxes, outlet boxes, etc. necessary to mount switches and receptacles in a proper and approved method.

2.09 HEATING AND VENTILATING EQUIPMENT

A. Unit heaters:

1. Choose appropriate heater for the voltage and capacity as shown on the Drawings. Heaters shall be resistance type with totally enclosed fan motor. Provide necessary auxiliary control equipment for complete operation as shown on the Drawings. Provide all necessary mounting hardware for installation.
2. Provide separate thermostats for all unit heaters. Provide with local disconnect if required by code. All thermostats shall be heavy duty, industrial grade and shall include setpoint numbers on adjustable dial.
3. Unit heaters shall be provided with integral 24V control transformer. Provide heavy duty magnetic contactors for all 3 phase heaters and for all single phase heaters larger than 5KW.
4. Provide with thermal cutouts for disconnecting power if overheating occurs.
5. GENERAL PURPOSE UNIT HEATERS - Provide unit heaters as shown on the Drawings in rooms without chemical or liquid pumping equipment such as office areas, control rooms, generator rooms, air blower rooms. Unit heaters shall be Chromalox Type LUH or accepted equal. Provide with remote thermostat Chromalox WR-80, WT, WTL chosen for the application or accepted equal.
6. INDUSTRIAL UNIT HEATER - Unit heaters shown installed in damp areas such as pump rooms and vaults shall be corrosion resistant construction, phosphate undercoating and powder coat finish. Size and ratings as shown on the Drawings. Heaters shall be Chromalox Type KUH or accepted equal. Provide with remote thermostat Chromalox type WR-80, or WCRT or accepted equal.

2.10 DRY TYPE TRANSFORMERS

A. Dry type transformers shall be constructed of heavy gauge sheet steel. Coil and terminal chamber shall be constructed with guarded opening for ventilation and convection cooling. Transformer shall be connected for the application. Unless otherwise shown or required for the application, primary coil shall be delta connected, secondary coil wye connected.

B. Separate primary and secondary windings shall have Class H insulation and shall be rated for continuous operation at rated kVA with temperature rise of not over 150 degrees C above a 40 degree C ambient, with a maximum hot spot temperature of 220 degrees C. Windings, core and coil assembly shall be treated and built to resist the effects of dirt and moisture.

C. Unless otherwise noted or shown, transformers shall be provided with a minimum of four full capacity taps, minimum of two 2-1/2 percent above and two 2-1/2 percent below normal (rated) primary voltage.

D. Transformers furnished shall have a continuous rating of not less than the size noted on the Drawings.

E. The secondary neutral terminal on three-phase K-rated transformers shall be sized for 200% of secondary phase current.

F. Provisions for external connections shall be made by means of a terminal board employing lugs compatible for the external conductors to be installed.

G. The core of the transformer shall be grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA, IEEE ANSI standards.

H. Provide grounding per NEC.

I. Provide enclosures per the requirements of the area installed – NEMA 3R for outdoor and damp areas, NEMA 12 for indoor areas.

J. Acceptable manufacturers for dry type transformers shall be General Electric, Cutler Hammer, Square D, Heavy Duty and accepted equals.

2.11 PANELBOARDS

A. Panelboards shall be rated at proper voltage and current for intended use with bus bars of tin plated copper or aluminum. Panels shall have phases, voltage and current ratings as shown on the Drawings. Panels shall have 100 percent neutral, with equipment ground bar, unless noted otherwise. Panelboards shall be dead front.

B. Panels shall have as a minimum the number of circuits shown on the panel schedules on the Drawings.

C. The following interrupting capacity shall be considered minimum. Other ratings shall be as specified on the Drawings.

1. 240V and 208Y/120V – sub-fed Panelboards 10,000 AIC symmetrical
2. 240V and 208Y/120V – Service Panelboards 20,000 AIC symmetrical
3. 480V Panelboards 30,000 AIC symmetrical

D. Provide service entrance rated panelboards where shown on the Drawings or required by the NEC.

E. Provide enclosures per the requirements of the area installed – NEMA 3R for outdoor and damp areas, NEMA 12 for indoor areas or as shown on the Drawings.

F. Mount breakers in all panelboards so that breaker handles operate in a horizontal plane. Circuit breakers shall be bolt-type only. Provide common trip on all multiple pole breakers.

G. Where noted, provide spare breakers, complete for future connection of wiring circuits. Where "Space Only" is indicated for breakers, provide all bussing and breaker mounting hardware in the panelboard; provide steel knockouts in dead front metal closure of unused part of panel. If any steel knockouts are removed, provide breakers in such spaces or approved cover plates. Open spaces are not permitted.

H. Panelboards shall be flush or surface as indicated; tight closing doors without play when latched. Where two cabinets are located adjacent to each other in finished areas, provide matching trim of the same height.

I. Provide cabinets of sufficient dimensions to allow for future expansion and addition of circuit breakers within the panelboards as indicated on Drawings.

J. Provide lock for each cabinet door. All Electrical distribution equipment locks to be keyed identically.

K. Fasten panelboard with machine screws with oval countersunk heads, finish hardware quality, with escutcheons or approved trim clamps. Clamps accessible only when dead front door is open are acceptable. Surface mounted panelboards with fronts greater than 48 inches vertical dimension shall have trim hinged at right side in addition to hinged door over dead front.

L. Provide factory standard lacquer or enamel finish, ASA #49 gray.

M. Provide Surge arrestors, with indicators, where shown on the one-line diagrams to protect against overvoltage transients. JOSLYN J9200 series with protective capacitor GE model 9L18 or accepted equal. Select proper components for the application as shown on the Drawings.

N. Numbering and buss arrangement shall be as shown on the Panel Schedules on the Drawings.

O. Provide a type written circuit directory card for each panelboard with the load name, number, location and kVA.

P. Provide engraved (color layer - engraved through outer layer) plastic name plate with 1/2 inch high characters for panel identification (for panel name); attached with 316 stainless steel screws to each panelboard front. Emergency system - white on red; Normal system - black letters on white. Include voltage, phase and wire (i.e., 208Y/120V, 3 phase, 4 wire) in 3/8 inch characters.

Q. Secure in place with top of cabinet at 6' - 6", unless otherwise noted. Top of cabinet and trim shall be level.

R. For each branch circuit panelboard: Provide neatly type written as-built information for each panelboard by circuit with its proper load designation. Mount the panelboard circuit directory inside the door of each panelboard in a clear plastic sleeve. Provide one spare blank card for each card used.

S. Close all openings in dead front with closures manufactured for the purpose or install spare breakers.

T. SURGE SUPPRESSION:

1. Where surge suppressor (SPD or TVSS) is specified or shown on the Drawings, provide integral surge suppression device with the following minimum characteristics:

   a. Surge Current per phase – 120,000kA

   b. Surge Current L – N 60,000kA

   c. IEEE C3 Wave (10kA) – 9,000

2. Unit shall have overcurrent protection, infrared and thermal detection - Include diagnostic package and direct bus bar connection and 10 year warranty – Cutler Hammer Clipper CPS-S or accepted equal.

2.12 FUSES

A. Fuses shall be of the type and amperage indicated on the Drawings. The voltage rating shall be appropriate for the application indicated. The fuse types indicated on the Drawings imply a certain set of fuse characteristics. No substitutions of fuse types will be allowed without written approval from the Engineer.

B. All fuses used on the project shall be provided with "blown fuse" indicators.

C. Where fuses in motor circuits are indicated but not sized, provide Manufacturer's recommended fuse size based on actual motor installed.

D. Provide in-line or integrally-mounted fuse clips on control power or low-voltage transformer.

E. Provide fuse puller or pullers for fuse sizes used.

F. Provide surface mounted cabinet, sized to store required spare fuses at location coordinated with Owners Representative.

G. Provide a minimum of two spare fuses for each fuse used.

H. Acceptable Manufacturers:

1. BUSSMAN
2. GOULD SHAWMUT
3. LITTLEFUSE
4. RELIANCE

2.13 MOLDED CASE CIRCUIT BREAKERS

A. Molded case circuit breakers shall be quick-make and quick-break type. They shall have wiping type contacts. Each shall be provided with arc chutes and individual trip mechanisms on each pole consisting of both thermal and magnetic trip elements. Two and three pole breakers shall be common trip. All breakers shall be calibrated for operation in an ambient temperature of 40 degrees C. Molded case circuit breakers shall be trip-free. Each breaker shall have trip indication independent of the ON or OFF positions.

B. Breakers shall have lugs UL listed for both copper and aluminum.

C. Circuit breakers shall be capable of accepting the cable shown on the Drawings. Circuit breakers not capable of accepting the cable shown shall not be acceptable.

D. Breakers shall have the interrupting rating and trip rating indicated on the Drawings.

E. All breakers that serve motor loads shall be provided with disconnect handle mechanism to lock out the circuit in the open position

2.14 DISCONNECTS

A. Provide local equipment disconnects only if required by the manufacturer or NEC.

B. Disconnect's rating shall be chosen by the Contractor to meet the requirements of the equipment served.

C. Switch shall be heavy duty type, shall be quick-make quick-break and shall be horsepower rated. Switch shall have blades as required to open all ungrounded conductors and shall be single throw unless noted.

D. Enclosure shall be suitable for location in which mounted.

E. Enclosures located outdoors or in damp or corrosive areas shall be NEMA 4X, aluminum or 316 stainless steel.

F. Fusible disconnects shall be as above with addition of fuse space and clips to accept Class R fuses. Use only where required by equipment manufacturer to meet UL installation requirements.

G. Disconnects for motor loads shall be lockable in the open position.

2.15 MOTORS

A. General

1. Unless specifically excepted, all motors shall be of the "energy efficient" or "energy saver" type which meet the minimum efficiencies required by the Washington State energy codes.

   a. All Motors shall be suitable both electrically and mechanically to drive the connected equipment under any and all modes of operation without exceeding the FLA (Full Load Amps) rating of the motor.

2. All motors shall be suitable for the environment in which they are to be installed. The environment in which motors will be installed in this project will be 100% humidity continuously.

3. Motor voltages shall be chosen to meet the requirements of the electrical system. The Contractor shall choose the motor voltages to meet what is shown on the Drawings.

4. Motor enclosures shall be totally enclosed fan cooled (TEFC) unless otherwise specified or required by the environment installed. Provide explosion proof non-ventilated - (XPNV) or fan cooled (XPFC) motors in hazardous areas.

5. All single-phase motors shall be self-protected. Single phase motors shall be provided with start capacitors if necessary for proper operation of the motor. The start capacitors shall be located within the motor housing.

6. Enclosed Motors: Provide drain plugs for non-explosion proof motors and drain and breather for explosion proof motors.

7. Finish: Provide a prime and final finish of the manufacturer's standard colors.

8. Provide imbedded thermostats for thermal alarm or motor cut out for all motors 40 Hp and above unless otherwise shown.

9. Provide a terminal connection box two sizes larger than normal to allow extra room for motor feeder splices. Refer to Motor Terminal Splice Insulation requirements.

10. Provide NEMA Class B insulation, minimum, with additional nonhygroscopic moisture protection which will maintain a minimum resistance of 1.0 megohms after 168 hours of exposure at 100% humidity.

11. Provide motors with a 1.15 service factor at maximum motor operating load.

B. Submersible Motors:

1. Definite purpose submersible motors shall conform to the following:

   a. Motor shall be designed for service in a liquid temperature of 25 degrees centigrade. Set controls to permit operation only when fully submerged unless specifically rated for non submerged duty.

b. Motor shall have two mechanical seals; the lower one outside the motor and protecting the upper one which shall be in an oil filled chamber.

c. Provide imbedded thermostats for thermal alarm or motor cut-out.

d. Provide water detector probes in seal oil chamber.

e. Provide one or more multiconductor cables of approved construction and suitable length to extend from the motor to the indicated receptacle or junction box. Provide strain relief for the cable.

f. Separate cables shall be provided for power and alarm conductors.

g. Provide control wiring connection diagram and all necessary components, relays, etc. for the required and proper control and shutdown of the motor. Provide descriptive information to the Engineer and System Integrator on the control of the equipment.

2.16 HARDWARE

The Contractor shall provide any necessary hardware for mounting equipment and devices. The mounting hardware shall be made of materials suitable for the environment installed. Provide materials made from aluminum, non-metallic, or 316 stainless steel in outdoor, damp, or corrosive areas.

PART 3 : EXECUTION

3.01 GENERAL

A. Provide services of an authorized representative of manufacturer to visit site of work and inspect, check, adjust if necessary, and approve equipment installation.

B. Assure that equipment manufacturer's representative is present when equipment is placed in operation.

C. Verify that equipment representative revisits job site as often as necessary until all trouble is corrected and equipment installation and operation are satisfactory, in opinion of Engineer.

D. Verify that motor overcurrent protection is in accordance with the N.E.C.

E. Verify the motor protection and control is in accordance with the equipment manufacturers requirements.

3.02 WIRE & RACEWAY SIZING

A. The contractor shall size wire per NEC for the load being served. Raceways shall be sized per NEC for the wire or cables installed. Scheduled raceways and wire sizes are minimum size and contractor shall upsize if required for installation per the NEC.

B. Size pull and terminal boxes per NEC. Pull box sizes, if shown on the Drawings, are minimum size and the contractor shall upsize if required by NEC.

3.03 OUTLETS AND SWITCHES

A. General

1. For all receptacles, switches, and other related devices of the lighting and receptacle system, provide all necessary raceway and wire for a complete installation.
2. Center all outlets with regard to building lines, furring and trim. Symmetrically arrange outlets in the room. Satisfactorily correct outlets improperly located or installed.
3. Set outlets plumb and extend flush outlets to the finished surface of the wall, ceiling or floor without projecting beyond same.
4. Install symmetrically all receptacles, switches and outlets shown on the trim and where necessary, set the long dimension of the plate horizontal or gang in tandem.
5. Outlets in outdoor areas or wet areas shall be GFI – provide GFI outlets in other areas as required by Code.

3.04 RACEWAYS

A. General:

1. Not all conduits/raceways are scheduled. Wire diagrams and oneline diagrams show wiring requirements. Provide all necessary raceways for wiring as shown on the Drawings.
2. For all power and control equipment, provide all necessary raceways and wire per Drawings and specifications even if not specifically shown on the Drawings.
3. Raceway routing shown on Drawings is general in nature, unless otherwise indicated on the Drawings, the Contractor shall be responsible for determining conduit routing that conforms to the installation requirements required by the Drawings and specifications.
4. The number of directional changes of a conduit shall be limited to 270 degrees in any run between pull boxes.
5. Conduit runs shall be limited to a maximum of 400 feet, less 100 feet or fraction thereof, for every 90 degrees of change in direction.
6. In general, conduit inside structures shall be exposed unless otherwise specified or indicated on the Drawings. No conduit shall be exposed in water chambers unless so indicated on the Drawings.
7. Provide raceways/conduits per the conduit and wire schedule and additional as necessary to meet the requirements of the wiring.
8. Scheduled conduit sizes are minimum. Contractor shall upsize conduits if necessary or if required by the NEC.

9. Non scheduled conduits shall be a minimum of ¾” or sized per the NEC for the wiring installed plus 20%.
10. Conduit across structural joints where structural movement is allowed shall have an O-Z "Type DX" or Crouse-Hinds "Type XD," bonded, weathertight expansion and deflection fitting of that conduit size.
11. Separate conduits of different voltages by a minimum of 2” – separate signal wire conduits from all other types of conduits by a minimum of 6”.
12. All conduits shall be a minimum of 3/4".
13. Conduits entering underground structures shall be made water tight – see “handholes and Vaults” for more requirements.

B. Sealing Of Conduit:

1. Conduits passing from a hazardous or corrosive area into a nonhazardous or noncorrosive area, or between Class 1, Division 1 area and Class 1, Division 2 area shall be provided with a sealing fitting which shall be located at the boundary in accordance with NEC.
2. Seal fittings for conduit systems in hazardous atmosphere locations shall be hot-dip galvanized cast ferrous alloy or PVC coated GRC if area is corrosive. Sealing compound shall be hard type, UL listed for explosionproof sealing fittings. Sealing compound shall be nonhardening type for corrosive areas. Seal fitting and sealing compound shall be as manufactured by Appleton, Crouse-Hinds, or accepted equal.

C. Handholes and Vaults:

1. Sizes of handholes and vaults shown on the Drawings are minimum sizes. If space allows the Contractor may upsize the structures for ease of pulling or if required by the NEC.
2. Conduits entering energized equipment shall have both conduit ends sealed with a waterproof duct sealing compound - WATERGUARD Industrial Encapsulant or accepted equal. Where conduits enter through sides of handholes the penetration shall be made watertight.
3. Provide a minimum of 12 inches of ¾ to 1” drainage gravel under entire surface of all vaults and handholes.
4. All wire installed in handholes and vaults shall be neatly bundled and racked to the handhole or vault side walls.
5. Provide welded 316 stainless steel nameplate on each handhole and vault cover with the tag number and contents (480v,120v, power, control, signal, etc.) clearly indicated.
6. Before final inspection, all vaults and handholes shall be cleaned and washed out with high pressure water to remove all dirt and debris and sumps shall be knocked out.
7. Provide drains from water tight lids to nearest sump, wet well, or provide a 3’ cubic drain area filled with drain gravel for draining handhole/vault covers.

8. Conduits entering substructures that contain electrical equipment shall first enter a Non Metallic junction box near the bottom of the box and then continue out of the top of the box to create a water break to stop water from entering electrical equipment – drill a ¼" weep hole in the junction box to drain away water.

3.05 WIRE AND CABLE INSTALLATION

A. Splices in power and control and signal wires or cables is not allowed. All wire transitions shall be done on terminals.

B. Keep all conductors within the allowable tension limits during installation. Lubricants for wire pulling, if used, shall be approved for the insulation and raceway material. Observe cable manufacturer's and industry standard cable bending radius recommendations.

3.06 WIRE AND CABLE TERMINATION

A. General:

1. Power conductors, No. 8 AWG and larger may be terminated directly in box-type lugs.
2. Solid conductors (when allowed for lighting and receptacle circuits) of #10 and #12 may be directly terminated to screw terminals.
3. For any power, control, or signal wire terminating on screw type terminals; provide spade or ring tongue type terminations.
4. Stranded control conductors may be directly terminated in box type terminals at control panels. Insulated terminals shall be used also on all stranded instrumentation wiring.
5. Terminal boxes shall be provided at instrument cable splices. If cable is buried or in raceway below grade at splice, an instrument stand shall be provided as specified with terminal box mounted approximately 3 feet above grade.
6. Special instrumentation cables shall be terminated in accordance with the recommendations of the manufacturer of the equipment and subject to review by the Engineer.
7. No splices shall be used in power, control and/or signal wiring. The wiring shall be continuous from point-to-point. Extending existing cables will not be allowed except where shown on the Drawings.

B. Terminal Marking:

1. All terminals in instrument and relay compartments, motor control centers, in control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment shall have reference number and letter in accordance to the following.
   a. h = Control power hot (usually 120v or 24v)
   b. n = neutral

c. g = ground

d. c = control (use if none of the above letters apply)

e. p = power (usually 480v)

f. s = signal (usually 4-20ma or 1-5v) (use if none of the above letters apply)

g. B = DC + and –

2. PLC input or output (S=slot number and I = card input number: for example slot 3 input 7 = 3-07).

C. Wire Marking:

1. All power and control conductors shall be tagged; including conductors in instrument and relay compartments of motor control centers, in control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment, shall be tagged at each end with legible, permanently coded tight fitting wire-marking sleeve showing the complete wire designation.
2. Wire marking lettering shall be bold and type written.
3. Wiring within a single enclosure shall be marked with the basic wire and terminal number at each end.
4. Control and signal wires that interface to PLC I/O shall be marked so that the number relates to the PLC slot and I/O number – this is the same number as the terminal number.
5. All field wiring shall have wire labels at each end. The labels shall be marked with the output terminal number at the original equipment (control panel, MCP, RCP, LCP or MCC) or remote device terminal # (if applicable).
6. For wire that terminates in at a control panel at both ends or a control panel and an MCC, the priority for the numbering shall be as follows

   a. MCP 2. RCP 3. MCC 4. LCP

END OF SECTION

ATTACHMENT: ELECTRICAL SYSTEM TEST REPORTS

ELECTRICAL SYSTEM TEST REPORT - 600V CABLE

ELECTRICAL SYSTEM
DESCRIPTION DATA

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

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

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

MEASURED CONDITIONS		DATA		
Operating Load Voltage	Volts	Vab_____	Vbc_____	Vca_____
		Van_____	Vbn_____	Vcn_____
Operating Load Feeder Current	Amps	Ia_____	Ib_____	Ic_____
Conductor Insulation Resistance (record the indicated measurement for each of the following circuits:)	Megohms	a-b_____	b-c_____	c-a_____
	Megohms	a-g_____	b-g_____	c-g_____

1. Service Feeder
2. Pump Feeders

MOTOR DATA AND TEST REPORT

EQUIPMENT NAME AND NUMBER: _____

EQUIPMENT SPECIFICATION SECTION: _____

MOTOR STARTER LOCATION _____

CONTRACTORS REPRESENTATIVE _____ DATE _____

MOTOR NAMEPLATE DATA

MFR Name/Model No. _____
Voltage/Phase/HP _____
FLA/LRA _____
Service Factor _____
Efficiency Index (or percent) _____
NEMA Design _____
Code Letter _____
Insulation Type _____
Temperature Rise _____
Ambient Temperature _____
RPM _____
Enclosure _____
Thermal Trip Setting _____
Space HTR: Watts/Volts _____
Other Data _____

MOTOR STARTER INFORMATION
Manufacturer/Type _____
Overload Heater No _____

* RECORDED FULL LOAD DATA	VOLTS	A-G_____	B-G_____	C-G_____
FULL LOAD OPERATING VOLTAGE	VOLTS	A-B_____	B-C_____	C-A_____
FULL LOAD OPERATING CURRENT	AMPS	A_____	B_____	C_____
INSULATION RESISTANCE (deenergized)	MEGOHMS	A-G_____	B-G_____	C-G_____
MOTOR CIRCUIT RESISTANCE	OHMS	A-B_____	B-C_____	C-A_____

* VOLTAGE & CURRENT READINGS SHALL BE TAKEN AT THE CLOSEST ACCESSIBLE POINT TO THE LOAD

END OF SECTION

SECTION 26 05 05
ELECTRICAL DEMOLITION

PART 1 : GENERAL

1.01 SUMMARY

This work shall consist of the removal or modifications and disposal, wholly or in part, of all electrical equipment, conduit and wire as stated or shown on the Drawings or specifications to be removed. This also includes removal of or modifications to electrical equipment associated with structural and mechanical equipment shown to be removed on the Drawings or stated in the specifications.

1.02 PROJECT DESCRIPTION DEMOLITION WORK INCLUDES

A. Removal of the existing pumps, floats and other devices in the wet well and associated wire and exposed conduits.

B. Removal of the existing control panels, motor controls, and associated wire and exposed conduits.

1.03 DISRUPTION OF OPERATIONS

A. All demolition work shall be conducted so that disruption of the pump stations is minimal. Shutdown of equipment must be approved by and performed by the Owner.

B. Any electrical or controls modification or removal work which interrupts any ongoing pump station process or system or is required to be done in a specific sequence to accommodate project scheduling shall be coordinated with the plant operations staff and the Engineer. The Contractor shall submit a work plan for review, coordination, and approval by the Engineer.

1.04 TELEMETRY REPLACEMENT

A. Since the existing telemetry system must remain operational during the entire construction process, the existing telemetry panel will be relocated in an “out of the way place.”

B. If the primary source of power fails, then the telemetry panel will be connected to the backup source and tested. The telemetry panel will only be without power while the Contractor is on site.

C. Once the new control system is operational and accepted by the Owner, then the existing telemetry system can be reinstalled and reconnected to the new system.

1.05 INSPECTION

Existing electrical equipment shall be inspected jointly by the Contractor and Engineer for proper operation and rating of devices installed. Any deficiencies such as corrosion or non-functional devices or incorrect or unacceptable wiring shall be established by the Contractor prior to relocation or modifications. Contractor agrees that the quality of the modified installation will equal or exceed that of the existing installation.

1.06 SUBMITTALS

A. Submittals shall be provided for the work under this section to insure that modification work is fully planned and coordinated with the requirements of the operating the pump stations. Submittals shall conform to the requirements of Section 1-06, and Section 26 00 00.

1. The Contractor shall forward submittals for review for all modification work under this Contract that requires interruption of plant process or control. No work shall be allowed to commence on any of this modification work until submittals are reviewed and approved by the Owner.

2. Submittals required under this section shall include the following information:

   a. A general description of the overall plan to switch over power and control. This description should outline the steps involved in the overall plan, the interruptions to power and control required, the duration of the interruptions, and the steps that will be taken to minimize the duration of the interruptions.

   b. The submittals should indicate the support and assistance required from the plant operations staff where applicable.

   c. The description should include any and all provisions for standby power whether Contractor supplied or existing plant standby power generators will be utilized.

   d. The description should include consideration of the sequence of the modification work under this section with respect to other new or modification work specified elsewhere. The Contractor's plan shall indicate that the work under this section is coordinated with these other requirements. The description of work shall indicate testing requirements where called for under these specifications as part of the sequence of construction.

   e. Any other preparation work required of the Owner in conjunction with the Contractor's work shall be clearly described.

1.07 DISPOSAL OF PRODUCTS OF DEMOLITION

The Contractor shall dispose of all materials associated with demolition and removal, at a site of his choosing. The Contractor shall be responsible for obtaining any and all necessary permits and shall comply with applicable codes, laws, and standards.

PART 2 : PRODUCTS

Not Used.

PART 3 : EXECUTION

3.01 GENERAL DEMOLITION

The Contractor shall conduct all demolition operations to avoid damage to adjacent property and structures. All electrical equipment associated with structural or mechanical equipment shown to be removed on the Drawings shall be removed as part of the demolition of the mechanical or structural equipment.

3.02 WIRE DEMOLITION

All wire associated with equipment to be removed shall be disconnected and removed from the equipment back to the furthest point of connection which does not effect any other equipment operation.

3.03 CONDUIT DEMOLITION

A. All conduit associated with equipment to be removed shall be disconnected and removed from the equipment back to the furthest J-box or panel which will not effect any other equipment. Conduit poured into slabs or wall shown to be abandon shall be cut off at the wall or floor surface and plugged with concrete. Conduit (shown with wire removed only) poured into slabs or walls shall be provided with a pull cord and capped.

B. Conduit removal shall include removal of all supports, boxes, etc. associated with the conduit to be removed which does not effect the operation of any other equipment.

C. If first approved by the Engineer, conduit that is to be demolished may remain if the Contractor can present (to the satisfaction of the Engineer) that the conduit can be used for new wire or equipment to be installed.

3.04 OTHER RELATED EQUIPMENT

All motor starters, switches, control panels, and mounting stands shall be removed unless their removal impacts equipment that is to remain in service or is specifically noted for future service. Conduits where stubbed up to equipment being removed, relocated, or re-circuited and not being reused shall be removed. Other conduits to be removed shall be as noted on the Drawings.

3.05 PANEL DEMOLITION

Panels designated for demolition shall be removed or moved and reconnected for temporarily operation of equipment where necessary.

3.06 MOTOR DEMOLITION

Motors designated for demolition shall be removed or moved and connected for temporarily operation of equipment where necessary. Provide temporary starters and control equipment if necessary for continued operation during construction.

3.07 CONDUIT RELOCATION

Existing conduit which interferes with new equipment shall be rerouted around the new equipment or to the location as shown on the Drawings. Existing wiring may be reused if the length does not require splices, otherwise provide new wire.

3.08 TEMPORARY INTERCONNECTIONS

A. GENERAL:

1. Temporary interconnections shall be provided as required to maintain power, control, and signal during construction which involves demolition of existing raceway systems or modifications to process control. As a minimum requirement, temporary interconnections shall conform to the requirements of NEC Article 305.

B. WIRING METHODS AND MATERIALS:

1. POWER, CONTROL AND SIGNAL (EXCEPT FIBER-OPTIC): Temporary interconnections which extend outdoors or between rooms indoors that are subject to damage shall be made with C-L-X or Teck type armored cable and shall be of construction approved for direct-burial and wet locations. Where required by existing area classifications, cables and termination fittings shall be approved for installation in classified locations.
2. MECHANICAL PROTECTION: Temporary interconnections shall be protected from mechanical damage, particularly where passing through pinch points, where subject to vehicular traffic, or in heavy construction usage areas.

C. REMOVAL OF TEMPORARY INTERCONNECTIONS:

1. All temporary interconnections shall be removed following the testing and acceptance of the permanent connections for any given equipment or system described in the specifications.

3.09 INSTALLATION

All modifications to existing electrical equipment specified in this section shall be performed in strict accordance with the recommendations of the equipment manufacturer. Nothing herein shall be construed to relieve the Contractor of his responsibility for this portion of the work.

3.10 TESTING

After completion of installation, all relocated or modified electrical and controls shall be field tested to demonstrate compliance with the required performance. Testing shall be in accordance with other sections of this specification.

END OF SECTION

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SECTION 26 27 13
UTILITY POWER SERVICE & METERING

PART 1 : GENERAL

1.01 SUMMARY

A. Work consists of modifications to three existing services. The existing service must be maintained for the existing facility operation until the temporary bypass or the new pump station has been accepted.

B. Provide new service work at each of the three pump stations as follows:

1. PS45 – Remove existing service from the station to the utility transformer and provide a new 100 amp, 240V, 3 Phase service to the station; new raceways and wire.
2. PS46 – Remove existing service from the station to the utility transformer and provide a new 100 amp, 240V, 3 Phase service to the station; new raceways and wire.
3. PS47 – Remove existing service from the station to the utility transformer and provide a new 100 amp, 240V, 3 Phase service to the station; new raceways and wire.

1.02 SCHEDULING WORK WITH THE UTILITY COMPANY

A. The Contractor shall be responsible for all scheduling and coordination with the utility company. The Contractor shall coordinate and schedule power outages, power service for operation and construction, and power service as may be required by the facility prior to Certificate of Occupancy.

1. Utiliity Contact:

   Errol Burgos

   Puget Sound Energy

   425-324-5341

   errol.burgos@pse.com

B. The Contractor shall make all necessary applications for service with the utility, and shall notify the owner in writing of any obligations that the owner must fulfill for service to be started, installed, or modified.

1.03 CONTRACTOR/UTILITY INTERFACE RESPONSIBILITIES

A. The requirements shown on the Drawings for power service to the sites are general in nature and the Contractor shall meet all of the serving utilities requirement to deliver a complete electric service.

B. The contractor shall coordinate and provide all required work and equipment to provide service to the sites as required by the serving utility.

C. UTILITY CHARGES

1. All direct serving utility charges for the work will be paid for by the Owner and shall not be included in the Contractor's bid price.
2. The Contractor is required to coordinate work with the power utility and other utilities as necessary for installation of new service and service entrance requirements.
3. Utility charges, including all costs associated with utility meter and/or transformer changes, shall be paid directly by the Owner. Contractor is to submit Utility invoices for such work, without markup, to the Owner.

1.04 QUALITY ASSURANCE

Comply with all serving utility company standards and requirements.

1.05 STANDARDS AND CODES

A. Work involving service installation shall be done in accordance with the serving utility's standards and the National Electric Code.

B. Service equipment shall be listed and labeled by UL as "suitable for use as service equipment."

1.06 SUBMITTALS

A. In conformance with the submittal requirements of Section 1-06 and Section 26 00 00, submit catalog data showing material information and conformance with specifications on the following:

1. Prior to submittal to the Engineer, the Contractor shall submit all equipment and construction details (such as size, mounting height, location of equipment, etc.) to the serving utility for verification of compliance to the utility's requirements.

PART 2 : PRODUCTS

2.01 METER ENCLOSURE

A. Meter enclosure shall be a Circle AW and as required to meet the requirements of the serving utility. Installation shall be in vandal proof NEMA 3R enclosure with a lockable hinged door.

1. Provide a phenolic nameplate on each meter enclosure with the pump station number and site address.

B. Contractor shall coordinate with Utility. on type of metering required and shall provide all labor and material necessary to meet Utility requirements.

C. Provide disconnect ahead of the meter if required by the Utility. Disconnect shall meet Utility standards.

2.02 SURGE ARRESTORS

Provide surge arrestors, with indicators, at each service entrance and where shown on the one-line diagrams to protect against overvoltage transients. JOSLYN J9200 series with protective capacitor GE model 9L18 or accepted equal. Select proper components for the application as shown on the Drawings.

PART 3 : EXECUTION

3.01 GROUND ELECTRODE SYSTEM

A. The grounded conductor and ground bus shall be connected to the grounding electrode system, via the grounding electrode conductor as indicated on system one-line diagram.

B. The system shall be as indicated in Article 250-81 of the National Electrical Code.

3.02 UNDERGROUND SECONDARY SERVICE

Install in accordance with Section 26 05 00.

3.03 UTILITY REQUIREMENT VERIFICATION

A. The contractor shall coordinate and submit all equipment, materials, etc. related to the utility work to the serving utility to verify conformance to the Utility's requirements for service. The contractor shall also submit any plans for the installation of the primary and secondary service for approval by the Utility prior to excavation. Any discrepancy between the Utility requirements and the Contract documents shall be brought to the immediate attention of the Engineer.

B. Contractor shall obtain permit and obtain L&I inspection prior to connection of power.

END OF SECTION

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SECTION 26 32 00
POWER GENERATION

PART 1 : GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes packaged engine-generator sets for standby power supply with the following features:

1. Gas engine.
2. Unit-mounted cooling system.
3. Unit-mounted control and monitoring.
4. Outdoor enclosure.

B. Related Sections include the following:

1. Section 26 36 00 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.03 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

B. LP: Liquid petroleum.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

1.05 INFORMATIONAL SUBMITTALS

A. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces. Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Qualification Data: For installer and manufacturer.

C. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
4. Report of sound generation.
5. Report of exhaust emissions showing compliance with applicable regulations.
6. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

D. Field quality-control test reports.

E. Warranty: Special warranty specified in this Section.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Div 1, include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

1.07 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles (321 km) of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ASME B15.1.

F. Comply with NFPA 37.

G. Comply with NFPA 70.

H. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

I. Comply with UL 2200.

J. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

K. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.09 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Owner no fewer than 7 days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 5 to 40 deg C.
2. Altitude: Sea level to 1000 feet (300 m).
3. High salt-dust content in the air due to sea-spray evaporation.

1.10 COORDINATION

Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: two years from date of Substantial Completion.

1.12 MAINTENANCE SERVICE

Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment. Service shall include complete system inspection and functional review of generator critical components, inspection of battery system, fuel system, engine system, engine lubrication system, intake/exhaust system, generator controls and power connections, and generator and automatic transfer switch operation.

PART 2 : PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer shall be the following, no substitutions.

1. Onan/Cummins Power Generation; Industrial Business Group.

2.02 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

C. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated.
2. Output Connections: Three-phase, four wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.

5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.

6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.

7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.

8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.03 ENGINE

A. Fuel: Natural gas.

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.

2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.

3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Natural Gas: Provide the following:

a. Carburetor.

b. Secondary Gas Regulator.

c. Fuel-Shutoff Solenoid Valve.

d. Flexible Fuel Connector.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Governor: Mechanical.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
4. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
   a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
   b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

I. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

J. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

K. Starting System: 12-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.

6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.

7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.

8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.

    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.

    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.

    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.

    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

    f. Enclosure and Mounting: NEMA 250, Type 1.

2.04 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers. Panel features shall include the following:

1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
2. Current and Potential Transformers: Instrument accuracy class.

C. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.

D. Indicating and Protective Devices and Controls:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Start-stop switch.
11. Overspeed shutdown device.
12. Coolant high-temperature shutdown device.
13. Coolant low-level shutdown device.
14. Oil low-pressure shutdown device.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

F. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals.

G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

2.05 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

2.06 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

H. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

2.07 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, sound-attenuating to levels specified, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure. Enclosure shall be provided by generator manufacturer.

B. Sound attenuation level of complete unit shall be 68 dB(A) or less measured at a distance of 23 feet (7 m). Provide Sound Attenuation Level 2 for the specified manufacturer.

2.08 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolation Pads:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

   a. Ace Mountings Co., Inc.

   b. California Dynamics Corporation.

   c. Isolation Technology, Inc.

   d. Kinetics Noise Control, Inc.

   e. Mason Industries, Inc.

   f. Vibration Eliminator Co., Inc.

   g. Vibration Isolation.

   h. Vibration Mountings & Controls, Inc.

2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.

3. Size: Factory or field cut to match requirements of supported equipment.

4. Pad Material: Oil and water resistant with elastomeric properties.

5. Surface Pattern: Smooth pattern.

B. Restrained Spring Isolators: Freestanding, Steel, Open-Spring Isolators with Vertical-Limit Stop Restraint in Two-Part Telescoping Housing:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Ace Mountings Co., Inc.
   b. California Dynamics Corporation.
   c. Isolation Technology, Inc.
   d. Kinetics Noise Control, Inc.
   e. Mason Industries, Inc.
   f. Vibration Eliminator Co., Inc.
   g. Vibration Isolation.
   h. Vibration Mountings & Controls, Inc.
2. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators. Housings are equipped with non-adjustable snubbers to limit vertical movement.
   a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig (3447 kPa).
   b. Threaded top housing with adjustment bolt and cap screw to fasten and level equipment.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.09 FINISHES

A. Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

B. Outside Generator–Set Enclosure Color:

1. PS 45 – Sandstone.
2. PS 46 – Sandstone.
3. PS 47 – Sandstone.

2.10 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.

PART 3 : EXECUTION

3.01 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete.".

1. Comply with requirements for vibration isolation devices specified in this section.

D. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.03 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect engine exhaust pipe to engine with flexible connector.

D. Connect fuel piping to engines with a gate valve and union and flexible connector.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
   a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
   b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.

c. Verify acceptance of charge for each element of the battery after discharge.

d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.

5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.

E. Coordinate tests with tests for transfer switches and run them concurrently.

F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

J. Remove and replace malfunctioning units and retest as specified above.

K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.05 DEMONSTRATION

Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION

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SECTION 26 36 00
LOAD TRANSFER SWITCHES (ATS)

PART 1 : GENERAL

1.01 SUMMARY

A. This Section provides equipment and installation for load transfer switches automatic transfer switch (ATS).

1. Provide one service entrance rated ATS, one for each site for a total of four switches, as shown on the Drawings.

B. Automatic system load transfer switch shall be supplied as an integral component of the generator set and control system. The switches shall be rated for use as service entrance equipment.

C. Transfer switch shall be well documented with clear wiring diagrams and submittals shall include wiring diagram showing clearly all connections for field wiring with terminal numbering.

D. Provide indicating lights, switches, meters, nameplates, and controls as shown on the Drawings and specified herein.

1.02 REFERENCES

A. All materials and equipment specified herein shall within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label. They shall be listed at the AIC ratings where installed on this project.

B. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.

C. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code, N.E.C.

1.03 SUBMITTALS

A. Submittal documents shall conform to the requirements of Section 1-06 and Section 26 00 00.

B. Submittals shall include the manufacturer’s name, address, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference. Include other information necessary to establish contract compliance of each item proposed to furnish.

C. Each item shall be clearly marked and provided with adequate sales and technical information to clearly show conformance with all aspects of the specification. Packages not provided as described above or largely incomplete shall be returned to the Contractor, without comment.

D. After review by the ENGINEER, the CONTRACTOR shall submit the Shop Drawings of the service section to the utility company for approval prior to fabrication.

1.04 COORDINATION OF EQUIPMENT

A. It is the Contractor's responsibility to coordinate equipment information with the transfer switch manufacturer so that the correct type of equipment is provided and sized properly for the devices being served and to supply such equipment with the proper protection.

B. The Contractor shall verify that all equipment will fit physically within the space allotted per the Drawings. The Contractor shall be responsible to coordinate the features, controls, ratings, etc. of the transfer switch to match the requirements of the generator as described in Section 26 32 00.

1.05 COORDINATION WITH CONTROL SYSTEM

A. The transfer switch manufacturer shall equip the assembly with all appurtenances and accessories (including but not limited to control relays, control contacts, control wiring and terminal strips) as required by the Control System Integrator for interface with the main control system and as required to interface with the generator to provide a totally integrated and operable system.

B. The Control System Integrator, as specified in Section 40 90 00, shall be responsible for coordination and integration of control system with the transfer switch controls.

C. The System Integrator shall direct the transfer switch supplier to provide all intended details of the equipment which may influence or affect the control system. The System Integrator shall determine all requirements for and shall cause integration of the control system and the MCC into a unified operating system. The System Integrator will define all requirements for all interfacing equipment, appurtenances and accessories.

1.06 ACCEPTABLE MANUFACTURERS (AUTOMATIC TRANSFER SWITCHES)

A. Acceptable manufacturers are:

1. Onan Corporation
2. Cutler Hammer/Westinghouse

B. The equipment of the manufacturer selected must fit within the space restrictions as shown on the Drawings.

1.07 O&M DATA

Provide O&M data for all transfer switch and related equipment in accordance to the general requirements in Section 26 00 00.

PART 2 : PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The transfer switches shall be equipped with three poles for normal and emergency service of 480 volts, 60 hertz, 3 phase. The transfer switches shall be rated **100** amperes.

B. The transfer switch shall be mechanically and electrically held and rated to 600 volts for all classes of load and continuous inductive duty.

C. The transfer switch shall conform to UL 1008 Revision 4 provisions for Withstand Current Ratings and Closing Ratings. The ATS shall be rated for a fault current of **22,000** amperes RMS symmetrical minimum, or as shown on the Drawings, whichever is the greater number.

D. The switch shall be capable of enduring 6000 cycles of complete opening and closing at rated current and voltage at a rate of 6 cycles per minute without failure.

E. The automatic transfer switch shall be <u>open transition</u> type with a minimum adjustable pause in neutral capability of 10 seconds, incorporating isolating switching unit mechanisms and overcurrent protection on the utility supply with number of poles as specified on the Drawings.

F. The switch shall be double throw inherently interlocked mechanically and electrically to prevent supplying the load from both sources simultaneously. The operating current shall be obtained from the source to which the load is to be transferred. The transfer mechanism shall be of the double break design with solid silver cadmium surface contacts and individual heat resistant arc chambers.

G. Single break contacts will also be acceptable if arc barriers and magnetic blow out coils are used. The contacts shall be capable of carrying 20 times the continuous rating for interrupting current.

H. All contacts, coils, etc. shall be readily accessible for replacement from front of panel without major disassembly of associated parts.

I. The transfer switch shall have UL 1008 label and listing.

J. Transfer switches used as service entrance shall be labeled for service entrance use.

2.02 AUTOMATIC TRANSFER SWITCHES

A. Service Entrance Rated:

1. Service entrance rated ATS shall be rated for service entrance use and shall have a separate circuit breaker ahead of the switching mechanism as shown on the Drawings.
2. Dual circuit breaker type ATS's will not be allowed.

2.03 CONTROLS HARDWARE

A. All relays shall be provided with indicating LED lights for energized position indication.

B. Time delay relays shall be provided with timing and timed out LED indicators.

C. Panel front Indication lights shall be push-to-test or the switch shall have a push to test feature for indication lights, unless lights are LED.

D. All fuses shall be provided with “blown fuse” indicators.

E. All wiring shall be numbered at each end with basic wiring numbering scheme.

F. All terminals shall be clearly labeled.

G. All internal equipment shall be labeled.

H. All external devices shall be clearly labeled.

I. Provide transfer switch with solid state logic control.

2.04 CONTROLS FEATURES

A. Automatic transfer switches shall include the following accessories:

1. Undervoltage Sensor: Adjustable solid state low voltage sensing relays (pick up at 85 to 98 percent of normal voltage - set at 98%; drop out at 75 to 100 percent - set at 90% of pickup setting). Provide for each phase.
2. Time Delay Start and Stop on Drop Out: Solid state adjustable time delay on start (0 to 15 seconds). Set start delay for 15 seconds. Timer will send start signal to gen. set CP, where louver timer will allow 15 second delay for louvers to open prior to starting genset.
3. Time Delay Stop: Solid state adjustable time delay (0 to 10 minutes) to allow generator cool down after normal power is restored and retransfer occurs. Set at 5 minutes.
4. Time Delay Transfer & Retransfer: Solid state time delay relay adjustable 2 to 120 seconds for transfer to emergency and 0 to 30 minutes for retransfer to normal. Set at 5 minutes for retransfer to normal. Set at 3 seconds for transfer to emergency.
5. With or Without Load Selector Switch: Switch to select exercise with or without load.

6. Normal-Test Switch: Switch such that in the "Normal" mode the transfer switch will operate automatically and in the "Test" mode the generator will start for test purposes. This switch shall work in conjunction with the "With" or "Without" load switch. An extra contact block shall be provided on the normal-test switch for wiring to the Programmable Controller, if one is required.
7. Exercise Clock: An exerciser clock shall be provided which shall be programmable to exercise the generator set. The exerciser shall be adjustable from 15 to 60 minutes once each week. The exercise shall be either with or without load. If power fails during the exercise cycle, the load shall automatically pick up.
8. Programmed Transition: The load transfer control shall be capable of remaining in the neutral position for an adjustable time of 1 to 30 seconds when transferring from one line power source to the other to allow residual voltages to decay before application of the source.
9. Provide the following dry contacts each with terminals for field connection, 2 amp rated at 120 VAC.
    a. Two separate normally open dry auxiliary contacts, one indicating transfer switch is in NORMAL position and one indicating switch is in EMERGENCY position.
    b. Four separate normally open dry contacts two indicating "commercial power / normal power" available and two indicating generator / emergency power available.
    c. Normally open dry contact indicating generator called to run.
10. Position lights for normal and emergency position indication.
11. Two indication lights, one for emergency power available and one for normal power available.
12. Note: provide push to test type lights or push to test feature for all indication lights.

PART 3 : EXECUTION

3.01 GENERAL

A. Transfer switches shall be assembled per the System Integrators and generator manufacturers requirements. The transfer switches shall be delivered to the site ready for external connections to field equipment. Transfer switch shall be leveled and securely anchored to the floor.

B. All assembly and wiring not completed by the manufacturer or Integrator, due to shipping sections, multiple suppliers, etc. shall be the responsibility of the Contractor.

C. Transfer switch shall be installed to meet seismic zone 3 requirements according to the manufacturer’s recommendations.

3.02 TESTING

A. Automatic transfer switches shall be configured by the Contractor and field tested along with the control system and the generator per the requirements in this section and Section 40 90 00. Operation of all the automatic transfer switch functions shall be tested. The testing shall include, but not be limited to, operation of all input and output (I/O) points, control devices for a continuous period of 2 days.

B. Testing and inspection of the automatic transfer switch shall include all components.

C. After completion of initial testing, Contractor shall conduct subsequent testing for inspection by the Engineer. The Contractor shall provide for time, equipment and support for the Engineer to test the automatic transfer switch for a period of up to 1 day. All control functions and all status and alarm monitoring and indication shall be demonstrated under simulated operating conditions.

D. Manual transfer switches shall be tested for correct operation.

3.03 INSTALLATION

A. The transfer switch equipment shall not be shipped to the site until a suitable environment is available for installation of the equipment. A suitable environment for the purposes of this contract for the automatic transfer switch shall be dry, covered and heated to maintain a minimum ambient temperature of 60 degrees F. Prior to shipment of electrical equipment, the Contractor shall contact the Engineer for field verification of a suitable environment.

B. The transfer switch shall be installed in accordance with the installation drawings and instructions. Installation shall be performed by workers who are skilled and experienced in the installation of motor control equipment. It is the Contractor's responsibility to provide sufficient space for the equipment and size of equipment to fit within the space requirements and meet all code requirements.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 : GENERAL

1.01 SUMMARY

This Section includes site clearing, grubbing and stripping, and removal of all trash, shrubs and debris, and other unsuitable material within limits of construction.

1.02 REFERENCES

A. Clearing, grubbing, and stripping shall be in accordance with the provisions of Sections 2-01 and 2-02 of the Standard Specifications, and to requirements specified herein. In the event of conflicts, the more restrictive requirement shall apply.

1. Standard Specifications - 2014 WSDOT Standard Specifications for Road, Bridge, and Municipal Construction.

PART 2 : PRODUCTS

Not Used.

PART 3 : EXECUTION

3.01 PREPARATION

A. Protect existing trees and other vegetation to remain against damage:

1. Do not smother trees by stockpiling construction materials or excavated materials within drip line.
2. Avoid foot or vehicular traffic or parking of vehicles within drip line.
3. Provide temporary protection as required.

B. Repair or replace trees and vegetation not designated for removal that are damaged by construction operations:

1. Repairs to be performed by a qualified tree surgeon.
2. Remove trees which cannot be repaired and restored to full-growth status.
3. Replace with new trees of minimum 4 IN caliper.
4. Owner will obtain authority for removal and alteration work on adjoining property.

3.02 SITE CLEARING

A. Topsoil removal:

1. Strip topsoil to depths encountered.
    a. Remove heavy growths of grass before stripping.
    b. Stop topsoil stripping sufficient distance from trees not designated for removal to prevent damage to main root system.
    c. Separate from underlying subsoil or objectionable material.
2. Stockpile topsoil for subsequent reuse.
    a. Construct storage piles to freely drain surface water.
    b. Seed or cover storage piles to prevent erosion.

B. Clearing and grubbing:

1. Clear from within limits of construction all trees not marked to remain:
    a. Include shrubs, brush, downed timber, rotten wood, heavy growth of grass and weeds, vines, rubbish, structures and debris.
2. Grub (remove) from within limits of construction all stumps, roots, root mats, logs and debris encountered:
    a. Totally grub under areas to be paved.
    b. Grubbing in lawn areas:
        1) In cut areas, totally grub.
        2) In fill areas, where fill is less than 3 FT, totally grub ground.
        3) Where fill is 3 FT or more in depth, stumps may be left no higher than 6 IN above existing ground surface.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not to exceed six (6) inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

C. Disposal of waste materials:

1. Do not burn combustible materials on site.
2. Remove all waste materials from site to an appropriate refuse facility.
3. Remove all vegetative waste from the site to an appropriate composting facility.
4. Do not bury organic matter on site.

3.03 ACCEPTANCE

Upon completion of the site clearing, obtain Engineer's acceptance of the extent of clearing, depth of stripping and rough grade.

END OF SECTION

SECTION 31 23 33
TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Excavation, trenching, backfilling and compacting for all underground utilities.
2. Excavation of earthwork of whatever consistency encountered.
3. Over-excavation of materials as directed by Engineer.
4. Handling of excavated materials and associated cleanup.
5. Providing and placing various fill materials in accordance with the Contract Documents.
6. Compacting existing and imported materials suitable for the contemplated loadings.

1.02 REFERENCES

A. ASTM International (ASTM):

1. C33, Standard Specification for Concrete Aggregates.
2. C131, Test for Resistance to Abrasion of Small-Size Coarse Aggregate by Us of the Los Angeles Machine.
3. C136, Sieve Analysis of Fine and Coarse Aggregates.
4. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
5. D1241, Materials for Soil-Aggregate Subbase, Base, and Surface Courses, with Gradation Requirements modified per this Specification.
6. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
7. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
8. D2922, Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
9. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
10. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

B. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

C. Reference Document: Geotechnical Report, Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design, July 28, 2015, Landau Associates.

1.03 QUALITY ASSURANCE

Registered professional engineer licensed in the State of Washington for design of shoring systems or other excavation safety plans in accordance with Section 31 41 00.

1.04 DEFINITIONS

Excavation: all excavation will be defined as unclassified.

1.05 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.

C. Submit respective pipe or conduit manufacturer's data regarding bedding methods of installation and general recommendations.

D. Mix design for controlled density fill (CDF) and Cellular Concrete Backfill.

E. Test reports:

1. Submit sieve analysis reports on all granular materials in accordance with ASTM C136.
2. Submit maximum laboratory density test data (maximum modified proctor) in accordance with ASTM D1557 on all materials subject to compaction testing.
3. If the source or quality of any materials changes during construction, the Contractor shall furnish additional test reports to the Owner for review and acceptance prior to the use of the different material.

F. Informational submittals for Excavation Support Systems: see Section 31 41 00.

G. See Section 31 23 43 for dewatering plan requirements.

1.06 PROJECT CONDITIONS

A. Avoid overloading or surcharging a sufficient distance back from edge of excavation to prevent slides or caving:

1. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property owners.

B. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.

C. Protect and maintain bench marks, monuments or other established points and reference points and if disturbed or destroyed, replace items in accordance with WAC 332-120 to full satisfaction of Owner and controlling agency.

D. Verify location of existing underground utilities.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Trench Backfill:

1. Bank Run Gravel for Trench Backfill: in accordance with Section 9-03.19 of the Standard Specifications. During wet weather construction, the amount of fines (material passing a U.S. No. 200 sieve) shall not exceed 5 percent by dry weight, based on a wet sieve analysis of that portion passing the ¾-inch sieve.

B. Pipe Zone Bedding:

1. Natural Gas and Potable Water:

   a. Clean sand.

2. All Other Utilities:

   a. Gravel Backfill for Pipe Zone Bedding: in accordance with Section 9-03.12(3) of the Standard Specifications. During wet weather construction, the amount of fines (material passing a U.S. No. 200 sieve) shall not exceed 5 percent by dry weight, based on a wet sieve analysis of that portion passing the ¾-inch sieve.

C. Foundation Material:

1. If peat is encountered:

   a. Cellular Concrete Backfill as specified in Section 03 31 16.

2. All other unsuitable materials:

   a. Foundation Material, Class B: in accordance with Section 9-03.17 of the Standard Specifications.

PART 3 : EXECUTION

3.01 GENERAL

Remove and dispose of unsuitable materials to site provided by Contractor.

3.02 EXCAVATION

A. Remove rock excavation, clay, silt, gravel, hard pan, loose shale, and loose stone as shown on Drawings or as directed by Engineer.

B. Excavation for appurtenances:

1. 12 IN (minimum) clear distance between outer surface and embankment.
2. See Specification Section 31 23 43 for applicable requirements.

C. Groundwater dewatering shall conform to Section 31 23 43.

D. Trench excavation:

1. Excavate trenches to depth shown on Drawings and as necessary to accommodate work.
2. Support existing utility lines where proposed work crosses at a lower elevation.
3. Stabilize excavation to prevent undermining of existing utility.
4. Open trench outside buildings, units, and structures:
   a. No more than the distance between two manholes, structures, units, or 300 LF, whichever is less.
   b. Field adjust limitations as weather conditions dictate.
   c. All trenches shall be backfilled or covered with sheeting prior to end of each day's work.
5. Trenching within buildings, units, or structures:
   a. No more than 100 LF at any one time.
6. Observe the following trenching criteria:
   a. Excavate width to accommodate free working space.
   b. Maximum trench width at top of pipe or conduit may not exceed outside diameter of utility service by more than the dimensions shown on the Drawings.
   c. Cut trench walls vertically from bottom of trench to 1 FT above top of pipe, conduit, or utility service at a minimum.
   d. Keep trenches free of surface water runoff.

E. Trenching for electrical installations:

1. Observe the preceding Trench Excavation paragraph in PART 3 of this Section.
2. Modify for electrical installations as follows:
   a. Open no more than 600 LF of trench in exterior locations for trenches more than 12 IN but not more than 30 IN wide.

b. Any length of trench may be opened in exterior locations for trenches which are 12 IN wide or less.

c. Do not over excavate trench without prior approval by the Engineer.

d. Cut trenches for electrical runs with minimum 30 IN cover, unless otherwise specified or shown on Drawings.

e. See Division 26 for additional requirements.

F. Flowable fill or CDF:

1. CDF shall be:

a. Discharged from a mixer by any means acceptable to the Engineer into the area to be filled.

b. Placed in 4 FT maximum lifts to the elevations indicated:

1) Allow 12 HR set-up time before placing next lift or as approved by the Engineer.

2) Contractor shall place CDF lifts in such a manner as to prevent flotation of the pipe.

2. CDF shall not be placed on frozen ground.

3. Subgrade on which CDF is placed shall be free of disturbed or softened material and water.

4. Conform to appropriate requirements of Section 31 23 43.

5. CDF batching, mixing, and placing may be started if weather conditions are favorable, and the air temperature is 34 DegF and rising.

6. At the time of placement, CDF must have a temperature of at least 40 DegF.

7. Mixing and placing shall stop when the air temperature is 38 DegF or less and falling.

8. Each filling stage shall be as continuous an operation as is practicable.

9. Contractor shall prevent traffic contact with CDF for at least 24 HRS after placement or until CDF is hard enough to prevent rutting by construction equipment.

10. CDF shall not be placed until water has been controlled or groundwater level has been lowered in accordance with the requirements of groundwater dewatering in PART 3 of this Section.

3.03 PREPARATION OF FOUNDATION FOR PIPE LAYING

A. Over-excavation:

1. If peat is encountered, pipe foundation shall be overexcavated and replaced with 2 feet of Cellular Concrete Backfill as specified in Section 03 31 16.

2. All other unsuitable foundation material shall be overexcavated, backfilled as specified and compacted to 90 percent of maximum dry density per ASTM D1557.

B. Rock excavation:

1. Excavate minimum of 6 IN below bottom exterior surface of the pipe or conduit.
2. Form bell holes in trench bottom.

3.04 BACKFILLING METHODS

A. Carefully compacted Trench Backfill and Pipe Zone Bedding materials. Furnish where indicated on Drawings, specified for trench embedment conditions and for compacted backfill conditions up to 12 IN above top of pipe or conduit:

1. Comply with the following:
   a. Place backfill in lifts not exceeding 6 IN (compacted thickness).
   b. Hand place, shovel slice, and pneumatically tamp all carefully compacted backfill around the haunches of the pipe.
   c. Observe specific manufacturer's recommendations regarding backfilling and compaction.
   d. Compact each lift to specified requirements.

B. Trench Backfill:

1. Perform in accordance with the following:
   a. Place backfill in lift thicknesses capable of being compacted to densities specified. Maximum lift thickness shall be 12 IN (compacted thickness) provided Contractor sufficiently demonstrates his means and methods are capable of obtaining the required compaction. Otherwise, maximum lift thickness shall be 6 IN (compacted thickness) at the discretion of the Engineer.
   b. Observe specific manufacturer's recommendations regarding backfilling and compaction.
   c. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.
   d. Legally dispose of all excavated material that is not reused as backfill.

C. Backfill at utility crossings:

1. When a new utility crosses under an existing utility, backfill at least the final 12-inches of trench beneath the invert of the existing utility with CDF to provide a uniform bedding for the existing utility.
2. Provide forms to control quantity of CDF that is used as backfill. Remove forms after CDF has set sufficiently to stand on its own without the forms.

3. Allow CDF to set sufficiently to support the weight and compaction efforts of the remaining backfill placing and compacting the remaining backfill material.

D. Water flushing for consolidation is not permitted.

E. Backfilling for electrical installations:

1. Observe the preceding Carefully Compacted Backfill paragraph or Trench Backfill paragraph in PART 3 of this Section or when approved by the Engineer.
2. Modify for electrical installation as follows:
   a. Observe notes and details on electrical drawings for fill in immediate vicinity of direct burial cables.

3.05 COMPACTION

A. General:

1. Place and assure bedding, backfill, and fill materials achieve an equal or higher degree of compaction than undisturbed materials adjacent to the work.
2. In no case shall degree of compaction below minimum compactions specified be accepted.

B. Compaction requirements:

1. Unless noted otherwise on Drawings or more stringently by other Specification sections, comply with following minimum trench compaction criteria:
   a. Pipe Zone Bedding:

LOCATION	COMPACTION DENSITY
All locations	90 percent of maximum dry density by ASTM D1557

   b. Trench Backfill:

LOCATION	COMPACTION DENSITY
Under pavements, roadways, surfaces, structures, sidewalks within highway right-of-ways	95 percent of maximum dry density by ASTM D1557
Under turfed, sodded, plant seeded, nontraffic areas	90 percent of maximum dry density by ASTM D1557

3.06 FIELD QUALITY CONTROL

A. Testing: Owner has retained a testing laboratory to perform the soils testing. Contractor shall:

1. Assure Owner has immediate access for testing of all soils related work.
2. Ensure excavations are safe for testing personnel.
3. Pay for all costs associated with retesting associated with "Failing" tests.

END OF SECTION

SECTION 31 23 43
EARTHWORK

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Structure excavation and backfilling necessary for the construction of all structures associated with the project, except linear utility trenching, which is addressed in Section 31 23 33.
2. Excavation of earthwork of whatever consistency encountered.
3. Over-excavation of materials as directed by Engineer.
4. Handling of excavated materials and associated cleanup.
5. Providing and placing various fill materials in accordance with the Contract Documents.
6. Compacting existing and imported materials suitable for the contemplated loadings.
7. Foundation requirements for roadways, parking areas, and other asphalt-surfaced areas are addressed in Section 32 12 16.

1.02 REFERENCES

A. ASTM International (ASTM):

1. C33, Standard Specification for Concrete Aggregates.
2. C131, Test for Resistance to Abrasion of Small-Size Coarse Aggregate by Us of the Los Angeles Machine.
3. C136, Sieve Analysis of Fine and Coarse Aggregates.
4. D1241, Materials for Soil-Aggregate Subbase, Base, and Surface Courses, with Gradation Requirements modified per this Specification.
5. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3(2,700 kN-m/m)).
6. D2922, Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
7. D3786, Standard Test Method for Bursting Strength of Textile Fabrics--Diaphragm Bursting Strength Tester Method.
8. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
9. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

10. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

B. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

C. Reference Document: Geotechnical Report, Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design, July 28, 2015, Landau Associates.

1.03 QUALITY ASSURANCE

Registered professional engineer licensed in the State of Washington for design of shoring systems or other excavation safety plans in accordance with Section 31 41 00.

1.04 DEFINITIONS

Excavation: All excavation will be defined as unclassified.

1.05 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.

C. Certifications.

D. Test reports:

1. Sieve analysis for all borrow materials in accordance with ASTM C136.
2. Laboratory density test data (maximum modified proctor) in accordance with ASTM D1557 on all materials subject to compaction testing.
3. Material source data.
4. If the source or quality of any materials changes during construction, the Contractor shall furnish additional test reports to the Owner for review and acceptance prior to the use of the different material.

E. At least 20 Working Days before dewatering is started, the Contractor shall submit a Construction Dewatering Plan to the Engineer. The Dewatering Plan shall include:

1. Details regarding method, installation, and construction of the dewatering system including:
   a. Numbers and types of equipment.
   b. Soil permeability.

c. Anticipated and potential effects on adjacent structures and properties.

d. Depth, locations, and conveyance capacity of equipment.

e. Water discharge locations.

f. Necessary permits and requirements for water discharge.

g. An estimate of advance time to dewater the excavation prior to work in the excavation when necessary.

h. Such other information to verify acceptable control and performance.

2. The Dewatering Plan shall be prepared by a licensed professional hydrogeologist or engineer, and shall be reviewed by Engineer before Contractor begins excavation.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Structural Backfill:

1. As indicated on the Drawings.

a. Select Borrow: in accordance with Section 9-03.14(2) of the Standard Specifications. During wet weather construction, the amount of fines (material passing a U.S. No. 200 sieve) shall not exceed 5 percent by dry weight, based on a wet sieve analysis of that portion passing the ¾-inch sieve.

b. Cellular Concrete Backfill as specified in Section 03 31 16.

B. Foundation Material:

1. As indicated on the Drawings.

a. Foundation Material, Class A: in accordance with Section 9-03.17 of the Standard Specifications.

b. Cellular Concrete Backfill as specified in Section 03 31 16.

C.

C. Crushed Surfacing Base Course (CSBC): in accordance with Section 9-03.9(3) of the Standard Specifications.

D. Crushed Surfacing Top Course (CSTC): in accordance with Section 9-03.9(3) of the Standard Specifications.

E. Geotextile Filter Fabric:

1. Nonwoven type.

2. Equivalent opening size: 50-100 (U.S. Standard Sieve).

3. Permeability coefficient (cm/second): 0.07 minimum, 0.30 maximum.

4. Grab strength: 90 LBS minimum in either direction in accordance with ASTM D4632 requirements.
5. Mullen burst strength: 125 psi minimum in accordance with ASTM D3786 requirements.

PART 3 : EXECUTION

3.01 PROTECTION

A. Protect existing surface and subsurface features on-site and adjacent to site as follows:

1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing items indicated to remain in place.
2. Protect and maintain bench marks, monuments or other established reference points and property corners:
   a. If disturbed or destroyed, replace in accordance with WAC 332-120 at own expense to full satisfaction of Owner and controlling agency.
3. Verify location of utilities:
   a. Omission or inclusion of utility items does not constitute nonexistence or definite location.
   b. Secure and examine local utility records for location data.
   c. Take necessary precautions to protect existing utilities from damage due to any construction activity. Service lines from the main utility may not be shown on the Drawings. Contractor shall anticipate the need to work around these service lines.
   d. Repair damages to utility items at own expense.
   e. In case of damage, notify Engineer and affected utility company at once so that required protective measures may be taken.
4. Maintain free of damage, existing sidewalks, structures, and pavement, not indicated to be removed:
   a. Any item known or unknown or not properly located that is inadvertently damaged shall be repaired to original condition.
   b. All repairs to be made and paid for by Contractor.
5. Provide full access to public and private premises, fire hydrants, street crossings, sidewalks and other points as designated by Owner to prevent interruption of travel.
6. Maintain stockpiles and excavations in such a manner to prevent inconvenience or damage to structures on-site or on adjoining property.
7. Avoid surcharge or excavation procedures which can result in heaving, caving, or slides.

B. Salvageable items: carefully remove items to be salvaged, and store on Owner's premises unless otherwise directed.

C. Dispose of waste materials, legally, off site:

1. Burning, as a means of waste disposal, is not permitted.

3.02 SITE EXCAVATION AND GRADING

A. The work includes all operations in connection with excavation, borrow, construction of fills and embankments, rough grading, and disposal of excess materials in connection with the preparation of the site(s) for construction of the proposed facilities.

B. Excavation and grading:

1. Perform as required by the Drawings.
2. Drawings may indicate both existing grade and finished grade required for construction of Project:
   a. Stake all units, structures, piping, roads, parking areas and walks and establish their elevations.
   b. Perform other layout work required.
   c. Replace property corner markers to original location if disturbed or destroyed.
3. Preparation of ground surface for embankments or fills:
   a. Before fill is started, scarify to a minimum depth of 6 IN in all proposed embankment and fill areas.
   b. Where ground surface is steeper than one vertical to four horizontal, plow surface in a manner to bench and break up surface so that fill material will bind with existing surface.
4. Protection of finish grade:
   a. During construction, shape and drain embankment and excavations.
   b. Maintain ditches and drains to provide drainage at all times.
   c. Protect graded areas against action of elements prior to acceptance of work.
   d. Reestablish grade where settlement or erosion occurs.

C. Borrow:

1. Provide necessary amount of approved fill compacted to density at least equal to that indicated in this Section.
2. Include cost of all borrow material in original proposal.
3. Fill material to be approved by Engineer prior to placement.

D. Construct embankments and fills as required by the Drawings:

1. Construct embankments and fills at locations and to lines of grade indicated:

a. Completed fill shall correspond to shape of typical cross section or contour indicated regardless of method used to show shape, size, and extent of line and grade of completed work.

2. Provide approved fill material which is free from roots, organic matter, trash, frozen material, and stones having maximum dimension greater than 6 IN:

   a. Ensure that stones larger than 4 IN are not placed in upper 6 IN of fill or embankment.

   b. Do not place material in layers greater than 8 IN loose thickness.

   c. Place layers horizontally and compact each layer prior to placing additional fill.

3. Compact by sheepsfoot, pneumatic rollers, vibrators, or by other equipment as required to obtain specified density:

   a. Control moisture for each layer necessary to meet requirements of compaction.

3.03 USE OF EXPLOSIVES

Blasting with any type of explosive is prohibited.

3.04 FIELD QUALITY CONTROL

A. The Owner will retain a qualified independent testing laboratory to perform the laboratory and field tests.

B. Do not include in bid price the cost of inspection services indicated herein as being performed by the independent testing laboratory.

C. Moisture density relations, to be established by the independent testing laboratory, are required for all materials to be compacted.

D. Extent of compaction testing will be as necessary to assure compliance with specifications.

E. Give minimum of 24 HR advance notice to Engineer when ready for compaction or subgrade testing and inspection.

F. Should any compaction density test or subgrade inspection fail to meet specification requirements, perform corrective work as necessary.

G. Pay for all costs associated with corrective work and retesting resulting from failing compaction density tests.

3.05 COMPACTION DENSITY REQUIREMENTS

A. Obtain approval from Engineer with regard to suitability of soils and acceptable subgrade prior to subsequent operations.

B. Provide dewatering system necessary to successfully complete excavation, compaction and construction requirements.

C. Remove frozen, loose, wet, or soft material and replace with approved material as directed by Engineer.

D. Stabilize subgrade with well graded granular materials as directed by Engineer.

E. Assure by results of testing that compaction densities comply with the following requirements:

1. Sitework:

LOCATION	COMPACTION DENSITY
Under Paved Areas, Sidewalks and Piping:	95 percent per ASTM D1557
Unpaved Areas	90 percent per ASTM D1557

2. Structures:

LOCATION	COMPACTION DENSITY
Inside of structures under foundations, under equipment support pads, under slabs-on-grade and scarified existing subgrade under fill material	95 percent per ASTM D1557
Outside structures next to walls, piers, columns and any other structure exterior member	90 percent per ASTM D1557

3. Specific areas:

LOCATION	COMPACTION DENSITY
Outside structures under equipment support foundations	95 percent per ASTM D1557

3.06 EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES

A. General:

1. In general, work includes, but is not necessarily limited to, excavation for structures and retaining walls, removal of underground obstructions and undesirable material, furnishing and placing fill and backfill, and compaction of subgrade and backfill.

2. Obtain fill and backfill material necessary to produce grades required:

a. Materials and source to be approved by Engineer.

3. In this Section, the word "foundations" includes footings, base slabs, foundation walls, mat foundations, grade beams, piers and any other support placed directly on soil.

4. In the paragraphs of this Section, the word "soil" also includes any type of rock subgrade that may be present at or below existing subgrade levels.

B. Excavation requirements for structures:

1. General:

a. Do not commence excavation for foundations for structures until Engineer approves:

1) The removal of topsoil and other unsuitable and undesirable material from existing subgrade.

2) Density and moisture content of site area compacted fill material meets requirements of specifications.

3) Site surcharge or mass fill material can be removed from entire construction site or portion thereof.

4) Surcharge or mass fill material has been removed from construction area or portions thereof.

b. Engineer grants approval to begin excavations.

2. Dimensions:

a. Excavate to elevations and dimensions indicated or specified.

b. Allow additional space as required for construction operations and inspection of foundations.

3. Removal of obstructions and undesirable materials in excavation includes, but is not necessarily limited to, removal of old foundations, existing construction, unsuitable subgrade soils, expansive type soils, and any other materials which may be concealed beneath present grade, as required to execute work indicated on Drawings:

a. If undesirable material and obstructions are encountered during excavation, remove material and replace as directed by Engineer.

4. Level off bottoms of excavations to receive foundations, floor slabs, equipment support pads, or compacted fill:

a. Remove loose materials and bring excavations into approved condition to receive concrete or fill material.

b. Where compacted fill material must be placed to bring subgrade elevation up to underside of construction, compact existing subgrade to density stated in this Section before fill material is placed thereon.

c. Do not carry excavations lower than shown for foundations except as directed by Engineer.

d. If any part of excavations is carried below required depth without authorization, maintain excavation and start foundation from excavated level with concrete of same strength as required for superimposed foundation, and no extra compensation will be made to Contractor therefore.

5. Make excavations large enough for working space, forms, dampproofing, waterproofing, and inspection.

6. Notify Engineer as soon as excavation is completed in order that subgrades may be inspected:

   a. Do not commence further construction until subgrade under compacted fill material, under foundations, under floor slabs-on-grade, under equipment support pads, and under retaining wall footings has been inspected and approved by the Engineer as being free of undesirable material, being of compaction density required by this specification, and being capable of supporting the allowable foundation design bearing pressures and superimposed foundation, fill, and building loads to be placed thereon.

   b. Engineer shall be given the opportunity to inspect subgrade below fill material both prior to and after subgrade compaction.

   c. Place fill material, foundations, retaining wall footings, floor slabs-on-grade, and equipment support pads as soon as weather conditions permit after excavation is completed, inspected, and approved and after forms and reinforcing are inspected and approved.

   d. Before concrete or fill material is placed, protect approved subgrade from becoming loose, wet, frozen, or soft due to weather, construction operations, or other reasons.

7. Dewatering:

   a. Refer to Geotechnical Report for Construction Dewatering considerations and on-site soils information. <u>In order to limit potential settlement associated with dewatering peat soils, the contractor shall assume a maximum tolerable lowering of the site groundwater table of 1 foot, measured as a radial distance of 30 feet from the excavation limits, or the distance to any existing residential structure, whichever is less.</u>

   b. The Contractor is fully responsible for controlling groundwater.

   c. Excavations shall be kept free of water as necessary to advance the project and maintain safe working conditions.

   d. The Contractor shall control surface run-off so as to prevent entry or collection of water in excavations.

   e. The control of groundwater shall prevent softening of the bottom of excavations, or formations of “quick” or heaving conditions, or “boils”.

   f. Dewatering systems shall be designed and operated so as to prevent any removal or flowing of native soils or previously placed fill soils.

g. In the event the subgrade is compromised as a result of the Contractor's dewatering methods, the Contractor shall be fully responsible for restoring the integrity of the subgrade to the satisfaction of the Engineer.

h. Disposal of the water shall not cause injury to public or private property, or nuisance to the public, or degradation of the natural or built environment.

i. Sufficient pumping and power equipment in good working condition shall be available at all times for all emergencies, including power outage, and competent personnel shall be available at all times for the operation of the dewatering system.

j. Water discharge locations shall comply with required permits from the Kitsap County, other local jurisdictions, State and Federal agencies as appropriate.

k. The Contractor shall discharge dewatering water in accordance with the terms of the Construction Stormwater General Permit and any other applicable project permits. No sediment shall present in the discharge water and the discharge volume/rate shall be within the permit's allowable capacity. All sediment removal measures shall be at the Contractor's expense.

l. If sediment laden water is being discharged, the Contractor shall immediately cease dewatering discharge upon notification by the County or Engineer. The Contractor shall anticipate that the dewatering discharge may have to be discontinued for a period of time, especially during wet weather conditions. No claim may be made if the conditions require that the dewatering discharge be temporarily discontinued.

m. The Contractor shall do whatever is necessary to eliminate or minimize sediment transport during dewatering operations. If sediments or solids are present in the dewatering water, the Contractor shall employ best management practices to remove settleable and suspended solids as required to meet permit or water quality requirements.

n. The dewatering system shall be designed to prevent loss of foundation support to adjacent structure, underground installation, improvement, or the sides of an excavation. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not drawn down to the extent that would damage or endanger adjacent structure, underground installation, sidewalk, pavement, other improvement, or property. <u>The contractor shall assume a maximum tolerable lowering of the site groundwater table of 1 foot, measured as a radial distance of 30 feet from the excavation limits, or the distance to any existing residential structure, whichever is less.</u>

o. The groundwater table shall be lowered to a minimum of 2 feet below the bottom of any excavation.

p. The return of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils and supported soils, prevent disturbance of compacted bedding and backfill, and prevent flotation or movement of structures and utilities.

q. All costs associated with dewatering excavations and controlling groundwater shall be included in and paid under bid item “Dewatering” for each of the respective bid schedules.

r. Keep dewatering system in operation until dead load of structure exceeds possible buoyant uplift force on structure.

8. Subgrade stabilization:

a. If subgrade under foundations, fill material, floor slabs-on-grade, or equipment support pads is in a frozen, loose, wet, or soft condition before construction is placed thereon, remove frozen, loose, wet, or soft material and replace with approved Foundation Material as directed by Engineer.

b. Provide compaction density of replacement material as stated in this Section.

c. Method of stabilization shall be performed as directed by Engineer.

d. Do not place further construction on the repaired subgrades, until the subgrades have been approved by the Engineer.

9. Do not place floor slabs-on-grade including equipment support pads until subgrade below has been approved, piping has been tested and approved, reinforcement placement has been approved, and Contractor receives approval to commence slab construction.

a. Do not place building floor slabs-on-grade including equipment support pads when temperature of air surrounding the slab and pads is or is expected to be below 40 DegF until structure is completed and heated to a temperature of at least 50 DegF.

10. Protection of structures:

a. Prevent new and existing structures from becoming damaged due to construction operations or other reasons. See Sections 02 22 26, 02 22 29, and 02 22 30 for construction noise, vibration, and settlement monitoring and control requirements.

b. Prevent subgrade under new and existing foundations from becoming wet and undermined during construction due to presence of surface or subsurface water or due to construction operations.

11. Shoring:

a. Provide Excavation Support Systems in accordance with Section 31 41 00.

b. Shore, sheet pile, slope, or brace excavations as required to prevent them from collapsing.

c. Remove shoring as backfilling progresses but only when banks are stable and safe from caving or collapse.

12. Drainage:

a. Control grading around structures so that ground is pitched to prevent water from running into excavated areas or damaging structures.

b. Maintain excavations free of water where foundations, floor slabs, equipment support pads or fill material are to be placed.

c. Provide pumping required to keep excavated spaces clear of water during construction.

d. Should any water be encountered in the excavation, notify Engineer.

e. Provide free discharge of water by trenches, pumps, wells, well points, or other means as necessary and drain to point of disposal that will not damage existing or new construction or interfere with construction operations.

13. Frost protection:

a. Do not place foundations, slabs-on-grade, equipment support pads, or fill material on frozen ground.

b. When freezing temperatures may be expected, do not excavate to full depth indicated, unless foundations, floor slabs, equipment support pads, or fill material can be placed immediately after excavation has been completed and approved.

c. Protect excavation from frost if placing of concrete or fill is delayed.

d. Where a concrete slab is a base slab-on-grade located under and within a structure that will not be heated, protect subgrade under the slab from becoming frozen until final acceptance of the Project by the Owner.

e. Protect subgrade under foundations of a structure from becoming frozen until structure is completed and heated to a temperature of at least 50 DegF.

C. Fill and backfill inside of structure and below foundations, base slabs, floor slabs, equipment support pads and piping:

1. General:

a. Subgrade to receive fill or backfill shall be free of undesirable material as determined by Engineer and compacted to density specified herein.

b. Surface may be stepped by at not more than 12 IN per step or may be sloped at not more than 2 percent.

c. Do not place any fill or backfill material until subgrade under fill or backfill has been inspected and approved by Engineer as being free of undesirable material and compacted to specified density.

2. Obtain approval of fill and backfill material and source from Engineer prior to placing the material.

3. Granular fill under floor slabs-on-grade: Place all floor slabs-on-grade on a minimum of 6 IN of granular fill unless otherwise indicated.

4. Fill and backfill placement:

a. Prior to placing fill and backfill material, optimum moisture and maximum density properties for proposed material shall be obtained from Engineer.

b. Place fill and backfill material in 6 IN maximum compacted thickness lifts as necessary to obtain required compaction density. 12 IN compacted thickness lifts may be used if Contractor proves the required compaction density is being obtained.

c. Compact material by means of equipment of sufficient size and proper type to obtain specified density.

d. Use hand operated equipment for filling and backfilling next to walls.

e. Do not place fill and backfill when the temperature is less than 40 DegF and when subgrade to receive fill and backfill material is frozen, wet, loose, or soft.

f. Use vibratory equipment to compact granular material; do not use water.

5. Where fill material is required below foundations, place fill material, conforming to the required density and moisture content, outside the exterior limits of foundations located around perimeter of structure as shown on the Drawings or the following horizontal distance whichever is greater:

a. As required to provide fill material to indicated finished grade.

b. 5 FT.

c. Distance equal to depth of compacted fill below bottom of foundations.

d. As directed by Engineer.

D. Filling and backfilling outside of structures.

1. This paragraph of this Section applies to fill and backfill placed outside of structures above bottom level of both foundations and piping but not under paving.

2. Provide material as approved by Engineer for filling and backfilling outside of structures.

3. Fill and backfill placement:

   a. Prior to placing fill and backfill material, obtain optimum moisture and maximum density properties for proposed material from Engineer.

   b. Place fill and backfill material in 6 IN compacted thickness lifts as necessary to obtain required compaction density. 12 IN compacted thickness lifts may be used if Contractor proves the required compaction density is being obtained.

   c. Compact material with equipment of proper type and size to obtain density specified.

   d. Use only hand operated equipment for filling and backfilling next to walls and retaining walls.

   e. Do not place fill or backfill material when temperature is less than 40 DegF and when subgrade to receive material is frozen, wet, loose, or soft.

   f. Use vibratory equipment for compacting granular material; do not use water.

4. Backfilling against walls:

   a. Do not backfill around any part of structures until each part has reached specified 28-day compressive strength and backfill material has been approved.

   b. Do not start backfilling until concrete forms have been removed, trash removed from excavations, pointing of masonry work, concrete finishing, dampproofing and waterproofing have been completed.

   c. Do not place fills against walls until floor slabs at top, bottom, and at intermediate levels of walls are in place and have reached 28-day required compressive strength to prevent wall movement.

   d. Bring backfill and fill up uniformly around the structures and individual walls, piers, or columns.

E. Backfilling outside of structures under piping or paving:

1. When backfilling outside of structures requires placing backfill material under piping or paving, the material shall be placed from bottom of excavation to underside of piping or paving at the density required for fill under piping or paving as indicated in this Section.

2. This compacted material shall extend transversely to the centerline of piping or paving a horizontal distance each side of the exterior edges of piping or paving equal to the depth of backfill measured from bottom of excavation to underside of piping or paving.

3. Provide special compacted bedding or compacted subgrade material under piping or paving as required by other Sections for the Project.

END OF SECTION

SECTION 31 25 14
SOIL EROSION AND SEDIMENT CONTROL

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Soil erosion and sediment control.

1.02 REFERENCES

A. Erosion control standards: Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas by the United Sates Department of Agriculture (USDA), Soil Conservation Service, College Park, Maryland.

B. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

1.03 QUALITY ASSURANCE

Designate and have a Certified Erosion and Sediment Control Lead (CESCL) onsite at all times.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Straw bales, twine tied.

B. Pipe riser and barrel: 16 GA corrugated metal pipe (CMP) of size indicated.

C. Stone for stone filter: 2 IN graded gravel or crushed stone.

D. Grass Seed: annual ryegrass.

E. Filter fabric fence: Conform to Section 8-01.3(9)A of the Standard Specifications.

F. Catch basin inserts: Conform to Section 8-01.3(9)D of the Standard Specifications. Inserts shall have straps to facilitate removal and cleaning of inserts and shall have a minimum storage capacity of 0.5 cf. Above inlet covers and inlet grate covers are not allowed.

G. Silt dikes: Conform to Section 8-01.3(6) of the Standard Specifications.

H. Fiber Rolls: Conform to Section 8-01.3(6) of the Standard Specifications.

I. Sand Bags: Conform to Section 8-01.3(6) of the Standard Specifications.

J. Mulch shall be wood cellulose fiber with guar gum or accepted equal as a soil binder.

PART 3 : EXECUTION

3.01 PREPARATION

A. Prior to general stripping of topsoil and excavating:

1. Install perimeter dikes and swales.
2. Excavate and shape sediment basins and traps.
3. Construct pipe spillways and install stone filter where required.
4. Machine compact all berms, dikes and embankments for basins and traps.
5. Install straw bales where indicated:
   a. Provide two stakes per bale.
   b. First stake angled toward previously installed bale to keep ends tight against each other.
6. Install catch basin inserts, filter fabric fence, fiber rolls, and other erosion control measures as necessary.

B. Construct sediment traps where indicated on Drawings during rough grading as grading progresses.

C. Temporarily seed basin slopes and topsoil stockpiles:

1. Rate: 1/2 LB/1000 SF.
2. Re-seed as required until good stand of grass is achieved.

D. Temporary erosion and sedimentation control measures shall be in place and functional before land disturbing activities take place.

3.02 DURING CONSTRUCTION PERIOD

A. Maintain basins, dikes, traps, stone filters, straw bales, and other erosion and sedimentation control measures:

1. Inspect regularly especially after rainstorms.
2. Repair, augment, or replace damaged or missing items.

B. After rough grading, sow temporary grass cover over all exposed earth areas not draining into sediment basin or trap.

C. Provide necessary swales and dikes to direct all water towards and into sediment basins and traps.

D. Do not disturb existing vegetation (grass and trees):

1. Contractor shall over-seed areas at a rate of 5 pounds per 1,000 square feet where Contractor's actions have compromised the erosion and sedimentation control functions of the existing grasses.

2. Areas subsequently disturbed by the Contractor's operations shall be reseeded.

E. Excavate sediment out of basins, traps, and catch basin inserts, when capacity has been reduced by 50 percent:

F. Remove sediment from behind bales to prevent overtopping.

G. Topsoil and fine grade slopes and swales, etc.: Seed and mulch as soon as areas become ready. Apply mulch at 200 pounds per acre minimum.

H. All construction areas shall be properly protected and stabilized with erosion and sedimentation control measures as construction progresses.

3.03 NEAR COMPLETION OF CONSTRUCTION

A. Eliminate basins, dikes, traps, etc.

B. Grade to finished or existing grades.

C. Fine grade all remaining earth areas, then seed and mulch.

D. Clean catch basins and storm water conveyance piping.

END OF SECTION

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SECTION 31 41 00
EXCAVATION SUPPORT SYSTEMS

PART 1 : GENERAL

1.01 SUMMARY

Work covered in this section includes requirements for cribbing and shoring to be used for demolition, structural excavations, and trench safety.

1.02 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Submit the following:

1. Certification that all excavation support system design work has been performed under the direction of a professional engineer licensed by the State of Washington.
2. Structural shoring design and support calculations for all shoring system that will be used for this project. The shoring design shall be stamped by a professional engineer licensed in the State of Washington.
3. Shoring contractor qualifications.
4. Construction noise, vibration, and settlement monitoring and control plans demonstrating conformance to the requirements in Sections 02 22 26, 02 22 29, and 02 22 30.

C. Informational submittals:

1. Trench shield (trench box) certification if employed:
   a. Specific to Project conditions.
   b. Re-certified if members become distressed.
   c. Certification by registered professional structural engineer, registered in the State of Washington.
   d. Engineer is not responsible to, and will not, review and approve.
2. Trench safety plan and/or trench shoring drawing:
   a. Trench Safety Plan and/or trench shoring drawings submittal is required only as evidence that plans and drawings have been prepared if required by authorities having jurisdiction.
   b. Engineer is not responsible to, and will not, approve.

1.03 REFERENCES

A. WAC 295-155 – Safety Standards for Construction Work.

B. RCW Chapter 39.04.180 – Public Works/Trench Excavations – Safety Systems Required.

C. RCW Chapter 49.17 Washington Industrial Safety & Health Act.

D. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

E. Reference Document: Geotechnical Report, Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design, July 28, 2015, Landau Associates.

1.04 QUALITY ASSURANCE

A. The shoring contractor shall:

1. Specialize in earth retention/construction as its primary business.
2. Be fully experienced and properly qualified, licensed, equipped, organized and financed to perform the shoring and excavation support work.
3. Have successfully completed at least five projects of similar scope and shoring/earth retention requirements in similar soil and groundwater conditions in the last five (5) years.

B. Contractor shall perform monitoring surveys as specified in Section 02 22 30.

1.05 SYSTEM REQUIREMENTS

A. All cribbing, sheeting, and shoring shall be designed by a qualified person and meet the requirements of WAC 296-155.

B. The Contractor shall be exclusively responsible for providing the services of the competent person and registered professional engineer, as referenced in WAC 296-155-650, relating to excavation, trenching, and shoring. Representatives of the Owner and the Consulting Engineer shall not be required to perform the roles of competent person or registered professional engineer as defined in WAC 296-155-650.

C. Adequate sheeting, shoring, bracing, sloping, dewatering, or other methods of sustaining the stability of the floor and walls of the excavation shall be utilized as necessary to support the excavation under loading conditions that exist or arise during construction.

D. Means and methods shall protect and not adversely impact the structures or facilities, existing or constructed. Dewatering, if employed in conjunction with a shoring system, shall be in accordance with Sections 31 23 33 and 31 23 43.

PART 2 : PRODUCTS

Not Used.

PART 3 : EXECUTION

3.01 CRIBBING, SHEETING, AND SHORING

A. Install and maintain shoring, sheeting, bracing, and sloping necessary to support the sides of the excavation and to prevent any movement that may damage adjacent facilities, delay the work, or endanger life and health. Conform to the requirements of WISHA and other applicable governmental regulations and agencies.

B. The Contractor shall be solely responsible for making and maintaining all excavations in a safe manner.

C. Proper design and installation of the shoring and associated dewatering systems, method of construction, and monitoring and protection of the structure excavations, shoring, existing structures and facilities are the responsibility of the Contractor. Contractor shall ensure the integrity of existing structures and facilities are maintained and that appropriate construction techniques are employed at all times to protect existing, as well as installed, structures and facilities. In the event shoring becomes unstable or surface settlement occurs, Contractor shall immediate implement corrective measures and notify the Engineer. Contractor shall be solely liable for any and all shoring and associated dewatering systems necessary to support the excavations under any and all loading conditions that may exist or arise during construction.

D. Use any combination of shoring and overbreak, tunneling, boring, sliding trench shield, or other method allowed by the applicable local, state, and federal safety codes.

E. Carefully reconsolidate the bedding and side support behind a movable box prior to placing backfill.

F. Sheet piling and timbers in trench and other excavations shall be withdrawn in a manner so as to prevent subsequent settlement of structures or pipe, or additional backfill loading that might overload the pipe. Reconsolidate bedding/backfill to the satisfaction of the Engineer.

G. Leave in place those portions of cribbing and sheeting extending below the crown elevation of the pipe, unless the bedding and side support can be reconsolidated to the satisfaction of the Engineer.

H. Where shoring or movable trench shields extend below the top of a pipe and are to be removed, locate at least one pipe diameter away from the pipe. They may be located closer only if Contractor demonstrates to Engineer's satisfaction a means of reconsolidation.

I. If a movable box is used in lieu of cribbing or sheeting, and the bottom cannot be kept above the springline of the pipe, the bedding or side support shall be carefully reconsolidated behind the movable box prior to placing initial backfill.

J. Where removal of sheeting would result in damage to adjacent utilities or other property, Engineer may order all or a portion of sheeting to be cut off and left in place.

K. Do not use horizontal strutting below the barrel of a pipe.

L. Do not use the pipe as support for trench bracing.

M. Damages resulting from improper shoring and failure to shore shall be the sole responsibility of the Contractor.

3.02 TRENCH EXCAVATION SAFETY SYSTEMS

A. Protect all utility trench excavation in excess of 4 feet in depth with a safety system conforming to the referenced requirements.

B. The Contractor's trench safety system shall be designed by a qualified person and meet the referenced requirements.

3.03 PAYMENT

All costs associated with providing, installing and maintaining adequate excavation support systems as specified herein shall be included in and paid under bid item "Excavation Support Systems" for each of the respective bid schedules.

END OF SECTION

SECTION 32 12 16
HOT MIX ASPHALT (HMA) PAVING

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Temporary and permanent HMA paving.

1.02 REFERENCES

A. Federal Specifications (FS):

1. TT-P-115F, Paint, Traffic (Highway, White and Yellow).

B. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

C. Construction Standards: Washington State Department of Transportation, 2014 as amended to date.

D. AASHTO T 209 – Standard Method of Test for Theoretical Maximum Specific Gravity and Density of Hot-Mix Asphalt (HMA).

1.03 MISCELLANEOUS

Should conflicts arise between standard specifications of government agencies mentioned herein and these Contract Documents, these Contract Documents shall govern.

1.04 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.

C. HMA concrete design mix.

PART 2 : PRODUCTS

2.01 MATERIALS

A. HMA:

1. Asphalt Binder: PG 64-22 as set forth in Section 9-02.1(4) of the Standard Specifications.

2. Hot Mix Asphalt: HMA Class ½-inch as set forth in Section 9-03.8(2) of the Standard Specifications.
3. Aggregate: Per Section 9-03.8 of the Standard Specifications for 1/2-inch HMA Class.

B. Asphalt seal coat: AR-2000 asphalt binder.

C. Line paint:

1. Nonreflective.
2. White.
3. FS TT-P-115F.

2.02 MIXES

A. Mix shall comply with Section 5-04.3(7)A of the Standard Specifications:

1. ESAL shall be > 3 million and less than 10 million.

PART 3 : EXECUTION

3.01 PREPARATION

A. Subgrade preparation:

1. Prepare using methods, procedures, and equipment necessary to attain required compaction densities, elevation and section.
2. Scarify and re-compact top 6 IN of fills and embankments which will be under paved areas.
3. Remove soft or spongy areas and replace with aggregate material.
4. Compact subgrade to 95 percent relative density per ASTM D1557.
5. Assure moisture content of structural fill is within 3 percent of its optimum to achieve required compaction density.
6. Following compaction, trim and roll to exact cross section:
   a. Check with approved grading template.
7. Coordinate with Engineer for density tests on subgrade to determine that subgrade complies with the specification.

B. Aggregate course:

1. Place material in not more than 6 IN thick layers.
2. Spread, shape, and compact all material deposited on the subgrade during the same day.
3. Compact to 95 percent relative density per ASTM D1557.

C. Loose and foreign material: remove loose and foreign material immediately before application of paving.

D. Appurtenance preparation:

1. Adjust manholes, inlets, valve boxes and any other utility appurtenances to design grade after new HMA has been installed.

3.02 INSTALLATION

A. Construct to line, grade and section as shown on Drawings and in accordance with the Standard Specifications.

B. Spread prime coat uniformly on compacted aggregate base course at rate of 0.05 to 0.10 GAL per square yard in accordance with Section 5-04.3(5) of the Standard Specifications.

C. Compact each lift to a minimum of 92 of the maximum density as determined by AASHTO Test Method T 209:

1. Level of compaction shall be determined as the average of not less than 5 nuclear density gauge tests taken on the day the mix is placed at randomly selected locations within each lot.
2. Quantity represented by each lot shall be no greater than a single day's production or approximately 400 tons, whichever is less.
3. Cores taken within 48 hours of placement of the mix may be used as an alternative to the nuclear density gauge tests.
4. HMA pavement not meeting the prescribed minimum density standard shall be removed and replaced with satisfactory material at the Contractor's expense.

D. Seal joints between new HMA and existing asphalt surface with AR-2000 seal coat that is at least 12-inches wide, centered on the joint.

E. Temporary HMA pavement:

1. HMA pavements that are installed and subsequently removed by the Contractor.
2. Install to a minimum depth of one inch over 3 inches of crushed surfacing top course.
3. Provide a suitable and safe driving surface for traffic and pedestrians by compacting with a roller or vibratory plate to provide a smooth driving surface. “Wheel-rolling” is not acceptable.
4. Remove and dispose of temporary HMA pavement prior to installing permanent HMA pavement.
5. Install temporary HMA pavement over all trenches in streets that currently have asphalt paving. Maintain temporary HMA pavement until permanent HMA pavement is installed.
6. Temporary HMA pavement that fails due to rutting, spalling, or other means, as determined by the Engineer, shall be repaired by the Contractor at no cost to the Owner.

F. Line painting:

1. Thoroughly clean surfaces which are to receive paint.
2. Make completely dry before paint is applied.
3. Do not paint until minimum of five (5) days has elapsed from time surface is completed:
   a. A longer period may be required if directed by Engineer.
   b. Provide temporary striping as needed.
4. Do not apply paint over wet surfaces, during wet or damp weather, or when temperature is below 40 DegF.
5. Markings and striping shall be applied to match existing.

3.03 FIELD QUALITY CONTROL

A. Comply with Section 5-04.3(8) of the Standards Specifications.

B. Composite pay factors will not be used.

C. No deductions will be made for the weight of asphalt binder, blending sand, mineral filler, or any other component of the mixture.

D. If HMA is rejected or subsequently removed as a function of the Contractor's means and methods for obtaining the final grades and thicknesses shown on the drawings, the material removed will not be included in the measured quantity being paid.

END OF SECTION

SECTION 32 91 19
TOPSOILING AND FINISHED GRADING

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Topsoiling and finished grading.

B. Location of work: All areas within limits of grading and all areas outside limits of grading which are disturbed in the course of the work.

1.02 REFERENCES

A. ASTM International (ASTM):

1. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
2. E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves.

1.03 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Project Data: test reports for furnished topsoil.

1.04 PROJECT CONDITIONS

Verify amount of topsoil stockpiled and determine amount of additional topsoil, if necessary to complete work.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Topsoil:

1. Two way soil mix of 50% composted organic mulch and 50% sand, sandy loam, or silty sand high in organic content blended with compost.
2. Well combined, free of weeds, rocks debris and other deleterious materials that will not pass through a 7/16 inch sieve.
3. Shall not contain sawdust or other fresh wood byproducts.
4. Acceptable Sources:
   a. EMU Topsoil, Poulsbo, WA.
   b. Peninsula Topsoil, Belfair, WA

c. Cedar Grove Compost Company, Maple Valley, WA.

d. Or accepted equal.

5. Additional sources may be found at the Clean Washington Center organization's web-site www.cwc.org.

2.02 TOLERANCES

Finish grading tolerance: 0.1 foot plus/minus from required elevations.

PART 3 : EXECUTION

3.01 GENERAL

A. Proceed as rapidly as the Site becomes available, consistent with normal seasonal limitations for soil preparation work.

B. Subgrade to consist of native soils or placed soils that will provide plants with nutrients, positive drainage and appropriate particle sizes that promote long-term plant health and stability.

C. Immediately notify Engineer of poorly draining or unacceptable drainage conditions within landscape areas that will affect the health and maturation of new plantings.

D. Soil moisture content:

1. Do not work soil when moisture content is so great that excessive compaction will occur. A person walking across subgrade or planting soil shall not depress soil more than one inch.

2. Do not work soil when it is so dry that dust will form in the air or when clods will not break readily.

E. Keep streets, sidewalks, and project area clean and free from debris.

F. Protect prepared soils from disruption by other work and construction activities.

3.02 SUBGRADE PREPERATION

A. Clear existing grass within limits of areas to be sodded or hydroseeded.

B. Loosen grade to a depth of 4 inches.

C. In areas with existing tree roots or within tree driplines, hand cultivate soil to a depth of 4 inches taking care not to damage existing root systems.

3.03 ROUGH GRADE REVIEW

Prior to placing topsoil, the Engineer shall review subgrades for acceptance.

3.04 SOIL PREPARATION AND PLACING TOPSOIL

A. Place sufficient depth of planting soil to achieve finish grade as indicated on the Drawings and to provide allowance for one inch depth of settlement.

B. Place planting soil mix to a depth of 2 inches.

C. Roll and compact planting soil at 85 percent maximum density per ASTM D1557.

3.05 FINISH GRADE

A. Provide finished surface free of stones, sticks, or other material 1 inch or more in any dimension.

B. Provide finished surface smooth and true to required grades.

C. Restore stockpile area to condition of rest of finished work.

3.06 ACCEPTANCE

A. Upon completion of topsoiling, obtain Engineer's acceptance of grade and surface.

B. Make test holes where directed to verify proper placement and thickness of topsoil.

END OF SECTION

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SECTION 32 92 33
SEEDING, SODDING AND LANDSCAPE PLANTING

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Seeding, sodding, and landscape planting.

1.02 REFERENCES

A. American Nursery and Landscape Association/American National Standards Institute (ANLA/ANSI):

1. Z60.1, American Standard for Nursery Stock.

B. AOAC International (AOAC).

C. ASTM International (ASTM):

1. D2028, Standard Specification for Cutback Asphalt (Rapid-Curing Type).
2. D5276, Standard Test Method for Drop Test of Loaded Containers by Free Fall.

D. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

1.03 QUALITY ASSURANCE

A. Quality control:

1. With the exception of cuttings, all plant material furnished by the Contractor shall conform to the requirements of the current issue of “American Standard for Nursery Stock”.
2. Inspections will be made by the Engineer or other owner representative. The Contractor shall request inspection at least 24 hours in advance of the time inspection is required. Inspections at the following times will be required:
   a. When subgrade has been established and scarified.
   b. After topsoiling and finished grading has been completed.
   c. After staking of landscape boulders.
   d. After layout of all plant material.
   e. At the initial completion of work.
   f. For Final Acceptance of all work.

3. Fertilizer:

   a. If Engineer determines fertilizer requires sampling and testing to verify quality, testing will be done at Contractor's expense, in accordance with current methods of the AOAC.

   b. Upon completion of Project, a final check of total quantities of fertilizer used will be made against total area seeded.

   c. If minimum rates of application have not been met, Contractor will be required to distribute additional quantities to make up minimum application specified.

B. Qualifications:

1. All work shall be performed by a licensed Landscape Contractor registered in the State of Washington and shall be qualified for landscaping work through certification by the Washington Association of Landscape Professionals (WALP) or by the Washington State Nursery and Landscape Association (WSNLA).

2. Pruning work to be performed by a licensed Arborist.

1.04 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.

2. Manufacturer's installation instructions.

3. Signed copies of vendor's statement for seed mixture required, stating botanical and common name, place of origin, strain, percentage of purity, percentage of germination, and amount of Pure Live Seed (PLS) per bag.

4. Source and location of mulch, sod, plants, and plant material.

C. Samples:

1. Mulch.

2. Compost.

D. Maintenance Plan:

1. Type written maintenance plan and schedule for Owner's use following Contractor's maintenance period.

2. Submit prior to final acceptance.

E. Informational submittals:

1. Copies of invoices for fertilizer used on Project showing grade furnished, along with certification of quality and warranty.

1.05 SEQUENCING AND SCHEDULING

A. Installation schedule:

1. Provide schedule showing when trees, shrubs, groundcovers and other plant materials are anticipated to be planted.
2. Show schedule of when lawn type and other grass areas are anticipated to be planted.
3. Indicate planting schedules in relation to schedule for finish grading and topsoiling.
4. Indicate anticipated dates Engineer will be required to review installation for initial acceptance and final acceptance.

B. Pre-installation meeting:

1. Meet with Engineer and other parties as necessary to discuss schedule and methods, unless otherwise indicated by Engineer.

PART 2 : PRODUCTS

2.01 MATERIALS

A. Sod:

1. Viable, dense, strongly rooted, not less than two (2) years old.
2. Composed of the following or other mix of native species subject to Engineer approval:

KIND AND VARIETY OF SEED IN MIXTURE	PERCENT BY WEIGHT
Red fescue (*Festuca rubra*)	50%
Idaho fescue (*Festuca idahoensis*)	50%

3. Free of weeds and undesirable native grasses.
4. Strips 12 to 18 IN wide.
5. Mow prior to stripping from field.
6. Cut so 3/4 IN of soil is firmly attached to roots.
7. Not frozen or dormant.

B. Seeded lawn:

1. General: Grasses, legumes, or cover crop seed of the type specified shall conform to the standards for "Certified" grade seed or better as outlined by the State of Washington Department of Agriculture "Rules for Seed Certification", current edition. Seed shall be furnished in standard containers on which shall be shown the following information:

   a. Common name of seed.

   b. Lot number.

   c. Net weight.

   d. Percentage of purity.

   e. Percentage of germination (in case of legumes percentage of germination to include hard seed), and,

   f. Percentage of weed seed content and inert material clearly marked for each kind of seed in accordance with applicable State and Federal law.

2. Upon request, the Contractor shall furnish to the Engineer duplicate copies of a statement signed by the materials person certifying that each lot of seed has been tested by a recognized and accredited seed testing laboratory within six months before the date of delivery on the project. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

3. The seed mixture and rate of application shall be as follows:

KIND AND VARIETY OF SEED IN MIXTURE	PERCENT BY WEIGHT
Blue wildrye (*Elymus glaucus*)	50%
Red fescue (*Festuca rubra*)	30%
Idaho fescue (*Festuca idahoensis*)	20%

4. The rate of application shall be 8 pounds per 1000 square feet. No noxious weeds will be permitted. The seed mixture shall be no less than 98% pure, and shall have a minimum germination rate of 90%.

C. Mulches and amendments:

1. Hardwood mulches:

a. Mulch (for fine landscape areas):

1) Bark Mulch shall consist of Douglas fir, pine, or hemlock bark. It shall be ground so that on a loose volume basis, a minimum of 95 percent passes a 1-1/2-inch sieve and no more than 55 percent passes a 1/4-inch sieve.

2) The bark mulch shall not contain resin, tannin, or any other deleterious material that would be detrimental to plant life.

D. Fertilizer:

1. Commercial fertilizer meeting applicable requirements of State and Federal law.

2. Cyanic compound or hydrated lime not permitted in mixed fertilizers.

3. For lawn-type seeding and sod: 5-10-5 analysis.

E. Limestone: Agricultural grade ground limestone containing not less than 88 percent of combined calcium and magnesium carbonates, 100 percent passing a 10-mesh sieve, 90 percent passing a 20-mesh sieve, and 60 percent passing a 100-mesh sieve.

F. Water:

1. Water free from substances harmful to grass or sod growth.

2. Provide water from source approved prior to use.

G. Plants:

1. See plants identified on the Drawings.

2. Sound, healthy, vigorous, with normal top and root systems, free from disease, insect pests or their eggs, grown in same or colder climatic zone as project:

a. Nursery grown stock, freshly dug:

1) No heeled-in, cold storage or collected stock.

b. Species and size as indicated on Drawings.

3. Deciduous shade trees: Single leader, straight trunk, well-branched, free of branches up to 6 foot high, and with symmetrical growth.

4. Balled and burlapped plants (B&B): Firm, natural balls of soil.

5. Container grown plants (Cont): Roots well established in soil, grown in container for at least one growing season.

2.02 ACCESSORIES

A. Tree stakes: 2 inch diameter pressure treated lodgepole pine wood stakes 8 foot in length with chamfered tops and 6 inch conical points.

B. Staking wire: 12 gauge galvanized.

C. Reinforced rubber hose: 5/8 or 3/4 inch diameter.

D. Antidesiccant: Emulsion that will provide a film over plant surfaces permeable enough to permit transpiration.

PART 3 : EXECUTION

3.01 SOIL PREPARATION

A. General:

1. Refer to Section 32 31 19.
2. Limit preparation to areas which will be planted soon after.
3. Provide facilities to protect and safeguard all persons on or about premises.
4. Verify location and existence of all underground utilities:
   a. Take necessary precaution to protect existing utilities from damage due to construction activity.
   b. Repair all damages to utility items at sole expense.
5. Provide facilities such as protective fences and/or watchmen to protect work from vandalism:
   a. Contractor to be responsible for vandalism until acceptance of work in whole or in part.

B. Preparation for lawn-type sodding:

1. Distribute topsoil to the depth as indicated in Section 32 31 19.
2. Spread limestone uniformly over designated areas at a rate of 50 pounds per 1000 square feet:
   a. Thoroughly mix and till through topsoil layer.
3. Prior to applying fertilizer, loosen areas to be sodded by tilling or other suitable device if the soil has become hard or compacted:
   a. Hand till as required near critical root zones of existing trees. Do not mechanically till or damage roots 2 inches or larger.
4. Distribute fertilizer uniformly over areas to be sodded at a rate of 12 pounds per 1000 square feet.
5. Incorporate fertilizer into soil to a depth of at least 2 inches by tilling, raking or other approved methods.
6. Correct any surface irregularities in order to prevent pocket or low areas which will allow water to stand.

7. Grade lawn areas to a smooth, even surface with a loose, uniformly fine texture:
   a. Roll and rake, remove ridges and fill depressions, as required to meet finish grades.
   b. Limit fine grading to areas which can be planted soon after preparation.
8. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.02 INSTALLATION

A. Sodding:

1. Notify Engineer of source and location of sod at least 30 days prior to sodding operation, to permit inspection:
   a. Submit species and percentages of purity and state botanical and common names.
2. Sod areas as designated and disturbed lawn areas which were sodded or established prior to construction.
3. Perform sodding only during climatic or weather conditions conducive to successful results:
   a. Lay within 24 hours of stripping.
   b. Do not use dormant or frozen sod.
   c. Sodding may be accomplished at all seasonal periods providing adequate provisions for sod protection are taken to ensure fitness and survival.
   d. Do not place sod when temperature is below 32 DegF.
   e. Do not place frozen or dried out sod.
   f. Do not sod on frozen or dried out soil.
4. Lay sod to form a solid mass with tightly fitted joints:
   a. Butt ends and edges; do not overlap.
   b. Stagger joints.
   c. Tamp or roll lightly to ensure full contact with subgrade.
   d. Work sifted soil into minor cracks, avoid smothering adjacent grass.
5. Protection of sodded areas shall be provided using high visibility flagging and staking.

B. Seeding:

1. Seeded lawn installation shall proceed through the following sequence of steps in its construction and shall be coordinated with irrigation system construction when applicable.

2. Areas to be seeded shall be installed either between March 1 and May 15 or between September 1 and October 1.
3. Areas to receive seed shall be cleared and grubbed, and the surface graded to a uniform surface including accommodating vertical clearances adjacent to improvements in this Section. If the surface is determined suitable for seeding by the Engineer, no topsoil or compost will be required. Where fill is required, planting soil mix shall be provided to bring the surface to finish grade. If the existing soil is unacceptable for seeding, the Contractor shall remove enough material to allow for the placement of a minimum of 2-inches of planting soil mix.
4. After the addition of any soil amendments and application of lime, the area shall be mechanically tilled to a depth of 4-inches to achieve a homogeneous blend. Soil shall then be raked by approved hand or mechanical methods to remove and dispose of all large clods, rocks, debris, and litter larger than 1-inch in any dimension.
5. The area shall then be rolled in 2 directions, the second rolling at right angles to the first. The roller shall be of a standard, waterfilled type to apply 150 to 300 pounds per square foot ground pressure.
6. The finished grade shall meet the vertical clearance requirements adjacent to improvements as specified in this Section.
7. Fertilizer shall be applied as specified in this Section. Coverage shall be uniform and all areas shall be covered.
8. Apply the Contract-specified seed mix by hydroseeding, mechanical, and hand application methods as the area may require.
9. Rake seed and fertilizer into the top 1/2 to 1-inch of soil to produce a uniform, dense lawn.
10. Roll the area in one (1) direction.
11. Water the rolled area with a 1-inch average depth of water without causing erosion and sedimentation.
12. Temporary flagging and warning signs shall be installed preventing the public from disturbing and damaging newly installed lawn.

3.03 PLANTING TREES, SHRUBS, AND GROUND COVERS

A. Notification:

1. Notify Engineer of source of plants and plant materials at least 30 days prior to planting to permit Engineer's inspection of source qualifications.

B. Preparation:

1. Handle plants so that roots or balls are adequately protected from breakage of balls, from sun or drying winds:
   a. Ensure tops or roots of plants are not permitted to dry out.
2. During transportation, protect materials from wind and sun to prevent tops and roots from drying out.

3. Protect tops of plants from damage:
   a. Plants with damaged tops will be rejected.
4. For purpose of inspection and planting identification, attach durable, legible labels to bundle or container of plant material delivered at the planting site:
   a. State correct plant name and size of each plant in weather-resistant ink on labels.
5. Do not prune trees and shrubs at nursery.

C. Planting Season:

1. Plant trees and shrubs and groundcover any time the ground is suitable between September 15 and June 1.

D. Planting Procedure:

1. Indicate locations of plants for approval by Engineer before excavating plant locations.
2. In event underground construction, utilities, obstructions, or rock are encountered in excavation of plantings, secure alternate locations from Engineer:
   a. Make said changes without additional compensation.
   b. Where tree locations fall under existing overhead wires, or crowd existing trees, adjust locations as directed by Engineer.
3. Fertilizer:
   a. Apply fertilizer at a rate of 8 pounds per 1000 square foot.
4. Excavate pits and beds as necessary and in accordance with ANLA/ANSI Z60.1:
   a. Loosen bottom of pits prior to planting.
   b. Excavation is unclassified, excavate all materials without additional cost.
5. Tree and shrub pits to be circular in shape with vertical sides at least one foot greater in diameter than ball diameter:
   a. Pit to be of sufficient depth to provide six inches of planting soil under ball when set to natural grade.
6. Shrub and ground cover beds:
   a. Plant shrubs used in mass plantings in individual holes of required size.
7. Set plants straight or plumb, in locations when indicated and at such level that after settlement they bear same relationship to finished grade as they did in their former setting:
   a. Carefully tamp planting soil under and around base of balls to prevent voids.

b. Remove burlap, rope and wires from top of balls.

c. Do not remove burlap from sides and bottom of balls.

8. Backfill plants with planting soil:

a. Tamp to 1/2 depth of pit and thoroughly water and puddle before bringing backfill to proper grade.

b. After planting has been completed, flood pit again so that backfill is thoroughly saturated and settled.

9. After planting is complete, form a level saucer 3 IN high around each tree extending to limit of plant pit for watering purposes.

10. Mulch plant pit after saucer has been shaped:

a. Mulch to limits of pit and uniformly over ground cover beds to a depth of 3 IN.

b. In mass plantings of shrubs, mulch entire area uniformly among shrubs to a depth of 3 inches.

c. If mulching is delayed and soil has dried out, water plants thoroughly before spreading mulch.

11. Staking: Stake trees immediately after planting as detailed on Drawings:

a. Place ties at top and bottom of wrapping material and not more than 12 IN apart between top and bottom ties.

12. Remove dead or damaged branches:

a. Remove only dead or damaged branches from evergreens or deciduous plants.

13. Water plants during planting operations:

a. Water each plant a minimum of once each week until final acceptance.

b. Apply sufficient water to moisten backfill about each plant so that moisture will extend into the surrounding soil.

3.04 MAINTENANCE AND REPLACEMENT

A. General:

1. Landscape establishment shall consist of the Contractor providing regularly scheduled, adequate, and proper care for all new planting for the landscape establishment period according to best practices per WALP. The landscape establishment period shall begin on the date of written notice from the Engineer of the acceptance of plantings, and shall end 365 calendar Days thereafter unless the Contract specifies otherwise. Once all other Work is physically complete, the Contractor shall request an inspection for initial completion of the Work.

2. At least five (5) Working Days before the beginning of the landscape establishment period, the Contractor shall submit a maintenance and weed control plan for approval by the Engineer. The weed control plan shall identify the means, manner, methods, and timing intervals to assure weed control throughout the plant establishment period. This weed control plan will be subject to revision dependent on results of the implemented plan. The submittal shall also include a watering schedule indicating how and when each and every component of the landscaping receives water.

3. Begin maintenance of planted areas immediately after each portion is planted and continue until final acceptance or for a specific time period as stated below, whichever is the longer.

4. Provide and maintain temporary piping, hoses, and watering equipment as required to convey water from water sources and to keep planted areas uniformly moist as required for proper growth.

5. Protection of new materials:

   a. Provide barricades, coverings or other types of protection necessary to prevent damage to existing improvements indicated to remain.

   b. Repair and pay for all damaged items.

B. Weed Control: The Contractor shall maintain all areas, whether mulched or not, in a weed-free condition during the landscape establishment period. Removal shall be by mechanical control methods unless alternatives are approved by the Engineer in writing.

C. Plant replacement: Replacement plants required during establishment shall be planted within a time period set by the Engineer, which will depend on the season and availability of the replacement plants. Missing plants shall be replaced by the Contractor in kind. Scheduling of plant replacement shall be coordinated with the Engineer.

D. Inspection: Plantings and landscaped areas will be inspected regularly by the Engineer during the landscape establishment period. Should the Engineer determine that the Contractor is not providing regular adequate and proper care of plant material or is performing unacceptable landscape establishment work, the Engineer will provide written notice to the Contractor of such condition. The Contractor shall reply to the Engineer within seven (7) Days of the date of written notice with proposed corrections. Such corrective measures shall occur within fourteen (14) Days after the date of written notice unless the Engineers agree otherwise:

1. Approximately fifteen (15) Days before the end of the landscape establishment period, the Contractor shall request a final site inspection by the Engineer. Conditions found unacceptable by the Engineer shall be corrected by the Contractor within a ten (10)-Day period immediately following the inspection. After correction, the Contractor shall notify the Engineer for a re-inspection and written Final Acceptance. Corrective Work shall include replacement of dead, missing, or unacceptable landscaping material; weeding; pick-up of all litter; and repair and/or readjustment of the irrigation system. Necessary replanting shall be arranged by the Engineer in accordance with the best planting time of the year.

E. Seeded or Sodded Lawns:

1. Maintain sodded lawns: Thirty (30) Days, minimum, after installation and review of entire project area to be sodded.
2. Maintenance period begins at completion of planting or installation of entire area to be sodded.
3. Engineer will review sodded lawn area after installation for initial acceptance.
4. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, and replanting as required to establish a smooth, uniform lawn, free of weeds and eroded or bare areas.
5. Lay out temporary lawn watering system and arrange watering schedule to avoid walking over muddy and newly seeded areas:
   a. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch.
6. Mow lawns as soon as there is enough top growth to cut with mower set at recommended height for principal species planted:
   a. Repeat mowing as required to maintain height.
   b. Do not delay mowing until grass blades bend over and become matted.
   c. Do not mow when grass is wet.
   d. Time initial and subsequent mowings as required to maintain a height of 1-1/2 to 2 inch.
   e. Do not mow lower than 1-1/2 inch.
7. Remulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose:
   a. Anchor as required to prevent displacement.
8. Replant bare areas using same materials specified.
9. Engineer will review final acceptability of installed areas at end of maintenance period.

10. Maintain repaired areas until remainder of maintenance period or approved by Engineer, whichever is the longer period.

F. Trees, Shrubs, Groundcovers and Emergent Plantings:

1. Maintenance includes but is not limited to watering when necessary, removing dead or dying branches, removing sprouts and suckers; tightening, repairing or replacing tree stakes and wrapping; maintaining mulch to originally specified depth; and weeding plant beds and pits:

    a. For hand watered trees, fifteen (15) gallons shall be applied per tree per watering on a three (3) Day schedule.

2. Remove and replace all new plants supplied, which are impaired, dead, or dying during one (1) year from initial acceptance.

3. Engineer will review completed planting for acceptability of installation:

    a. Approval of planting denotes initial acceptance and the beginning of the maintenance period.

END OF DIVISION

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SECTION 33 01 30.72
CURED-IN-PLACE PIPE (CIPP) LINING

PART 1 : GENERAL

1.01 SUMMARY

A. This Section specifies rehabilitation of pipelines and laterals by the installation of resin-impregnated fabric liner.

B. Manholes may be rehabilitated with products specified in other Sections. Contractor shall coordinate rehabilitation of manholes, mainlines, lateral interfaces, and laterals with product installers. Contractor shall ensure that resin systems are compatible with all rehabilitation products that they will contact.

1.02 REFERENCES

A. This Section incorporates by reference the latest revisions of the following documents. They are part of this section insofar as specified and modified herein. In case of conflict between the requirements of this Section and the listed documents, the requirements of this Section shall prevail.

Reference	Title
ASTM D543	Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D1600	Standard Terminology for Abbreviated Terms Relating to Plastics
ASTM D2990	Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
ASTM F412	Standard Terminology Relating to Plastic Piping Systems
ASTM F1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
ASTM F2019	Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

1.03 CONTRACTOR AND MANUFACTURER QUALIFICATIONS

A. The Manufacturer of the CIPP liner shall have a minimum of 200,000 linear feet of CIPP successfully installed in accordance with these specifications. Manufacturer's using standards other than those listed in these specifications shall demonstrate to the satisfaction of the Owner that the standards followed produce a product that is, at a minimum, equal to the quality of product developed using the listed standards.

B. The CIPP lining Contractor shall have a minimum of five (5) successfully completed projects totaling a minimum of 50,000 lineal feet using the proposed CIPP rehabilitation technology. In addition, the Contractor's project superintendent shall have a minimum of three (3) successfully completed projects totaling a minimum of 25,000 lineal feet using the proposed CIPP rehabilitation technology. The Contractor's identified project superintendent shall be on the project for the duration of the project and shall be available at all times during the CIPP rehabilitation. At least one person on the Contractor's installation crew shall have a minimum of one (1) year of CIPP installation experience and shall be on the project site at all times. The Contractor's identified Lateral Cutting Technician shall have minimum of one (1) year of experience reinstating laterals.

C. Wastewater collection system rehabilitation products submitted for approval shall be provided with third party test results supporting long-term performance and structural strength of the product. Third party test result data shall be satisfactory to the Engineer. Test samples shall have been prepared so as to simulate the installation methods and trauma of project conditions.

1.04 SUBMITTALS

A. All procedures or material descriptions requiring the Engineer's approval shall be submitted not less than 15 calendar days prior to mobilizing or commencing any CIPP activities at the site of the work and shall include the following information:

1. Qualifications requirements per Section 1.03
2. Licensing requirements per Section 1.06.
3. CIPP Lining Plan to include the following:
    a. Work sequence organized by pipeline section with installation schedule.
    b. Confirmation of liner length.
    c. Locations of all service connections with disposition for each.
    d. Anticipated cleaning and preparation requirements.
    e. Sewer Service Interruption Notification Plan.
4. Manufacturer's certificate(s) indicating that the supplied lining materials meet the requirements of the Specifications, ASTM standards and a certificate of compliance from an independent third party lab.
5. Details on all lining materials and resins.

6. Name of resin supplier and liner fabric supplier.
7. Manufacturer's or Assembler's certification that the liner materials and system are in compliance with the specifications, codes, and standards referenced in these specifications.
8. Test reports on testing of CIPP products.
9. Manufacturer's or Assembler's recommendations for factory and field (whichever applies) wet out procedures including: volume of resin per unit of liner, mixing ratios and procedures for resin and catalyst/hardener, shelf life of resin, pot life of resin, required wet out procedure to ensure full saturation, and other criteria deemed necessary to ensure proper wet out of the liner.
10. Manufacturer's or Assembler's data sheets for factory wet out and/or Contractor's data sheets for field wet out showing: quantity of resin and catalyst used for each length of liner, at or prior to time of installation.
11. Manufacturer's or Assembler's certification that all Manufacturer's or Assembler's wet out recommendations have been followed on all lengths of CIPP which have factory wet out, at or prior to time of installation.
12. Manufacturer's or Assembler's recommendations for storage procedures and temperature control, handling and inserting the liner, curing details, service connection methods, trimming and finishing, and minimum equipment requirements to allow for an adequate installation.
13. Manufacturer's or Assembler's recommendations and procedures for minimum and maximum
14. Data on Contractor's equipment to be used on site including: type and tolerance of temperature gages and thermocouples used to monitor cure temperature; type and tolerance of equipment used to generate liner inversion pressure; make model, and technical data of all equipment used to generate heat for the curing process; make, model and technical data of backup equipment used to maintain curing temperature; rough size of vehicle(s) which carries the CIPP pipe and installation equipment.
15. Pipe sizing certified calculations demonstrating that the liner has been properly sized to avoid the creation of wrinkles or folds.
16. Manufacturer or Assembler onsite Representative's Certification that the Contractor's installation meets all requirements of the Manufacturer or Assembler and will not void the Owner's warranty.
17. CIPP field samples from previous field installations of the same resin system and tube materials as proposed for the actual installation. Field sampling procedure shall be in accordance with the latest version of ASTM F1216 or ASTM F1743 and in accordance with ASTM D5813.
18. Material Safety Data Sheets for resins, hardeners, catalysts, solvents, and all other compounds or chemicals to be used on the job site.
19. Data logger output in graphic format showing pipe section, time, pressure, and temperature during activation, heating, curing, and cool down.

20. Informational hand out that describes the materials, processes, and odors associated with the lining process. This handout shall be provided at the request of concerned residents.

21. Prior to installation, the manufacturer shall provide the inversion pressures necessary for proper insertion and top hat/tube installation. The tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing host pipe, and the maximum allowable pressure that will not damage the tube. Forces or pressures shall be limited so that the tube is not stretched longitudinally by more than 5% of the original length.

22. The proposed bypassing system shall be per Section 01 59 00.

23. Post-Installation CCTV inspection videos.

1.05 QUALITY ASSURANCE

A. The Manufacturer or Assembler shall provide the following:

1. List of inspection items that should be observed and recorded. Inspection items include pre-installation activities, product identification, installation procedures, equipment operations, and post-installation activities.

2. Review all post-installation CCTV tapes of the installed liner. Following this review the Manufacturer's or Assembler's representative shall provide certification to the Engineer ensuring that the Contractor's installation meets the Manufacturer's or Assembler's requirements and will not void the warranty.

B. The finished CIPP shall be continuous over the entire length of an insertion run between two manholes or access points and shall be free from visual defects such as foreign inclusions, dry spots, pinholes, and de-lamination.

C. Wrinkles in the finished CIPP greater than 5 percent of the pipe diameter are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense. Methods of repair shall be proposed by Contractor and submitted to the Engineer for review and approval.

1.06 LICENSING

A. The Contractor or sub-contractor installing the CIPP shall have a current license agreement with the product Manufacturer or Assembler.

B. Individuals installing the CIPP shall be certified by the product Manufacturer or Assembler.

C. Lining installation shall be in accordance with the requirements of the product Manufacturer or Assembler and as directed by their Technical Representative. This includes the correction of defective work.

D. Certification showing that the Installer is currently licensed by the appropriate licensor to perform CIPP installation shall be provided.

1.07 WARRANTY

A. The Contractor shall warrant each mainline sewer lined with the specified product against defects in materials, surface preparation, lining application, and workmanship for a period of 12 months from the date of final acceptance of the project. The Contractor shall, within one month of written notice thereof, repair defects in materials or workmanship that may develop during said 12-month period. Defects shall be defined as: visible leakage of groundwater through the CIPP system, de-lamination of any portion of the CIPP system as visible from CCTV inspection, or separation of any part of the CIPP system from the host pipe to the extent that the CIPP system inside diameter in the separated area is 90 percent or less of the completed CIPP system inside diameter. The Contractor shall also repair any damage to other work; damage to sewer system components (including pump stations) damages to buildings, houses or environmental damage caused by the backup of the sewer because of the failure of the lining system or repairing of the same at the expense of Contractor, and without cost to the Owner.

B. Repairs shall include removal of the existing liner and re-lining if possible, or excavation and replacement of the section of pipe where the defect occurs.

PART 2 : PRODUCTS

2.01 MATERIALS AND DESIGN REQUIRMENTS

A. Cured in Place Resin Impregnated Material in General

1. The liner shall be designed for a “fully deteriorated” pipe condition in accordance with the procedures of the latest edition of ASTM F1216, Appendix XI and these specifications. All material properties used in design calculations shall be long-term (time-corrected) values. The Contractor shall be familiar with the existing site conditions when preparing the liner design.
2. The CIPP will be continuous in length and the wall thickness shall be uniform. No overlapping sections shall be allowed in the circumference or the length of the liner.
3. The CIPP will be capable of conforming to offset joints, bells, and disfigured pipe sections. It shall be able to stretch to fit irregular pipe sections and negotiate bends.
4. The CIPP resin shall be compatible with the liner fabric, other rehabilitation systems it may contact, and the host pipe materials.
5. The CIPP shall be marked at a distance of regular intervals along its entire length, not to exceed 5 feet. Markings shall include Manufacturer’s or Assembler’s name or identifying symbol.
6. The CIPP liner shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

7. The composite materials of the liner tube and resin shall, upon installation inside the host pipe, exceed the following minimum test standards, based on restrained sample cured in host pipe and flat plate sample:

Physical Properties	
Flexural Strength (ASTM D790)	4,500 psi
Flexural Modulus (ASTM D790) Short Term	300,000 psi
Flexural Modulus (ASTM D2990) Long Term	150,000 psi
Tensile Strength (ASTM 1216 [pressure pipe only])	3,000 psi

8. The CIPP shall be fabricated to a size that, when installed, will tightly fit the internal circumference and length of the original pipe.
   a. Allowance shall be made for circumferential and longitudinal stretching during the installation process.
   b. Diametric shrinking during the curing process shall meet the requirements of ASTM D 5813, Section 6.3.1 or better.
9. The liner thickness shall be designed based on the engineering formulas listed in ASTM D638 and F1216 for fully deteriorated pipes. The thickness shall be sufficient to prevent groundwater from entering the pipe, while maintaining the maximum cross-sectional pipe area possible.
10. Maximum Liner Thickness: The installed CIPP liner shall reduce the existing inside pipe diameter by no greater than 1.5 inches.
11. Contractor shall prepare design calculations for approval prior to performing the lining work. The submitted design calculations shall provide the following information as a minimum:
    a. Manhole to Manhole designation As shown on the Drawings
    b. Pipe Nominal Diameter (inches)
    c. Minimum Liner thickness (inches)
    d. Proposed Liner Thickness (inches)
12. The following parameters shall be assumed for the liner design:
    a. Modulus of soil reaction, E'S = 1,500 psi (fully deteriorated)
    b. Unit weight of soil = 140 pcf
    c. The minimum ovality for straight runs shall be 2.0 percent
    d. AASHTO H20 traffic loads
    e. Groundwater at the surface
    f. Factor of Safety, N=2.0
13. For liners inserted by the inversion method, the CIPP shall be coated on one side with a translucent waterproof coating of:
    a. Polyvinyl chloride (PVC), or;
    b. Polyurethane.

14. For liners inserted by the pull/winch method, the CIPP shall be coated on one side with a translucent waterproof coating of:
    a. Polyvinyl chloride (PVC), or;
    b. Polyurethane, or;
    c. Polyethylene, or;
    d. Polypropylene.

B. Resin

1. The resin/liner system shall meet the 10,000 hour test in accordance with Section 8.2.2 Test Methods of ASTM D 5813.
2. Prior to construction, the Contractor shall submit an infrared spectrum chemical fingerprint of the type of resin to be used for this project.

C. Physical Properties

1. The CIPP shall be corrosion resistant to withstand exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, diluted sulfuric acid, and other chemical reagents typical of sewage conveyance. Chemical resistance of the installed CIPP shall meet the chemical resistance requirements of ASTM D543 when subjected to the following solutions:

Chemical Solution	Concentration, percent
Tap Water (pH 6-9)	100
Nitric Acid	5
Phosphoric Acid	10
Sulfuric Acid	10
Gasoline	100
Vegetable Oil	100
Detergent	0.1
Soap	0.1

2. The hydraulic profile of the installed CIPP shall be maintained as large as possible. The CIPP shall have at a minimum the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using commonly accepted roughness coefficients for the existing pipe material taking into consideration its age and condition.
3. Physical properties shall be subject to ASTM D 2122.

2.02 TOP HAT MATERIALS

A. The required principal components are based on materials developed by the impregnation of an absorbent carrier material shaped into a tube of the correct size to fit the host pipe. This sleeve is expanded to the inner wall of the host pipe and cured in place to obtain a hard plastic sleeve mechanically bonded to the host pipe.

B. The flexible polyester felt top hat is a tube insert that shall be fabricated to the proper size for the lateral and host pipe. The proper fit will allow the top hat to key into the internal surface irregularities of the lateral joint and neatly fit tight to the internal circumference of the lateral. The top hat tube shall be a laminate made of non-woven fiber materials that allows for circumferential stretching and angular alignment with the lateral pipe connection geometry during insertion.

C. The carrier material for the tubes shall be of fibrous absorbent composition tailored to achieve the following:

1. Allow the migration of resin from its internal structure by compressing to a thickness of less than 90% of its uncompressed thickness under a pressure of 1psi.
2. The carrier material must consist of non-degradable fibers such as polyester or polypropylene or corrosion resistant fiberglass. The carrier may use stitched or glued joints of material with sufficient strength to comply with the minimum requirement of this specification (Table 1).

Table 1: CIPP Initial Structural Properties (ASTM F1216)

Property	ASTM Method	Minimum Value
Tensile Strength	D638	3,000 psi
Flexural Strength	D790	4,500 psi
Modulus of Elasticity	D790	250,000 psi

3. The material must have an abrasion resistant, chemically resistant, fully bonded coated surface in the lateral portion to ensure that on curing a smooth surface free from blemishes, pinholes or loose non wetted fibers.
4. Where fiberglass is used, a surface veil or a layer of felt must be used to prevent osmosis or wicking of the strands.
5. The resin used to impregnate the liner must be a resin cured by light, heat or chemicals via the use of accelerators. As an alternative, any other safe energy source, which does not involve the use of electrical current within the main sewer, may be used when evidence can be supplied of the intrinsic safety of the method. PET resins, resin filters, resin additives, and resin enhancement agents are prohibited. Only neat resins are acceptable. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.

6. Proven resistance to the municipal wastewater environment that may comprise, as a minimum, all of the following factors:
    a. Immersion in septic sewage at temperatures up to 75 degrees F.
    b. Exposure in hydrogen sulfide gas from septic sewage at temperatures up to 75 degrees F.
    c. Proven resistance to ultra-violet light (sunlight) at any stage prior to installation.
    d. Solvent free epoxy, polyester, silicate, and vinyl ester resins are acceptable.
    e. Shall not contain silicones, stereates, or natural waxes that would adversely affect the adhesives properties or any other chemical or physical properties of the CIPP liner.

PART 3 : EXECUTION

3.01 PREPARATION

The Contractor shall make all necessary provisions to ensure service conditions and structural conditions of host pipe are suitable for installation and warranty of the liner. The Contractor shall verify the lengths in the field prior to ordering and prior to impregnation of the tube with resin, to ensure that the tube will have sufficient length to extend the entire length of the run. The Contractor shall also measure the inside diameter of the existing pipelines in the field prior to ordering liner so that the liner can be installed in a tight-fitted condition.

A. Flow Management

1. Contractor shall maintain operation of the existing sewer systems throughout the duration of the project without any interruption of sewer service, unless otherwise allowed by section 01 59 00. Install temporary sewer bypass systems in accordance with Section 01 59 00. Temporary bypassing shall be in service prior to cleaning and shall continue until after post installation CCTV inspection.

B. Cleaning

1. Clean and prepare pipe per CIPP Manufacturer's or Assembler's requirements.

C. Point Repairs

1. Advise the Engineer of any point requiring repairs that can only be performed by excavating the defect and removing or repairing the obstruction.

2. Grout defects in the host pipeline including but not limited to open joints, fractures, cracks, and holes in the pipeline as follows:

   a. Grout all defects as recommended by liner manufacturer or installer.

   b. Grout all locations with active infiltration.

3. The determination of an excessive leak shall be made by the Owner's representative and shall be based on PACP leak designations. Leaks that would be categorized as a Runner(IR) – Severity 4 or Gusher(IG) – Severity 5 shall be considered as excessive. Leaks categorized as Weeper(IW) – Severity 2 or Dripper(ID) – Severity 3 shall be considered incidental to the unit price for CIPP rehabilitation.

4. Make point repairs of any host pipe defect that can be removed by conventional sewer cleaning equipment or by remotely performed repair methods acceptable to the Engineer.

5. Remove protruding laterals, rolled gaskets, roots, mineral deposits, and other objects protruding into the host pipe, internally with a remote controlled cutter.

6. Pipelines that cannot be rehabilitated due to excessive leakage may be deleted from the project at the Engineers discretion.

D. Manholes

1. Protect all manholes to withstand forces generated by the equipment while installing the liner.

E. Top Hats

1. Temporary bypassing shall be per Contractor's bypass plan, see Section 1.04. Prior to shutdown of private service laterals, coordinate with County, Engineer and homeowners per Contractor's bypass plan. Contractor shall provide for the transfer of flow, through or around the section or sections of host pipe that are to be repaired.

2. Contractor shall video inspect the service lateral immediately prior to the repairs of the lateral and connection. The Contractor shall use a self-leveling camera to determine the structural condition of the service lateral. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction or other condition exists that will interfere with the proper installation an acceptable lateral liner or lateral connection sealing and repair product.

3. The section of lateral pipe to be lined must be free of debris, obstructions, scale or any other material that reduces the effective diameter of the pipe.

4. All necessary work to repair the lateral-main joint shall be completed prior to commencing any service lateral pipe lining operation described herein.

5. If the service lateral lining process requires the installation of a cleanout, the Engineer must approve the Work before it is done.

3.02 LINER INSTALLATION

A. Inversion Method

1. The impregnated tube shall be inserted through an existing manhole or other access point by means of the Manufacturer's or Assembler's recommended installation process. The application of a hydrostatic head, compressed air, or other means shall fully extend the liner to the next designated manhole or termination point and inflate and firmly adhere the liner to the pipe wall.
2. The liner shall be installed at a rate less than 10 feet per minute at all times.
3. Liner shall not be installed through intermediate manholes unless specifically requested in advance in writing and approved by the Engineer.
4. Liner installation shall be in accordance with ASTM F 1216, Section 7.
5. When inversion is by hydrostatic head, the Contractor shall use methods that control the installation rate, accounting for the increase in hydrostatic head in pipes that have significant elevation change.

B. Pull/Winch Method

1. The impregnated tube shall be pulled into place within the host pipe with the aid of a power winch that is equipped with a device to monitor the force and prevent excessive tension and tube elongation.
2. The maximum allowable longitudinal elongation, or stretch, of the material shall be one (1) percent. The longitudinal stretch of the tube shall be gauged by comparing marker on the fully inserted tube to the actual length of pipe being rehabilitated.
3. The Contractor shall use a flexible and impermeable calibration hose to inflate the tube. The calibration hose may or may not remain in the complete installation. Hose materials remaining in the installation shall be compatible with the resin system used, shall bond permanently with the tube, and shall be translucent to facilitate post-installation inspection. Hose materials that are to be removed after curing shall be of non-bonding material.
4. Liner installation shall be in accordance with ASTM 1743, Section 6.

C. Finished Pipe Liner

1. The finished lining shall be continuous over the entire length of an installation run and be free of visual defects such as foreign inclusions, dry spots, pinholes, wrinkles, and de-lamination. The lining shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.

2. Any defect, which will or could affect the structural integrity, strength, capacity, or future maintenance of the installed liners, shall be repaired at the Contractor's expense, in a manner approved by the Engineer.

3. The beginning and end of the CIPP liner shall be cut flush at the inlet and outlet points in the manhole, and the ends sealed with a resin mixture compatible with the liner/resin system and shall provide a watertight seal. Sealing material and installation method shall be submitted to and approved by the Engineer prior to start of construction. Hydraulic cements and quick-set cement products are not acceptable.

3.03 LATERAL CONNECTION SEALING AND REPAIR PRODUCT INSTALLATION

A. All service lateral connections along a mainline to be CIPP lined shall receive a lateral connection sealing and repair product after installation of the mainline liner, unless the lateral has been recently replaced by a point repair or remove and replacement resulting in a new connection. After suitable cleaning and video inspection, introduce the fiberglass lateral connection sealing and repair product (top hat) from the mainline into the lateral as follows:

1. A flexible resin impregnated top hat tube that is sized to the service laterals will be inserted into the service lateral by means of a robotic manipulator device. The robotic device, together with a television camera, will be used to align the repair product with the service lateral connection opening. Air pressure, supplied to the applicator through an air hose, shall be used to insert the top hat into the service lateral pipe. The insertion pressure will be adjusted to fully deploy the top hat into the service lateral connection and hold it tight to the main and lateral pipe walls.

2. A resin-impregnated sample shall be retained by the installer for each installation to provide verification of the curing process taking place in the host pipe. This sample shall be hung in the entry manhole to simulate ambient conditions of the host pipe.

3. The inserted product will be inspected using a CCTV camera to confirm the product is correctly positioned and/or centered in the lateral opening prior to curing.

4. The pressure apparatus shall include a bladder of sufficient length in both the main and service lateral lines to extend beyond the ends of both the lateral tube and main line brim segments. A smooth transition from top hat to the pipe diameters without a step, ridge or gap between the product and the inner diameters of the service lateral and mainline host pipes must be achieved.

5. After insertion is completed, the manufacturer’s recommended pressure must be maintained on the impregnated product for the duration of the curing process. The liner is chemically cured at ambient temperatures or by a suitable heat source. The heating equipment shall be capable of delivering a mixture of steam and air throughout the liner bladder assembly to uniformly raise the temperature above the temperature required to cure the resin. The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of the soil). The

heat source temperatures shall be monitored and logged during the cure and cool down cycles. Once the sample piece in the manhole has cured, the bladder is deflated, removed from connection and returned to the manhole to repeat the cycle. Contractor shall recover the sample piece and label with upstream and downstream manhole numbers and footage from upstream manhole to service connection. Sample shall be submitted for testing.

6. The top hat insert shall seal to the inside wall of the mainline 3 inches minimum around the host lateral opening and to the lateral wall 18 inches minimum into the lateral pipe from the main host pipe. This bond seal shall be created by the resin cure and aided with the use of hydrophilic gaskets or hydrophilic caulk. The cured top hat must attain the cured physical strength of the lateral liner.

7. The Contractor shall install the top hat into the service lateral connection within five (5) days of the main line CIPP liner installation.

3.04 LATERAL CIPP INSTALLATION

A. After the top hat connection has properly cured, the CIPP service lateral pipe is installed.

B. The internal wall color of the cured liner must be a light reflective color so that clear detailed CCTV inspection can be accomplished.

C. The lateral CIPP must overlap the top hat installation a minimum of six (6) inches in the lateral host pipe and be properly cured and sealed according to manufacturer's recommendations.

D. Install CIPP as outlined in the latest version of ASTM F1216 for direct inversion installations.

3.05 TESTING

A. Material Testing

1. Provide certified test results of the properties of the cured lining material from the actual installed CIPP at a minimum of one location per each liner insertion setup. The cured CIPP shall be sampled and tested for flexural strength and flexural modulus in accordance with the requirements of ASTM D790.

2. Liner thickness shall be determined at a minimum of three (3) locations on a cut section of the liner using a method of measurement accurate to the nearest 0.005 inch. Wall thickness of samples shall be determined as described in ASTM F1743, Section 8.1.6. The minimum wall thickness at any point shall not be less than 87-1/2 percent of the design thickness.

B. Field Testing

1. Low Pressure Air Test: Mainlines without service connections shall be low pressure air tested in accordance with Section 22 13 00.

C. Top Hat Inspection and Testing

1. Finished liner shall be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, fins, pinholes, wrinkles, and other deformities.
2. All re-established services shall be smoke tested prior to backfill. Failures shall be completely removed and replaced until a successful test is achieved at no additional cost to the Owner.
3. Testing requirements of 3.05A and B shall also apply to service lateral lining and lateral connection sealing and repair products. The resin-impregnated sample for each installation shall be retained, labeled, and submitted to an independent laboratory, approved by the Owner.
4. The Engineer and the Contractor shall inspect each installation visually by CCTV. No infiltration of groundwater should be observed. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations. The pre- and post-construction CCTV inspection documentation in DVD format will become the property of the Owner. The test shall be repeated at no additional cost to the Owner until the results are satisfactory to the Engineer.

END OF SECTION

SECTION 33 05 16
UTILITY STRUCTURES

PART 1 : GENERAL

1.01 SUMMARY

A. Section includes:

1. Precast concrete manholes, vaults, pump station wet well and accessories.

1.02 REFERENCES

A. ASTM International (ASTM):

1. A48, Standard Specification for Gray Iron Castings.
2. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
3. C150, Standard Specification for Portland Cement.
4. C443, Joints for Concrete Pipe and Manhole Sections.
5. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
6. C857, Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
7. C858, Underground Precast Concrete Utility Structures.
8. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
9. C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
10. C1619, Elastomeric Seals for Joining Concrete Structures.

B. AASHTO Standard Specification for Highway Bridges.

C. ACI 318 Building Code Requirements for Structural Concrete.

D. Standard Specifications for Road, Bridge, and Municipal Construction, 2014 by the Washington State Department of Transportation.

E. Reference Document: Geotechnical Report, Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design, July 28, 2015, Landau Associates.

1.03 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Product technical data including:
   a. Catalog data.
   b. Acknowledgement that products submitted meet requirements of standards referenced.
   c. Manufacturer's installation instructions.
2. Fabrication and/or layout drawings:
   a. Include detailed diagrams of precast structures showing typical components and dimensions, reinforcements, weights and other details.
   b. Itemize, on separate schedule, sectional breakdown of each catch basin, manhole, and vault structure with all associated components and refer to drawing identification number or notation.
   c. Indicate knockout elevations for all piping entering each precast structure coordinated with the location and elevation of pipe and conduit shown on the Drawings.
   d. Field verified invert elevations of existing sewer piping for Manhole Base Liner for existing manholes.
3. Cement concrete mix design.
4. Reinforcement design based on specified Design Requirements in Paragraph 1.04.
5. Buoyancy design calculations for precast structures.
6. Structural design calculations based on the Basis of Rational Design, stamped by a professional engineer licensed by the State of Washington.
7. Manhole and wet well vacuum test results.

1.04 DESIGN REQUIREMENTS

A. Normal weight concrete per Specification Section 03 31 00.

B. Minimum concrete cover over reinforcement shall not be less than that required by ACI 318, if greater than ASTM C858 unless shown otherwise on the Drawings.

C. Minimum Loading Requirements:

1. Loading assumptions, unless noted otherwise on the Drawings, shall conform to ASTM C857 except as follows:
   a. Top slabs shall be designed for A-16 (HS20-44) Loading OR 250 PSF Live Loading, whichever is greater, unless otherwise indicated.

b. Wall and bottom slab design and uplift calculations shall include hydrostatic pressure from groundwater, with a design groundwater elevation equal to the ground surface, as recommended by the Geotechnical Report prepared by Landau Associates, dated July 28, 2015.

c. Live loads and weights for post-installed items such as internal piping, pumps, valves, sewage, concrete grout fill, etc. shall not be included in the buoyancy calculations.

d. Buoyancy calculations shall have a minimum factor of safety equal to 1.5.

e. Buoyancy resistance forces may include the following:

1) Weight of the precast structure.

2) Weight of the cast-in-place top slab shown on the Drawings within a footprint of 1 foot beyond outside edge of the precast structure.

3) Buoyant soil weight within the footprint of the extended base slab.

4) Buoyant soil weight within a wedge defined from the outside of the extended base slab to ground surface assuming a soil friction angle of 20 degrees. Frictional resistance forces between the concrete and soil may not be used for resistance in the buoyancy calculations.

a) Buoyancy calculations at PS-47 shall assume all lightweight backfill for a buoyant soil unit weight of 10 pcf.

PART 2 : PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Precast Concrete Structures:

a. Oldcastle Precast (basis of design).

b. H2 Pre-cast Inc.

c. Or accepted equal.

2. Watertight Manhole Frame and Cover:

a. MwayPro.

b. Or accepted equal.

3. Manhole Steps:

a. Bowco Industries, Inc.

b. Parson Environmental.

c. American Step.

d. Or accepted equal.

4. Premolded Joint Compound:

a. CS 440, ConSeal.

b. Kent Seal.

c. Or accepted equal.

5. Exterior Joint Wrap:

a. ConWrap CS-212, ConSeal.

b. WrapidSeal, CCI Pipeline Systems.

c. Or accepted equal.

6. Manhole Base Liner:

a. Predl Systems North America Inc. of Burnaby, B.C.

b. Or accepted equal.

B. Submit request for substitution in accordance with Division 1.

2.02 MANHOLE/WET WELL AND VAULT STRUCTURE COMPONENTS

A. Manhole/Wet Well components:

1. Reinforcement: ASTM C478.

2. Concrete Mix:

a. Constructed with Portland ASTM C150, Type I/II cement blend for a marine environment.

3. Minimum wall and base thicknesses: As determined by precast manufacturer based on specified Design Requirements, minimum if noted on the Drawings.

4. Provide the following components for each manhole/wet well structure as appropriate:

a. Extended base (precast) with integral bottom section. Extended base dimensions and thickness shall be determined by precast manufacturer to accommodate the specified Design Requirements in Paragraph 1.04. Extended base shall be designed to the minimum dimensions noted on the Drawings.

b. Precast bottom section(s).

c. Precast barrel section(s), minimized to reduce number of joints.

1) Joints shall be located a minimum 6 inches from a pipe penetration, cast or cored.

d. Precast eccentric transition section.

e. Precast adjuster ring(s).

f. Precast concrete transition section.

5. Provide manhole section with minimum inside dimensions as shown on the Drawings, minimum 48 IN.
6. Interior and exterior surfaces shall be sacked and/or ground smooth to provide a uniform surface.
7. Wrap all joints with 8-inch wide Exterior Joint Wrap after installation.
8. Coat interior and exterior surfaces of manholes and wet wells as specified in Section 09 96 00.
9. Manholes and wet wells shall be vacuum tested and visually inspected as specified in this Section.

B. Vaults components:

1. Reinforcement: ASTM C478.
2. Concrete Mix:
   a. Constructed with Portland ASTM C150, Type I/II cement blend for a marine environment.
3. Minimum dimensions: As indicated on the Drawings.
4. Minimum wall thicknesses: As determined by precast manufacturer based on specified Design Requirements, minimum if noted on the Drawings.
5. Provide the following components for each vault:
   a. Extended base (precast) with integral bottom section. Extended base dimensions and thickness shall be determined by precast manufacturer to accommodate the specified Design Requirements in Paragraph 1.04. Extended base shall be designed to the minimum dimensions noted on the Drawings.
      1) Cast floor drain specified in Section 22 05 00 into base.
      2) Pitch floor at a minimum of 1/4-inch per foot to drain during casting or with high strength non-shrink grout.
   b. Precast bottom section(s).
   c. Precast riser section(s), minimized to reduce number of joints.
      1) Joints shall be located a minimum 6 inches from a pipe penetration, cast or cored.
   d. Precast solid wall and solid center construction.
   e. Aluminum ladder as shown on the Drawings.
6. Interior and exterior surfaces shall be sacked and/or ground smooth to provide a uniform surface.
7. Wrap all joints with 8-inch wide Exterior Joint Wrap after installation.
8. Coat interior and exterior surfaces of vaults as specified in Section 09 96 00.

C. Pipe penetrations in precast structures:

1. Pipe and conduit penetrations larger than 6 inches in diameter shall be precast with the structure in the location and elevations shown on the Drawings. All penetrations below 6 inches in diameter may be core drilled in the field by the Contractor if allowed by the precast manufacturer.

D. Watertight Manhole Frame and Cover:

1. Frame and cover shall meet load rating EN124:1994 C250.
2. Material shall be fiberglass composite for both frame and cover.
3. Clear opening shall be 30-inches.
4. Cover shall be watertight with a replaceable gasket.
5. All component parts shall be resistant to chemical attack, fuels, salt and water or a combination of the above over the lifespan of the cover and frame. Surface discoloration is acceptable in service.
6. Manhole frame and cover shall be cast into a precast flat top of diameter and thickness shown on the Drawings.

E. Manhole Steps:

1. Injection molded copolymer polypropylene conforming to ASTM D4101 that encapsulates a 1/2-inch diameter, Grade 60 ASTM A615 deformed steel reinforcing bar.
2. Meet ASTM C478, ASTM C497, AASHTO M199, and OSHA related standards.
3. Steps provided in accordance with ASTM C478 shall conform to ANSO 14.3.

F. Joint Treatment:

1. Joints of precast manholes/wet wells and vault base, riser, and top sections:
   a. Manholes/Wet Well: rubber gaskets conforming to ASTM C443.
   b. Other Joints: Rubber gasket or self-sealing mastic type waterstop, Greenstreak, Lockstop, or accepted equal to provide a watertight seal on the interior.

G. High Strength, Non-shrink Grout: as specified in Section 03 60 00.

H. Manhole Base Liner:

1. Where indicated on the Drawings, new and existing manholes shall be provided with prefabricated fiberglass reinforced plastic (FRP) Manhole Base Liners. New Manhole Base Liners shall be integrally cast and adequately anchored inside new precast manhole base sections during the concrete casting process at the manhole suppliers manufacturing facility. Existing Manhole Base Liners shall be sized by the manufacturer

to fit within the existing manhole and grouted in place in the field. Contractor shall field verify invert elevations of existing sewer piping prior to manufacture of base liner. The base liner shall be a one-piece construction of unlayered, homogenous composite with minimum thickness of 0.12” (3 mm) and shall be in lengths and nominal inside diameters corresponding to the new or existing concrete base section.

2. The Manhole Base Liner shall include full flow channels with side-walls to the crown of the largest diameter pipe. Channels shall be constructed with orientation and inverts as shown on the Drawings. The inner surface of the bench shall be provided with an anti-skid pattern. For new manholes, watertight gasketed pipe bell connections to suit specific pipe types, grade and alignment, shall be monolithically attached to the base liners and shall extend to the outside profile of the concrete structure. For existing manholes, Link Pipe Sewer Sealer or approved equivalent shall be used to repair the exterior piping once Manhole Base Liner has been installed.

3. The outer surface of the liner shall be aggregate coated and have steel spirals/lattice bonded to the FRP in order to insure adequate anchoring to concrete base sections to pass vacuum testing with 10” of negative pressure.

4. The inside liner surfaces shall be free of bulges, dents and other defects that result in a variation of inside diameter of more than 1/4” (7 mm) for base liner flow channel and pipe connections. The precast concrete pipe penetration joint surfaces shall be free of excess concrete at external and internal surfaces to insure a proper seal between the pipe connection and the liner.

5. The FRP polyurethane hybrid polymer liner shall be a non load-bearing component, which is resistant to the chemical environment normally found in wastewater collection systems. The liner shall be prefabricated rigid FRP sections of unlayered homogeneous composite with an aggregate coated outer surface to insure adequate mechanical anchoring of FRP liner to the concrete base section. Base liner properties shall be in accordance with the following:

   a. 0.12” (3mm) minimum thickness.

   b. Fiberglass (Type E Glass).

   c. Minimum length of fibers = 0.625 inches.

   d. Content by weight 10% - 12%.

   e. Inert Filler.

   f. Content by weight 10% - 13%.

   g. Bonding aggregate - prewashed, cleaned; dried, fractured 3/8” gravel.

   h. Graded particle size minimum 0.08” and maximum 0.12”.

   i. Rate of application - 3.5 lb/ sq ft.

   j. Density of F.R.P. Polyurethane Hybrid Composite (ASTM D1622) - 1.17g/cm3.

k. Shore “A” Hardness Durometer (ASTM D2240) - Exceeds 90 on scale.

l. Percolation Test - Water absorption of top surface - 0.032%.

m. Thermal shock (CSA-B45-M93) 100 thermal cycles – no sign of defects.

n. Chemical Resistance (Selected Reagents) (ASTM D1308):

Nitric Acid 69%	No surface Degradation - Surface Staining
Hydrochloric Acid 60%	No surface Degradation
Ammonia 28%	No surface Degradation
Sodium Hydroxide 5.25%	No surface Degradation
Sulfuric Acid 50%	No surface Degradation
Sulfuric Acid 70%	No surface Degradation
Sulfuric Acid 80%	No surface Degradation
Acetone	No surface Degradation
Unleaded Gasoline	No surface Degradation
Turpentine	No surface Degradation
Acetone Immersion (ASTM. D2152)	No attack

PART 3 : EXECUTION

3.01 MANHOLE/WET WELL AND VAULT CONSTRUCTION

A. Precast concrete manholes/wet wells and vaults with integral bottom section:

1. Ensure accurate vertical placement and leveling prior to placement.
2. Provide vertical alignment tolerance of maximum 1 IN horizontal to 10 FT vertical.
3. Prechannel manhole inverts with a semi-circular bottom conforming to the inside contour of the adjacent sewer sections:
   a. Channels shall be prechanneled with concrete extending to the spring line of the largest diameter pipe penetration or higher.
   b. Shape inverts accurately and smoothly to minimize turbulence and give them a steel trowel finish.
   c. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit.
   d. Slope benches from the manhole wall towards the channel at a minimum of 1/4 inch per foot.
4. Build each manhole and vault structure to dimensions shown on Drawings and at such elevation that pipe sections built into wall of manhole will be true extensions of line of pipe.
5. Provide reinforcing around openings for pipe or duct penetrations per ACI 318.

B. For all horizontal mating surfaces between concrete and concrete or concrete and metal, seal joints with rubber gaskets in a manner similar to pipe joints conforming to ASTM C443 or ASTM C1619. In addition, all joints shall be provided with an Exterior Joint Wrap.

C. Catch basins, manholes/wet wells, vaults, and inlets shall be watertight.

D. Pipe to manhole connections as shown on the Drawings.

E. Joints in structures shall be located a minimum 6 inches from a pipe penetration, cast or cored.

F. Set and adjust frame and cover final 6 IN (minimum) to 18 IN (maximum) to match finished pavement or finished grade elevation using precast adjuster rings.

3.02 MANHOLE BASE LINER

Install Manhole Base Liner in new and existing manholes in strict accordance with the manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

A. Manhole/Wet Well Testing:

1. Vacuum Testing:

   a. Prior to backfill and interior coating installation, vacuum test manholes and wet well system according to ASTM C1244.

2. Visual Inspection Testing:

   a. After backfill and release of groundwater to its natural level, observe inside of structure for groundwater infiltration. Contractor shall perform corrective action as approved by the Engineer to eliminate any infiltration, at no cost to the Owner.

B. Precast reinforced concrete risers and tops shall be subject to rejection on account of failure to conform to any specification requirements. In addition, individual sections of risers and tops may be rejected because of any of the following reasons:

1. Fractures or cracks passing through shell, except for single end crack not exceeding depth of joint.
2. Defects indicating imperfect proportioning, mixing and molding.
3. Surface defects indicating honeycombed or open texture.
4. Damaged ends where such damage would prevent making satisfactory joint.
5. Manhole steps out of line, or not properly spaced.
6. Visible infiltration.
7. Internal diameter of section varying more than 1 percent from nominal diameter.

8. Any continuous crack having surface width of 0.01 in. or more and extending for length of 12 inches or more, regardless of position.

END OF SECTION

SECTION 40 73 00
PRESSURE GAUGES

PART 1 : GENERAL

1.01 DESCRIPTION OF WORK

A. Section Includes:

1. Instruments for pressure measurement for sewage systems.

1.02 SUBMITTALS

A. In accordance with the provisions of Section 1-06, submit the following:

1. Catalog data for performance and operation of the gauges and appurtenances.
2. Calibration certification for factory calibration of sewage pressure measurement assemblies.
3. Operation and Maintenance Data.

PART 2 : PRODUCTS

2.01 PRESSURE SENSOR

A. PRESSURE SENSOR RING: The pressure sensor shall consist of a full-faced, through-bolt body sealed from the sewage within the pipeline. The lining shall be suitable for sewage service. The non-wetted body shall be constructed of carbon steel. Mating flanges shall be ANSI B16.5 Class 150, Type 316 stainless steel, sized to match nominal pipe diameter shown on the Drawings.

B. NEEDLE VALVE: A ¼-inch needle valve shall be provided as shown on the Drawings. The valve body shall be 316 stainless steel.

C. PRESSURE GAUGE: The pressure gauge shall be a 2.5-inch diameter severe service gauge. The body shall be stainless steel. Internal components shall be stainless steel. The gauge shall be filled with glycerin. The pressure range shall be 0 to 30 psi. The connection shall be ¼-inch.

D. PIPE FITTINGS: ¼-inch pipe fittings shall be constructed of Type 316 stainless steel and provided by the Pressure Sensor manufacturer for a complete assembly as shown on the Drawings.

2.02 ACCEPTABLE MANUFACTURERS

A. Ashcroft or Red Valve Company, Inc.

1. Accessories may be by different manufacturer's, however, assembly shall be factory assembly by one supplier and shipped as one unit.

B. Accepted equal.

PART 3 : EXECUTION

3.01 INSTALLATION

A. Install in accordance with the manufacturer's recommendations.

B. Field test assembly for accuracy.

C. Pressure sensor assemblies or gauges that fail the field test shall be removed and replaced.

END OF SECTION

SECTION 40 90 00
INSTRUMENTATION AND CONTROLS

PART 1 : GENERAL

1.01 SUMMARY

A. This Section is **intended** to specify the components of the instrumentation and control system including: control panel(s) and the general requirements for the construction and arrangement of the associated equipment and field instrumentation.

B. Work and materials specified in this Section include:

1. PLC control cabinet(s) (MCP), I/O, and associated equipment and instrumentation.
2. Motor starters and power distribution equipment.
3. Field Instrumentation, installation and calibration requirements.
4. Shop and field testing, and calibration of power & control system components and equipment.

1.02 SYSTEM DESCRIPTION

A. Provide three PLC based control panels (MCP) (one for each station) with AB compact logix PLC for all equipment control, monitoring and alarming.

B. Provide field instrumentation and control devices and installation details.

1.03 SYSTEM INTEGRATOR

A. The System Integrator shall be responsible for the final design and assembly of the instrumentation and control system and control panels.

B. All programming of the PLC and operator interface shall be by the System Integrator per the descriptions in PART 4 of this Section.

C. The System Integrator shall configure the relocated Radio and set up and test all communications to the central SCADA system.

D. The System Integrator shall be responsible for the final design and assembly of the entire I&C system. The system shall be designed to provide the control capabilities and functions indicated and implied by the plans and these specifications and to provide trouble-free operation with minimum maintenance. The system shall readily enable manual operation of any and all functions in the event of failure of any one component.

E. The Contractor shall select one System Integrator from the following acceptable companies:

1. L2 Systems, LLC - Everett, Washington
2. Quality Controls - Lynnwood, Washington

3. Technical Systems, Inc. - Lynnwood, Washington

F. Other alternate System Integrators not listed above shall not be considered.

1.04 REFERENCES

A. All equipment and materials shall conform to the latest revised editions of applicable standards published by the following organizations:

1. American National Standards Institute (ANSI).
2. Institute of Electrical and Electronic Engineers (IEEE).
3. National Electrical Manufacturer's Association (NEMA).
4. Underwriters' Laboratories (U/L).
5. Instrument Society of America (ISA).

B. All electrical equipment and materials, and the design, construction, installation, and application thereof shall comply with all applicable provisions of the National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and any applicable Federal, State, and local ordinances, rules and regulations.

C. All materials and equipment specified herein shall within the scope of UL examination services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.

D. All control panels shall bear a label by UL or by an approved testing authority for the completed assembled panel.

1.05 SHOP DRAWINGS

A. The System Integrator shall develop any shop drawings required for design, fabrication, assembly and installation of the power and control panels. Shop drawings shall include all drawings required in manufacture of specialized components and for assembly and installation of them. Shop drawings shall include detailed "end-to-end" control wiring diagrams showing all interface of field equipment and instrumentation. In addition the following drawings shall be provided:

B. CONTROL CABINET LAYOUT DRAWINGS

1. The System Integrator shall develop shop drawings for the control cabinets and wiring and terminals within the control cabinets to show all details of the control system. Drawings shall include scaled drawings of both interior and exterior elevation views. All components shall be identified by both the nameplate information and also the component number related to the bill of materials.

C. EQUIPMENT AND INSTRUMENT WIRING DIAGRAMS

1. The System Integrator shall provide individual wiring diagrams (one drawing) for each field instrument and for each controlled motor load. All wiring interface for each instrument or equipment shall be shown on a single drawing* and the drawing shall be titled with the equipment or instrument name and number. Each drawing shall including field devices, PLC I/O and motor control, etc. associated with that instrument or equipment. Include all terminals, terminal numbers, wire numbers (both internal and field), PLC I/O and memory address, and equipment TAG number.

   ** for instruments of the same type - if space allows then more than one instrument of the same exact type may be shown on a single drawing. This exception applies for instruments only, not for equipment.*

D. CARD DRAWINGS

1. The System Integrator shall provide the information for each input and each output of the PLC on "PLC Card drawings". All details of each card must be shown on a single drawing – one I/O card per drawing*. Each I/O point shall be designated with the memory address, point id tag number, point description and wiring diagram reference drawing number.

   *cards of the same type – if space allows, then more than one card of the same exact type may be shown on a single drawing.

E. TERMINAL ARRANGEMENT DRAWINGS

1. Provide terminal layout drawings that show the layout of all terminals in the cabinet.

F. Shop drawings shall be drawn in AutoCAD 2000 or newer version and include the following:

1. Technical data sheets for all components with the complete part number of the component clearly designated with all required options.
2. Arrangement drawings of all cabinet front-mounted and internal-mounted instruments, switches, devices, and equipment indicated. Show all panel mounting details required. Include outer dimensions of all panels on the drawing. Deviations from approved arrangements require resubmittal and approval prior to installation.
3. Arrangement drawings shall be drawn to scale using standard Architectural or Engineering scales.
4. Shop drawings shall be provided on sheets no larger than 11" X 17". Shop drawings shall include specific product detail such as rating, size, and number of contacts, etc. Wiring diagrams shall be included for all components in the system including control equipment supplied with mechanical devices.

5. For shop drawing packages provide the drawings in a separate 11” X 17” binder with an index for the drawings at the front.

G. Installation details shall include the size, number, type and location of interconnecting wiring and conduit, installation of cabinets and enclosures, installation of sensors, instruments, limit switches, and other installation requirements. Shop drawings shall be submitted to Engineer for review and approval.

1.06 SUBMITTALS

A. Submittal Requirements

1. Submittal documents shall conform to the requirements of Section 1-06, Section 26 00 00 and the following.
2. I&C submittals shall be provided in two completely separate documents one with all product data and a second with all shop drawings as follows:
   a. All products shall be included in a <u>single</u> PDF document including the cover sheet and index and bill of materials (BOM) in <u>one single document</u>. – Index the PDF document to show each individual product in the index column.
   b. Shop drawings shall be included in a single PDF document including the cover sheet and index in <u>one single document</u>.
3. Submittals shall be indexed and identified as follows:
   a. Email <u>subject line</u> shall be “project name, EI&C submittal submittal #, spec section# - description.”
   b. Cover sheet with:
      1) the project name and submittal #
      2) Contractor's and sub-contractor’s name, phone number, and email address.
      3) BOM bill of materials showing each product being submitted.
      4) List of deviations from specified components
   c. PDF index tabs per the electrical specifications by section and paragraph or equipment name e.g. provide a minimum of one tab section for each piece of equipment in all of the PART 2 PRODUCT Sections 2.01 - 2.
4. Per the general submittal requirements in other sections of this specification and the following. The System Integrator shall develop and shall submit to the Engineer the following project data:
   a. A detailed project schedule relating specifically to I&C - showing submittals, review time, long lead equipment, panel fabrication, expected site delivery date - startup, etc. Highlight any anticipated critical path tasks. Provide a copy with the submittal and e-mail in PDF.

b. All shop drawings: (provide an electronic copy, in AutoCAD of all shop drawings on CD ROM to the Engineer with the submittals, revised submittals, and with final as-built drawings).

c. Cut sheets for all products with a BOM - Bill of materials showing quantity, Manufacturer, catalog number, and the supplier name and phone number and relevant spec. paragraph number. Number each item in the bill of materials and relate the bill of materials to the submitted product index.

d. I/O checklist that verifies that all control and status/indication points in the control panels both implemented and spare have been tested. One copy of the I/O Checklist shall be submitted for the start of the Factory Test. One copy of the I/O Checklist shall be submitted prior to the Control system startup. The PLC Card drawings shall be used for this purpose.

5. Provide reference numbering on all cut sheets to relate them to the bill of materials. Provide same reference numbering by the equipment shown on the shop drawings.

6. Provide a listing of all spare parts to be provided.

1.07 COORDINATION WITH OTHER EQUIPMENT

A. The System Integrator shall be responsible for obtaining all necessary information/product data (wiring diagrams, load data, etc.) for other equipment and instrumentation used in the project that requires integration into the power and control system – even for equipment and instrumentation outside the System Integrator's scope of supply. This may include, but is not limited to (standby generator, ATS, flow transmitters and other instrumentation, control valves, motor data, etc.)

B. System wiring diagrams shall include information from other equipment.

C. See PART 4 of this Section for additional requirements.

1.08 NAMEPLATES

A. Nameplates shall be provided on all electrical devices – (equipment, instruments, boxes, etc.).

B. Nameplates shall also be provided on all electrical panel interior and exterior equipment (including but not limited to: relays, I/O cards, circuit breakers, power supplies, terminals, contactors, switches, indicating lights, buttons, meters, and other devices.)

C. Equipment nameplates shall have both the equipment name and number and equipment circuit number (if applicable).

D. INSTRUMENT NAMEPLATES: Provide nameplates for all instruments with instrument name, number, and the ckt breaker, or fuse location for the power source. For nameplates that cannot be attached to the instrument provide a stainless steel cable ring to attach it to the instrument.

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

F. Relays shall be provided with 2 nameplates, one on the backpan by the relay base and one on the face of the relay.

G. Provide warning nameplates on all panels and equipment which contain multiple power sources. Provide nameplates describing locations of power sources and disconnects. Provide any other warning or information nameplates as required by NEC or UL.

H. Nameplates shall be secured to equipment with stainless steel screws/fasteners. Epoxy glue or other quality adhesive may be used where fasteners are not practical if first approved by the Engineer.

PART 2 : PRODUCTS

2.01 GENERAL

A. Design and Assembly

1. All equipment and materials utilized in the system shall be the products of reputable, experienced manufacturers with at least five (5) years experience in the manufacture of similar equipment. Similar items in the system shall be the products of the same manufacturer.
2. All equipment shall be of industrial grade and of standard construction, shall be capable of long, reliable, trouble-free service, and shall be specifically intended for control and monitoring of operation of motor-driven pumps and equipment.
3. All equipment shall be of modular design to facilitate interchangeability of parts and to assure ease of servicing. All equipment, where practical, shall be of solid state, integrated circuit design.
4. The system shall be completely assembled in the shop by the System Integrator. All components and equipment shall be prewired to the maximum extent possible.
5. All components, including both internally and face-mounted instruments and devices, shall be clearly identified with phenolic nameplates of black background with white letters. Nameplates on the interior of panels shall be White Polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; TYTON 822 or accepted equal.

B. Interconnecting Wiring/terminals

1. All conductors shall be stranded wire with thermoplastic insulation and shall be cabled to groups and supported so as to prevent breaking and to present an orderly arrangement and neat appearance. All outgoing wiring shall be terminated on a marked terminal strip capable of connection of at least 2 No. 14 wires and all terminal connections shall be numbered throughout the system.

2. TERMINAL NUMBERING

   a. All field terminals shall have UNIQUE TERMINAL NUMBERS. This also includes NEUTRAL and LINE terminals shall be individually identified. (example NU1, NU2 .etc. for UPS neutrals N1, N2 etc for normal power neutral terminals.

   b. Terminal numbers and wire numbers shall relate to the equipment or component number. For example – all PLC I/O terminal & wire numbers shall be the PLC rack/slot/I/O number.

3. In general: all field control wiring shall be #14 AWG. Internal wiring may be smaller #16 or #18 is acceptable as long as it is sized for the load and circuit protection. PLC I/O wiring between the PLC cards and the terminal strips shall be pre manufactured bundled cables wire size shall be #18 - #22.

4. WIREWAYS

   a. Provide wire ways as necessary in the enclosure to contain all internal wiring and all field wiring that exists on this contract with consideration given to future space and the future wiring. Size wireways such that there is ample room for the numbers of wires that will be wired to the terminals or terminal space in the cabinet plus room for an additional 30% future wire.

   b. Provide corner wireways in the cabinet corners or as shown on the Drawings.

   c. Low voltage DC control and signal conductors shall be bundled separately from alternating current circuits. Separate raceways and wire gutters shall be dedicated for AC and DC wiring, and labeled as such on the shop drawings. Wiring may cross at right angles if necessary. Special caution shall be used for PLC I/O card wiring and field terminations to accommodate the separation of AC and DC circuits. Intrinsically safe wiring shall be physically separated from non intrinsically safe wiring.

   d. Internal wiring shall be in separate wireways from the field wiring.

5. All wiring and tubing crossing hinges shall be installed in a manner to prevent chafing. Bundles of similar conductors shall be clamped securely to the door and to the panel, and the bundles shall run parallel to the hinge for at least 12 inches. Spiral nylon cable wrap shall be provided in the hinge section of the bundle to fully protect the conductors or tubing against chafing.

2.02 PROGRAMMABLE CONTROL EQUIPMENT

A. Programmable Logic Controller (PLC)

1. The PLC in the main control panels shall be Allen-Bradley CompactLogix. No equal.
2. Provide PLC processors with on board Ethernet communications.
3. Provide all PLCs with EEPROMS.
4. PLC rack w/ spare slots – if applicable.
5. 24VDC digital input cards.
6. 24VDC digital output cards. All digital outputs shall interface with the output relay terminals.
7. Analog input cards with individually isolated points.
8. Analog output cards with individually isolated points.
9. Note combination cards are not allowed except with special permission from the Engineer.
10. Provide power supplies as required and recommended by the manufacturer.
11. Spare and empty slots in the PLC rack shall be covered with a blank slot filler.
12. Provide all necessary power supplies as required and recommended by the manufacturer.
13. Provide isolated fused circuit for power to PLC.
14. Spare and empty slots in the PLC rack shall be covered with a blank slot filler.

B. Additional I/O

1. System Integrator shall provide all I/O necessary for the operations of the equipment and instrumentation for the project and as shown on the wire diagrams. The System Integrator shall provide additional I/O for the equipment and instrumentation that is outside of the System Integrators scope of supply, but still needs to interface with the control panel as described in PART 4 of this specification. Include the additional I/O when calculating the required spare I/O below.

C. Spare and Future I/O

1. INSTALLED SPARE: Provide all necessary analog and digital I/O for the project plus 15% installed spare, (round up to the nearest whole number) in each cabinet. Provide terminals for all installed PLC I/O cards (including spares) to match the number of points in the card. For all spare I/O provide interface wiring to terminals.
2. Provide 1 spare fused disconnect for every 4 spare digital input terminals.

3. Spare digital outputs shall all be provided with interposing relays with one form C output wired to two terminals for a normally open contact interface.
4. For each spare analog input provide one fused, and two non fused wired for a loop powered instrument input. Provide one shield ground terminal for every two spare analog inputs.
5. FUTURE: Provide spare space to the right of the PLC for at two additional cards. Provide spare din rail for the additional terminals associated with the additional I/O cards (minimum of 12” for digital and 12” for analog terminals) and also account for the additional room in the wireways for the future wire.

2.03 COMMUNICATIONS EQUIPMENT

A. Ethernet Communication Module

1. Provide Ethernet communications on the PLC processor for communications.

B. Ethernet Communications Switch

1. All Ethernet switches used for this project shall be made by the same manufacturer.
2. Provide an Ethernet switch with ports as required as shown on the Drawings plus 1 spare port. Ethernet switches shall be din rail mountable. The switch ports shall be configurable for either 10 or 100 base T. Hirschmann or N-Tron or EtherTrak, or accepted equal. Provide mounting and power circuits as required for the equipment.

C. Ethernet / Receptacle Interface Module

1. Provide a combination Ethernet port/ 120V receptacle unit mounted with clear plastic hinged cover on the front door of each control cabinet with a PLC. So that the programmer can plug in without opening the cabinet door.

D. Radio and Telemetry Equipment

1. Relocate individual telemetry panels for each station as shown on the plans.
2. Provide the following discrete telemetry points back to the Owners SCADA system:
   a. Utility power loss
   b. Dry well flood
   c. High wet well
   d. Low wet well
   e. Pump fail

f. Gen fail

g. Intruder

h. Pump 1 running

i. Pump 2 running

3. Provide the following analog telemetry points back to the Owners SCADA system:

   a. Flow

   b. Wet well level

4. Reinstall Radio Antenna mounted on mast per the plans. Install per Owners direction and Manufacturer's recommendations.

5. Provide Antenna Cable wired to surge protected bulk head at the cabinet.

   a. Provide communications cables for interface to the Radio and PLC and Operator Interface.

   b. Provide Coax cable to extend from the Radio in the MCP to the Antenna. Cable shall be Times Microwave Systems - LMR-400DB or accepted equal cable must be less than 2.7dB loss per 100 ft at 450 MHz.

   c. Provide all necessary fittings, bulkhead fittings, etc. for a complete Radio/antenna installation.

   d. Provide cable lightning arrestor and any other components as recommended by the Manufacturer:

6. Provide separate power supply rated for the radio requirements.

2.04 PROGRAMMING OF PROGRAMMABLE CONTROLLER

General: The programmable controller and operator interface shall be programmed by the System Integrator for all required control, monitoring, and alarming of the packaged system.

2.05 SUPPORT EQUIPMENT AND SOFTWARE

A. Provide one copy of current version of PLC programming software to the Owner. For software registration information please contact the owner to insure the correct name and address information is used.

B. Provide one PLC to PC programming cable to the Software Owner.

C. Provide one copy of current version of operator Interface development software to the Owner.

2.06 EQUIPMENT ENCLOSURES

A. Cabinet Size

1. Sizes of enclosure for the control cabinet shall be chosen by the System Integrator to provide ample space for the installed components and still fit within the given space in the structure. The enclosure shall be free standing.
2. The enclosure minimum size shall be as shown on the Drawings, unless otherwise indicated on the Drawings. With Engineer's approval, the Integrator shall upsize the cabinet if necessary to fit in the components.

B. Control Cabinets

1. Outdoor Cabinets shall be NEMA 3R – Stainless Steel, or Aluminum – with Stainless steel hinge pins and door handles.
2. Provide all control cabinets with a drip shield.
3. Cabinets shall be hinged with stainless steel pins.
4. Cabinets shall be provided with a stainless steel 3 point latch.
5. Provide all control cabinets with a data pocket and insert the cabinet drawings in the pocket when shipped to the site.
6. Provide all control cabinets which house PLC equipment with a 12x12" folding shelf HOFFMAN A-CSHELF12 or accepted equal. Also provide an Ethernet port and 120V receptacle with a hinged clear cover for laptop interface on the outside of control panel door.
7. Provide corrosion inhibitors in all control cabinets prior to shipping. Amount of inhibitor shall be provided for the volume of the enclosure for one year. HOFFMAN AHC series or accepted equal.
8. Enclosure shall be manufactured by Hoffman Products, Inc. or accepted equal.

C. Enclosure Door Latches

1. Door latches on all enclosures shall be fast operating type 3-point latch door handle.
2. NEMA 4 and 4X shall also have 3-point latch if possible, but where a 3-point latch will not meet rating requirements and also for all types of enclosures that are too small for a 3 point latch use fast operating clamp assembles. Hoffman Bulletin A-80 or accepted equal. The latch handle shall operate toward the center of the panel to open the door, and be pointing down when closed.
3. Small boxes and control stations shall have 2 screw driver or hand operated latches.

D. Folding Shelf / Door Stop

1. Provide a 12”x12” folding shelf on the door to all cabinets with remote I/O or PLC’s for supporting a laptop computer. Hoffman A-CSHELF12 or accepted equal.
2. Mount the shelf so that when the cabinet is installed, the shelf will be 36” – 40” above the floor.
3. On all cabinet doors with a folding shelf, provide a doorstop, Hoffman A-DSTOPK ALGSTOP-2 or accepted equal.

E. Wireways

1. Provide molded plastic wireways, slotted for wire connections for all wiring in the panels. They shall be complete with covers. Wireways shall be manufactured by Panduit or Taylor, or accepted equal.

F. Air Conditioner

1. Provide a fan-driven air conditioning unit with 120 VAC line thermostat on side of each control enclosure which houses instruments, relays, PLC’s, starters, or other solid state devices; located outdoors in direct sunlight. The thermostat shall be adjustable between 70°F and 100°F. Provide correct wattage and voltage for the required application. Provide required openings in enclosure sealed to prevent water intrusion. Air conditioner shall be nominal 4000 BTU/hr closed-loop, sealed system. Air conditioner shall be designed for use in a marine environment with outdoor coils coated for corrosion. Enclosure shall be stainless steel NEMA 4X.

G. Strip Heater

1. Provide a 100 watt (or as shown on the plans) resistance heater with 120 VAC line thermostat in each control enclosure located outdoors or in moist environments. The thermostat shall be adjustable between 50°F. and 80°F or preset at 60°F. Provide heater with aluminum mounting plate for application in a non-metallic enclosure. The heater shall be silicone rubber type as manufactured by WATLOW ELECTRIC , St. Louis, MO. or accepted equal.

H. Panel Light, Switch and Convenience Outlet

1. Provide LED lights with manual switch in control panels that contain a PLC rack, relays, or other equipment that would require troubleshooting or operator access for normal operation. Provide a simplex outlet, 120VAC 15A, in all panels that require a computer or other maintenance tools that may need a power source. These shall be on a separate dedicated circuit.

2.07 TERMINALS

A. General

1. Provide terminals blocks arranged as described in this specification.
2. PLC card – I/O terminal blocks shall be grouped together to match the terminal arrangement of the PLC card that they are connected to.
3. TERMINAL NUMBERING
   a. Provide unique terminal numbers for all field wired terminals.
   b. Terminal numbers and wire numbers shall relate to the equipment or component number. For example – all PLC I/O terminal & wire numbers shall be the PLC rack/slot/I/O number.
   c. Do not use drawing numbers as a part of the wire or terminal number. The drawings shall use drawing number references on all wires that connect between drawings or are shown on more than one drawing.
4. Provide terminals for all wire connections to field wiring and internal power distribution. For all terminals (including line voltage and neutral terminals) that are used for wiring out to field devices provide unique terminal numbers.
5. Provide spare din rail space and spare terminals as indicated by the Drawings or these specifications.
6. For all energized circuits (power and control) powered from the panel and extend outside of the panel provide an individual fused terminal with appropriate fast blow fuse (1/2 amp for PLC inputs) and “blown fuse” indicator light for each circuit and unique terminal number.
7. For all signal circuits that extend outside of the panel provide an individual fused terminal with appropriate fusing and integral blown fuse indication. All 4 to 20 mA circuits shall be individually fused with a 1/16 amp fast blow fuse; and blown fuse indicator.
8. For all energized circuits powered outside of the panel which extend into the panel, provide a disconnecting terminal to isolate each individual circuit.
9. Provide fusing of all DC circuits with appropriately sized fuses and blown fuse indicators.
10. Analog loops that are 24 VDC powered shall have a knife switch to disable the loop.
11. Connections shall have compression terminals capable of terminating 2 #14 AWG stranded wires. Terminals shall be DIN rail strip mounted Provide number strips for terminal blocks that are referenced by the wire marker. Provide bridge bars for jumpering between terminal blocks. Provide end clamps to separate and terminate terminal block groups. Provide end covers for groups of terminal blocks in sets to match the number points associated with individual I/O cards in the PLC rack.

12. Provide Separation Plates on each side of terminals that are at a different potential or polarity than surrounding terminals.
13. Provide clear plastic DIN rail mounted nametag stanchions for each block of terminations. Each nametag shall hold a preprinted label designating the PLC rack and PLC card (slot) that terminates to that set of terminals.
14. Terminals shall be mounted such that there is a minimum of 2 inches of clear space on both sides of the terminal (between the terminals and the wireway); for ease of wiring and so that the entire wire tag will be visible outside the wireway.
15. Mount all terminals strips on 2” standoffs from backpan.
16. Provide wired terminals to match the number of points supplied on each I/O card in a cabinet.

B. General Purpose and Digital Input Terminals

1. Terminal Blocks for general purpose and digital input terminations shall be Phoenix Contact UK 5, or accepted equal. Provide UKK5 Double Hi, or accepted equal, if space is limited.

C. Analog Input Terminals

1. Terminal Blocks for use in analog input terminations shall be knife disconnect type, Phoenix UK 5-MTK , or accepted equal.
2. Provide one ground terminal for every two analog inputs for grounding the shield.
3. Provide a fused terminal with a ¼ amp fuse and blown fuse indicator for all analog inputs for loop power.

D. Analog Output Terminals

1. **UKK 5** Terminal blocks for analog outputs shall be fused, double hi with a separate ground terminal, or accepted equal.

E. Digital Output Relay Terminals

1. Provide interface/interposing relays for all digital outputs that extend out of the control panel and for all spare and future digital outputs. Relays shall be individual form C relays, or accepted equal. Interface to digital output cards or relays as required to interface I/O module to DIN rail mounted relays, or accepted equal.
2. Relay output cards are not to be used unless specifically allowed by the Engineer. All digital outputs shall interface with individual output relays. Panel mounted devices may be directly powered by the output card if approved by the Engineer.
3. Provide relays to match the number of points supplied on each digital output card in a cabinet.
4. Provide two descriptive labels for all relays. – One label on the backpan and one label on the relay.

F. Fused Terminals

1. Fuse terminal blocks shall be hinged disconnect level type with “blown fuse” indicators. PHOENIX CONTACT UK 5 HESI series, or accepted equal.

G. Test And Calibration

1. Provide 1 set for each Cabinet supplied plus 1 spare set consisting of:

   a. Short Circuit Plug, 1 pair of Reducing Plugs, 1 pair of Test Adapters.

H. PLC I/O to Terminal Wiring

1. Provide pre-manufactured round multi-conductor cable for connection of PLC cards to terminal blocks. The number of wires in the cable shall match the number of points on the PLC I/O card for digital points. Each conductor shall be an individual color for digital inputs. The individual wires shall be #20 or #22 stranded. Provide Belden 9431 or accepted equal.
2. The wire used for analog inputs shall be multi conductor #20 or #22 twisted pairs with an overall shield. provide pairs to match the input cards. Wire pairs shall be numbered and colored red for + and black for, BELDEN 9431 or accepted equal.
3. The wire used for analog outputs shall be multi conductor #20 or #22 twisted pairs with an overall shield. provide pairs to match the output cards. Wire pairs shall be numbered and colored red for + and black for, BELDEN 9516 or accepted equal.

2.08 OPERATOR INTERFACE DEVICES

A. All operator interface devices mounted on the panel front shall be rated for the environment in which they will be located. Operator devices mounted outdoors, or in wet or corrosive environments shall be NEMA 4X rated.

B. Selector Switches

1. Selector switches shall be for use on 120 volt control circuits. Contacts shall have a continuous current rating of 10 amperes both inductive and resistive. Selector switches shall be of the heavy duty oil tight type. Allen Bradley 800T, 800H, GE CR104P, Square D Type K or accepted equal.

C. Push buttons

1. Push buttons and illuminated push buttons shall be for use on 120 volt control circuits. and shall have continuous current rating of 10 amperes both inductive and resistive. Pushbuttons for "emergency" "help" applications shall have maintained contacts and red mushroom head operators. Allen Bradley Bulletin 800T, 800H or accepted equal.

D. Indicating Lights

1. Indicating lights shall be push-to-test LED type. Illuminated pushbutton type with the pushbutton wired for the push-to-test function required. Appropriate lens caps shall be provided as shown.

E. Operator interface

1. Provide an operator interface. Provide a minimum 7” inch color graphic display with both a resistive touch screen and keypad. Interface shall be capable of color graphic displays. Software shall be RS View Studio Machine. Provide with Ethernet communications module. Operator Interface shall be Allen-Bradley panelview plus 700 no equal.
2. Provide all necessary software and hardware for a complete system.
3. Programming of the operator interface shall be done by the System Integrator

2.09 CABINET POWER DISTRIBUTION

A. Control Panel Circuit Breakers

1. Control panel circuit breakers shall be thermal-magnetic type, supplementary overcurrent devices. Circuit breakers shall be snap mountable on rails. Circuit breakers shall be sized for actual circuit load or as shown on the Drawings.
   a. Provide 2 spare installed 5amp circuit breakers or the number of spares shown on the Drawings, whichever is greater. Wire breakers out to terminals and provide number of spare neutral terminals to match number of hot terminals.
   b. Provide 2 spare “hot” terminals wired to the output of each spare breaker and 3 spare neutral terminals wired to the appropriate neutral.
2. Control panel circuit breakers shall be Allen-Bradley 1492-CB, or accepted equal.
3. In all control panels, provide a laminated drawing of the panel power distribution circuit breakers for referencing all circuit breakers in the panel.

B. Grounding

1. Provide 3 spare ground terminals in each cabinet.
2. Provide a ground bus in each cabinet – minimum 6” long with screw terminals for grounding equipment and instrumentation.

C. Fuses

1. Provide, fuse pullers; (one for each type of fuse), for removal of fuses.
2. Provide blown fuse indicators on all fuses.

D. Power Supplies – Redundant Pair

1. Power supplies shall be switching type, voltage, & sized to be able to supply the demand. Units shall be closed frame DIN rail type and have overvoltage and overcurrent protection. Units shall have LED power on light and 2 sets of output terminals. Power supplies shall be sized for the load plus an additional 30% IDEC, SOLA Power Supply or accepted equal.
2. Power supplies shall be installed as a redundant pair. Provide one supervised power supply fail contact input for each power supply to the PLC for alarming.
3. Provide one fused and one non fused terminal for all DC circuits that extend outside the cabinet. Provide spare DC terminals for a minimum of 2 additional DC circuits or 20% whichever is the greater amount.
4. Provide one redundant pair of power supplies at 14VDC for the radio and one redundant pair at 24VDC for the instrumentation and I/O power.
5. Provide redundancy module for true power supply redundancy / sharing of load between the redundant pair – SOLA or accepted equal.

E. Uninterruptible Power Supply (UPS)

1. The uninterruptible power supply (UPS) shall be a continuously on-line. Unit shall be sized to operate on a 120 VAC 60 Hz. feeder and maintain 120 VAC load on battery backup for 5 minutes. Unit shall be din rail mounted wired to control system power. The UPS size shall be chosen by the System Integrator for the load being served plus 20%. If the load requires two UPS units then provide two units and two bypass switches and separate the loads such that one unit carries all of the instruments and the other carries all of the other loads.
2. UPS shall include built in transient voltage surge suppresser (UL 1449) with a THD less than 5% at full load for clean power to the PLC, power supplies and other power sensitive equipment. UPS shall include user interface with indication of battery condition, capacity and programmable operating parameters. Provide battery replacement warning. Allen-Bradley 1609, APC or accepted equal.
3. Provide UPS alarm module and provide all necessary wiring and relays for connection to the UPS to provide 2 normally closed contacts which open upon loss of power for the PLC digital inputs for: a) loss of input power to the UPS and b) for a low battery alarm.
4. Provide separate 120 volt hot and neutral terminals for UPS circuits.
5. Provide labeling to differentiate UPS power circuits vs. non UPS powered circuits by adding a “U” suffix on the terminal name.
   a. Provide 2 spare installed 5amp UPS circuit breakers or the number of spares shown on the Drawings, whichever is greater.
   b. Provide 3 spare “hot” terminals wired to the output of each spare UPS breaker and the same number of spare neutral terminals wired to the appropriate neutral.

6. UPS INSTALLATION: The unit shall be din rail mounted. Bypass circuitry shall be provided with a bypass switch.

2.10 RELAYS

A. Relay Labels

1. Provide two labels for all relays one label on the backpan and one label on the front surface of the relay.

B. Relays For General Purpose

1. Relays for general purpose shall have appropriate coil voltage for the application, contacts (amp and voltage) shall be rated for the application, minimum 2 amps. All relays shall have an integral indicating light to show if there is coil voltage present. They shall have pin/blade base and matching socket. Units shall be Allen-Bradley 700 type HA, HB, or accepted equal.
2. Appropriate relay (coil voltage and contact load ratings) shall be selected based on application from the control wiring diagrams and load served.

C. Time Delay Relays

1. Time delay relays shall be multi-function, multi-range with plug-in base, pin style terminations timing and timed out LED indicators, and calibrated scales. Relays shall have minimum 0.5 seconds to 60 minutes, 8 selectable timing ranges, 5 amp contacts. Select coil voltage for the application. Minimum accuracy requirements (plus or minus) shall be as follows: 1) Repeat accuracy 1/2% 2) Timing change over full voltage range 1/2% change over full temperature range 2% 3) Scale tolerance 5%. Allen-Bradley Bulletin 700 type HR series; or accepted equal.

D. Digital Output Relays

1. All digital outputs shall be provided with interposing relays wired out to terminals - including spares. Relays shall be group mounted with connecting cable to the PLC output card. Output relays can be single pole, N.O. or N.C. for the application – all Spare DO relays shall be form C with the N.O. contact wired to terminals.

E. Intrinsically Safe Repeater Relays (ISR)

1. Intrinsically safe repeater relays shall be provided with N.O. and/or N.C. contacts as required. Acceptable manufacturers are IMO GEMS SAFE-PAK or R. STAHL INTRINSIC Safety Repeater Relays No. 9230. Provide enclosures or barriers as required.

F. Intrinsically Safe Barriers (ISB)

1. Intrinsically safe barriers shall be GEMS "SAFE-PAK" ZENER Barrier 54800 series as manufactured by TRANSAMERICA DELAVAL.

2.11 INSTRUMENTATION

A. General Requirements of Instrumentation

1. All Instruments, switches and control sensors shall be rated for the environment in which they will be located. In general, devices mounted indoors shall be NEMA 12 rated. Devices mounted outdoors, or in wet or corrosive environments shall be NEMA 4X rated.
2. Devices mounted in hazardous areas shall be rated for the classification of the area that they are located.
   a. Provide barriers, intrinsically safe relays, explosion proof boxes, or other equipment, if necessary to rate equipment for the environment installed.
   b. Provide seal fittings per NEC.
3. Transmitters shall be indicating type when available and shall have local or direct reading indicators, unless otherwise shown.
      1) Provide a pressure gauge for every pressure switch and transmitter.
4. Select range of instruments for the application.
5. Transmitter input power shall be 120VAC 60HZ unless otherwise shown, output shall be 4-20 mA into a minimum 500 ohm load.
6. For each instrument that has a separate power source, provide a power disconnect switch (rated for the environment and the application) mounted next to each instrument.
7. Transmitters located outdoors shall be provided in an enclosure with a heater or provided with thermostat controlled heaters in their enclosure.
8. Instruments shall automatically reset and resume normal operation after power interruption with out manual resetting.
9. Instrument cords (for example: cords between the sensor and the transmitter) shall be provided:
   a. With length sufficient for the application.
   b. With rating for the environment installed.
10. Terminate all wiring on terminal strips, splicing wiring is not acceptable.
11. Wire that terminates on screw type terminals shall be provided with a spade or loop type end connector.
12. For all indicating transmitters that are mounted inside enclosures, provide a window in the enclosure so that the display can be viewed without opening the enclosure.
13. Instrumentation supplier shall provide installation inspection, calibration and training as required for proper installation.

B. Door-Switches

1. Provide door security switches at locations indicated on the Drawings. Switches shall be limit switches with lever arm as required for the application Square D class 9007 or accepted equal. Install such that the switch contacts are closed when the door is closed.

2. Magnetic type with contacts normally open held closed when door is closed. Switches shall have anodized finish and be furnished with 3 foot stainless steel armored cable. Sentrol 2500 series or accepted equal.

C. Float-type Level Switches (wastewater)

1. Float-type level switches used for wastewater applications shall be non-mercury tilt switch type with a separate, epoxy coated, weight. Switches shall have polypropylene housing, permanently encapsulated, hermetically sealed, N.O. (or N.C.) rated at 12A at 115V. Cable shall be 3 #16 AWG, stranded, with PVC jacket, integral to float with sufficient length to meet requirements shown on the Drawings.

2. The floats shall be mounted on a stainless steel mounting bracket with individual hooks and a float cord wedge clamp (for easy level adjustment) for each float. **Wire grip type supports/cord grips are not allowed-see detail on Drawings**. All mounting hardware shall be type 316 stainless steel or cast aluminum.

3. Float switches shall be SJE-Rhombus or accepted equal. Provide mounting hardware to meet the requirements for the installation.

D. Float Cord Wedge Clamps

1. Float-Cord wedge clamps shall be aluminum or stainless steel service wedge clamps with flexible bail, AMERICAN ELECTRIC W-1 OR W-1B series. Choose appropriate clamp for size of cord and corrosive classification of the Area.

E. Drywell Liquid Level Switches (flood switch)

1. Provide drywell liquid level switch, hermetically sealed, magnetically actuated, snap action, 15W, 120V SPST, N.C. (dry). TRANSAMERICA DELAVAL - GEMS LS-1900 or 1950 chosen for the environment or accepted equal.

F. Water Level Submersible Transmitters

1. The level sensors shall consist of a submersible level transmitter suspended on a cable. Siemens A1000i – no equal.

2. Provide sensor for the application rated for use in wastewater applications, classified areas etc. for the application per the manufacturer's recommendations.

3. ACCESSORIES:
   a. Provide all accessories as recommended and required by the manufacturer for a complete installation.
   b. Provide with Siemens stainless steel support tube that connects to the level transmitter for cable connection.
   c. Provide all submersible level sensors with vent tube moisture protection termination box.
   d. Provide cable support hanger as manufactured by Halliday.
4. Coordinate type of transmitter provided with pressure range required for the application and physical size of the sensor tube and the manufacturer's recommendations.

G. Magnetic Flowmeter

1. Provide a magnetic flow meter for each location shown on the Drawings and / or listed below:
2. Magmeter shall be Krohne Enviromag 2000 or Siemens SITRANS F M MAG 5000, no equal.
3. SPECIFICATIONS:
   a. NEMA 4X enclosure rated for accidental submergence in water up to 30 feet for 48 hours.
   b. Rated for class 1 div 2 group C & D.
   c. Ground rings, or probes for meters over 30".
   d. Bi-directional flow capable.
   e. Accuracy of +/- 1 percent for flow velocity between 3 & 31 fps.
   f. Magmeters shall be hydraulically calibrated at the manufacturer's facility against a master meter traceable to the NBS. A printout of the calibration data and calibration curve shall be furnished with each magmeter.
   g. Power input 120VAC, output 4-20mA.
   h. Dry contact closure for every X gallons of flow [where X = max flow of meter (gpm) / 10] – for accurate flow reading into the PLC. Contact shall remain closed for a minimum of 3 seconds.
4. FEATURES:
   a. Flange material: 316L stainless steel
   b. Liner: Teflon
   c. Electrodes: 316 stainless steel
   d. Integral transmitter with digital indicator (readout in GPM)
5. MOUNTING: The transmitter, transducer, and sensor assembly shall be mounted to the pipe per the requirements of the Drawings and the manufacturer.

6. Substitutions: Not accepted.

2.12 MOTOR STARTERS

A. Motor starter units shall be of the combination type with components as indicated on the Drawings. Magnetic contactors shall be heavy duty IEC or NEMA rated. All contactors shall be provided with two field convertible auxiliary contacts. Motor starters and associated equipment shall be provided to match or exceed the load being served.

B. If IEC contactors are used, then the amp rating of the contactor shall be a minimum of 1.75 times the amp rating of the motor.

C. Provide interface options for control, monitoring, and alarming as shown on the Drawings and the wire diagrams. Manufacturer shall select the size and rating as required for the application.

D. Overload Relays

1. Overload relays on starters shall be adjustable, solid state type with a minimum adjustment range of 3 to 1. Overload relays shall have selector for either auto or manual reset. Overload Relays shall monitor all energized conductors and shall trip on phase fail and ground fault. A separate N.O. overload contact shall be provided in addition to standard N.C. overload contact. Overload relay shall be provided with a circuit test button which shall simulate an overload trip, trip indication, and reset pushbutton. Overload which trip on phase/power fail shall automatically reset upon normal power restoration. - Siemens 3RB12, Allen-Bradley E-1 or accepted equal.

2. Provide interface options for control, monitoring, and alarming as shown on the Drawings and the wire diagrams. Manufacturer shall select the size and rating as required for the application.

E. Control Power Transformers

1. Each motor starter shall be equipped with its own individual control circuit transformer, 120 VAC secondary with primary and secondary fuses and blown fuse indicators. The transformer shall be sized to accommodate the contactor(s) and all connected control circuit loads. The transformer size shall also accommodate any devices connected or shown on the Drawings as being served by the control circuit transformer.

F. Transient Suppressors

1. Provide all contactor coils with transient suppressors to limit the high voltage transients produced when power is removed from the coil. CUTLER HAMMER - C320AS1 or accepted equal.

2.13 CIRCUIT BREAKERS

A. Circuit breakers shall be molded case thermal-magnetic type. Circuit breakers other than those mounted in the panelboard shall be capable of being padlocked in the open position. Circuit breakers shall be quick-make and quick-break type. They shall have wiping type contacts. Each shall be provided with arc chutes, individual trip mechanisms on each pole. Two and three pole breakers shall be common trip. All breakers shall be calibrated for operation in an ambient temperature of 40oC. Molded case circuit breakers shall be trip-free. Each breaker shall have separate trip indication independent of the ON or OFF positions.

1. Breakers shall have lugs UL listed for both copper and aluminum.
2. Breakers shall have the interrupting rating and trip rating indicated on the Drawings.
3. All breakers for motor starters shall include auxiliary contacts which open when the breaker in the OFF position.
4. Provide service entrance rated breakers if required for the application by NEC.

B. Provide interface options for control, monitoring, and alarming as shown on the Drawings and the wire diagrams. Manufacturer shall select the size and rating as required for the application.

2.14 SURGE ARRESTORS

Provide surge arrestors, with indicators, where shown on the one-line diagrams to protect against overvoltage transients. JOSLYN J9200 series with protective capacitor GE model 9L18 or accepted equal. Select proper components for the application as shown on the Drawings.

2.15 OPERATING MECHANISMS / MOTOR LOCKOUT

A. The main disconnect/circuit breaker/fuse shall be provided with a lockable external "thru-the-door" operating handle with bypass. Square D Class 9422 or accepted equal.

B. Each Individual motor circuit breaker or disconnect shall be provided with a lockable external "thru-the-door" operating handle with bypass mechanism for locking in the open position to meet the lockout/tagout requirements per the NEC.

2.16 WIRE MARKERS:

Field installed wire markers shall be T&B, SHRINK-KON HVM or accepted equal.

2.17 SPARE PARTS

A. In addition to spare parts mentioned elsewhere in this Section, the Contractor shall supply the following spare parts for use by the Owner. All spare parts shall be shipped with the equipment.

1. Qty 1 spare compact logix PLC processor to match, complete with Ethernet communications and all other options.
2. Qty 1 spare (non installed) PLC input and output card of each type used.
3. Qty 1 spare power supply of each type and rating used.
4. Qty 1 Relay of each type used or 10 % whichever is the greater amount.
5. Qty 10 lamps of each type used or 100% whichever is the greater amount.
6. Qty 200% spare fuses (two spare fuses for each fuse supplied).
7. Provide 10 spare nameplates 3” square or less with 20 letters 1/2” or less to be specified by the owner.
8. Qty 1 Copy of final PLC program on a thumb drive.

PART 3 : EXECUTION

3.01 INSTALLATION

A. GENERAL

1. The instrumentation and control system shall be installed, in accordance with the Drawings, installation details, and also instructions prepared by the System Integrator, and per special instruction from equipment or instrumentation Manufacturers.
2. The Integrator shall provide detailed installation drawings and wiring diagrams for this purpose.
3. Installation shall include all elements and components of the I&C system and all conduit and interconnecting wiring between all elements, components, and sensors.
4. Provide instrument calibration sheets for all instruments to verify function, range, setpoints etc.
   a. For analog instruments include range information and test at 0, 25%, 50% 75% and 100%. Unless otherwise shown set displays as follows – for level measurement in FEET, for pressure in PSI, for flow GPM.
   b. For switches verify operation and check setpoint for correct operation – for floats verify trip level, pressure switch settings, etc.

B. Wire and Cable Termination:

1. Stranded control conductors may be directly terminated using compression type terminals at control panels. Special instrumentation cables shall be terminated in accordance with the recommendations of the Manufacturer of the equipment and subject to review by the Engineer.
2. No splices shall be used in power, control and/or signal wiring. The wiring shall be continuous from point-to-point.
3. Terminals and connectors shall be installed with the compression tool recommended by the terminal Manufacturer.
4. Any control or signal wire landing on a screw terminal shall be terminated with a spade or loop connector.
5. All wire and cable shall be provided with a wire tag at each termination in accordance with the wire tagging requirements in the specification.
6. Terminals shall be installed such that there is a minimum of 2” clear space between the terminal strip and the wireway on both sides of the terminal; for ease of wiring.

3.02 CONTROL PANEL DESIGN & FABRICATION

A. General

1. Panels shall not be fabricated until Engineer has reviewed and approved the submittals or the integrator has written authorization from the Engineer to construct the panels. It shall be the integrator’s responsibility to inform the Engineer in writing if there are limited time constraints that need to be met to start the panel fabrication to meet contract deadlines.

B. General Layout

1. Provide separate wire ways for field wiring and for internal wiring. Provide separate wireways for 120V and DC circuits. Mount PLC at top of control section, Mount digital input and output wireways and terminals on the left hand side and analog I/O terminals and wireways on the right side with power distribution down the middle of the control area. See Drawings.
2. For control panels that contain motor control power equipment: In general the power distribution shall be located toward the left side of the cabinet and the PLC and other control components shall be separate and located in the right side of the cabinet. If power and controls are in the same cabinet, then provide at least 4” of separation between any 480V power wiring or components and the signal wireway, or provide a steel barrier between the power and controls sections.
3. If panel has intrinsic safe component area – provide space below the UPS in the center of the cabinet at the bottom.

C. Operating Device Location

1. Operating devices shall be mounted no higher than 6' - 4" and no lower than 4' - 0" above finished floor when panel is installed unless otherwise approved by the Engineer. Operating devices with displays (such as PLC interface and power monitoring devices) shall be mounted so that the center of the display is between 4’-6” and 5’-0” above finished floor unless otherwise approved by the Engineer.

D. Power Components

1. Provide lockable breakers for all motor load circuits to meet NEC lockout tagout requirements.
2. Provide cabinet power disconnect / door interlocking mechanism as required by UL, NEC, and any other authority.
3. Provide service entrance rated breaker if required for the application.
4. Provide all individual motor starters with their own electrically isolated 120V control power transformer (CPT) or 120V control power circuit derived from the load side of the motor starter circuit breaker. Control power circuit for hand control shall be from the CPT so that motor load can be run manually when auto control power circuits have failed.

E. Control Cabinets

1. Install PLC I/O card to terminal interface wiring with pre-manufactured, multi-conductor or bundled wire.
2. Install all terminals on 2” standoffs.
3. Terminals shall be installed to allow a minimum of 2” of clear space between the terminal and the wireway or any other components.
4. Coordinate terminals and wireway locations to account for the location of the conduit entrances into the cabinet.
5. Wire ways shall be 3” deep, width shall be chosen for the application.
6. Provide separate wire ways for internal and field wiring.
7. The UPS shall be din rail or shelf mounted – maintain at least 2” space between the bottom of the UPS and the bottom of the cabinet for field wiring.
8. Provide right angle connectors on cables if the cable connection prevents closing of access doors on equipment within the cabinet or on the control cabinet itself.

3.03 FACTORY TESTING & INSPECTION

A. Prior to delivery to the site, the power & control panels shall be tested by the System Integrator. All control devices shall be operated and the cabinet shall be powered with rated incoming voltage for at least 2 days. Simulating equipment shall be provided and wired into the control cabinet system for this testing. The entire control system shall be interconnected as it will be installed in the field. If

the actual equipment is not available, then simulation equipment shall be provided to fully demonstrate the functionality of the system. The System Integrator shall test all functionality of the system and verify proper operation of the hardware and software.

B. Following the System Integrators testing, the power & control panel shall be tested and inspected by the Design Engineer prior to shipment to the project site. The testing shall include, but not be limited to, operation of all input and output (I/O) points, control devices and motor controllers and demonstration of all control functions with the actual equipment or via a simulation. The System Integrator shall revise, modify, adjust the system as required by the Engineer during the testing period. The System Integrator shall inform and coordinate the time of the testing with the Engineer at least 4 weeks prior to the testing date.

C. The System Integrator shall provide working space, a 6 foot table and 2 office/desk chairs for the test Engineers.

D. If the Integrator's shop where the factory testing will take place is more than 100 miles from downtown Seattle, the System Integrator shall include in the contract price the cost to fly 2 engineers round trip to the shop where the panel is built plus an additional $800 for other travel expenses, meals, lodging, etc.

3.04 STARTUP AND TESTING

A. All components of the control system shall be calibrated by the Manufacturer after completion of installation. Each component shall be adjusted to be within the Manufacturer's required range and for the specific application.

B. Components that cannot be properly calibrated or that are found to exceed the Manufacturer's specified range or accuracy shall be removed and replaced at no additional cost to the Owner.

C. The control system shall be placed into operation by the Contractor and System Integrator.

D. All components shall be tested and recorded on check-off forms and shall be witnessed by the Engineer.

3.05 FIELD TESTING OF THE CONTROL SYSTEM

A. General

1. When the installation is substantially complete, the Contractor shall commence field testing of the control system. This shall determine that all system components connect up correctly to each other so that the system works as designed.
2. Field testing of the control system shall take place in 4 phases.
   a. Continuity Testing,
   b. I/O Testing,
   c. Program Testing

d. System Validation Testing.

B. Continuity Testing

1. As equipment wiring is completed, the Contractor and Hardware Integrator shall perform a continuity test for every control to determine terminal to terminal continuity and verify all control and signal wiring is installed in accordance to the Hardware Integrators wiring diagrams.

C. I/O Testing

1. The entire I&C system shall be I/O tested.
2. Prior to calling for I/O testing the Contractor shall:
   a. Complete the continuity testing.
   b. Label all wire at both ends.
   c. Submit all associated test and calibration forms (Instrument, motor, wire, etc.).
   d. Run all motors (in HAND) to verify correct operation and rotation.
   e. Provide all equipment and instrument labels per spec.
   f. Test operation of “packaged sub systems”.
3. Prior to any equipment being put into automatic operation, every digital and analog input and output shall be tested for correct operation and witnessed by the Electrical Engineer. The contractor shall provide a set of the PLC Card drawings and instrument and control wiring diagrams on 81/2x11” sheets for a check-off list of all inputs and outputs. If a point cannot be verified within 5 minutes of starting the check that point shall be noted as a punch list item to be corrected and re-tested at a later time.
4. **Definition: Successfully I/O Tested**. A piece of equipment of system shall be considered “successfully I/O tested” when all of the I/O for that equipment has been tested and verified by both the programmer and the Electrical Engineer and checked off of the wiring diagrams or PLC I/O card drawings. Note: The Electrical Engineer must witness and verify all I/O testing.
5. Once all I/O associated with a piece of equipment of system has been **successfully tested**, then the equipment or system will be deemed ready for program testing.
6. INPUTS:
   a. The Contractor shall simulate an actual field condition whenever possible to provide both the digital and analog signal inputs into the PLC and these will be verified by the programmers. Where an actual field simulation is not practical, then the Contractor shall jumper the digital inputs at a point closest to the field device as possible and shall use an analog loop simulator for analog inputs.
   b. Analog inputs shall be tested at 0, 25%, 50%, and 100% of full range.

7. OUTPUTS:

   a. The programmer will simulate outputs from the PLC and the Contractor shall verify the field operation of the output. The field operation verification shall be by actual operation of equipment when possible. When actual field operation of equipment is not practical for verification, then the Contractor shall use volt and amp metering to verify digital and signal outputs.

   b. Analog outputs shall be tested at 0, 25%, 50%, and 100% of full range.

D. Program Testing

1. The Contractor shall provide field support to the programmer for testing of the program. The Contractor shall provide field simulation of equipment as needed by the programmer to test all monitoring and alarm functions of the programming. The Contractor shall anticipate that the program testing will require up to a total of 24 hours of field support time for this project. The cost for this time shall be included in the bid.

E. System Validation Testing

1. After the program testing is complete, validation testing shall be by the Hardware and Software Engineer and Contractor, with the Owner and Engineer present. Validation testing shall include operation and verification of all control components and features of the entire control system.

2. The Contractor shall simulate various field conditions to test all control operations, monitoring and alarms for all systems and equipment.

3. The Contractor shall inform the Engineer of the testing schedule at least one week prior to the commencement of testing. Validation testing shall be considered complete when the Owner and Engineer have determined that all of the original system requirements have been met.

4. The System Integrator shall revise, modify, adjust the system as required during and following start-up to provide the operation required by the contract documents.

5. Note: the Engineer shall not be called out by the Contractor for validation testing on equipment until all components are installed, all wiring points have been checked, and operation has been tested and verified by the Contractor.

3.06 COMMISSIONING

Once all systems have passed validation testing, then the plant will be operated for 2 weeks or time period as determined in the documents to verify plant operations prior to final acceptance.

3.07 SYSTEM MAINTENANCE

The System Integrator shall be responsible for maintenance of the system from time of start-up to the date of acceptance, by formal action of the Owner, of all work under the contract. The System Integrator shall correct deficiencies and defects and make any and all repairs, replacements, modifications, and adjustments as malfunctions or failures occur. The System Integrator shall perform all such work required or considered to be required by the Owner to cause and maintain proper operation of the system and to properly maintain the system.

3.08 SERVICES OF SYSTEM INTEGRATOR

A. General: An authorized service representative of the control panel System Integrator shall be present at the Site for a minimum of three Days at each pump station (for a total of twelve days) to furnish the services listed below. For the purpose of this paragraph, a Day is defined as a 7 hour period excluding travel time.

B. Inspection, Startup, Field Adjustment: The authorized service representative shall supervise the following and certify the equipment and controls have been properly installed, aligned, and readied for operation.

1. Installation of the equipment.
2. Inspection, checking, and adjusting the equipment.
3. Startup and field testing for proper operation.
4. Performing field adjustments such that the equipment installation and operation comply with requirements.

C. Instruction of Owner's Personnel: The authorized representative shall instruct the Owner's personnel in the operation and maintenance of the equipment, including step by step troubleshooting with test equipment. Instruction shall be specific to the equipment models provided. Training shall be scheduled a minimum of 2 weeks in advance of the first session. Training shall include individual two sessions for 2 shifts of plant personnel (2 hours for each session) at each pump station.

D. Proposed training materials shall be submitted for review, and comments shall be incorporated. Training materials shall remain with the trainees. The Owner may videotape the training for later use with the Owner's personnel. The Hardware Integrator shall conduct specifically organized training sessions in operation and maintenance of the control system 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 control system. 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

3.09 OPERATION AND MAINTENANCE DATA

A. The System Integrator shall prepare and assemble detailed operation and maintenance manuals in accordance with the project general requirements. The manuals 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. System schematics / shop drawings
9. Electronic copy on CD ROM of all shop drawings in AutoCAD version 2000 or newer
10. As-built wiring diagrams of cabinet and enclosure contained assemblies
11. Catalog data and complete parts list for all equipment and control devices
12. Listing of recommended spare parts
13. Listing of recommended maintenance tools and equipment.

B. Two (2) hard copies of the entire O&M manual shall be provided.

C. Two (2) copies of the entire O&M manual shall be provided in electronic PDF format on CD ROMs.

3.10 RECORD DRAWINGS

The System Integrator shall be responsible to provide a clean and neatly marked up set of record drawings showing any changes from the submittal and Drawings. The Contractor shall provide a hard copy of the final as-built drawings and wiring diagrams in the PLC cabinet for each pump station. These drawings shall be provided prior to final approval of the project and release of the retainage.

PART 4 : ADDITIONAL REQUIREMENTS

4.01 PROGRAMMING

General: All programming shall be provided by the System Integrator - See programming Section 40 90 10.

PART 5 : WIRING DIAGRAMS

5.01 EQUIPMENT WIRING DIAGRAMS

Provide one page wiring diagram for each motor / equipment load showing all of the control wiring associated with that load. Drawing shall show the motor control center wiring, field wiring, PLC I/O, and control panel wiring all on one sheet; complete with terminal numbers and wire numbers. Include PLC Card information rack and slot and I/O designation for each point.

5.02 INSTRUMENT WIRING DIAGRAMS

Show all wiring associated with each instrument on one page – including power supply location and signal wiring. Show all terminals numbers and wire numbers. Designate boundaries between field and control panels and etc.

5.03 NETWORK DIAGRAM

Provide detailed drawings showing all of the components of the communications network – include all terminals and wire numbering. Designate equipment locations.

5.04 PLC I/O CARD DRAWINGS

Provide I/O card drawings for all PLC I/O cards. Drawings shall show details specific to each I/O card, name of each input or output, reference drawing number for associated EQUIPMENT AND INSTRUMENT WIRING DIAGRAM, card number, slot number, control panel terminal and wire numbers, etc.

END OF SECTION

SECTION 40 90 10
PROGRAMMING WASTEWATER PUMP STATIONS

PART 1 : GENERAL

1.01 PROGRAMMING

A. The System Integrator shall provide all programming for all 3 pump stations.

B. The System Integrator shall provide all programming of the PLC and operator interface for a complete user friendly interface and control of the pump station.

C. The System Integrator shall provide telemetry system and modem and communications configuration, PLC programming and testing for interface back to the headquarters for data, monitoring and alarming of all pump station equipment, functions, instruments, etc.

D. Any required SCADA system programming at the headquarters will be done by the Owner.

E. Programming of the pump station shall be done in such a manner that future troubleshooting and system modifications can be accomplished efficiently.

F. All PLC registers must include descriptions to the highest extent possible.

G. Indirect addressing is not acceptable.

1.02 SUBROUTINES

A. Process controls shall be organized in sub routines to the highest extent possible. Multiple process controls within one subroutine is not acceptable. Each sub process control shall have its own ladder file (subroutine) with the required equipment request, permissive and speed control logic as needed for the individual process.

B. If a sub process contains multiple pieces of equipment it is acceptable for the common equipment controls to be within the same subroutine. Start/Stop, Lead/Lag and alternating shall reside within the same ladder file for the associated process only.

1.03 ALARM HANDLING

A. Alarm programming shall be developed such that alarm conditions will be managed in a common fashion.

B. All alarm conditions must have adjustable timers. When the alarm condition becomes true, the associated alarm timer will latch the alarm after the timer has expired. The alarm indication must continue until the acknowledge button is pressed.

C. Acknowledging an alarm does not clear or reset the alarm conditions, but simply turns off the associated horn & lights. If the alarm condition is still true when the reset button is pressed, then the alarm remains active. When the alarm condition has physically cleared and the reset button is pushed, then the alarm status is cleared.

1.04 DATA FILES

A. The data files shall be organized in such a matter that troubleshooting and modifications can be accomplished with ease and efficiency.

B. Naming for data files shall be as detailed as possible. The description entry shall be filled as detailed as possible for a clear understanding of what the data file contains.

C. A separate data file shall be created for data that can be organized within the same topic.

D. Floating point registers (real numbers) shall be used whenever applicable. The use of integers shall not be used in word format unless absolutely necessary. The use of integer files to the bit level is acceptable for the use of masking and comparing.

1.05 CONTROL DESCRIPTIONS AND PROGRAMMING

A. Operating Modes

1. There are three modes of operation: HAND, AUTO, and FLOAT CONTROL.

   a. HAND control of the pumps will run a pump at full speed.

   b. AUTO – pumps will operate from the PLC control based on the level transmitter level. Also if high floats activate then the associated pump will be called to run for a time period at full speed.

   c. BACKUP FLOATS – will call the pumps to run from program in the PLC. The pumps will also be called from a “hardwired float control” backup system with a direct input to the motor starter to call the pumps to operate at full speed on motor starter for a time period set on a time delay relay.

B. Pump Control (HAND & AUTO MODE)

1. Sewage pumps will be set point controlled via PLC / operator interface to start and stop on level. Provide Lead and Lag and standby Stop and start setpoints.

2. Lead, lag, and standby pumps will start and stop based on separate sets of level setpoints (operator adjustable on the operator interface).

3. If the lead or lag pump fails – then the next pump will be called when the level setpoint is reached for the next pump.

4. Normal operation of the pumps is controlled by signals received from a submersible level transmitter mounted in the wet well. The level controller transmits a continuous level signal – the on/off levels and lead and lag and standby pump calls are generated by the PLC (Programmable Logic Controller) at pre-set levels selected by the operator thru the panel view operator interface mounted on the front of the control panel.

5. Hand-off auto switches located on the control panel door provide selected control of the pumps individually as follows:

    a. Hand position will bypass the level sensing equipment, floats and pump motor winding thermal cutout sensor and turn the pump on. Hand position will not operate the pump while an overload condition has been detected.

    b. Off position does not allow the pump to operate in any mode. This switch position is not to be used as a disconnect. For pump/motor maintenance; use the pump disconnect circuit breaker.

    c. Auto position allows the pumps to be controlled from the PLC level control programming or the hardwired backup, allowing normal automatic lead/lag operation and on/off based on wet well level setpoints.

6. Status and alarm lights located on the pump control panel are push-to-test type, providing local annunciation of following conditions:

    a. Pump - running (green)

    b. Pump Ready (white)

    c. Wet well high level (red)

    d. Wet well low level (red)

7. Panelview alarms

    a. Pump - motor winding high temperature (red)

    b. Pump– leakage (amber)

    c. Individual annunciation for high level from transmitter and all high level floats

    d. Low level transmitter and float alarms

    e. Intrusion, operator – in – trouble

    f. Generator alarms

8. The level sensing equipment transmits 4-20mA analog wet well level status data to headquarters via telemetry system equipment. Refer to the wet well elevation and details on the drawings for mounting method and the sensor elevation.

9. The control system receives wet well level alarm signals for high wet well and low wet well from float switches.

10. The following describes the alarm and status outputs available for local annunciation and transmission to headquarters, with exceptions noted:

    a. Pump Running—This status output is present for each pump while it is running. Individual green status lights are annunciated on the front of the pump control panel and the motor control center. Individual pump-run status signals can be transmitted to headquarters via telemetry from motor starter auxiliary contacts.

    b. Pump Ready – operating and control power present, no failures, and switch in AUTO.

    c. Pump Overload

        1) This alarm is activated individually for each pump upon tripping of the pump's overload. This alarm output will automatically shut down the pump.

        2) Overloads are set for automatic reset so that a power fault that clears will not disable the pump.

        3) The pump will remain in the shutdown condition until the overload resets automatically after a time period that is built into the operating parameters of the overload or the operations personnel reset the pump by pushing the reset push button.

    d. Pump High Winding Temperature

        1) This alarm is activated individually for each pump when a thermal contact within the winding of the pump motor senses high temperature and opens.

        2) The contact is circuited to the PLC and will automatically shut down the pump and annunciate the alarm locally on the front of the pump control panel. This “shutdown interlock” will only occur in AUTO control. In HAND or hardwired float backup control modes the high winding temperature is alarm only.

        3) The alarm can be transmitted to headquarters as “pump fail”. Upon cooling of the pump motor windings, the thermal contact will close and automatically allow the pump to restart. The alarm light located on the front of the control panel will remain on until Operations personnel de-energize it by pressing the Alarm Reset push-button on the front of the panel.

e. Pump Leakage—This alarm is activated individually for each pump when a conductivity probe detects liquid in the motor housing. The probe is circuited to the PLC for leakage alarm indication. This condition will not automatically shut down the pumps. The alarm can be transmitted to headquarters via telemetry. Once the leakage clears (see pump maintenance literature for addressing leakage problem).

f. High Wet Well

1) This alarm is activated when one of the high-level floats are raised above the horizontal in the wet well. This occurs during either a failure of both pumps, a failure of the power source, or extremely high flow conditions where both pumps cannot keep up with the flow.

2) All of the circuits associated with the high level floats are from a separate source from the normal control power circuits for the normal auto PLC controls. A high level condition is annunciated on the front of the panel, and can be sent via telemetry. When the condition clears the alarm lights will de-energize. The high level floats will also start the pumps as an automatic backup system described below.

g. Low Wet Well

1) This alarm is activated when the low-level float is dropped below the horizontal in the wet well for a continuous time period of five seconds.

2) This situation occurs when either one of the pumps has failed to turn off, or when the pumps are operating on the back-up mercury floats. All of the circuits associated with the low level float are supervised (normally energized).

3) When this circuit becomes de-energized, then a low level condition is annunciated on the front of the panel, and can be via telemetry. When the condition clears the alarm lights will de-energize.

4) The low level float activation will shut down the pumps in auto control from the PLC and alarm. The low level float is not interlocked with the backup hardwired float control or HAND operation of the pumps.

5) When operating in float control or HAND control the low level will be alarm only.

C. Special Control:

1. Provide automatic alternation of the lead pump every 24 hours.

D. Operator Interface

1. The operator interface is a graphic control screen mounted on the face of the control panel. All wet well level setpoints and time delays for on/off control of the pumps can be modified from this interface.
2. The operator interface also displays all pump station information and monitoring showing equipment status such as wet well level, pump running / fail / ready status – flow rate, generator, and utility power status, etc.
3. The operator interface also displays all local alarms for equipment fail, trouble, high / low wet well, etc.

E. Alarm Handling

1. Alarm programming shall be developed such that alarm conditions will be managed in a common fashion.
2. All alarm conditions will have adjustable timers. When the alarm condition becomes true, the associated alarm timer will latch the alarm after the timer has expired. The alarm indication must continue until the acknowledge button is pressed on the panelview.
3. Acknowledging an alarm does not clear or reset the alarm conditions, but simply turns off the associated horn & lights. If the alarm condition is still true when the reset button is pressed, then the alarm remains active. When the alarm condition has physically cleared and the reset button is pushed, then the alarm status is cleared.

1.06 ADDITIONAL PROGRAMMING

A. The PLC will be programmed for additional equipment such as Generator, ATS, Intrusion System and all other monitored and controlled equipment associated with the pump station. Provide a separate subroutine for all additional equipment including auto dialer outputs or telemetry if existing.

B. Generator

1. Monitor Running, Fail, Trouble and Low fuel signals.
2. Running signal is for future telemetry use
3. Display Fail, trouble and low fuel alarms. Group alarms with common alarm output to telemetry

C. ATS

1) Monitor position status.
2) Show Fail, trouble and low fuel alarms. Group utility power fail alarm with power fail output to telemetry.

D. Intrusion

1. Monitor intrusion status and display alarm.

2. Intrusion system entry and exit delays must be adjustable by operator.

E. Site lighting

1. Programming as instructed for site lighting control.

F. If an telemetry is used for remote alarming, then telemetry output programming for the following alarm outputs to the telemetry.

1. High level – parallel contacts from supervised high level alarm float, and from PLC output for: high level indication from the level transmitter and high level float backup pumping system to a single terminal pair – provide programming as required for all alarm systems.
2. **Common Alarm** - Provide PLC output for a common alarm condition to telemetry for all alarms that are not otherwise specifically called for to be inputs to telemetry.
3. **Pump Fail** – provide programming for pump fail which consists of pump running and check valve limit switch indicating valve not open, overload, overtemp, motor called to run and no running feedback from starter.
4. **Power Fail** – input from ATS and input from control power status relay and UPS trouble.

1.07 BACKUP AUTO (PLC) CONTROL SYSTEM (FLOAT CONTROL)

A. Backup control system that consists of 2 high level floats (one for each pump) physically offset by 3" to 4”, hardwired to time delay relays that call on the pumps if high level float is activated.

B. PLC Backup from floats

1. In case of a level transducer failure, provide control wiring and programming logic as follows for automatic backup from the PLC activated by the high and low level floats.
2. If high level float #1 is activated then the PLC shall start the lead pump and set a timer for it to run for a time period (selectable by the operator).
3. If high level float #2 is activated then the PLC shall start the lag pump and set a timer for it to run for a time period (selectable by the operator).
4. High level control float must also be hard wired to telemetry in parallel with high level alarm float. High and low level floats shall also be wired thru relay contacts to the PLC. If the PLC sees the high level control float then start the pumps and run until the low level float is activated.

C. Float Control Backup

1. In case of level transmitter failure, low float failure, PLC failure, etc.; provide a hardwired backup high-level float system (that is completely separate from the PLC) to start pumps and a time delay relay to shut off pumps.

a. If the PLC is failed, then the high level floats will activate the associated time delay relays and call on the pumps for a selected time period.

b. High float #1 will call on the lead pump (if in AUTO), if the level continues to rise to high float #2, then the lag pump will be called on for a selected time period.

2. Backup control circuitry shall be powered from dedicated panel board circuit, not from UPS circuit.

3. For low level float – if activated then (in NORMAL control mode) the PLC shall shut off the pumps and alarm for low level in the wet well. Low level float shall not disable the backup high level float system and shall not shut off the pumps in HAND.

1.08 MISCELLANEOUS MONITORING & CONTROL

A. Safety and security

1. Monitor intrusion status and display alarm. Intrusion system entry and exit delays must be adjustable by operator.

2. Monitor smoke alarm signal and alarm.

3. Monitor Operator trouble signal and alarm.

1.09 TOTALIZING

A. Provide Current Day, Previous Day, Current Month, Previous Month and Accumulative Runtimes and Start Counters for all equipment with run feedback (Sewage Pumps and Generator). Runtimes shall go to tenths of an hour.

B. For stations with flow transmitters, provide Current Day, Previous Day, Current Month, Previous Month and Accumulative flow totalizing.

C. Display information on the flow data operator interface screen.

1.10 OPERATOR INTERFACE

A. Provide screens to display all station monitoring data:

1. Overview screen with graphic display of pumps, wet well level, station flow. This screen should also show the start/stop level setpoints and indicate the float positions. Overview screen shall include – pump called, pump running, pump failed, lead and lag indication.

2. Provide a setpoint adjustment screen for the modification of the standard operational setpoints such as level and ramp control.

3. Provide a screen for the setpoint adjustment of the non-standard operational setpoints (these are the setpoints that the operator would not normally change).

B. All equipment run status and instrumentation values shall be displayed on operator interface screens in an organized manner as required to maintain an easily navigated operator interface.

C. All control set points shall be accessible via operator interface and must be secured as requested by owner.

D. All Alarm setpoints shall have adjustable delays and can be disabled by entering a value of 0 for the delay.

E. Operator interface will also include Runtime, Start Counter & Flow Total data.

F. Also included will be alarm summary and alarm history screens.

G. Provide analog I/O scaling screens.

1.11 STARTUP & TESTING

A. Testing shall include I/O testing and program testing for all functions and features (monitoring, alarming, and control) of the program.

B. All sewage pump operations, alarming & local monitoring shall be tested from the instrument to operator interface.

C. All alarms shall be tested from point of activation to telemetry.

1.12 TRAINING & O&M MANUAL

A. Provide 8 hours of operator training of which will consist of pump operations, safety & security and alarm management.

B. Provide an O&M manual that can be used as a quick reference guide for operator interface navigation & station operations.

END OF SECTION

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SECTION 41 67 00
FALL PREVENTION SYSTEM

PART 1 : GENERAL

1.01 SUMMARY

This section covers installation of fall prevention systems. Provide one (1) complete fall prevention system for the three pump stations. Provide two (2) cast-in-place floor sleeves at each pump station (6 total floor sleeves) as indicated on the Drawings.

1.02 REFERENCES

A. ANSI A10.4 - Safety Requirements for Personnel Hoists on Construction and Demolition Sites.

B. Occupational Safety and Health Administration (OSHA).

C. Washington State Department of Labor and Industries, Division of Industrial Safety and health – General Safety and Health Standards (Chapter 296-24-WAC), including all revisions and amendments thereto.

D. U.S. Department of Labor, Occupational Safety and Health Administration, 29 CFR Chapter XVII Part 1910 – Occupational Safety and Health standards, including all revisions and amendments thereto.

1.03 SUBMITTALS

A. In accordance with the requirements of Section 01340, submit the following Project Data:

1. Catalog data for all components.

PART 2 : PRODUCTS

2.01 GENERAL

Paragraphs 2.02 - 2.05 indicated the major components of the fall prevention system. Additional components shall be provided as required to provide a complete and functional fall prevention system. Fall prevention system components shall be manufactured by DBI SALA, no substitutions.

2.02 UPPER MAST

UCL Advanced 12” – 29” Variable Offset Upper Mast, Model # 8518001 with Head Mounted U-Bracket, Model # 8515651.

2.03 LOWER MAST EXTENSION

45-inch length compatible with Upper Mast, Model #8518003.

2.04 HOIST/SELF RETRACTING LIFELINE

3-Way Sealed-Blok Self Retracting Lifeline, Model # 3400923.

2.05 FLOOR SLEEVE

Advanced Floor Mount Cast-in-Place Sleeve Davit Base, Model #8512828. Provide stainless steel cap with each sleeve.

PART 3 : EXECUTION

3.01 GENERAL

Install in accordance with manufacturer's instructions.

END OF SECTION

APPENDIX A

WASHINGTON STATE PREVAILING WAGE RATES FOR PUBLIC WORKS CONTRACTS

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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: 8/12/2016

County	Trade	Job Classification	Wage	Holiday	Overtime	Note
Kitsap	Asbestos Abatement Workers	Journey Level	$43.95	5D	1H	
Kitsap	Boilermakers	Journey Level	$30.34		1	
Kitsap	Brick Mason	Journey Level	$52.82	5A	1M	
Kitsap	Brick Mason	Pointer-Caulker-Cleaner	$52.82	5A	1M	
Kitsap	Building Service Employees	Janitor	$9.47		1	
Kitsap	Building Service Employees	Shampooer	$9.47		1	
Kitsap	Building Service Employees	Waxer	$9.47		1	
Kitsap	Building Service Employees	Window Cleaner	$13.22		1	
Kitsap	Cabinet Makers (In Shop)	Journey Level	$23.72		1	
Kitsap	Carpenters	Acoustical Worker	$54.02	5D	4C	
Kitsap	Carpenters	Bridge, Dock And Wharf Carpenters	$54.02	5D	4C	
Kitsap	Carpenters	Carpenter	$54.02	5D	4C	
Kitsap	Carpenters	Carpenters on Stationary Tools	$54.15	5D	4C	
Kitsap	Carpenters	Creosoted Material	$54.12	5D	4C	
Kitsap	Carpenters	Floor Finisher	$54.02	5D	4C	
Kitsap	Carpenters	Floor Layer	$54.02	5D	4C	
Kitsap	Carpenters	Scaffold Erector	$54.02	5D	4C	
Kitsap	Cement Masons	Journey Level	$53.95	7A	1M	
Kitsap	Divers & Tenders	Diver	$107.22	5D	4C	8A
Kitsap	Divers & Tenders	Diver On Standby	$64.42	5D	4C	
Kitsap	Divers & Tenders	Diver Tender	$58.33	5D	4C	
Kitsap	Divers & Tenders	Surface Rcv & Rov Operator	$58.33	5D	4C	
Kitsap	Divers & Tenders	Surface Rcv & Rov Operator Tender	$54.27	5A	4C	
Kitsap	Dredge Workers	Assistant Engineer	$56.44	5D	3F	
Kitsap	Dredge Workers	Assistant Mate (Deckhand)	$56.00	5D	3F	
Kitsap	Dredge Workers	Boatmen	$56.44	5D	3F	
Kitsap	Dredge Workers	Engineer Welder	$57.51	5D	3F	
Kitsap	Dredge Workers	Leverman, Hydraulic	$58.67	5D	3F	

Kitsap	Dredge Workers	Mates	$56.44	5D	3F	
Kitsap	Dredge Workers	Oiler	$56.00	5D	3F	
Kitsap	Drywall Applicator	Journey Level	$54.02	5D	1H	
Kitsap	Drywall Tapers	Journey Level	$54.07	5P	1E	
Kitsap	Electrical Fixture Maintenance Workers	Journey Level	$31.74		1	
Kitsap	Electricians - Inside	Journey Level	$51.26		1	
Kitsap	Electricians - Motor Shop	Craftsman	$15.37		1	
Kitsap	Electricians - Motor Shop	Journey Level	$14.69		1	
Kitsap	Electricians - Powerline Construction	Cable Splicer	$74.92	5A	4D	
Kitsap	Electricians - Powerline Construction	Certified Line Welder	$65.71	5A	4D	
Kitsap	Electricians - Powerline Construction	Groundperson	$44.12	5A	4D	
Kitsap	Electricians - Powerline Construction	Heavy Line Equipment Operator	$65.71	5A	4D	
Kitsap	Electricians - Powerline Construction	Journey Level Lineperson	$65.71	5A	4D	
Kitsap	Electricians - Powerline Construction	Line Equipment Operator	$55.34	5A	4D	
Kitsap	Electricians - Powerline Construction	Pole Sprayer	$65.71	5A	4D	
Kitsap	Electricians - Powerline Construction	Powderperson	$49.16	5A	4D	
Kitsap	Electronic Technicians	Journey Level	$44.76	7E	1D	
Kitsap	Elevator Constructors	Mechanic	$85.45	7D	4A	
Kitsap	Elevator Constructors	Mechanic In Charge	$92.35	7D	4A	
Kitsap	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	$13.50		1	
Kitsap	Fence Erectors	Fence Erector	$13.80		1	
Kitsap	Fence Erectors	Fence Laborer	$11.60		1	
Kitsap	Flaggers	Journey Level	$37.26	7A	3I	
Kitsap	Glaziers	Journey Level	$56.16	7L	1Y	
Kitsap	Heat & Frost Insulators And Asbestos Workers	Journeyman	$63.18	5J	1S	
Kitsap	Heating Equipment Mechanics	Journey Level	$72.83	7F	1E	
Kitsap	Hod Carriers & Mason Tenders	Journey Level	$45.32	7A	3I	
Kitsap	Industrial Power Vacuum Cleaner	Journey Level	$29.89		1	
Kitsap	Inland Boatmen	Boat Operator	$56.78	5B	1K	
Kitsap	Inland Boatmen	Cook	$53.30	5B	1K	
Kitsap	Inland Boatmen	Deckhand	$53.30	5B	1K	
Kitsap	Inland Boatmen	Deckhand Engineer	$54.32	5B	1K	
Kitsap	Inland Boatmen	Launch Operator	$55.57	5B	1K	
Kitsap	Inland Boatmen	Mate	$55.57	5B	1K	
Kitsap		Cleaner Operator, Foamer Operator	$9.73		1	

	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control					
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Grout Truck Operator	$11.48		1	
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Head Operator	$12.78		1	
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Tv Truck Operator	$24.17		1	
Kitsap	Insulation Applicators	Journey Level	$54.02	5D	4C	
Kitsap	Ironworkers	Journeyman	$63.53	7N	1O	
Kitsap	Laborers	Air, Gas Or Electric Vibrating Screed	$43.95	7A	3I	
Kitsap	Laborers	Airtrac Drill Operator	$45.32	7A	3I	
Kitsap	Laborers	Ballast Regular Machine	$43.95	7A	3I	
Kitsap	Laborers	Batch Weighman	$37.26	7A	3I	
Kitsap	Laborers	Brick Pavers	$43.95	7A	3I	
Kitsap	Laborers	Brush Cutter	$43.95	7A	3I	
Kitsap	Laborers	Brush Hog Feeder	$43.95	7A	3I	
Kitsap	Laborers	Burner	$43.95	7A	3I	
Kitsap	Laborers	Caisson Worker	$45.32	7A	3I	
Kitsap	Laborers	Carpenter Tender	$43.95	7A	3I	
Kitsap	Laborers	Caulker	$43.95	7A	3I	
Kitsap	Laborers	Cement Dumper-paving	$44.76	7A	3I	
Kitsap	Laborers	Cement Finisher Tender	$43.95	7A	3I	
Kitsap	Laborers	Change House Or Dry Shack	$43.95	7A	3I	
Kitsap	Laborers	Chipping Gun (under 30 Lbs.)	$43.95	7A	3I	
Kitsap	Laborers	Chipping Gun(30 Lbs. And Over)	$44.76	7A	3I	
Kitsap	Laborers	Choker Setter	$43.95	7A	3I	
Kitsap	Laborers	Chuck Tender	$43.95	7A	3I	
Kitsap	Laborers	Clary Power Spreader	$44.76	7A	3I	
Kitsap	Laborers	Clean-up Laborer	$43.95	7A	3I	
Kitsap	Laborers	Concrete Dumper/chute Operator	$44.76	7A	3I	
Kitsap	Laborers	Concrete Form Stripper	$43.95	7A	3I	
Kitsap	Laborers	Concrete Placement Crew	$44.76	7A	3I	
Kitsap	Laborers	Concrete Saw Operator/core Driller	$44.76	7A	3I	
Kitsap	Laborers	Crusher Feeder	$37.26	7A	3I	
Kitsap	Laborers	Curing Laborer	$43.95	7A	3I	
Kitsap	Laborers	Demolition: Wrecking & Moving (incl. Charred Material)	$43.95	7A	3I	
Kitsap	Laborers	Ditch Digger	$43.95	7A	3I	

Kitsap	Laborers	Diver	$45.32	7A	3I	
Kitsap	Laborers	Drill Operator (hydraulic,diamond)	$44.76	7A	3I	
Kitsap	Laborers	Dry Stack Walls	$43.95	7A	3I	
Kitsap	Laborers	Dump Person	$43.95	7A	3I	
Kitsap	Laborers	Epoxy Technician	$43.95	7A	3I	
Kitsap	Laborers	Erosion Control Worker	$43.95	7A	3I	
Kitsap	Laborers	Faller & Bucker Chain Saw	$44.76	7A	3I	
Kitsap	Laborers	Fine Graders	$43.95	7A	3I	
Kitsap	Laborers	Firewatch	$37.26	7A	3I	
Kitsap	Laborers	Form Setter	$43.95	7A	3I	
Kitsap	Laborers	Gabian Basket Builders	$43.95	7A	3I	
Kitsap	Laborers	General Laborer	$43.95	7A	3I	
Kitsap	Laborers	Grade Checker & Transit Person	$45.32	7A	3I	
Kitsap	Laborers	Grinders	$43.95	7A	3I	
Kitsap	Laborers	Grout Machine Tender	$43.95	7A	3I	
Kitsap	Laborers	Groutmen (pressure)including Post Tension Beams	$44.76	7A	3I	
Kitsap	Laborers	Guardrail Erector	$43.95	7A	3I	
Kitsap	Laborers	Hazardous Waste Worker (level A)	$45.32	7A	3I	
Kitsap	Laborers	Hazardous Waste Worker (level B)	$44.76	7A	3I	
Kitsap	Laborers	Hazardous Waste Worker (level C)	$43.95	7A	3I	
Kitsap	Laborers	High Scaler	$45.32	7A	3I	
Kitsap	Laborers	Jackhammer	$44.76	7A	3I	
Kitsap	Laborers	Laserbeam Operator	$44.76	7A	3I	
Kitsap	Laborers	Maintenance Person	$43.95	7A	3I	
Kitsap	Laborers	Manhole Builder-mudman	$44.76	7A	3I	
Kitsap	Laborers	Material Yard Person	$43.95	7A	3I	
Kitsap	Laborers	Motorman-dinky Locomotive	$44.76	7A	3I	
Kitsap	Laborers	Nozzleman (concrete Pump, Green Cutter When Using Combination Of High Pressure Air & Water On Concrete & Rock, Sandblast, Gunite, Shotcrete, Water Bla	$44.76	7A	3I	
Kitsap	Laborers	Pavement Breaker	$44.76	7A	3I	
Kitsap	Laborers	Pilot Car	$37.26	7A	3I	
Kitsap	Laborers	Pipe Layer Lead	$45.32	7A	3I	
Kitsap	Laborers	Pipe Layer/tailor	$44.76	7A	3I	
Kitsap	Laborers	Pipe Pot Tender	$44.76	7A	3I	
Kitsap	Laborers	Pipe Reliner	$44.76	7A	3I	
Kitsap	Laborers	Pipe Wrapper	$44.76	7A	3I	
Kitsap	Laborers	Pot Tender	$43.95	7A	3I	
Kitsap	Laborers	Powderman	$45.32	7A	3I	

Kitsap	Laborers	Powderman's Helper	$43.95	7A	3I	
Kitsap	Laborers	Power Jacks	$44.76	7A	3I	
Kitsap	Laborers	Railroad Spike Puller - Power	$44.76	7A	3I	
Kitsap	Laborers	Raker - Asphalt	$45.32	7A	3I	
Kitsap	Laborers	Re-timberman	$45.32	7A	3I	
Kitsap	Laborers	Remote Equipment Operator	$44.76	7A	3I	
Kitsap	Laborers	Rigger/signal Person	$44.76	7A	3I	
Kitsap	Laborers	Rip Rap Person	$43.95	7A	3I	
Kitsap	Laborers	Rivet Buster	$44.76	7A	3I	
Kitsap	Laborers	Rodder	$44.76	7A	3I	
Kitsap	Laborers	Scaffold Erector	$43.95	7A	3I	
Kitsap	Laborers	Scale Person	$43.95	7A	3I	
Kitsap	Laborers	Sloper (over 20")	$44.76	7A	3I	
Kitsap	Laborers	Sloper Sprayer	$43.95	7A	3I	
Kitsap	Laborers	Spreader (concrete)	$44.76	7A	3I	
Kitsap	Laborers	Stake Hopper	$43.95	7A	3I	
Kitsap	Laborers	Stock Piler	$43.95	7A	3I	
Kitsap	Laborers	Tamper & Similar Electric, Air & Gas Operated Tools	$44.76	7A	3I	
Kitsap	Laborers	Tamper (multiple & Self-propelled)	$44.76	7A	3I	
Kitsap	Laborers	Timber Person - Sewer (lagger, Shorer & Cribber)	$44.76	7A	3I	
Kitsap	Laborers	Toolroom Person (at Jobsite)	$43.95	7A	3I	
Kitsap	Laborers	Topper	$43.95	7A	3I	
Kitsap	Laborers	Track Laborer	$43.95	7A	3I	
Kitsap	Laborers	Track Liner (power)	$44.76	7A	3I	
Kitsap	Laborers	Traffic Control Laborer	$39.84	7A	3I	8R
Kitsap	Laborers	Traffic Control Supervisor	$39.84	7A	3I	8R
Kitsap	Laborers	Truck Spotter	$43.95	7A	3I	
Kitsap	Laborers	Tugger Operator	$44.76	7A	3I	
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 0-30 psi	$74.29	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 30.01-44.00 psi	$79.32	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 44.01-54.00 psi	$83.00	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 54.01-60.00 psi	$88.70	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 60.01-64.00 psi	$90.82	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 64.01-68.00 psi	$95.92	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 68.01-70.00 psi	$97.82	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 70.01-72.00 psi	$99.82	7A	3I	8Q
Kitsap	Laborers		$101.82	7A	3I	8Q

		Tunnel Work-Compressed Air Worker 72.01-74.00 psi				
Kitsap	Laborers	Tunnel Work-Guage and Lock Tender	$45.42	7A	3I	8Q
Kitsap	Laborers	Tunnel Work-Miner	$45.42	7A	3I	8Q
Kitsap	Laborers	Vibrator	$44.76	7A	3I	
Kitsap	Laborers	Vinyl Seamer	$43.95	7A	3I	
Kitsap	Laborers	Watchman	$33.86	7A	3I	
Kitsap	Laborers	Welder	$44.76	7A	3I	
Kitsap	Laborers	Well Point Laborer	$44.76	7A	3I	
Kitsap	Laborers	Window Washer/cleaner	$33.86	7A	3I	
Kitsap	Laborers - Underground Sewer & Water	General Laborer & Topman	$43.95	7A	3I	
Kitsap	Laborers - Underground Sewer & Water	Pipe Layer	$44.76	7A	3I	
Kitsap	Landscape Construction	Irrigation Or Lawn Sprinkler Installers	$9.47		1	
Kitsap	Landscape Construction	Landscape Equipment Operators Or Truck Drivers	$10.05		1	
Kitsap	Landscape Construction	Landscaping Or Planting Laborers	$12.92		1	
Kitsap	Lathers	JOURNEY LEVEL	$21.00		1	
Kitsap	Marble Setters	Journey Level	$52.82	5A	1M	
Kitsap	Metal Fabrication (In Shop)	Fitter	$26.96		1	
Kitsap	Metal Fabrication (In Shop)	Laborer	$9.47		1	
Kitsap	Metal Fabrication (In Shop)	Machine Operator	$13.83		1	
Kitsap	Metal Fabrication (In Shop)	Welder	$13.83		1	
Kitsap	Millwright	Journey Level	$44.89		1	
Kitsap	Modular Buildings	Cabinet Assembly	$11.56		1	
Kitsap	Modular Buildings	Electrician	$11.56		1	
Kitsap	Modular Buildings	Equipment Maintenance	$11.56		1	
Kitsap	Modular Buildings	Plumber	$11.56		1	
Kitsap	Modular Buildings	Production Worker	$9.47		1	
Kitsap	Modular Buildings	Tool Maintenance	$11.56		1	
Kitsap	Modular Buildings	Utility Person	$11.56		1	
Kitsap	Modular Buildings	Welder	$11.56		1	
Kitsap	Painters	Journey Level	$39.35	6Z	2B	
Kitsap	Pile Driver	Journey Level	$54.27	5D	4C	
Kitsap	Plasterers	Journey Level	$51.68	7Q	1R	
Kitsap	Playground & Park Equipment Installers	Journey Level	$9.47		1	
Kitsap	Plumbers & Pipefitters	Journey Level	$65.52	5A	1G	
Kitsap	Power Equipment Operators	Asphalt Plant Operators	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Assistant Engineer	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Barrier Machine (zipper)	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Batch Plant Operator, Concrete	$56.44	7A	3C	8P

Kitsap	Power Equipment Operators	Bobcat	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Brokk - Remote Demolition Equipment	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Brooms	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Bump Cutter	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Cableways	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Chipper	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Compressor	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Over 42 M	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Concrete Finish Machine -laser Screed	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure.	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Conveyors	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes Friction: 200 tons and over	$58.67	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: 20 Tons Through 44 Tons With Attachments	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: 100 Tons Through 199 Tons, Or 150' Of Boom (Including Jib With Attachments)	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: 200 tons- 299 tons, or 250’ of boom including jib with attachments	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: 300 tons and over or 300’ of boom including jib with attachments	$58.67	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: 45 Tons Through 99 Tons, Under 150' Of Boom (including Jib With Attachments)	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: A-frame - 10 Tons And Under	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: Friction cranes through 199 tons	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators	Cranes: Through 19 Tons With Attachments A-frame Over 10 Tons	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Crusher	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Deck Engineer/deck Winches (power)	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Derricks, On Building Work	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Dozers D-9 & Under	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators		$56.00	7A	3C	8P

		Drill Oilers: Auger Type, Truck Or Crane Mount				
Kitsap	Power Equipment Operators	Drilling Machine	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators	Elevator And Man-lift: Permanent And Shaft Type	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Forklift: 3000 Lbs And Over With Attachments	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Forklifts: Under 3000 Lbs. With Attachments	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Grade Engineer: Using Blue Prints, Cut Sheets, Etc	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Gradechecker/stakeman	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Guardrail Punch	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Horizontal/directional Drill Locator	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Horizontal/directional Drill Operator	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Hydralifts/boom Trucks Over 10 Tons	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Hydralifts/boom Trucks, 10 Tons And Under	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Loader, Overhead 8 Yards. & Over	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Loaders, Overhead Under 6 Yards	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Loaders, Plant Feed	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Loaders: Elevating Type Belt	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Locomotives, All	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Material Transfer Device	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Mechanics, All (leadmen - $0.50 Per Hour Over Mechanic)	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators	Motor Patrol Graders	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators		$56.00	7A	3C	8P

		Outside Hoists (elevators And Manlifts), Air Tuggers,strato				
Kitsap	Power Equipment Operators	Overhead, Bridge Type Crane: 20 Tons Through 44 Tons	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Overhead, Bridge Type: 100 Tons And Over	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators	Overhead, Bridge Type: 45 Tons Through 99 Tons	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Pavement Breaker	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Pile Driver (other Than Crane Mount)	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Plant Oiler - Asphalt, Crusher	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Posthole Digger, Mechanical	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Power Plant	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Pumps - Water	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Quad 9, Hd 41, D10 And Over	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Quick Tower - No Cab, Under 100 Feet In Height Based To Boom	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Remote Control Operator On Rubber Tired Earth Moving Equipment	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Rigger And Bellman	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Rigger/Signal Person, Bellman (Certified)	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Rollagon	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Roller, Other Than Plant Mix	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Roller, Plant Mix Or Multi-lift Materials	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Roto-mill, Roto-grinder	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Saws - Concrete	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Scraper, Self Propelled Under 45 Yards	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Scrapers - Concrete & Carry All	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Scrapers, Self-propelled: 45 Yards And Over	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Service Engineers - Equipment	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Shotcrete/gunite Equipment	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Shovel , Excavator, Backhoe, Tractors Under 15 Metric Tons.	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$57.51	7A	3C	8P

Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators	Slipform Pavers	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Spreader, Topsider & Screedman	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Subgrader Trimmer	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Tower Bucket Elevators	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Tower Crane Up To 175' In Height Base To Boom	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators	Tower Crane: over 175' through 250' in height, base to boom	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators	Tower Cranes: over 250' in height from base to boom	$58.67	7A	3C	8P
Kitsap	Power Equipment Operators	Transporters, All Track Or Truck Type	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Trenching Machines	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Truck Crane Oiler/driver - 100 Tons And Over	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Truck Crane Oiler/driver Under 100 Tons	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators	Truck Mount Portable Conveyor	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators	Welder	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators	Wheel Tractors, Farmall Type	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators	Yo Yo Pay Dozer	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Asphalt Plant Operators	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Assistant Engineer	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Barrier Machine (zipper)	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Batch Plant Operator, Concrete	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Bobcat	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Brokk - Remote Demolition Equipment	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Brooms	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Bump Cutter	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cableways	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Chipper	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Compressor	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water		$56.94	7A	3C	8P

		Concrete Pump: Truck Mount With Boom Attachment Over 42 M				
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Finish Machine -laser Screed	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure.	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Conveyors	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes Friction: 200 tons and over	$58.67	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 20 Tons Through 44 Tons With Attachments	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 100 Tons Through 199 Tons, Or 150' Of Boom (Including Jib With Attachments)	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 200 tons- 299 tons, or 250’ of boom including jib with attachments	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 300 tons and over or 300’ of boom including jib with attachments	$58.67	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 45 Tons Through 99 Tons, Under 150' Of Boom (including Jib With Attachments)	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: A-frame - 10 Tons And Under	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: Friction cranes through 199 tons	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: Through 19 Tons With Attachments A-frame Over 10 Tons	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Crusher	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Deck Engineer/deck Winches (power)	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Derricks, On Building Work	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Dozers D-9 & Under	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Drill Oilers: Auger Type, Truck Or Crane Mount	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Drilling Machine	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Elevator And Man-lift: Permanent And Shaft Type	$53.57	7A	3C	8P

Kitsap	Power Equipment Operators-Underground Sewer & Water	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Forklift: 3000 Lbs And Over With Attachments	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Forklifts: Under 3000 Lbs. With Attachments	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Grade Engineer: Using Blue Prints, Cut Sheets, Etc	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Gradechecker/stakeman	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Guardrail Punch	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Horizontal/directional Drill Locator	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Horizontal/directional Drill Operator	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom Trucks Over 10 Tons	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom Trucks, 10 Tons And Under	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loader, Overhead 8 Yards. & Over	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loaders, Overhead Under 6 Yards	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loaders, Plant Feed	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loaders: Elevating Type Belt	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Locomotives, All	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Material Transfer Device	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Mechanics, All (leadmen - $0.50 Per Hour Over Mechanic)	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Motor Patrol Graders	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$53.57	7A	3C	8P

Kitsap	Power Equipment Operators-Underground Sewer & Water	Outside Hoists (elevators And Manlifts), Air Tuggers,strato	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Overhead, Bridge Type Crane: 20 Tons Through 44 Tons	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Overhead, Bridge Type: 100 Tons And Over	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Overhead, Bridge Type: 45 Tons Through 99 Tons	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Pavement Breaker	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Pile Driver (other Than Crane Mount)	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Plant Oiler - Asphalt, Crusher	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Posthole Digger, Mechanical	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Power Plant	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Pumps - Water	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Quad 9, Hd 41, D10 And Over	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Quick Tower - No Cab, Under 100 Feet In Height Based To Boom	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Remote Control Operator On Rubber Tired Earth Moving Equipment	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Rigger And Bellman	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Rigger/Signal Person, Bellman (Certified)	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Rollagon	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Roller, Other Than Plant Mix	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Roller, Plant Mix Or Multi-lift Materials	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Roto-mill, Roto-grinder	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Saws - Concrete	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Scraper, Self Propelled Under 45 Yards	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Scrapers - Concrete & Carry All	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Scrapers, Self-propelled: 45 Yards And Over	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Service Engineers - Equipment	$56.00	7A	3C	8P
Kitsap		Shotcrete/gunite Equipment	$53.57	7A	3C	8P

	Power Equipment Operators-Underground Sewer & Water					
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel , Excavator, Backhoe, Tractors Under 15 Metric Tons.	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Slipform Pavers	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Spreader, Topsider & Screedman	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Subgrader Trimmer	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Bucket Elevators	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Crane Up To 175' In Height Base To Boom	$57.51	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Crane: over 175' through 250' in height, base to boom	$58.10	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Cranes: over 250' in height from base to boom	$58.67	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Transporters, All Track Or Truck Type	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Trenching Machines	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/driver - 100 Tons And Over	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/driver Under 100 Tons	$56.00	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck Mount Portable Conveyor	$56.44	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Welder	$56.94	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Wheel Tractors, Farmall Type	$53.57	7A	3C	8P
Kitsap	Power Equipment Operators-Underground Sewer & Water	Yo Yo Pay Dozer	$56.44	7A	3C	8P
Kitsap	Power Line Clearance Tree Trimmers	Journey Level In Charge	$45.75	5A	4A	
Kitsap	Power Line Clearance Tree Trimmers	Spray Person	$43.38	5A	4A	
Kitsap	Power Line Clearance Tree Trimmers	Tree Equipment Operator	$45.75	5A	4A	

Kitsap	Power Line Clearance Tree Trimmers	Tree Trimmer	$40.84	5A	4A	
Kitsap	Power Line Clearance Tree Trimmers	Tree Trimmer Groundperson	$30.74	5A	4A	
Kitsap	Refrigeration & Air Conditioning Mechanics	Mechanic	$65.52	5A	1G	
Kitsap	Residential Brick Mason	Journey Level	$17.04		1	
Kitsap	Residential Carpenters	Journey Level	$40.66	5D	4C	
Kitsap	Residential Cement Masons	Journey Level	$30.87		1	
Kitsap	Residential Drywall Applicators	Journey Level	$40.64	5D	4C	
Kitsap	Residential Drywall Tapers	Journey Level	$20.00		1	
Kitsap	Residential Electricians	Journey Level	$27.00		1	
Kitsap	Residential Glaziers	Journey Level	$56.16	7L	1Y	
Kitsap	Residential Insulation Applicators	Journey Level	$13.96		1	
Kitsap	Residential Laborers	Journey Level	$16.89		1	
Kitsap	Residential Marble Setters	Journey Level	$17.04		1	
Kitsap	Residential Painters	Journey Level	$19.52		1	
Kitsap	Residential Plumbers & Pipefitters	Journey Level	$21.11		1	
Kitsap	Residential Refrigeration & Air Conditioning Mechanics	Journey Level	$17.64		1	
Kitsap	Residential Sheet Metal Workers	Journey Level (Field or Shop)	$28.95		1	
Kitsap	Residential Soft Floor Layers	Journey Level	$19.38		1	
Kitsap	Residential Sprinkler Fitters (Fire Protection)	Journey Level	$27.74		1	
Kitsap	Residential Stone Masons	Journey Level	$52.82	5A	1M	
Kitsap	Residential Terrazzo Workers	Journey Level	$9.47		1	
Kitsap	Residential Terrazzo/Tile Finishers	Journey Level	$30.26		1	
Kitsap	Residential Tile Setters	Journey Level	$31.14		1	
Kitsap	Roofers	Journey Level	$46.46	5A	3H	
Kitsap	Roofers	Using Irritable Bituminous Materials	$49.46	5A	3H	
Kitsap	Sheet Metal Workers	Journey Level (Field or Shop)	$72.83	7F	1E	
Kitsap	Shipbuilding & Ship Repair	CARPENTER	$19.29		1	
Kitsap	Shipbuilding & Ship Repair	ELECTRICIAN	$25.53		1	
Kitsap	Shipbuilding & Ship Repair	Heat & Frost Insulator	$63.18	5J	1S	
Kitsap	Shipbuilding & Ship Repair	Laborer	$19.64		1	
Kitsap	Shipbuilding & Ship Repair	MACHINIST	$19.29		1	
Kitsap	Shipbuilding & Ship Repair	OPERATOR	$19.44		1	
Kitsap	Shipbuilding & Ship Repair	Painter	$39.35	6Z	2B	
Kitsap	Shipbuilding & Ship Repair	PIPEFITTER	$19.29		1	
Kitsap	Shipbuilding & Ship Repair	RIGGER	$19.29		1	
Kitsap	Shipbuilding & Ship Repair	Sheet Metal	$22.21		1	
Kitsap	Shipbuilding & Ship Repair	SHIPFITTER	$19.29		1	

Kitsap	Shipbuilding & Ship Repair	WELDER/BURNER	$19.29		1	
Kitsap	Sign Makers & Installers (Electrical)	Journey Level	$20.58		1	
Kitsap	Sign Makers & Installers (Non-Electrical)	Journey Level	$9.47		1	
Kitsap	Soft Floor Layers	Journey Level	$44.11	5A	3D	
Kitsap	Solar Controls For Windows	Journey Level	$10.31		1	
Kitsap	Sprinkler Fitters (Fire Protection)	Journey Level	$70.14	5C	1X	
Kitsap	Stage Rigging Mechanics (Non Structural)	Journey Level	$13.23		1	
Kitsap	Stone Masons	Journey Level	$52.82	5A	1M	
Kitsap	Street And Parking Lot Sweeper Workers	Journey Level	$16.00		1	
Kitsap	Surveyors	Assistant Construction Site Surveyor	$56.00	7A	3C	8P
Kitsap	Surveyors	Chainman	$55.47	7A	3C	8P
Kitsap	Surveyors	Construction Site Surveyor	$56.94	7A	3C	8P
Kitsap	Telecommunication Technicians	Journey Level	$43.32	7E	1E	
Kitsap	Telephone Line Construction - Outside	Cable Splicer	$37.60	5A	2B	
Kitsap	Telephone Line Construction - Outside	Hole Digger/Ground Person	$20.79	5A	2B	
Kitsap	Telephone Line Construction - Outside	Installer (Repairer)	$36.02	5A	2B	
Kitsap	Telephone Line Construction - Outside	Special Aparatus Installer I	$37.60	5A	2B	
Kitsap	Telephone Line Construction - Outside	Special Apparatus Installer II	$36.82	5A	2B	
Kitsap	Telephone Line Construction - Outside	Telephone Equipment Operator (Heavy)	$37.60	5A	2B	
Kitsap	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	$34.94	5A	2B	
Kitsap	Telephone Line Construction - Outside	Telephone Lineperson	$34.93	5A	2B	
Kitsap	Telephone Line Construction - Outside	Television Groundperson	$19.73	5A	2B	
Kitsap	Telephone Line Construction - Outside	Television Lineperson/Installer	$26.31	5A	2B	
Kitsap	Telephone Line Construction - Outside	Television System Technician	$31.50	5A	2B	
Kitsap	Telephone Line Construction - Outside	Television Technician	$28.23	5A	2B	
Kitsap	Telephone Line Construction - Outside	Tree Trimmer	$34.93	5A	2B	
Kitsap	Terrazzo Workers	Journey Level	$47.46	5A	1M	
Kitsap	Tile Setters	Journey Level	$47.46	5A	1M	
Kitsap	Tile, Marble & Terrazzo Finishers	Journey Level	$12.00		1	

Kitsap	Traffic Control Stripers	Journey Level	$43.73	7A	1K	
Kitsap	Truck Drivers	Asphalt Mix Over 16 Yards (W. WA-Joint Council 28)	$51.25	5D	3A	8L
Kitsap	Truck Drivers	Asphalt Mix To 16 Yards (W. WA-Joint Council 28)	$50.41	5D	3A	8L
Kitsap	Truck Drivers	Dump Truck	$19.60		1	
Kitsap	Truck Drivers	Dump Truck And Trailer	$19.60		1	
Kitsap	Truck Drivers	Other Trucks	$18.37		1	
Kitsap	Truck Drivers	Transit Mixer	$20.79		1	
Kitsap	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	$13.17		1	
Kitsap	Well Drillers & Irrigation Pump Installers	Oiler	$14.08		1	
Kitsap	Well Drillers & Irrigation Pump Installers	Well Driller	$14.40		1	

APPENDIX B

GEOTECHNICAL ENGINEERING REPORT

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Geotechnical Report
Manchester Pump Stations
Nos. 45, 46, and 47 Upgrades Design
Kitsap County, Washington

July 28, 2015

Prepared for

BHC Consultants, LLC.

LANDAU ASSOCIATES
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EXECUTIVE SUMMARY

The following text summarizes the key points presented in the report.

- Kitsap County is proposing system rehabilitations to the existing sewer system located along the shore of Puget Sound in the unincorporated village of Manchester, Washington. The improvements generally include the rehabilitation of Pump Stations 45, 46, and 47 (PS-45, PS-46, and PS-47), which includes installation of new pump station vaults, wet wells, beach manholes, and reconnection of sanitary sewer lines (i.e., gravity and force main) to the system. In addition, approximately 175 feet (ft) of sanitary sewer force main will be replaced to the west of the proposed PS-45. The project also includes installation of approximately 3,330 ft of cured in-place pipe liner in the existing beach line (installed from existing manholes) and reconnection of side sewers.
- Subsurface conditions along the project alignment were explored by advancing and sampling 10 exploratory borings (B-1 through B-10) at the approximate locations shown on the Site and Exploration Plan, Figures 2A through 2C. The borings were completed on April 7 through 8 and July 14 through 15, 2015. The borings were advanced to depths of between about 11½ and 41½ ft below ground surface (BGS). A detailed discussion of the field exploration program, together with edited logs of the borings, is presented in Appendix A. A discussion of the geotechnical laboratory test procedures and test results are presented in Appendix B.
- Our borings primarily encountered glacially-derived soil that we interpret as "melt-out till". The melt-out till is water bearing (i.e., contains an aquifer). Substantial amounts of peat (a highly-compressible soil type) were encountered in borings at the PS-46 and PS-47 sites. Undocumented fill was also encountered in several borings.
- Our borings encountered high groundwater and, in the case of the PS-47 site, artesian groundwater. The proposed beach manhole connections at the PS-45 and PS-46 sites also extend into an intertidal beach. High groundwater should be expected during construction of the pump stations and beach line connections.
- We recommend that project specifications require the contractor to develop a shoring and dewatering plan that will not substantially lower groundwater levels outside of the excavations. This is due to the presence of peat soils at two of the three pump station sites (PS-46 and PS-47) that, if dewatered, could result in appreciable settlement of adjacent residential structures and utilities.
- Applicable shoring techniques for the wet wells and deep utilities include, but are not limited to, sheet pile walls. Caissons could also be applicable for wet well construction. Dewatering measures that will not lower groundwater outside of the excavation include, but are not limited to, deep sheet pile walls that effectively cut off the groundwater flow path then dewatering from inside the excavation, or installing a concrete bottom seal in the excavation.
- Peat soils are present extending to about 8 ft BGS at the PS-46 site. We recommend that these materials be overexcavated from below the proposed utility and pump station improvements at PS-46.
- We recommend that project specifications include provisions for the use of lightweight fills such as cellular concrete. Utility and structure excavations at PS-47, and possibly other pump station sites, will likely encounter peat that extends below practical depth of overexcavation. Lightweight fills should be used during construction at the direction of the engineer to match the post-construction load to existing conditions in areas where peat remains below improvements. Flexible utility connections should be used at PS-47.

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APPENDICES

Appendix	Title
A	Field Explorations
B	Geotechnical Laboratory Testing

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LIST OF ABBREVIATIONS AND ACRONYMS

ASTM	ASTM International
BHC	BHC Consultants
BGS	Below Ground Surface
EFW	Equivalent Fluid Unit Weight
ft	Foot/Feet
IBC	International Building Code
ICC	International Code Council
pcf	Pounds per Cubic Foot
PS-45	Pump Station 45
PS-46	Pump Station 46
PS-47	Pump Station 47
psf	Pounds per Square Foot
ROW	Right-of-Way
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
USGS	U.S. Geological Survey

1.0 INTRODUCTION

This report presents the results of our field investigation and provides geotechnical engineering conclusions and recommendations to support design and construction of the Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design project in Kitsap County, Washington. The purpose of this study was to complete investigations to characterize subsurface soil and groundwater conditions at the proposed pump station sites and to develop geotechnical conclusions and recommendations for design and construction of the proposed improvements.

The overall project location is shown on the Vicinity Map, Figure 1. The Site and Exploration Plan, Figures 2A through 2C, show the approximate locations of the proposed improvements and explorations completed for the project. The Subsurface Profiles, Figures 3A through 3C, show the geologic conditions and the proposed pump station improvements. Appendix A presents a description of the field exploration program and summary logs of the conditions observed in the explorations. A summary of the geotechnical laboratory testing procedures and test results are presented in Appendix B.

This report has been prepared based on our discussions with BHC Consultants (BHC), basemaps showing existing conditions and locations of the proposed improvements provided by BHC, our review of readily available subsurface information in the project area, the results of the explorations completed for this project, and our experience on similar projects.

1.1 SCOPE OF SERVICES

Landau Associates was contracted by BHC to provide geotechnical services to support the project. Our services were provided in accordance with terms and conditions of a Subconsultant Agreement between BHC and Landau Associates dated January 6, 2015 and our Proposal for Geotechnical Services dated August 13, 2014.

To support the project, we provided the following specific services:

- Compiled and reviewed readily available geotechnical and geologic information in the project vicinity.
- Contacted the Washington Utilities Coordinating Council “One Call” service to locate utilities in the project area. We also reviewed available utility maps for the pump station sites and subcontracted a private utility locating service.
- Completed 10 geotechnical borings (B-1 through B-10) to approximate depths ranging from 11½ to 41½ feet (ft) below ground surface (BGS) to characterize soil and groundwater conditions at each of the proposed pump station sites.
- Logged each soil unit observed in the exploratory borings and recorded pertinent information, including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence.

- Completed geotechnical laboratory testing consisting of grain size analyses and natural moisture content determinations on select samples from the explorations.
- Completed geotechnical engineering analyses and developed geotechnical engineering conclusions and recommendations for the design and construction of the proposed improvements.
- Prepared and submitted this geotechnical report summarizing our field investigations and geotechnical engineering conclusions and recommendations. This report includes:
  - A site plan showing the locations of the explorations completed for this investigation
  - Descriptive summary logs of the conditions encountered in the explorations completed for this study
  - A subsurface profile at each of the proposed pump station sites, showing subsurface conditions and proposed improvements
  - A summary of the surface and subsurface conditions observed at the location of the proposed pump station sites and sanitary sewer lines
  - Construction dewatering considerations
  - Recommendations for earthwork and grading, including excavations, subgrade preparation, potential dewatering methods, reuse of onsite materials, and structural fill placement and compaction criteria
  - General recommendations for lateral earth pressures to be considered in the design of temporary shoring and recommendations for appropriate shoring techniques
  - Lateral earth pressure recommendations for wet well, valve vault, and manhole design
  - Recommended shallow foundation support, including allowable soil bearing pressure and settlement
  - Geotechnical seismic design information in accordance with the 2012 International Building Code [IBC; International Code Council (ICC) 2011].

1.2 PROJECT UNDERSTANDING

We understand Kitsap County is proposing system rehabilitations to the existing sewer system located along the shore of Puget Sound in the unincorporated village of Manchester. The improvements generally include the rehabilitation of Pump Stations 45, 46, and 47 (PS-45, PS-46, and PS-47), which includes installation of new pump station vaults, wet wells, beach manholes, elevated concrete structures, and reconnection of sanitary sewer lines (i.e., gravity and force main) to the system. In addition, approximately 175 ft of sanitary sewer force main will be replaced to the west of the proposed PS-45. The project also includes installation of approximately 3,330 ft of cured in-place pipe liner in the existing beach line (installed from existing manholes) and reconnection of side sewers.

The existing pump stations, sewer lines, and manholes are located on beach areas near or within tidal influence. The proposed pump stations will be located landward of tidal influence and the proposed beach manholes will remain in locations of tidal influence as shown on Figures 2A through 2C, and 3A

through 3C. The proposed sanitary sewer force main at PS-45 will be located upland of tidal influence as shown on Figure 2A.

2.0 EXISTING CONDITIONS

This section provides a discussion of the general surface and subsurface conditions observed at the pump station sites at the time of our investigation. Interpretations of the site conditions are based on the results of our review of available information, site reconnaissance, subsurface explorations, and laboratory testing.

2.1 SURFACE CONDITIONS

The project site is located in the unincorporated village of Manchester in Kitsap County, Washington. The project includes work at three separate pump station sites (PS-45, PS-46, and PS-47) along the shoreline of Puget Sound.

The PS-45 site is located in the public right-of-way (ROW) along the southern end of East Daniels Loop, is bordered by private residences to the north and south, and the Puget Sound to the east. Surface conditions at this site consist of an asphalt-paved roadway with crushed rock surfacing and gravelly, beach sand on the eastern portion of the site. A concrete and riprap bulkhead separates the beach from the developed portion of the site. Existing surface features are shown on Figures 2A and 3A.

The PS-46 site is located in the ROW at the end of East Caraway Drive, is bordered by private residences to the north and south, and the Puget Sound to the east. Surface conditions at this site consist of an asphalt-paved roadway, crushed rock surfacing and manicured sod, and gravelly, beach sand on the eastern portion of the site. A concrete and riprap bulkhead separates the beach from the developed portion of the site. Existing surface features are shown on Figures 2B and 3B.

The PS-47 site is located in the ROW at the end of East Hemlock Street, is bordered by private residences to the north and south, and the Puget Sound to the east. Surface conditions at the site consist of an asphalt-paved roadway, manicured sod, and a sandy beach on the eastern portion of the site. Existing surface features are shown on Figures 2C and 3C.

2.2 GEOLOGIC SETTING

Geologic information for the project area was obtained from the *Geologic Map of Surficial Deposits in the Seattle 30' by 60' Quadrangle, Washington* (Yount et al. 1993). According to Yount, subsurface deposits in the vicinity of the proposed development consist of Vashon till. Vashon till generally consist of a non-sorted, non-stratified mixture of boulders, cobbles, gravel, and sand in a matrix of silt and clay with some lenses of sorted, stratified sand and gravel. Till typically exhibits low permeability and high shear strength, characteristics resulting from compaction by the weight of an overlying glacier.

The geologic conditions described above are generally consistent with those observed in our subsurface explorations; however, the composition and density of most of the glacial soil encountered within our explorations is slightly different from that of a soil traditionally considered to be Vashon till. Generally, the glacially-derived soil at the project site is less dense, contains fewer fines, and includes more sorted, stratified sand and gravel lenses than typically found in Vashon till. In order to avoid confusion, we have elected to refer to all glacially-derived soil encountered in our explorations as "melt-out till". The melt-out till encountered in the borings is water bearing (i.e., contains an aquifer), whereas typical glacial till is cemented and is more likely to act as an aquitard than contain an aquifer. Though not mapped, peat and undocumented fill were also encountered in select borings.

The peat encountered consists of fibrous, organic matter in varying stages of decomposition. Peat is typically found in lowland depressions or wetlands, and exhibits high compressibility and low shear strength. We interpret the peat material encountered at the PS-46 site as a post-glacial, intertidal estuary deposit. Peat encountered at the PS-47 site is interpreted as part of the melt-out till complex, which is complicated at the PS-47 site due to stream processes of the adjacent creek.

The history of undocumented fill placement at the project sites is unknown; however, it is likely that the fill observed in our borings originated from residential development and roadway construction. Fill can randomly contain organic material, debris, unsuitable soil, and/or soil that has not been properly compacted. In addition, fill can be compressible and variable in composition and thickness over short distances.

2.3 FIELD EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions along the project alignment were explored by advancing and sampling 10 exploratory borings (B-1 through B-10) at the approximate locations shown on the Site and Exploration Plan, Figures 2A through 2C. The borings were completed using hollow-stem auger drilling techniques on April 7 and 8, 2015 and July 14 and 15, 2015. The borings were advanced to depths of between about 11½ and 41½ ft BGS. The borings were completed by Holocene Drilling, Inc. of Puyallup, Washington under subcontract to Landau Associates. A detailed discussion of the field exploration program, together with edited logs of the borings, is presented in Appendix A.

Geotechnical laboratory testing consisted of natural moisture content determinations and grain size analyses on selected samples from the borings. A discussion of the geotechnical laboratory test procedures and test results are presented in Appendix B.

2.4 SUBSURFACE SOIL CONDITIONS

Subsurface soil conditions at the proposed pump station sites are summarized below; detailed information is presented in Appendix A. Because cobbles are too large in diameter to fit into the split-spoon sampler used for the borings, cobble inclusion, as noted below and on the logs, is based on observations of drill cuttings. Although not encountered in the borings, boulders could be encountered in glacial soils at the site.

2.4.1 PUMP STATION 45 SITE

Borings B-1, B-2, B-6, and B-7 were advanced at the PS-45 site. Borings B-1, B-6, and B-7 were advanced near the locations of the proposed wet well and beach manhole, and boring B-2 was advanced near the location of the proposed sanitary sewer force main as shown on Figure 2A. Fill was encountered below the ground surface in borings B-1, B-2, B-6, and B-7 at depths of 4, 2, 4½, and 7 ft BGS, respectively. The fill observed in borings B-1, B-6, and B-7 consisted of loose, sandy gravel with silt to loose, fine to coarse sand with gravel. The fill observed in boring B-2 consisted of loose, silty sand. Melt-out till was encountered below the fill in each boring. The melt-out till encountered in boring B-1, B-6 and B-7 was observed to generally consist of medium dense to very dense, gravelly sand with silt and cobbles to very sandy gravel with silt and cobbles. The melt-out till encountered in boring B-2 was observed to generally consist of loose, very silty sand with varying gravel and cobble content.

2.4.2 PUMP STATION 46 SITE

Borings B-3, B-8, B-9, and B-10 were advanced near the location of the proposed wet well, beach manhole, and generator/electrical pad at the PS-46 site, as shown on Figure 2B. At boring B-3, approximately 5½ ft of fill is interpreted to be present. At borings B-9 and B-10, approximately 4 ft of fill was found. The fill was observed to consist of loose, sandy gravel or very gravelly sand with silt and wood debris. Peat was encountered in borings B-3 and B-9 from approximately 4 to 8 ft BGS. Melt-out till was encountered below the peat and was found to extend to the maximum depth explored of 41½ ft BGS. The melt-out till encountered in the borings generally consisted of medium dense to very dense sand with silt, gravel, and cobbles. An exception to this summary was a lower permeability layer consisting of very dense, very silty sand with gravel encountered in borings B-3 and B-8 from 22 to 27 ft and 15 to 20½ ft BGS, respectively. The low permeability layer tended to have moist to wet conditions and characteristics of typical glacial till.

The peat encountered in borings B-3 and B-9 had a moisture content of nearly 500 percent; this material is highly compressible if subjected to new structure loads, or if dewatered (because the overburden soil weight increases from a buoyant to non-buoyant condition by dewatering).

2.4.3 PUMP STATION 47 SITE

Borings B-4 and B-5 were advanced near the location of the proposed wet well and beach manhole at the PS-47 site, as shown on Figure 2C. Significant changes in soil conditions were observed between borings B-4 and B-5 which are only 55 ft apart.

At boring B-4, approximately 4 ft of fill was encountered. The fill was observed to consist of loose to medium dense, sandy to very sandy gravel. Melt-out till was encountered below the fill layer and was found to extend to the maximum depth explored of 31½ ft BGS. The melt-out till generally consisted of loose to dense, very gravelly to gravelly sand with varying silt and cobble content, or medium dense to very dense, silty sand to sand with silt.

Boring B-5 encountered melt-out till at ground surface overlying a layer of peat from 17 to 27 ft BGS. Melt-out till was also encountered below the peat layer and extended to the maximum depth of 41½ ft BGS. The melt-out till encountered in the boring generally consisted of medium dense, very gravelly to gravelly sand with varying silt and cobble content, or medium dense to very dense, silty sand with varying gravel content.

The peat layer encountered in boring B-5 consisted of 4 ft of fine to coarse sand with peat lenses overlying 6 ft of peat. The peat encountered in boring B-4 had a moisture content of about 75 percent in the upper 4 ft and about 350 percent in the lower 6 ft; this entire layer should be considered highly compressible if subjected to new structure loads or dewatered.

2.5 GROUNDWATER

Groundwater was encountered at the time of drilling in all of the explorations completed for this study. The table below summarizes groundwater data collected for this project. The approximate exploration locations are shown on Figures 2A to 2C.

SUMMARY OF GROUNDWATER DATA

Boring Designation	Approximate Ground Surface Elevation (ft)	Date	Depth to Groundwater Table (ft BGS)(a)	Groundwater Elevation (ft)(a)	Remark
B-1	8.8	4/7/15	7.5	1.3	Groundwater rose to 2.8 ft BGS 1 hour after drilling commenced. Aquifer under pressure but not artesian conditions, see Section 3.2.1 for details
B-2	19.0	4/7/15	9.5	9.5	
B-3	8.0	4/7/15	4.5	3.5	
B-4	8.5	4/8/15	4.0	4.5	Artesian conditions encountered at 22 ft BGS, resulted in 2 ft of head above ground surface in drill rods
B-5	8.1	7/14/15	2.0	6.1	
B-6	8.1	7/14/15	8.0	0.1	
B-7	7.9	7/14/15	7.0	0.9	
B-8	3.7	7/15/15	1.5	2.2	
B-9	7.8	7/15/15	6.0	1.8	
B-10	9.6	7/15/15	8.0	1.6	

Note:
(a) At time of drilling

The groundwater conditions summarized above are for the specific locations and dates indicated, and therefore may not necessarily be indicative of other locations and/or times. Because the sites are adjacent to Puget Sound, it can be assumed that groundwater conditions will fluctuate throughout the day at the pump station sites. Furthermore, it is anticipated that groundwater conditions will vary depending on local subsurface conditions, the weather, and other factors. Groundwater levels in the project area are expected to fluctuate seasonally, with maximum groundwater levels generally occurring during the winter and early-spring months. For the portion of each site that comprises beach and is located at or below mean high water, we anticipate that groundwater is typically at ground surface daily.

3.0 GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS

In our opinion, construction of the Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design project is feasible from a geotechnical perspective. The seaward portion of the excavation at PS-45 and PS-46 will extend into an intertidal beach, meaning that dewatering from outside the excavation would be nearly impossible (i.e., an attempt at dewatering Puget Sound). Significant dewatering would also present a settlement risk to adjacent structures and utilities. The potential settlement risk is especially high at the PS-46 and PS-47 sites where highly-compressible peat soils are present.

Due to the potential settlement risk of peat soils when dewatered, we recommend that project specifications require the contractor to develop a shoring and dewatering plan that will not substantially lower groundwater levels outside of the excavation limits. At the time of this report, we recommend that the maximum tolerable lowering of the site groundwater table be taken as 1 ft, measured as a radial distance of 30 ft from the excavation limits, or the distance to any existing residential structure, whichever is less. This tolerance might need to be refined during preparation of project plans and specifications, depending on final site layout.

Applicable shoring techniques for the wet wells and beach line connections include but are not limited to sheet pile walls. Caissons could also be considered for wet well construction. Dewatering measures that will not substantially lower the groundwater table outside of the excavation may include, but are not limited to, deep sheet pile walls to effectively cut off the groundwater flow path, then dewatering from inside the excavation, or installing a concrete bottom seal inside the excavation.

Peat soils are present between about 4 and 8 ft BGS at the PS-46 site. We recommend that these shallow materials be overexcavated from below the proposed improvements at PS-46.

The proposed site layout and associated excavation requirements will likely leave peat soils in place at depth under PS-47 improvements. Because the site soil conditions can change quickly over short distances, unanticipated peat layers might also be encountered in excavations at other pump station sites. We recommend that project specifications include provisions for the use of lightweight fills to remedy potential settlement of peat layers. Lightweight fills will be required during construction at the direction of the engineer to match the load imposed on settlement-sensitive peat layers to preconstruction conditions.

Our geotechnical conclusions and recommendations are presented in the following sections for pump station design, gravity sewer pipelines, and sanitary sewer force mains.

3.1 PUMP STATION DESIGN RECOMMENDATIONS

The following sections of the report provide recommendations for the proposed pump stations. Recommendations are provided for seismic design considerations including code-based seismic design

criteria, construction dewatering, temporary excavation support, vibration and settlement monitoring, foundation support, backfill and compaction criteria, lateral earth pressures, and uplift resistance. Recommendations for mitigations of peat soils in utility excavations adjacent to the pump stations are also included in this section.

3.1.1 SEISMIC DESIGN CONSIDERATIONS

Seismic design of the proposed pump stations will be in accordance with the 2012 IBC (ICC 2011) or current version. The soil below the foundation level at the pump station sites is typically glacially consolidated and not considered prone to liquefaction due to its high density. According to the 2012 IBC, the soil profile that underlies the pump stations classifies as Site Class C, per Section 1613.3.2 (ICC 2011). The following spectral accelerations for a 2 percent probability of exceedance in 50 years should be used to determine the maximum considered earthquake spectral acceleration [U.S. Geological Survey (USGS) 2014]:

MAXIMUN CONSIDERED EARTHQUAKE SPECTRAL ACCELERATION

Spectral Acceleration for short periods (S_s):	159.6 percent of gravity (1.60g)
Spectral Acceleration for a 1-second period (S_1):	61.2 percent of gravity (0.61g)

For Site Class C, a value of 1.00 should be used for site coefficient F_a, and 1.30 for site coefficient F_v. The design spectral response accelerations can be taken as $^2/_3$ of the values determined above.

3.1.2 CONSTRUCTION DEWATERING AT PUMP STATION SITES

It is our opinion that dewatering outside of the excavations for the new wet wells, beach manholes, and deep connecting utilities should not be allowed. In developing a dewatering plan, the contractor shall assume a maximum tolerable lowering of the site groundwater table of 1 ft, measured as a radial distance of 30 ft from the excavation limits, or the distance to any existing residential structure, whichever is less. In order to provide a suitable trench bottom, the groundwater table should be lowered to a minimum of 2 ft below the excavation bottom.

Dewatering measures that will not substantially lower the groundwater table outside of the excavation include but are not limited to: 1) deep shoring systems (such as sheet pile walls) that effectively cut off the groundwater flow path, then dewatering from inside the excavation or 2) installing a concrete bottom seal inside the shored excavation, then dewatering above the seal.

The contractor should be responsible for design and implementation of the dewatering system. Applicable methods of dewatering for this project could include sump pumping from the excavation, or wells and/or well points. The contractor shall submit a construction dewatering plan that includes proposed

means, methods and equipment, and proposed measures to monitor and maintain groundwater levels outside of excavations, as well as corrective measures if groundwater levels are lowered in exceedance of project specifications. A preconstruction survey should also be required of the contractor to establish baseline information about the condition of existing structures (including photos), and baseline elevations of settlement-sensitive site features.

The soil type to be dewatered is anticipated to primarily consist of melt-out till composed of silty, gravelly sand or very gravelly sand with silt. Peat will also be encountered. These soil deposits are expected to yield moderate pumping quantities during construction dewatering. For any dewatering method, care must be taken to provide the correct filtering around each dewatering well to prevent the migration of fines and loss of ground around the well. Fine sand and silt are the most susceptible to being moved by water flow. Grain size data in Appendix B of this report may be used to evaluate the filtering requirements and estimated hydraulic conductivity (K_{sat}) of onsite soils.

Discharge water from pumps should be monitored for the pumping of excessive amounts of fines. Based on our experience, if an excessive amount of fines (e.g., total sediment concentrations greater than 15 milligram per liter) is detected in the discharge water, the contractor must immediately take corrective measures. Dewatering wells should be constructed and abandoned in accordance with the regulations set forth by the Washington State Department of Ecology, Washington Administrative Code (WAC) 173-160.

3.1.3 TEMPORARY SHORING

Temporary excavations at the pump station sites (including adjacent, deep utilities) are expected to mostly encounter medium dense to very dense melt-out till. This material is typically a water-bearing sand and gravel, with variable silt and cobble content. Groundwater is expected at or near ground surface and the excavations will extend into tidal influence. Based on the exploration findings, our experience, and discussions with qualified contractors, we anticipate that a sheet pile cutoff wall could be used to complete the deeper excavations. Sinking a caisson or other shoring methods could also be feasible. Temporary sloped excavations could be feasible for shallow utilities or other incidental excavations, as discussed in Section 3.2.2.

The use of driven shoring elements (such as sheet piles) will be difficult due to the medium dense to very dense soil conditions. Design of temporary shoring should be the responsibility of the contractor. We recommend that the groundwater table be assumed at ground surface for design of temporary shoring. Shoring that extends above ground surface in intertidal areas should also be designed for the lateral loads imparted by water in Puget Sound. The soil parameters in the following table may be used for design of temporary shoring.

SOIL PARAMETERS FOR DESIGN OF TEMPORARY SHORING

Soil Parameter	Fill	Melt-out till	Peat
Soil Unit Weight (γ) pcf	120	130	80
Buoyant Soil Unit Weight (γ') pcf	58	67	13
Soil Internal Angle of Friction (φ)	32	38	N/A
Soil Cohesion (c) psf	0	0	25

pcf = pounds per cubic foot
psf = pounds per square foot
N/A = not applicable
Note: Hydrostatic pressure should be included in shoring design. Assumed groundwater elevation is at ground surface.

Installation of shoring elements using a vibratory hammer will produce ground vibration in the vicinity of the excavation. Ground vibrations associated with shoring installation could cause damage to nearby improvements. Ground vibrations occurring in loose to medium dense sand and gravel could result in the densification of the loose soil and settlement of the ground surface. Ground vibrations producing densification and settlement are dependent on a complex combination of factors, including energy and amplitude of the vibratory hammer, number of repetitions, soil properties, shoring length, location of the water table, type of pile installation, and distance from the pile.

Settlement of the ground surface resulting from sheet pile vibrations densifying loose sand has been documented in previous published (Dowding 1994) and unpublished case histories. Settlement is typically greatest in the immediate vicinity of the sheet pile and decreases with increasing distance from the sheet pile. Based on case histories, maximum settlements of up to 3 inches could easily occur within 5 to 6 ft of a sheet pile wall as a result of vibration (Dowding 1994). Vibration-induced settlements should be negligible approximately 50 ft from the face of the wall.

Temporary shoring should be designed by a structural engineer licensed in the State of Washington and all applicable local, state, and federal safety codes should be followed. Special consideration will need to be given in the contractor's shoring design on how to complete the beach line manhole connections.

3.1.4 VIBRATION SETTLEMENT MONITORING

The pump station sites are located adjacent to residential structures, as shown on Figures 2A through 2C. Approximate setback distance between the structures and the pump station sites are noted on Figures 3A through 3C. The installation of shoring will likely create vibrations that put adjacent structures and other improvements at risk for settlement. We recommend that a vibration and settlement monitoring specification be prepared for the project. The specification should require that the contractor submit a vibration and settlement monitoring plan that includes proposed equipment and associated vibrations, as well as corrective measures for vibrations or settlement that exceed project tolerances. A pre-construction

survey will also be required to establish baseline information about the condition of existing structures (including photos), and baseline elevations of settlement-sensitive site features.

3.1.5 FOUNDATION SUPPORT

The sections below provide specific recommendations for foundation support at each pump station site. Our recommendations were developed while considering elevated concrete structures, vaults, wet wells, beach manholes, gravity sanitary sewer lines and the generator pad at PS-46.

We anticipate that underground structures will typically result in a zero net increase in bearing pressure after the improvements are installed; this should be verified in final design. However, if peat (a very light material) is encountered in excavations and removed and repaired with typical soil backfill, the net increase in bearing pressure can be significant. The generator pad and elevated concrete structures are expected to impose total loads of about 200 to 300 psf.

3.1.5.1 Pump Station 45 Site

Peat soils were not encountered. No special foundation support considerations are anticipated.

3.1.5.2 Pump Station 46 Site

Peat soils were encountered at depths of about 4 to 8 ft BGS at the location of the pump station (vault, wet well, elevated concrete pad). Peat soils were not encountered at the generator pad site or extending seaward of the pump station. We recommend that the peat soils be overexcavated from below all proposed improvements and replaced with structural fill.

3.1.5.3 Pump Station 47 Site

Peat soils were encountered from 17 to 27 ft BGS in boring B-5, and not encountered in boring B-4. Our general interpretation of where peat soils underlie the proposed improvements is shown on Figure 3C. Please note that peat is shown to possibly underlie the pump station (vault, wet well, and elevated concrete pad); this is our interpretation because the pump station site recently shifted to the south, and is nearly as close to exploration B-5 as it is to B-4. Our special foundation support recommendations related to the presence of peat is as follows:

- **Elevated Concrete Structure**. This is anticipated to add weight and peat soils could be present below. We recommend designing the structure for a zero net increase in bearing pressure. This can be accomplished by overexcavating foundation material and replacing it with lightweight fill material such as cellular concrete. Cellular concrete could also be considered for fill material to raise grades and further reduce loads. **All lightweight fill materials used for this project should have a dry density greater than water. A dry density of 70 pcf is appropriate for planning purposes.**

- **Vault and Wet Well**. These structures are not anticipated to add weight when compared to existing conditions, but backfill around them could. If peat is encountered at the base of these excavations, we recommend a 2-ft overexcavation and replacement with lightweight fill. In addition, if the vault and wet well construction techniques require backfill (rather than a clean caisson installation), lightweight backfill should be used. The use of lightweight fill in this application should follow through to buoyancy calculations by the designer.
- **Beach Manhole**. Same considerations as the vault and wet well.
- **Sanitary Sewer Gravity Lines**. Peat will likely be encountered in a portion of these excavations, and extending below practical depth of removal (27 ft or deeper). Where peat is encountered, we recommend that the excavation bottom be overexcavated and replaced with 2 ft of lightweight fill. Lightweight fill should also be used over a portion of the backfill zone. For planning purposes, assume half the backfill zone will comprise lightweight fill. The actual required thickness will be at the direction of the engineer during construction, based on the excavation conditions observed. Please note that if the contractor uses a concrete seal for dewatering, the entire backfill zone will likely comprise lightweight fill, depending on the thickness of peat removed.

Other alternatives we considered for peat mitigation at PS-47 included the removal of all peat, supporting utilities on driven piles, and soil preloading. In our opinion, soil preloading could be considered for the PS-47 elevated concrete structure; this might not be practical given schedule and access constraints. Supporting improvements on driven piles could put adjacent utility tie-ins at a significant risk for differential settlement. **We recommend that flexible utility connections be used at PS-47.**

3.1.5.4 General Recommendations

Structure excavations not exposing peat will typically expose medium dense to very dense melt-out till (i.e., sand and gravel). Special recommendations for mitigating settlement of peat soils are described in the sections above.

We recommend a net allowable bearing pressure of 2,000 psf at the PS-45 site. A net allowable bearing pressure of 2,000 psf is also recommended at the PS-46 site after the peat is overexcavated and replaced as discussed in Section 3.1.5.2. We recommend that structures at the PS-47 site be designed for a zero net increase in bearing pressure using lightweight fill materials as described in Section 3.1.5.3. The net allowable bearing pressure includes a factor of safety of at least 3.0 on the calculated ultimate bearing capacity. The term "Net Allowable Bearing Pressure" refers to the total pressure resulting from the total of all dead plus live loads that can be imposed on the soil at foundation level. The maximum allowable bearing pressure can be increased by one-third for short-term transient loadings. Total settlement should be less than one inch and is expected to occur as the load is placed on the mat. Post-construction settlement should be negligible.

We recommend that project plans include an allowance for 2 ft of overexcavation and replacement to protect the foundation subgrade soil from disturbance. The overexcavation should be backfilled with

material meeting the requirements for Class A Foundation Material, as described in Section 9-03.17 of the 2014 Washington State Department of Transportation (WSDOT) *Standard Specifications for Road, Bridge, and Municipal Construction* (Standard Specifications). Excavation, backfilling, and compaction should be in accordance with section 2-09.3(1)C of the 2014 WSDOT Standard Specifications. This overexcavation and replacement is not applicable where a concrete seal is used or where peat has been removed and replaced with lightweight fill.

Prior to placement of reinforcing steel and concrete, or in any instances where peat is encountered, we recommend that the foundation bearing conditions be confirmed by a qualified geotechnical or civil engineer.

3.1.6 BACKFILLING

Where lightweight fill is not required, backfill should meet the requirements for Select Borrow in Section 9-03.14(2) of the 2014 WSDOT Standard Specifications. If wet weather construction is anticipated, the amount of fines (material passing a U.S. No. 200 sieve) should not exceed 5 percent, by dry weight, based on a wet sieve analysis of that portion passing the ¾-inch sieve.

Backfill for structures should be placed and compacted in accordance with Section 2-03.3(14)C, Method B of the 2014 WSDOT Standard Specifications. Compaction and moisture control tests should be done in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. The maximum dry density and optimum moisture content may also be determined by the ASTM International (ASTM) D1557 test procedure.

3.1.7 LATERAL EARTH PRESSURES

For design of below-grade walls of the wet well and valve vault structures, we recommend assuming a design groundwater elevation equal to the ground surface. The wet well and valve vault walls are expected to be restrained against rotation during backfilling and should therefore be designed for an equivalent fluid unit weight (EFW) of 95 pcf, assuming level backfill and at-rest, undrained soil conditions. Design of any subsurface walls should include appropriate lateral pressures caused by any adjacent surcharge loads.

For uniform surcharge pressures, uniformly distributed lateral pressures of 0.41 times the surcharge pressure should be added for non-yielding walls. Given the relatively small size, the wet well and valve vault structures are expected to move with the ground during a seismic event, and incorporation of unbalanced dynamic lateral earth pressures in the design of the pump station is not considered warranted.

3.1.8 UPLIFT RESISTANCE

For design, we recommend assuming that the groundwater could rise to ground surface and that the pump station and adjacent utilities could experience uplift pressure. Uplift forces will be resisted by the dead weight of the structure and friction between the walls/sides of the pump station/utility and the surrounding soil backfill.

3.2 UTILITY INSTALLATION

The following sections provide geotechnical recommendations for design and construction of proposed new underground utilities. **Special requirements pertaining to shoring, dewatering, and settlement mitigation of the beach manholes and connecting sanitary sewer gravity lines are discussed in Section 3.1.2, 3.1.3, and 3.1.5.**

We understand that utilities outside of the pump station excavation area will be relatively shallow, and mostly limited to the PS-45 force main. Geotechnical recommendations are included for construction dewatering, trench excavation and retention, pipe foundation support, pipe bedding and pipe zone backfill, trench backfill and compaction criteria, loads on pipes, manholes, and pipeline settlement and buoyancy considerations.

3.2.1 PUMP STATION 45 FORCE MAIN – CONSTRUCTION DEWATERING

We understand that the PS-45 force main will be designed as close to ground surface as practical, with a minimum cover requirement of about 4 ft; excavations are likely to extend to about 5 ft BGS. Other shallow utilities are expected to be within the same depth range. Groundwater was encountered at approximate depths of 7.0, 9.5, and 8.0 ft BGS within the PS-45 force main alignment, in borings B-1, B-2, and B-6, respectively. The water level in boring B-1 rose to within approximately 2.8 ft of ground surface 1 hour after drilling. It is our opinion that the rise in groundwater was due to penetrating an aquifer under pressure (but not artesian) at depth in the boring. A shallow groundwater monitoring well was subsequently installed in boring B-6 to monitor groundwater levels for shallow excavation considerations. We did not observe an appreciable rise in groundwater in the shallow well; groundwater levels at boring B-6 should be verified prior to final plans, specifications, and estimates. It is our opinion that excavations extending to about 10 ft BGS or shallower should be able to use conventional dewatering methods.

In order to provide a suitable trench bottom, the groundwater table should be lowered to a minimum of 2 ft below the trench bottom. If construction is completed during the summer and early-fall months when the groundwater table is near its seasonal low, it is anticipated that construction dewatering can be accomplished with conventional sumps and pumps within the trench. If construction is completed during

the winter and early-spring months when the groundwater table nears its seasonal high, more extensive construction dewatering could be necessary.

The contractor should be responsible for the design, installation, monitoring, and maintenance of any dewatering system(s). If wells or well points are necessary, the contractor should be required to submit a dewatering plan prepared by a registered professional engineer or hydrogeologist for review by Kitsap County prior to implementation. Disposal of all dewatering effluent is the responsibility of the contractor.

3.2.2 TRENCH EXCAVATION AND SUPPORT

We anticipate that the majority of excavations for shallow utilities will be within loose fill or medium dense to dense melt-out till. A heavy-duty, hydraulic excavator with sufficient reach should be able to excavate the proposed trenches to the planned depths. Cobbles and random boulders are commonly present in melt-out till deposits and the contractor should be prepared to handle and dispose of such oversized material. Upon reaching the trench bottom, we recommend that a "smooth-bladed" bucket be used to clean the trench bottom of loose and/or disturbed soil. The final trench bottom should be firm and free of loose and disturbed soil.

Trench excavation should conform to the requirements of Section 7-08.3(1)A of the 2014 WSDOT Standard Specifications. All applicable local, state, and federal safety codes should be followed. Temporary excavations in excess of 4 ft must either be shored or sloped in accordance with *Safety Standards for Construction Work, Part N*, located in Chapter 296-155 of the WAC. In the absence of groundwater seepage, the melt-out till would typically classify as a Type B soil per Chapter 296-155 of the WAC. Fill would generally be classified as a Type C soil. The prescriptive maximum allowable excavation slope for Type B soil is 1H:1V (horizontal to vertical), while the maximum allowable excavation slope for Type C soil is 1½H:1V. If groundwater seepage is present, flatter slopes, temporary shoring, and/or dewatering will likely be required. Actual trench configurations and maintenance of safe working conditions, including temporary excavation stability, should be the responsibility of the contractor, based on inspection of actual soil conditions at the time of construction.

If bracing is needed to support the trench walls, the temporary bracing system should be designed by a structural engineer licensed in the State of Washington. Surcharge loads on trench support systems due to construction equipment, stockpiled material, and vehicle traffic should be included in the design. The temporary shoring design should be submitted to the engineer for review prior to construction. Actual trench configurations should be the responsibility of the contractor. All applicable local, state, and federal safety codes should be followed.

3.2.3 PIPE FOUNDATION SUPPORT

Based on conditions observed and reported at the exploration locations, soil conditions at planned trench depths are expected to predominately consist of medium dense to very dense melt-out till. **Special considerations for pipe foundation support in areas likely to encounter peat are provided in Section 3.1.5.** The melt-out till soil type should provide adequate foundation support for the pipeline provided the foundation soil remains in a relatively undisturbed condition and is properly dewatered. The native pipe foundation soils contain a significant amount of fines (material passing a U.S. No. 200 sieve) and are easily disturbed by construction activities. Excessive foot traffic, using an excavator with teeth when cutting final grade, and improper dewatering can cause soil to become disturbed. If disturbed, these soils will not provide suitable foundation support of the pipe.

If the bottom of the trench becomes disturbed and cannot be compacted to a firm condition due to moisture content, the disturbed material should be overexcavated to expose undisturbed, firm foundation soil. Overexcavations should be backfilled with suitable foundation material to provide a firm trench bottom. Foundation material should meet the requirements for Foundation Material Class B in Section 9-03.17 of the 2014 WSDOT Standard Specifications. Foundation material should be placed in 6-inch lifts and mechanically compacted to provide a firm excavation bottom. If the trench bottom exposes peat, the engineer should be contacted to provide appropriate direction regarding the use of lightweight fill materials and subgrade preparation.

3.2.4 PIPE BEDDING AND PIPE ZONE BACKFILL

To provide uniform support of buried utility pipes, the pipe should be bedded in accordance with Section 7-08.3(1)C of the 2014 WSDOT Standard Specifications. The bedding material should extend 6 inches below the invert of the pipe. Bedding material for buried utility pipes should consist of Gravel Backfill for Pipe Zone Bedding meeting the requirements Section 9-03.12(3) of the 2014 WSDOT Standard Specifications. For rigid pipes (i.e., concrete and ductile iron), the bedding material should extend above the pipe bottom a distance of at least 15 percent of the pipe outside diameter. For flexible pipes (e.g., PVC, HDPE, etc.), the bedding material should extend at least 6 inches above the crown of the pipe. For metal pipe, the bedding material should extend to at least the spring line of the pipe.

Pipe zone backfill for rigid and metal pipes should meet the requirements of Section 7-08.3(3) of the 2014 WSDOT Standard Specifications and should extend a minimum of 6 inches over the crown of the pipe. Fill or melt-out till excavated from above the water table with less than about 15 percent fines (i.e., soil with a Unified Soil Classification System classification of GP-GM, GW-GM, or SP-SM) would be suitable for use for pipe zone backfill provided that it is near its optimum moisture content, can be compacted to the required density, and oversize particles (i.e., material with a maximum particle size greater

than 1½ inches) are removed from the soil. If additional material is needed for pipe zone backfill or if wet weather construction is anticipated, Gravel Backfill for Pipe Zone Bedding meeting the requirements Section 9-03.12(3) of the 2014 WSDOT Standard Specifications should be used. If wet weather construction is anticipated, the amount of fines (material passing a U.S. No. 200 sieve) in the pipe zone backfill (either native or import) should not exceed 5 percent by dry weight, based on a wet sieve analysis of that portion passing the ¾-inch sieve.

Pipe bedding material and pipe zone backfill should be brought up evenly around the pipe in relatively horizontal lifts not exceeding 6 inches, and worked under the haunches of the pipe by slicing with a shovel, vibration, or other approved procedures. Pipe bedding and pipe zone backfill should be compacted to at least 90 percent of the maximum dry density determined in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. The maximum dry density may also be determined by the ASTM D1557 test procedure. The contract specifications should be reviewed to determine if onsite soils are allowed for reuse as pipe zone backfill. The opinions in this report do not override the project specifications.

3.2.5 TRENCH BACKFILL AND COMPACTION CRITERIA

The excavated material from the proposed pump station structures and sewer lines are expected to generally consist of fill and melt-out till. Excavated material encountered from above the groundwater table was observed to have moisture content of slightly below to slightly above the optimum moisture content for compaction. During the relatively dry portions of the year (mid-summer to early fall), these deposits could be reused as trench backfill in improved areas, provided the soil can be properly moisture conditioned and compacted to the required density. The contractor should anticipate having to moisture condition (wetting and/or drying) the excavated soil prior to its use. This may include spreading and aerating the material in thin lifts during dry, warm weather conditions. During wet weather, the soil will likely be unsuitable for use as trench backfill.

Excavated soil encountered below the groundwater table will be significantly above the optimum moisture content for compaction, and will require a significant amount of aeration to use as structural fill. Given the space constraints and scheduling issues, it may be more practical to waste the excavated soil encountered below the groundwater table at an approved offsite location. If the contractor intends to utilize some of the excavated soil for trench backfill, the contractor will need to separate suitable from unsuitable material. All excavated material containing peat should be wasted.

Imported trench and structure backfill should meet the requirements for Bank Run Gravel for Trench Backfill in Section 9-03.19 of the 2014 WSDOT Standard Specifications. If wet weather

construction is anticipated, then the amount of fines (material passing a U.S. No. 200 sieve) should be limited to 5 percent or less based on the fraction of the material passing a U.S. ¾-inch sieve.

Backfilling of trenches should be in accordance with the requirements of Section 7-08.3(3) of the 2014 WSDOT Standard Specifications. Compaction testing should be in accordance with the requirements of Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. Alternatively, the maximum dry density may be determined using the ASTM procedure D1557.

3.2.6 MANHOLES

Manholes should be designed to withstand a lateral pressure with an EFW of 95 pcf, based on at-rest, saturated soil conditions and including the hydrostatic pressure. The subgrade soil beneath the beach manholes at PS-45 and PS-46 are expected to provide adequate foundation support, provided the soil remains in a relatively undisturbed condition. **Special requirements for the beach manhole at PS-47 are provided in Section 3.1.5.** Recommendations for uplift resistance are provided in Section 3.1.8 of this report.

Installation of manholes should be in accordance with the requirements of Section 7-05.3 of the 2014 WSDOT Standard Specifications. If the excavation bottom for the manhole becomes disturbed, the disturbed soil should be overexcavated to expose undisturbed native soil and backfilled with suitable foundation material to provide a firm bottom. Foundation material should meet the requirements for Foundation Material Class A in Section 9-03.17 of the 2014 WSDOT Standard Specifications. Foundation material should be placed in 6-inch lifts and thoroughly compacted to provide a firm excavation bottom. Manholes should be backfilled in accordance with the requirements of Section 2-09.3(1)E of the 2014 WSDOT Standard Specifications.

3.2.7 SETTLEMENT AND BUOYANCY

The net increase in bearing pressure below pipelines and manholes is generally small or negative due to the amount of soil displaced by the pipeline or manhole. We expect post-construction settlements of new pipes and manholes to be negligible, provided that the pipeline/manhole is underlain by undisturbed native soil or firm foundation backfill material, the ground surface over and adjacent to the pipe or manhole remains at about the same level prior to construction, and no additional load from a new structure is placed over the pipeline or manhole.

Differential settlement between the new improvements and connections to the existing system may occur. We recommend that flexible pipes/connections be used at PS-47 to mitigate for potential differential settlement.

If the groundwater table is located above the crown of the pipeline and pipeline is not full, the pipeline will be subjected to a buoyant force. The buoyant force will be resisted by the weight of the pipe and the weight of the soil, W_s (pounds), above the crown of the pipe. Conservatively, assuming that the groundwater table is at the existing ground surface, the weight of the soil along a 1 ft length of pipe can be taken as:

$W_s = 73*H*D$

Where:

H = Distance from the ground surface to the crown of the pipe in ft

D = Diameter of the pipe in ft.

The equation above assumes a unit weight of compacted backfill to be 135 pcf and will need to be modified in areas where lightweight backfill is used. Conservatively, the equation can be modified for lightweight backfill to:

$W_s = 10*H*D$

4.0 DOCUMENT REVIEW AND CONSTRUCTION OBSERVATIONS

We recommend that a qualified geotechnical engineer review the portions of the plans and specifications that pertain to structure foundations, pipeline installations, general earthwork construction, and dewatering in order to determine if they are consistent with the recommendations presented in this report. The purpose of the review is to verify that the recommendations presented in this geotechnical report have been properly interpreted and implemented in the design and specifications.

We recommend that monitoring, testing, and consultation be provided during construction to confirm that the conditions encountered are consistent with those indicated by our explorations; to provide expedient recommendations should conditions be revealed during construction that differ from those anticipated; to provide specific recommendations for overexcavation and load balance where peat is encountered; and to evaluate whether geotechnical-related activities comply with project plans and specifications, and the recommendations contained in this report. Such activities include observation of pipeline installation, fill placement and compaction subgrade preparation, pump station structure installation, and other geotechnical-related activities. Landau Associates would be pleased to provide these services.

5.0 USE OF THIS REPORT

This report was prepared for the exclusive use of BHC Consultants for specific application to the Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design project located in Kitsap County, Washington. The use by others, or for purposes other than intended, is at the user's sole risk. The findings, conclusions, and recommendations presented herein are based on our understanding of the project, review of available geotechnical and geologic information in the project vicinity, and on subsurface conditions observed during explorations completed for this project. Within the limitations of scope, schedule, and budget, the conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering principles and practices in the area at the time the report was prepared. We make no other warranty, either express or implied.

There may be some variation in subsurface soil and groundwater conditions at the site, and the nature and extent of the variations may not become evident until construction. Accordingly, a contingency for unanticipated conditions should be included in the construction budget and schedule. We should be contacted if variations in subsurface conditions are encountered during construction.

We appreciate the opportunity to provide geotechnical services on this project and look forward to assisting you during the bidding and construction phases. If you have any questions or comments regarding the information contained in this report, or if we may be of further service, please call us at (360) 791-3178.

LANDAU ASSOCIATES, INC.

Benjamin J. Ford, E.I.T.
Senior Staff Engineer

Calvin A. McCaughan, P.E.
Principal

BJF/CAM/bar

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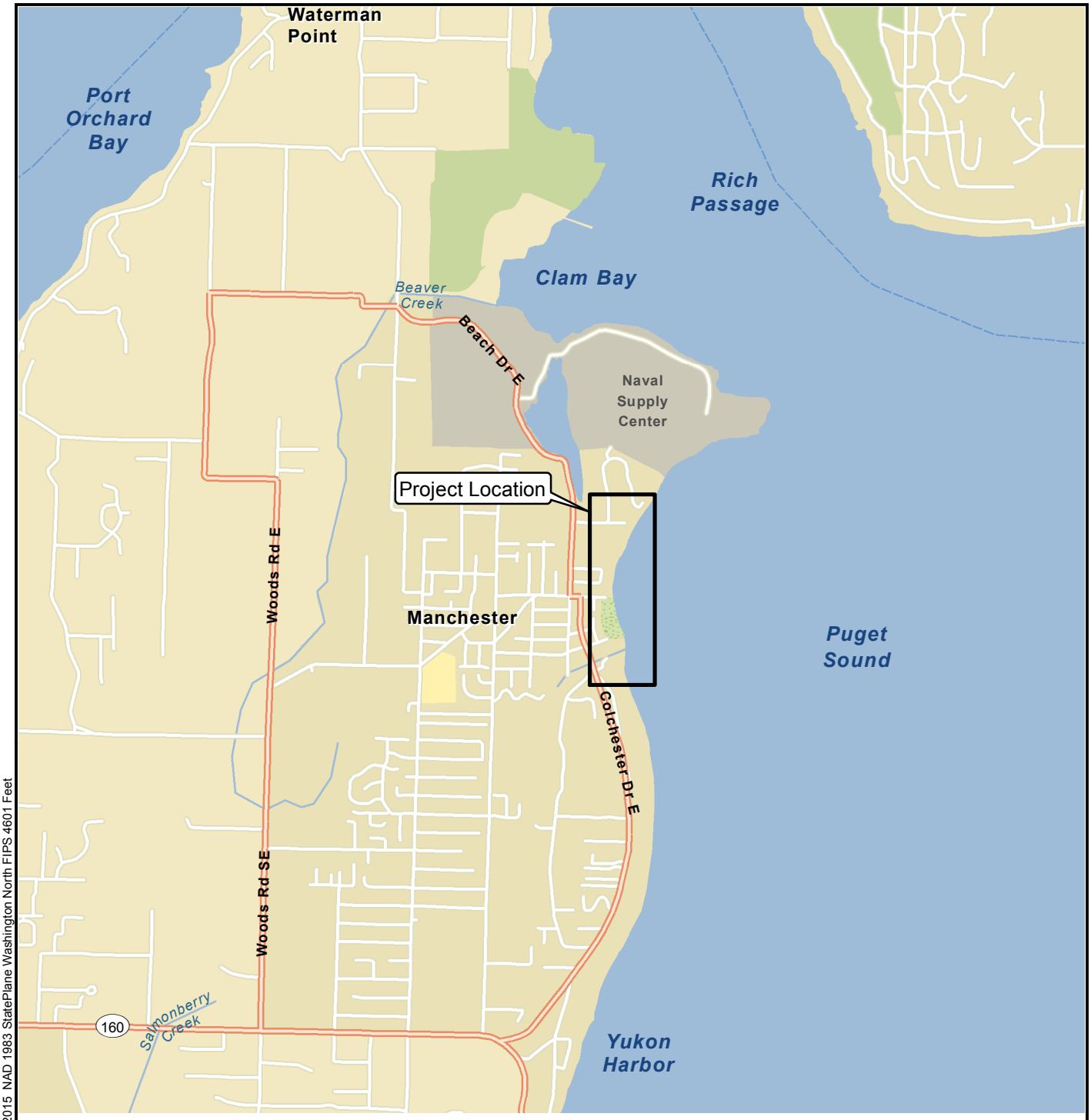

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Data Source: Esri 2012

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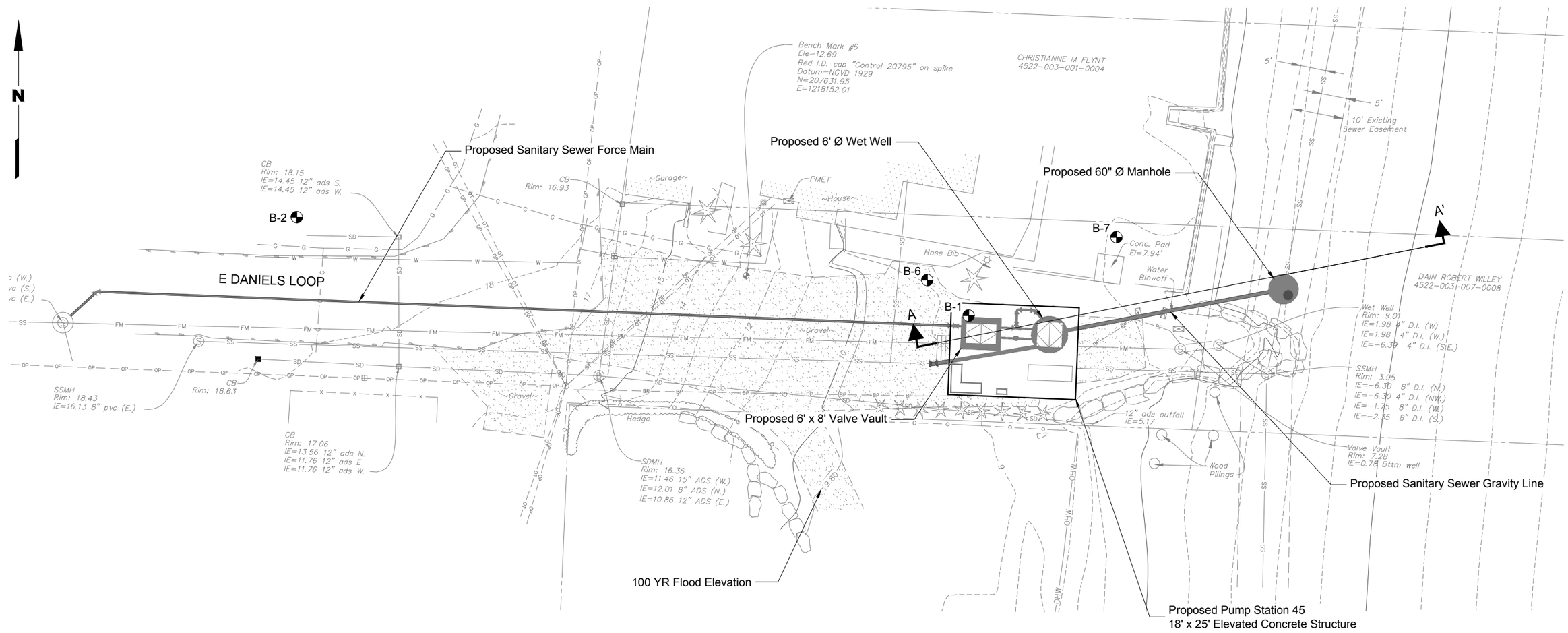
Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design Kitsap County, Washington	**Vicinity Map**	Figure 1



Legend

B-1 Approximate Boring Location and Designation

A A' Subsurface Profile Location, See Figure 3A

Note

1. Proposed improvement locations are subject to change and should be considered approximate.

Base map source: BHC Consultants, LLC., 2015

0 20 40
Scale in Feet

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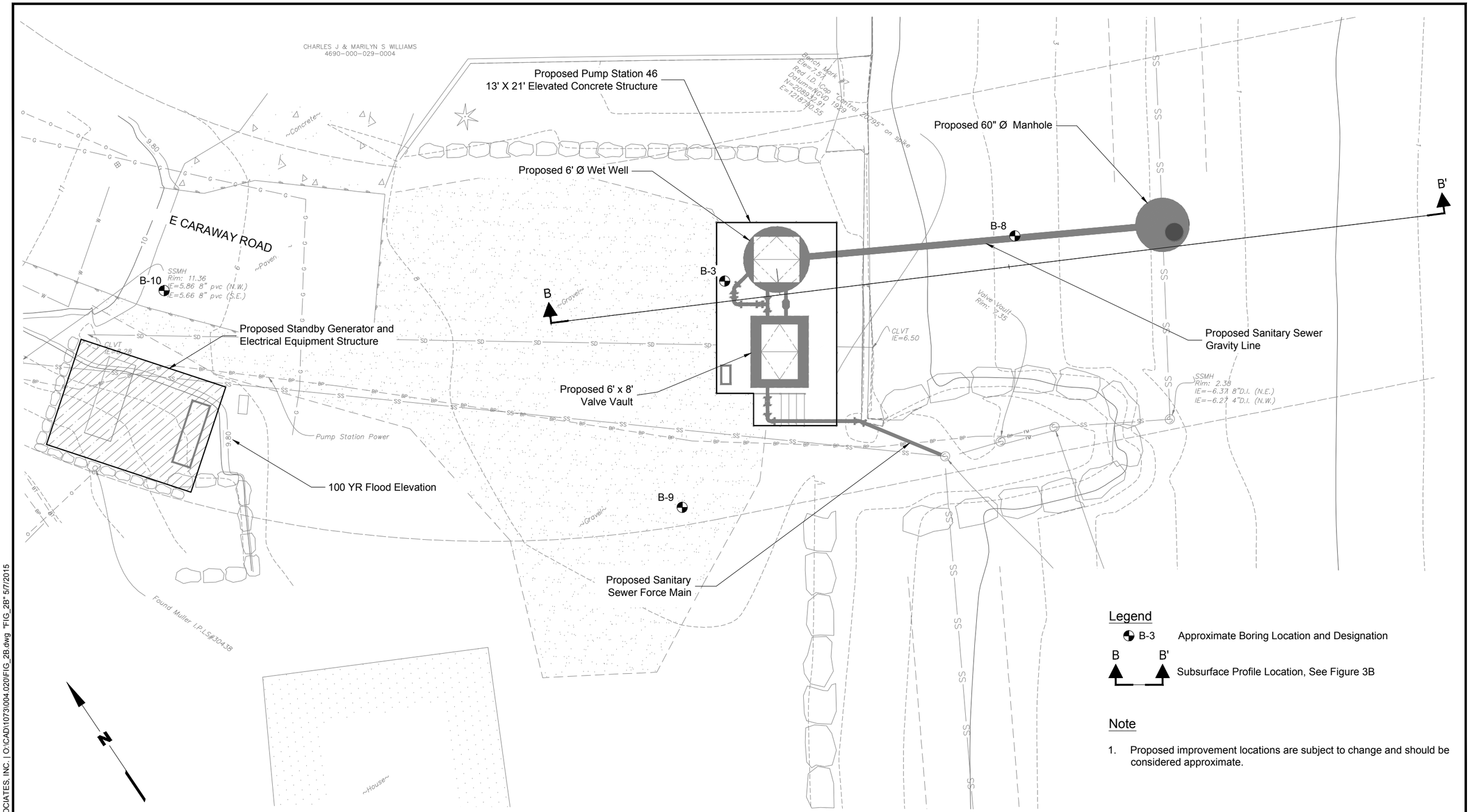
Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design Kitsap County, Washington	**Pump Station 45 Site and Exploration Plan**	Figure 2A

LANDAU ASSOCIATES, INC. | O:\CAD\1073\004.020\FIG_2A.dwg "FIG_2A" 5/7/2015



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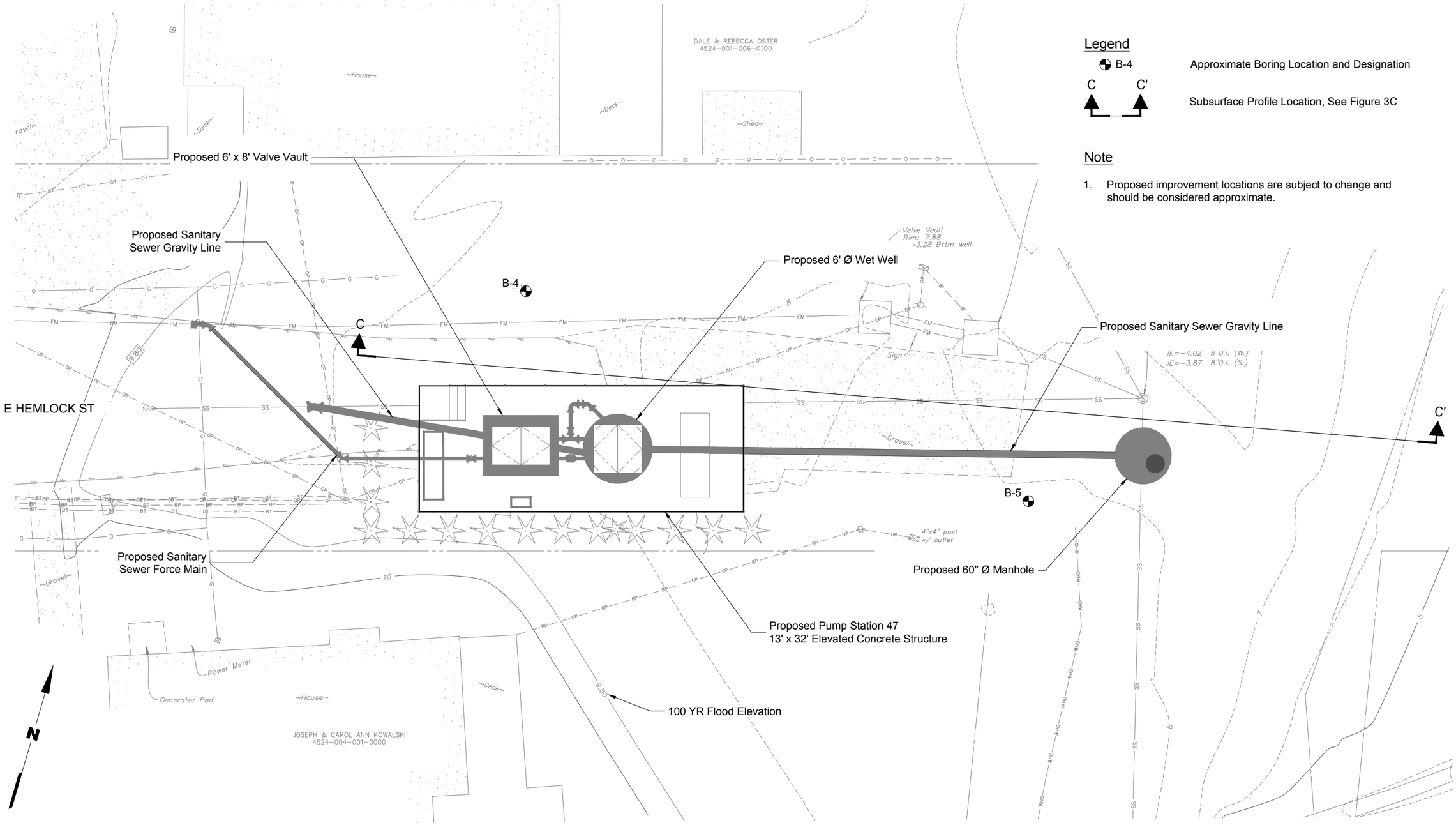
Manchester Pump Stations
Nos. 45, 46, and 47
Upgrades Design
Kitsap County, Washington

Pump Station 46
Site and Exploration Plan

Figure
2B



Legend

B-4 — Approximate Boring Location and Designation

C C' — Subsurface Profile Location, See Figure 3C

Note

1. Proposed improvement locations are subject to change and should be considered approximate.

Base map source: BHC Consultants, LLC., 2015

0 10 20
Scale in Feet

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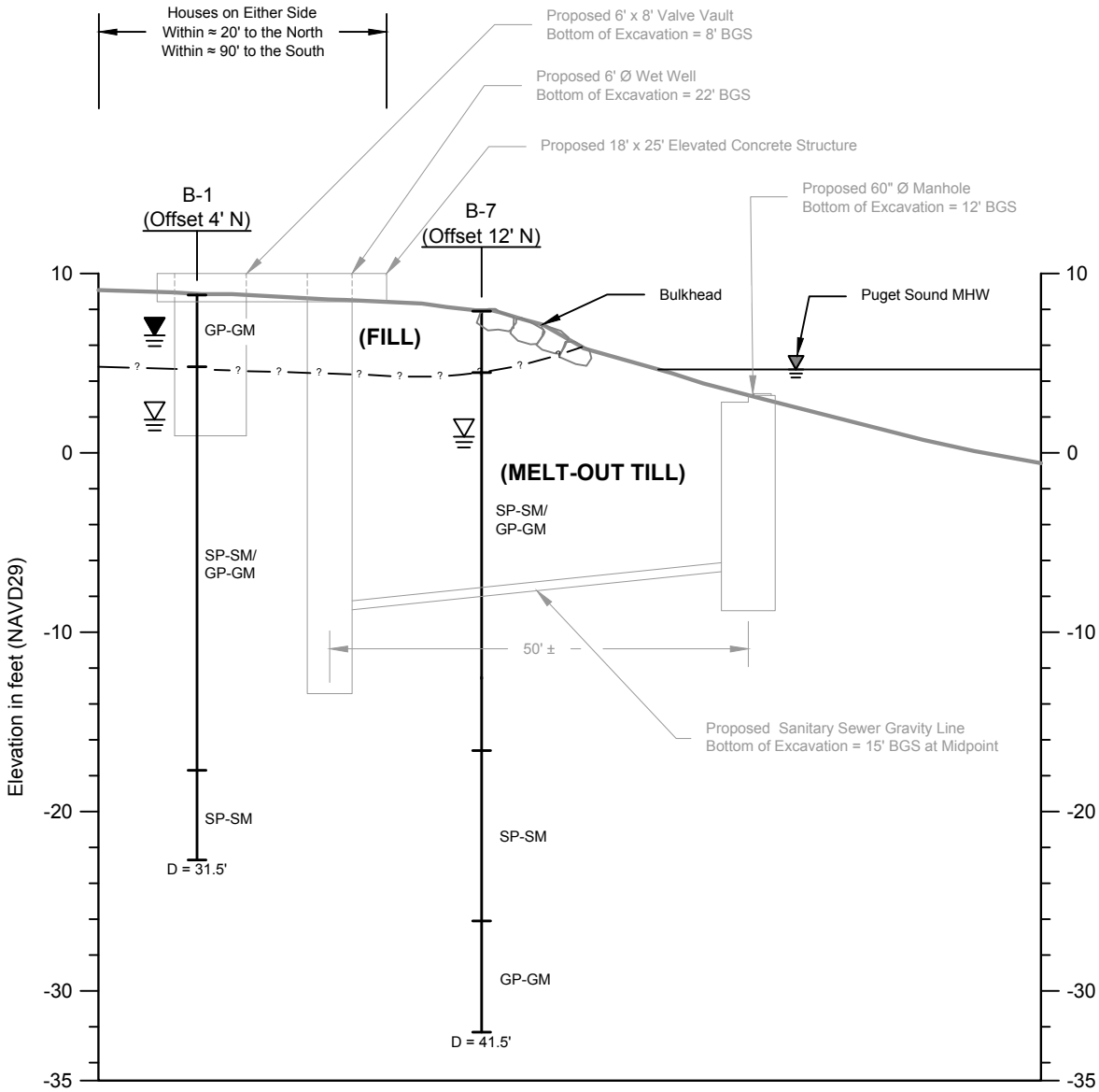
Manchester Pump Stations Nos. 45, 46, and 47 Upgrades Design Kitsap County, Washington	**Pump Station 47 Site and Exploration Plan**	Figure 2C

LANDAU ASSOCIATES, INC. | O:\CAD\1073\004.020\FIG_2C.dwg "FIG_2C" 5/7/2015



Legend

B-1	Project Exploration Designation
(Offset 4' N)	Offset Distance in Feet and Direction
	Top of Exploration
	Groundwater Level (After time of drilling)
	Groundwater Level (At time of drilling)
SP	Soil Type Contact
	Inferred Geologic Contact
	Bottom of Exploration
D=31.5'	Depth of Exploration
BGS	Below Ground Surface
MHW	Mean High Water
Ø	Diameter

Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. See report text for descriptions of geologic units.
3. For Cross Section location, see the Site and Exploration Plan, Figure 2A.

0 20 40

Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 10'

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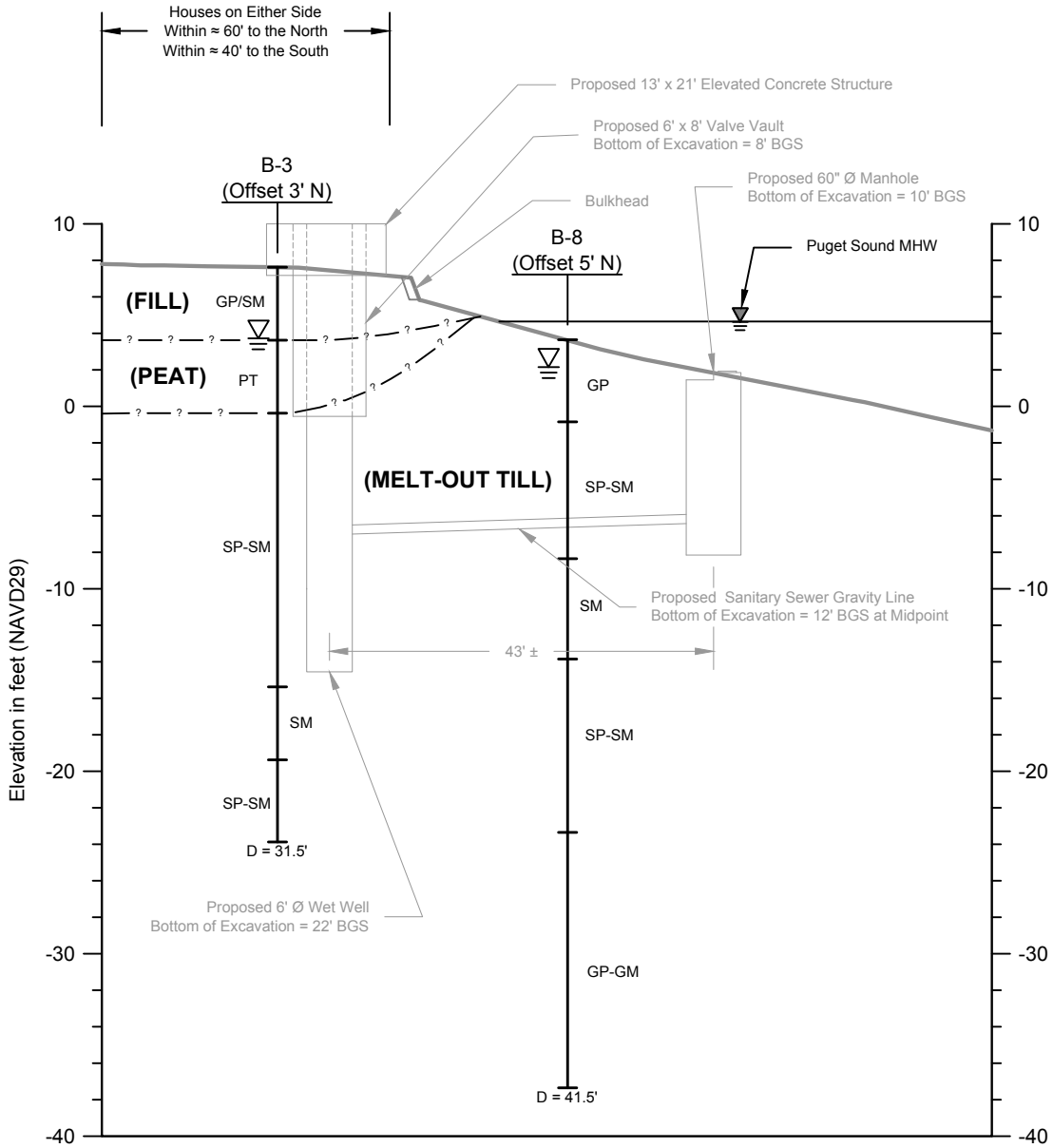
Manchester Pump Stations
Nos. 45, 46, and 47
Upgrades Design
Kitsap County, Washington

Pump Station 45
Subsurface Profile A-A'

Figure
3A



Legend

B-3	Project Exploration Designation
(Offset 3' N)	Offset Distance in Feet and Direction
	Top of Exploration
	Groundwater Level (After time of drilling)
	Groundwater Level (At time of drilling)
SP	Soil Type Contact
	Inferred Geologic Contact
	Bottom of Exploration
D=31.5'	Depth of Exploration
BGS	Below Ground Surface
MHW	Mean High Water
Ø	Diameter

Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. See report text for descriptions of geologic units.
3. For Cross Section location, see the Site and Exploration Plan, Figure 2B.

0 20 40

Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 10'

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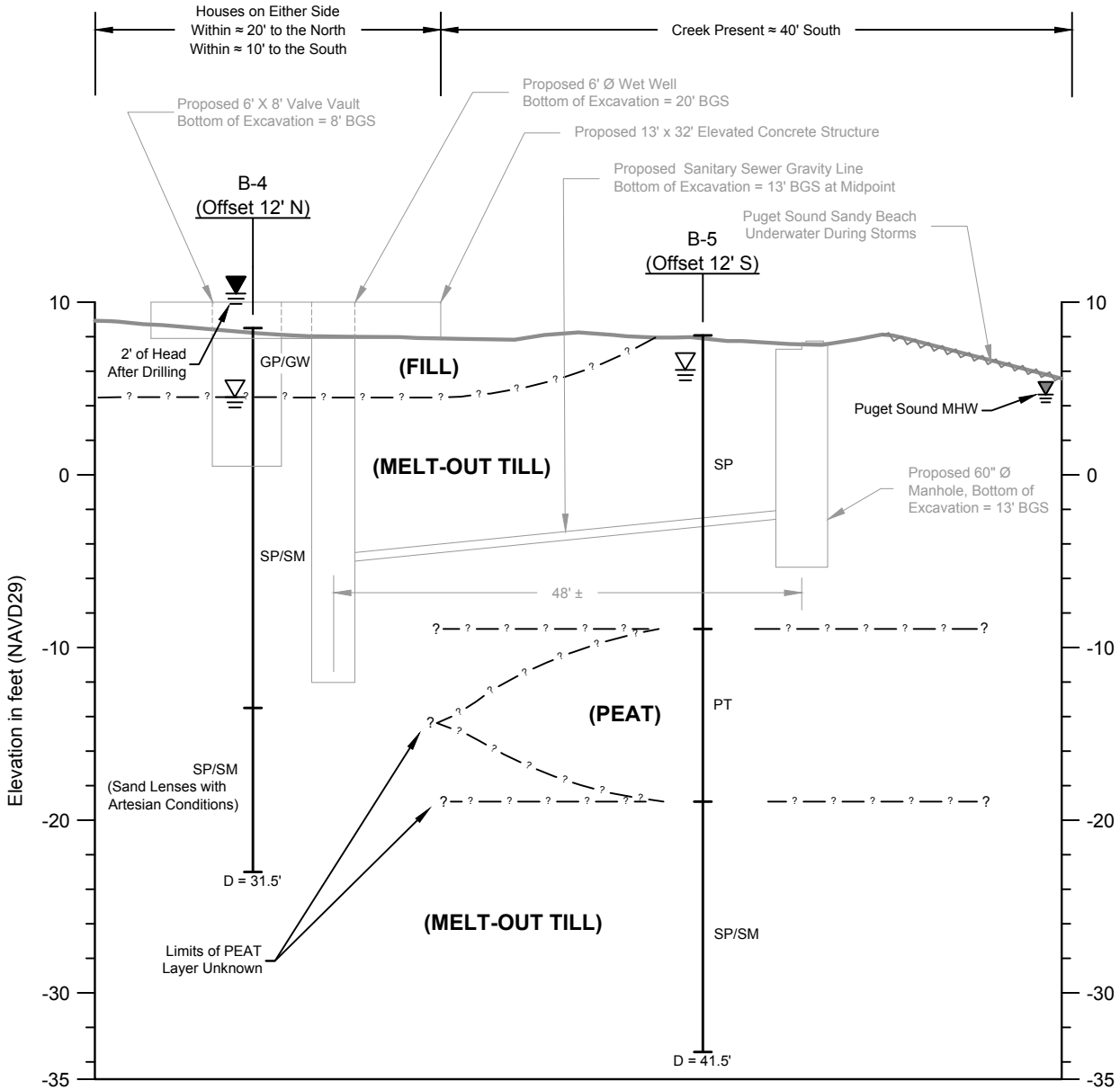
Manchester Pump Stations
Nos. 45, 46, and 47
Upgrades Design
Kitsap County, Washington

Pump Station 46
Subsurface Profile B-B'

Figure
3B



Legend

B-4	Project Exploration Designation
(Offset 12' N)	Offset Distance in Feet and Direction
	Top of Exploration
	Groundwater Level (After time of drilling)
	Groundwater Level (At time of drilling)
SP	Soil Type Contact
	Inferred Geologic Contact
	Bottom of Exploration
D=31.5'	Depth of Exploration
BGS	Below Ground Surface
MHW	Mean High Water
Ø	Diameter

Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. See report text for descriptions of geologic units.
3. For Cross Section location, see the Site and Exploration Plan, Figure 2C.

0 20 40

Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 10'

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Manchester Pump Stations
Nos. 45, 46, and 47
Upgrades Design
Kitsap County, Washington

Pump Station 47
Subsurface Profile B-B'

Figure
3C

APPENDIX A

Field Explorations

APPENDIX A
FIELD EXPLORATIONS

Subsurface soil and groundwater conditions within the limits of the project area were explored on April 7 and 8, 2015 and July 14 and 15, 2015. The exploration program consisted of advancing and sampling 10 exploratory borings (B-1 through B-10) at the approximate locations shown on the Site and Exploration Plans, Figures 2A through 2C. The exploratory borings were advanced to between 11½ and 41½ feet below the existing ground surface using hollow-stem auger drilling techniques. The exploratory borings were advanced by Holocene Drilling, Inc. of Puyallup, Washington under subcontract to Landau Associates. Explorations B-1 through B-4 were located by a physical survey conducted by AES Consultants, LLC. of Silverdale, Washington under subcontract to BHC Consultants. Explorations B-5 through B-10 were located by physical measurements taken by a Landau Associates' representative. The ground surface elevation at each boring location was taken from the above survey conducted.

The field exploration program was coordinated and monitored by a Landau Associates' geotechnical engineer or geologist, who also obtained representative soil samples, maintained a detailed record of the observed subsurface soil and groundwater conditions, and described the soil encountered by visual and textural examination. Each representative soil type observed in our exploratory borings was described using the soil classification system shown on Figure A-1, in general accordance with ASTM International D2488, *Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)*. Logs of the explorations are presented on Figures A-2 through A-11. These logs represent our interpretation of subsurface conditions identified during the field exploration program. The stratigraphic contacts shown on the individual logs represent the approximate boundaries between soil types; actual transitions may be more gradual. The soil and groundwater conditions depicted are only for the specific date and locations reported and, therefore, are not necessarily representative of other locations and times. A further discussion of the soil and groundwater conditions observed during the explorations is contained in the text portion of this report.

Disturbed samples of the soil encountered from the borings were obtained at frequent intervals using a 2.375-inch-inside-diameter Modified California Penetration Test split-spoon sampler. The sampler was driven up to 18 inches (or a portion thereof) into the undisturbed soil ahead of the auger bit with a 140-pound automatic hammer falling a distance of approximately 30 inches. The number of blows required to drive the sampler for the final 12 inches (or portion thereof) of soil penetration, is noted on the boring logs adjacent to the appropriate sample notation. Soil samples collected in this manner were taken to our laboratory for further examination and testing. Upon completion of drilling and sampling, the remaining boreholes were abandoned in general accordance with the requirements of Washington Administrative Code 173-160.

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
	≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

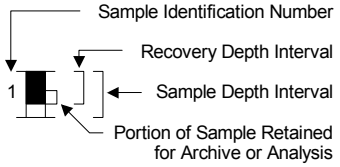
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time other than ATD

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Soil Classification System and Key

Figure
A-1

B-1

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 8.8
Drilled By: Holocene Drilling Inc.
Logged By: BJF Date: 04/07/15

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater	Moisture Content (%) / SPT N-Value / Fines Content (%)
0							GP	Crushed rock (loose, moist) **(FILL)**		
							GP-GM	Brown, very sandy, fine GRAVEL with silt (loose, moist)	2.8 ft	
	5	S-1	h2	13	W = 8 GS			**Groundwater at 2.8 ft, 1 hour after drilling**		
5							SP-SM	Gray, gravelly, fine to coarse SAND with silt (medium dense, moist) **(MELT-OUT TILL)**	7.5 ft ATD	
		S-2	h2	24	W = 18 GS					
							SP-SM	Mottled orange-brown, fine to coarse SAND with silt and gravel (medium dense, wet)		
	0	S-3	h2	51	W = 18 GS					51
10		S-4	h2	80	W = 24 GS			Grades to dense, fine to medium SAND without gravel		80
							GP-GM	Mottled orange-brown, very sandy, fine to coarse GRAVEL with silt and cobbles (very dense, wet)		
	-5	S-5	h2	>92	W = 11 GS					
15		S-6	h2	65	W = 9 GS			Grades to dense		65
							SP-SM	Mottled orange-brown, very gravelly, fine to coarse SAND with silt and trace cobbles (very dense, wet)		
	-10	S-7	h2	>92	W = 12 GS					
20							GP-GM	Mottled orange-gray, very sandy, fine to coarse GRAVEL with silt and cobbles (very dense, wet)		
		S-8	h2	>92	W = 13 GS					
	-15	S-9	h2	>92	W = 9 GS			Grades to mottled orange-brown		
25		S-10	h2	>92	W = 26 GS					
							SP-SM	Gray, gravelly, fine to medium SAND with silt and trace cobbles (very dense, wet)		
	-20	S-11	h2	>92	W = 18 GS					
30		S-12	h2	60	W = 21 GS			Grades to dense, fine to coarse SAND		60
35										

Moisture Content (%): Plastic Limit 20 40 60 80 Liquid Limit
▲ SPT N-Value ▲ (10 20 30 40)
△ Non-Standard N-Value △
× Fines Content (%) × (20 40 60 80)

Boring Completed 04/07/15
Total Depth of Boring = 31.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-1

Figure
A-2

B-2

SAMPLE DATA						SOIL PROFILE				
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 19.0 Drilled By: Holocene Drilling Inc. Logged By: BJF Date: 04/07/15	Groundwater	Moisture Content (%) (Plastic Limit 20, Liquid Limit 80) ▲ SPT N-Value ▲ △ Non-Standard N-Value △ (10, 20, 30, 40) × Fines Content (%) × (20, 40, 60, 80)
0							SM	0.25 feet of sod over 0.5 feet of topsoil. (loose, moist) **(TOPSOIL)**		
		S-1	h2	11	W = 23 GS		SM	Brown, silty, fine to medium SAND (loose, moist) **(FILL)**		
	15							Mottled brown-gray, very silty, fine to medium SAND (loose, moist) **(MELT-OUT TILL)**		
5		S-2	h2	15	W = 20 GS			Grades to with gravel		
		S-3	h2	19	W = 20 GS				9.5 ft ATD	
	10						SP-SM	Gray, gravelly, fine to coarse SAND with silt and trace cobbles (medium dense, wet)		
10		S-4	h2	15	W = 14 GS			Grades to loose		

Boring Completed 04/07/15
Total Depth of Boring = 11.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-2

Figure
A-3

B-3

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 8.0
Drilled By: Holocene Drilling Inc.
Logged By: BJF Date: 04/07/15

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater	Moisture Content (%) / SPT N-Value / Fines Content (%)
0							GP	0.25 feet of crushed rock (loose, moist)		
							GP	Brown, sandy, fine to coarse GRAVEL (loose, moist) **(FILL)**		
	5	S-1	h2	>92	W = 20 GS		SP-SM	Brown, very gravelly, fine to coarse SAND with silt and wood debris. (Exaggerated blow count due to wood piece in the sampler) (very loose, moist)	4.5 ft ATD	
5		S-2	h2	2	W = 491		PT	Brown PEAT (very soft, wet) **(PEAT)**		491
	0	S-3	h2	5	W = 24 GS		SM	Mottled brown-gray, gravelly, silty, fine to coarse SAND with trace cobbles (very loose, moist to wet) **(MELT-OUT TILL)**		
10		S-4	h2	28	W = 16 GS			Grades to medium dense, fine to medium SAND without gravel		
	-5	S-5	h2	50	W = 12 GS					50
15		S-6	h2	40	W = 10 GS			Grades to very gravelly, silty		
	-10	S-7	h2	65	W = 16 GS			Grades to dense, very silty, with gravel		65
20		S-8	h2	46	W = 18 GS			Grades to medium dense		
	-15	S-9	h2	>92	W = 23 GS		SM	Gray, very silty, fine to coarse SAND with gravel (very dense, moist) **Cemented, low permeability layer**		
25		S-10	h2	>92	W = 11 GS			Grades to gravelly		
	-20	S-11	h2	89	W = 24 GS		SP-SM	Blue-gray, fine to medium SAND with silt (dense, wet)		89
30		S-12	h2	>92	W = 18 GS		SP	Blue-gray, gravelly, fine to coarse SAND with trace cobbles (very dense, wet)		
35										

Boring Completed 04/07/15
Total Depth of Boring = 31.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-3

Figure
A-4

B-4

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 8.5
Drilled By: Holocene Drilling Inc.
Logged By: BJF Date: 04/08/15

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater	Moisture Content (%) (Plastic Limit 20, 40, 60, 80 Liquid Limit) / SPT N-Value ▲ / Non-Standard N-Value △ (10, 20, 30, 40) / Fines Content (%) × (20, 40, 60, 80)
0							GP	Brown, sandy, fine to coarse GRAVEL (loose, moist) **(FILL)**		
	5	S-1	h2	22	W = 9 GS		GW	Brown, very sandy, fine to coarse GRAVEL (medium dense, moist)	4.0 ft ATD	
5		S-2	h2	57	W = 17 GS		SP-SM	Gray, very gravelly, fine to coarse SAND with silt and trace cobbles (dense, wet) **(MELT-OUT TILL)**		57
	0	S-3	h2	17	W = 14 GS			Grades to loose		
10		S-4	h2	28	W = 14 GS		SP	Gray, gravelly, fine to coarse SAND with trace cobbles (medium dense, wet)		
	-5	S-5	h2	42	W = 21 GS		SM	Light brown, silty, fine to medium SAND (medium dense, moist to wet)		
15		S-6	h2	50	W = 20 GS					50
	-10	S-7	h2	32	W = 20 GS		SP-SM	Mottled orange-brown, gravelly, fine to medium SAND with silt (medium dense, wet)		
20		S-8	h2	14	W = 22 GS		SM	Mottled orange-brown, silty, fine to medium SAND (loose, moist)		
	-15	S-9	h2	66	W = 18 GS			**Artesian water encountered, estimated flow of 2 to 3 GPM, resulted in 2 ft of head within drill casing (above ground surface)**		66
25		S-10	h2	68	W = 18 GS			Grades to dense, with gravel and trace cobbles		68
	-20	S-11	h2	>92	W = 19 GS			Grades to very dense, without gravel		
30		S-12	h2	>92	W = 21 GS		SP	Gray, fine to medium SAND (dense, wet)		
		S-13								
		S-14			W = 20 GS		SP-SM	Mottled orange-gray, fine to medium SAND with silt and gravel (very dense, wet)		
35										

Boring Completed 04/08/15
Total Depth of Boring = 31.5 ft.

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-4

Figure
A-5

B-5

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 8.1
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 07/14/15

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	USCS Symbol	Soil Profile
0						SP	Brown-gray, very gravelly, fine to coarse SAND (medium dense, wet) **(MELT-OUT TILL)**
	5	S-1	b2	14			
5		S-2	b2	16			Grades to gravelly
	0	S-3	b2	26		GP	Gray, sandy, fine to coarse GRAVEL (medium dense, wet)
10		S-4	b2	36		SP	Gray, gravelly, fine to coarse SAND (dense, wet)
	-5	S-5	b2	16			Grades to medium dense, includes trace peat seams
15		S-6	b2	44			Without peat seams, dense
	-10	S-7	b2	3	W = 98	SP/ PT	Gray, fine to coarse SAND with gravel and peat lenses **(PEAT)**
20		S-8	b2	5	W = 52		
	-15	S-9	b2	18	W = 362	PT	Dark brown PEAT (loose, moist to wet) Exaggerated blow count due to wood in sampler
25		S-10	b2	3	W = 353		Grades to very loose
	-20	S-11	b2	22		SP-SM	Gray, fine to coarse SAND with silt (medium dense, wet) **(MELT OUT TILL)**
30		S-12	b2	62		SM	Gray, silty, fine to coarse SAND with gravel (very dense, wet)
	-25	S-13	b2	50/ 5"			Grades to orange-brown
35							

Groundwater: 2.0 ft ATD

Moisture Content (%): Plastic Limit 20 40 60 80 Liquid Limit

▲ SPT N-Value ▲ △ Non-Standard N-Value △: 10 20 30 40

× Fines Content (%) ×: 20 40 60 80

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-5

Figure
A-6
(1 of 2)

B-5

SAMPLE DATA						SOIL PROFILE			Groundwater	Moisture Content (%) (Plastic Limit 20, 40, 60, 80 Liquid Limit) ▲ SPT N-Value ▲ △ Non-Standard N-Value △ (10, 20, 30, 40) × Fines Content (%) × (20, 40, 60, 80)
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 8.1 Drilled By: Holocene Drilling Inc. Logged By: DAR Date: 07/14/15		
35		S-14	b2	50/ 6"			SM	Gray, silty, fine to coarse SAND with gravel (very dense, wet)		50/ 6"
	-30	S-15	b2	50/ 6"						50/ 6"
40							SP-SM	Gray, gravelly, fine to coarse SAND with silt (medium dense, moist to wet)		
		S-16	b2	28						

Boring Completed 07/14/15
Total Depth of Boring = 41.5 ft.

45
50
55
60
65
70

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

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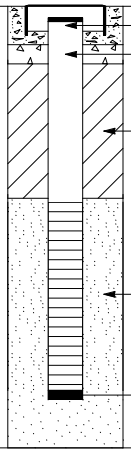
Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-5

Figure
A-6
(2 of 2)

B-6

SAMPLE DATA						SOIL PROFILE			GROUNDWATER	
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 9.1 Drilled By: Holocene Drilling Inc.	Water Level	Detail
0							GP SP	Crushed rock (medium dense, moist) **(FILL)** Gray, fine to coarse SAND (loose, moist to wet)		
	5	S-1	b2	8						
5		S-2	b2	34			SM	Mottled orange-brown, gravelly, fine to coarse SAND with silt (dense, moist) **(MELT OUT TILL)**	8.0 ft ATD	
	0	S-3	b2	50/ 6"				Grades to very dense		
10		S-4	b2	50/ 6"						

Flush-mounted monument with locking cap
Concrete Seal
Bentonite chips
20/40 Colorado sand pack
Threaded end cap

Boring Completed 07/14/15
Total Depth of Boring = 11.5 ft.

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of B-6

Figure
A-7

B-7

SAMPLE DATA

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data
0					
5	5	S-1	b2	2	
		S-2	b2	7	
	0	S-3	b2	73	
10		S-4	b2	50/ 6"	
	-5	S-5	b2	50/ 4"	
15		S-6	b2	50/ 6"	
	-10	S-7	b2	50/ 5"	
20		S-8	b2	50/ 4"	
	-15	S-9	b2	50/ 4"	
25		S-10	b2	60	
	-20	S-11	b2	50/ 6"	
30		S-12	b2	57	
	-25				
35					

SOIL PROFILE

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 7.9
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 07/14/15

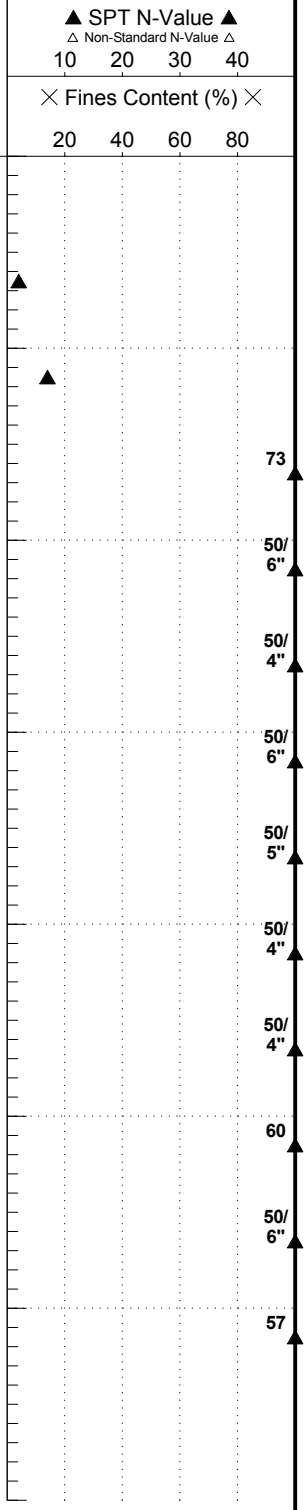
Graphic Symbol	USCS Symbol	Description
	SM	2 inches of sod over 10 inches of topsoil (loose, moist)
	SP-SM	**(TOPSOIL)**
		Dark gray to brown, fine to coarse SAND with silt, gravel, and trace organics (very loose, moist to wet) **(FILL)**
		Grades to loose
	SP-SM	Mottled orange/brown, gravelly, fine to coarse SAND with silt (very dense, wet) **(MELT OUT TILL)**
		Grades to very gravelly
	GP-GM	Mottled orange/brown, very sandy, fine to coarse GRAVEL with silt and cobbles (very dense, wet)
	SP-SM	Mottled orange/brown, fine to coarse SAND with silt (very dense, moist to wet)
	GP-GM	Reddish-brown, sandy, fine to coarse GRAVEL with silt (very dense, moist to wet)

Groundwater: 7.0 ft ATD

Moisture Content (%) — Plastic Limit 20 40 60 80 Liquid Limit

▲ SPT N-Value ▲ △ Non-Standard N-Value △ 10 20 30 40

× Fines Content (%) × 20 40 60 80



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-7

Figure
A-8
(1 of 2)

B-7

SAMPLE DATA						SOIL PROFILE				
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 7.9 Drilled By: Holocene Drilling Inc. Logged By: DAR Date: 07/14/15	Groundwater	Moisture Content (%) Plastic Limit 20 40 60 80 Liquid Limit ▲ SPT N-Value ▲ △ Non-Standard N-Value △ 10 20 30 40 × Fines Content (%) × 20 40 60 80
35		S-14	b2	50/ 4"			GP-GM	Reddish-brown, sandy, fine to coarse GRAVEL with silt (very dense, moist to wet)		50/ 4"
	-30	S-15	b2	50/ 6"						50/ 6"
40		S-16	b2	50/ 4"						50/ 4"
45										
50										
55										
60										
65										
70										

Boring Completed 07/14/15
Total Depth of Boring = 41.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

B-8

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 3.7
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 07/15/15

Groundwater: 1.5 ft ATD

Moisture Content (%) — Plastic Limit 20 40 60 80 Liquid Limit
▲ SPT N-Value ▲ △ Non-Standard N-Value △ 10 20 30 40
× Fines Content (%) × 20 40 60 80

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Description	Fines Content (%)
0							GP	Gray, fine to coarse GRAVEL with sand (medium dense, moist to wet) **(MELT OUT TILL)**	
	0	S-1	b2	10					
5		S-2	b2	18			SM	Mottled brown-gray, silty, fine to coarse SAND with gravel and trace cobbles (medium dense, wet)	
	-5	S-3	b2	20					
10		S-4	b2	24				Grades to without gravel	
	-10	S-5	b2	50/6"			SM	Blue-gray, very silty, fine to coarse SAND with gravel (very dense, moist) **Lower permeability layer**	50/6"
15		S-6	b2	50/5"					50/5"
	-15	S-7	b2	50/6"			SP-SM	Blue-gray, silty, gravelly, fine to coarse SAND with trace cobbles (very dense, wet)	50/6"
20		S-8	b2	50/5"					50/5"
	-20	S-9	b2	50/5"					50/5"
25		S-10	b2	50/5"					50/5"
	-25	S-11	b2	50/6"			GP-GM	Blue-gray, fine to coarse GRAVEL with sand, silt, and trace cobbles (very dense, wet)	50/6"
30		S-12	b2	50/6"					50/6"
	-30	S-13	b2	50/3"					50/3"
35									

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-8

Figure
A-9
(1 of 2)

B-8

SAMPLE DATA						SOIL PROFILE				
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 3.7 Drilled By: Holocene Drilling Inc. Logged By: DAR Date: 07/15/15	Groundwater	Moisture Content (%) (Plastic Limit 20, 40, 60, 80 Liquid Limit) ▲ SPT N-Value ▲ △ Non-Standard N-Value △ (10, 20, 30, 40) × Fines Content (%) × (20, 40, 60, 80)
35		S-14	b2	50/ 2"			GP-GM			50/ 2"
	-35	S-15	b2	50/ 5"			GM	Gray, silty, fine to coarse GRAVEL with sand (very dense, moist to wet) Grades to light brown-gray		50/ 5"
40		S-16	b2	50/ 6"						50/ 6"
45										
50										
55										
60										
65										
70										

Boring Completed 07/15/15
Total Depth of Boring = 41.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

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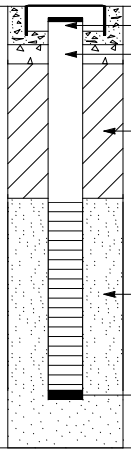
Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-8

Figure
A-9
(2 of 2)

B-9

SAMPLE DATA						SOIL PROFILE			GROUNDWATER	
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 7.8 Drilled By: Holocene Drilling Inc.	Water Level	Detail
0							GP SM	0.25 feet of crushed rock (medium dense, moist) **(FILL)** Dark brown, silty fine to coarse SAND with gravel and organics (loose, moist)		
	5	S-1	b2	7						
5		S-2	b2	5			PT	Dark brown Peat (loose, moist to wet) **(PEAT)**	6.0 ft ATD	
	0	S-3	b2	10			SM	Gray, silty, fine to coarse SAND with gravel (medium dense, wet) **(MELT OUT TILL)** Grades to very silty, without gravel		
10		S-4	b2	14						
15										
20										
25										
30										
35										



Boring Completed 07/15/15
Total Depth of Boring = 11.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 \\OLYMPIA1\PROJECTS\1073\004\T\1073004.010.GPJ WELL LOG W/ ELEVATION

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of B-9

Figure
A-10

B-10

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 9.6
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 07/15/15

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Description	Groundwater
0							AC	3 inches of asphalt over 7 inches of crushed rock	
							SM	**(ASPHALT)**	
		S-1	b2	3				Dark brown, silty, fine to coarse SAND with organics (very loose to medium dense, moist)	
	5						SM	**(FILL)**	
5		S-2	b2	24				Brown-gray, silty, gravelly, fine to coarse SAND (medium dense, moist) **(MELT OUT TILL)**	8.0 ft ATD
		S-3	b2	21				Grades to brown, with gravel	
	0								
10		S-4	b2	24					

Moisture Content (%) — Plastic Limit 20 40 60 80 Liquid Limit

▲ SPT N-Value ▲ — △ Non-Standard N-Value △ — 10 20 30 40

× Fines Content (%) × — 20 40 60 80

Boring Completed 07/15/15
Total Depth of Boring = 11.5 ft.

15 20 25 30 35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073004.01 7/28/15 Y:\1073\004\T\1073004.010.GPJ SOIL BORING LOG WITH GRAPH

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Manchester Pump Stations
Nos. 45, 46, and 47
Uprgades Design
Kitsap County, Washington

Log of Boring B-10

Figure
A-11

APPENDIX B

Geotechnical Laboratory Testing

APPENDIX B
GEOTECHNICAL LABORATORY TESTING

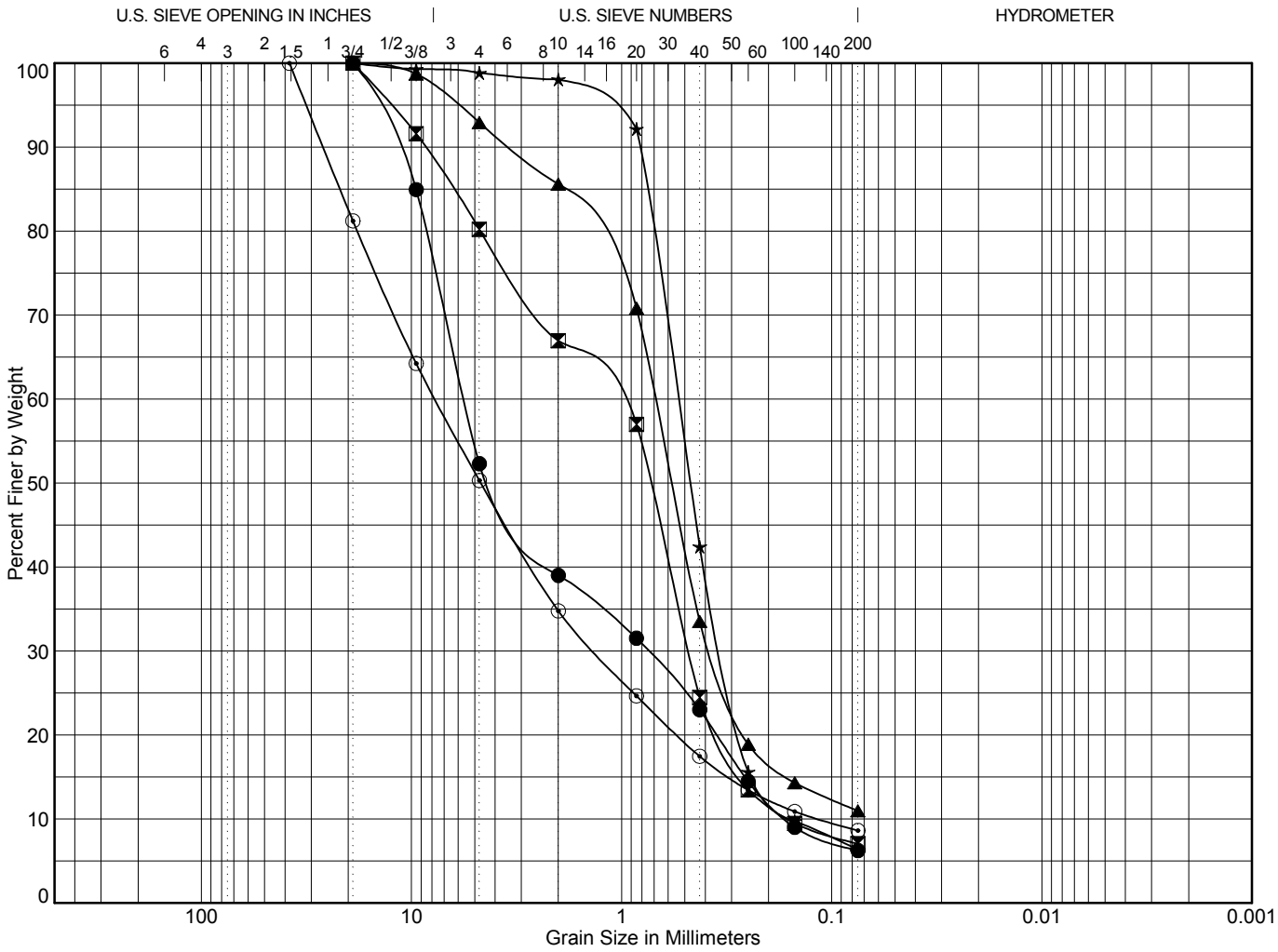
Natural moisture content determinations and sieve analyses were conducted in Landau Associates' laboratory on representative samples recovered from the borings for the purpose of classification. Laboratory testing was performed in general accordance with the ASTM International (ASTM) standard test procedures, which are described below. The samples were checked against the field log descriptions, which were updated where appropriate in general accordance with ASTM D2487, *Standard Test Method for Classification of Soils for Engineering Purposes*.

NATURAL MOISTURE CONTENT

Natural moisture content determinations were performed on soil samples recovered from the borings in general accordance with ASTM D2216. The natural moisture contents are shown at the respective sample depths in the column labeled “Test Data” on the summary boring logs in Appendix A.

GRAIN SIZE ANALYSIS

Grain size analyses were performed on representative soil samples obtained from the borings in general accordance with ASTM D422, to provide an indication of the grain size distribution. Samples selected for grain size analysis are designated with a “GS” in the column labeled “Test Data” on the summary boring logs in Appendix A. The results of the sieve analyses are shown on Figures B-1 through B-8 in this appendix.



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-1	2.5	Very sandy, fine GRAVEL with silt (GP-GM)				0.61	33.99
⧗	B-1	5.5	Gravelly, fine to coarse SAND with silt (SP-SM)				1.30	6.87
▲	B-1	8.0	Fine to coarse SAND with silt and gravel (SP-SM)				3.28	11.35
★	B-1	10.5	Fine to medium SAND with silt (SP-SM)				1.32	3.54
⊙	B-1	12.5	Very sandy, fine to coarse GRAVEL with silt (GP-GM)				2.03	67.19

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-1	2.5	19	5.593	4.089	0.751	0.165	0.0	47.7	13.3	16.0	16.8	6.2
⧗	B-1	5.5	19	1.1	0.732	0.478	0.16	0.0	19.8	13.3	42.5	17.4	7.0
▲	B-1	8.0	19	0.695	0.577	0.374		0.0	7.1	7.3	52.1	22.6	11.0
★	B-1	10.5	19	0.543	0.472	0.332	0.154	0.0	1.2	0.8	55.6	36.1	6.3
⊙	B-1	12.5	38.1	7.692	4.668	1.336	0.114	18.8	30.9	15.5	17.3	8.8	8.6

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

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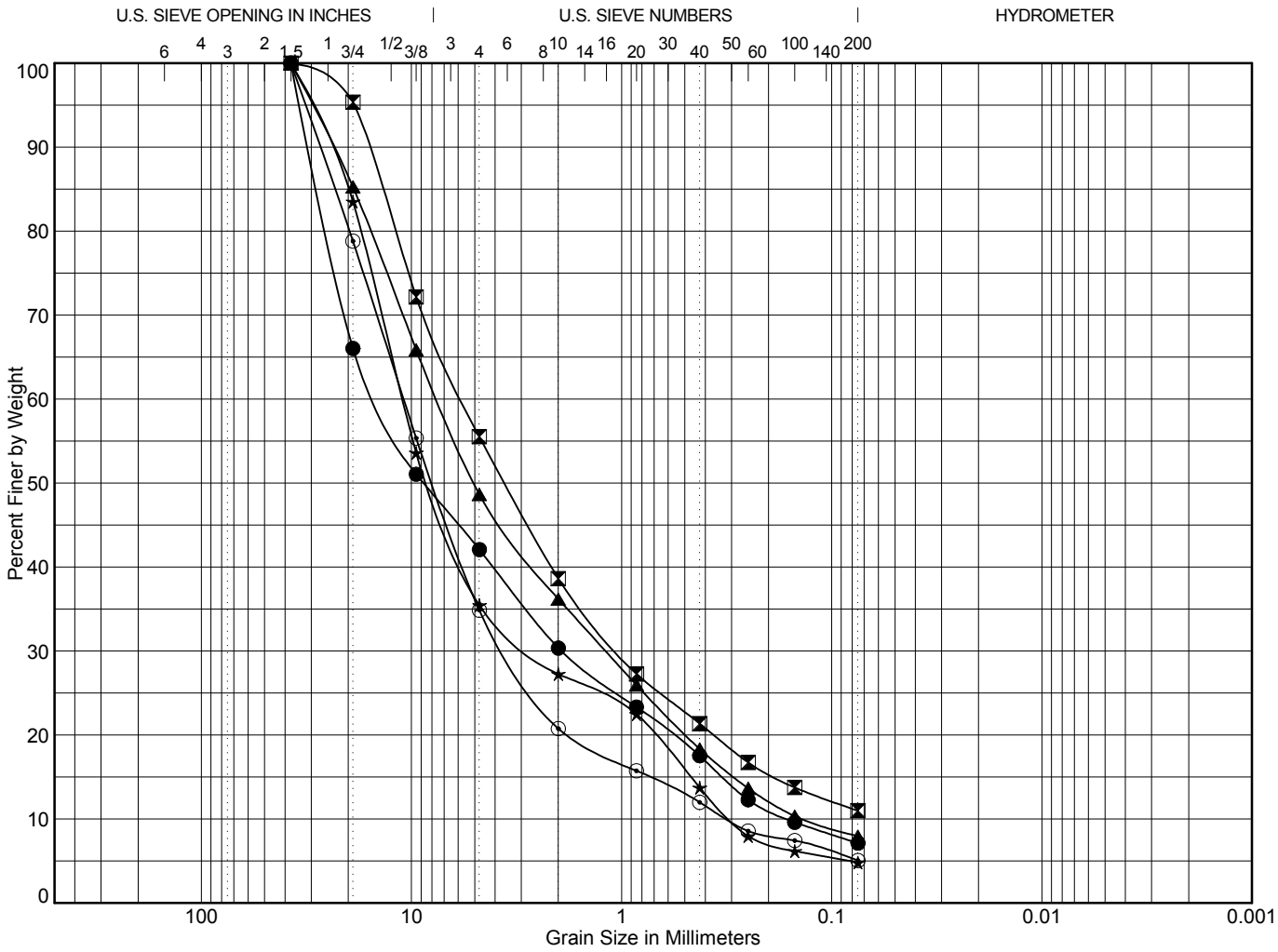
LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-1



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-1	15.5	Very sandy, fine to coarse GRAVEL with silt (GP-GM)				1.58	88.81
⧗	B-1	18.0	Very gravelly, fine to coarse SAND with silt (SP-SM)				3.24	97.63
▲	B-1	20.0	Very sandy, fine to coarse GRAVEL with silt (GP-GM)				1.39	55.15
★	B-1	23.0	Very sandy, fine to coarse GRAVEL with silt (GP-GM)				2.15	36.53
⊙	B-1	25.5	Very sandy, fine to coarse GRAVEL with silt (GP-GM)				3.65	34.87

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-1	15.5	37.5	14.373	8.756	1.916	0.162	34.0	23.9	11.7	12.8	10.4	7.1
⧗	B-1	18.0	37.5	5.724	3.581	1.043		4.6	39.8	16.9	17.3	10.4	11.0
▲	B-1	20.0	37.5	7.501	5.016	1.192	0.136	14.7	36.6	12.5	17.8	10.4	7.9
★	B-1	23.0	37.5	11.018	8.279	2.673	0.302	16.5	48.1	8.2	13.5	8.9	4.8
⊙	B-1	25.5	37.5	10.898	7.927	3.527	0.313	21.2	44.0	14.1	8.8	6.9	5.0

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

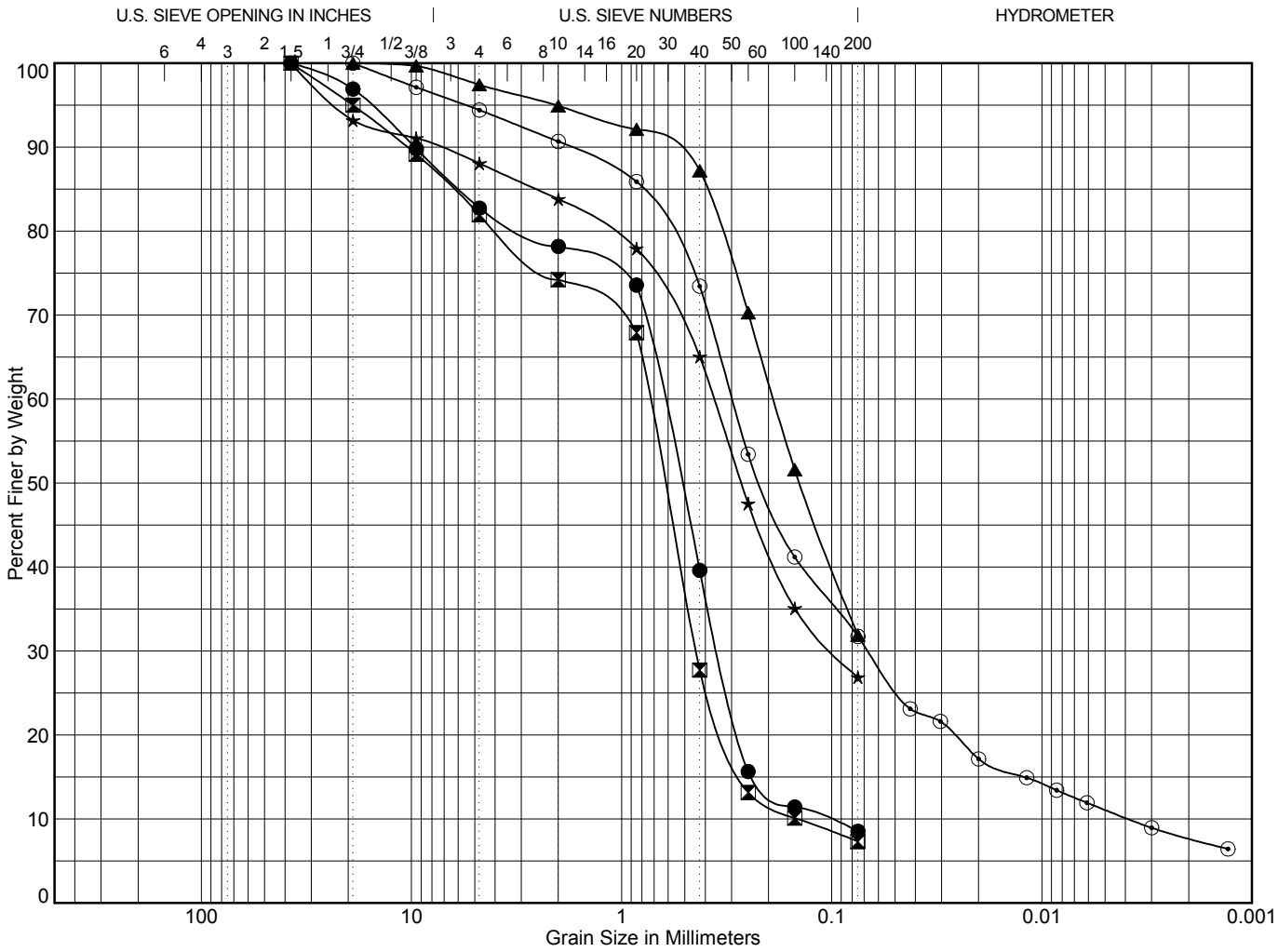
1073004.01 5/15/15 Y:\1073\004\T\1073004.010.GPJ GRAIN SIZE W/STATS

LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-2



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-1	28.0	Gravelly, fine to medium SAND with silt (SP-SM)				1.72	6.05
⧗	B-1	30.5	Gravelly, fine to coarse SAND with silt (SP-SM)				1.80	5.07
▲	B-2	3.0	Very silty, fine to medium SAND (SM)					
★	B-2	5.5	Silty, fine to medium SAND with gravel (SM)					
⊙	B-2	7.5	Very silty, fine to medium SAND with gravel (SM)				3.89	77.24

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-1	28.0	37.5	0.644	0.525	0.344	0.106	3.1	14.2	4.6	38.6	31.1	8.5
⧗	B-1	30.5	37.5	0.742	0.624	0.442	0.146	5.0	13.1	7.7	46.5	20.4	7.3
▲	B-2	3.0	19	0.189	0.142			0.0	2.6	2.5	7.7	55.3	31.9
★	B-2	5.5	37.5	0.365	0.269	0.098		6.8	5.1	4.3	18.8	38.2	26.9
⊙	B-2	7.5	19	0.298	0.217	0.067	0.004	0.0	5.6	3.7	17.2	41.7	31.7

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

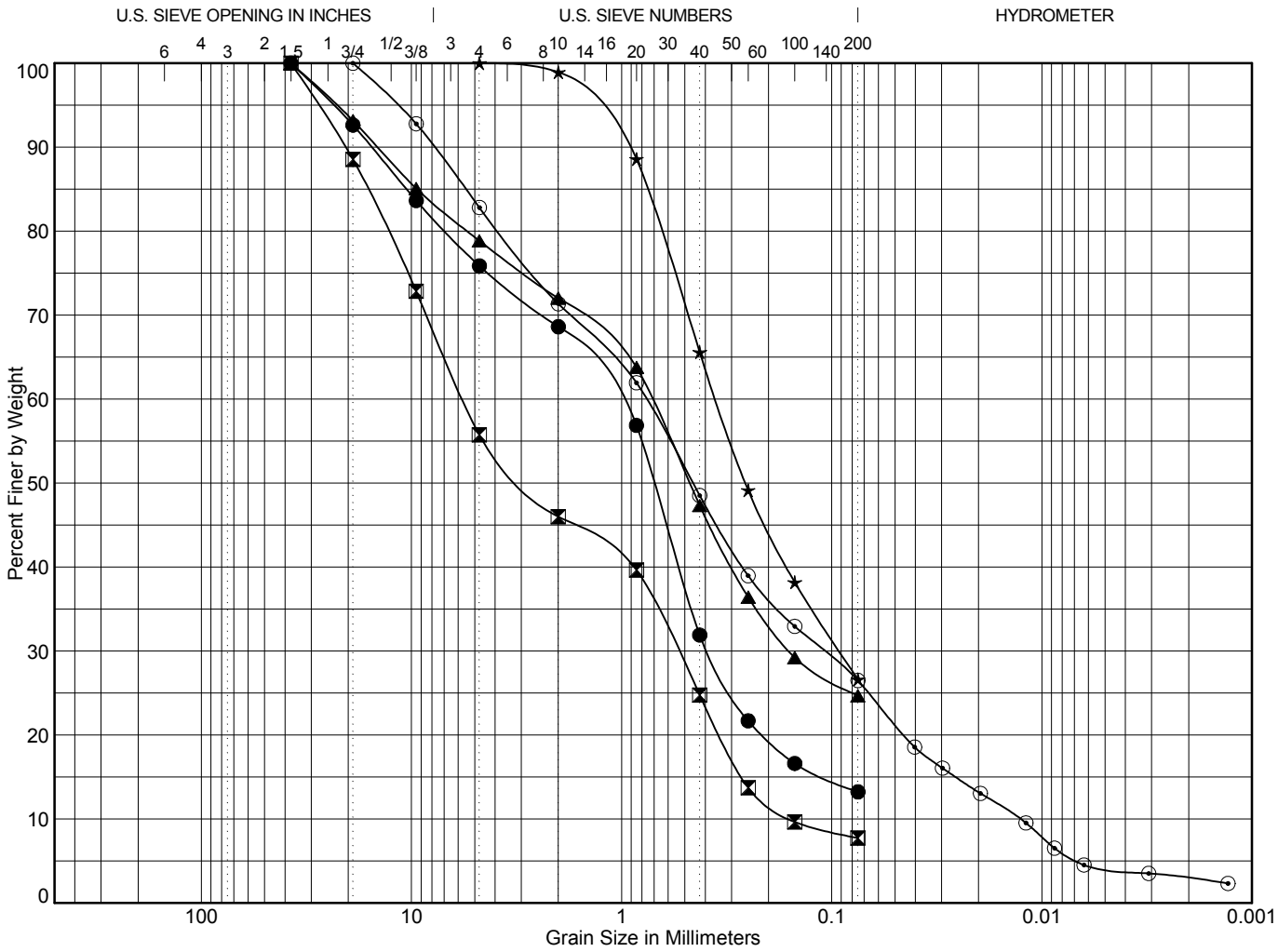
1073004.01 5/15/15 Y:\1073\004\T\1073004.010.GPJ GRAIN SIZE W/STATS

LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-3



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-2	10.0	Gravelly, fine to coarse SAND with silt (SP-SM)					
⧗	B-3	2.5	Very gravelly, fine to coarse SAND with silt (SP-SM)				0.33	35.94
▲	B-3	8.5	Gravelly, silty, fine to coarse SAND (SM)					
★	B-3	10.5	Silty, fine to medium SAND (SM)					
⊙	B-3	13.0	Gravelly, silty, fine to coarse SAND (SM)				1.22	60.44

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-2	10.0	37.5	1.068	0.702	0.385		7.4	16.8	7.2	36.7	18.7	13.2
⧗	B-3	2.5	37.5	5.645	2.853	0.542	0.157	11.5	32.8	9.8	21.2	17.0	7.7
▲	B-3	8.5	37.5	0.725	0.476	0.159		6.8	14.3	6.8	24.7	22.6	24.7
★	B-3	10.5	4.75	0.355	0.257	0.092		0.0	0.0	1.1	33.3	39.0	26.6
⊙	B-3	13.0	19	0.769	0.459	0.109	0.013	0.0	17.2	11.5	22.8	22.0	26.5

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

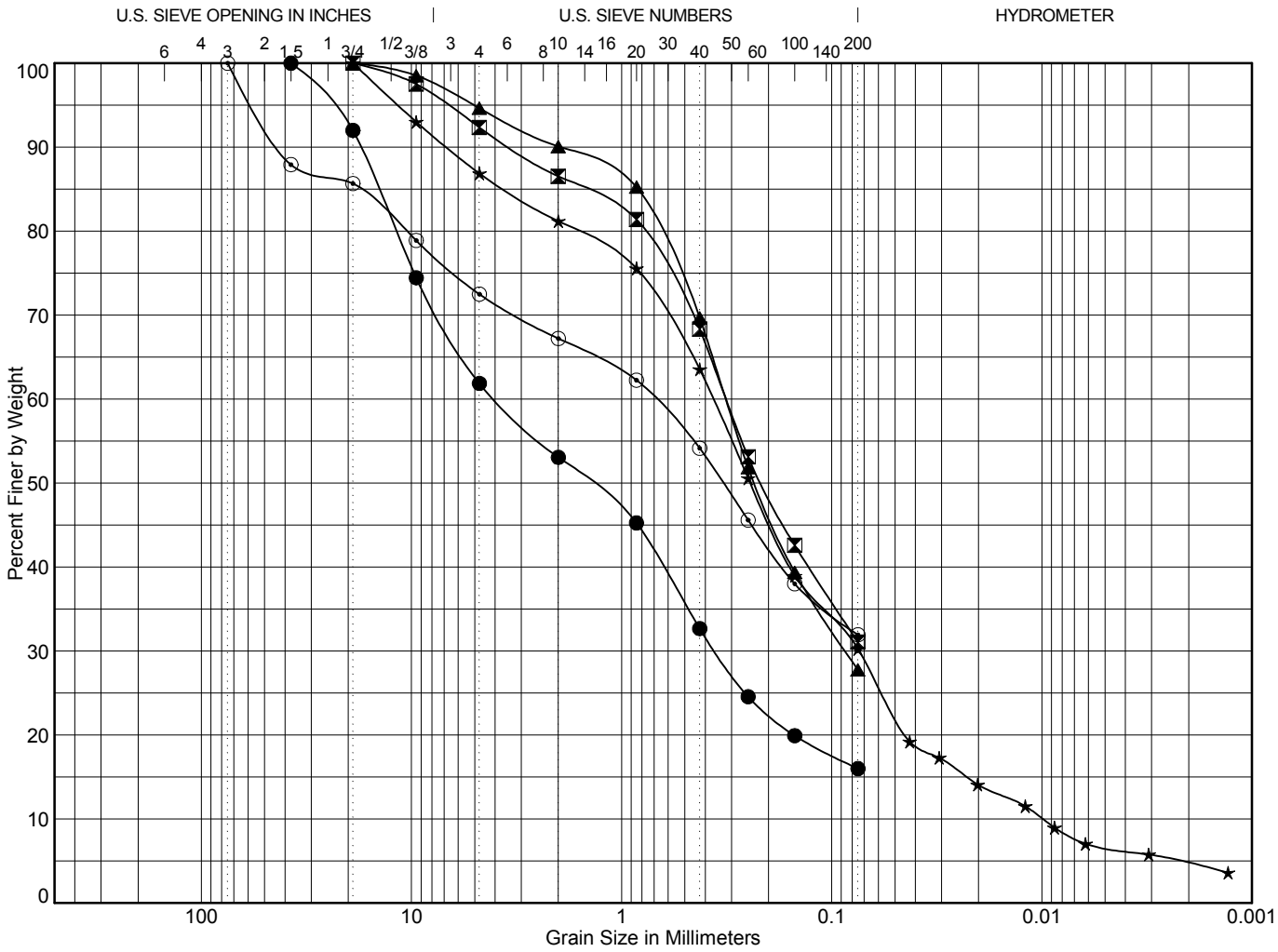
1073004.01 5/15/15 Y:\1073\004\T\1073004.010.GPJ GRAIN SIZE W/STATS

LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-4



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-3	15.5	Very gravelly, silty, fine to coarse SAND (SM)					
⧗	B-3	17.5	Very silty, fine to coarse SAND with gravel (SM)					
▲	B-3	20.5	Silty, fine to coarse SAND with gravel (SM)					
★	B-3	22.5	Very silty, fine to coarse SAND with gravel (SM)				1.51	37.11
⊙	B-3	25.0	Very silty, gravelly, fine to coarse SAND (SM)					

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-3	15.5	37.5	3.956	1.431	0.357		8.0	30.1	8.8	20.4	16.7	16.0
⧗	B-3	17.5	19	0.318	0.215			0.0	7.6	5.8	18.2	37.3	31.1
▲	B-3	20.5	19	0.319	0.232	0.086		0.0	5.4	4.6	20.4	41.9	27.8
★	B-3	22.5	19	0.368	0.244	0.074	0.01	0.0	13.1	5.7	17.6	33.3	30.2
⊙	B-3	25.0	75	0.701	0.329			14.3	13.2	5.3	13.1	22.2	31.9

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

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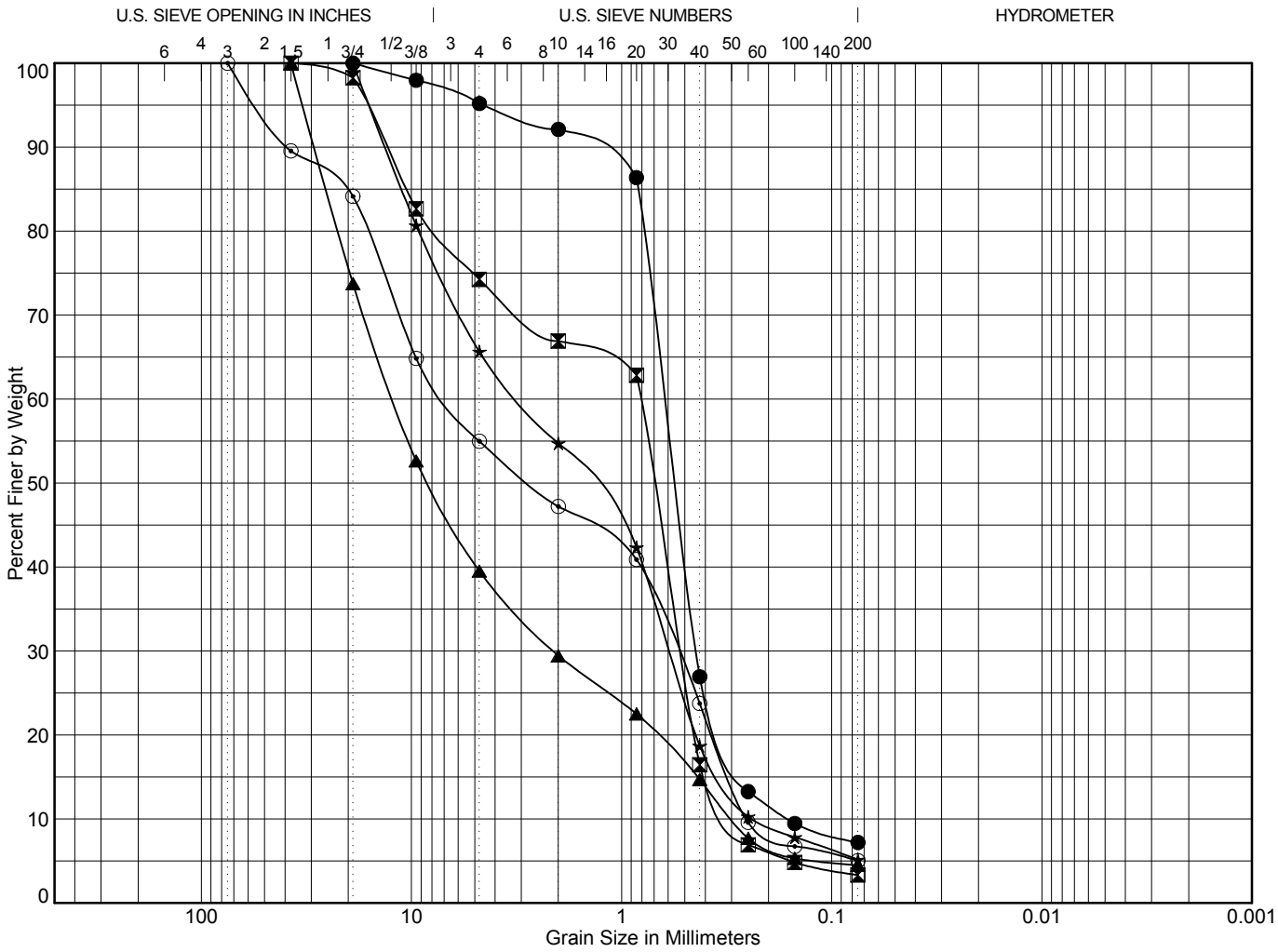
Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-5



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-3	28.0	Fine to medium SAND with silt (SP-SM)				1.92	3.88
⧗	B-3	30.5	Gravelly, fine to coarse SAND (SP)				1.12	2.75
▲	B-4	3.0	Very sandy, fine to coarse GRAVEL (GW)				1.22	40.65
★	B-4	5.0	Very gravelly, fine to coarse SAND with silt (SP-SM)				0.49	12.84
⊙	B-4	8.0	Very gravelly, fine to coarse SAND with silt (SP-SM)				0.17	26.62

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-3	28.0	19	0.625	0.556	0.44	0.161	0.0	4.8	3.1	65.2	19.7	7.2
⧗	B-3	30.5	37.5	0.815	0.702	0.52	0.297	1.7	24.0	7.3	50.5	13.2	3.3
▲	B-4	3.0	37.5	12.095	8.262	2.099	0.298	26.2	34.2	10.1	14.7	10.2	4.5
★	B-4	5.0	19	3.036	1.442	0.592	0.236	0.0	34.4	10.9	36.0	13.5	5.2
⊙	B-4	8.0	75	6.759	2.729	0.547	0.254	15.9	29.2	7.8	23.5	18.7	5.0

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

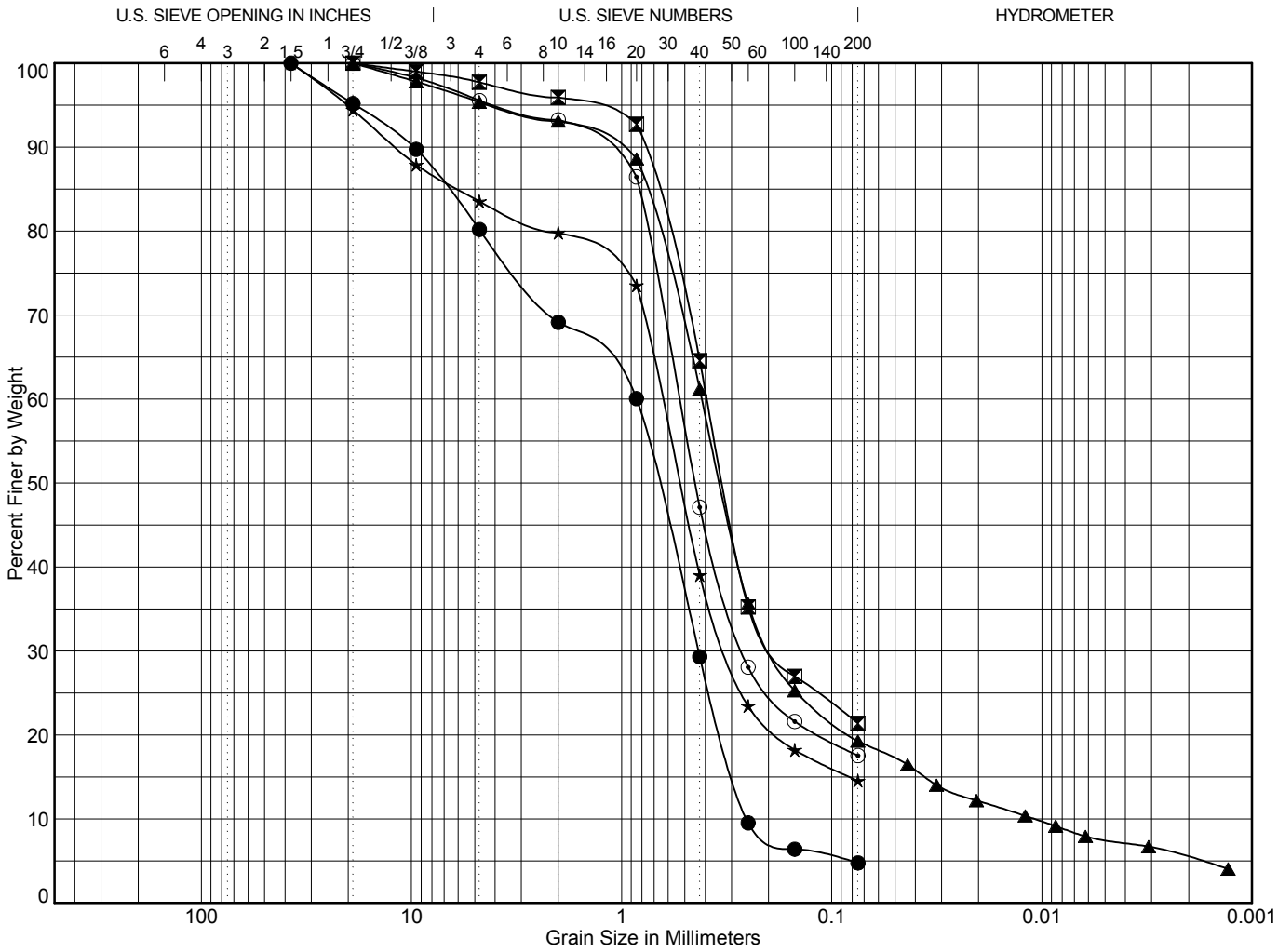
1073004.01 5/15/15 Y:\1073\004\T\1073004.010.GPJ GRAIN SIZE W/STATS

LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-6



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-4	10.5	Gravelly, fine to coarse SAND (SP)				0.87	3.35
⧓	B-4	13.0	Silty, fine to medium SAND (SM)					
▲	B-4	15.5	Silty, fine to medium SAND (SM)				7.96	38.22
★	B-4	18.0	Gravelly, fine to medium SAND with silt (SP-SM)					
⊙	B-4	20.5	Silty, fine to medium SAND (SM)					

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-4	10.5	37.5	0.849	0.677	0.432	0.253	4.8	15.0	11.0	39.8	24.6	4.8
⧓	B-4	13.0	19	0.391	0.326	0.181		0.0	2.3	1.8	31.3	43.2	21.4
▲	B-4	15.5	19	0.415	0.337	0.189	0.011	0.0	4.6	2.3	31.9	41.9	19.3
★	B-4	18.0	37.5	0.648	0.53	0.312		5.5	10.9	3.7	40.8	24.5	14.5
⊙	B-4	20.5	19	0.533	0.447	0.264		0.0	4.5	2.3	46.1	29.6	17.5

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

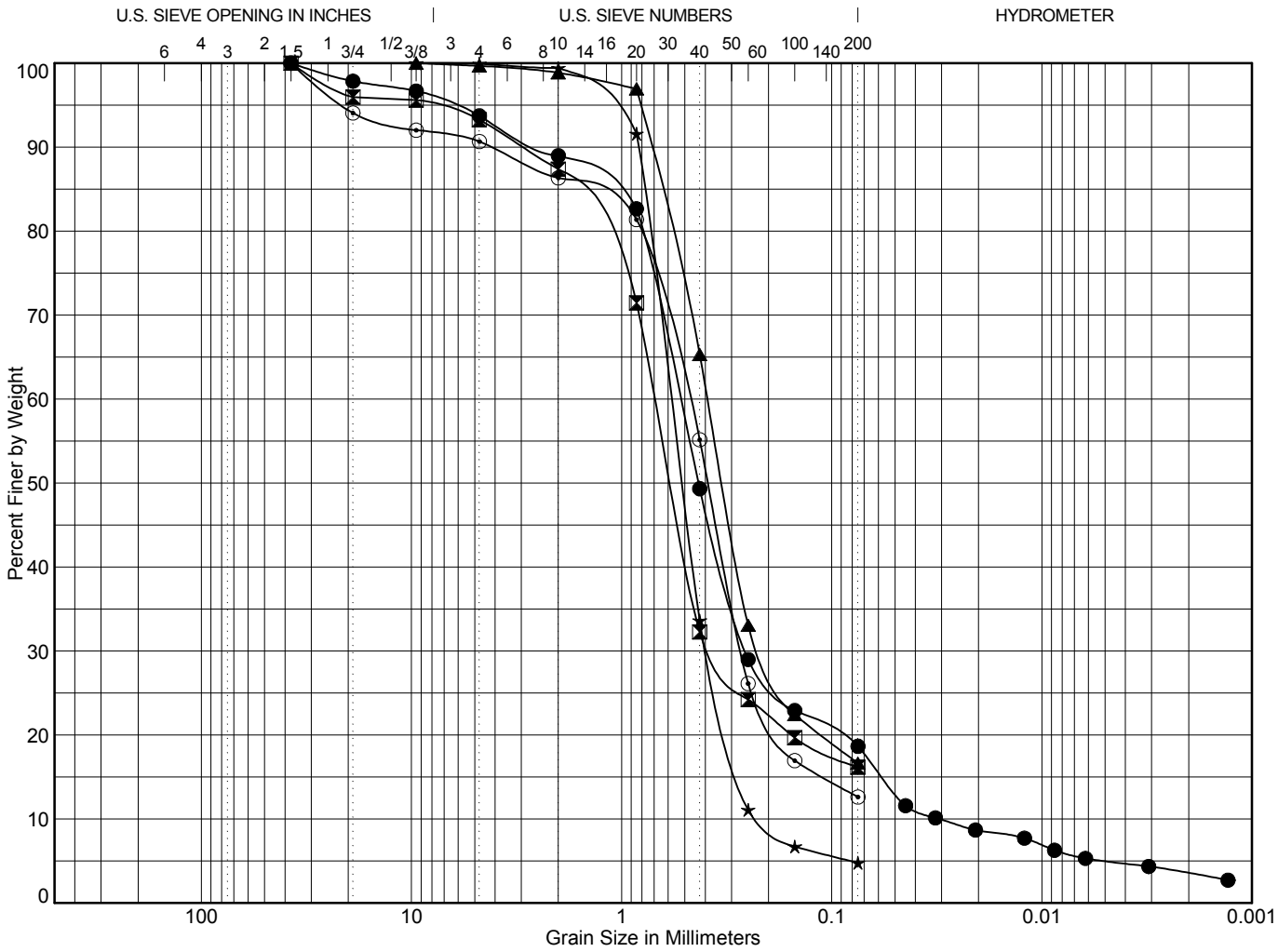
1073004.01 5/15/15 Y:\1073\004\T\1073004.010.GPJ GRAIN SIZE W/STATS

LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-7



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-4	23.0	Silty, fine to medium SAND with gravel (SM)				4.03	17.20
⧗	B-4	26.0	Silty, fine to coarse SAND with gravel (SM)					
▲	B-4	28.5	Silty, fine to medium SAND (SM)					
★	B-4	30.0	Fine to medium SAND (SP)				1.19	2.65
⊙	B-4	31.0	Fine to medium SAND with silt and gravel (SP-SM)					

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-4	23.0	37.5	0.531	0.431	0.257	0.031	2.2	4.1	4.7	39.7	30.7	18.7
⧗	B-4	26.0	37.5	0.694	0.582	0.366		4.1	2.7	5.9	55.1	16.1	16.2
▲	B-4	28.5	9.5	0.389	0.33	0.216		0.0	0.3	0.8	33.5	48.7	16.6
★	B-4	30.0	9.5	0.582	0.517	0.39	0.22	0.0	0.1	0.5	65.8	28.9	4.8
⊙	B-4	31.0	37.5	0.483	0.387	0.268		5.9	3.4	4.3	31.2	42.5	12.6

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

1073004.01 5/15/15 Y:\1073\004\T\1073004.010.GPJ GRAIN SIZE W/STATS

LANDAU ASSOCIATES

Manchester Pump Station
45, 46, and 47 Rehabilitations
Kitsap County, Washington

Grain Size Test Data

Figure
B-8

APPENDIX C

STORM WATER POLLUTION PREVENTION PLAN

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Storm Water Pollution Prevention Plan

For
Kitsap County Manchester Pump Stations 45, 46, and 47
and Beach Lines Rehabilitation

Prepared For
Department of Ecology Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
425-649-7000

Owners
Kitsap County
Wastewater Division
614 Division Street
Port Orchard, WA 98366

Developers
Kitsap County
Wastewater Division
614 Division Street
Port Orchard, WA 98366

Operator/Contractor
To Be Determined

Project Site Location
Kitsap County

Certified Erosion and Sediment Control Lead
To Be Determined
(Contractor's Personnel)

Draft SWPPP Prepared By
BHC Consultants, LLC
1601 Fifth Avenue Suite 500
Seattle, WA 98101
(206) 505-3400
Erika Schuyler, PE

SWPPP Preparation Date
August 2016

Approximate Project Construction Dates
November 2016 to December 2018

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1.0 Introduction

This Storm Water Pollution Prevention Plan (SWPPP) has been prepared as part of the NPDES storm water permit requirements for the Kitsap County Manchester Pump Stations 45, 46, and 47 and Beach Lines Rehabilitation Project (herein after referred to as “the Project”) in Kitsap County, Washington. The Kitsap County Wastewater Division (hereinafter referred to as “the County”) is upgrading three pump stations (Pump Station 45, Pump Station 46, and Pump Station 47) for this project, as well as rehabilitating the existing sanitary sewer line in Manchester beach. All three stations have equipment that is old, inefficient, and no longer operating reliably. Upgrades to the pump stations are expected to include provisions to bring the stations into compliance with the County’s current design standards, which include flow meters, pig launchers, and bypass connections. Consideration has been given to selecting similar pumps and standardized equipment to the spare parts the County has to maintain in its inventory and to simplify maintenance and operations.

Pump Station 45 (PS-45) and Pump Station 46 (PS-46) are located at the end of existing roadways (East Daniels Loop and East Caraway Road, respectively) within the public right-of-way. These pump stations jut out beyond the Puget Sound ordinary high water mark and are elevated on a concrete and rip-rap platform. The Pump Station 47 (PS-47) area is also located at the end of an existing roadway (East Hemlock Street) within public right of way, above the ordinary high water mark of Puget Sound.

The beach line is located within an existing easement on the beach of Puget Sound. Adjacent residents have access to the beach and public access is provided at the Port of Manchester public boat launch, which is located south of PS-45.

Temporary bypass pumping systems will be installed as necessary when the existing pumping systems at each station must be taken offline to facilitate construction of the new facilities.

Specific activities associated at each site are as follows:

Construction activities at PS-45 and PS-46 will include the following:

- Demolishing the existing pump station.
- Removing the existing rock jetty which houses the existing pump station.
- Installing a new we well, valve vault, meter vault, and associated pipe and fittings.
- Removing and relocating the power, telemetry, and control panels with new, modern equipment.
- Providing a temporary bypass pumping system to handle incoming flows when the existing station has to be taken offline.
- Restoring disturbed areas with asphalt, gravel, and sod.
- Rehabilitating existing adjacent bulkheads with soft armor to better match the beach habitat.

Construction activities at PS-47 will include the following:

- Demolishing the existing pump station.
- Installing a new wet well, valve vault, meter vault, and associated pipe and fittings.
- Removing and replacing the power, telemetry, and control panels with new, modern equipment.
- Providing a temporary bypass pumping system to handle incoming flows when the existing station has to be taken offline.
- Restoring disturbed areas with asphalt, gravel, and sod.

The purpose of this SWPPP is to describe the proposed construction activities, the temporary and permanent erosion and sediment control (TESC) measures, pollution prevention measures, inspection/monitoring activities, and record keeping that will be implemented during the proposed construction project. The objectives of the SWPPP are to:

- Implement Best Management Practices (BMPs) to prevent erosion and sedimentation and to identify, reduce, eliminate or prevent storm water contamination and water pollution from construction activity.
- Prevent violations of surface water quality, groundwater quality, or sediment management standards.
- Prevent adverse water quality impacts during the construction phase, including impacts on beneficial uses of the receiving water, by controlling peak flow rates and volumes of storm water runoff at the Permittee's outfalls and downstream of the outfalls.

This SWPPP was prepared using a 2005 Ecology SWPPP Template and was reviewed and updated to ensure that the 2012 Construction General Permit (CGP) requirements are addressed. This SWPPP was prepared based on the requirements set forth in the Construction Storm Water General Permit, *Storm Water Management Manual for Western Washington* (SWMMWW). The report is divided into seven main sections with several appendices that include storm water related reference materials. The topics presented in the each of the main sections are:

- Section 1 – INTRODUCTION. This section provides a summary description of the project, and the organization of the SWPPP document.
- Section 2 – SITE DESCRIPTION. This section provides a detailed description of the existing site conditions, proposed construction activities and post construction conditions.
- Section 3 – CONSTRUCTION BMPs. This section provides a detailed description of the BMPs to be implemented based on the 12 required elements of the SWPPP as determined by the SWMMWW.
- Section 4 – CONSTRUCTION PHASING AND BMP IMPLEMENTATION. This section provides a description of the timing of the BMP implementation in relation to the project schedule.
- Section 5 – POLLUTION PREVENTION TEAM. This section identifies the appropriate contact names (emergency and non-emergency), monitoring personnel, and the onsite temporary erosion and sedimentation control inspector
- Section 6 – INSPECTION AND MONITORING. This section provides a description of the inspection and monitoring requirements such as the parameters of concern to be monitored, sample locations, sample frequencies, and sampling methods for all storm water discharge locations from the site.
- Section 7 – RECORD KEEPING. This section describes the requirements for documentation of the BMP implementation, site inspections, monitoring results, and changes to the implementation of certain BMPs due to site factors experienced during construction.

Supporting documentation and standard forms are provided in the following Appendices:

- Appendix A – Site plans
- Appendix B – Construction BMPs
- Appendix C – Alternative Construction BMP list
- Appendix D – General Permit
- Appendix E – Site Inspection Forms (and Site Log)

2.0 Site Description

2.1 Existing Conditions

The project includes upgrades to three pump stations located in Kitsap County, Washington along Manchester Beach, and an upgrade to the existing sewer line within the beach. A site vicinity map is provided in Appendix A. Residential homes are adjacent to the pump stations. The existing conditions at each site are as follows:

- **PS-45** is a beach line pump station located at the easternmost portion of East Daniels Loop, and extends out into Manchester Beach by a constructed rock jetty. The pump station conveys sewage directly west approximately 250 lineal feet through a 4-inch diameter force main and discharges into a gravity manhole in East Daniels Loop. PS-45 is equipped with two 3.7 horsepower (hp) submersible pumps, each rated for a pumping capacity of 200 gallons per minute (gpm). Stormwater from the site generally infiltrates into the ground or flows overland to the Puget Sound. This drainage pattern will not be changed by the project. PS-45 is adjacent to residential homes. No wetlands were found in the area, and portions of the pump station are within the 100-year floodplain.
- **PS-46** is a beach line pump station located at the end of East Caraway Road, and extends out into Manchester Beach by a constructed rock jetty. The pump station pumps nearly vertical (approximately 20 feet) through a 4-inch diameter force main and discharges to an adjacent beach front manhole. PS-46 is equipped with two 2.8 hp submersible pumps, each rated for a pumping capacity of 200 gpm. Stormwater from the site generally infiltrates into the ground or flows overland to the Puget Sound. This drainage pattern will not be changed by the project. PS-46 is adjacent to residential homes. No wetlands were found in the area, and portions of the pump station are within the 100-year floodplain. Landau Associates performed geotechnical investigations at each pump station site. Substantial amounts of peat (a highly-compressible soil type) were encountered in select borings at the PS-46 site. It is recommended that these materials be overexcavated from below the proposed utility and pump station improvements at PS-46.
- **PS-47** is a beach line pump station located at the end of East Hemlock Street. The pump station conveys sewage directly west approximately 210 lineal feet through a 4-inch diameter force main into a gravity manhole located at the intersection of Nubling Avenue East and East Hemlock Street. PS-47 is equipped with two 2.8 hp submersible pumps, each rated for a pumping capacity of 200 gpm. Stormwater from the site generally infiltrates into the ground or flows overland to the Puget Sound. This drainage pattern will not be changed by the project. PS-47 is adjacent to residential homes. No wetlands were found in the area, and portions of the pump station are within the 100-year floodplain. Landau Associates performed geotechnical investigations at each pump station site. Substantial amounts of peat (a highly-compressible soil type) were encountered in select borings at the PS-47 site. Utility and structure excavations at PS-47 will likely encounter peat that extends below practical depth of overexcavation. Lightweight fills should be used during construction at the direction of the Engineer to match the post-construction load to existing conditions in areas where peat remains below improvements.

2.2 Proposed Construction Activities

Pump station construction for all three pump stations are described below.

Pump Station 45 Improvements

Elevated Concrete Structure - The finished floor elevation of the proposed pump station structure at PS-45 will be located above the 100-year flood level at elevation 11.0 ft, approximately 2-3 ft higher than existing (and finished) grade. The proposed location for the electrical equipment at PS-45 is upland approximately 50 ft from the elevated structure on a concrete equipment pad. The standby generator is located on the elevated concrete structure.

Wet Well/Vaults - The wet well and valve vault proposed for PS-45 are precast concrete structures.

Beach Manholes - Given the location of the existing pump station influent manhole and proposed location of the new wet well, a new influent manhole located in the beach will be required to intercept the existing beach sewer pipeline and divert flow through a new 8-inch diameter sewer pipeline to the new pump station. The new beach manhole will be a conventional manhole in which the existing sewer pipeline is cut, manhole inserted, and pipe reconnected.

Force Main – PS-45 pumps through a 4-inch diameter force main that free discharges into an existing manhole within close proximity to the project sites. The existing 180-LF force main at PS-45 is original construction from the 1960s and is proposed to be replaced with a new 4-inch diameter high density polyethylene force main.

Existing Pump Station Decommissioning - The existing pump station facilities and cemented rock jetties projecting into the Puget Sound at PS-45 will be removed; however, existing deep pump station structures (wet well and influent manhole) are proposed to be removed to 3 feet below grade, filled with sand and abandoned in place.

Buffer Area Calculations – Table 1 describes the surfacing of the final improvements at PS-45.

Table 1 – Pump Station 45 Final Surfacing

Area Converted to Impervious	131 SF
Impervious Converted to Native Vegetation	94 SF
Lawn Converted to Native Vegetation	777 SF

Pump Station 46 Improvements

Elevated Concrete Structure - The finished floor elevation of the proposed PS-46 structure will be located above the 100-year flood level at elevation 11.0 ft, approximately 2-3 ft higher than existing (and finished) grade. The proposed location for the generator and electrical equipment at PS-46 is upland from the elevated structure, near the existing pump station electrical equipment.

Wet Well/Vaults - The wet well and valve vault proposed for PS-46 are precast concrete structures.

Beach Manholes - Given the location of the existing pump station influent manhole and proposed location of the new wet well at PS-46, a new influent manhole located in the beach will be required to intercept the existing beach sewer pipeline and divert flow through a new 8-inch diameter sewer pipeline to the new pump station.. The new beach manhole will be a conventional manhole in which the existing sewer pipeline is cut, manhole inserted, and pipe reconnected.

Force Main – PS-46 pumps through a 4-inch diameter force main that free discharges into an existing manhole. The existing force main at PS-46 is approximately 5 ft in length, where the pump station only serves to lift and discharge the sewage into an adjacent beach manhole. The force main will be replaced with a new 4-inch diameter ductile iron force main, approximately 10 ft in length.

Existing Pump Station Decommissioning - The existing pump station facilities and cemented rock jetties projecting into the Puget Sound at PS-46 will be removed; however, existing deep pump station structures (wet well and influent manhole) are proposed to be removed to 3 feet below grade, filled with sand and abandoned in place.

Buffer Area Calculations – Table 2 describes the surfacing of the final improvements at PS-46.

Table 2 – Pump Station 46 Final Surfacing	
Area Converted to Impervious	682 SF
Impervious Converted to Native Vegetation	107 SF
Lawn Converted to Native Vegetation	550 SF

Pump Station 47 Improvements

Elevated Concrete Structure - The finished floor elevation of the proposed pump station structure will be located above the 100-year flood level at elevation 11.0 ft, approximately 2-3 ft higher than existing (and finished) grade. At PS-47 site, the elevated structure will house the electrical equipment cabinet and standby generator.

Wet Well/Vaults - The wet well and valve vault proposed for PS-47 are precast concrete structures.

Beach Manholes - Given the location of the existing pump station influent manhole and proposed location of the new wet well at PS-47, a new influent manhole located in the beach will be required to intercept the existing beach sewer pipeline and divert flow through a new 8-inch diameter sewer pipeline to the new pump station. The new beach manhole will be a conventional manhole in which the existing sewer pipeline is cut, manhole inserted, and pipe reconnected.

Force Main - The existing force main at PS-47 has been replaced since the station's original 1960's construction with a polyvinyl chloride (PVC) force main. The proposed PS-47 improvements connect to the existing force main at the pump station site and reuse approximately 160 feet to its point of discharge in an existing manhole.

Existing Pump Station Decommissioning - Similar to PS-45 and PS-46, the existing PS-47 facilities will be will be removed and existing deep pump station structures (wet well and influent manhole) are proposed be removed to 3 feet below grade, filled with sand and abandoned in place.

Buffer Area Calculations – Table 3 describes the surfacing of the final improvements at PS-47.

Table 3 – Pump Station 47 Final Surfacing	
Area Converted to Impervious	768 SF
Impervious Converted to Native Vegetation	322 SF
Lawn Converted to Native Vegetation	1,167 SF

Beach Line Improvements

Beach Line rehabilitation construction will utilize cured-in-place-pipe (CIPP), which is an effective rehabilitative measure that provides an existing pipe a new interior surface while minimizing impacts. The CIPP process involves insertion of a resin-saturated sock (glass or synthetic fibers) into a pipe which is then cured by water, steam or ultra-violet light.

Access to the beach line manholes will only be available during low tides, unless the Contractor was to effectively keep the water out of the manholes during higher tides by means of a cofferdam or structure above the tide level. CIPP liner installation typically includes multiple large, heavy trucks and a scaffolding tower. Portable CIPP equipment may also be used. Accessing the manholes from the water side of the project (by means of a dock system or barge) is another possible approach to construction.

To access the sewer line, a temporary crossing of the Duncan Creek channel below the Puget Sound ordinary high water mark at low tide will be required, which may result in temporary impacts to the creek channel and bed. The channel will be restored to existing conditions as necessary following construction.

Additional to the Beach Line Improvements is the repair and replacement of the existing manhole beach pedestals. New pedestals will be installed at each existing beach manhole to allow for ease of operation and maintenance of the manholes. Onsite excavations will be approximately 85 SF to install/replace the pedestal.

Dewatering

It is anticipated that temporary excavations for the new valve vaults and wet wells, beach manholes, and gravity pipelines connecting the counterparts will be completed as single, shored excavations. Dewatering from outside the excavations would be impractical due to the high connectivity to Puget Sound. Shoring and dewatering measures for the projects may be limited to a sheet pile cutoff wall, with a concrete bottom seal that is tremmied under water. Dewatering requirements, after the bottom seal is poured and initial water is pumped out, would be limited to removing the nominal water that seeps through the sheet pile interlocks.

3.0 Construction Storm Water BMPs

3.1 The 12 BMP Elements

This section describes the 12 required elements and the appropriate BMPs to satisfy those required elements. These BMPs apply to all sites unless otherwise stated and are included in Appendix B. Alternate BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed herein are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the NPDES Construction Storm Water General permit. To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Storm Water permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead (CESCL) will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

3.1.1 Element #1 – Preserve Vegetation/Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. In general, natural vegetation and native topsoil shall be retained in an undisturbed state to the maximum extent possible. The BMPs relevant to marking the clearing limits that will be applied for this project include:

- Preserving Natural Vegetation (BMP C101)
- High Visibility Plastic or Metal Fence (BMP C103)
- Silt Fence (BMP C233)

3.1.2 Element #2 – Establish Construction Access

Construction access or activities occurring on unpaved areas shall be minimized on all sites, yet where necessary, access points may be stabilized to minimize the tracking of sediment onto public roads. Portions of construction exits may be paved with asphalt and drainage routed to a treatment system. Street sweeping and street cleaning shall be employed to prevent sediment from entering state waters or creating hazardous driving conditions. All wash wastewater shall be controlled and treated on site. The specific BMPs related to establishing construction access that may be used on this project include:

- Stabilized Construction Entrance/Exit (BMP C105)
- Construction Road/Parking Area Stabilization (BMP C107)

3.1.3 Element #3 – Control Flow Rates

In order to protect the properties and waterways downstream of the project sites, storm water discharges from the sites will be controlled. The specific BMP for flow control that may be used on these projects include:

- Wattles (BMP C235)

  Straw wattles will be used as a temporary erosion and sediment control barrier to reduce the velocity of runoff and capture and retain sediment.

3.1.4 Element #4 – Install Sediment Controls

All storm water runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to an infiltration facility. The specific BMPs that may be used for controlling sediment on this project include:

- Materials on Hand (BMP C150)
- Silt Fence (BMP C233)
- Storm Drain Inlet Protection (BMP C220)
- Wattles (BMP C235)

In addition, sediment will be removed from paved areas in and adjacent to construction work areas manually or using mechanical sweepers, as needed, to minimize tracking of sediments on vehicle tires away from the site and to minimize wash-off of sediments from adjacent streets in runoff.

In general, storm water patterns will remain unaffected by construction. Necessary care will be taken to prevent sediment from the construction project from contaminating storm water. Storm water that collects in excavations or near stored or stockpiled soils will be treated as dewatering effluent.

3.1.5 Element #5 – Stabilize Soils

Exposed and un-worked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. The specific BMPs for soil stabilization that may be used on this project include:

- Temporary and Permanent Seeding (BMP C120)
- Mulching (BMP C121)
- Nets and Blankets (BMP C122)
- Plastic Covering (BMP C123)
- Polyacrylamide (PAM) for Soil Erosion Protection (BMP C126)
- Dust Control (BMP C140)
- Materials on Hand (BMP C150) may also be applicable.

The project sites are located west of the Cascade Mountain Crest. As such, no soils shall remain exposed and un-worked for more than 7 days during the dry season (May 1 to September 30) and 2 days during the wet season (October 1 to April 30). Regardless of the time of year, all soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on weather forecasts.

In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be temporarily covered with plastic sheeting. All stockpiled soils shall be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

3.1.6 Element #6 – Protect Slopes

Protecting slopes is not applicable for this project because the project area does not have any steep slopes nor will any steep slopes adjacent to the project boundaries be disturbed.

3.1.7 Element #7 – Protect Drain Inlets

All storm drain inlets and culverts in operation during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. However, the first priority is to keep all access roads clean of sediment and keep street wash water separate from entering storm drains until treatment can be provided. The following protection measures will be applied on this project:

- Storm Drain Inlet Protection (BMP C220)

BMP C220 will be implemented and maintained for all drainage inlets and culverts that could potentially be impacted by sediment-laden runoff on and near the project site. Catch Basin Inserts will be used for inlet protection.

3.1.8 Element #8 – Stabilize Channels and Outlets

Not applicable; temporary on-site conveyance channels are not used for this project.

3.1.9 Element #9 – Control Pollutants

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of storm water. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well organized, and free of debris. Process water, such as wheel wash water and potentially contaminated water from asphalt surfaces will either be disposed of offsite or treated with settlement tanks. Necessary precautions will be taken to ensure pollutants are handled and disposed of in a safe manner. The contractor will be required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan under the Federal regulations of the Clean Water Act (CWA).

Stormwater shall not be exposed to Fecal Coliform Bacteria during the course of construction. Fecal Colliform Bacteria can be present at the project site due to the nature of the facilities, but is and will continue to be contained within the existing and future sewer pump station structures, manholes and conveyance piping. Portable toilets shall have a secondary containment measure in place to help avoid impact to the Puget Sound in the case of a spill or leak.

3.1.10 Element #10 – Control Dewatering

All dewatering water from open cut excavation, tunneling, foundation work, trench, or underground vaults shall be pumped out and cleaned using methods such as a Baker tank. Discharged water shall be dispersed in a manner that does not cause erosion, flooding or a violation of State water quality standards in receiving waters. BMPs that may be used for sediment trapping and turbidity reduction include:

- Transport off-site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.
- Sanitary or combined sewer discharge with local sewer purveyor approval.
- Concrete Handling (BMP C151)
- Construction Storm Water Filtration (BMP C 251)

3.1.11 Element #11 – Maintain BMPs

All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with each particular BMP's specifications. Visual monitoring of the BMPs will be conducted at least once every calendar week and within 24 hours of any rainfall event that causes a discharge from the site.

All temporary erosion and sediment control BMPs shall be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized.

3.1.12 Element #12 – Manage the Project

Erosion and sediment control BMPs for this project have been designed based on the following principles:

- Design the project to fit the existing topography, soils, and drainage patterns.
- Emphasize erosion control rather than sediment control.
- Minimize the extent and duration of the area exposed.
- Keep runoff velocities low.
- Retain sediment on site.
- Thoroughly monitor site and maintain all ESC measures.
- Schedule major earthwork during the dry season.

As this project sites are located west of the Cascade Mountain Crest, the project will be managed according to the following key project components:

Phasing of Construction

- The construction project is being phased to the extent practicable in order to prevent soil erosion, and, to the maximum extent possible, the transport of sediment from the site during construction.
- Re-vegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities during each phase of construction, per the Scheduling BMP (C 162).

Seasonal Work Limitations

- From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the local permitting authority that silt-laden runoff will be prevented from leaving the site through a combination of the following:
    - ☐ Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters; and
    - ☐ Limitations on activities and the extent of disturbed areas; and
    - ☐ Proposed erosion and sediment control measures.

- Based on the information provided and/or local weather conditions, the local permitting authority may expand or restrict the seasonal limitation on site disturbance.
- The following activities are exempt from the seasonal clearing and grading limitations:
  - ☐ Routine maintenance and necessary repair of erosion and sediment control BMPs;
  - ☐ Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil; and
  - ☐ Activities where there is 100 percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

Coordination with Utilities and Other Jurisdictions

- Care has been taken to coordinate with utilities, other construction projects, and the local jurisdiction in preparing this SWPPP and scheduling the construction work.

Inspection and Monitoring

- All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections shall be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control. This person has the necessary skills to:
  - ☐ Assess the site conditions and construction activities that could impact the quality of storm water, and
  - ☐ Assess the effectiveness of erosion and sediment control measures used to control the quality of storm water discharges.
- A Certified Erosion and Sediment Control Lead shall be onsite or on-call at all times.
- Whenever inspection and/or monitoring reveals that the BMPs identified in this SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMPs or design changes shall be implemented as soon as possible.

Maintaining an Updated Construction SWPPP

- This SWPPP shall be retained onsite or within reasonable access to the site.
- The SWPPP shall be modified whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.
- The SWPPP shall be modified if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the site. The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven (7) days following the inspection.

3.2 Site Specific BMPs

Site specific BMPs are shown on the construction drawings in Appendix A.

3.3 Additional Advanced BMPs

Advanced BMPs are only needed if construction activities are complex enough to warrant them, or if the site has the potential for significant impacts to water quality. Such BMPs are not warranted for this project.

3.4 Adverse Weather

The BMPs proposed in this SWPPP are intended to prevent adverse impacts to receiving waters both during the dry and wet season. In the event they are not functioning as intended additional BMPs will be selected and installed by the Contractor to meet the permit requirements.

4.0 Construction Phasing and BMP Implementation

The BMP implementation schedule is driven by the construction schedule. The following provides a sequential list of the proposed construction schedule milestones and the corresponding BMP implementation schedule for each project. The list contains key milestones such as wet season construction. The project sites are located west of the Cascade Mountain Crest. As such, the dry season is considered to be from May 1 to September 30 and the wet season is considered to be from October 1 to April 30.

Pump Station 45

- Estimate of Construction start date: TBD
- Estimate of Construction finish date: TBD
- Dry Season starts: May 1
- Wet Season starts: October 1
- Install ESC measures: TBD-Contractor
- Mobilize equipment on site: TBD-Contractor
- Mobilize and store ESC and soil stabilization products (store materials on hand BMP C150): TBD-Contractor
- Begin clearing and grubbing: TBD-Contractor
- Construction of sewer facilities: TBD-Contractor
- Final paving and re- surfacing: TBD-Contractor

Pump Station 46

- Estimate of Construction start date: TBD
- Estimate of Construction finish date: TBD
- Dry Season starts: May 1
- Wet Season starts: October 1
- Install ESC measures: TBD-Contractor
- Mobilize equipment on site: TBD-Contractor
- Mobilize and store ESC and soil stabilization products (store materials on hand BMP C150): TBD-Contractor
- Begin clearing and grubbing: TBD-Contractor
- Construction of sewer facilities: TBD-Contractor
- Final paving and re- surfacing: TBD-Contractor

Pump Station 47

- Estimate of Construction start date: TBD
- Estimate of Construction finish date: TBD
- Dry Season starts: May 1

• Wet Season starts:	October 1
• Install ESC measures:	TBD-Contractor
• Mobilize equipment on site:	TBD-Contractor
• Mobilize and store ESC and soil stabilization products (store materials on hand BMP C150):	TBD-Contractor
• Begin clearing and grubbing:	TBD-Contractor
• Construction of sewer facilities:	TBD-Contractor
• Final paving and re- surfacing:	TBD-Contractor

Beach Lines

• Estimate of Construction start date:	TBD
• Estimate of Construction finish date:	TBD
• Dry Season starts:	May 1
• Wet Season starts:	October 1
• Install ESC measures:	TBD-Contractor
• Mobilize equipment on site:	TBD-Contractor
• Mobilize and store ESC and soil stabilization products (store materials on hand BMP C150):	TBD-Contractor
• Begin clearing and grubbing:	TBD-Contractor
• Construction of sewer facilities:	TBD-Contractor
• Final paving and re- surfacing:	TBD-Contractor

5.0 Pollution Prevention Team

5.1 Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

- Certified Erosion and Sediment Control Lead (CESCL) – primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, etc.); to be called upon in case of failure of any ESC measures.
- Project Representative – For projects with engineered structures only (sediment ponds/traps, sand filters, etc.): site representative for the owner that is the project's supervising engineer responsible for inspections and issuing instructions and drawings to the contractor's site supervisor or representative
- Emergency Ecology Contact – individual to be contacted at Ecology in case of emergency.
- Emergency Owner Contact – individual that is the site owner or representative of the site owner to be contacted in the case of an emergency.
- Non-Emergency Ecology Contact – individual that is the site owner or representative of the site owner than can be contacted if required.
- Monitoring Personnel – personnel responsible for conducting water quality monitoring; for most sites this person is also the Certified Erosion and Sediment Control Lead.

5.2 Team Members

Names and contact information for those identified as members of the pollution prevention team are provided in the following table. The members will be updated once the contractor has been selected.

Table 4 – Team Members

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	To be determined (Contractor Personnel)	TBD
Emergency Ecology Contact	On Duty Contact	(425) 649-7000
Emergency Owner Contact	Floyd Bayless	(360) 509-1209
Non-Emergency Ecology Contact	On Duty Contact	TBD
Monitoring Personnel	On Duty Contact	TBD

6.0 Site Inspections and Monitoring

Monitoring includes visual inspection, monitoring for water quality parameters of concern, and documentation of the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities at each pump station and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Storm water quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book (see Appendix E). This SWPPP may function as the site log book if desired, or the forms may be separated and included in a separate site log book. However, if separated, the site log book must be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction for each project site.

6.1 Site Inspection

All BMPs will be inspected, maintained, and repaired as needed to assure continued performance of their intended function. The inspector will be a CESCL per BMP C160. The name and contact information for the CESCL is provided in Section 5 of this SWPPP.

Site inspection will occur in all areas disturbed by construction activities and at all storm water discharge points. Storm water will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen. The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of storm water discharges. All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

6.1.1 Site Inspection Frequency

Site inspections will be conducted at least once a week and within 24 hours following any discharge from each of the sites. For sites with temporary stabilization measures, the site inspection frequency can be reduced to once every month.

6.1.2 Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in Appendix E. The site inspection log forms may be separated from this SWPPP document, but will be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

6.2 Storm Water Quality Monitoring

Dewatering activities may be necessary occur during construction of portions of this project. Water from these activities will be discharged into the existing sanitary sewer system or Baker tanks and then discharged to the storm water system. Dewatering will address the perched water table via sumps and pumps; deep wells or well points are not anticipated. Water samples shall be taken at all discharge points to be tested for turbidity, pH, temperature, and dissolved oxygen levels. Sampling shall occur weekly and within 24 hours of a discharge. The following table gives the target values of each measurement type. Kitsap County or the Department of Ecology may require monitoring at locations of specific discharge points; the Contractor shall coordinate this with the CESCL.

Table 5 – Water Quality Target Benchmark Values	
Parameter	**Target Value at Discharge Point**
Turbidity	Less than 25 NTU
pH	6.5 to 8.5
Temperature	Less than or equal to 16˚ C (60.8˚ F)
Dissolved Oxygen	Greater than or equal to 9.5 mg/l

6.2.1 Turbidity Sampling

Samples will be analyzed for turbidity using the EPA 180.1 Analytical Method. The key benchmark values that require action are 25 and 250 nephelometric turbidity units (NTU). If the 25 NTU benchmark is exceeded, the following steps will be conducted:

- Ensure all BMPs specified in this SWPPP are installed and functioning as intended.
- Assess whether additional BMPs should be implemented, and document revisions to the SWPPP as necessary.
- Sample discharge location daily until the analysis results are less than 25 NTU (turbidity) or greater than 32 cm (transparency).

If the turbidity is greater than 25 NTU but less than 250 NTU for more than 3 days, additional treatment BMPs will be implemented within 24 hours of the third consecutive sample that exceeded the benchmark value. If the 250 NTU benchmark for turbidity is exceeded at any time, the following steps will be conducted:

- Notify Ecology by phone within 24 hours of analysis (see Section 5.0 of this SWPPP for contact information).
- Continue daily sampling until the turbidity is less than 25 NTU.
- Initiate additional treatment BMPs such as off-site treatment, infiltration, filtration and chemical treatment within 24 hours of the first 250 NTU exceedance.
- Implement additional treatment BMPs as soon as possible, no later than 7 days of the first 250 NTU exceedance.
- Describe inspection results and remedial actions taken in the site log book and in monthly discharge monitoring reports as described in Section 7.0 of this SWPPP.

6.2.2 pH Sampling

This project will not involve significant concrete work as defined in the NPDES Construction Storm Water General Permit. However, storm water runoff will be monitored for pH starting on the first day of any activity that includes more than 40 yards of poured or recycled concrete, or after the application of “Engineered Soils” such as, Portland cement treated base, cement kiln dust, or fly ash. This does not include fertilizers. For concrete work, pH monitoring will start the first day concrete is poured and will continue until 3 weeks after the last pour. For engineered soils, the pH monitoring period begins when engineered soils are first exposed to precipitation and continue until the area is fully stabilized.

Storm water samples will be collected daily from all points of discharge from the site and measured for pH using a calibrated pH meter, pH test kit, or wide range pH indicator paper. If the measured pH is 8.5 or greater, the following steps will be undertaken:

- Prevent the high pH water from entering storm drains of surface water.
- Adjust or neutralize the high pH water if necessary using appropriate technology such as CO2 sparging (liquid or dry ice).
- Contact Ecology if chemical treatment other than CO2 sparging is planned

7.0 Reporting and Record Keeping

7.1 Record Keeping

7.1.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Storm water quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book (see Appendix E).

7.1.2 Records Retention

Records of all monitoring information (site log book, inspection reports/checklists, etc.), this Storm Water Pollution Prevention Plan, and any other documentation of compliance with permit requirements shall be retained during the life of the construction project and for a minimum of three years following the termination of permit coverage in accordance with permit condition S5.C.

7.1.3 Access to Plans and Records

The SWPPP, General Permit, Notice of Authorization letter, and Site Log Book will be retained on site or within reasonable access to the site and will be made immediately available upon request to Ecology or the local jurisdiction. A copy of this SWPPP will be provided to Ecology within 14 days of receipt of a written request for the SWPPP from Ecology. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with permit condition S5.G.

7.1.4 Updating the SWPPP

In accordance with Conditions S3, S4.B, and S9.B.3 of the General Permit, this SWPPP will be modified if the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect on the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination based on inspection(s) that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

7.2 Reporting

7.2.1 Discharge Monitoring Reports

Discharge Monitoring Reports (DMRs) will be submitted to Ecology monthly. If there was no discharge during a given monitoring period, the Permittee shall submit the form as required, with the words “No discharge” entered in the place of monitoring results. The DMR due date is 15 days following the end of each month.

7.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit is not met, and it causes a threat to human health or the environment, the following steps will be taken in accordance with permit section S5.F:

- Ecology will be immediately notified of the failure to comply.
- Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.
- A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

In accordance with permit condition S4.D.5.b, the Ecology regional office will be notified if chemical treatment other than CO2 sparging is planned for adjustment of high pH water (see Section 5.0 of this SWPPP for contact information).

Appendix A – Site Maps and Construction Documents

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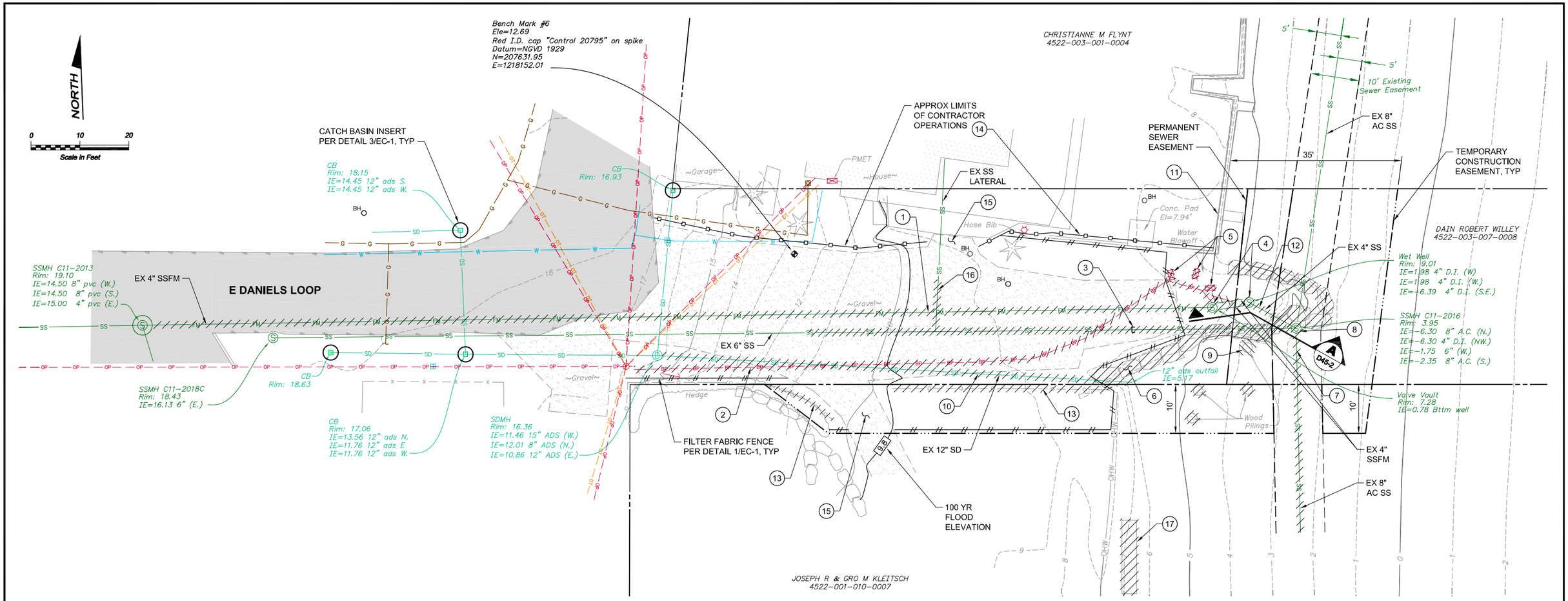

NOTES:

1. DEMOLITION OF EXISTING PUMP STATION FACILITIES SHALL OCCUR ONLY AFTER COMMISSIONING (INSTALLATION, TESTING, AND CONFIRMED OPERATION) OF THE NEW PUMP STATION, UNLESS OTHERWISE APPROVED BY THE COUNTY.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. SEE SPEC SECTION 02 41 00 FOR ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS.
4. PROTECT ALL EXISTING UTILITIES, STRUCTURES, FACILITIES, TREES, ETC. UNLESS SPECIFICALLY INDICATED TO BE REMOVED.
5. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
6. SEE RESTORATION DWGS FOR REMOVAL OF EXISTING ASPHALT AND GROUND.
7. ADJUST/REMOVE/REINSTALL FILTER FABRIC FENCE AS NECESSARY TO CONSTRUCT IMPROVEMENTS.

CONSTRUCTION NOTES:

1. REROUTE EXISTING FORCE MAIN FOR CONSTRUCTION OF NEW FACILITIES. REMOVE EXISTING FORCE MAIN IN AREA OF NEW IMPROVEMENTS. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY FORCE MAIN AND PLUG AND ABANDON REMAINING EXISTING FORCE MAIN.
2. RELOCATE POWER SERVICE PER ELECT DWGS AND REMOVE EXISTING PUMP STATION POWER SERVICE. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY SERVICE.
3. PLUG AND ABANDON EXISTING SEWER TO EAST, REMOVE EXISTING SEWER TO WEST. SEE DWG C45-1 FOR LIMITS OF NEW IMPROVEMENTS.
4. DECOMMISSION AND REMOVE MECHANICAL, ELECTRICAL, AND MISCELLANEOUS EQUIPMENT FROM EXISTING PUMP STATION WET WELL AND VALVE VAULT. REMOVE DISCHARGE PIPING BETWEEN STRUCTURES. SEE DWG D45-2 FOR ADDITIONAL DEMOLITION DETAILS.
5. RELOCATE EXISTING PUMP STATION ELECT EQUIP FOR USE DURING CONSTRUCTION PER ELECT DWGS. REMOVE ELECT EQUIP FOLLOWING COMMISSIONING OF NEW PUMP STATION.
6. REMOVE EXISTING CONC/ROCK GROIN DURING DEMOLITION OF EXISTING PUMP STATION, SEE R45 DWGS FOR RESTORATION DETAILS. MINOR REMOVAL AND REPLACEMENT WILL BE ALLOWED FOR INSTALLATION OF NEW SEWER AND BEACH MANHOLE.
7. PLUG AND ABANDON EXISTING SEWER, REMOVE AS REQUIRED. MAINTAIN SERVICE DURING CONSTRUCTION, SEE NEW BEACH MANHOLE LOCATION ON DWG C45-1.
8. REMOVE EXISTING SSMH. SEE DWG D45-2 FOR ADDITIONAL DEMOLITION DETAILS.
9. FULLY REMOVE EXISTING CREOSOTE-TREATED WOOD PILINGS, TYP OF 4.
10. REMOVE AND REPLACE EXISTING STORM DRAIN. SEE DWG C45-1 FOR REROUTING.
11. PROTECT EXISTING CONCRETE BULKHEAD DURING CONSTRUCTION IN ACCORDANCE WITH SPEC SECTION 02 41 10.
12. PLUG AND ABANDON EXISTING SEWER.
13. REMOVE CHAINLINK FENCE, GATE AND POST. PROTECT EXISTING HEDGE.
14. INSTALL DELINEATION FENCING PER DETAIL 2/EC-1, COORDINATE OPENINGS WITH HOMEOWNER FOR ACCESS.
15. MAINTAIN DRIVEABLE ACCESS TO PROPERTIES DURING CONSTRUCTION. NOTIFY HOMEOWNERS ONE DAY IN ADVANCE OF ANY CONSTRUCTION ACTIVITY REQUIRING BLOCKAGES OF 30 MINUTES OR MORE. BLOCKAGES SHALL LAST NO LONGER THAN 4 HOURS UNLESS PRIOR APPROVAL IS GIVEN BY THE HOMEOWNER.
16. REMOVE EXISTING SEWER LATERAL IN AREA OF NEW IMPROVEMENTS. SEE DRAWING C45-1 FOR REROUTING.
17. REMOVE APPROXIMATELY 15' x 3' x 3' REINFORCED, CONCRETE ENCASED STYROFOAM CORE BLOCK. ACTUAL LOCATION IS APPROXIMATELY 30' SOUTH OF THE LOCATION DEPICTED ON THIS PLAN.

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TERRY JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

No.	Revision	Date	By	App'd
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Designed: T. Whitehouse, P.E.
Drawn: P. Simon
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: 1" = 10'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

EXISTING PUMP STATION SITE, TESC AND DEMOLITION PLAN

Drawing: D45-1
Sheet: 26 of 73
File: P15-10341_D45-1
Date: August 2016

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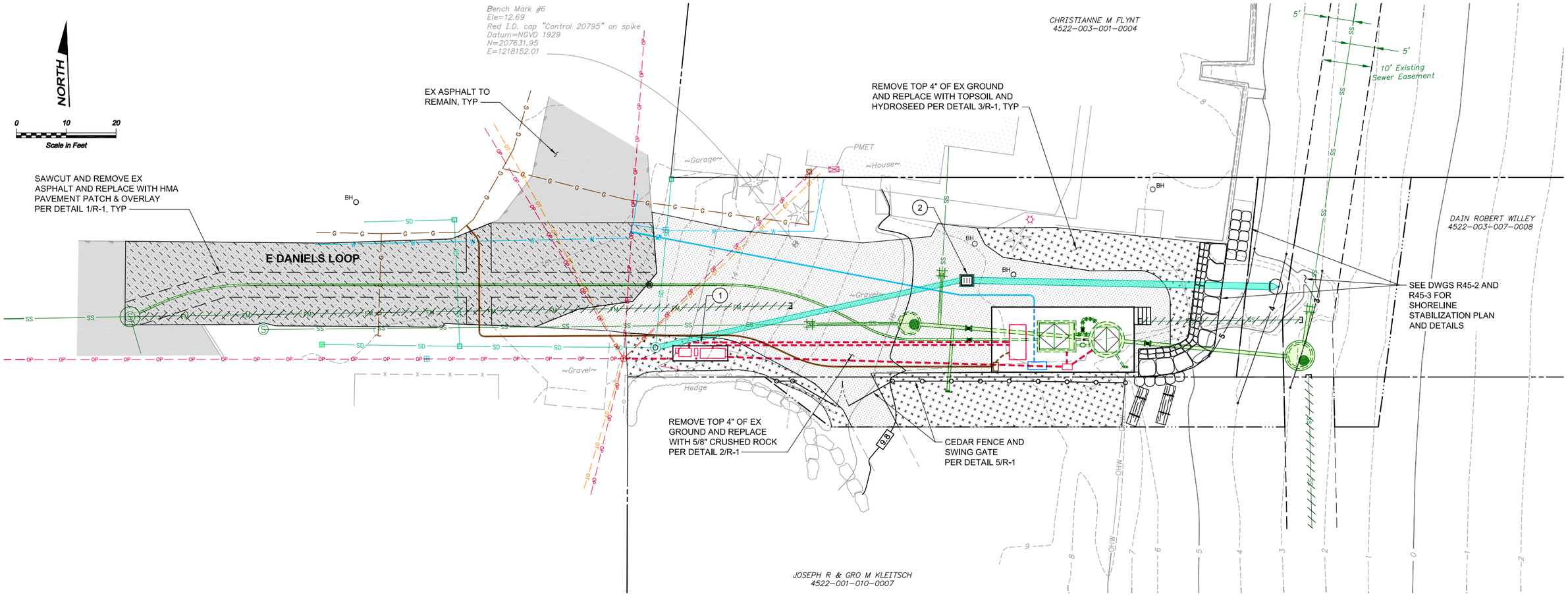

NOTES:

1. ALL NECESSARY RESTORATION MAY NOT BE IDENTIFIED ON THE DRAWINGS. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO PRE-CONSTRUCTION CONDITIONS OR BETTER.

CONSTRUCTION NOTES:

(1) GRADE AREA WITHIN 3 FEET NORTH OF STEPPED EQUIPMENT PAD NEARLY LEVEL AS DIRECTED BY THE CONSTRUCTION MANAGER IN THE FIELD. SEE DETAIL 2/S45-2 FOR APPROXIMATE ELEVATIONS.

(2) GRADE IMMEDIATE AREA AROUND CB TO SLOPE TO CB AS DIRECTED BY THE CONSTRUCTION MANAGER IN THE FIELD.

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UNDERGROUND SERVICE

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TIMOTHY JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

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Approved: R. Dorn, P.E.

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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

FINISHED SITE AND RESTORATION PLAN

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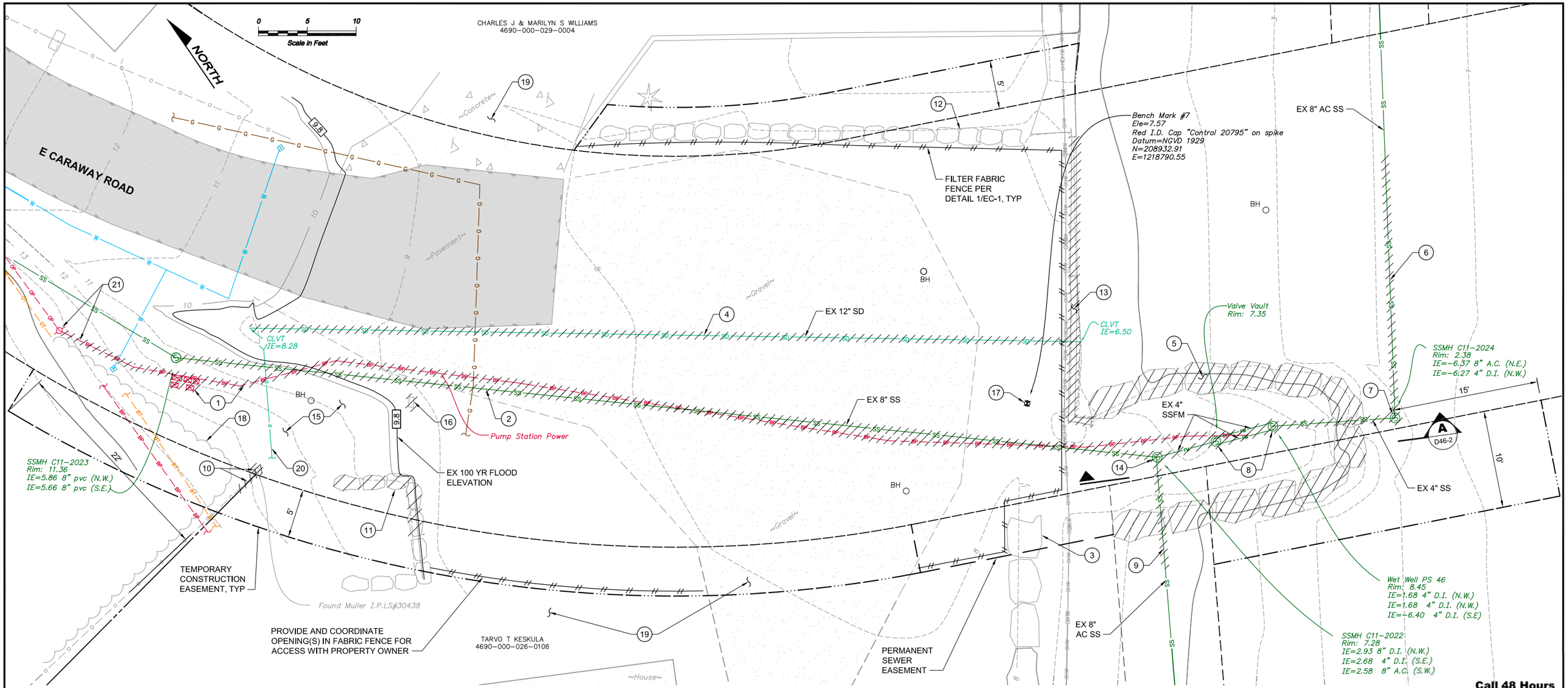

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2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. SEE SPEC SECTION 02 41 00 FOR ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS.
4. PROTECT ALL EXISTING UTILITIES, STRUCTURES, FACILITIES, TREES, ETC. UNLESS SPECIFICALLY INDICATED TO BE REMOVED.
5. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
6. SEE RESTORATION DWGS FOR REMOVAL OF EXISTING ASPHALT AND GROUND.
7. ADJUST/REMOVE/REINSTALL FILTER FABRIC FENCE AS NECESSARY TO CONSTRUCT IMPROVEMENTS.

CONSTRUCTION NOTES:

1. RELOCATE EXISTING PUMP STATION ELECTRICAL EQUIPMENT AND POWER SERVICE PER ELECTRICAL DWGS FOR USE DURING CONSTRUCTION. REMOVE EXISTING PUMP STATION POWER SERVICE. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY ELECTRICAL EQUIPMENT AND POWER SERVICE.
2. REMOVE AND REPLACE EXISTING SEWER. SEE DWG C46-1 FOR REROUTING.
3. REMOVE AND REINSTALL ROCKERY TO TIE INTO NEW ROCKERY WALL.
4. REMOVE AND REPLACE EXISTING STORM DRAIN. SEE DWG C46-1 FOR REROUTING.
5. REMOVE EXISTING CONC/ROCK GROIN DURING DEMOLITION OF EXISTING PUMP STATION, SEE R46 DWGS FOR RESTORATION DETAILS. MINOR REMOVAL AND REPLACEMENT WILL BE ALLOWED FOR INSTALLATION OF NEW MANHOLE AND 8" SS.
6. PLUG AND ABANDON EXISTING SEWER, REMOVE AS REQUIRED. MAINTAIN SERVICE DURING CONSTRUCTION, SEE NEW BEACH MANHOLE LOCATION ON DWG C46-1.
7. REMOVE EXISTING SSMH. SEE DWG D46-2 FOR ADDITIONAL DEMOLITION DETAILS.
8. DECOMMISSION AND REMOVE MECH, ELECT, AND MISC EQUIPMENT FROM EXISTING PUMP STATION WET WELL AND VALVE VAULT. REMOVE FM PIPING ENTERING AND EXITING STRUCTURES. SEE DWG D46-2 FOR ADDITIONAL DEMOLITION DETAILS.
9. REMOVE EXISTING SEWER TO FACILITATE NEW MANHOLE AND PIPING CONNECTION. BYPASS PUMP FROM SSMH C11-2022. SEE DWG C46-1 FOR NEW MANHOLE LOCATION.
10. REMOVE AND REINSTALL EXISTING FENCE TO EDGE OF PROPERTY LINE TO MATCH EXISTING. RE-ESTABLISH PROPERTY MARKER.
11. REMOVE AND REINSTALL EXISTING ROCK WALL PLANTER. SEE DWG FOR R46-1 FOR RESTORATION DETAILS.
12. REMOVE AND REINSTALL ROCKERY AND LANDSCAPING TO MATCH EXISTING.
13. REMOVE EXISTING CONCRETE BULKHEAD AFTER CONSTRUCTION OF NEW PUMP STATION. SEE R46 DWGS FOR RESTORATION DETAILS.
14. REMOVE EXISTING SSMH. INSTALL TEMPORARY FORCE MAIN AND/OR GRAVITY SEWER TO NEW SSMH C11-2049 FOR EXISTING PUMP STATION OPERATION DURING CONSTRUCTION AS REQUIRED. SEE DWG D46-2 FOR ADDITIONAL DEMOLITION DETAILS.
15. CUT/FILL AND REGRADE AREA TO CONSTRUCT NEW IMPROVEMENTS, SEE DWG R46-1 FOR FINISHED GRADE ELEVATIONS.
16. REMOVE AND RELOCATE MAILBOX TO LOCATION DIRECTED BY PROPERTY OWNER.
17. BENCH MARK FOR USE DURING CONSTRUCTION. RE-ESTABLISHMENT AFTER CONSTRUCTION IS NOT REQUIRED.
18. HEAVY SHRUBBERY, TRIM BACK TO CONSTRUCT NEW IMPROVEMENTS AS REQUIRED. PROTECT TREES.
19. MAINTAIN DRIVEABLE ACCESS TO PROPERTIES DURING CONSTRUCTION. NOTIFY HOMEOWNERS ONE DAY IN ADVANCE OF ANY CONSTRUCTION ACTIVITY REQUIRING BLOCKAGES OF 30 MINUTES OR MORE. BLOCKAGES SHALL LAST NO LONGER THAN 4 HOURS UNLESS PRIOR APPROVAL IS GIVEN BY THE HOMEOWNER.
20. REMOVE AND REPLACE 4" CURTAIN DRAIN IN KIND. REROUTE AROUND NEW IMPROVEMENTS.
21. REMOVE SHRUBBERY TO POWER POLE FOR NEW CONDUIT INSTALLATION. REMOVE SHRUBBERY WITHIN A 3 FOOT RADIUS OF EXISTING POWER POLE.

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TIMOTHY JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

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Designed: T. Whitehouse, P.E.
Drawn: P. Simon
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: 1" = 5'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

EXISTING PUMP STATION SITE, TESC AND DEMOLITION PLAN

Drawing: D46-1
Sheet: 41 of 73
File: P15-10341_D46-1
Date: August 2016

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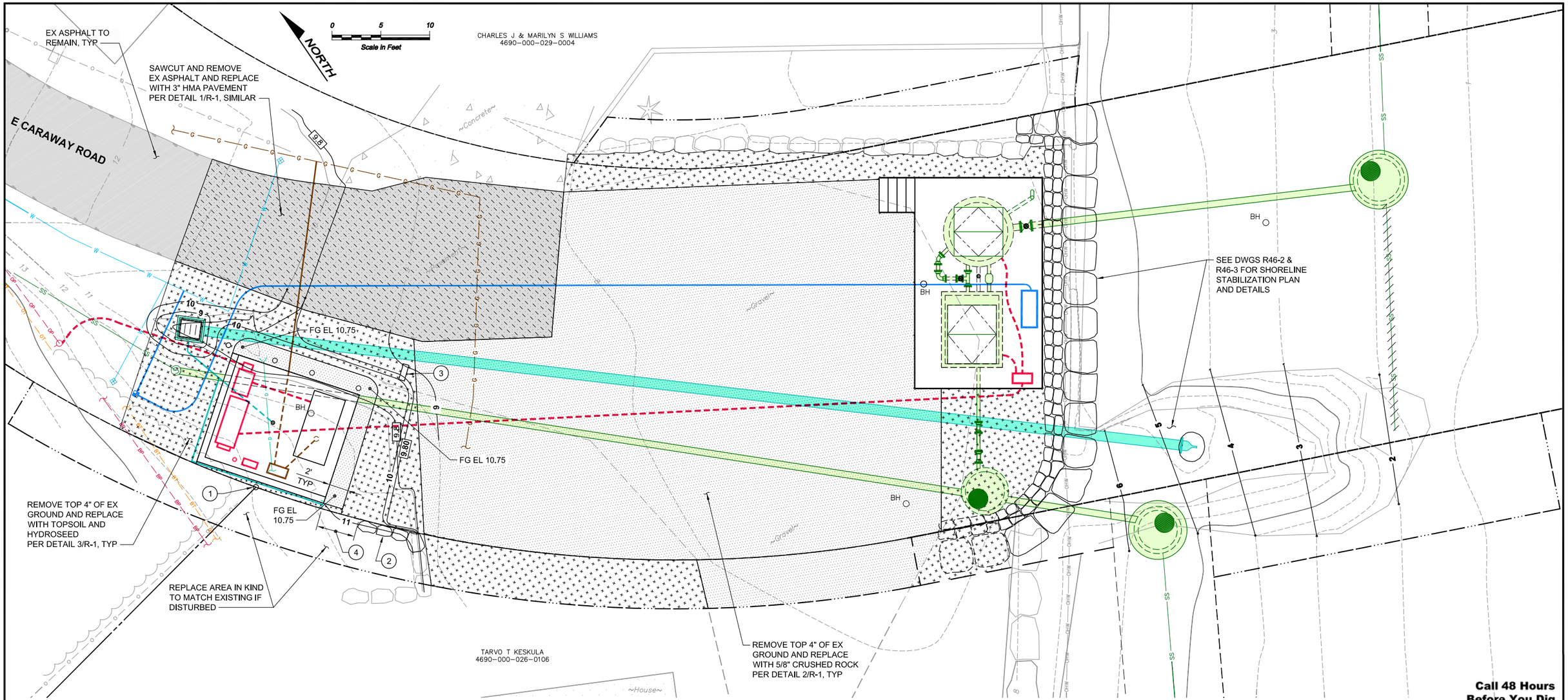

NOTES:

1. ALL NECESSARY RESTORATION MAY NOT BE IDENTIFIED ON THE DRAWINGS. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO PRE-CONSTRUCTION CONDITIONS OR BETTER.

CONSTRUCTION NOTES:

1. RE-ESTABLISHED PROPERTY MARKER.
2. REINSTALL ROCK WALL PLANTER TO MATCH EXISTING. REMOVE AND RELOCATE/REPLACE IRRIGATION SYSTEM IN KIND AS NECESSARY.
3. RELOCATED MAILBOX, FINAL LOCATION AS DIRECTED BY PROPERTY OWNER.
4. PROVIDE 4'-0" CLEAR OPENING BETWEEN EDGE OF ROCKERY AND STRUCTURE. GRADE OPENING AT CONSTANT SLOPE TO TRANSITION FROM PROPOSED TO EXISTING GRADES.

Call 48 Hours Before You Dig
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UNDERGROUND SERVICE

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TYLER JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

FINISHED SITE AND RESTORATION PLAN

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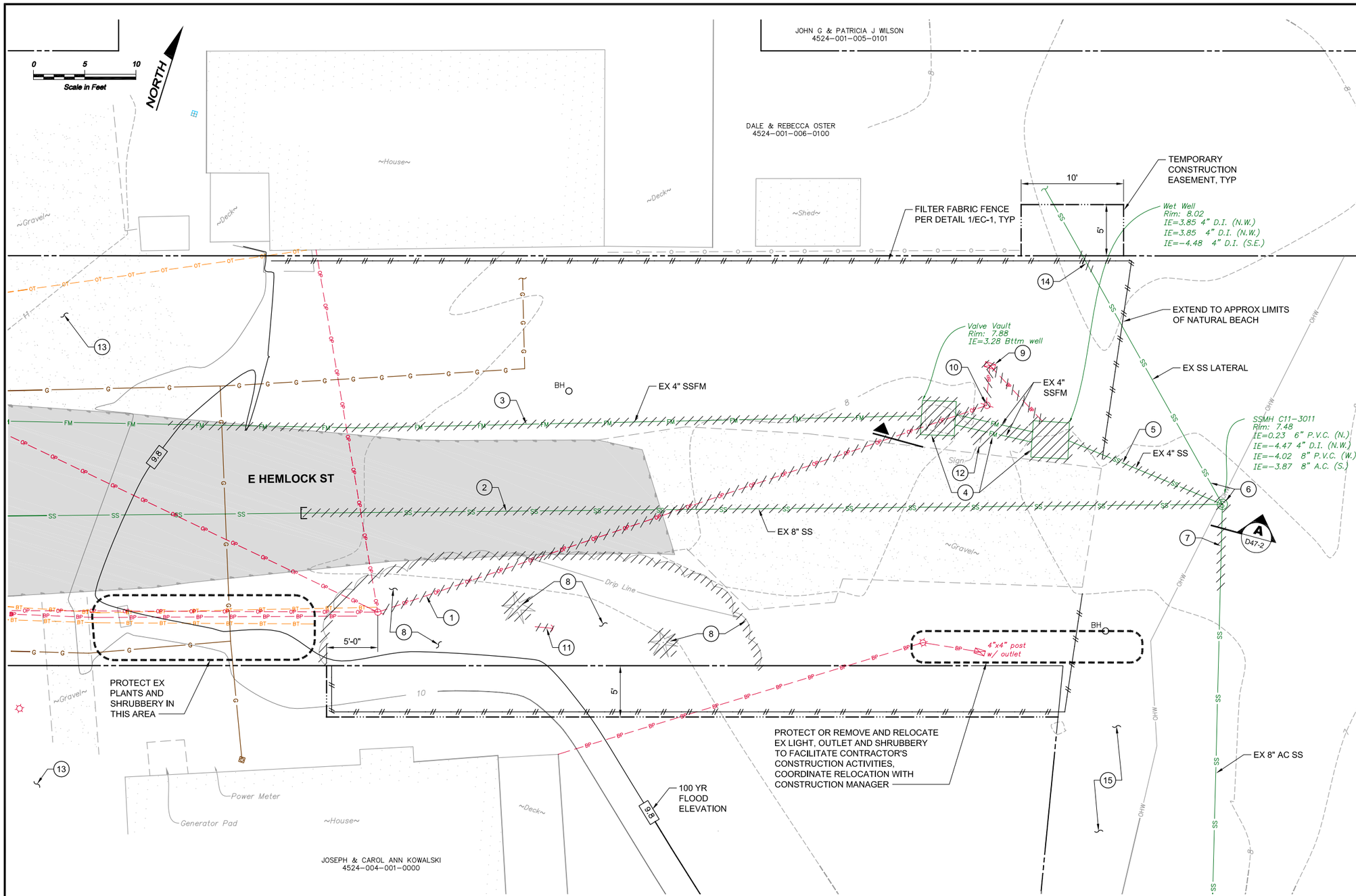

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1. DEMOLITION OF EXISTING PUMP STATION FACILITIES SHALL OCCUR ONLY AFTER COMMISSIONING (INSTALLATION, TESTING, AND CONFIRMED OPERATION) OF THE NEW PUMP STATION, UNLESS OTHERWISE APPROVED BY THE COUNTY.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. SEE SPEC SECTION 02 41 00 FOR ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS.
4. PROTECT ALL EXISTING UTILITIES, STRUCTURES, FACILITIES, TREES, ETC. UNLESS SPECIFICALLY INDICATED TO BE REMOVED.
5. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
6. SEE RESTORATION DWGS FOR REMOVAL OF EXISTING ASPHALT AND GROUND.
7. ADJUST/REMOVE/REINSTALL FILTER FABRIC FENCE AS NECESSARY TO CONSTRUCT IMPROVEMENTS.

CONSTRUCTION NOTES:

1. RELOCATE OVERHEAD POWER SERVICE PER ELECT DWGS AND REMOVE EXISTING PUMP STATION POWER SERVICE. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY SERVICE.
2. PLUG AND ABANDON EXISTING SEWER, REMOVE AS REQUIRED. SEE DWG C47-1 FOR LIMITS OF NEW IMPROVEMENTS.
3. REMOVE EXISTING FORCE MAIN. SEE DWG C47-1 FOR LIMITS OF NEW IMPROVEMENTS.
4. DECOMMISSION AND REMOVE MECH, ELECT, AND MISC EQUIPMENT FROM EXISTING PUMP STATION WET WELL AND VALVE VAULT. REMOVE DISCHARGE PIPING BETWEEN STRUCTURES. SEE DWG D47-2 FOR ADDITIONAL DEMOLITION DETAILS.
5. PLUG AND ABANDON EXISTING SEWER.
6. MAINTAIN SERVICE OF EXISTING SEWER LATERAL DURING AND AFTER CONSTRUCTION. SEE DWG D47-2 FOR ADDITIONAL DEMOLITION DETAILS. SEE NEW BEACH MANHOLE LOCATION ON DWG C47-1 FOR EXISTING SEWER LATERAL RECONNECTION.
7. REMOVE AS REQUIRED AND CONNECT TO NEW SSMH. MAINTAIN SERVICE DURING CONSTRUCTION, SEE NEW BEACH MANHOLE LOCATION ON DWG C47-1.
8. CAREFULLY REMOVE BOXWOOD SHRUB SCREEN, WRAP IN BURLAP AND DELIVER TO ADJACENT PROPERTY OWNER (KOWALSKI) FOR REPLANTING. REMOVE TREE AND REMAINING HEAVY SHRUBBERY FOR CONSTRUCTION OF NEW IMPROVEMENTS.
9. REMOVE ELECT EQUIP.
10. REMOVE EXISTING POWER POLE.
11. REMOVE AND REPLACE OR RELOCATE POWER POLE GUY WIRE. COORD W/ UTILITY PROVIDER.
12. REMOVE AND REINSTALL SIGN IN LOCATION DIRECTED BY COUNTY.
13. MAINTAIN DRIVEABLE ACCESS TO PROPERTIES DURING CONSTRUCTION. NOTIFY HOMEOWNERS ONE DAY IN ADVANCE OF ANY CONSTRUCTION ACTIVITY REQUIRING BLOCKAGES OF 30 MINUTES OR MORE. BLOCKAGES SHALL LAST NO LONGER THAN 4 HOURS UNLESS PRIOR APPROVAL IS GIVEN BY THE HOMEOWNER.
14. REMOVE EXISTING SEWER LATERAL TO INSTALL CLEANOUT, SEE C47-1 FOR LOCATION.
15. REMOVE CREOSOTE TREATED DRIFT LOGS AND STYROFOAM AS DIRECTED BY THE CONSTRUCTION MANAGER.

Call 48 Hours Before You Dig
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UNDERGROUND SERVICE

SURVEY CONTROL

BENCH MARK #5 LOCATED AT NW CORNER OF INTERSECTION OF NUBLING AVE E AND E HEMLOCK ST
EL 21.86
MAG NAIL
DATUM=NGVD 1929
N=206551.84
E=1218047.88

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	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Scale: 1" = 5'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

EXISTING PUMP STATION SITE, TESC AND DEMOLITION PLAN

Drawing: D47-1
Sheet: 57 of 73
File: P15-10341_D47-1
Date: August 2016

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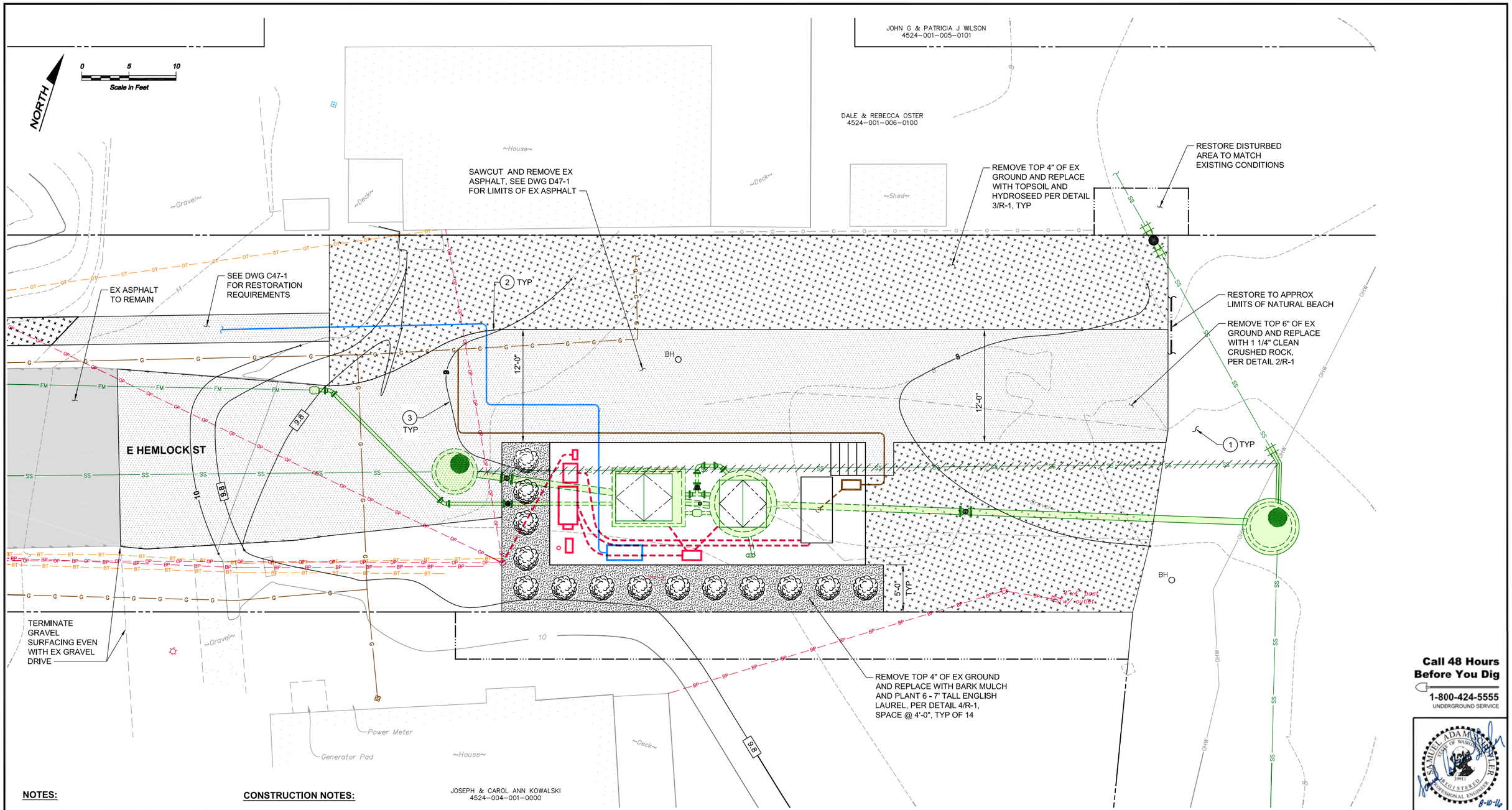
Path: S:\Cad\Kitsap County\15-10341 PS 45 46 47 BL Design\d Filename: P15-10341_D47-1 Plot date: Aug 11, 2016-08:52:09am CAD User: psimon.
Xref Filename: | X15-10341_TB | Whitehouse | Schuyler_Adam | Dahl | Gibson | X15-10341_PS47-Prop | Schuyler_Erika | X15-10341_45-46-47-Topo | X15-10341_45-46-47-Esmts |



NOTES:

1. ALL NECESSARY RESTORATION MAY NOT BE IDENTIFIED ON THE DRAWINGS. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO PRE-CONSTRUCTION CONDITIONS OR BETTER.

CONSTRUCTION NOTES:

1. RESTORE BEACH WITH NATIVE MATERIALS TO MATCH EXISTING. MATCH EXISTING CONTOURS.
2. TRANSITION WITH GRADUAL CURVE.
3. GRADE TO DIRECT DRAINAGE FROM E HEMLOCK ST AWAY FROM PUMP STATION AND DOWN 12' GRAVEL DRIVE.

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
	BUILDING PERMIT SUBMITTAL	04-2016	TJW	RAD
	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Kitsap County Public Works
614 Division Street, MS 26
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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

FINISHED SITE AND RESTORATION PLAN

Drawing: R47-1
Sheet: 64 of 73
File: P15-10341_R47-1
Date: August 2016

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Path: S:\Cad\Kitsap County\15-10341 PS 45 46 47 BL Design\d Filename: P15-10341_R47-1 Plot date: Aug 12, 2016-10:13:12am CAD User: psimon.
Xref Filename: | X15-10341_TB | Whitehouse | Schuyler_Adam | Dahl | Gibson | X15-10341_PS47-Prop | Schuyler_Erika | X15-10341_45-46-47-Topo | X15-10341_45-46-47-Esmts | X15-10341_PS47-Restr |

Appendix B – Construction BMPs

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BMP C101: Preserving Natural Vegetation

Purpose

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

Conditions of Use

Natural vegetation should be preserved on steep slopes, near perennial and intermittent watercourses or swales, and on building sites in wooded areas.

- As required by local governments.
- Phase construction to preserve natural vegetation on the project site for as long as possible during the construction period.

Design and Installation Specifications

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

  Plants need protection from three kinds of injuries:

- *Construction Equipment* - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- *Grade Changes* - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can typically tolerate fill of 6 inches or less. For shrubs and other plants, the fill should be less.

  When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. A tile system protects a tree from a raised grade. The tile system should be

laid out on the original grade leading from a dry well around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

Lowering the natural ground level can seriously damage trees and shrubs. The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant.

- *Excavations* - Protect trees and other plants when excavating for drainfields, power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed:

  Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint if roots will be exposed for more than 24-hours.

  Backfill the trench as soon as possible.

  Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots.

Some problems that can be encountered with a few specific trees are:

- Maple, Dogwood, Red alder, Western hemlock, Western red cedar, and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees.
- The windthrow hazard of Pacific silver fir and madrona is high, while that of Western hemlock is moderate. The danger of windthrow increases where dense stands have been thinned. Other species (unless they are on shallow, wet soils less than 20 inches deep) have a low windthrow hazard.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not.
- Thinning operations in pure or mixed stands of Grand fir, Pacific silver fir, Noble fir, Sitka spruce, Western red cedar, Western hemlock, Pacific dogwood, and Red alder can cause serious disease problems. Disease can become established through damaged limbs, trunks, roots,

BMP C103: High Visibility Fence

Purpose

Fencing is intended to:

1. Restrict clearing to approved limits.
2. Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
3. Limit construction traffic to designated construction entrances, exits, or internal roads.
4. Protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use

To establish clearing limits plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

Design and Installation Specifications

High visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high visibility orange. The fence tensile strength shall be 360 lbs./ft. using the ASTM D4595 testing method.

If appropriate install fabric silt fence in accordance with BMP C233 to act as high visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirements of this BMP.

Metal fences shall be designed and installed according to the manufacturer's specifications.

Metal fences shall be at least 3 feet high and must be highly visible.

Fences shall not be wired or stapled to trees.

Maintenance Standards

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

BMP C105: Stabilized Construction Entrance / Exit

Purpose

Stabilized Construction entrances are established to reduce the amount of sediment transported onto paved roads by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for construction sites.

Conditions of Use

Construction entrances shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential construction provide stabilized construction entrances for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size/configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized entrances not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation Specifications

See Figure 4.1.1 for details. Note: the 100' minimum length of the entrance shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction entrances with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction entrance stabilization because these products raise pH levels in stormwater and concrete discharge to surface waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the following standards:

Grab Tensile Strength (ASTM D4751)	200 psi min.
Grab Tensile Elongation (ASTM D4632)	30% max.
Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
AOS (ASTM D4751)	20-45 (U.S. standard sieve size)

- Consider early installation of the first lift of asphalt in areas that will paved; this can be used as a stabilized entrance. Also consider the installation of excess concrete as a stabilized entrance. During large concrete pours, excess concrete is often available for this purpose.

- Fencing (see BMP C103) shall be installed as necessary to restrict traffic to the construction entrance.
- Whenever possible, the entrance shall be constructed on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance.
- Construction entrances should avoid crossing existing sidewalks and back of walk drains if at all possible. If a construction entrance must cross a sidewalk or back of walk drain, the full length of the sidewalk and back of walk drain must be covered and protected from sediment leaving the site.

Maintenance Standards

Quarry spalls shall be added if the pad is no longer in accordance with the specifications.

- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMP C103) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

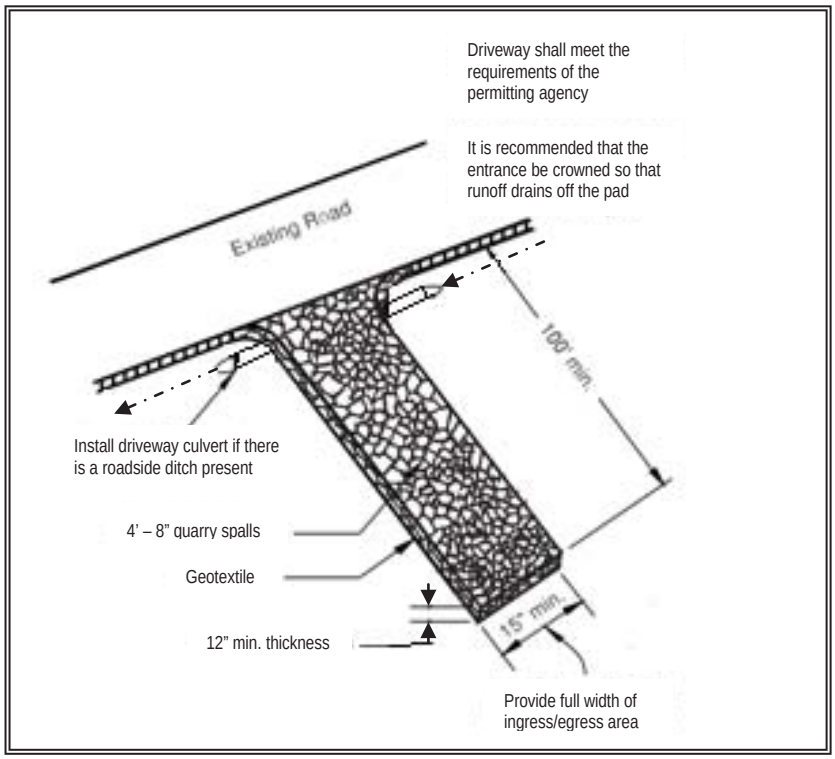


Figure 4.1.1 – Stabilized Construction Entrance

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C105. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C106: Wheel Wash

Purpose

Wheel washes reduce the amount of sediment transported onto paved roads by motor vehicles.

Conditions of Use

When a stabilized construction entrance (see BMP C105) is not preventing sediment from being tracked onto pavement.

- Wheel washing is generally an effective BMP when installed with careful attention to topography. For example, a wheel wash can be detrimental if installed at the top of a slope abutting a right-of-way where the water from the dripping truck can run unimpeded into the street.

BMP C107: Construction Road/Parking Area Stabilization

Purpose

Stabilizing subdivision roads, parking areas, and other on-site vehicle transportation routes immediately after grading reduces erosion caused by construction traffic or runoff.

Conditions of Use

Roads or parking areas shall be stabilized wherever they are constructed, whether permanent or temporary, for use by construction traffic.

- High Visibility Fencing (see BMP C103) shall be installed, if necessary, to limit the access of vehicles to only those roads and parking areas that are stabilized.

Design and Installation Specifications

- On areas that will receive asphalt as part of the project, install the first lift as soon as possible.
- A 6-inch depth of 2- to 4-inch crushed rock, gravel base, or crushed surfacing base course shall be applied immediately after grading or utility installation. A 4-inch course of asphalt treated base (ATB) may also be used, or the road/parking area may be paved. It may also be possible to use cement or calcium chloride for soil stabilization. If cement or cement kiln dust is used for roadbase stabilization, pH monitoring and BMPs (BMPs C252 and C253) are necessary to evaluate and minimize the effects on stormwater. If the area will not be used for permanent roads, parking areas, or structures, a 6-inch depth of hog fuel may also be used, but this is likely to require more maintenance. Whenever possible, construction roads and parking areas shall be placed on a firm, compacted subgrade.
- Temporary road gradients shall not exceed 15 percent. Roadways shall be carefully graded to drain. Drainage ditches shall be provided on each side of the roadway in the case of a crowned section, or on one side in the case of a super-elevated section. Drainage ditches shall be directed to a sediment control BMP.
- Rather than relying on ditches, it may also be possible to grade the road so that runoff sheet-flows into a heavily vegetated area with a well-developed topsoil. Landscaped areas are not adequate. If this area has at least 50 feet of vegetation that water can flow through, then it is generally preferable to use the vegetation to treat runoff, rather than a sediment pond or trap. The 50 feet shall not include wetlands or their buffers. If runoff is allowed to sheetflow through adjacent vegetated areas, it is vital to design the roadways and parking areas so that no concentrated runoff is created.
- Storm drain inlets shall be protected to prevent sediment-laden water entering the storm drain system (see BMP C220).

Maintenance Standards

Inspect stabilized areas regularly, especially after large storm events.

Crushed rock, gravel base, etc. shall be added as required to maintain a

stable driving surface and to stabilize any areas that have eroded.

Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

Perform street cleaning at the end of each day or more often if necessary.

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

Conditions of Use

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch with straw or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

- Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching for specifications.
- Seed and mulch, all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions or geotextiles) which will prevent erosion.

Design and Installation Specifications

Seed retention/detention ponds as required.

Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed before water flow; install sod in the channel bottom—over hydromulch and erosion control blankets.

Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.

- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
  - BFM and MBFMs do not require surface preparation.
  - Helicopters can assist in installing BFM and MBFMs in remote areas.
  - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
  - Installing BFM and MBFMs can save at least $1,000 per acre compared to blankets.

Maintenance Standards

Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, or nets/blankets. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the local authority when sensitive areas would otherwise be protected.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C120. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C121: Mulching

Purpose

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There is an enormous variety of mulches that can be used. This section discusses only the most common types of mulch.

Conditions of Use

As a temporary cover measure, mulch should be used:

- For less than 30 days on disturbed areas that require cover.
- At all times for seeded areas, especially during the wet season and

during the hot summer months.

- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

- For seeded areas mulch may be made up of 100 percent: cottonseed meal; fibers made of wood, recycled cellulose, hemp, kenaf; compost; or blends of these. Tackifier shall be plant-based, such as guar or alpha plantago, or chemical-based such as polyacrylamide or polymers. Any mulch or tackifier product used shall be installed per manufacturer's instructions. Generally, mulches come in 40-50 pound bags. Seed and fertilizer are added at time of application.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see Table 4.1.8. Always use a 2-inch minimum mulch thickness; increase the thickness until the ground is 95% covered (i.e. not visible under the mulch layer). Note: Thickness may be increased for disturbed areas in or near sensitive areas or other areas highly susceptible to erosion.

Mulch used within the ordinary high-water mark of surface waters should be selected to minimize potential flotation of organic matter. Composted organic materials have higher specific gravities (densities) than straw, wood, or chipped material. Consult Hydraulic Permit Authority (HPA) for mulch mixes if applicable.

Maintenance Standards

- The thickness of the cover must be maintained.
- Any areas that experience erosion shall be remulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

Table 4.1.8
Mulch Standards and Guidelines

Mulch Material	Quality Standards	Application Rates	Remarks
Straw	Air-dried; free from undesirable seed and coarse material.	2"-3" thick; 5 bales per 1,000 sf or 2-3 tons per acre	Cost-effective protection when applied with adequate thickness. Hand-application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. In windy areas straw must be held in place by crimping, using a tackifier, or covering with netting. Blown straw always has to be held in place with a tackifier as even light winds will blow it away. Straw, however, has several deficiencies that should be considered when selecting mulch materials. It often introduces and/or encourages the propagation of weed species and it has no significant long-term benefits. It should also not be used within the ordinary high-water elevation of surface waters (due to flotation).
Hydromulch	No growth inhibiting factors.	Approx. 25-30 lbs per 1,000 sf or 1,500 - 2,000 lbs per acre	Shall be applied with hydromulcher. Shall not be used without seed and tackifier unless the application rate is at least doubled. Fibers longer than about ¾-1 inch clog hydromulch equipment. Fibers should be kept to less than ¾ inch.
Composted Mulch and Compost	No visible water or dust during handling. Must be produced in accordance with WAC 173-350, Solid Waste Handling Standards. .	2" thick min.; approx. 100 tons per acre (approx. 800 lbs per yard)	More effective control can be obtained by increasing thickness to 3". Excellent mulch for protecting final grades until landscaping because it can be directly seeded or tilled into soil as an amendment. Composted mulch has a coarser size gradation than compost. It is more stable and practical to use in wet areas and during rainy weather conditions. Do not use composted mulch near wetlands or near phosphorous impaired water bodies.
Chipped Site Vegetation	Average size shall be several inches. Gradations from fines to 6 inches in length for texture, variation, and interlocking properties.	2" thick min.;	This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by runoff. It is not recommended within 200 feet of surface waters. If seeding is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment.
Wood-based Mulch or Wood Straw	No visible water or dust during handling. Must be purchased from a supplier with a Solid Waste Handling Permit or one exempt from solid waste regulations.	2" thick min.; approx. 100 tons per acre (approx. 800 lbs. per cubic yard)	This material is often called "hog or hogged fuel." The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).
Wood Strand Mulch	A blend of loose, long, thin wood pieces derived from native conifer or deciduous trees with high length-to-width ratio.	2" thick min.	Cost-effective protection when applied with adequate thickness. A minimum of 95-percent of the wood strand shall have lengths between 2 and 10-inches, with a width and thickness between 1/16 and ⅜-inches. The mulch shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or wood shavings shall not be used as mulch. (WSDOT specification (9-14.4(4))

BMP C123: Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.

- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. Note: The relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for long-term (greater than six months) applications.
- Due to rapid runoff caused by plastic covering, do not use this method upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- Plastic sheeting may result in increased runoff volumes and velocities, requiring additional on-site measures to counteract the increases. Creating a trough with wattles or other material can convey clean water away from these areas.
- To prevent undercutting, trench and backfill rolled plastic covering products.
- While plastic is inexpensive to purchase, the added cost of installation, maintenance, removal, and disposal make this an expensive material, up to $1.50-2.00 per square yard.
- Whenever plastic is used to protect slopes install water collection measures at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to covey clean rainwater away from bare soil and disturbed areas. Do not mix clean runoff from a plastic covered slope with dirty runoff from a project.
- Other uses for plastic include:
  1. Temporary ditch liner.
  2. Pond liner in temporary sediment pond.
  3. Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored.
  4. Emergency slope protection during heavy rains.
  5. Temporary drainpipe (“elephant trunk”) used to direct water.

Design and Installation Specifications

- Plastic slope cover must be installed as follows:
  1. Run plastic up and down slope, not across slope.
  2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet.
  3. Minimum of 8-inch overlap at seams.

4. On long or wide slopes, or slopes subject to wind, tape all seams.
5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath.
6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and tie them together with twine to hold them in place.
7. Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil which causes extreme erosion.
8. Sandbags may be lowered into place tied to ropes. However, all sandbags must be staked in place.

- Plastic sheeting shall have a minimum thickness of 0.06 millimeters.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

Maintenance Standards

- Torn sheets must be replaced and open seams repaired.
- Completely remove and replace the plastic if it begins to deteriorate due to ultraviolet radiation.
- Completely remove plastic when no longer needed.
- Dispose of old tires used to weight down plastic sheeting appropriately.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C123. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C124: Sodding

Purpose

The purpose of sodding is to establish permanent turf for immediate erosion protection and to stabilize drainage ways where concentrated overland flow will occur.

Conditions of Use

Sodding may be used in the following areas:

- Disturbed areas that require short-term or long-term cover.
- Disturbed areas that require immediate vegetative cover.
- All waterways that require vegetative lining. Waterways may also be seeded rather than sodded, and protected with a net or blanket.

- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use of paved roadways by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.
- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.

Maintenance Standards

Respray area as necessary to keep dust to a minimum.

BMP C150: Materials on Hand

Purpose

Keep quantities of erosion prevention and sediment control materials on the project site at all times to be used for regular maintenance and emergency situations such as unexpected heavy summer rains. Having these materials on-site reduces the time needed to implement BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

Conditions of Use

- Construction projects of any size or type can benefit from having materials on hand. A small commercial development project could have a roll of plastic and some gravel available for immediate protection of bare soil and temporary berm construction. A large earthwork project, such as highway construction, might have several tons of straw, several rolls of plastic, flexible pipe, sandbags, geotextile fabric and steel “T” posts.
- Materials are stockpiled and readily available before any site clearing, grubbing, or earthwork begins. A large contractor or developer could keep a stockpile of materials that are available for use on several projects.
- If storage space at the project site is at a premium, the contractor could maintain the materials at their office or yard. The office or yard must be less than an hour from the project site.

Design and Installation Specifications

Depending on project type, size, complexity, and length, materials and quantities will vary. A good minimum list of items that will cover numerous situations includes:

Material
Clear Plastic, 6 mil
Drainpipe, 6 or 8 inch diameter
Sandbags, filled
Straw Bales for mulching,
Quarry Spalls
Washed Gravel
Geotextile Fabric
Catch Basin Inserts
Steel "T" Posts
Silt fence material
Straw Wattles

Maintenance Standards

- All materials with the exception of the quarry spalls, steel "T" posts, and gravel should be kept covered and out of both sun and rain.
- Re-stock materials used as needed.

BMP C151: Concrete Handling

Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the state.

Conditions of Use

Any time concrete is used, utilize these management practices. Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Design and Installation

- Wash out concrete truck chutes, pumps, and internals into formed areas only. Assure that washout of concrete trucks is performed off-

BMP C160: Certified Erosion and Sediment Control Lead

Purpose

The project proponent designates at least one person as the responsible representative in charge of erosion and sediment control (ESC), and water quality protection. The designated person shall be the Certified Erosion and Sediment Control Lead (CESCL) who is responsible for ensuring compliance with all local, state, and federal erosion and sediment control and water quality requirements.

Conditions of Use

A CESCL shall be made available on projects one acre or larger that discharge stormwater to surface waters of the state. Sites less than one acre may have a person without CESCL certification conduct inspections; sampling is not required on sites that disturb less than an acre.

- The CESCL shall:
  - Have a current certificate proving attendance in an erosion and sediment control training course that meets the minimum ESC training and certification requirements established by Ecology (see details below).

    Ecology will maintain a list of ESC training and certification providers at: http://www.ecy.wa.gov/programs/wq/stormwater/cescl.html

    OR

  - Be a Certified Professional in Erosion and Sediment Control (CPESC); for additional information go to: www.cpesc.net

Specifications

- Certification shall remain valid for three years.
- The CESCL shall have authority to act on behalf of the contractor or developer and shall be available, or on-call, 24 hours per day throughout the period of construction.
- The Construction SWPPP shall include the name, telephone number, fax number, and address of the designated CESCL.
- A CESCL may provide inspection and compliance services for multiple construction projects in the same geographic region.

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

- Maintaining permit file on site at all times which includes the Construction SWPPP and any associated permits and plans.
- Directing BMP installation, inspection, maintenance, modification, and removal.

- Updating all project drawings and the Construction SWPPP with changes made.
- Completing any sampling requirements including reporting results using WebDMR.
- Keeping daily logs, and inspection reports. Inspection reports should include:
  - Inspection date/time.
  - Weather information; general conditions during inspection and approximate amount of precipitation since the last inspection.
  - A summary or list of all BMPs implemented, including observations of all erosion/sediment control structures or practices. The following shall be noted:
    1. Locations of BMPs inspected.
    2. Locations of BMPs that need maintenance.
    3. Locations of BMPs that failed to operate as designed or intended.
    4. Locations of where additional or different BMPs are required.
    - Visual monitoring results, including a description of discharged stormwater. The presence of suspended sediment, turbid water, discoloration, and oil sheen shall be noted, as applicable.
    - Any water quality monitoring performed during inspection.
    - General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.
- Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.

BMP C162: Scheduling

Purpose

Sequencing a construction project reduces the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

Conditions of Use

The construction sequence schedule is an orderly listing of all major land-disturbing activities together with the necessary erosion and sedimentation control measures planned for the project. This type of schedule guides the contractor on work to be done before other work is started so that serious erosion and sedimentation problems can be avoided.

Following a specified work schedule that coordinates the timing of land-disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of surface ground cover leaves a site vulnerable to accelerated

- New pipe outfalls can provide an opportunity for low-cost fish habitat improvements. For example, an alcove of low-velocity water can be created by constructing the pipe outfall and associated energy dissipater back from the stream edge and digging a channel, over-widened to the upstream side, from the outfall. Overwintering juvenile and migrating adult salmonids may use the alcove as shelter during high flows. Bank stabilization, bioengineering, and habitat features may be required for disturbed areas. This work may require a HPA. See Volume V for more information on outfall system design.

Maintenance Standards

- Inspect and repair as needed.
- Add rock as needed to maintain the intended function.
- Clean energy dissipater if sediment builds up.

BMP C220: Storm Drain Inlet Protection

Purpose

Storm drain inlet protection prevents coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use

Use storm drain inlet protection at inlets that are operational before permanent stabilization of the disturbed drainage area. Provide protection for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless conveying runoff entering catch basins to a sediment pond or trap.

Also consider inlet protection for lawn and yard drains on new home construction. These small and numerous drains coupled with lack of gutters in new home construction can add significant amounts of sediment into the roof drain system. If possible delay installing lawn and yard drains until just before landscaping or cap these drains to prevent sediment from entering the system until completion of landscaping. Provide 18-inches of sod around each finished lawn and yard drain.

Table 4.2.2 lists several options for inlet protection. All of the methods for storm drain inlet protection tend to plug and require a high frequency of maintenance. Limit drainage areas to one acre or less. Possibly provide emergency overflows with additional end-of-pipe treatment where stormwater ponding would cause a hazard.

Table 4.2.2 Storm Drain Inlet Protection			
Type of Inlet Protection	**Emergency Overflow**	**Applicable for Paved/ Earthen Surfaces**	**Conditions of Use**
Drop Inlet Protection			
Excavated drop inlet protection	Yes, temporary flooding will occur	Earthen	Applicable for heavy flows. Easy to maintain. Large area Requirement: 30' X 30'/acre
Block and gravel drop inlet protection	Yes	Paved or Earthen	Applicable for heavy concentrated flows. Will not pond.
Gravel and wire drop inlet protection	No		Applicable for heavy concentrated flows. Will pond. Can withstand traffic.
Catch basin filters	Yes	Paved or Earthen	Frequent maintenance required.
Curb Inlet Protection			
Curb inlet protection with a wooden weir	Small capacity overflow	Paved	Used for sturdy, more compact installation.
Block and gravel curb inlet protection	Yes	Paved	Sturdy, but limited filtration.
Culvert Inlet Protection			
Culvert inlet sediment trap			18 month expected life.

Design and Installation Specifications

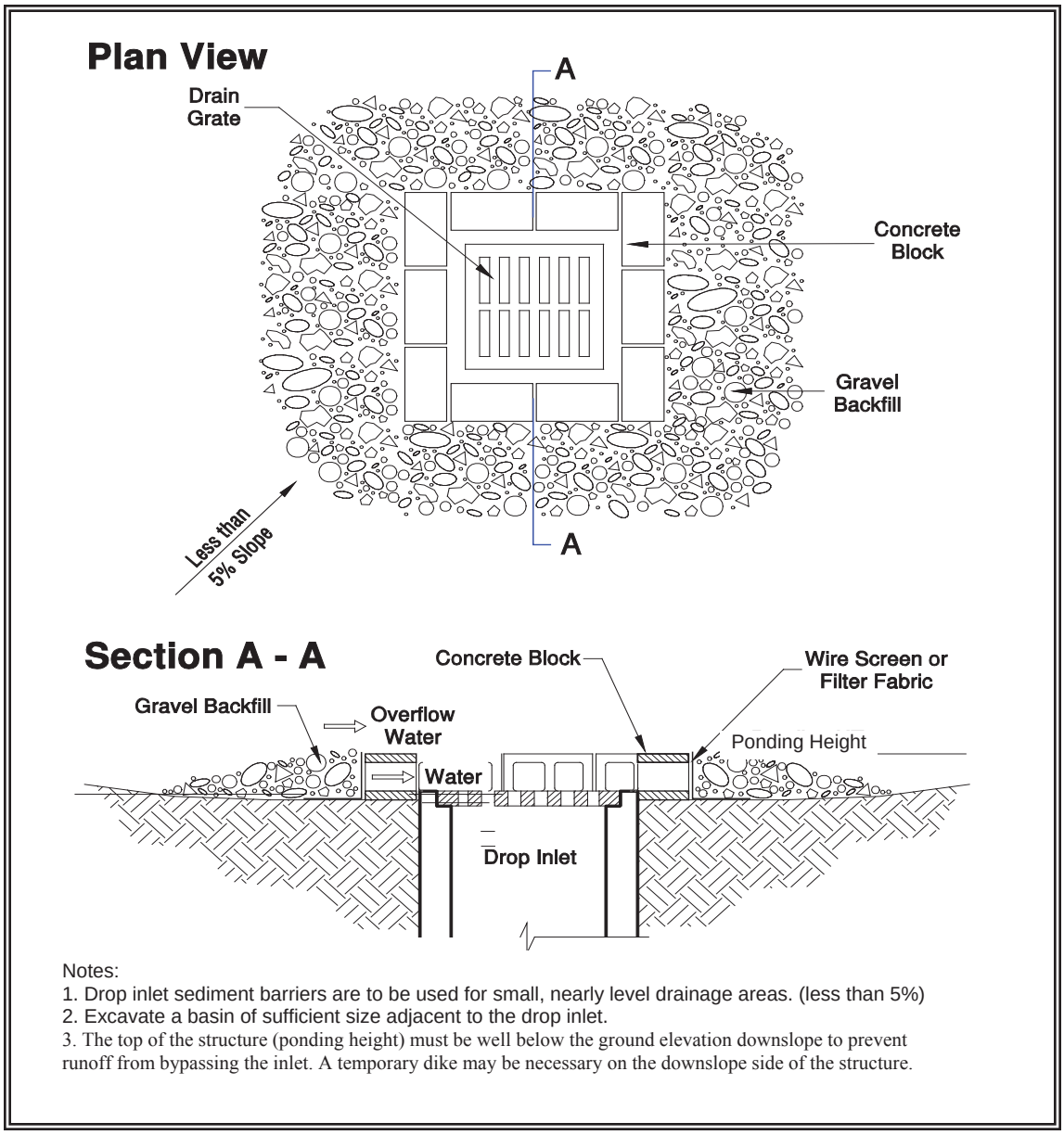
Excavated Drop Inlet Protection - An excavated impoundment around the storm drain. Sediment settles out of the stormwater prior to entering the storm drain.

- Provide a depth of 1-2 ft as measured from the crest of the inlet structure.
- Slope sides of excavation no steeper than 2H:1V.
- Minimum volume of excavation 35 cubic yards.
- Shape basin to fit site with longest dimension oriented toward the longest inflow area.
- Install provisions for draining to prevent standing water problems.
- Clear the area of all debris.
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.

- Build a temporary dike, if necessary, to the down slope side of the structure to prevent bypass flow.

Block and Gravel Filter - A barrier formed around the storm drain inlet with standard concrete blocks and gravel. See Figure 4.2.8.

- Provide a height of 1 to 2 feet above inlet.
- Recess the first row 2-inches into the ground for stability.
- Support subsequent courses by placing a 2x4 through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel donut.
- Provide an inlet slope of 3H:1V.
- Provide an outlet slope of 2H:1V.
- Provide a1-foot wide level stone area between the structure and the inlet.
- Use inlet slope stones 3 inches in diameter or larger.
- Use gravel ½- to ¾-inch at a minimum thickness of 1-foot for the outlet slope.



Notes:
1. Drop inlet sediment barriers are to be used for small, nearly level drainage areas. (less than 5%)
2. Excavate a basin of sufficient size adjacent to the drop inlet.
3. The top of the structure (ponding height) must be well below the ground elevation downslope to prevent runoff from bypassing the inlet. A temporary dike may be necessary on the downslope side of the structure.

Figure 4.2.8 – Block and Gravel Filter

Gravel and Wire Mesh Filter - A gravel barrier placed over the top of the inlet. This structure does not provide an overflow.

- Use a hardware cloth or comparable wire mesh with ½-inch openings.
- Use coarse aggregate.
- Provide a height 1-foot or more, 18-inches wider than inlet on all sides.
- Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
- Overlap the strips if more than one strip of mesh is necessary.

- Place coarse aggregate over the wire mesh.
- Provide at least a 12-inch depth of gravel over the entire inlet opening and extend at least 18-inches on all sides.

Catchbasin Filters – Use inserts designed by manufacturers for construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. To reduce maintenance requirements combine a catchbasin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way.

- Provides 5 cubic feet of storage.
- Requires dewatering provisions.
- Provides a high-flow bypass that will not clog under normal use at a construction site.
- Insert the catchbasin filter in the catchbasin just below the grating.

Curb Inlet Protection with Wooden Weir – Barrier formed around a curb inlet with a wooden frame and gravel.

- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against wire/fabric.
- Place weight on frame anchors.

Block and Gravel Curb Inlet Protection – Barrier formed around a curb inlet with concrete blocks and gravel. See Figure 4.2.9.

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

Curb and Gutter Sediment Barrier – Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure 4.2.10.

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the outside of the berm sized to sediment trap standards for protecting a culvert inlet.

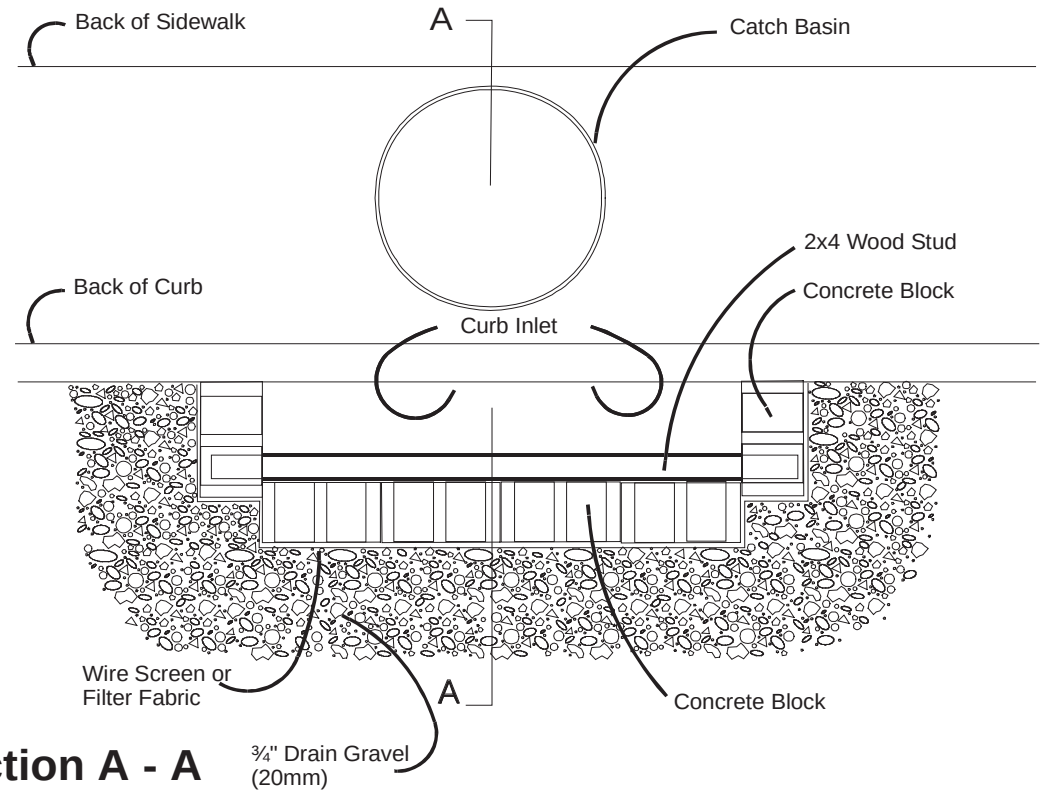
Maintenance Standards

- Inspect catch basin filters frequently, especially after storm events. Clean and replace clogged inserts. For systems with clogged stone filters: pull away the stones from the inlet and clean or replace. An alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.
- Do not wash sediment into storm drains while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C220. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

Plan View



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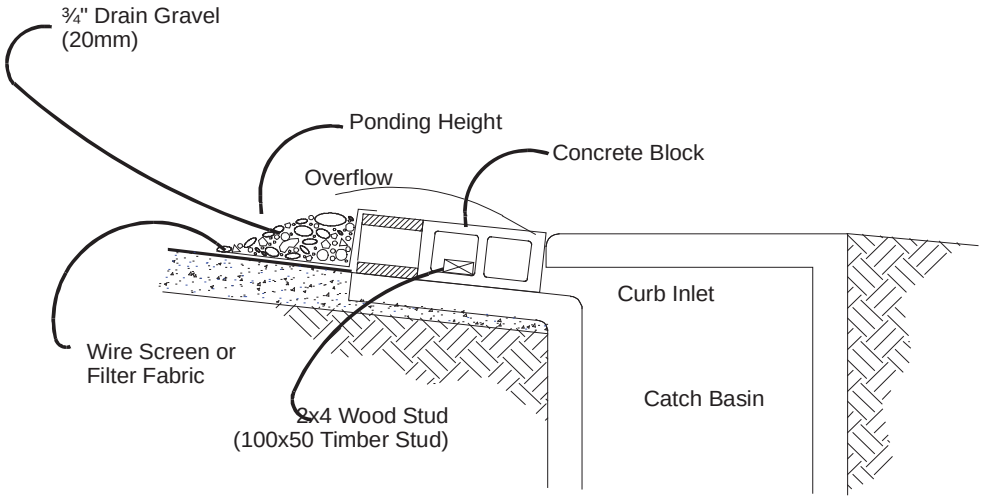
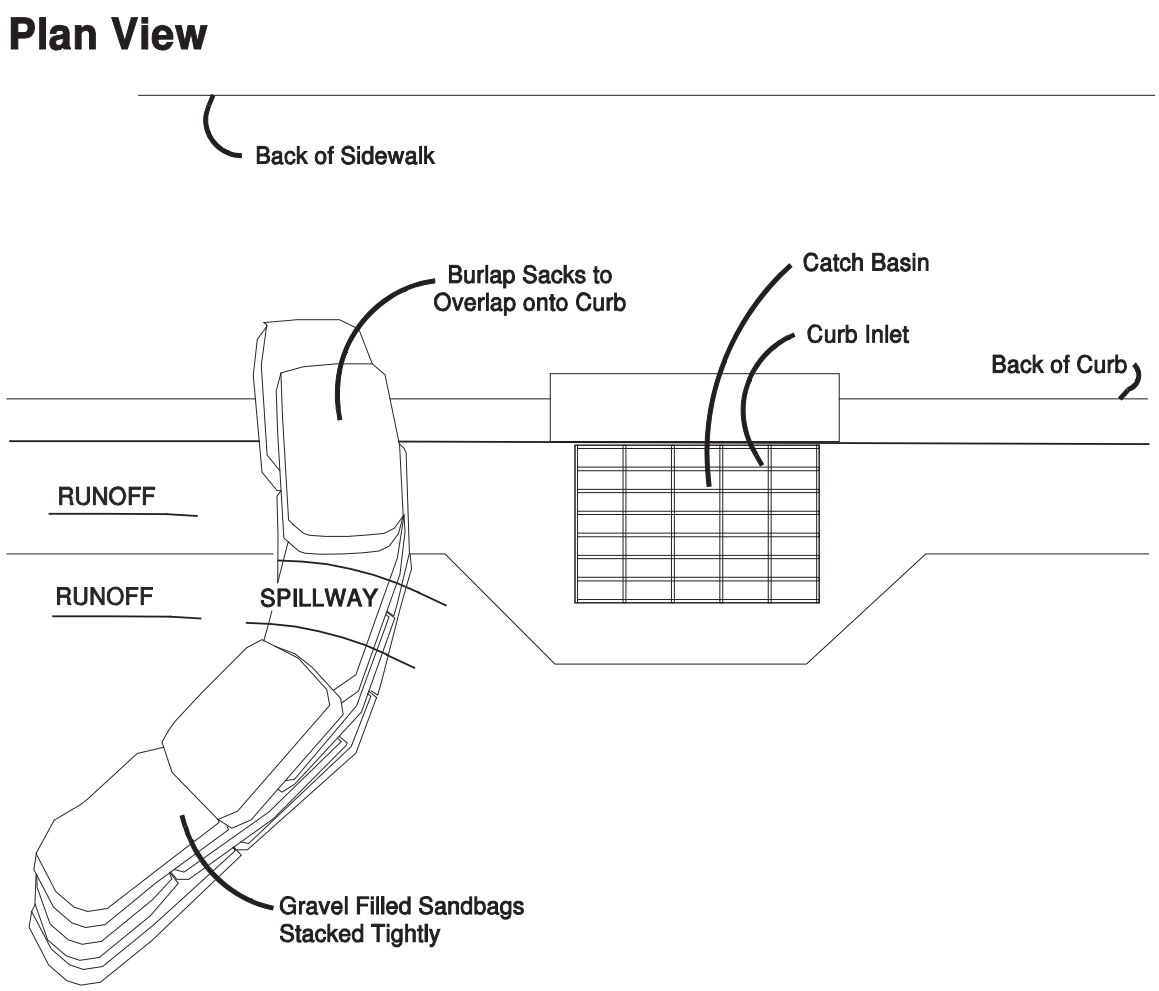


NOTES:
1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

Figure 4.2.9 – Block and Gravel Curb Inlet Protection



NOTES:
1. Place curb type sediment barriers on gently sloping street segments, where water can pond and allow sediment to separate from runoff.
2. Sandbags of either burlap or woven `geotextile' fabric, are filled with gravel, layered and packed tightly.
3. Leave a one sandbag gap in the top row to provide a spillway for overflow.
4. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

Figure 4.2.10 – Curb and Gutter Barrier

BMP C232: Gravel Filter Berm

Purpose

A gravel filter berm is constructed on rights-of-way or traffic areas within a construction site to retain sediment by using a filter berm of gravel or crushed rock.

Conditions of Use

Where a temporary measure is needed to retain sediment from rights-of-way or in traffic areas on construction sites.

Design and Installation Specifications

- Berm material shall be ¾ to 3 inches in size, washed well-grade gravel or crushed rock with less than 5 percent fines.
- Spacing of berms:
  - Every 300 feet on slopes less than 5 percent
  - Every 200 feet on slopes between 5 percent and 10 percent
  - Every 100 feet on slopes greater than 10 percent
- Berm dimensions:
  - 1 foot high with 3H:1V side slopes
  - 8 linear feet per 1 cfs runoff based on the 10-year, 24-hour design storm

Maintenance Standards

- Regular inspection is required. Sediment shall be removed and filter material replaced as needed.

BMP C233: Silt Fence

Purpose

Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure 4.2.12 for details on silt fence construction.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment pond.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

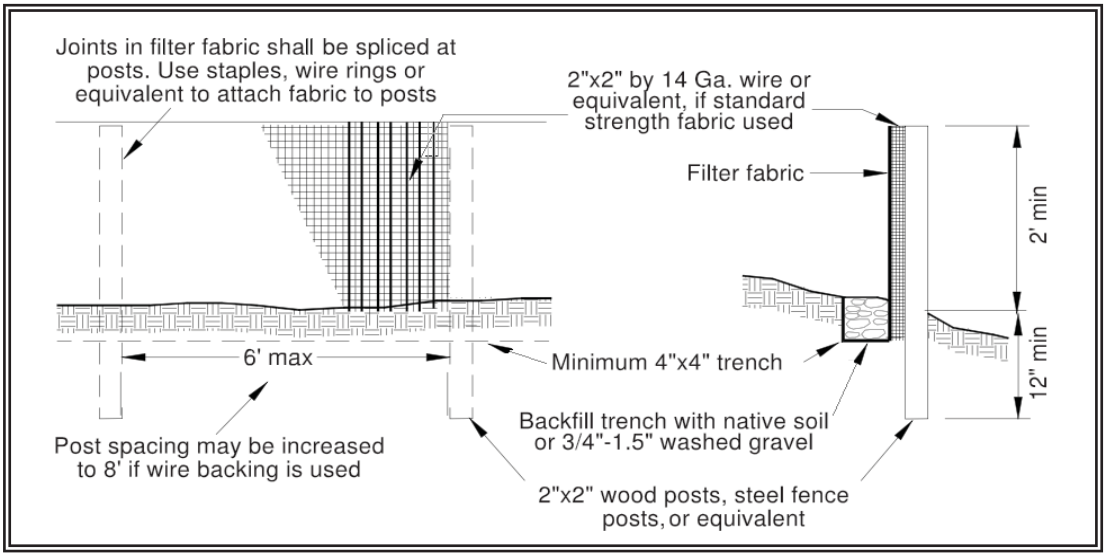


Figure 4.2.12 – Silt Fence

Design and Installation Specifications

- Use in combination with sediment basins or other BMPs.
- Maximum slope steepness (normal (perpendicular) to fence line) 1H:1V.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.2.3):

Table 4.2.3
Geotextile Standards

Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength fabrics with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the

fabric. Silt fence materials are available that have synthetic mesh backing attached.

- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F. to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations.
- Refer to Figure 4.2.12 for standard silt fence details. Include the following standard Notes for silt fence on construction plans and specifications:

  1. The contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
  2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.
  3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
  4. The filter fabric shall be sewn together at the point of manufacture to form filter fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
  5. Attach the filter fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the filter fabric to the posts in a manner that reduces the potential for tearing.
  6. Support the filter fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the filter fabric up-slope of the mesh.
  7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the filter fabric it supports.
  8. Bury the bottom of the filter fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the filter fabric, so that no flow can pass beneath the fence and

scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.

9. Drive or place the fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
10. Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
    - Wood with dimensions of 2-inches by 2-inches wide min. and a 3-feet min. length. Wood posts shall be free of defects such as knots, splits, or gouges.
    - No. 6 steel rebar or larger.
    - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
    - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
    - Other steel posts having equivalent strength and bending resistance to the post sizes listed above.
11. Locate silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
12. If the fence must cross contours, with the exception of the ends of the fence, place gravel check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
    - Gravel check dams shall be approximately 1-foot deep at the back of the fence. Gravel check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
    - Gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Gravel check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to Figure 4.2.13 for slicing method details. Silt fence installation using the slicing method specifications:

1. The base of both end posts must be at least 2- to 4-inches above the top of the filter fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the filter fabric, enabling posts to support the filter fabric from upstream water pressure.
4. Install posts with the nipples facing away from the filter fabric.
5. Attach the filter fabric to each post with three ties, all spaced within the top 8-inches of the filter fabric. Attach each tie diagonally 45 degrees through the filter fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
6. Wrap approximately 6-inches of fabric around the end posts and secure with 3 ties.
7. No more than 24-inches of a 36-inch filter fabric is allowed above ground level.

   Compact the soil immediately next to the filter fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.

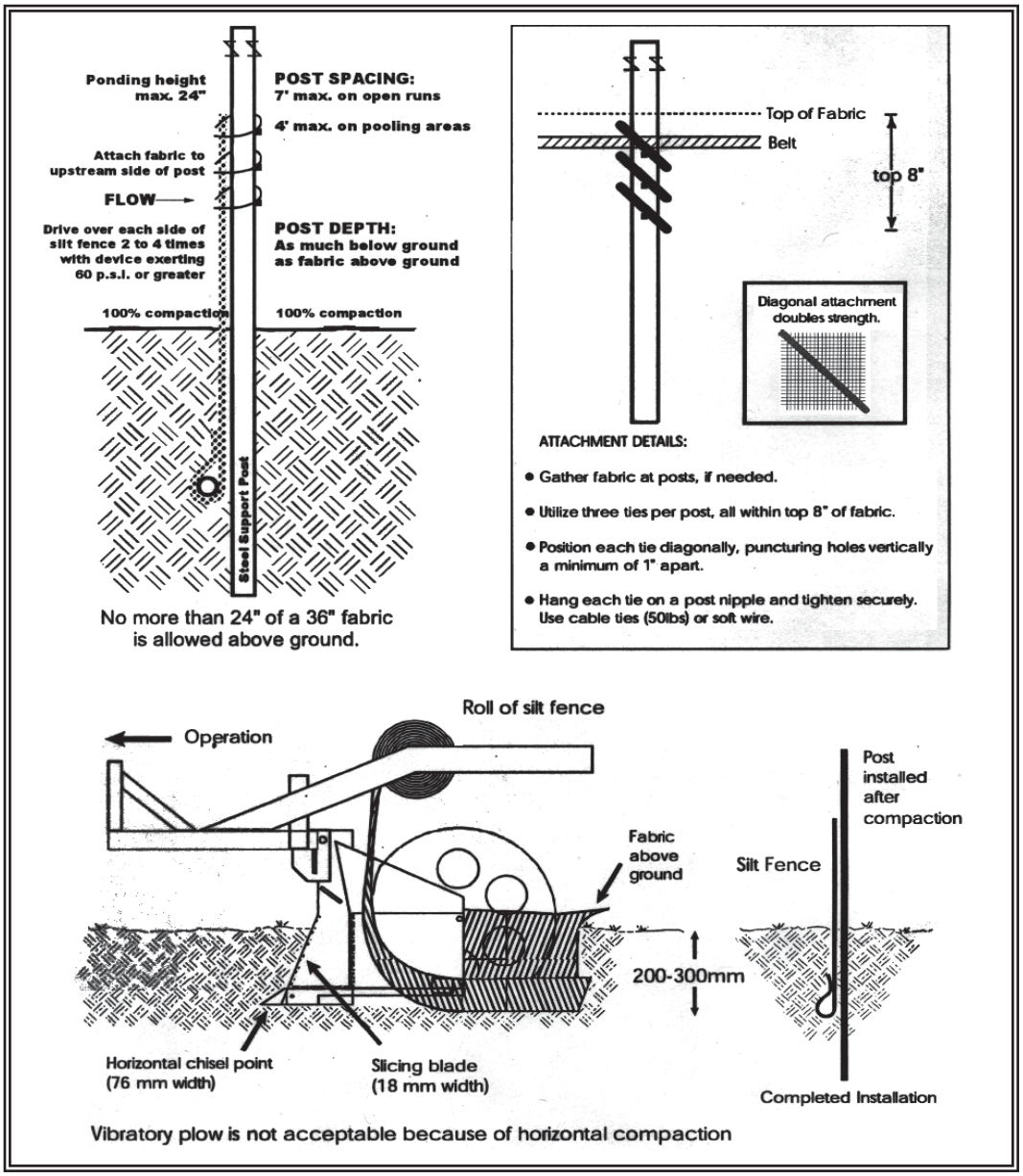


Figure 4.2.13 – Silt Fence Installation by Slicing Method

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.

- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

BMP C234: Vegetated Strip

Purpose

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond. The only circumstance in which overland flow can be treated solely by a strip, rather than by a sediment pond, is when the following criteria are met (see Table 4.2.4):

Table 4.2.4
Contributing Drainage Area for Vegetated Strips

Average Contributing area Slope	Average Contributing area Percent Slope	Max Contributing area Flowpath Length
1.5H:1V or flatter	67% or flatter	100 feet
2H:1V or flatter	50% or flatter	115 feet
4H:1V or flatter	25% or flatter	150 feet
6H:1V or flatter	16.7% or flatter	200 feet
10H:1V or flatter	10% or flatter	250 feet

Design and Installation Specifications

- The vegetated strip shall consist of a minimum of a 25-foot flowpath length continuous strip of dense vegetation with topsoil. Grass-covered, landscaped areas are generally not adequate because the volume of sediment overwhelms the grass. Ideally, vegetated strips shall consist of undisturbed native growth with a well-developed soil that allows for infiltration of runoff.
- The slope within the strip shall not exceed 4H:1V.
- The uphill boundary of the vegetated strip shall be delineated with clearing limits.

Maintenance Standards

- Any areas damaged by erosion or construction activity shall be seeded immediately and protected by mulch.
- If more than 5 feet of the original vegetated strip width has had vegetation removed or is being eroded, sod must be installed.
- If there are indications that concentrated flows are traveling across the buffer, surface water controls must be installed to reduce the flows

entering the buffer, or additional perimeter protection must be installed.

BMP C235: Wattles

Purpose

Wattles are temporary erosion and sediment control barriers consisting of straw, compost, or other material that is wrapped in biodegradable tubular plastic or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment. Wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length. Wattles are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes. See Figure 4.2.14 for typical construction details. WSDOT Standard Plan I-30.30-00 also provides information on Wattles (http://www.wsdot.wa.gov/Design/Standards/Plans.htm#SectionI)

Conditions of Use

- Use wattles:
  - In disturbed areas that require immediate erosion protection.
  - On exposed soils during the period of short construction delays, or over winter months.
  - On slopes requiring stabilization until permanent vegetation can be established.
- The material used dictates the effectiveness period of the wattle. Generally, Wattles are typically effective for one to two seasons.
- Prevent rilling beneath wattles by properly entrenching and abutting wattles together to prevent water from passing between them.

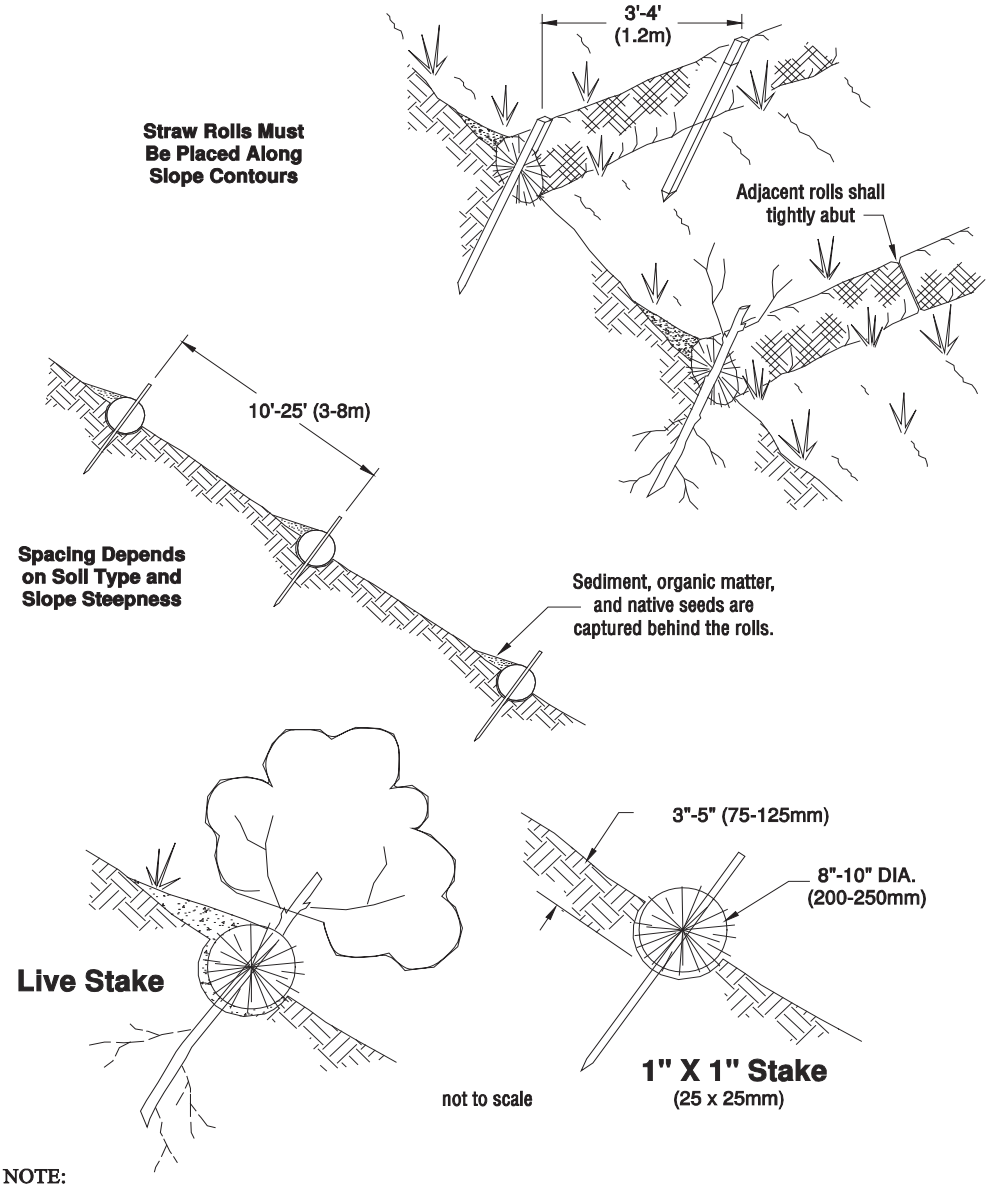
Design Criteria

- Install wattles perpendicular to the flow direction and parallel to the slope contour.
- Narrow trenches should be dug across the slope on contour to a depth of 3- to 5-inches on clay soils and soils with gradual slopes. On loose soils, steep slopes, and areas with high rainfall, the trenches should be dug to a depth of 5- to 7- inches, or 1/2 to 2/3 of the thickness of the wattle.
- Start building trenches and installing wattles from the base of the slope and work up. Spread excavated material evenly along the uphill slope and compacted using hand tamping or other methods.
- Construct trenches at intervals of 10- to 25-feet depending on the steepness of the slope, soil type, and rainfall. The steeper the slope the closer together the trenches.
- Install the wattles snugly into the trenches and abut tightly end to end. Do not overlap the ends.
- Install stakes at each end of the wattle, and at 4-foot centers along entire length of wattle.

- If required, install pilot holes for the stakes using a straight bar to drive holes through the wattle and into the soil.
- Wooden stakes should be approximately 3/4 x 3/4 x 24 inches min. Willow cuttings or 3/8-inch rebar can also be used for stakes.
- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.

Maintenance Standards

- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.



NOTE:
1. Straw roll installation requires the placement and secure staking of the roll in a trench, 3"-5" (75-125mm) deep, dug on contour. runoff must not be allowed to run under or around roll.

Figure 4.2.14 – Wattles

- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C235. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C236: Vegetative Filtration

Purpose

Vegetative Filtration may be used in conjunction with BMP C241 Temporary Sediment Ponds, BMP C206 Level Spreader and a pumping system with surface intake to improve turbidity levels of stormwater discharges by filtering through existing vegetation where undisturbed forest floor duff layer or established lawn with thatch layer are present. Vegetative Filtration can also be used to infiltrate dewatering waste from foundations, vaults, and trenches as long as runoff does not occur.

Conditions of Use

- For every five acre of disturbed soil use one acre of grass field, farm pasture, or wooded area. Reduce or increase this area depending on project size, ground water table height, and other site conditions.
- Wetlands shall not be used for filtration.
- Do not use this BMP in areas with a high ground water table, or in areas that will have a high seasonal ground water table during the use of this BMP.
- This BMP may be less effective on soils that prevent the infiltration of the water, such as hard till.
- Using other effective source control measures throughout a construction site will prevent the generation of additional highly turbid water and may reduce the time period or area need for this BMP.
- Stop distributing water into the vegetated area if standing water or erosion results.

Design Criteria

- Find land adjacent to the project that has a vegetated field, preferably a farm field, or wooded area.
- If the project site does not contain enough vegetated field area consider obtaining permission from adjacent landowners (especially for farm fields).
- Install a pump and downstream distribution manifold depending on the project size. Generally, the main distribution line should reach 100 to 200-feet long (many large projects, or projects on tight soil, will

Appendix C – Alternative BMPs

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The following includes a list of possible alternative BMPs from the 2012 DOE SWMMWW for each of the 12 elements not described in the main SWPPP text. This list can be referenced in the event a BMP for a specific element is not functioning as designed and an alternative BMP needs to be implemented.

Element #1 – Preserve Vegetation/Mark Clearing Limits

- Silt Fence (BMP C233)
- Buffer Zones (BMP C102)

Element #2 - Establish Construction Access

- Wheel Wash (BMP C106)

Element #3 - Control Flow Rates

- Water Bars (BMP C203)
- Check Dams (C207)
- Outlet Protection (C209)
- Sediment Trap (BMP C240)
- Temporary Sediment Pond (BMP C241)

Element #4 - Install Sediment Controls

- Brush Barrier (BMP C231)
- Gravel Filter Berm (BMP C232)
- Vegetated Strip (BMP C234)
- Sediment Trap (BMP C240)
- Temporary Sediment Pond (BMP C241)
- Construction Stormwater Chemical Treatment (BMP C250)
- Construction Stormwater Filtration (BMP C251)

Element #5 - Stabilize Soils

- Temporary and Permanent Seeding (BMP C120)
- Nets and Blankets (BMP C122)
- Sodding (C124)
- Topsoiling/Composting (C125)
- Polyacrylamide for Soil Erosion Protection (BMP C126)
- Surface Roughening (BMP C130)
- Gradient Terraces (BMP C131)
- Dust Control (BMP C140)

Element #6 - Protect Slopes

- Not applicable. Protecting slopes is not necessary for this project.

Element #7 – Protect Drain Inlets

- Alternative BMPs not included in the DOE SWMMWW

Element #8 - Stabilize Channels and Outlets

- Not applicable. No temporary on-site conveyance channels are used for this project.

Element #9 – Control Pollutants

- Alternative BMPs not included in the DOE SWMMWW

Element #10 - Control Dewatering

- Water Bars (BMP C203)
- Vegetative Filtration (BMP C236)

Element #11 – Maintain BMPs

- No alternative BMPs provided

Element #12 – Manage the Project

- No alternative BMPs provided

Element # 13– Protect Low Impact Development BMPs

- No alternative BMPs provided.

Appendix D – General Permit

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2013 Stormwater Management Program (SWMP) for National Pollutant Discharge Elimination System (NPDES) Permit Implementation in Kitsap County, Washington

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March 2013

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KITSAP COUNTY, WASHINGTON STORMWATER MANAGEMENT PROGRAM

1. INTRODUCTION

1.1 Overview and Background

The *National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Discharges from Small Municipal Separate Storm Sewers in Western Washington*, hereafter referred to as the Phase II Permit or Permit, outlines stormwater program activities and implementation milestones that permittees must follow to comply with the federal Clean Water Act. All Phase II communities are expected to develop a Stormwater Management Program (SWMP) that includes all the required activities, implement those activities within the required timeframes of the Permit term, and submit annual reports to Ecology by March 31st each year to document progress toward complete program implementation.

The 2007 Phase II National Pollution Discharge Elimination System (NPDES) Permit (as modified in 2009) was in effect for this reporting period until February 15, 2012. By Engrossed Substitute House Bill 1478 (2011), the legislature directed Ecology to reissue the 2007 Permit without changes, to be effective for one year until a new Permit could be established. The current Permit was issued by Ecology on August 1, 2013 and became effective on September 1, 2012. It will expire on July 31, 2013, at which time the new updated 2013 Permit will become effective. The 2013-2018 Permit will implement actions required by Pollution Control Hearings Board, including low impact development (LID) related decisions.

This Phase II NPDES Permit applies to cities and counties in Western Washington operating a municipal separate storm sewer system (MS4) that is located within, or partially within, an urbanized area and that discharges to a surface water of Washington State. Urbanized areas are defined as population centers with at least 50,000 people and densities of at least 1,000 people per square mile based on the most recent federal census data. Kitsap County has been designated by Ecology as a Phase II permittee. The permit pertains to the MS4 contained within the census urbanized area and the urban growth areas adjacent to the cities of Poulsbo, Bremerton, and Port Orchard.

Kitsap County occupies a unique position in the central Puget Sound region of the State of Washington, located directly between the urban areas of Seattle and Tacoma and the largely undeveloped Olympic Peninsula. It is bounded by the Hood Canal on the west, Puget Sound on the east, and Mason and Pierce Counties to the south. Kitsap County has a total landmass of 393 square miles, ranking 36th in size among all counties in Washington State.

Kitsap County was founded in 1857. The current population of Kitsap County is approximately 250,000, making Kitsap County one of the most densely populated counties in the state. The people of Kitsap County are represented by three elected County Commissioners, and are served by a variety of agencies and government departments. The County seat is located in the town of Port Orchard Washington. The Chairman of the Board of County Commissioners serves as the chief

administrative officer of the county and as the direct manager for departments reporting to the Board, including the departments of Community Development, Public Works, Personnel and Human Services, Administrative Services, Information Services, and Parks and Recreation. The Board of County Commissioners is responsible for establishing public policy. They also have the fiscal responsibility for the county including: budget authority, power to set fees and charges, levying of taxes, and issuance of debt consistent with provisions of state laws.

The Public Works Department is responsible for building, operating and maintaining public facilities and utilities within unincorporated Kitsap County, including streets, sewer, and drainage systems. The Surface and Stormwater Management (SSWM) Program provides maintenance and operation of the all county storm drainage facilities. This Enterprise fund receives its revenues mostly from user fees billed under the authority of Chapters 12.36 and 12.40 of the Kitsap County Code (KCC) and Chapter 36.89 of the Revised Code of Washington (RCW).

1.2 Department Implementation Responsibilities

Within the County organization, many staff will contribute toward meeting Permit requirements. Managing the NPDES Permit and developing the SWMP is primarily the responsibility of the Public Works Department SSWM Program. Support is provided by the County Auditor for accounting, the County Treasurer for utility billing, the Department of Administrative Services for budgeting, Information Services and Facilities Department for facilities maintenance, the Parks and Recreation Department for maintenance and operation of the county fairgrounds and park system, and the Department of Community Development for development review and code enforcement.

1.2.1 Kitsap County Surface and Stormwater Management Program

Kitsap County established the SSWM Program and stormwater utility pursuant to Chapter 36.89 RCW in 1993 as codified in Chapter 12.36 KCC. The SSWM Program is a collaborative and coordinated effort between Kitsap County Public Works Department (PW), Kitsap County Department of Community Development (DCD), Kitsap Conservation District (KCD) and Kitsap Public Health District (KPHD). The Board of County Commissioners then adopted the Kitsap County Comprehensive Stormwater Management Plan in 1994. The plan is updated via detailed scopes of work and inter-local agreements each budget cycle. The utility rate structure was also adopted in 1994 and amended in 1995, 2004, 2006, and 2012. The rate structure is contained in Chapter 12.40 KCC. The initial adoption and each amendment included several public meetings and input from watershed community groups, advisory committees, and the general public.

Many of the existing elements within the Kitsap County SSWM Program satisfy the requirements of the Western Washington Phase II NPDES Permit. These elements are summarized in this document, as are the applicable programs from other county departments. Some SSWM Program elements are outside the scope of the Permit and are not detailed in the SWMP.

1.3 Document Organization

This report comprises the written documentation of the Kitsap County SWMP that is required to be submitted with the Annual Report. In accordance with the Phase II Permit terms, the SWMP has been designed to reduce the discharge of pollutants to the maximum extent practicable (MEP) per federal regulations and meet the State of Washington criteria of using all known, available, and reasonable methods of prevention, control and treatment (AKART) requirements to protect water quality. The following sections describe the actions that Kitsap County has taken or will take to comply with the requirements of the Phase II NPDES Permit.

To aid in tracking permit requirements, this document has been organized into sections that correspond with the Special Conditions in the Phase II NPDES Permit and are outlined as follows:

- Section 2.0 - Public Education and Outreach, Special Condition S5.C.1
- Section 3.0 - Public Involvement and Participation, Special Condition S5.C.2
- Section 4.0 - Illicit Discharge Detection and Elimination (IDDE), Special Condition S5.C.3
- Section 5.0 - Controlling Runoff from New Development, Redevelopment, and Construction Sites, Special Condition S5.C.4
- Section 6.0 - Pollution Prevention and Operation and Maintenance for Municipal Operations, Special Condition S5.C.5
- Section 7.0 - Compliance with Total Maximum Daily Load Requirements, Special Condition S7
- Section 8.0 - Monitoring, Special Condition S8
- Section 9.0 - Reporting Requirements, Special Condition S9

Although compliance activities associated with Special Conditions S7, S8 and S9 are not required to be included in the SWMP, they are documented here for thoroughness. Compliance activities with Special Conditions S7 and S8 must be and are still included as part of annual reporting. Further, additional Permit conditions, such as Special Conditions S1 through S4 and General Conditions G1 through G20, still apply to permit holders, though they do not result in specific program activities, nor is the SWMP required to document compliance with these activities. These additional conditions cover topics such as who is covered by the Phase II Permit, what discharges are authorized under the Permit, and legal guidelines for transferring, revoking, and appealing the Permit. Penalties for non-compliance are also included in these conditions.

2. PUBLIC EDUCATION AND OUTREACH

This section describes the Permit requirements, current County activities, and planned actions to be implemented for public education and outreach.

2.1 Permit Requirements

Section S5.C.1 requires the following:

- Develop and administer an education program to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts. The program must target residents, businesses, industry, and County employees at all levels.
- Develop a method to allow measurement and evaluation of the education program's effectiveness at changing targeted behaviors.
- Track and maintain records of public education and outreach activities.

2.2 Current Activities

Kitsap County is currently providing public education related to the Permit through a variety of forums and presentation media within the Departments of Public Works (SSWM & Roads), as well as collaboratively through partnerships with the Washington State University (WSU) Extension, Kitsap Conservation District (KCD), and Kitsap Public Health District (KPHD). Program highlights include:

- The program tracks educational metrics of programs implemented by the Department of Public Works in a database. Educational metrics and activities performed by the collaborative partnerships with WSU, KCD and KPHD are reported separately. Kitsap SSWM has 2 part-time educators and one full-time E&O staff member. In 2012, educational activities were increased over 2011 levels with over 243,000 awareness messages (+74%) and over 4,600 youth participants(+33%) in learning programs. The program engaged 64% of 4th grade teachers in the county, an increase of 4% over 2011.
- Kitsap County is a founding member of the Kitsap Peninsula Clean Runoff Collaborative (KPCRC), a regional group established in 2008 that focuses on water quality. This group has been renamed the West Sound Stormwater Outreach Group (West Sound SOG) in order to align with other SOGs in Puget Sound. The WSSOG has worked since 2007 to identify a baseline of behaviors, attitudes and awareness about stormwater by completing a baseline public opinion survey in 2008. The survey informed the priorities for raising awareness and targeting behavior change campaigns from 2008 to 2011. In 2011 a follow up survey was completed. The 2011 survey demonstrated increases in public awareness about stormwater messages, directing car wash runoff to grass or gravel, fundraiser car washes and proper disposal of pet waste. The survey established new benchmarks for whom to call to report water pollution or a spill. Finally, the survey verified that messages related to specific actions to improve water quality are more accepted than broad concepts about runoff. In 2012 the group will evaluate a regional measure of behavior adoption by determining if the Sound Behavior Index can be used locally. This would build upon the leading edge work of the Puget Sound Partnership (PSP). The PSP has, at

the request of Kitsap County, broken down the regional data by county. This may prove to be a more cost effective approach because the PSP will collect survey data every 2-3 years, and Kitsap could partner and contribute funds rather than implement its own survey.

- The WSSOG selected pet waste pick-up and proper disposal as a key behavior for evaluating awareness and behavior changes. Pet waste pick-up and proper disposal was implemented in 2009 using two programs. The Backyard Pet Waste Pilot Campaign was launched on a small scale and a follow up evaluation demonstrated that residents understood the message, talked to others about proper pet waste management, and recalled the messages. In 2010, 2011, and 2012 the campaign was expanded and delivered to over 25,000 residents with lots of 0.5 acres or less. To address pet waste in public places, the Community Mutt Mitt Program was established and has resulted in 294 stations installed and maintained by volunteer community groups, a 28% increase in stations in 2012. In 2012 alone, over 540,000 pet-waste disposal bags were used. This effort represents over 89 tons of dog waste diverted from the natural surface waters of Kitsap County.
- The WSSOG also initiated a storm-drain marker program that began in 2009. The markers advertise the Water Pollution Hotline and the "Puget Sound Starts Here" message derived from the STORM campaign. To date, 2,400 drain markers have been installed throughout Kitsap County.
- Kitsap County is a core member in the Puget Sound-wide STORM (Stormwater Outreach for Regional Municipalities) education effort and serves on several committees. In 2009, STORM created the "Puget Sound Starts Here" campaign focusing on yard care, pet care, and car care. The campaign was launched including a website and radio/television spots broadcast throughout major TV and radio advertising markets reaching 3.2 million viewers in 2010. In 2012 the first regional "Puget Sound Starts Here" Month was implemented, with events held around Puget-Sound. Kitsap County held the YMCA Low Impact Development tour and distributed 8,000 coasters and 2,800 coffee sleeves. The campaign continued through the summer with Theatre advertising resulting in over 800,000 viewings. Looking forward, STORM is preparing to launch the "Puget Sound Starts Here" Phase 2 campaign, with a focus on both traditional media advertising and social media advertising.
- Kitsap County personnel are also actively involved with the Kitsap Environmental Educators Program (KEEP), and the Hood Canal Watershed Education Network (HCWEN). Educators participated in Strategic Planning in 2012 for both organizations, which will provide the framework for integration with local and regional programs.
- In 2012, Kitsap County was awarded two Washington State Department of Ecology grants to develop regional and statewide materials key for homeowner installation of rain gardens, <u>The Rain Garden Handbook Update</u>, and promoting permit-required spill hotlines, <u>Promotion of the Water Pollution Hotline</u>. Both projects will be completed in 2013.

- The SSWM Education Partnership was formed in 2011 and increased their partnership projects. The group produced the third in a series of "Kitsap Healthy Waterways" newsletter delivered to the North Dyes Inlet/Clear Creek residents. The partnership had a Rain Garden Booth at the Peninsula Home and Garden Expo, winning first prize for "Most Educational Booth" and followed up in the fall with the same booth at the Peninsula Home and Remodel Show. The partnership was key in reinvigorating the historical Kitsap Salmon Tours. It was a highly successful and well-received event, which is now in the planning stages for 2013. The SSWM

Education Partnership also began targeting outreach to the Low Impact Development Industry, recognizing that designers, installers, inspectors, facility maintenance staff and plan reviewers will require initial education as well as ongoing "lessons-learned" education. WSU held its first Professional Rain Garden Workshop for the industry and Kitsap Public Works piloted a technical field tour. Both projects included an evaluation component to better inform future LID outreach efforts.

2.3 Planned Activities for 2013

Kitsap County has implemented all required actions under this section of the Permit. Activities planned for 2013 will include maintaining and improving the programs outlined above and adapting them as necessary to meet new permit and program objectives.

Kitsap County will continue to implement pet waste education programs, business education programs, and maintain partnerships with SSWM education partners and other local education programs. The County has conducted formative research on the needs of the Low Impact Development (LID) Industry to guide future outreach to plan reviewers, designers and installers in preparation for an increased demand for LID facilities. Future LID outreach programs include technical field tours and technical information handouts for both permitted facilities and homeowner retrofit situations.

3. PUBLIC INVOLVEMENT AND PARTICIPATION

This Section describes the Permit requirements, and current and planned compliance activities for public involvement and participation.

3.1 Permit Requirements

Section S5.C.2 of the Permit requires the County to:

- Provide ongoing opportunities for public involvement through advisory boards and commissions, watershed committees, public participation in developing rate structures and budgets, stewardship programs, environmental activities or other similar activities. The public must be able to participate in the decision-making processes involving the development, implementation and update of the SWMP.
- Make the SWMP document and Annual Report available to the public and to post these documents on either the County's or Ecology's website. Any other submittals required by Ecology also must be available on the website.

3.2 Current Activities

The Kitsap County SSWM Program supports various public involvement and participation opportunities that exceed the minimum measures required by this element. Pubic involvement activities are included as part of the Departments of Public Works, Parks, and Community Development, as well as through partnerships with the Washington State University (WSU) Extension, Kitsap Conservation District (KCD), and Kitsap Public Health District (KPHD). Program highlights include:

- The Kitsap County Stream Stewardship Program is comprised of the WSU Stream Stewards and the KCD Backyard Habitat Program and is organized to facilitate the implementation of volunteer and landowner projects that protect and restore stream and riparian corridors and enhance the health and productivity of aquatic ecosystems.

- The Kitsap Rain Garden Mentor Program provides training to volunteer "mentors" who then assist neighbors and community groups in establishing rain gardens on private property and perform outreach about rain gardens and their value in protecting Puget Sound.

- The Kitsap County SSWM Program Advisory Committee was established in 1996. The committee consists of 18 members representing citizens (two from each Commissioner District), water related public agencies (KCD, KPHD, DCD, and Parks), the Suquamish Tribe, and the cities of Poulsbo, Bainbridge Island, Bremerton, and Port Orchard. The purpose of this Committee is to advise the Public Works Director and the Board of Commissioners on issues related to the County's "Water as a Resource" Policy. The committee also provided feedback on the SSWM Program and on this SWMP.

3.3 Planned Activities for 2013

Kitsap County has implemented all required actions under this section of the Permit. Activities planned for 2013 will include maintaining and improving the programs and adapting them as necessary to meet new permit and program objectives. Improved coordination of volunteer and involvement opportunities will be performed among the SSWM Education Partners.

4. ILLICIT DISCHARGE DETECTION AND ELIMINATION

This section describes the Permit requirements, programs, and planned activities related to Illicit Discharge Detection and Elimination (IDDE).

4.1 Permit Requirements

Section S5.C.3 of the Permit requires the County to:

- Implement an ongoing program to detect and remove illicit discharges, connections and improper disposal, including any spills into the municipal separate storm sewers owned or operated by the County.
- Develop a storm sewer system map, implement ordinances to prohibit illicit discharges, and create a program to detect and address illicit discharges.
- Publicize a hotline or other local telephone number for reporting of spills or other illicit discharges. Track illicit discharge reports and actions taken in response to calls.
- Adopt and implement procedures for IDDE program evaluation and assessment.
- Provide appropriate training to staff on identification and reporting of illicit discharges.
- Summarize all illicit discharges and connections reported to the County and response actions taken in the Annual Report; including updates to the SWMP document.

4.2 Current Activities

Kitsap County has conducted IDDE activities described by the Permit since 1995. All known municipal stormwater outfalls have been screened for potential pollution sources. Much of the IDDE efforts have been carried out via an inter-local agreement between SSWM and KPHD. Specific program elements include the following:

- The Kitsap County stormwater infrastructure inventory is managed through the Cartegraph© Software system. This database system links to the Kitsap County Geographical Information System (GIS) and stores information on each asset (size, type, as-built date, condition, inspection and maintenance history, etc). The system is continuously updated to reflect public and private system changes, additions, and upgrades based on as-built documents received upon project completion. The system can be combined with other GIS information to create maps showing land use, topography or other features to aid in illicit discharge detection and elimination or spill control. Map data is available upon request.

- Kitsap County Code Title 12 has prohibited illicit discharges to the stormwater drainage system since at least 1996. The code was updated in August 2009 to make minor changes in wording to reflect the specific requirements of the Permit regarding definitions and enforcement mechanisms.

- Kitsap County SSWM and KPHD cooperate to conduct a comprehensive county-wide IDDE Program. Specific geographic areas are targeted based on existing water quality concerns and monitoring trends. Personnel follow up on screenings through field investigations and interaction with residents and business owners. The most successful efforts to date have been made through the SSWM sponsored KPHD Pollution Identification and Correction (PIC) Program that targets anthropogenic pathogens found in aquatic systems. The program is highlighted in the Puget Sound Partnership Action Agenda as a model for other regions.

- A regional hotline (360-337-5777) for all reporting of spills within Kitsap County was implemented in 2009. The hotline is posted on the County and Health District websites, for example: http://www.kitsapgov.com/sswm/spill.htm. All employees were informed of the regional hotline through a Kitsap County intranet publication. Field employees attend training sessions on the regional hotline program and spill response procedures.

- In 2011, Kitsap County Education staff worked with Inspection staff to develop a database and inspection program for restaurants in high priority watersheds, and continued the program in 2012. Properties handling food products are inspected for illicit discharges including grease, wash water and dumpster overflow liquids. Educational visits and follow up inspections were performed at sites with illicit discharges.

- In 2012, Kitsap County Education staff worked with Inspection staff to develop a survey for apartment complexes about outdoor vehicle washing behaviors, policies and communication methods. The project revealed that 91% (21 of 23) of apartment complexes do not allow vehicle washing on site, 78% state in the "no vehicle washing" policy in the lease, and 65% were interested in partnering on literature to continue to communicate the "no washing" policy to tenants.

- Kitsap County has provided annual training to employees on the proper identification and response to illicit discharges including spills. Kitsap County will continue to update employees on the proper response as procedures change and/or on an annual schedule.

4.3 Planned Activities for 2013

Kitsap County has implemented all required actions under this section of the Permit, including publication of the Kitsap County IDDE Program Manual and full implementation of all IDDE program elements. 2013 actions will consist of maintaining and improving the programs and adapting them as necessary to meet new permit and program objectives.

5. CONTROLLING RUNOFF FROM NEW DEVELOPMENT, REDEVELOPMENT AND CONSTRUCTION SITES

This section describes the Permit requirements, programs, and planned activities related to Controlling Runoff from New Development, Redevelopment and Construction Sites.

5.1 Permit Requirements

Section S5.C.4 of the Permit requires the County to:

- Develop, implement, and enforce a program to reduce pollutants in stormwater runoff that enter the municipal separate storm sewer system from new development, redevelopment and construction site activities. The program must apply to both private and public projects.
- Adopt and implement a regulatory process with the necessary legal authority for plan review, inspection, and escalating enforcement procedures necessary to implement the program in accordance with Permit conditions, including the minimum technical requirements in either the 2012 Ecology Stormwater Management Manual for Western Washington or an equivalent manual.
- Provide options to allow non-structural preventive actions and source reduction approaches such as Low Impact Development techniques (LID) and measures to minimize the creation of impervious surfaces and the disturbance of native soils and vegetation.
- Adopt regulations that include provisions to verify adequate long-term operations and maintenance of new post-construction permanent stormwater facilities and best management practices in accordance with Permit conditions, including an annual inspection frequency and/or approved alternative inspection frequency and maintenance standards for private drainage systems that are as protective as those in the 2012 Ecology Stormwater Management Manual for Western Washington.
- Train staff on the new codes, standards, processes and procedures.
- Develop a process to record and track all inspections, maintenance and enforcement actions by staff for inclusion in the Annual Report.
- Make available appropriate information to permit applicants regarding NDPES Construction and Industrial permits and their notices of intent (NOI).
- Summarize annual activities for the Annual Report and identify any necessary update to SWMP document.

5.2 Current Activities

Kitsap County's Department Community Development (DCD) has a comprehensive land-use and development permit program. This program includes a permit review and inspection process that addresses the areas required by the Permit as follows:

- The Kitsap County Code was updated on February 16, 2010 to reflect the minimum technical requirements for construction and post construction runoff control. The County also adopted a new Stormwater Design Manual that is based on the 2005 and the 2009 King County Surface Water Design Manual. These new standards also include maintenance standards that comply with the Permit.

- The Kitsap County Stormwater Manual also incorporates the latest low impact development practices from the Kitsap County Low Impact Development Guidance Manual published in June 2009 under a grant to the Kitsap Home Builders Foundation from Ecology.

- Kitsap County personnel have attended training conducted by Department of Ecology, Puget Sound Partnership, WSU Extension, and the Kitsap Home Builders Foundation in preparation for the change in local stormwater design standards. Kitsap County has also made this training available to local builders, developers, engineers and other land development professionals.

- Kitsap County SSWM Program inspectors have conducted private stormwater management facility inspections since 1995. This program continues and was recently augmented to ensure all required sites are inspected annually. In 2012, some 664 private stormwater management facilities were inspected. A total of 159 facilities were found to be deficient and all of these problems were corrected prior to the end of 2012.

- The Kitsap County development permit process contains procedures to make NPDES Construction and Industrial Permit NOI information available.

5.3 Planned Activities for 2013

Kitsap County has implemented all required actions under this section of the Permit. Future actions will consist of maintaining and improving the programs and adapting them as necessary to meet new permit and program objectives. In addition, the Kitsap Stormwater Management Manual and Kitsap County Code will need to be updated to meet requirements of the new Phase II NPDES Permit, as well as the 2012 Ecology Stormwater Manual and 2012 LID Guidance Manual.

6. POLLUTION PREVENTION AND OPERATION AND MAINTENANCE FOR MUNICIPAL OPERATIONS

This section describes the Permit requirements, programs, and planned activities related to Pollution Prevention and Operation and Maintenance (O&M) for Municipal Operations.

6.1 Permit Requirements

Section S5.C.5 of the Permit requires the County to:

- Develop and implement a stormwater system O&M program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations.
- Establish maintenance standards for the municipal separate stormwater system that are at least as protective as those specified in the 2005 Stormwater Management Manual for Western Washington.
- Conduct inspections of stormwater flow control and treatment facilities and catch basins according to required frequencies, unless previous inspection data show that a reduced frequency is justified.
- Establish and implement procedures to reduce stormwater impacts associated with runoff from municipal operations and maintenance activities, including but not limited to streets, parking lots, roads or highways owned or maintained by the County, and to reduce pollutants in discharges from all lands owned or maintained by the County.
- Develop and implement an ongoing training program for staff whose job functions may impact stormwater quality, and then document the training program.
- Prepare Stormwater Pollution Prevention Plans (SWPPP) for all heavy equipment maintenance or storage yards and material storage facilities owned or operated by the County that are not covered by an Industrial Stormwater General Permit.
- Summarize annual activities for the Annual Report and include any necessary updates to the SWMP document.

6.2 Current Activities

Kitsap County maintains County-owned facilities in a manner that is protective of water quality. In particular:

- Kitsap County is one of the agencies participating in the Western Washington Regional Road Maintenance Endangered Species Act Program. Since December 12, 2001, Kitsap County has been officially committed to implement the Regional Road Maintenance ESA program. This program includes all the activities listed under S5.C.5.f and has a training element as well. A copy of the Regional Road Maintenance ESA program guidelines can be found at: http://www.metrokc.gov/kcdot/roads/esa/regionalprogram/index.cfm

- Kitsap County Public Works facilities that meet the Permit thresholds have had a SWPPP in place since 2003. Kitsap County maintains over 500 stormwater facilities to standards consistent with the Permit and cleans or inspects over 10,000 catch basins annually. Soils and other materials removed from these systems are normally processed at the County-owned decant facility located adjacent to the Central Kitsap Wastewater Treatment Plant. The decant facility is operated under a solid waste transfer station permit issued by KPHD.

- Kitsap County Parks and Fairgrounds and Facilities Maintenance programs have created and implemented policies and procedures to address the applicable compliance areas each program covers in the area of property maintenance. These policies and procedures are based on the latest available best management practices to protect water quality while conducting routine maintenance activities on parks, buildings, and associated areas. The SWPPP for the Kitsap County Fairgrounds maintenance area was completed and implemented on February 2, 2010.

- Kitsap Public Works (Road Maintenance Division) operates a water-quality street-sweeping program utilizing three high-efficiency street sweepers (purchased in-part with Ecology Grant funds). This program results in the removal of a significant amount of street grit and debris, which is intercepted prior to being washed into our stormwater system or receiving waters.

- Kitsap County Public Works, Parks, Fairgrounds, and Facility Maintenance programs use a common integrated pest management plan and a fertilizer management program. This plan employs the latest best management practices to avoid the use of pesticides where possible. All applicators are licensed through the Washington State Department of Agriculture.

- The Kitsap Public Works waste disposal monitoring program closely tracks the amount and quality of the solids removed from roads and the stormwater system. The solids come from several activities including soil removal during ditch maintenance and during pond maintenance, sediment removed from catch basins and vaults, and solids removed from streets by street sweepers. All of these solids, if allowed to accumulate in the stormwater system, have the potential to carry the associated contaminants to natural surface waters during runoff events. In 2012 the total solids collected from wastes from educator trucks, sweepers and ponds was 1,199 tons, which included 549 pounds of copper/zinc/lead and 191 gallons of oil. All stormwater and street solids are tested and disposed of in accordance with local and state requirements.

6.3 Planned Actions

Kitsap County has implemented all required actions under this section of the Permit. Future actions will consist of maintaining and improving the programs and adapting them as necessary to meet Permit and program objectives. Kitsap County will continue to construct and maintain more stormwater management (WQ treatment, flood-control, and GSI-LID) facilities in 2013 and beyond.

7. COMPLIANCE WITH TOTAL MAXIMUM DAILY LOAD REQUIREMENTS

This section describes the Permit requirements, programs, and planned activities related to Total Maximum Daily Load (TMDL) Requirements that are listed in Appendix 2 of the Phase II Permit. For all other applicable TMDL programs, compliance with the Phase II Permit is considered compliance with the TMDL and no additional SWMP documentation is required.

7.1 Permit Requirements

Section S7 of the Permit requires the County to comply with the requirements of the applicable TMDL as follows:

- For an applicable TMDL listed in Appendix 2 of the Permit, comply with the specific requirements identified in Appendix 2 and maintain records of all required actions that are relevant to the applicable TMDL. TMDL implementation activities must be included as part of the Annual Report.
- Where monitoring is required in Appendix 2 of the Permit, conduct the monitoring according to a Quality Assurance Project Plan (QAPP) approved by Ecology.

7.2 Current Activities

Currently, Kitsap County is affected by two TMDLs (to be listed in Appendix 2 of the 2013-18 Phase II NPDES Permit). The Sinclair-Dyes Inlet and Liberty Bay watersheds will have TMDL WQ Clean-up Plans to address bacterial pollution problems. These TMDL's will likely be implemented in 2013. Kitsap County has been working with Ecology on the development of these TMDL's and has already implemented numerous early-action projects to meet the water-quality goals of the TMDL.

7.3 Planned Actions for 2013

Kitsap County has implemented all required actions under this section of the Permit. Future actions will consist of maintaining and improving the programs and adapting them as necessary to meet new permit and program objectives. In addition, the Sinclair-Dyes Inlet and Liberty Bay TMDL WQ Clean-up Plans are expected to become active in 2013.

8. MONITORING

This section describes the Permit requirements and planned activities related to water quality monitoring.

8.1 Permit Requirements

Section S8 of the Permit requires water quality sampling or other testing if TMDLs apply or if testing is required for characterizing illicit discharges. The Annual Report must include the following items:

- A description of stormwater monitoring or studies conducted during the reporting period. If stormwater monitoring was conducted on behalf of the County, or if studies or investigations conducted by other entities were reported to the County, only a brief description of the type of information gathered or received must be included in the Annual Report.
- An assessment of the appropriateness of the best management practices identified by the County for components of the Stormwater Management Program and justification for any changes made or anticipated.

This section also requires the County to:

- Prepare for comprehensive, long-term water quality monitoring efforts through regular stormwater monitoring and targeted SWMP effectiveness monitoring. Future stormwater monitoring will characterize stormwater runoff quantity and quality at a limited number of locations to allow analysis of pollutants and changes in conditions over time and across the County. The monitoring plans shall include, at a minimum, stormwater, sediment or receiving water monitoring of physical, chemical and/or biological characteristics.
- Identify outfalls where permanent stormwater sampling stations can be installed and operated for future monitoring. One outfall or conveyance shall represent commercial land-use, the second shall represent low-density residential land use and the third will represent medium-to-high density residential land use.
- Identify suitable Program questions and sites where targeted Program effectiveness monitoring can be conducted together with development of a monitoring plan for these questions and sites. The proposed effectiveness monitoring should address the degree of effectiveness of the targeted action and if it is achieving the targeted outcome.

8.2 Current Activities

- Kitsap County participated in the Stormwater Work Group to propose the Regional Stormwater Monitoring Program (RSMP) to be incorporated in the 2013 NPDES Permit.
- Kitsap County is implementing a flow monitoring project at the YMCA site to assess the effectiveness of the permeable concrete and rain gardens. Flow data will be compared using modeling to pre-development conditions and traditionally built stormwater infrastructure conditions. A final report is due in January 2013. This report will provide insight into installation of LID in the lower Clear Creek basin.

8.3 Planned Actions for 2013

Kitsap County has implemented all required actions under this section of the Permit. Future actions will consist of maintaining and improving the programs and adapting them as necessary to meet new permit and program objectives. In addition, Kitsap County will continue to be an active participant in the PSP Stormwater Monitoring Work-Group.

9. REPORTING REQUIREMENTS

This section describes the Permit requirements and planned activities related to reporting activities required under the Permit.

9.1 Permit Requirements

Section S9 of the Permit requires the following of the County:

- Submit an annual report to Ecology by March 31, 2008 and every year thereafter. The reporting period for the first annual report will be from the effective date of the Permit through December 31, 2007. The reporting period for subsequent annual reports will be the previous calendar year. The Annual Report shall include the SWMP, Annual Report form, and notification of jurisdictional boundary changes that affect the geographic area of Permit coverage, together with any implications for the SWMP.
- Retain all records related to the Permit and SWMP for at least five years and submit records to Ecology upon request.
- Make records related to the Permit and SWMP available to the public at reasonable times during business hours. The County must also provide a copy of the most recent annual report to any individual or entity upon request.

9.2 Planned Actions

Kitsap County has implemented all required actions under this section of the Permit.

10. CONCLUSION

This SWMP has been prepared to demonstrate compliance with the requirements of the NPDES Phase II Permit and to describe future planned activities as of March 2013. This SWMP is a living document that will be updated annually to reflect progress with implementing the stormwater management program components required for compliance with the Phase II Permit.

Appendix E – Site Inspection Forms (and Site Log)

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Construction Stormwater Site Inspection Form

Project Name _____ Permit # _____ Inspection Date _____ Time _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*
Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (*check all that apply*):

Pre Construction/installation of erosion/sediment controls	☐	Clearing/Demo/Grading	☐	Infrastructure/storm/roads	☐
Concrete pours	☐	Vertical Construction/buildings	☐	Utilities	☐
Offsite improvements	☐	Site temporary stabilized	☐	Final stabilization	☐

C. Questions:

1. Were all areas of construction and discharge points inspected? Yes ___ No ___
2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen Yes ___ No ___
3. Was a water quality sample taken during inspection? (*refer to permit conditions S4 & S5*) Yes ___ No ___
4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* Yes ___ No ___
5. If yes to #4 was it reported to Ecology? Yes ___ No ___
6. Is pH sampling required? pH range required is 6.5 to 8.5. Yes ___ No ___

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

_____

_____

_____

_____

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

D. Check the observed status of all items. Provide "Action Required "details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						

E. Check all areas that have been inspected. ✔

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

<u>Sign the following certification:</u>

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

Title/Qualification of Inspector: _____

APPENDIX D

CONSTRUCTION QUALITY ASSURANCE PLAN

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MANCHESTER
PUMP STATIONS 45, 46, & 47
AND BEACH LINES REHABILITATION

CONSTRUCTION QUALITY ASSURANCE PLAN

Prepared For:

Kitsap County
Public Works, MS-26
614 Division Street
Port Orchard, WA 98366

August 2016

BHC CONSULTANTS
1601 Fifth Avenue, Suite 500
Seattle, WA 98101

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

The Construction Quality Assurance Plan was prepared under the supervision and direction of the undersigned whose seal as a Professional Engineer is affixed below:

Adam Schuyler, PE, PMP
Project Manager
BHC Consultants, LLC

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Chapter 1 Introduction

A Construction Quality Assurance (CQA) plan for the Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation project (Project) is a requirement of the State Revolving Fund agreement between the State of Washington Department of Ecology and Kitsap County. The CQA plan has been prepared in accordance with WAC 173-240-075.

This plan describes the services that will be provided by BHC Consultants, LLC (BHC) and its sub-consultants, during the construction of the Project. It is to be used for guidance by Kitsap County Department of Public Works (County) and their representatives responsible for quality assurance during this project.

1.1 Purpose and Scope

The purpose of this CQA Plan is to identify procedures that will be used to obtain independent, documented confirmation that standards of quality required by the Contract Documents for the construction of the Project are met. The Project is funded by the State Revolving Fund Loan through the Washington State Department of Ecology. This CQA Plan:

- Identifies the organization, roles, and responsibilities of individuals who will be participating in the project during construction.
- Describes key activities that will take place and processes that will be used to meet the quality standards including communication, documentation, technical records handling, review and observation functions, sampling and testing requirements, acceptance/rejection criteria, and corrective measures to be used when deficiencies are found
- Includes a summary of documentation procedures for work clarification and changes to the Project.

1.2 Key Terms

Three related but independent processes will be used during construction to verify that the standards of quality identified in the Contract Documents are met. These processes are: Construction Quality Assurance (CQA), Construction Quality Control (CQC), and Construction Management and Administration (CMA). Definitions for each of these processes follow.

- **Construction Quality Assurance** – Refers to a system of activities that provide adequate documentation and confidence that a facility is constructed as specified in the Contract Documents and that the materials used in construction are manufactured according to the Specifications. Construction quality assurance performed for this project generally includes observations, verifications, audits, sampling and evaluation of materials and workmanship necessary to determine and document the quality of the constructed facility.

- **Construction Quality Control** – Refers to a planned system of actions taken by manufacturers, fabricators, and/or the Contractor to monitor and control the quality of products and work to meet the requirements of the contract. Quality control includes inspections and testing to directly monitor the quality of all furnished, constructed, and

installed components. CQC activities are the responsibility of the Contractor. They are independent of CQA activities.

- **Construction Management and Administration** – Refers to those activities taken to control and administer the construction project, including conducting project meetings, monitoring project schedules, reviewing and acting on requests for payment, and coordinating changes to contract documents resulting from changed site conditions or the selection of alternative methods of construction or installation. BHC will be responsible for these CMA activities as described herein.

1.3 Reference Documents

This plan is not part of the construction Contract Documents for the project. However, the Contract Documents issued for construction are referenced by this plan. Additionally, several other documents may be referenced for information pertaining to the project and the County's existing systems/facilities. A list of available reference documents is provided below.

- Contract Construction Plans and Specifications; Kitsap County – Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation, *BHC Consultants, LLC*, August 2016 (subject to modifications during the bid period)
- Kitsap County – Manchester Sewer Facilities Strategies Plan, *BHC Consultants, LLC,* October 2014
- Standard Specifications for Road, Bridge and Municipal Construction, 2014, *Washington State Department of Transportation*
- Storm Water Pollution Prevention Plan for Kitsap County Manchester Pump Stations 45, 46, and 47 and Beach Lines Rehabilitation, *BHC Consultants, LLC,* July 2016

Chapter 2 Scope of Construction

The Project consists of rehabilitation of pump stations 45, 46 and 47 and approximately 3,330 feet of beach line sewer (installed from existing manholes), reconnection of side sewers, and replacement of all 13 existing beach line manholes.

The major components of this project include:

- Pump station rehabilitations including new submersible wastewater pumps, wet wells, valve/meter vaults, and onsite piping at three existing pump station sites.
- Removing and relocating the power, telemetry, and control panels with new, modern equipment.
- New standby generators at all three pump stations.
- Elevated concrete slabs, steps and handrails at all three pump stations.
- Associated site work and surface restoration at all three sites.
- Decommissioning and removal of three existing pump stations.
- Restoring disturbed areas with asphalt, gravel, and sod.
- Providing a temporary bypass pumping system to handle incoming flows when the existing station has to be taken offline
- Shoreline stabilization at two sites.
- Cured-in-place pipe (CIPP) beach line sewer rehabilitation.

Construction Contract Documents were prepared by BHC. These documents, titled *Kitsap County – Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation*, detail work associated with the improvements, the Contractor's responsibilities, the Engineer's authority, and the County's requirements. All work is to be performed in accordance with the Special Provisions, the 2014 WSDOT Standard Specifications, and the Plans.

Chapter 3 Construction Schedule

Key dates associated with the anticipated construction schedule are presented in the table below. The actual construction schedule and period will vary based on approved changes. A detailed construction schedule for the contract will be prepared by the Contractor and submitted to the County following award of the contract. The detailed construction schedule will include planned construction activities, their sequence, inter-relationship, duration and completion dates.

Construction Schedule	
Event	**Calendar Date**
Bid Opening	Anticipated to be October 2016
Limited Notice to Proceed	Anticipated to be January 2017
Notice to Proceed with Construction	Anticipated to be March 2017
Substantial Completion	400 Working Days from Full Notice To Proceed
Physical Completion	430 Working Days from Full Notice To Proceed

Chapter 4 Project Organization, Roles and Responsibilities

The major parties involved in the construction phase of this project are the County, the Contractor, and the Resident Engineer. Only the County and the Contractor are parties to the Construction Contract. The Resident Engineer serves as the representative of the County for the purpose of providing CQA and CMA services, as well as technical support, as requested by the County.

4.1 Project Organization

The key personnel and the relationships between the County and the CQA organization are shown in Figure 4-1. Lines of communication are discussed in Section 6.

A contact list for specific project personnel and associated addresses and telephone/fax numbers will be prepared and distributed following Contract Award and the Preconstruction Conference.

In general, responsibilities for the Project are as follows:

▪ Contract Execution and Administration	County
▪ Construction Management and Administration	County
▪ Resident Engineer	Third Party Contracted with County
▪ Construction Quality Control	Contractor
▪ Construction Quality Assurance	County
▪ Design Assistance During Construction	Engineer

Kitsap County
WWTP Upgrades
CQA\CMA Organization Chart

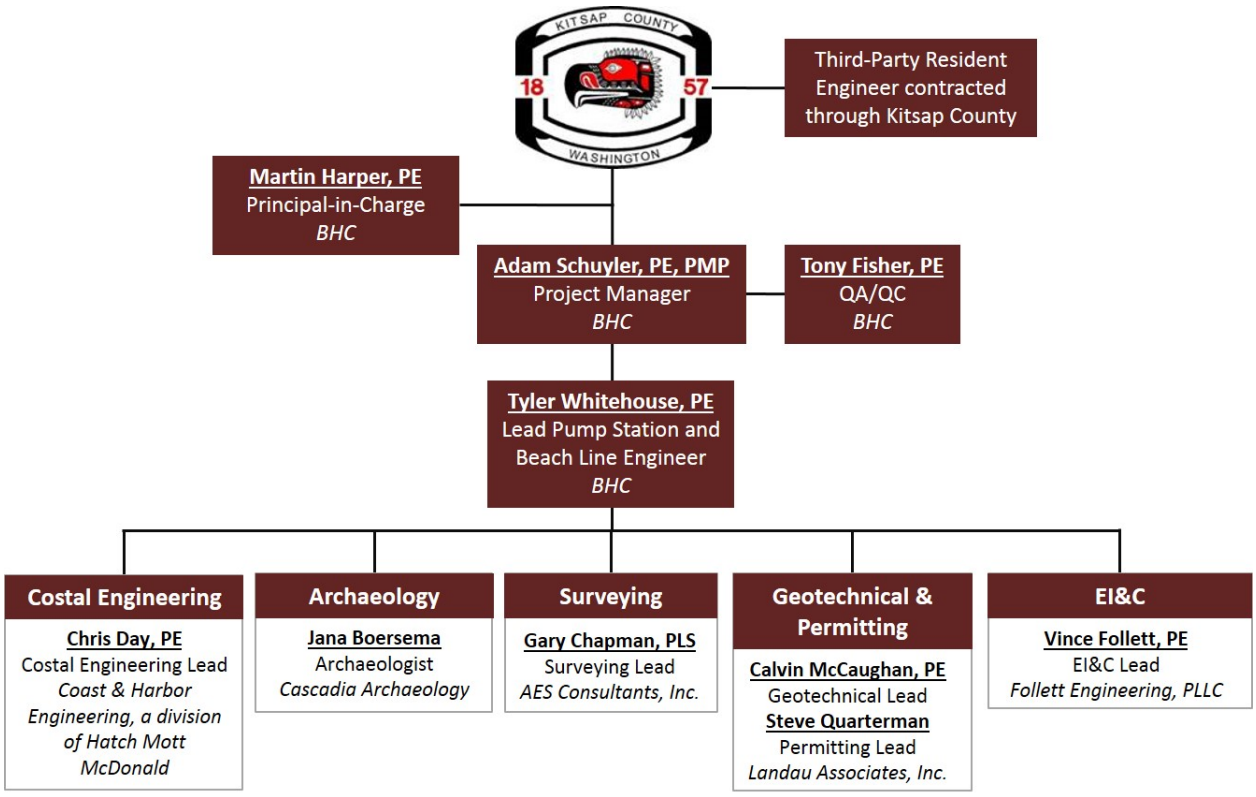


Figure 4-1 CQA\CMA Organization Chart

4.2 Owner – Kitsap County

The Owner of the project is Kitsap County (County). The County has overall responsibility for the construction of the project in conformance with Washington State Department of Ecology Criteria for Sewer Works Design. The County is responsible for funding the project and has ultimate responsibility for making decisions regarding acceptance of the work.

4.2.1 County Project Engineer

The Kitsap County Project Engineer, Barbara Zaroff, is responsible for overall administration of the project Contract. Responsibilities of the County Project Engineer, or the County's delegated representative, are listed below:

- Review and approval of Contractor's pay requests
- Approval and execution of contract change orders, request for proposals, and work directives
- Attendance at the preconstruction conference, weekly construction progress meetings, and other meetings as necessary

- Review of Contractor's certified payroll and compliance with prevailing wage. Resident Engineer will assist County staff in gathering required documentation from Contractor.

4.2.2 Construction Manager

The County's Construction Manager, Floyd Bayless, or designated representative, will be involved throughout the construction project. Responsibilities of the Construction Manager, or the County's delegated representative, are listed below:

- Coordinate with Contractor to allow continuity of existing and new pump station operations following review and recommendation by the Engineer
- Attend the weekly construction meetings and any other coordination meetings as necessary
- Coordinate with Contractor to meet all regulatory requirements for pump stations and beach line sewer following review and recommendation by the Engineer

4.3 Contractor

The Contractor selected for this project will have the authority and responsibility to perform construction activities within the binding terms of the Project Contract between the County and the Contractor.

The Contractor must be licensed by the State of Washington. In addition, the Contractor will be required to demonstrate qualifications and experience of their employees and subcontractors performing specialized components of the work.

To accomplish the work, the Contractor shall designate individuals to serve as the Contractor's Project Manager and the Contractor's Superintendent throughout the duration of the project.

The Contractor will be responsible for Construction Quality Control (CQC). Specifically, the Contractor will be responsible to provide evidence of the Contractor's, and all of its subcontractor's, qualifications, submit quality control documentation and certifications that materials were made to the requirements of the Contract Documents, and perform the work in accordance with the Contract Documents. The Contractor's responsibilities are fully defined in the Contract Documents and include all of the work that the Contractor may delegate to subcontractors.

The Contractor is responsible for the development and maintenance of a detailed construction schedule. The schedule is intended to provide a basis for the Contractor to manage progress, coordinate activities and initiate corrective action as necessary.

The Contractor is responsible for all safety measures on the job. They are responsible to meet all Local, State, and Federal safety requirements.

4.4 Engineer

The Engineer for this Project, BHC Consultants, will perform the County in Construction Management and Administration (CMA) services and assist the County. The scope of CMA services includes:

- Review of materials/equipment submittals
- Office engineering

- Change order(s) support to County
- Assist in coordinating quality assurance testing of materials included as Appendix B. All other testing coordinated by County.

BHC will be supported during construction by the following sub-consultants:

- AES Consultants, Inc.
- Landau Associates, Inc.
- Cascadia Archaeology
- Coast & Harbor Engineering a division of Hatch Mott MacDonald

BHC is responsible for coordinating sub-consultant activities, maintaining records, and functioning as the point of contact between the sub-consultants, the County, and the Contractor. The Contractor will be required to give the County a minimum of 48-hours notice prior to needing any special inspections or sign-offs from the Engineer or its sub-consultants.

4.4.1 Project Manager

The Project Manager for the Engineer, Adam Schuyler, P.E., is responsible for overall engineering administration for this project. Responsibilities of the Project Manager are listed below:

- Budget management for Engineering Services during Construction
- Supervision and coordination of the office and field engineering activities, including overall responsibility for the performance of the engineering services during construction
- Review contract change orders, request for proposals, and work directives
- Coordination with the County and Contractor regarding engineering issues
- Attendance at Preconstruction Conference and other meetings as included in the Engineer's contract

4.4.2 Resident Engineer (Third Party Contracted with County)

The Resident Engineer is responsible for coordination and review of the design requirements, resolution of engineering issues, onsite construction quality assurance, observation and documentation, and construction management activities for this project. Responsibilities are listed below:

- Review contract change orders, requests for proposals, and work directives as requested by County
- Prepare requests for information responses
- Maintain project files, including distribution of project submittals and other project documents.
- Attendance at the Preconstruction Meeting, Weekly Progress Meetings, and other meetings as necessary, including preparation of meeting minutes
- Assist County in quality assurance activities including observation and documentation of the Contractor's activities and verification that the Contractor is satisfying the requirements of the Contract Documents
- Coordinate with County, County operations personnel, and other project team members
- Coordinate with the engineering office staff and Contractor regarding engineering issues
- Coordinate with the Contractor
- Review County comments of Contractor's Pay Requests

- Maintain project files at the Resident Engineer's office
- Follow the safety polices of the Contractor, or at a minimum those safety policies set forth in BHC Accident Prevention Program
- Attendance at the Preconstruction Conference, Weekly Progress Meetings, and other meetings as necessary

Chapter 5 Field Documentation

Field documentation for this Contract is divided into the following categories:

- Reports
- Photographs
- Quantities
- Survey
- Pay Requests
- QA/QC Test Results
- Contract Correspondence and Forms.

Technical records handling is discussed in Section 8.

5.1 Reports

The Resident Engineer will be required to complete a daily report documenting the contract work that was performed. Daily reports will include, at a minimum, the following information:

- Weather and site conditions
- Visitors to the project site
- Contractor's equipment and personnel on site
- Specific contract work (including quantities) performed by the Contractor
- Items requiring special attention, such as:
  - Conflicts or deviations from the plans
  - Environmental issues
  - Erosion control
  - Traffic
  - Lost time

Discussions and conversations between the Contractor, Engineer, County and any public interaction will also be documented in the daily reports. Copies of the daily reports will be distributed to the County and the Engineer.

5.2 Photographs

The Resident Engineer will also document work progress using digital photographs. Photographs will be used to document as-constructed conditions as well as areas of conflict. Photographs will be logged with the following information:

- Date
- Area Designation

Each photograph will also require a brief description of the subject matter. Photographs will be downloaded weekly and maintained at the Resident Engineer's on-site office.

5.3 Quantities

The Resident Engineer will maintain documentation of in-place quantities in their on-site office. The documentation will include measurements, calculations, weight tickets, and other back-up as required, tabulated per bid item or schedule of value item. In the case of the unit price bid items, a summary sheet for each bid item will also be maintained. This documentation will be used to determine the monthly pay recommendations.

5.4 Survey

The Resident Engineer will obtain and maintain copies of the Contractor's survey control and recorded shots for review and use in verification that lines and grades are within the required tolerances. Copies of the Engineer's survey data will also be kept at the Resident Engineer's on-site office.

5.5 Pay Requests

Review the County's response to the Contractor's monthly pay request(s). Copies of each executed pay request will be in the Resident Engineer's office.

5.6 QA/QC Test Results

Quality assurance (QA) and quality control (QC) testing is discussed further in Section 7. Test results will be documented by the responsible party. Copies of the test results will be forwarded electronically to the County, the Contractor, and the Engineer. Complete testing records will be kept on file in the Resident Engineer's office.

5.7 Contract Correspondence Files

Official contract correspondence files will be kept in the Engineer's office, however, the Resident Engineer will also maintain relevant contract correspondence files that assist with his daily job performance. Correspondence files including letters, memorandums, facsimile correspondence and telephone conversation records, emails, etc., will be on file for correspondence with the County, the Contractor, and sub-consultants.

In addition, correspondence files including Requests for Information (RFI), Work Directives (WDs), Change Orders and Daily Field Reports will be maintained in the Resident Engineer's office.

5.8 Forms

The standard forms used to document and track the work for this project are included in Appendix A. All forms should be filled out by the initiator, i.e. "Request for Submittal Review" form is initiated by the Contractor and all appropriate fields need to be filled in prior to submission. Engineer or County required forms that are to be used by the Contractor will be provided both in digital format, hard copies available upon request.

Chapter 6 Communication

6.1 General

Project communication includes verbal discussions between the Engineer and the Contractor, formal written correspondence, and project meetings. Verbal discussions in the field will be documented in daily reports or on telephone conversation record forms and may be followed by formal written correspondence.

6.2 Correspondence

Daily correspondence and communication will occur between the Resident Engineer and Contractor in the field. Additionally, all formal correspondence issued by the Contractor shall be directed through the Resident Engineer in email or paper form. Furthermore, all formal correspondence from the Engineer or County will be issued through the Engineer's Project Manager or Resident Engineer. Copies of all formal correspondence will be distributed to the County, as appropriate.

6.3 Project Meetings

Project meetings will be scheduled to define and maintain responsibility and authority by promoting communication among the various personnel responsible for designing, constructing, managing, and observing the construction. The Resident Engineer will be responsible for conducting these meetings. Meeting minutes will be taken by the Resident Engineer and distributed to attendees and appropriate non-attending personnel.

At a minimum, all meetings will be attended by a County representative and the Contractor. The Engineer will attend, as requested by the County. The following are formal meetings and every attendee is to conduct themselves in a professional and respectful manner for the purpose of project coordination through constructive behavior and verbal interaction.

6.3.1 Preconstruction Meeting

A meeting will be held prior to the start of construction to review the project schedule and to clarify or resolve issues before construction startup. At a minimum, the County, Engineer's Project Manager, Resident Engineer, the Contractor's Project Manager, and the Contractor's Superintendent shall be present. Topics to be discussed during this meeting are listed below.

- Provide each party with relevant construction documents and supporting information. Supporting information may include construction drawings, specifications, CQA plans, and other applicable documents. This information transfer is not limited to documents distributed by the Engineer.
- The Contractor will submit a preliminary construction schedule and other documents as required in the Contract Documents
- All parties should use the opportunity to distribute documents they believe relevant to the satisfactory completion of the Project.
- Review Division 1 (General Requirements) of the Special Provisions. Identify project limitations, requirements of current permits, and coordination with other possible contractors and utilities.

- Review the responsibilities of each party as outlined in the Contract Documents. Discuss specific milestone dates, project sequencing, working hours, imported material schedule, etc.
- Discuss the purpose of this CQA Plan and the documentation structure provided by it as a means of verifying that the project will be constructed efficiently and within the specified design criteria and schedule.
- Review lines of authority and communication for each party.
- Discuss the established procedures and protocol for observations and tests, including sampling strategies.
- Discuss the established procedures and protocol for handling construction deficiencies, repairs, and retesting.
- Discuss the established procedures and protocol for handling contract questions/clarifications and contract modifications (change orders, work directives, etc.).
- Review methods for documenting and reporting inspections and testing data.
- Review work area security, traffic control and safety protocol.
- Conduct a site walk to review construction material and equipment storage locations.
- Discuss Contractor's plans for site logistics, including staging area location and preparation, field office setup and utility plans, and onsite parking.
- Discuss payment for work, including schedule of values, retainage, method of payment, unit price work, and lump sum breakdowns.

6.3.2 Weekly Progress Meetings

Weekly progress meetings will be held at the site according to a schedule agreed to by all parties. The purpose of the progress meetings and the topics to be discussed are listed below.

- Review, and revise as necessary, minutes of previous meetings.
- Review any safety issues or incidents
- Review the previous week's activities and accomplishments. Discuss status of critical work elements.
- Review the Contractor's Activity Schedule. Activity Schedule shall include the scheduled construction activities for the following fourteen (14) calendar days. Review the Contractor's updated temporary water pollution/erosion control plan.
- Determine schedule for the Engineer's technical support staff or subcontractor's personnel to witness specified testing.
- Discuss existing or potential design, construction or schedule issues, including delivery of any long-lead items.
- Discuss construction impacts on traffic flow, and utility operations; or constraints on construction activity dictated by these operations.
- Develop corrective measures and procedures to regain planned schedule.
- Discuss status of submittal review.
- Discuss status of contract modifications.
- Review progress payment estimates.

The progress meetings will be documented by the Resident Engineer. Copies of the meeting minutes will be sent to all meeting attendees and others as applicable.

6.3.3 Work Deficiency Meetings

Special meetings may be held if a problem or deficiency is observed or is thought to be likely to occur. At a minimum, such meetings will be attended by the Resident Engineer and

Contractor's Superintendent. The Engineer and/or their sub-consultants, Contractor's Project Manager, County and others (as appropriate) may also attend these meetings if necessary.

The purpose of these meetings will be to resolve problems or recurring work deficiencies by defining and discussing the problem or deficiency, reviewing alternative solutions, and implementing plans for resolution.

These meetings will be documented by the Resident Engineer. Copies of the meeting minutes will be sent to all meeting attendees and others as applicable.

6.3.4 Weekly Safety Meetings

The Contractor will hold weekly safety meetings and include all employees, subcontractors and all others working with in the construction area. Contractor will take attendance and take meeting minutes. Attendance by the Resident Engineer will be encouraged but in no way relieve the Contractor of any liability or responsibility for the safety measures of the job.

6.4 Coordination

Installation of the new facilities and conversion from the existing systems to the newly constructed facilities will require coordination and clear communication. The Contractor must coordinate his efforts so that construction activities do not adversely affect existing systems, regulated effluent quality, facilities operations and/or utilities. Clear communication will facilitate the coordination process.

6.4.1 Coordination with County's Contractors and Operations Personnel

It is the responsibility of the Contractor to coordinate his work so that impacts to the County's facilities are either prevented altogether or minimized.

Kitsap County operations personnel include:

Contact Name	Phone Number
Floyd Bayless, Construction Manager	Kitsap County Sewer Utility 360-509-1209

6.4.2 Coordination with Utilities and Regulatory Agencies

Several existing utilities, including water service, natural gas, power, fiber optic cable, and telephone service utilities are or may be located within the project areas. It is the responsibility of the Contractor to coordinate his construction activities so that interruptions in service are minimized. The Contractor may address correspondence directly to the affected utility; however, the Resident Engineer must receive copies to verify that the intent of the design is maintained and that the interests of the County are not adversely affected.

Following is a list of the utilities that have infrastructure within or near the project limits:

Utilities	Contact Name	Phone Number
Centurylink	Royce Klein Dan O'Tool	360-478-5930
Cascade Natural Gas	Rick Coy Chris Bassard	360-373-1405
Puget Sound Energy	Tom Brobst	425-392-6412
Washington State Department of Archaeology and Historic Preservation	Allyson Brooks Guy Tasa Rob Whitlam	360-586-3066 360-586-3534 360-586-3080
Washington State Department of Ecology	Lazaro Eleuterio	425-649-7027

See Appendix D "Inadvertent Discovery Plan" for additional contacts and procedures regarding archaeological deposits.

Chapter 7 Quality Assurance/Quality Control

7.1 General

This section describes the Quality Assurance and Quality Control (QA/QC) activities that will take place and processes that will be used during construction. The purpose of the QA activities performed by the County and assisted by the Resident Engineer is to ascertain that the work conforms to the requirements of the Contract Documents. The QA activities include:

- Review and observation
- Sampling and testing
- Use of acceptance/rejection criteria
- Identification of corrective measures

QA activities shall apply to all portions of work in the Contract Documents.

QC activities are required of the Contractor to verify and document that all materials and work conform to the requirements of the Contract Documents. These efforts include, but are not limited to:

- Source testing for all imported and borrow materials
- Review of manufacturer's submittals and certifications prior to submission to the Engineer
- Field and laboratory testing to verify compaction of embankment, trench backfill, road subgrade, crushed surfacing and asphalt
- Material testing for pump station building materials
- Pipe testing for force main & gravity lines
- All other testing required to assure the Contractor's work meets the requirements of the Contract Documents.

QA\QC activities and responsibilities associated with the individual components of the Project are described below. These components are as follows but not limited to:

- Gravity and Force Main Piping Construction
  - Material submittal review
  - Lines and grades
  - Bedding and backfill compaction
  - Pipe deformation testing
  - Pipe pressure testing
- Pump Station Construction
  - Site fill
  - Material submittal review
  - Special inspections required by sub-consultants
- Equipment Installation
  - Pump, piping, valves, and appurtenances
  - Electrical equipment
  - Auxiliary equipment

- General Site Work
  - Earthwork and compaction
  - Construction QA/QC
  - Electrical
- Pavement
  - Road section installation QA/QC
  - Testing asphalt compaction, temperature at delivery & during compaction
  - Testing crushed surfacing compaction
- CIPP Construction
  - Material submittal review
  - Material installation
  - Pipe pressure testing
- Facility Construction
  - Structure material placement and installation
  - Structure thermal & moisture protection, and finishes
  - Building permit inspections

7.2 Project Staffing and Effort

On-site construction observation will be performed primarily by the Resident Engineer. Additional personnel will be utilized on an as-needed basis. Duties of on-site personnel will involve observation and documentation (see Section 5) of construction activities, verification of conformance with Contract Documents, performance and coordination of CQA activities, as well as communication with the office engineering staff, County, Contractor, and others. Maintenance of field files and verification of in-place quantities are also responsibilities of on-site personnel.

7.3 Review and Observation

Review, observation, and recording of the Contractor's submittals, quality control testing, and work methods will be performed to confirm that products and methods are meeting the intent and the requirements of the Contract Documents. These efforts will take place before, during and after construction as described in the following subsections.

7.3.1 Preconstruction

The Resident Engineer will familiarize himself with the project design and have an understanding of the intent of the Contract Documents. The Resident Engineer shall also review the observation procedures set forth in this CQA plan. Prior to construction, the Resident Engineer shall review the following:

- Construction schedule
- Contractor's schedule of values for the pump station
- Submittal log
- Any other schedule or plan required prior to commencement of construction
- Construction testing requirements
- Transportation, unloading, handling, and storage procedures for the construction products
- Contractor's and installer's proposed construction procedures for design and specification compatibility and constructability

7.3.2 Construction

Construction oversight by the County and Resident Engineer will include, but is not limited to, the following:

- Verifying that required submittals have been submitted for review by the Engineer and have been approved for use in construction
- Check any materials coming on site against the accepted material submittals and Contract Documents. The Resident Engineer shall keep a basic log of materials reviewed and accepted or rejected
- Observing that stored or installed pipe, valves, concrete products, pumps, electrical components, building materials, etc. are not damaged
- Observing construction and maintenance of erosion control measures and facilities
- Observing each phase of the construction, documenting the contractor's compliance or noncompliance with the Contract Documents, and verifying the correction of defective work
- Reviewing the Contractor's updated Construction Activity Schedule and compare with actual progress
- Confirming that lines and grades have been verified by the Contractor prior to subsequent component construction and recommended conformance survey as needed
- Documentation of imported and in-place quantities completed by the Contractor and recommendations for progress payment
- Checking that the project piping, trenching, and grading work has been performed in general accordance with the Contract Documents
- Observing performance compliance testing performed by the Contractor as part of the Contractor's CQC program

These oversight activities will not relieve the Contractor from meeting the requirements, including Contractor's CQC procedures, set forth in the Contract Documents. Submittal requirements are discussed further in Section 8.

7.4 Sampling and Testing

7.4.1 Quality Control Testing

Quality Control Testing will be provided by the Contractor to verify the quality of construction materials and as the Contractor deems necessary to ensure the work product meets the requirements of the Contract Documents.

7.4.2 QA Testing

QA testing for this project will be performed using a certified testing laboratory under subcontract to the County and/or Engineer to determine and document the quality of the constructed facility and to verify the adequacy of the Contractor's QC testing. The testing lab will collect samples and perform in-situ and/or laboratory testing at the types and frequencies specified in the Contract Documents or as specified by the County and/or Engineer. The recommended QC tests including sample collection, in-situ or laboratory testing, field observation and oversight, documentation, and review of test results, as applicable, are detailed in the attached Tables in Appendix B.

The County and/or Engineer may conduct additional sampling and testing beyond that specified at any time.

7.5 Acceptance/Rejection of Work

7.5.1 Criteria for Acceptance/Rejection

The criteria for acceptance or rejection of elements of work will be as stated in the Contract Documents. Regular checks will be made through field and laboratory testing to ensure that the Contractor's QC procedures are adequate. The Resident Engineer is to provide copies of all test results to the County and Contractor. Test results that fail to meet the standards shall require corrective action by the Contractor as directed by the Engineer.

7.5.2 Corrective Measures

Corrective measures will be implemented as necessary to bring the work to the required quality and may include replacement of the work. Where replacement of work is required, the area to be replaced will be defined by the County, reviewed and documented by the Engineer, and based on test results, visual analysis, and professional judgment. Replacement of work may include special measures at borders of such areas to provide continuity.

Any deficiencies identified will be rectified upon discovery and subsequent Contractor notification. If deficiencies identified during construction are not rectified upon the County's request, payment for non-conforming work will be withheld until the corrections are complete.

7.5.3 Equipment Start-up and Operational Testing

Equipment and instrumentation installed in association with the Pump Station and Beach Line Sewer Upgrades will be subject to operational testing as part of the start-up procedures. Specific operational testing and start-up requirements are specified in the Contract Documents. Start-up and operational testing shall be performed by the Contractor, in the presence of the County and/or Engineer, prior to acceptance of the work. The Contractor shall conduct preliminary activities to ensure equipment or systems are ready for testing. These items include, but are not limited to:

- Equipment performance
- Troubleshooting
- SCADA system and telemetry
- Alarm systems

The Contractor is responsible for scheduling all start up and testing activities. The Contractor must coordinate these activities with the County who will coordinate with the appropriate County staff and Engineer.

Chapter 8 Technical Records Handling

8.1 Submittals

Specific requirements concerning submittals are detailed in the Contract Documents. General features of the submittal process are detailed below.

- The Contractor shall coordinate, check and submit shop drawings, samples, catalog cuts, layouts, color charts, bills of material, etc. as specified in each section of the Specification and required by the Project Data Submittals.
- The Contractor shall submit a Request for Submittal Review form, together with all product data, to the Engineer. The request will be submitted on a standard form as shown in Appendix A.
- Each Submittal shall receive an individual and unique submittal number. More than one item from a specific section may be included under a submittal number. Submittals for materials in the same section, but submitted at different times, will need separate numbers. Resubmittal of materials, in part or whole, shall have the same number as the original submittal plus a revision number.
- Three copies or one electronic copy will be required for each Submittal. Copies will be distributed to the Engineer, appropriate sub-consultant, and the County. Two reviewed copies or one electronic copy will be returned to the Contractor.

8.1.1 Filing

A complete set of construction management files will be maintained at the Resident Engineer's office including correspondence, submittals, contract administration, pay estimates, and Quality Assurance/Quality Control testing result files.

8.1.2 Contract Record Drawings

The Resident Engineer will maintain a set of mark-up Contract Documents in his office to be updated continuously as changes/modifications occur during construction.

The Contractor is also required to maintain an updated set of Contract Drawings at the construction site. Following completion of the project the Contractor must provide a complete set of contract record drawings detailing the constructed project.

The County and Resident Engineer will review the Contractor's record drawings on a monthly basis prior to Pay Requests. The Engineer will prepare the final set of contract record drawings. The final set of contract record drawings will then be submitted to the County.

Chapter 9 Work Clarification/Changes

During construction and as work progresses, it will be necessary to respond to the Contractor's questions (including providing technical clarification and/or instruction), provide direction to perform extra or modified work and amend the Contract (formally). The intended protocol for these procedures is outlined in the following sections. Specific requirements regarding changes to the Contract are defined in the Contract Documents.

9.1 Request(s) for Information

Request(s) for Information (RFIs) will be used to provide written direction to clarify points or give additional instructions to the Contractor. All work-related questions requiring clarification or additional instruction should be initiated formally by the Contractor using the standard form provided in Appendix A. The Engineer may also initiate an RFI to clarify points or provide additional detail.

9.2 Work Directive(s)

Where situations involve changes in the work which, if not processed expeditiously, might delay the project, the modifications may be initiated through use of a Work Directive. The Work Directive is not a Change Order, but only a directive issued by the County to proceed with work that will be included in a subsequent Change Order. Work directives may also be used to document changes in the work that do not involve adjustments to the contract price or contract time.

The intent of this procedure is to help expedite changes and modifications without delaying the construction schedule. Utilization of Work Directives will follow the procedures outlined in the Contract Documents. If deemed necessary, several Work Directives may be grouped into a single Change Order. County authorization may be initiated via facsimile, telephone, or in person.

9.3 Change Order(s)

The County, without invalidating the Contract, may order extra work or may make changes by altering or deleting any portion of the work, as deemed necessary or desirable (as set forth in the Contract Documents). Extra work and changes will be executed in writing by the County by means of a Change Order. Change Orders are required for situations involving the adjustments of Contract Price and/or Contract Time. Change Orders shall be signed by the County, the Engineer, and the Contractor. The value of extra work and changes shall be determined and paid for in accordance with the construction Contract Documents.

9.4 Review and Approval Process for Changes

Changes in the work shall be negotiated by the County and the Contractor. The County may request that the Contractor provide a proposal detailing the impacts to the contract amount and the contract schedule associated with a proposed contract modification. In addition, change orders that represent a significant deviation from the Contract Documents may require review and approval by a regulatory agency prior to execution of the change order. The County shall review and approve all negotiated changes. All Change Order and Work Directive forms require the signature of the County and Contractor in order for a change to be valid.

APPENDIX A

Construction Documentation Forms

DRAFT

BHC CONSULTANTS

REQUEST FOR INFORMATION – BHC RESPONSE

Project Name: _____

Project Number: _____

RFI No.: _____

Date: _____

Response From: _____ **Date:** _____

Item	Structure	Sheet(s)	Question	BHC Response

Contractor shall notify the Engineer/Contracting Agency of any costs and or schedule impacts associated with this RFI response per the requirements of the Contract Documents.

CONTRACTOR'S SUBMITTAL TRANSMITTAL

PROJECT NAME

Submittal No:
RE:

Contract No.

CONTRACTOR:

Date Submitted:

THE FOLLOWING ITEMS ARE HEREBY SUBMITTED FOR YOUR REVIEW AND ACTION:

LEGEND: **1)** No Exceptions Taken **2)** Make Corrections Noted **3)** Amend and Resubmit **4)** Rejected – See Remarks **5)** Eng Review Not Req'd

Item NO.	Paragraph	**DESCRIPTION**	(1)	(2)	(3)	(4)	(5)
1							
2							
3							
4							
5							
6							
7							

Remarks:

Click here to enter contractor remarks.

Response:

1.

Date: Click here to enter a date.

Response By:

CONTRACTOR'S CERTIFICATION:

CHECK ONE OF THE FOLLOWING:

☐ Submittal contains no deviations to requirements specified or shown.

☐Submittal contains deviations to requirements specified or shown as noted and justified in the letter attached to this transmittal sheet.

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

Submitted By:

Corrections or comments made on Contractor's shop drawings during this review do not relieve the Contractor from compliance with Contract Drawings and Specifications. This submittal has been reviewed for conformance with the design concept and general compliance with the Contract Documents only. Contractor is responsible for confirming and correlating all quantities and dimensions; fabrication processes and techniques; coordinating work with other trades; and satisfactory and safe performance of the work.

Reviewed By: Click here to enter text.

Returned By: Click here to enter text.

PROPOSED CHANGE NOTICE

Project:

Contract No:
Change Type:

Date:
Contractor:

PCN Number:

Subject:

Document References:

Proposed Change Details:

Reason for Change:

Notification By:

Approved Cost/Credit: $ _____ **Approved Contract Time Extension (Days):** _____

☐ Minor Changes Allowance Schedule

☐ Contract Change Order/Amendment

Contractor's Concurrence:

_____ Date: _____

Owner's Authorization to Proceed:

_____ Date: _____

BHC CONSULTANTS

OBSERVER'S DAILY REPORT

Sheet of Sheets			
Project	Project No.	Day	Date
Weather (See Instructions) AM PM			
Prime Contractor A.		Project Supervisor	

Subcontractor	Representative/Title
B.	
C.	
D.	
E.	

Contractor's Equipment

Operating Contractor's ID (A-E, see above)						
	No.	Equipment – ID No. and Description	Opr	Stdby	Down	Idle

Contractor's Workforce

Operating Contractor's ID (A-E, see above)										
Number / Total Hours										
Laborers	Carpenters	Operators	Teamsters	Ironworkers	Masons	Flaggers	Electricians	_____	_____	_____
/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/	/	/

REPORT (including discussions with Contractor)

Photos/Videos taken Today? ☐ Yes ☐ No

Observer's On Site Hours

From	
To	

(Signed) Observer

Reviewed By

BHC CONSULTANTS

OBSERVER'S DAILY REPORT

Sheet of Sheets	Date

WORK PERFORMED/CONTINUING

Item, Description, and Location of Work (NOTE: Any "No" is to be explained within this daily report)						Completed	Required Backup Samples Taken	Matls Documentation Approved	Matls Source Approved
Item No.	Contract Item Description	Area	Unit	Quantity	Testing	Y/N	Y/N	Y/N	Y/N

NOTES/SKETCHES

Observer

BHC CONSULTANTS

OBSERVER'S DAILY REPORT

Sheet of Sheets		
Contract	Day	Date

ADDITIONAL OBSERVATIONS LOG – Including but not limited to: a report of the day's operations, time log (if applicable), orders given and received, discussions with contractor, and any applicable statements for the monthly estimate.

Signed _____ Observer

EQUIPMENT – FIELD NOTE RECORD

Equipment		Area	Installation Dates		Testing	Notes
No.	Name		Started	Completed		

Page No. _____

LOAD TALLY SHEET

Sheet _____ of _____

Contract No.	Contractor	Date
Item No.	Material	

Net Weight	Truck No.	Time	Net Weight	Truck No.	Time	Net Weight	Truck No.	Time
Scaler			Total Lbs.			Total Gross		
Checked By								

APPENDIX B

Testing Forms

LANDAU ASSOCIATES

Construction Field Report

Project No.: _____ Report No.: _____

Client/Owner: _____ Date: _____

Project Name: _____

Location: _____

Weather Conditions: _____

Prepared By: _____ Reviewed By: _____

Visitors: _____

Unsatisfactory Conditions & Recommended Correction: _____

Attachments: _____

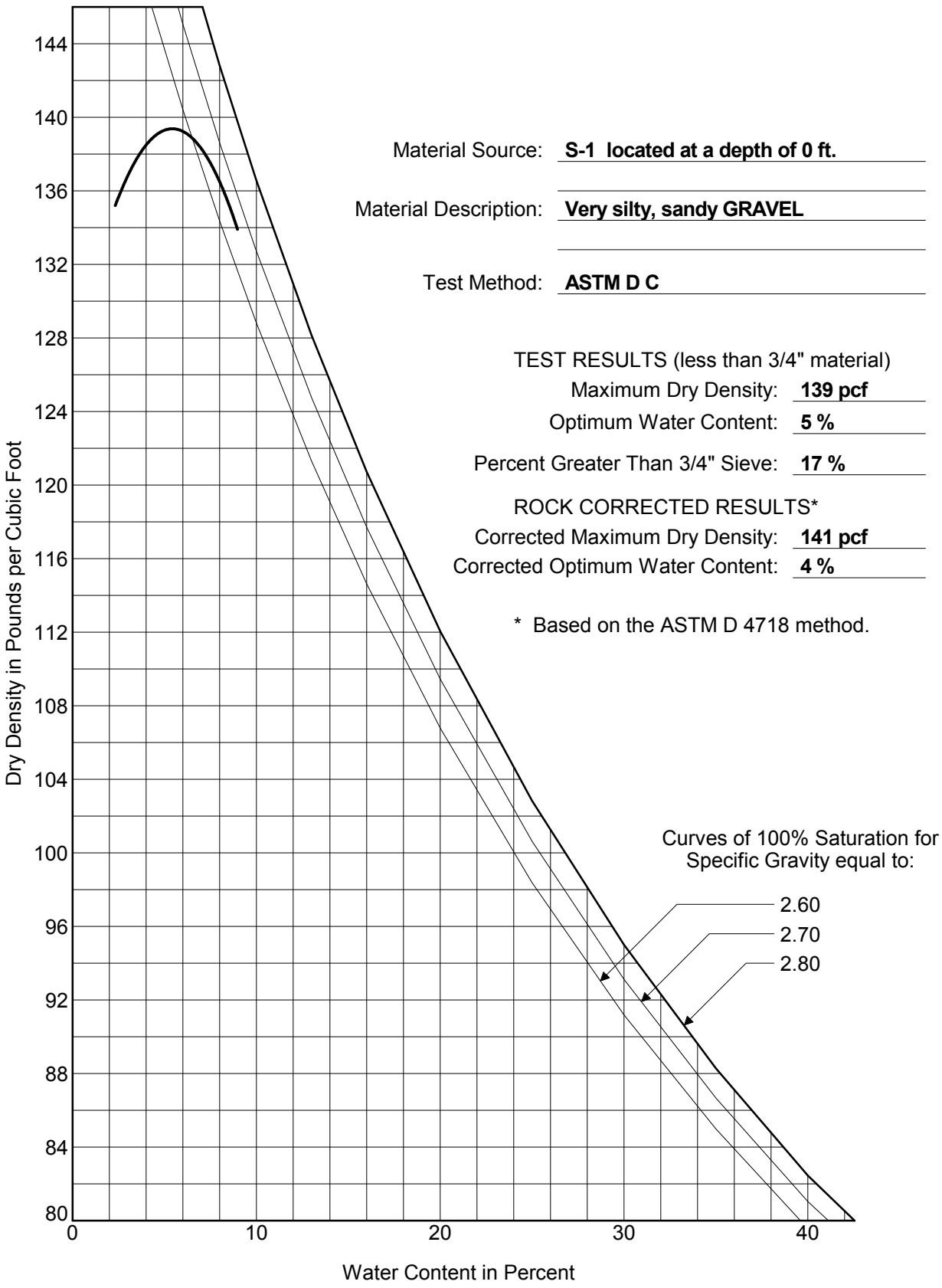
Distribution: _____

Landau Associates' representatives are onsite solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

A preliminary copy of the Field Report may be provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the Field Report are subject to review and revision by Landau Associates' project manager or designee. A reviewed Field Report shall take precedence over a preliminary report.

Signed:

130 2nd Avenue South • Edmonds, WA 98020 • (425) 778-0907 • fax (425) 778-6409 • www.landauinc.com



Material Source: **S-1 located at a depth of 0 ft.**

Material Description: **Very silty, sandy GRAVEL**

Test Method: **ASTM D C**

TEST RESULTS (less than 3/4" material)

Maximum Dry Density: **139 pcf**

Optimum Water Content: **5 %**

Percent Greater Than 3/4" Sieve: **17 %**

ROCK CORRECTED RESULTS*

Corrected Maximum Dry Density: **141 pcf**

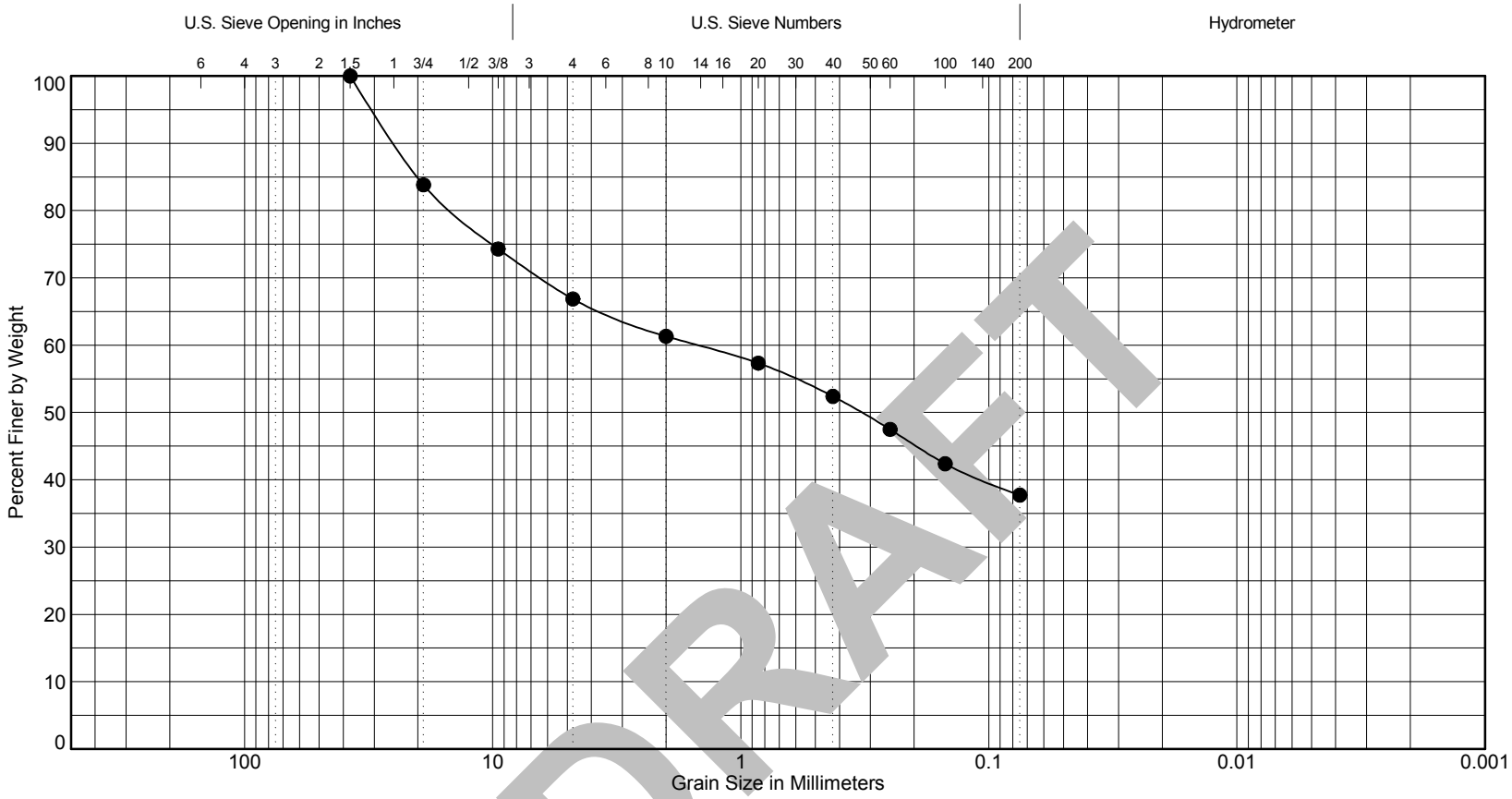
Corrected Optimum Water Content: **4 %**

* Based on the ASTM D 4718 method.

8/9/16 C:\USERS\AWARNELL\DESKTOP\EXAMPLE.GPJ COMPACTION FIGURE (PARABOLA WO POINTS)

LANDAU ASSOCIATES

Manchester Pump Stations Kitsap County, Washington	Moisture-Density Relationship	Figure 1



DRAFT

Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	S-1		0.1		Very silty, sandy GRAVEL	GM

LANDAU ASSOCIATES

Manchester Pump Stations
Kitsap County, Washington

Grain Size Distribution

Figure
1

LANDAU ASSOCIATES

PAGE: _____ OF _____

Field Nuclear Density Test Report

PROJECT NAME _____ PROJECT NO.: _____
LOCATION: _____ DATE: _____ REPORT #: _____
CLIENT: _____ GENERAL CONTRACTOR: _____
WEATHER: _____ SUBCONTRACTOR: _____

METHOD OF COMPACTION

VIBRATING PLATE _____
VIBRATING ROLLER _____
HOE-PACK _____
SHEEPS FOOT ROLLER _____

GAGE TYPE/NUMBER: _____
STANDARD COUNTS: MC= _____
DC= _____

MODIFIED PROCTOR [ASTM D 1557] TEST RESULTS (MDD-Maximum Dry Density, OMC-Optimum Moisture Content)

SAMPLE	MDD	OMC	DESCRIPTION/SOURCE

FIELD TEST DATA

TEST NO.	GENERAL LOCATION	ELEVATION (ft)	BELOW FINISH GRADE	SOIL TYPE	DRY DENSITY	MOISTURE	REL. OMC +/-	COMPACTION (%) FIELD	COMPACTION (%) SPECIFICATION	TEST RESULTS

REMARKS: _____

TESTED BY: _____

REVIEWED BY: _____

Landau Associates' representatives are onsite solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

APPENDIX C

Material and Testing
Quality Assurance/Quality Control Requirements

Table 1 - General Sitework

TEST	ASTM METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY		ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Source Testing (1)	Conformance Testing	Source Testing	Conformance Testing(3)	CONTRACTOR	RESIDENT ENG.
Native Backfill								
Gradation	ASTM C136/C117	WSDOT 9-03.15	1 test prior to use				Submit test results to Engineer.	
Moisture-Density	ASTM D1557	N/A	N/A			1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	95% MDD	N/A			1/100 LF		
Imported Trench Backfill								
Gradation	ASTM C136/C117	WSDOT 9-03.19	1 test prior to import				Submit test results to Engineer.	
Sand Equivalent	ASTM D2419	WSDOT 9-03.10						
Dust Ratio		WSDOT 9-03.10						
Moisture-Density	ASTM D1557	N/A				1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	95% MDD				1 test per lift/200 lf of trench		
Pipe Zone Bedding								
Gradation	ASTM C136/C117	WSDOT 9-03.12(3)	1 Test prior to import				Submit test results to Engineer.	

TEST	ASTM METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY		ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Source Testing (1)	Conformance Testing	Source Testing	Conformance Testing(3)	CONTRACTOR	RESIDENT ENG.
Sand Equivalent	ASTM D2419	WSDOT 9-03.12(3)	1 test prior to import				Submit test results to Engineer.	
Moisture-Density	ASTM D1557	N/A				1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	Refer to Section 02300						
Foundation Material								
Gradation	ASTM C136/C117	WSDOT 9-03.17	1 test prior to import				Submit test results to Engineer.	
Moisture-Density	ASTM D1557	N/A				1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	95% MDD				1 test per lift/100 lf of trench		
Structural Fill								
Gradation	ASTM C136/C117	WSDOT 9-03.12(1)	1 test prior to import				Submit test results to Engineer.	
Moisture-Density	ASTM D1557	N/A				1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conduct testing. Review test results
In-place Density Testing	ASTM D6938	95% MDD				6 tests under pump station bldg,		
Structural Backfill								
Gradation	ASTM C136/C117	WSDOT 9-03.12(2)	1 test prior to import				Submit test results to Engineer.	

TEST	ASTM METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY		ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Source Testing (1)	Conformance Testing	Source Testing	Conformance Testing(3)	CONTRACTOR	RESIDENT ENG.
Sand Equivalent	ASTM D2419	WSDOT 9-03.12(2)	1 test prior to import				Submit test results to Engineer.	
Dust Ratio								
Moisture-Density	ASTM D1557	N/A				1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conduct testing. Review test results
In-place Density Testing	ASTM D6938	95% MDD				1 test at each structure		
CSBC								
Gradation	ASTM C136/C117	WSDOT 9-03.9(3)	1 test prior to import				Submit test results to Engineer.	
Las Angeles Wear	ASTM C131							
Degradation Factor	ASTM D3744							
Sand Equivalent	ASTM D2419							
% Fracture	D5821							
Moisture-Density	ASTM D1557	N/A	N/A			1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	95% MDD	N/A			1/100 LF		

TEST	ASTM METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY		ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Source Testing (1)	Conformance Testing	Source Testing	Conformance Testing(3)	CONTRACTOR	RESIDENT ENG.
Select Fill								
Gradation	ASTM C136/C117	Refer to Section 02300	1 test prior to import				Submit test results to Engineer.	
Moisture-Density	ASTM D1557	N/A	N/A			1 test per similar product	Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	95% MDD	N/A			1/100 LF		

TEST	METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY		ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Source Testing (1)	Conformance Testing	Source Testing	Conformance Testing(3)	CONTRACTOR	ENGINEER
Unit Paving Base Course								
Gradation	ASTM C136/C117	WSDOT 2-03 & 2-06					Submit test results to Engineer.	
Moisture-Density	ASTM D1557	N/A					Provide notification of materials onsite or areas of work ready for testing. Allow access to work area for testing.	Conducts Testing. Review test results.
In-place Density Testing	ASTM D6938	95% MDD						
Asphalt Concrete Pavement								
Gradation/ Extraction	WSDOT T308/T27/T11	HMA PG64-22 Class 1/2" aggregate		Submit Mix Design			Submit test results to Engineer	
Rice Density	ASTM D2041							
Density	WSDOT Test Method TM8	91% minimum density	N/A			1/100 lf of road lane	Allow access to work area for testing	Conduct testing. Review test results.
Surface Smoothness		Transverse slope of completed surface of the wearing course shall not be greater than 1/8" from edge of 10' straightedge						

Note:
1. Additional testing required if source changes
2. See Contract documents for complete Contractor sampling and testing requirements.
3. All conformance testing will be at the discretion of the Resident Engineer.

Table 2 – Pipe Testing

TEST	METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY	ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Conformance	Source Testing	Conformance Testing	CONTRACTOR	ENGINEER
Gravity Sewer Pipe							
Low Pressure Air Test	Pneumatic	WSDOT 7-17.3.(2)F	All new pipes & appurtenances		All gravity pipe	Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.
Deflection Test	Mandrel	WSDOT 7-17.3.(2)G	All new pipes & appurtenances		All gravity pipe	Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.
TV Test	TV Camera	WSDOT 7-17.3.(2)H	All new pipes & appurtenances		All gravity pipe	Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.
Force Main Sewer Pipe							
Hydrostatic Test	ASTM F2164	Refer to Section 15060	All new pipes & appurtenances		All FM pipe	Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.
Water Main							
Hydrostatic Test		WSDOT 7-09.3(23)	All new pipes & appurtenances		All Water pipe	Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.
Disinfection of Water Main		WSDOT 7-09.3(23)	All new pipes & appurtenances		All Water pipe	Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.
OTHER PIPING							
		Refer to Section 15060	All new pipes & appurtenances			Submit testing plan. Conduct and document test as specified.	Review testing plan. Observe testing.

Table 3 – Concrete Testing

TEST	METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY	ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Conformance	Source Testing	Conformance Testing	CONTRACTOR	ENGINEER
Reinforced Concrete Exposed to the weather or earth – Class 1							
Mix Design		Refer to Sections 03000 and 03310	Per each Mix Design			Submit Mix Design for review	Review mix design, monitor concrete placed on site.
Field Batch Test		Refer to Sections 03000 and 03310			1 sample per 50 cubic yards	Provide access to pour and assist County's Consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Compressive Strength		Refer to Sections 03000 and 03310			4 cylinders per 50 cubic yards	Provide access to pour and assist County's consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Reinforced concrete not exposed to the weather except floor slabs on grade – Class 2							
Mix Design		Refer to Sections 03000 and 03310	Per each Mix Design			Submit Mix Design for review	Review mix design, monitor concrete placed on site.
Field Batch Test		Refer to Sections 03000 and 03310			1 sample per 50 cubic yards	Provide access to pour and assist County's Consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Compressive Strength		Refer to Sections 03000 and 03310			4 cylinders per 50 cubic yards	Provide access to pour and assist County's consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.

TEST	METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY	ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Conformance	Source Testing	Conformance Testing	CONTRACTOR	ENGINEER
Slabs on grade at interior locations – Class 3							
Mix Design		Refer to Sections 03000 and 03310	Per each Mix Design			Submit Mix Design for review	Review mix design, monitor concrete placed on site.
Field Batch Test		Refer to Sections 03000 and 03310			1 sample per 50 cubic yards	Provide access to pour and assist County's Consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Compressive Strength		Refer to Sections 03000 and 03310			4 cylinders per 50 cubic yards	Provide access to pour and assist County's consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Unreinforced concrete for pavements and sidewalk slabs – WSDOT Class 4000							
Mix Design		Refer to Sections 03000 and 03310	Per each Mix Design			Submit Mix Design for review	Review mix design, monitor concrete placed on site.
Field Batch Test		Refer to Sections 03000 and 03310			1 sample per 50 cubic yards	Provide access to pour and assist County's Consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Compressive Strength		Refer to Sections 03000 and 03310			4 cylinders per 50 cubic yards	Provide access to pour and assist County's consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.

TEST	METHOD	REQUIREMENTS Proposed criteria or Specification	CONTRACTOR - QUALITY CONTROL TEST FREQUENCY	ENGINEER - QUALITY ASSURANCE TEST FREQUENCY		ADDITIONAL QA/QC SUPPORT	
			Conformance	Source Testing	Conformance Testing	CONTRACTOR	ENGINEER
Unreinforced concrete for thrust blocks, channel filler, and other general uses – WSDOT Class 3000							
Mix Design		Refer to Sections 03000 and 03310	Per each Mix Design			Submit Mix Design for review	Review mix design, monitor concrete placed on site.
Field Batch Test		Refer to Sections 03000 and 03310			1 sample per 50 cubic yards	Provide access to pour and assist County's Consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
Compressive Strength		Refer to Sections 03000 and 03310			4 cylinders per 50 cubic yards	Provide access to pour and assist County's consultant with obtaining samples	Coordinate with County's Consultant. Observe testing.
CDF							
Mix Design		WSDOT 2-09.3(1)E	Mix Design if mixed offsite. Material data sheet if mixed on site.			Submit Mix Design for review	Review mix design, monitor concrete placed on site.

APPENDIX D

Inadvertent Discovery Plan

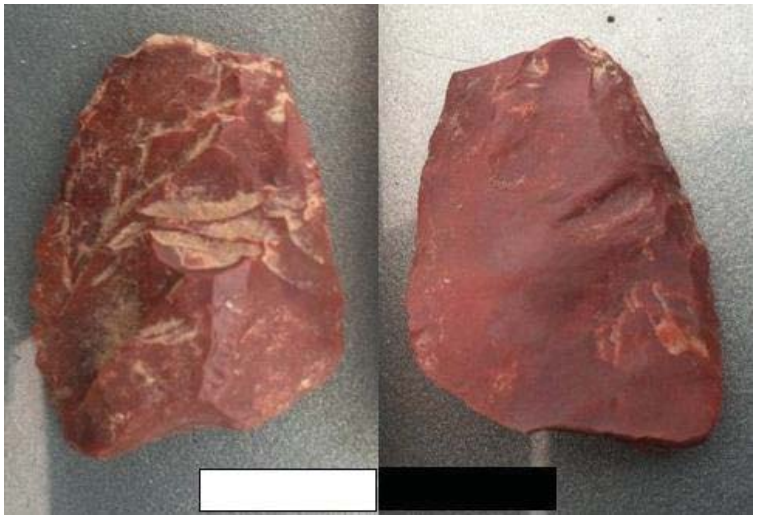
I might implement the IDP / UDP if …

I see chipped or ground stone artifacts.

Note: All scales are in centimeters.

I might implement the IDP / UDP if …

I see chipped or ground stone artifacts.



Note: All scales are in centimeters.

I might implement the IDP / UDP if …

I see ground or pecked stone artifacts.

- Striations or scratching
- Unusual or unnatural shapes
- Unusual stone
- Etching
- Perforations
- Pecking
- Regularity in modifications
- Variability of size, function, and complexity

I might implement the IDP / UDP if …

I see bone or shell artifacts.

- Often smooth
- Unusual shape
- Carved
- Often pointed if used as a tool
- Often wedge shaped like a "shoe horn"

Bone Awls from Oregon and Bone Wedge from California

I might implement the IDP / UDP if …

I see bone or shell artifacts.

- Often smooth
- Unusual shape
- Perforated
- Variability of size

I might implement the IDP / UDP if …

I see fiber or wood artifacts.

- Wet environments needed for preservation
- Variability of size, function, and complexity
- Rare

Artifacts from Mud Bay, Olympia, Washington

I might implement the IDP / UDP if …

I see historic period artifacts.

Artifacts from Downtown Seattle, Alaskan Way Viaduct (Upper Left and Lower) and Unknown Site (Upper Right)

I might implement the IDP / UDP if …

I see strange, different or interesting looking dirt, rocks, or shells

- Human activities leave traces in the ground that may or may not have artifacts associated with them
- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Charcoal or charcoal-stained soils
- Oxidized or burnt-looking soils
- Accumulations of shell
- Accumulations of bone or artifacts
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

I might implement the IDP / UDP if …

I see strange, different or interesting looking dirt, rocks, or shells

- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

Site on Muckleshoot Indian Reservation, near WSDOT ROW along SR 164

I might implement the IDP / UDP if …

I see strange, different or interesting looking dirt, rocks, or shells

- Often have a layered or “layer cake” appearance
- Often associated with black or blackish soil
- Often have very crush and compacted shell

I might implement the IDP / UDP if …

I see historic foundations or buried structures.

PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

MANCHESTER PUMP STATIONS 45, 56, AND 47
AND BEACH LINE REHABILITATION
KITSAP COUNTY WASHINGTON
June 23, 2015

1. INTRODUCTION

Kitsap County is proposing system rehabilitations to the existing sewer system located along the shore of Puget Sound in the unincorporated village of Manchester. The improvements generally include the rehabilitation of Pump Stations 45, 46, and 47 (PS45, PS46, PS47), which includes installation of new pump station vaults, wet wells, beach manholes, and reconnection of sanitary sewer lines (i.e., gravity and force main) to the system. In addition, approximately 175 feet (ft) of sanitary sewer force main will be replaced to the west of the proposed PS45. The project also includes installation of approximately 3,330 ft of cured in place pipe liner in the existing beach line (installed from existing manholes) and reconnection of side sewers.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include:

- An accumulation of shell, burned rocks, or other food related materials,
- Bones or small pieces of bone,
- An area of charcoal or very dark stained soil with artifacts,
- Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years,
- Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

<u>STEP 1: STOP WORK.</u> If any employee, contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work in the immediate area of the discovery must stop (typically a 10 foot radius, but depends on site conditions). The discovery location should be secured at all times. Do not call or speak with the media about the remains specifically.

If human remains are encountered, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed (See Section 5).

STEP 2: NOTIFY MONITOR. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions.

STEP 3: NOTIFY PROJECT MANAGEMENT. Contact the Project Manager:

Project Manager:
Adam Schuyler, BHC Consultants, LLC
(206) 357-9955 or (206) 505-3400

If you can't reach the Project Manager, contact the project's alternate point of contact:

Alternate Contact:
Erika Schuyler or Tyler Whitehouse, BHC Consultants, LLC
(206) 505-3400

The Project Manager or their designated Alternate Contact will make all other calls and notifications. A complete listing of Contacts is provided in Section 7.

4. FURTHER CONTACTS AND CONSULTATION

A. Project Manager's Responsibilities:

- Protect Find: The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource (typically a 10 foot radius, but depends on site conditions). Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.

- Direct Construction Elsewhere On-site: The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.

- Identify Find: The Project Manager will ensure that a qualified professional archaeologist examines the find to determine if it is archaeological. This will either be an archaeological consultant hired by the Project or staff from DAHP.

    - If the discovery is determined not archaeological, work may proceed with no further delay.

    - If the discovery is determined to be archaeological, the Project Manager will continue with notification.

    - If the discovery is human remains, potentially human remains, a burial, or funerary objects, the Project Manager will follow the the procedure described in Section 5. *Do not call 911*.

- Contact the Department of Archaeology and Historic Preservation (DAHP)

  Dr. Allyson Brooks
  State Historic Preservation Officer (SHPO)
  (360) 586-3066 or (360) 586-3064

  Dr. Rob Whitlam
  State Archaeologist
  (360) 586-3080

  Dr. Guy Tasa
  State Physical Anthroplogist
  (360) 586-3534 or (360) 790-1633

- Notify involved federal or permitting agencies (if any).

  Lazaro Eleuterio
  Washington State Department of Ecology
  (425) 649-7027

  Barbara Zaroff
  Kitsap County
  (360) 981-1767

- Notify the interested and affected Tribes.

  Tribes consulted on this project are:

Dennis Lewarch, Tribal Historic Preservation Officer (THPO) Suquamish Tribe	(360) 394-8529
Kris Miller, THPO Skokomish Indian Tribe	(360) 426-4232 ext. 215
Josh Wisniewski, THPO Port Gamble S'Klallam Tribe	(360) 633-1899
Gideon Cauffman, Cultural Resources Jamestown S'Klallam Tribe	(360) 681-4638
Bill White, Cultural Resources Lower Elwha Klallam Tribe	(360) 460-1617
Richard Young, Cultural Resources Tulalip Tribes	(360) 716-2652

5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect.

If the project occurs on federal lands (e.g., national forest or park, military reservation) or Indian lands (e.g., reservations, allotments, communities) the provisions of the Native American Graves Protection and Repatriation Act of 1990 apply, and the responsible federal agency will follow its provisions. Note that state highways that cross federal and Indian lands are on easements and are not owned by the state.

If the project occurs on non-federal lands, it will comply with applicable state laws, and the following procedure:

A. Notify Law Enforcement Agency or Coroner's Office (*Do not call 911*):

   In addition to the actions described in Sections 3 and 4, the Project Manager will immediately notify the local law enforcement agency or coroner's office.

   The coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will notify DAHP.

   Kitsap County Sheriff, Port Orchard (360) 337-7101

B. Participate in Consultation:

   Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains.

C. Further Activities:

   - Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.

   - When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

6. PROCEEDING WITH CONSTRUCTION

Project construction outside the discovery location may continue while documentation and assessment of the cultural resources proceed. A Professional Archaeologist must determine the boundaries of the discovery location. In consultation with DAHP and affected tribes, the Project Manager will determine the appropriate level of documentation and treatment of the resource. If federal agencies are involved, the agencies will make the final determinations about treatment and documentation.

Construction may continue at the discovery location only after the process outlined in this plan is followed and DAHP (and the federal agencies, if any) determine that compliance with state and federal laws is complete.

7. LIST OF CONTACTS

POSITION	NAME	PRIMARY PHONE	ALTERNATE PHONE
Project Manager	Adam Schuyler	(206) 357-9955	(206) 505-3400
Project Manager (Alternate) BHC Consultants, LLC	Erika Schuyler or Tyler Whitehouse	(206) 505-3400	
SHPO DAHP	Dr. Allyson Brooks	(360) 586-3066	(360) 586-306
State Archaeologist DAHP	Dr. Rob Whitlam		
State Physical Anthropologist DAHP	Dr. Guy Tasa	(360) 586-3534	(360) 790-1633
Washington State Department of Ecology	Lazaro Eleuterio	(425) 649-7027	
Kitsap County	Barbara Zaroff	(360) 981-1767	
THPO Suquamish Tribe	Dennis Lewarch	(360) 394-8529	
THPO Skokomish Indian Tribe	Kris Miller	(360) 426-4232 ext. 215	
THPO Port Gamble S'Klallam Tribe	Josh Wisniewski	(360) 633-1899	
Cultural Resources Jamestown S'Klallam Tribe	Gideon Cauffman	(360) 681-4638	
Cultural Resources Lower Elwha Klallam Tribe	Bill White	(360) 460-1617	
Cultural Resources Tulalip Tribes	Richard Young	(360) 716-2652	
Kitsap County Sheriff, Port Orchard		(360) 337-7101	

APPENDIX E

MANUFACTURER'S "NOT TO EXCEED" PRICE FOR SUBMERSIBLE WASTEWATER PUMPS

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WHITNEY EQUIPMENT COMPANY, INC.

21222 30th Drive SE, Suite 110 Tel. (425) 486-9499
Bothell, WA 98021 Fax. (425) 485-7409

August 11, 2016

Kitsap County Pump Station #'s 45 – 46 – 47
Quote 25184r2
Attn: Floyd Bayless – Kitsap County / Tyler Whitehouse - BHC

Floyd & Tyler:

Following is our revised proposal for equipment we represent and can furnish for the above referenced project. We do not include haulage, unloading, permits, bonds, installation, sales and/or use taxes of any kind, power, chemicals, water, concrete, grout, anchor bolts, wire, conduit, lights, fans, piping, valves, fittings, drains, gauges, signs, safety equipment, labor, tools, field paint, lubricants, insurance, or any other items not listed as included.

We do include one (1) each initial and final bookmarked and searchable PDF Submittal and O&M and Two (2) Hard Copies of O&M's. If assistance is needed, in addition to that quoted, in the initial start-up, or training in the operation, care, or maintenance of our equipment, it can be purchased at the rate of $112.00/hr at the job site, plus travel of $1.10 per mile.

Prices quoted herein are FOB factory, with full freight allowed to the job location.

The equipment will be coated with the manufacturers' standard preparation and coating and will be prepared for shipment per the manufacturers' standard packing procedure. The purchaser is responsible for receiving all items including inspecting for damage, noting damages, and filing for all missing or damaged items.

This job is being handled by Ben Scrace, phone (425)-486-9499. This quote is valid until December 31, 2016 from the above date.

Please call if you need further information and / or clarification.

Respectfully,

Ben Scrace
Vice President

FLYGT SUBMERSIBLE PUMPS

Pump Station #45 Quote 25184r2
Duplex Station Sized 210 gpm @ 34' TDH

2ea **FLYGT** NP 3085.770~256 SH Duplex Stainless Steel Adaptive N-Impeller, 4", 4 HP Submersible Sewage Pumps with Thermal & Fluid Leak Sensor
2ea 4 HP FM Rated Explosion Proof Submersible Motors, 230 Volt, 3 Phase, 3415 RPM
2ea 100ft Shielded Submersible Power/Signal Cable (4G2.5+2X1.5 17.5)
2ea Duasolid Epoxy Triple External Coating 14-30ml

Pump Mounting Accessories

2ea Flygt MiniCAS Thermal/Leakage Relay with Mounting Socket
2ea 4" Cast Iron Discharge Elbows
6ea 2" 316 SS Guide Rails – 2x20' | 3/Pump
2ea 2" 316L SS Upper Guide Rail Bracket
2ea 2" 316L SS Intermediate Guide Rail Bracket | 3/Pump
2ea 1-1.5" 316 SS Cable Grip
1ea 316 SS Cable Holder
2ea 45-ft Lifting Assembly | 5' 316L SS Lifting Chain with 40' Spectra Guide Line and Shackles
1ea Flygt Grip-Eye Lifting Device
1ea Zinc Anodes Kit Installed on Volute

Required Spare Parts

0ea Provided As Separate Quote (see below)

Additional Specification Requirements

1ea 5-Year 100% Pump Warranty (Includes: 5-year annual maintenance by Whitney Equipment Co.)
1ea 10-Year Limited Guide System Warranty Against Defects (Provided by Whitney Equipment Co.)
1ea Factory Vibration Test
1ea Factory Plotted Performance Curve Test
1ea Factory Hydrostatic Test
1ea 1-Day Manufactures Startup and Training Performed by Whitney Equipment Co.
1ea Freight FOB Factory (Sweden)

PS-45 2016 PRE-NEGOTIATED PUMP PRICE: $ 31,504.00

Valid Until December 31, 2016

Submittals: Pump: 3-4 Weeks After Receipt of Purchase Order

Lead Time: 14-16 Weeks After Receipt of Approved Submittals

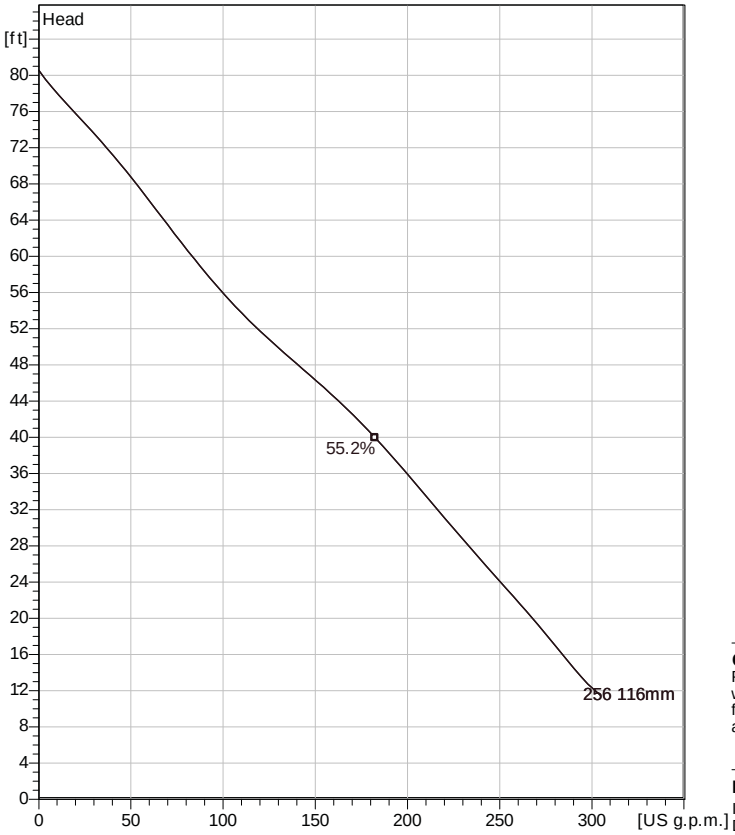
*NOTE: discharge elbow & guide rails can shipped prior to pumps upon request

Shipping & Handling: FOB Factory Estimate Included Above, Actual Pre-Pay & Added To Invoice
Sales Tax: ***NOT INCLUDED*** in above quote, provide resellers certificate

Payment Terms: Net 30 Days Per Below Schedule And Attached Terms & Conditions.
- 20% Upon Approved Submittals
- 70% Upon Delivery
- 10% Upon Startup & Training

NP 3085 SH 3~ Adaptive 256

Technical specification



Water, pure *Curve ISO*

Note: Picture might not correspond to the current configuration.

General

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

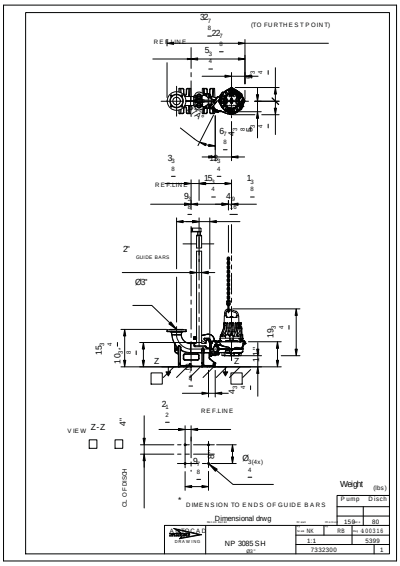
Impeller material	Stainless steel
Discharge Flange Diameter	3 1/8 inch
Inlet diameter	3 1/8 inch
Impeller diameter	116 mm
Number of blades	2

Motor

Motor #	N3085.770 15-09-2AL-W 4hp
Stator variant	12
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	4 hp
Rated current	10 A
Starting current	60 A
Rated speed	3415 rpm
Power factor	
1/1 Load	0.91
3/4 Load	0.88
1/2 Load	0.81
Efficiency	
1/1 Load	80.8 %
3/4 Load	82.7 %
1/2 Load	82.5 %

Configuration

Installation: P - Semi permanent, Wet



Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 45	**Ben Scrace**	**2015-12-18**	**2016-07-20**

NP 3085 SH 3~ Adaptive 256

Performance curve

Pump

Discharge Flange Diameter	3 1/8 inch
Inlet diameter	80 mm
Impeller diameter	$4^{9}/_{16}$"
Number of blades	2

Motor

Motor #	N3085.770 15-09-2AL-W 4hp
Stator variant	12
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	4 hp
Rated current	10 A
Starting current	60 A
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Power factor	
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Efficiency	
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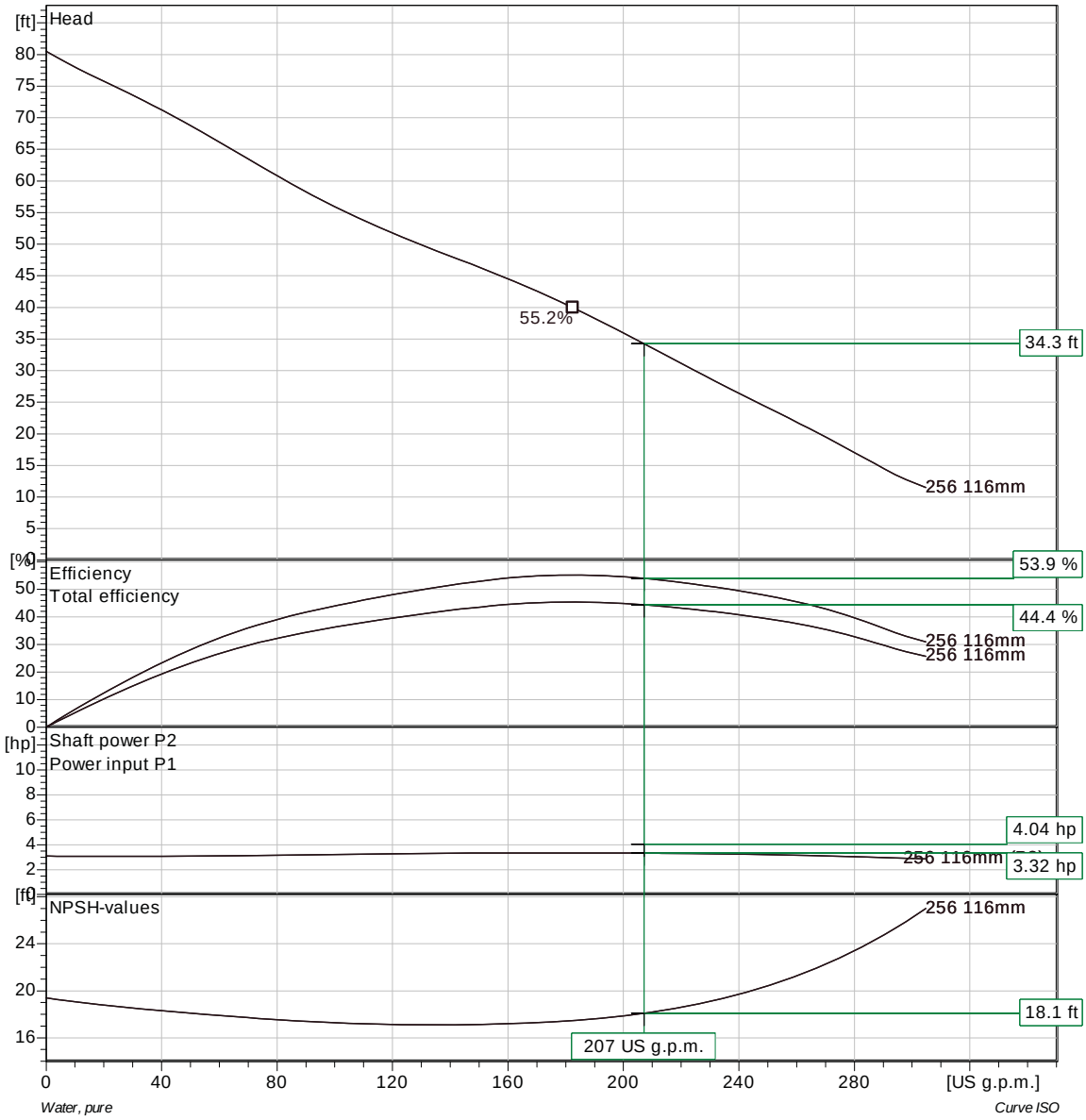


Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 45	**Ben Scrace**	**2015-12-18**	**2016-07-20**

FLYGT SUBMERSIBLE PUMPS

Pump Station #46 Quote 25184r2
Duplex Station Sized 265 gpm @ 21' TDH

2ea **FLYGT** NP 3085.770~256 SH Duplex Stainless Steel Adaptive N-Impeller, 4", 4 HP Submersible Sewage Pumps with Thermal & Fluid Leak Sensor
2ea 4 HP FM Rated Explosion Proof Submersible Motors, 230 Volt, 3 Phase, 3415 RPM
2ea 100ft Shielded Submersible Power/Signal Cable (4G2.5+2X1.5 17.5)
2ea Duasolid Epoxy Triple External Coating 14-30ml

Pump Mounting Accessories

2ea Flygt MiniCAS Thermal/Leakage Relay with Mounting Socket
2ea 4" Cast Iron Discharge Elbows
6ea 2" 316 SS Guide Rails – 2x20' | 3/Pump
2ea 2" 316L SS Upper Guide Rail Bracket
2ea 2" 316L SS Intermediate Guide Rail Bracket | 3/Pump
2ea 1-1.5" 316 SS Cable Grip
1ea 316 SS Cable Holder
2ea 45-ft Lifting Assembly | 5' 316L SS Lifting Chain with 40' Spectra Guide Line and Shackles
1ea Flygt Grip-Eye Lifting Device
1ea Zinc Anodes Kit Installed on Volute

Required Spare Parts

0ea Provided As Separate Quote (see below)

Additional Specification Requirements

1ea 5-Year 100% Pump Warranty (Includes: 5-year annual maintenance by Whitney Equipment Co.)
1ea 10-Year Limited Guide System Warranty Against Defects (Provided by Whitney Equipment Co.)
1ea Factory Vibration Test
1ea Factory Plotted Performance Curve Test
1ea Factory Hydrostatic Test
1ea 1-Day Manufactures Startup and Training Performed by Whitney Equipment Co.
1ea Freight FOB Factory (Sweden)

PS-46 2016 PRE-NEGOTIATED PUMP PRICE: $ 31,504.00

Valid Until December 31, 2016

Submittals: Pump: 3-4 Weeks After Receipt of Purchase Order

Lead Time: 14-16 Weeks After Receipt of Approved Submittals

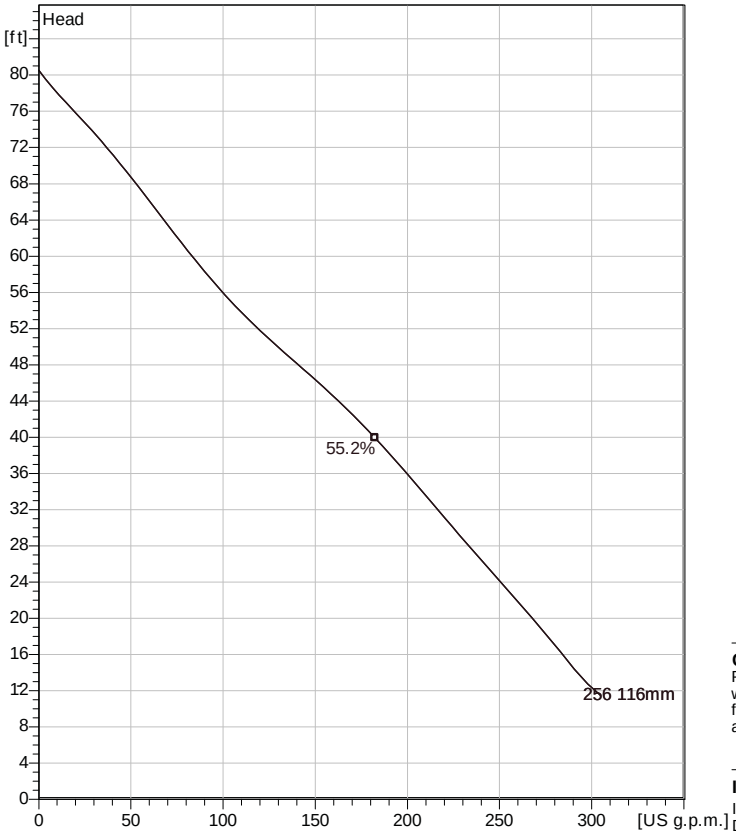
*NOTE: discharge elbow & guide rails can shipped prior to pumps upon request

Shipping & Handling: FOB Factory Estimate Included Above, Actual Pre-Pay & Added To Invoice
Sales Tax: ***NOT INCLUDED*** in above quote, provide resellers certificate

Payment Terms: Net 30 Days Per Below Schedule And Attached Terms & Conditions.
- 20% Upon Approved Submittals
- 70% Upon Delivery
- 10% Upon Startup & Training

NP 3085 SH 3~ Adaptive 256

Technical specification



Water, pure *Curve ISO*

Note: Picture might not correspond to the current configuration.

General

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

Impeller material	Stainless steel
Discharge Flange Diameter	3 1/8 inch
Inlet diameter	3 1/8 inch
Impeller diameter	116 mm
Number of blades	2

Motor

Motor #	N3085.770 15-09-2AL-W 4hp
Stator variant	12
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
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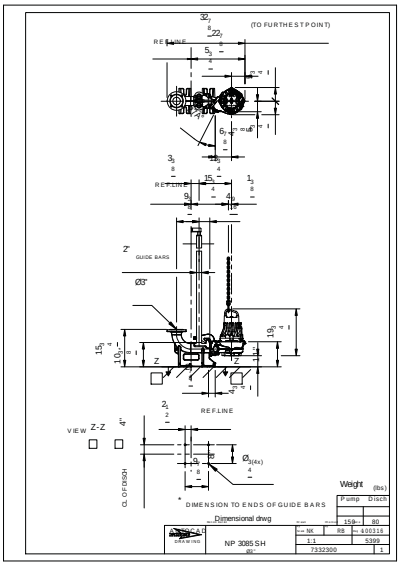
1/2 Load	0.81
Efficiency	
1/1 Load	80.8 %
3/4 Load	82.7 %
1/2 Load	82.5 %

Configuration

Installation: P - Semi permanent, Wet



Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 45	**Ben Scrace**	**2015-12-18**	**2016-07-20**

NP 3085 SH 3~ Adaptive 256

Performance curve

Pump

Discharge Flange Diameter	3 1/8 inch
Inlet diameter	80 mm
Impeller diameter	$4^{9}/_{16}$"
Number of blades	2

Motor

Motor #	N3085.770 15-09-2AL-W 4hp
Stator variant	12
Frequency	60 Hz
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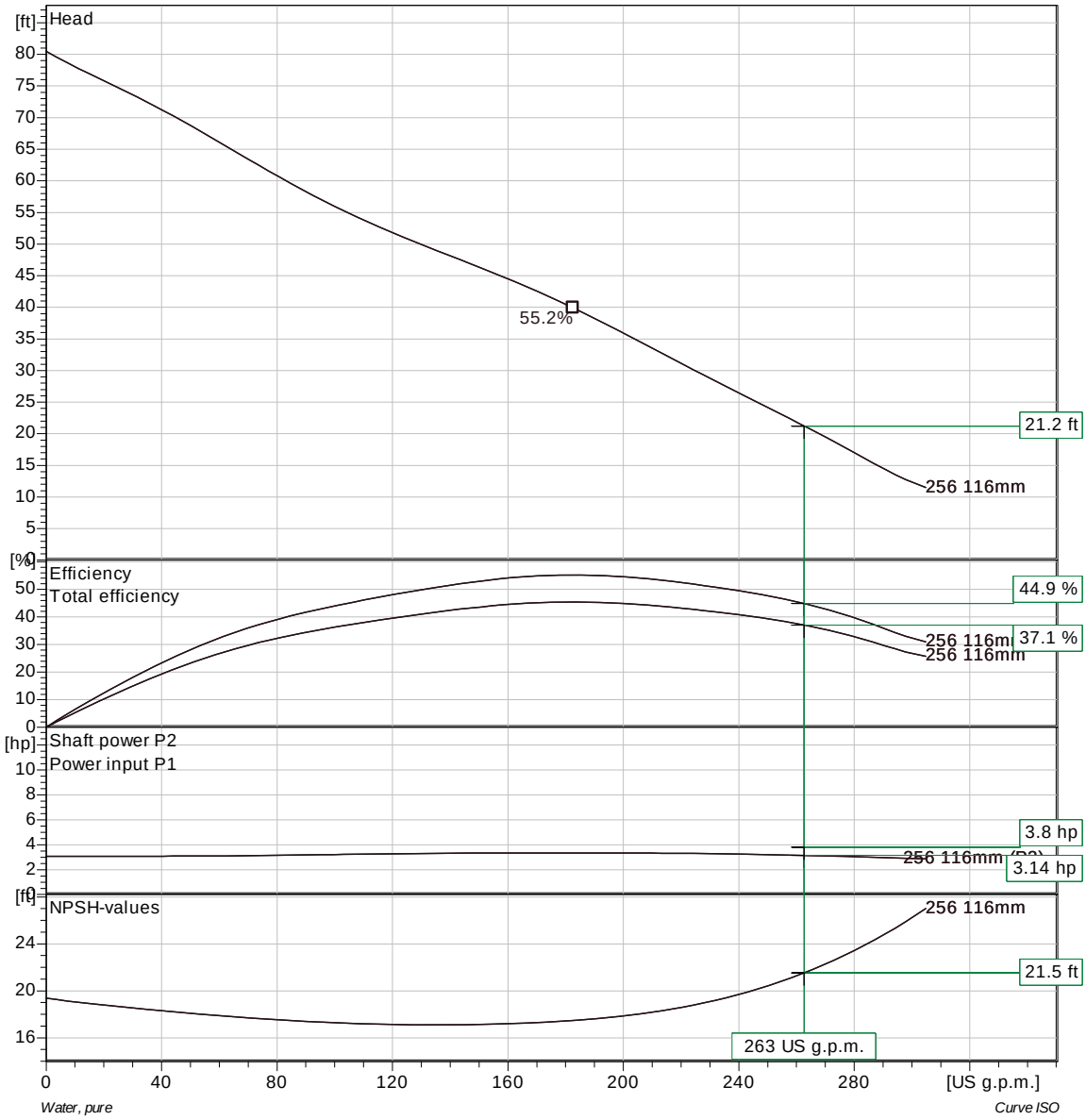


Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 45	**Ben Scrace**	**2015-12-18**	**2016-07-20**

FLYGT SUBMERSIBLE PUMPS

Pump Station #47 Quote 25184r2
Duplex Station Sized 195 gpm @ 37' TDH

2ea **FLYGT** NP 3085.770~256 SH Duplex Stainless Steel Adaptive N-Impeller, 4", 4 HP Submersible Sewage Pumps with Thermal & Fluid Leak Sensor
2ea 4 HP FM Rated Explosion Proof Submersible Motors, 230 Volt, 3 Phase, 3415 RPM
2ea 100ft Shielded Submersible Power/Signal Cable (4G2.5+2X1.5 17.5)
2ea Duasolid Epoxy Triple External Coating 14-30ml

Pump Mounting Accessories

2ea Flygt MiniCAS Thermal/Leakage Relay with Mounting Socket
2ea 4" Cast Iron Discharge Elbows
6ea 2" 316 SS Guide Rails – 2x20' | 3/Pump
2ea 2" 316L SS Upper Guide Rail Bracket
2ea 2" 316L SS Intermediate Guide Rail Bracket | 3/Pump
2ea 1-1.5" 316 SS Cable Grip
1ea 316 SS Cable Holder
2ea 45-ft Lifting Assembly | 5' 316L SS Lifting Chain with 40' Spectra Guide Line and Shackles
1ea Flygt Grip-Eye Lifting Device
1ea Zinc Anodes Kit Installed on Volute

Required Spare Parts

0ea Provided As Separate Quote (see below)

Additional Specification Requirements

1ea 5-Year 100% Pump Warranty (Includes: 5-year annual maintenance by Whitney Equipment Co.)
1ea 10-Year Limited Guide System Warranty Against Defects (Provided by Whitney Equipment Co.)
1ea Factory Vibration Test
1ea Factory Plotted Performance Curve Test
1ea Factory Hydrostatic Test
1ea 1-Day Manufactures Startup and Training Performed by Whitney Equipment Co.
1ea Freight FOB Factory (Sweden)

PS-47 2016 PRE-NEGOTIATED PUMP PRICE: $ 31,504.00

Valid Until December 31, 2016

Submittals: Pump: 3-4 Weeks After Receipt of Purchase Order

Lead Time: 14-16 Weeks After Receipt of Approved Submittals

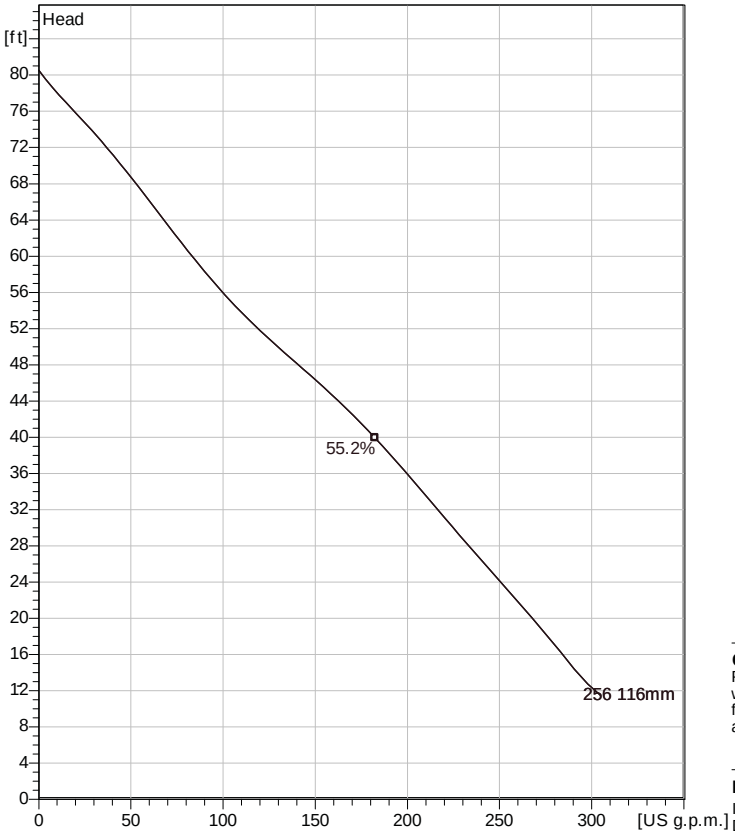
*NOTE: discharge elbow & guide rails can shipped prior to pumps upon request

Shipping & Handling: FOB Factory Estimate Included Above, Actual Pre-Pay & Added To Invoice
Sales Tax: ***NOT INCLUDED*** in above quote, provide resellers certificate

Payment Terms: Net 30 Days Per Below Schedule And Attached Terms & Conditions.
- 20% Upon Approved Submittals
- 70% Upon Delivery
- 10% Upon Startup & Training

NP 3085 SH 3~ Adaptive 256

Technical specification



Water, pure *Curve ISO*

Note: Picture might not correspond to the current configuration.

General

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

Impeller material	Stainless steel
Discharge Flange Diameter	3 1/8 inch
Inlet diameter	3 1/8 inch
Impeller diameter	116 mm
Number of blades	2

Motor

Motor #	N3085.770 15-09-2AL-W 4hp
Stator variant	12
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	4 hp
Rated current	10 A
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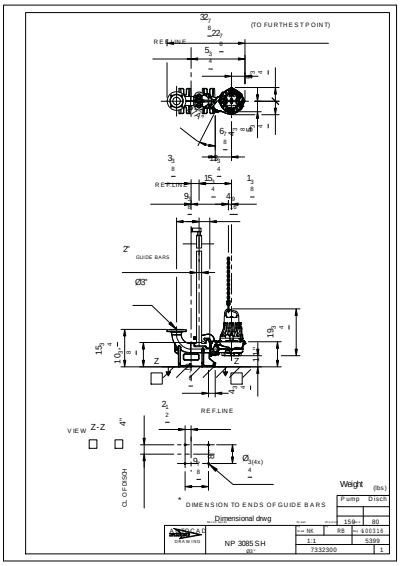
Rated speed	3415 rpm
Power factor	
1/1 Load	0.91
3/4 Load	0.88
1/2 Load	0.81
Efficiency	
1/1 Load	80.8 %
3/4 Load	82.7 %
1/2 Load	82.5 %

Configuration

Installation: P - Semi permanent, Wet



Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 46	**Ben Scrace**	**2015-12-18**	**2016-07-20**

NP 3085 SH 3~ Adaptive 256

Performance curve

Pump

Discharge Flange Diameter	3 1/8 inch
Inlet diameter	80 mm
Impeller diameter	$4^{9}/_{16}$"
Number of blades	2

Motor

Motor #	N3085.770 15-09-2AL-W 4hp
Stator variant	12
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
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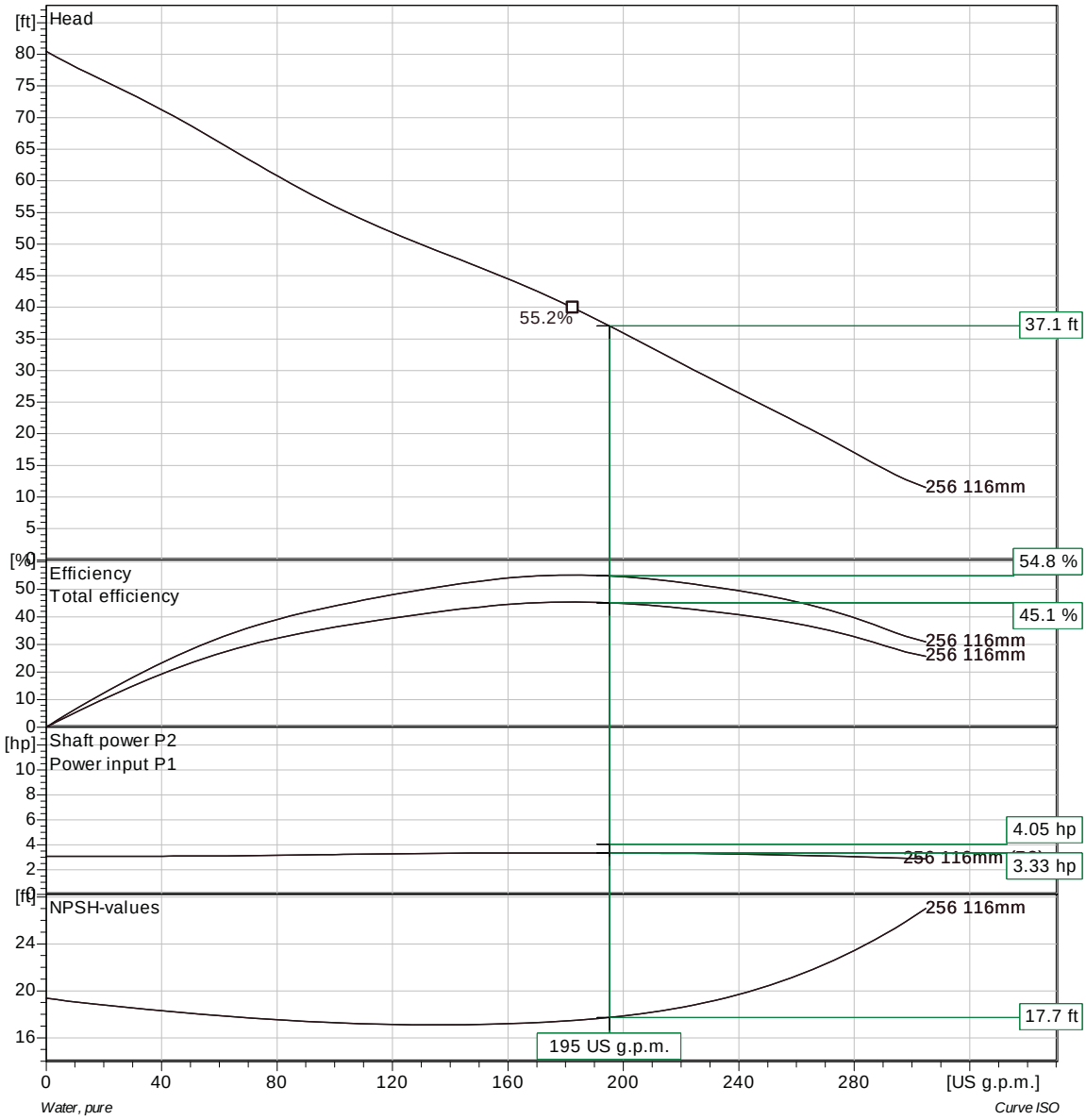


Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 46	**Ben Scrace**	**2015-12-18**	**2016-07-20**

FLYGT SUBMERSIBLE PUMPS

Pump Station #45, 46 & 47 Quote 25184r1

Required Spare Parts

1ea Basic Repair Kit 3315 HT (Includes: mechanical seal, bearings, O-rings)
3ea Spare 256 Duplex SS Adaptive N-Impeller & Insert Ring
3ea Sleeve Assembly (Includes Sleeve, Washer & Impeller Bolt)

PS-47 2016 PRE-NEGOTIATED PUMP PRICE: $ 5,750.00

Valid Until December 31, 2016

Submittals: Pump: 3-4 Weeks After Receipt of Purchase Order

Lead Time: 14-16 Weeks After Receipt of Approved Submittals

*NOTE: discharge elbow & guide rails can shipped prior to pumps upon request

Shipping & Handling: FOB Factory Estimate Included Above, Actual Pre-Pay & Added To Invoice

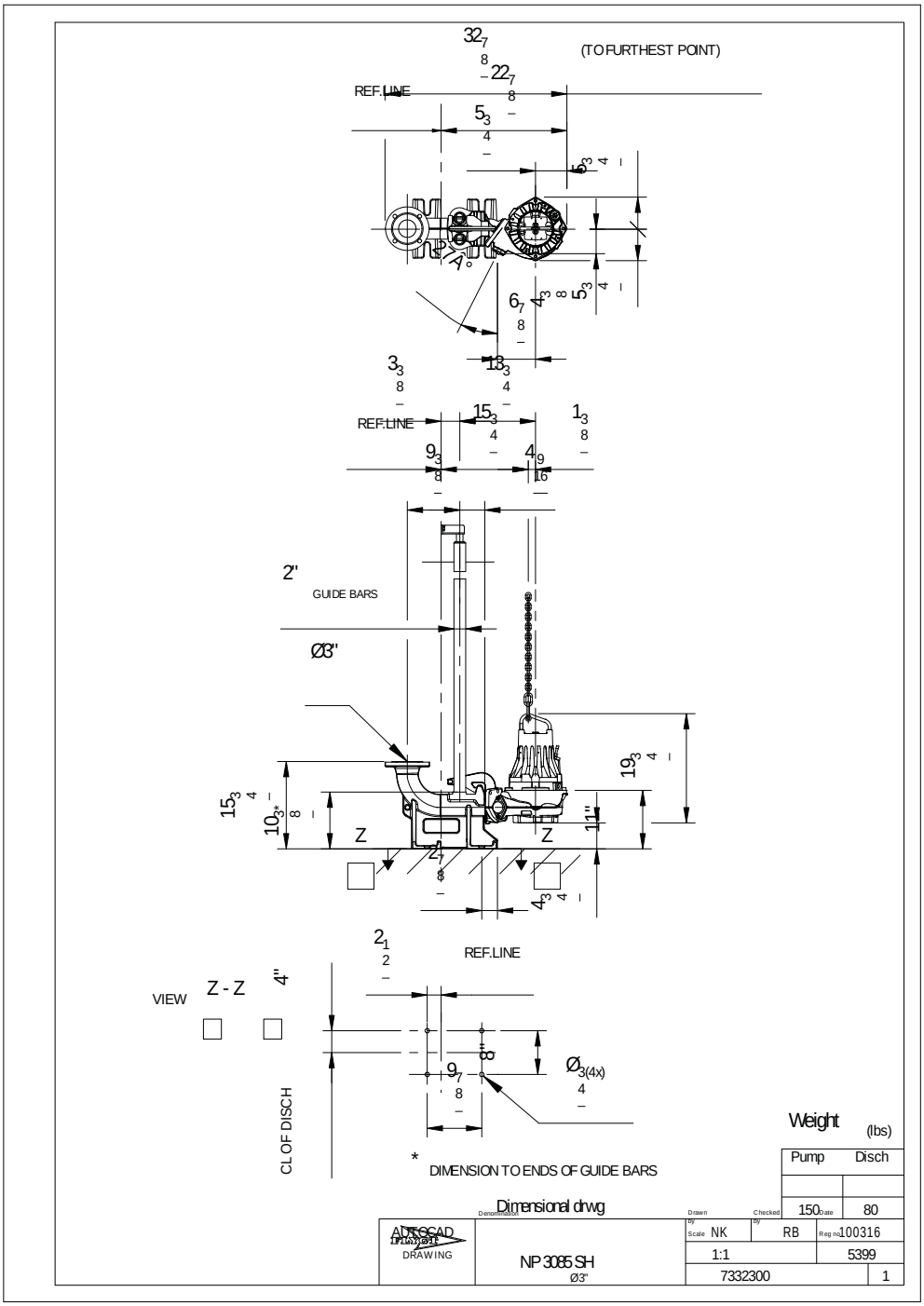
Sales Tax: ***NOT INCLUDED*** in above quote, provide resellers certificate

Payment Terms: Net 30 Days Per Below Schedule And Attached Terms & Conditions.

- 20% Upon Approved Submittals
- 70% Upon Delivery
- 10% Upon Startup & Training

NP 3085 SH 3~ Adaptive 256

Dimensional drawing



Project	Project ID	Created by	Created on	Last update
	Kitsap Cnty PS 46	**Ben Scrace**	**2015-12-18**	**2016-07-20**

WHITNEY EQUIPMENT COMPANY, INC. BOTHELL, WA

STANDARD CONDITONS OF SALE

These are Whitney Equipment Co., Inc., the Seller, Standard Terms and Conditions and the basis of our offer, unless specifically altered in writing herein, and changes may affect the price.

ACCEPTANCE: THIS QUOTATION OR PROPOSAL IS NOT AN OFFER. BUYER MAY, WITHIN 30 DAYS, MAKE THIS PROPOSAL THE BASIS OF AN ORDER, WHICH IS SUBJECT TO ACCEPTANCE OF THE SELLER AND THE ACCEPTANCE OF OUR SUPPLIERS TO FURNISH ALL OR PARTS OF THE ORDER.

TAXES: We do not include any Federal, State, City, County, or other sales, custom duties, or taxes such as sales, use, excise, retailer's occupation or similar taxes and fees, in the price and we will add any taxes that are required to pay to the purchase price. In lieu of paying such taxes to the Seller, the Buyer may furnish the Seller with a Tax Exemption Certificate or other legal and appropriate taxing authorities at any time.

TERMS: The Seller's terms are net cash 30 days after the date of the invoice. The Seller reserves the right to require payment in advance or C.O.D. and otherwise modify credit terms should the Buyer's credit standing not meet the Seller's acceptance. A service charge of 1.5% per month on the unpaid balance will be charged on all overdue monies payable. Buyer shall not assign or transfer their contract or any interest in it, or monies payable under it, without the written consent of Seller and any assignment made without such consent shall be null and void. Buyer agrees to pay all collection costs and costs of suit, including reasonable attorney fees, in the event Seller institutes collection action for overdue account. Seller expressly reserves all available lien rights in connection with any transaction between the parties.

CREDIT: Required with each order is the necessary credit information including bank reference, bonding company, or other necessary information with complete names, addresses, phone numbers, personal references, account and/or bond numbers.

SHIPMENTS: Delivery and shipping times are our best estimate and do not include time to transfer the products on order, and to accept order. We are not liable for delay that is beyond our control or caused by: an accident; riots; insurrections; national emergency; labor disputes of every kind however caused; embargoes; non-delivery by suppliers; delays of carriers or postal authorities; or governmental restrictions, prohibitions, or requirements. Regardless of the cause, we will not accept any penalty for shipping beyond the date specified in the contract.

APPROVALS: Buyer is responsible for obtaining engineers or owners approval on products. The Seller in this proposal represents only that products are as described. The Seller does not warrant that the products described will meet engineers or owners approval, or that products meet specification.

OCCUPATIONAL SAFETY AND HEALTH ACT of 1970 - We do not warrant or represent that any of our products by themselves or in a system or with other equipment will conform to or comply with the provisions of the Occupational Safety and Health Act of 1970 and the standards and regulations issued thereunder, or any other federal, state, or local law or regulation of the same or similar nature.

LIABILITY: Notwithstanding any liabilities or responsibilities assumed by Seller hereunder, Seller shall in no event be liable for lost profit, downtime, operating or maintenance costs or for any other special, indirect or consequential damages.

CANCELLATION: The Buyer may cancel his order only upon written notice and payment to Seller of reasonable cancellation charges specified by Seller.

INSURANCE: Buyer shall provide and maintain for Seller's benefit, insurance on said equipment against loss from fire, wind, water or other causes with insurance companies legally authorized to do business where said equipment is located in an amount at least equal to the value of said equipment until the equipment is accepted and paid for in full. In no case does the purchase price, even if inclusive of freight, cover the cost of insurance beyond the point of delivery specified in this Proposal.

WARRANTY: Whitney Equipment Company, Inc. makes no warranties on any products sold, provided however that the buyer shall have whatever warranty, if any, made by the manufacturer of the products sold. Whitney Equipment Co., Inc. expressly excludes from any warranty any and all charges, labor or otherwise, for installation, removal, reinstallation, shipping, utilities, equipment rental, other required materials, or any other items. The parties agree that the buyer's sole and exclusive remedy, if any, against the Seller shall be against the manufacturer as provided herein. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, down time, operating or maintenance costs, injury to persons or property, or any other special, indirect, incidental or consequential loss) shall be available to buyer.

THE WARRENTY AND THE LIMITATION OF REMEDIES SET FORTH HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND REMEDIES. WHITNEY EQUIPMENT CO., INC. MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE.

MERGER CLAUSE: The Seller's salesman may have made oral statements about the merchandise described in this contract. Such statements do not constitute warranties, shall not be relied on by the buyer, and are not part of the contract for sale. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.

PRICE: The prices specified are in U.S. currency, payable free of all expense to the Seller for collection charges. Prorated payment shall be made for partial shipments.

CHANGES: We reserve the right to make changes and to substitute other material as needed to make shipment and fulfill the contract.

ERRORS: Seller reserves the right to correct clerical or stenographic errors or omissions.

GOVERNING LAWS: The terms of this agreement and all rights and obligations hereunder shall be governed by the laws of the State of Seller's office to which this order has been submitted.

INSPECTION: Buyer shall inspect Seller's Products upon receipt, and if Buyer's inspection reveals any defects in the Products, Buyer shall notify the Seller within three (3) days after receipt of the Products of any claim Buyer might have concerning such defects in the Products discovered by Buyer. Buyer's failure to notify Seller within such a three (3) day period shall constitute a waiver by Buyer of all claims covering such defects in the Products.

NOT INCLUDED: We do not include any item not specifically listed as included and specifically do not include freight, haulage, unloading, freight claims, installation, erection, concrete, grout, water, utilities, lubricating grease and oil, power, tools, labor, controls, conduit, wiring, meters, main disconnects, piping, valves, fittings, gaskets, hardware, freight, taxes, covers, field paint, insurance, testing, royalties, maintenance, operation, erection supervision, transportation, anchor bolts, welding rod FREIGHT: Prices quoted are F.O.B. point of manufacture and do not include freight unless specifically listed as included. Title passed to the Buyer when the Products are transferred to the carrier and all freight claims are the responsibility of the Buyer. We will attempt to follow your shipping instructions, but are not responsible for actions and delays of the carrier or alter-carriers.

BACKCHARGES will not be accepted unless approved by Seller, in writing, before any work is done.

DELAYS: Price and terms and conditions are subject to revision if manufacture is not released at time of order placement or drawings for approval are not returned within 30 days from receipt by customer, or manufacture is released and subsequently held or delayed by the customer for more than 30 days, or customer requests longer than quoted shipment.

DECOMPOSITION AND WEAR: Decomposition by chemical action and wear caused by the presence of abrasive materials shall not constitute defects.

FLYGT
a xylem brand

Pump Clog-free Operations Guarantee
Flygt Brand Solids-Handling Pumps Equipped With N-Technology

Flygt guarantees that its solids-handling pumps, when equipped with impellers utilizing the self-cleaning N-Technology will be free from clogging when pumping sewage and wastewater containing solids and debris normally found in domestic wastewater.

This guarantee is extended to the original owner for a period of 12-months from the date of start-up of the equipment by the local authorized Flygt representative or distributor.

Should the Flygt N-Pump impeller clog with typical solids and/or debris normally found in domestic wastewater during this period, Flygt shall reimburse the owner for reasonable cost to remove the pump, clear the obstruction and reinstall the affected pump unit.

Flygt reserves the right to inspect the pump station, pump units and possible modify the pump unit, if deemed necessary, to mitigate any further occurrence of clogging at no cost to the owner.

Ron Askin, Managing Director
Xylem, Inc. – Water Solutions USA, Flygt Products

Date of Installation

Owner

Location/Project

Quantity / Model / Serial Number(s)

Whitney Equipment Company, Inc.

21222 30th Drive SE, Ste. 110 Bothell, WA 98021-7019 www.weci.com 425-486-9499 800-255-2580

Quote #: 25184r1 ***Date: 07/20/2016***

To:
Kitsap County
Floyd Bayless

From:
Whitney Equipment Company, Inc.
Ben Scrace, bscrace@weci.com

5-Year Maintenance contract for Station 45-46-47

The 5-year maintenance contract includes a full 5year 100% warranty on all wear items (see warranty attached)

Yearly Maintenance is as follows:

1. Check & Change Coolant/Oil & O-ring.
2. Inspect Volute - looking for wear on the volute face.
3. Inspect Impeller/ Propeller - looking for chips or cracks.
4. Inspect Wear/ Insert Ring - checking for cracks or tears in the ring.
5. Inspect Cable - checking for nicks, cuts, bends, or swelling.
6. Electrical Inspection of Motor
7. Validate level operation of pump station

After the inspection is complete, a test run will be conducted, and an amp draw taken, to ensure pumps are operating at Flygt recommend levels.

Service agreement includes oil & o-rings, priority scheduling, and 10% discount off Flygt parts orders for any needed repairs. Any additional work to be done to the impeller, volute, cable, or motor housing, etc; will not be covered in this service agreement.

Call outs for any additional service will be quoted at that time. After hours calls will be handled by Micah Davis 206-696-0482

Ben Scrace
Vice President, Aftermarket Sales & Service

Pump Lifting Assembly Limited Warranty

The warranty obligations of Whitney Equipment Company, Inc. ("Whitney Equipment") for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in assembly of this system.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, fire, improper packing and shipping (such claims must be presented to the carrier), or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Whitney Equipment to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover pumps, piping, cables or accessories used in conjunction with this product.

How Long Does this Coverage Last

This limited warranty lasts for ten (10) years from the date of original purchase of this product.

Who is Covered

Only the original purchaser &/or owner at time of initial startup completion of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Whitney Equipment will do

Whitney Equipment will replace this product with a direct replacement or with a similar product deemed by Whitney Equipment to perform substantially the same function as the original product.

Limitation on Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, WHITNEY EQUIPMENT IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some states, counties or cities do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, WHITNEY EQUIPMENT SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF WHITNEY EQUIPMENT CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPICABLE LAW.

IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from state to state, county to county or city to city.

This limited warranty is void if (i) the product is not being used on the equipment product was initially supplied with, (ii) the product is not distributed by Whitney Equipment. Your rights under this limited warranty are not diminished if you do not complete and return the product registration form at time of installation. Whitney Equipment thanks you for purchasing a Whitney Equipment product. We hope it will give you years of satisfaction.

Whitney Equipment Company, Inc.
21222 30th Dr SE, Ste 110, Bothell, WA 98021
425-486-9499 p | 425-485-7409 f | www.weci.com

WARRANTY
Xylem Water Solutions USA, Inc.

For the period defined, Xylem Water Solutions USA, Inc. offers a commercial warranty to the original End Purchaser against defects in workmanship and material on Flygt Products. Warranty covers Flygt parts and labor as outlined in **ADDENDUM – A**.

COVERAGE:
Xylem Water Solutions USA, Inc. will pay the cost of parts and labor during the warranty period, provided that the Flygt product, with cable attached, is returned prepaid to a Xylem Water Solutions USA, Inc. Authorized Service Facility for Flygt Product repairs. Coverage for Flygt parts and labor will be provided for the period shown in **ADDENDUM - A.** The warranty period will begin from date of shipment or date of a valid Start-up (For permanently installed pumps only). In cases where the Start-up date is used as the beginning of the warranty on a permanently installed Flygt pump, a Start-up Report completed by an approved service technician from a Xylem Water Solutions USA, Inc. Authorized Service Facility for Flygt products must be received by the Xylem Water Solutions USA, Inc. Area Service Manager for Flygt Products within thirty (30) days of the initial onset of the unit placed into service. If not received, the beginning of the warranty coverage will default to the Flygt product ship date. A Start-up for a permanently installed Flygt pump must occur within one (1) year from the date of shipment from a Xylem Water Solutions USA, Inc. authorized facility for Flygt Products or warranty will automatically default to ship date as start of warranty. (See **STORAGE** section) When using the start-up date as the beginning of the warranty, a copy of the Start-up Report will be required to support any Warranty Claims. Warranty on Flygt Dewatering pumps will begin with ship date only. No other date on Flygt Dewatering pumps will be considered.

Xylem Water Solutions USA, Inc.'s sole obligation under this Warranty for Flygt Products shall be to replace, repair or grant credit for Flygt Products upon Xylem Water Solutions USA, Inc.'s exclusive determination that the Flygt Product does not conform to the above warranty. In the event that the Flygt product is replaced, warranty on the replacement product will be equal to the balance remaining on the original product or ninety (90) days, which ever is greater.

MISUSE:
This Warranty shall not apply to any Flygt product or part of Flygt product which (i) has been subjected to misuse, misapplication, accident, alteration, neglect, or physical damage (ii) has been installed, operated, used and/or maintained in a manner which is in an application that is contrary to Xylem Water Solutions USA, Inc.'s printed instructions as it pertains to installation, operation and maintenance of Flygt Products, including but without limitation to (iii) operation of equipment without being connected to monitoring devices supplied with specific products for protection; or (iv) damaged due to a defective power supply, improper electrical protection, faulty installation or repair, ordinary wear and tear, corrosion or chemical attack, an act of God, an act of war or by an act of terrorism; or (v) has been damaged resulting from the use of accessory equipment not sold by Xylem Water Solutions USA, Inc. or not approved by Xylem Water Solutions USA, Inc. in connection with Flygt products.

WEAR PARTS:
This warranty does not cover costs for standard and/or scheduled maintenance performed, nor does it cover Flygt parts that, by virtue of their operation, require replacement through normal wear (aka: Wear Parts), unless a defect in material or workmanship can be determined by Xylem Water Solutions USA, Inc.. Wear Parts are defined as Cutters, Cutting Plates, Impellers, Agitators, Diffusers, Wear Rings (Stationary or Rotating), Volutes (when used in an abrasive environment), oil, grease, cooling fluids and/or any items deemed necessary to perform and meet the requirements of normal maintenance on all Flygt equipment.

WARRANTY
Xylem Water Solutions USA, Inc.

DISCLAIMERS:
(i) Xylem Water Solutions USA, Inc.'s warranties are null and void when Flygt Products are exported outside of the United States of America without the knowledge and written consent of Xylem Water Solutions USA, Inc.; (ii) Xylem Water Solutions USA, Inc. makes no independent warranty or representation with respect to parts or products manufactured by others and provided by Xylem Water Solutions USA, Inc. (however, Xylem Water Solutions USA, Inc. will extend to the Purchaser any warranty received from Xylem Water Solutions USA, Inc.'s supplier for such parts or products).

LIMITATIONS:
XYLEM WATER SOLUTIONS USA, INC. NEITHER ASSUMES, NOR AUTHORIZES ANY PERSON OR COMPANY TO ASSUME FOR XYLEM WATER SOLUTIONS USA, INC., ANY OTHER OBLIGATION IN CONNECTION WITH THE SALE OF ITS FLYGT EQUIPMENT. ANY ENLARGEMENT OR MODIFICATION OF THIS WARRANTY BY A FLYGT PRODUCT DISTRIBUTOR, OR OTHER SELLING AGENT SHALL BECOME THE EXCLUSIVE RESPONSIBILITY OF SUCH ENTITY.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, CONDITIONS OR TERMS OF WHATEVER NATURE RELATING TO FLYGT PRODUCT(S), INCLUDING AND WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED. PURCHASER'S EXCLUSIVE REMEDY AND XYLEM WATER SOLUTIONS USA, INC.'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES IS LIMITED TO REPAIRING OR REPLACING FLYGT PRODUCTS AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE PURCHASER HEREUNDER. IN NO EVENT IS XYLEM WATER SOLUTIONS USA, INC. LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF USE, LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION.

XYLEM WATER SOLUTIONS USA, INC. WILL NOT BE HELD RESPONSIBLE FOR TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR'S FEES, OR ANY EXPENSES ASSOCIATED WITH A FLYGT PRODUCT REPAIR SHOP NOT AUTHORIZED BY XYLEM WATER SOLUTIONS USA, INC. U.S.A., INC. REIMBURSEMENT COSTS FOR CRANES AND/OR ANY SPECIAL EQUIPMENT USED IN CONJUNCTION FOR THE REMOVAL AND/OR REINSTALLATION OF ANY FLYGT EQUIPMENT IS NOT COVERED UNDER THIS WARRANTY.

ANY UNAUTHORIZED ALTERATIONS TO SUPPLIED FLYGT EQUIPMENT USED WITHOUT XYLEM WATER SOLUTIONS USA, INC. SUPPLIED FLYGT BRAND CABLE OR CONTROLS WILL NOT BE COVERED UNDER THIS WARRANTY, UNLESS IT CAN BE PROVEN SUCH ANCILLARY EQUIPMENT IS SUITABLE FOR THE PURPOSE AND EQUAL TO XYLEM WATER SOLUTIONS USA, INC. SUPPLIED FLYGT BRAND CABLES OR CONTROLS THAT WOULD ORIGINALLY HAVE BEEN SUPPLIED WITH THE TYPE OF EQUIPMENT IN USE.

REQUIREMENTS:
A copy of Electrical System Schematics of the Control used (including a Control's Bill of Material) could be required to support a Warranty Claim when a non Flygt Brand Control is used. In addition, a written record, hereby known as "the log", will be associated with each unit serial number and must be maintained by the organization having product maintenance responsibility. The log must record each preventative maintenance activity and any repair activity during the life of the warranty or verification that a Xylem Water Solutions USA, Inc. authorized Service Contract for Flygt Products is in force and must be available for review and/or auditing. Failure to meet these conditions could render this warrant null and void. Such logs could be required to determine warranty coverage.

WARRANTY
Xylem Water Solutions USA, Inc.

STORAGE:
Should a delay occur between ship date and the date of start-up, maintenance as outlined in Xylem Water Solutions USA, Inc.'s Care & Maintenance Manual for Flygt Products must be performed by the "CONTRACTOR" and/or "OWNER" during any such period of storage. Documentation providing proof and outlining what maintenance was performed must be provided to Xylem Water Solutions USA, Inc. or its Flygt Products representative within thirty (30) days of said maintenance, or the Xylem Water Solutions USA, Inc. warranty for Flygt Products could be considered void.

CONTROLS:
Warranty coverage for permanently installed controls will start for the end purchaser on the date of shipment. This warranty does not apply to controls that have been damaged due to a defective and/or improper input power supply, improper electrical protection, accidental damage, improper or unauthorized installation and/or repair, unauthorized alteration, negligence, environmental corrosion or chemical attack, improper maintenance or storage of control, any act of God, an act of war, an act of terrorism or damage resulting from the use of accessory equipment not approved by Xylem Water Solutions USA, Inc.. Further, this warranty does not apply in the event an adjustment is found to correct the alleged defect.

Solid state devices will be covered for a period of one (1) year. Electrical control panels containing controllers, PLC's, drives, soft starts, and other computerized equipment will require Transient Voltage Surge Suppression (TVSS) protection in order to satisfy the requirements of this warranty. The protection equipment associated with the control must be kept in working condition during the life of the warranty. Auxiliary equipment supplied with the control (air-conditioners etc.) is limited by the respective original equipment manufacturer's warranty offered. Consumable items such as: light bulbs, fuses, and relays are covered under normal operating conditions. Electrical surges experienced during startups and/or during normal operating use of the control panel will cause the consumable items not to be covered under this warranty policy. Components not supplied by Xylem Water Solutions USA, Inc. will not covered by this warranty.

TOP (The Optimum Pump Station)
Xylem Water Solutions USA, Inc. will warrant the Flygt TOP pre-engineered fiberglass pump station components against defects in material and workmanship for a period of one (1) year from date of start-up or eighteen (18) months from date of shipment and is valid only to the original owner of the station. Warranty shall cover the cost of labor and materials required to correct any warrantable defect, excluding any removal and reinstallation costs, FOB Xylem Water Solutions USA, Inc.'s authorized warranty service location for Flygt's TOP.

Flygt Products contained within a TOP pre-engineered fiberglass pump station will carry the standard Xylem Water Solutions USA, Inc. warranty for Flygt products and/or accessories installed in the TOP pre-engineered fiberglass pump station.

All Flygt Product restrictions and/or limitations as outlined and described within the context of this warranty are germane to all sections of this Xylem Water Solutions USA, Inc. Warranty document.

Xylem Water Solutions USA, Inc.
National Quality Assurance - US Corporate

As modified by 5-Year Maintenace Contract

WARRANTY
Xylem Water Solutions USA, Inc.

ADDENDUM – WARRANTY COVERAGE BY PRODUCT

PRODUCT	PRODUCT SERIES AND CONFIGURATION	Months 1 - 12	Months 13 - 18	Months 19 - 24	Months 25 - 36	Months 37 - 39	Months 40 - 60
Axial Flow/ Mixed Flow/ Centrifugal Pumps & Mixers	3000 Series (CP, NP, DP, CT, NT, CZ, NZ, LL) ~~4000 Series (CR, PP)~~ ~~7000 Series (PL)~~	100%		100%			100%
ETO Electrical Control Panels	Engineered to Order, Xylem Manufactured Control Panels (permanently installed) - 3 Years	100% - 1 YR	LIMITED - 2 - YR				
Grinder Pumps	3000 Series (MP, MF, MH)	100% - 2 YR (From Ship Date)			3 YR (From Date of Manufacture)		
Abrasion/Corrosion Resistant & Chopper Pumps	3000 Series (FP, FS, FT, HP, HS) 5000 Series (HP, HS) 8000.280 Series (DP, DZ, DT, DS, DF)	100%					
Dewatering Pumps	2000 Series (BS, KS) 3000 Series (CS, NS, DS) 8000.280 Series (DS, DF)	100% (From Ship Date)					
TOPS	Fiberglass Pump Station	100% (From Ship Date)					
Accessories	Permanent / Portable	100% (From Ship Date)					
Hydro ejectors/ Aerators	HE, JA	100%					
Portable Pump Controls TOPS Control Panels	Control Boxes (Nolta, MSHA etc.) TOPS control panels (permanently installed)	100% (From Ship Date)					
Small Pumps	3045, 3057, SX	100% (From Ship Date)					
Parts - *	All new Flygt parts (mechanical & electrical)	100% (From Ship Date)					

* - Parts that fail where used in a repair are warranted for one (1) year from the date of the repair for the failed part only – no labor; This Includes Flygt pump controllers, Flygt supervision equipment, Flygt submersible level transducers, etc.

APPENDIX F

EASEMENTS

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Williams

TEMPORARY CONSTRUCTION EASEMENT

The undersigned property owner, (hereinafter known as the Grantor) hereby grants and conveys unto Kitsap County, A Political Subdivision of the State of Washington, assigns, and successors, (hereinafter known as Grantee), a Temporary Construction Easement over, under and across the following lands for the purpose of for the purpose of maneuvering equipment on private property outside of the existing right of way limits in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project.

Easement area is depicted in attached plan hereto and by this reference made a part thereof (Tax Parcel No. 4690-000-026-0007)

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities in accordance with the plans for the above-mentioned project and may need to utilize equipment to perform improvements. For access and in order to maneuvered equipment needed during construction of these improvements, Kitsap County and its assigns will need to work beyond the existing right of way (roadway) limits on private property as depicted in the attached Exhibit A.

2. In the event that any private improvements are disturbed or destroyed, they will be restored to as good condition as they were immediately before the property way was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

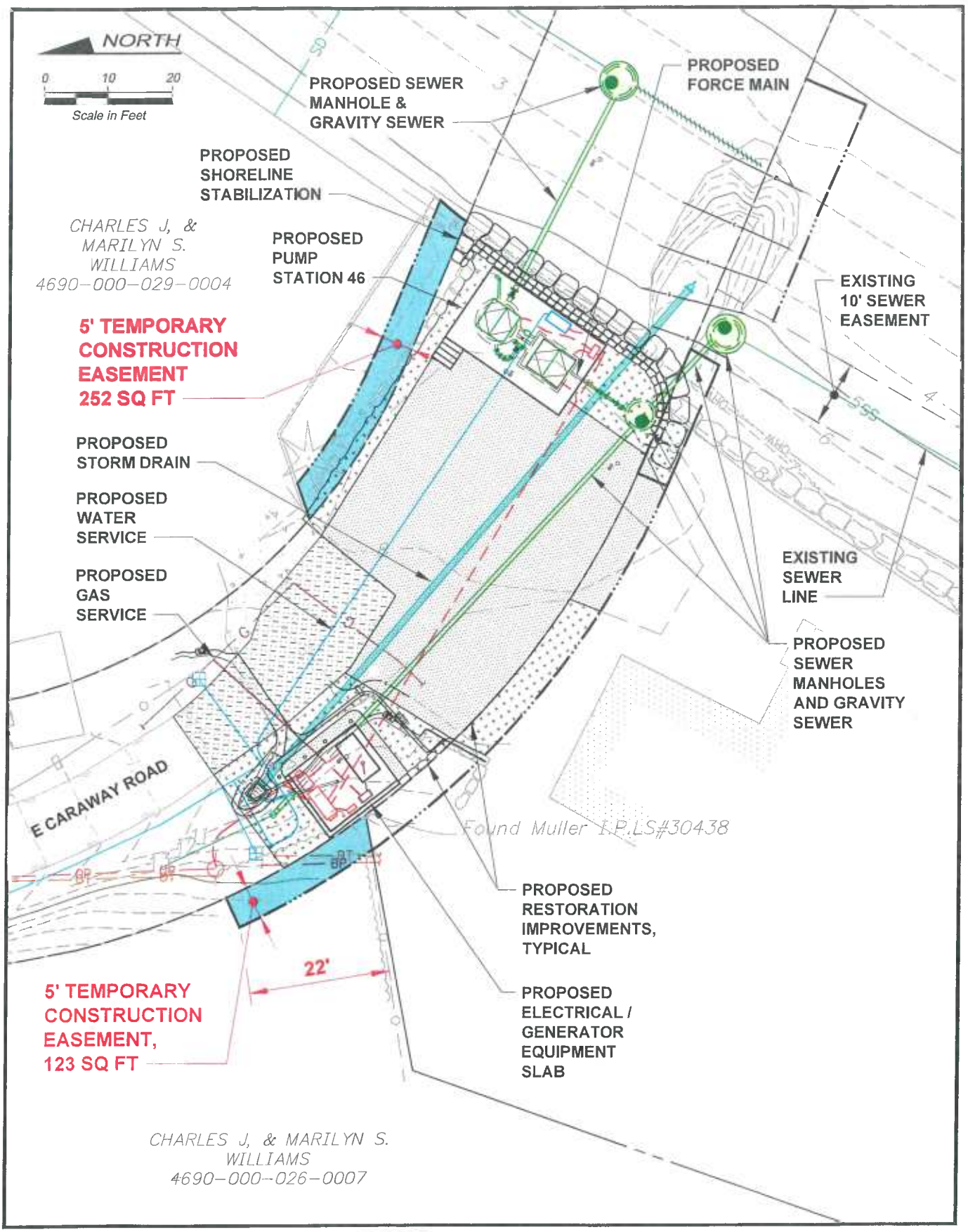
Dated this 29th day of March, 2016.

_____
Grantor

Contact Person: (360) 871-5133
Phone: _____

Other Information: _____

Exhibit A



S:\CAD\KITSAP COUNTY\15-10341 PS 45 46 47 BL DESIGN\DWGS\F15-10341_ESMT WILLIAMS-1.DWG (PLS) FILE NAME (UPDATED BY) PLOT DATE & TIME MAR 07 2016 08:46:27

XREFS: X15-10341_45-46-47-Topo, X15-10341_PS46-Prop

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Williams
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure 1

Keskula

TEMPORARY CONSTRUCTION EASEMENT

The undersigned property owner, (hereinafter known as the Grantor) hereby grants and conveys unto Kitsap County, A Political Subdivision of the State of Washington, assigns, and successors, (hereinafter known as Grantee), a Temporary Construction Easement over, under and across the following lands for the purpose of for the purpose of maneuvering equipment on private property outside of the existing right of way limits in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project.

Easement area is depicted in attached plan hereto and by this reference made a part thereof (Tax Parcel No. 4690-000-026-0106)

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities in accordance with the plans for the above-mentioned project and may need to utilize equipment to perform improvements. For access and in order to maneuvered equipment needed during construction of these improvements, Kitsap County and its assigns will need to work beyond the existing right of way (roadway) limits on private property as depicted in the attached Exhibit A.

2. In the event that any private improvements are disturbed or destroyed, they will be restored to as good condition as they were immediately before the property way was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

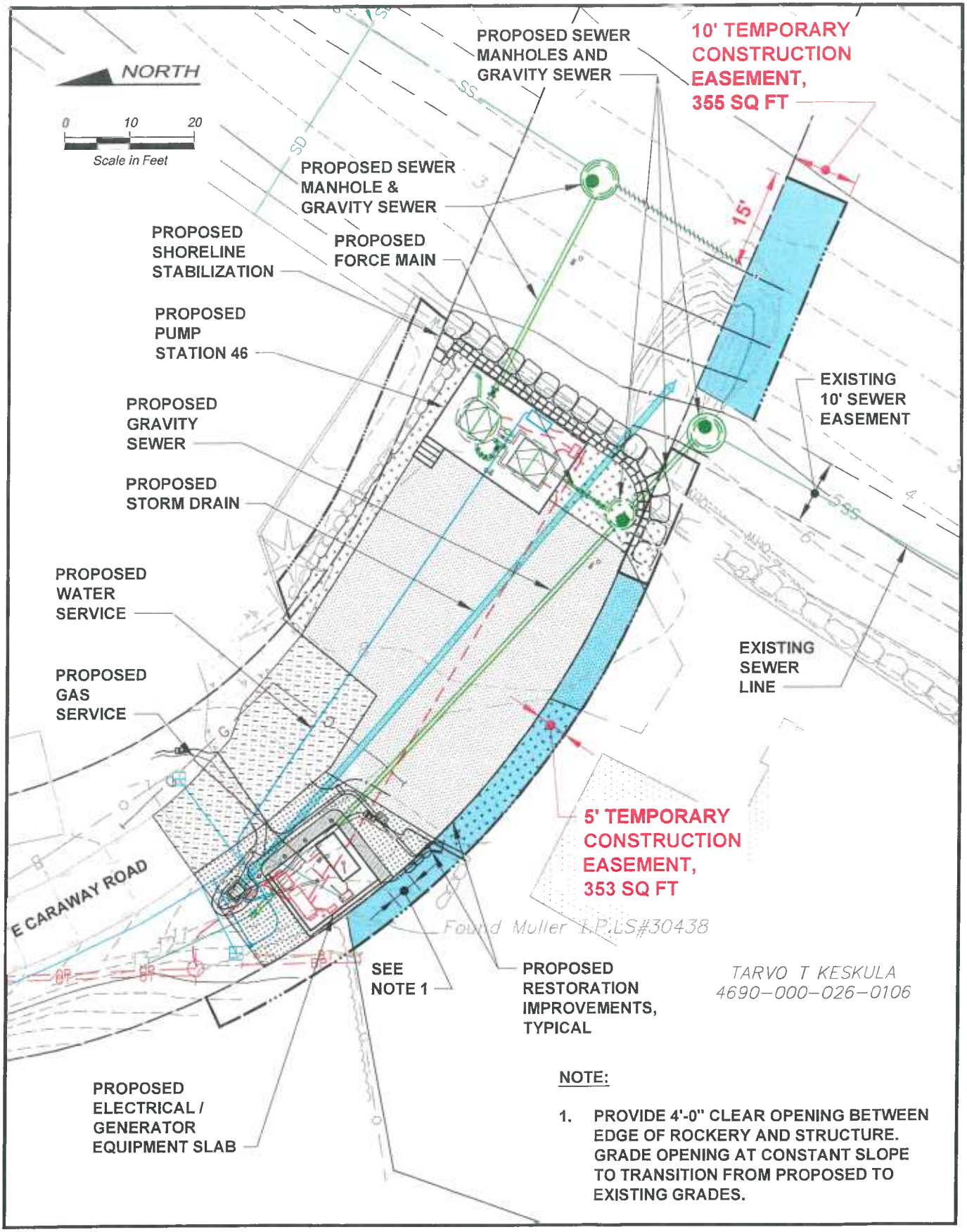
Dated this 4th day of May, 2016.

Tarvo Keskula
Grantor

Contact Person: _____
Phone: _____

Other Information: _____

Exhibit A



NOTE:

1. PROVIDE 4'-0" CLEAR OPENING BETWEEN EDGE OF ROCKERY AND STRUCTURE. GRADE OPENING AT CONSTANT SLOPE TO TRANSITION FROM PROPOSED TO EXISTING GRADES.

FILE NAME (UPDATED BY) | PLOT DATE & TIME
S:\CAD\KITSAP COUNTY\15-10341 PS 45 46 47 BL DESIGN\DWGS\F15-10341_ESMT KESKULA.DWG (PLS) | MAR 10 2016 07:28:57
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BHC CONSULTANTS

Keskula
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

AFTER RECORDING MAIL TO:

Molly Foster
Kitsap County Public Works
614 Division Street, MS-26
Port Orchard WA 98366-4699

KITSAP CO PUBLIC WORKS 201605180166
Easement Rec Fee: $ 76.00
05/18/2016 03:22 PM Page: 1 of 4
Dolores Gilmore, Kitsap Co Auditor

SANITARY SEWER EASEMENT

KNOW ALL MEN BY THESE PRESENTS, That the Grantor(s), **TARVO T. KESKULA, AS HIS SEPARATE ESTATE**, for and in consideration of Ten Dollars and No/100s ($10.00), hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and/or its assigns and successors, a perpetual Sanitary Sewer Easement, over, under, upon and across the hereinafter described lands for the purpose of **installing, expanding, upgrading, maintaining and operating the sewer facilities herein.** This sanitary sewer easement restricts and precludes any permanent structure from being constructed and/or placed within the area of the easement. Said lands being situated in a portion of Government Lot 1 of Section 22, Township 24 North, Range 2 East, W.M., Kitsap County, State of Washington and described as follows:

This Easement is Described in Exhibit "A" and Depicted in Exhibit "B"
(attached hereto and by this reference made a part hereof)

Dated this 4th day of May, 20 16.

By: Tarvo Keskula

LEGAL DESCRIPTION APPROVED BY
KITSAP COUNTY
DEPARTMENT OF PUBLIC WORKS
BY DATE 5/5/16

STATE OF WASHINGTON
} ss
COUNTY OF KITSAP

Assessor's Tax No. 4690-000-026-0106

On this day personally appeared before me TARVO T. KESKULA to me known to be the individuals described in and who executed the within and foregoing instrument, and acknowledged that ___ signed the same as ___ free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 4th day of May, 20 16.

Molly Foster
MOLLY FOSTER
Notary Public in and for the State of Washington.
Residing at: Port Orchard
My Commission Expires: 3-5-17

MOLLY FOSTER
NOTARY PUBLIC
COMMISSION EXPIRES 3-5-17
STATE OF WASHINGTON

EXCISE TAX EXEMPT MAY 18 2016

EXHIBIT A

KESKULA

4690-000-026-0106

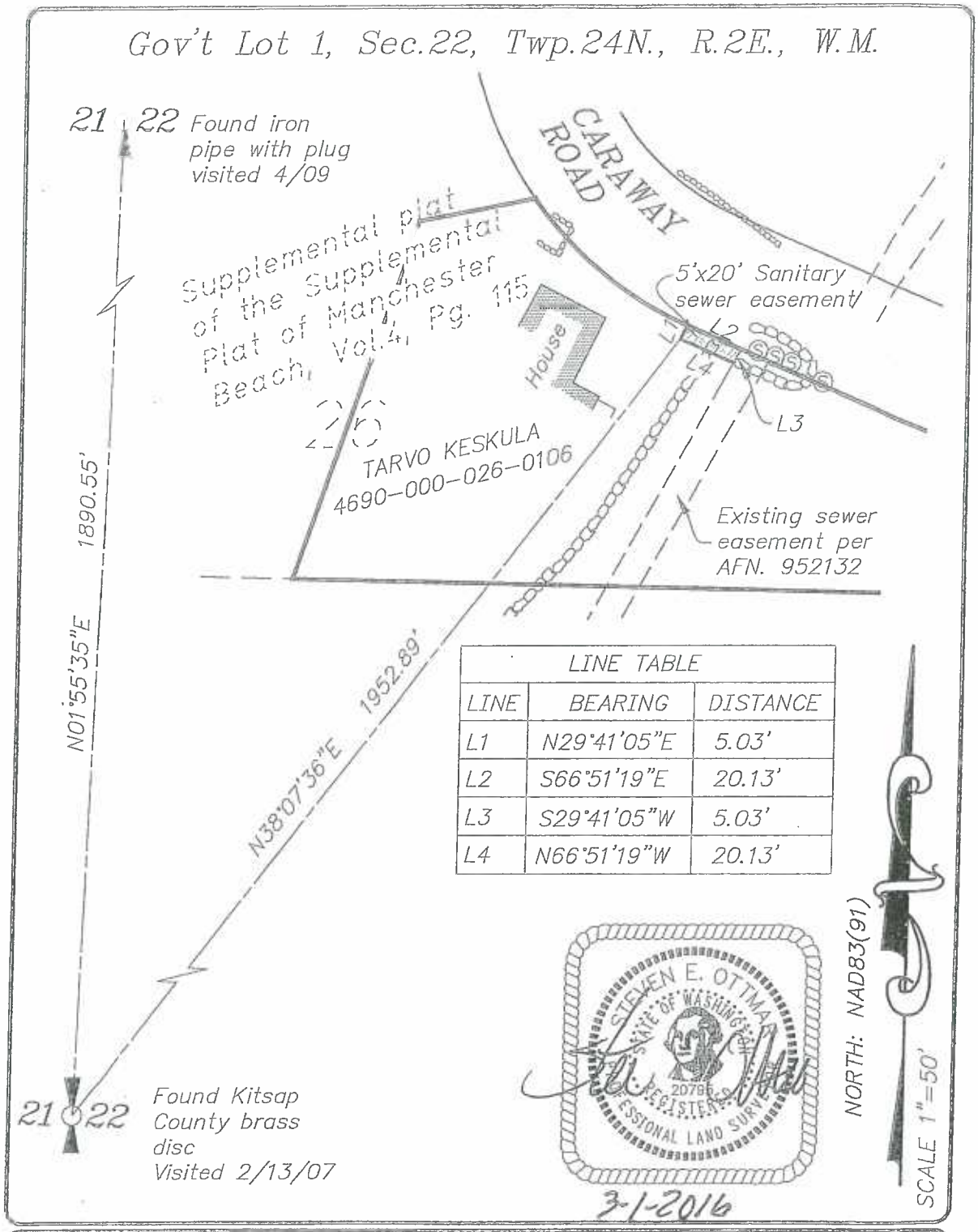
PERMANENT EASEMENT

THAT PORTION OF LOT 26, SUPPLEMENTAL PLAT OF THE SUPPLEMENTAL PLAT OF MANCHESTER BEACH, AS RECORDED IN VOLUME 4 OF PLATS, PAGE 115, RECORDS OF KITSAP COUNTY, WASHINGTON AND THE TIDELANDS OF THE SECOND CLASS SITUATE IN FRONT OF, ADJACENT TO OR ABUTTING THEREON, SITUATE IN GOVERNMENT LOT 1, SECTION 22, TOWNSHIP 24 NORTH, RANGE 2 EAST, W.M., KITSAP COUNTY, WASHINGTON, DESCIRBED AS FOLLOWS:

COMMENCING AT THE MEANDER CORNER BETWEEN SECTIONS 21 AND 22, TOWNSHIP 24 NORTH, RANGE 2 EAST, W.M.; THENCE SOUTH 01°55'35" WEST ALONG THE WEST LINE OF SAID SECTION 22 A DISTANCE OF 1890.55 FEET TO THE WEST QUARTER CORNER OF SAID SECTION 22; THENCE NORTH 38°07'36" EAST 1952.89 FEET TO THE POINT OF BEGINNING; THENCE NORTH 29°41'05" EAST 5.03 FEET TO THE NORTHERLY LINE OF SAID LOT 26; THENCE SOUTH 66°51'19" EAST ALONG SAID NORTHERLY LINE 20.13 FEET TO THE INTERSECTION OF SAID NORTHERLY LINE WITH THE WESTERLY LINE OF THE SEWER EASEMENT RECORDED UNDER AUDITOR'S FILE NO. 952132; THENCE SOUTH 29°41'05" WEST ALONG SAID WESTERLY LINE 5.03 FEET TO A POINT WHICH IS SOUTH 66°51'19" EAST OF THE POINT OF BEGINNING; THENCE NORTH 66°51'19" WEST 20.13 FEET TO THE POINT OF BEGINNING.

3-1-2016

EXHIBIT B

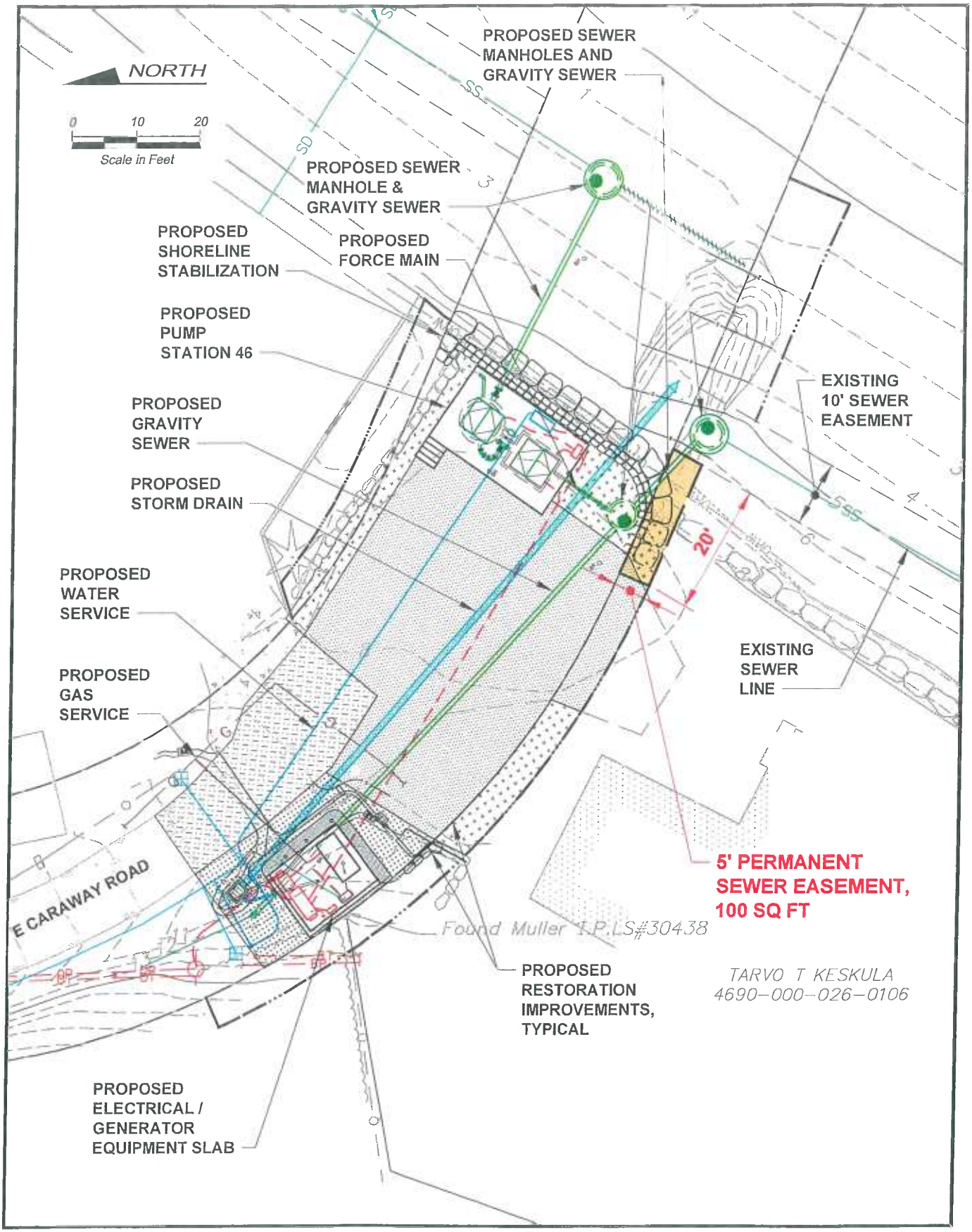


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N29°41'05"E	5.03'
L2	S66°51'19"E	20.13'
L3	S29°41'05"W	5.03'
L4	N66°51'19"W	20.13'

AES CONSULTANTS INC
P.O. BOX 930 · SILVERDALE, WA. 98383 · (360)692-6400

EXHIBIT MAP	DWN BY: G.M.C.	CHK. BY: S.E.O.
FOR BHC CONSULTANTS	DATE: 2/29/16	JOB No. 5890

Exhibit A



FILE NAME (UPDATED BY)
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XREFS: X15-10341_45-46-47-Topo, X15-10341_PS46-Prop
PLOT DATE & TIME
MAR 10 2016 07:28:57

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Keskula
Permanent Sewer Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure
2

Kleitsch

TEMPORARY CONSTRUCTION EASEMENT

The undersigned property owner, (hereinafter known as the Grantor) hereby grants and conveys unto Kitsap County, A Political Subdivision of the State of Washington, assigns, and successors, (hereinafter known as Grantee), a Temporary Construction Easement over, under and across the following lands for the purpose of for the purpose of maneuvering equipment on private property outside of the existing right of way limits in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project.

Easement area is depicted in attached plan hereto and by this reference made a part thereof (Tax Parcel No. 4522-001-010-0007)

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities in accordance with the plans for the above-mentioned project and may need to utilize equipment to perform improvements. For access and in order to maneuvered equipment needed during construction of these improvements, Kitsap County and its assigns will need to work beyond the existing right of way (roadway) limits on private property as depicted in the attached Exhibit A.

2. In the event that any private improvements are disturbed or destroyed, they will be restored to as good condition as they were immediately before the property way was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

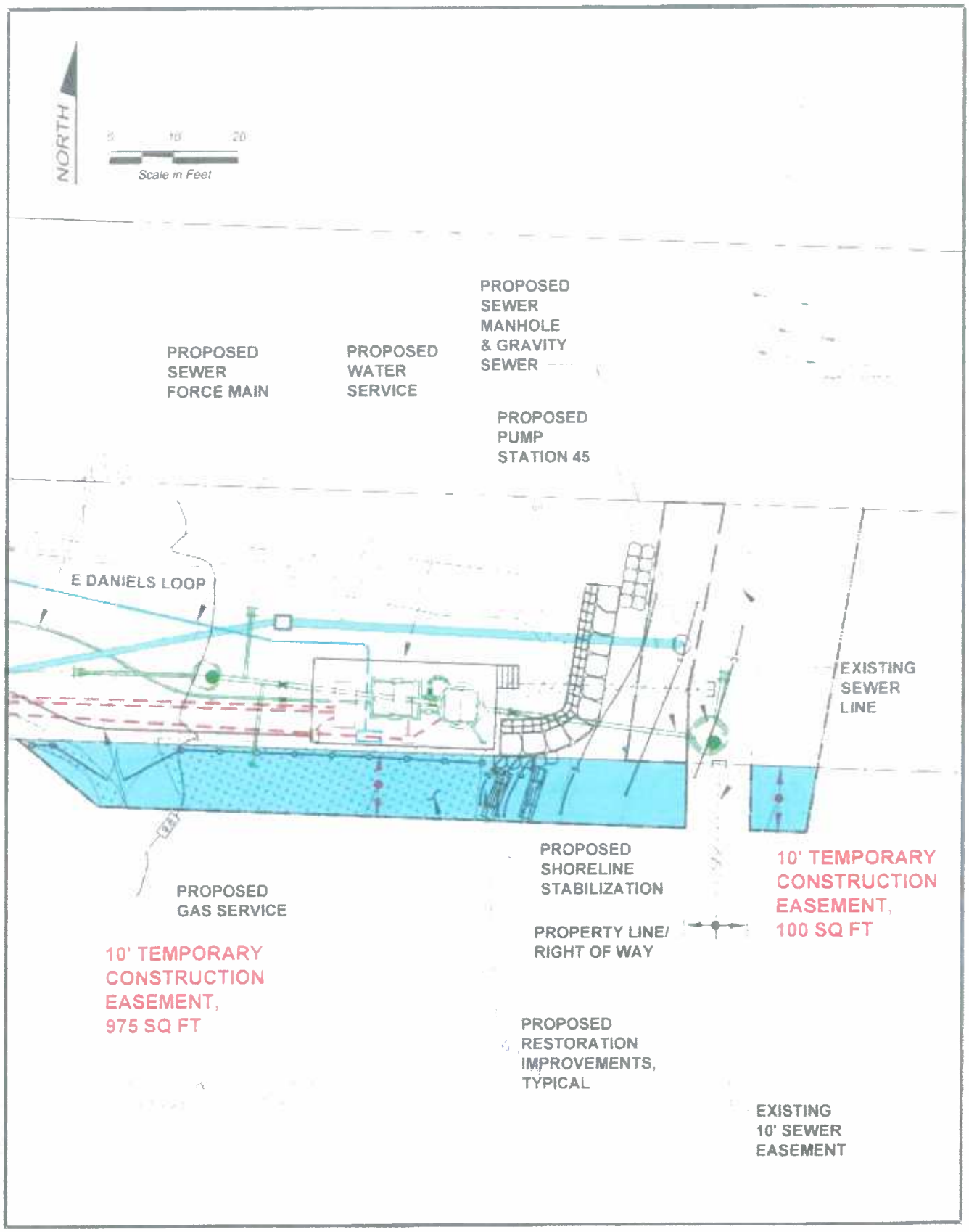
4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

Dated this 17 day of Aug, 2016.

Joe R. Kleitsch
Grantor

Contact Person: Joe Kleitsch
Phone: 206-954-7324

Other Information: _____



BHC CONSULTANTS

Kleitsch
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
August 2016

Figure
1

Oster

TEMPORARY CONSTRUCTION EASEMENT

The undersigned property owner, (hereinafter known as the Grantor) hereby grants and conveys unto Kitsap County, A Political Subdivision of the State of Washington, assigns, and successors, (hereinafter known as Grantee), a Temporary Construction Easement over, under and across the following lands for the purpose of for the purpose of maneuvering equipment on private property outside of the existing right of way limits in accordance with the approved construction plans for the Manchester Pump Station 45, 46, and 47 upgrade project.

Easement area is depicted in attached plan hereto and by this reference made a part thereof (Tax Parcel No. 4524-001-006-0100)

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities in accordance with the plans for the above-mentioned project and may need to utilize equipment to perform improvements. For access and in order to maneuvered equipment needed during construction of these improvements, Kitsap County and its assigns will need to work beyond the existing right of way (roadway) limits on private property as depicted in the attached Exhibit A.

2. In the event that any private improvements are disturbed or destroyed, they will be restored to as good condition as they were immediately before the property way was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

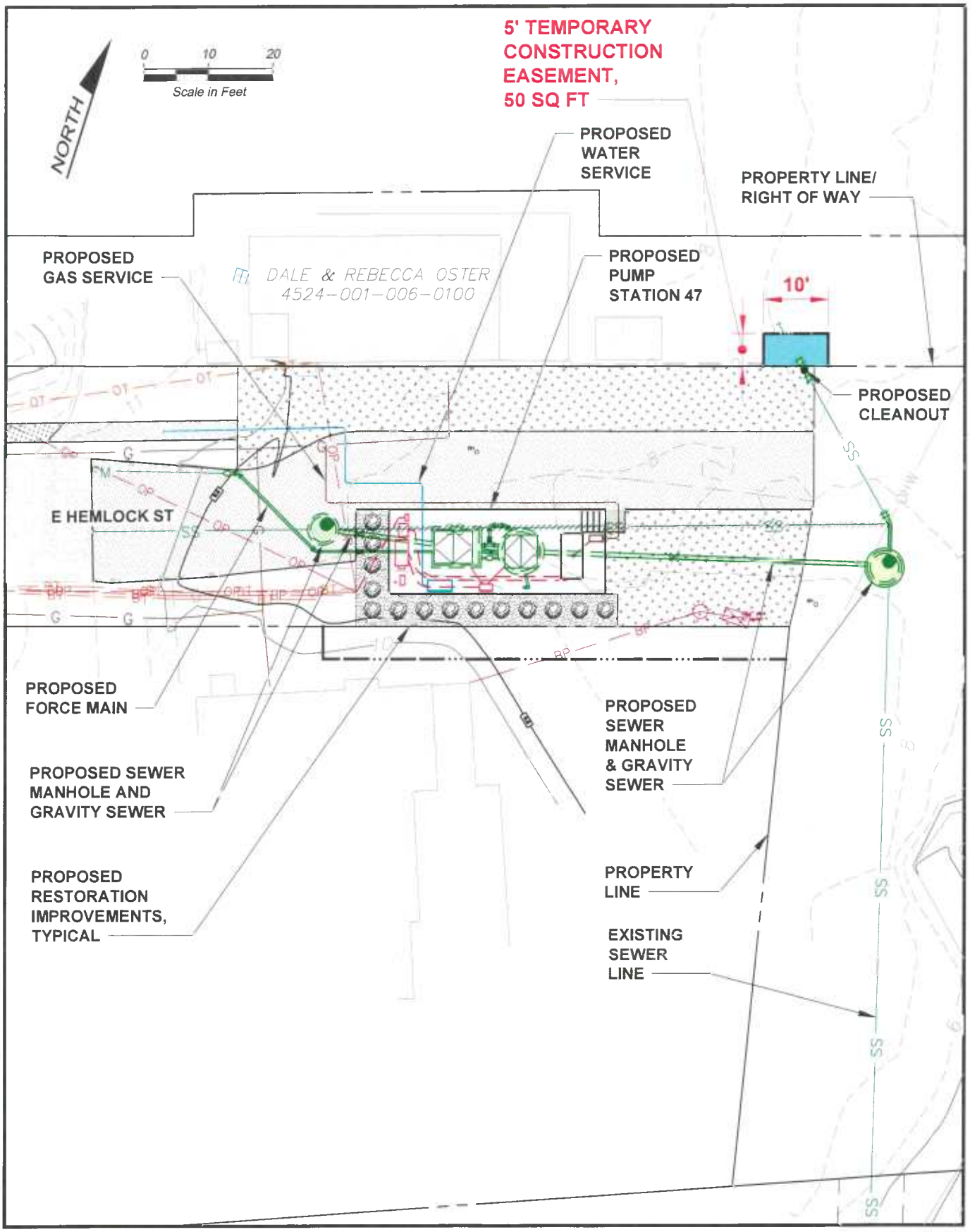
Dated this 19 day of MARCH, 2016.

Grantor

Contact Person: DALE OSTER
Phone: 206-954-8535

Other Information: _____

Exhibit A



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XREFS: X15-10341_45-46-47-Esmts, X15-10341_45-46-47-Topo, X15-10341_PS47-Prop

BHC CONSULTANTS

Oster
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

Kowalski

TEMPORARY CONSTRUCTION EASEMENT

The undersigned property owner, (hereinafter known as the Grantor) hereby grants and conveys unto Kitsap County, A Political Subdivision of the State of Washington, assigns, and successors, (hereinafter known as Grantee), a Temporary Construction Easement over, under and across the following lands for the purpose of for the purpose of maneuvering equipment on private property outside of the existing right of way limits in accordance with the approved construction plans for the Manchester Pump Station 45, 46, and 47 upgrade project.

Easement area is depicted in attached plan hereto and by this reference made a part thereof (Tax Parcel No. 4524-004-001-0000)

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities in accordance with the plans for the above-mentioned project and may need to utilize equipment to perform improvements. For access and in order to maneuvered equipment needed during construction of these improvements, Kitsap County and its assigns will need to work beyond the existing right of way (roadway) limits on private property as depicted in the attached Exhibit A.

2. In the event that any private improvements are disturbed or destroyed, they will be restored to as good condition as they were immediately before the property way was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

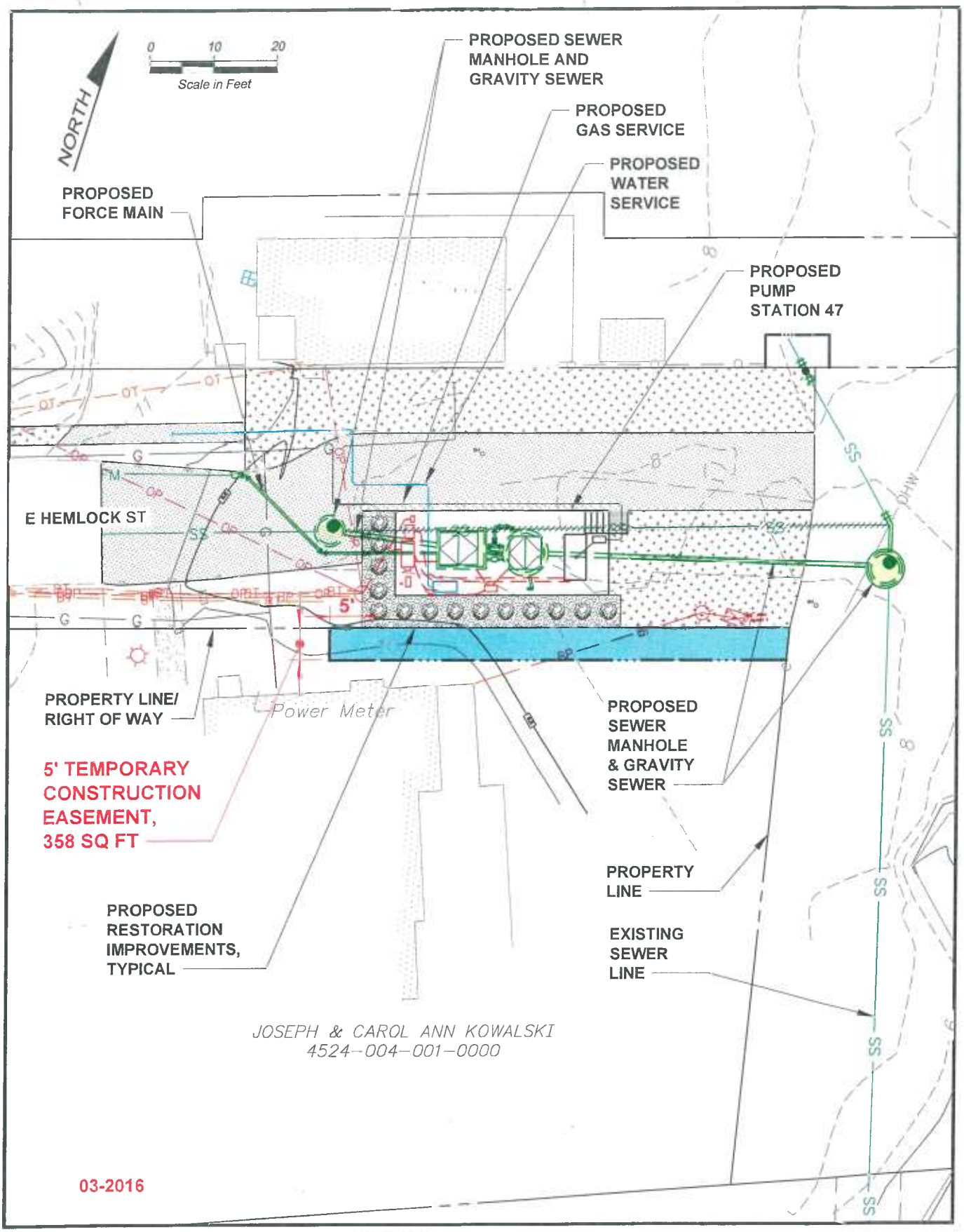
Dated this 25th day of April, 2016.

Grantor

Contact Person: Carol Kowalski
Phone: 206 551 9537

Other Information: Per Communication w/ Public Works

Exhibit A



FILE NAME (UPDATED BY) PLOT DATE & TIME
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XREFS: X15-10341_45-46-47-Esmts, X15-10341_45-46-47-Topo, X15-10341_PS47-Prop

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Kowalski
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

It is our understanding that only the manhole lid will be replaced or manhole and that all work will be confined to the manhole and lid and that no beach surface will be disturbed and no bulkhead structure or debris will be moved or removed from where they are now located.

Clark

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-022-2000**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. The contractor will not disturb any of the beach surface outside of the existing easement around sanitary sewer lid. The Grantor's bulkhead will not be disturbed and there will be no materials removed from the beach adjacent to the Grantor's property.

3. The Kitsap County Sewer Utility Construction Manger, Floyd Bayless and/or his assigns, will be on-site during any and all construction being performed adjacent to the Grantor's property and the Grantor will be provided at least 48-hours notice prior to any activities in this immediate area.

4. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

5. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

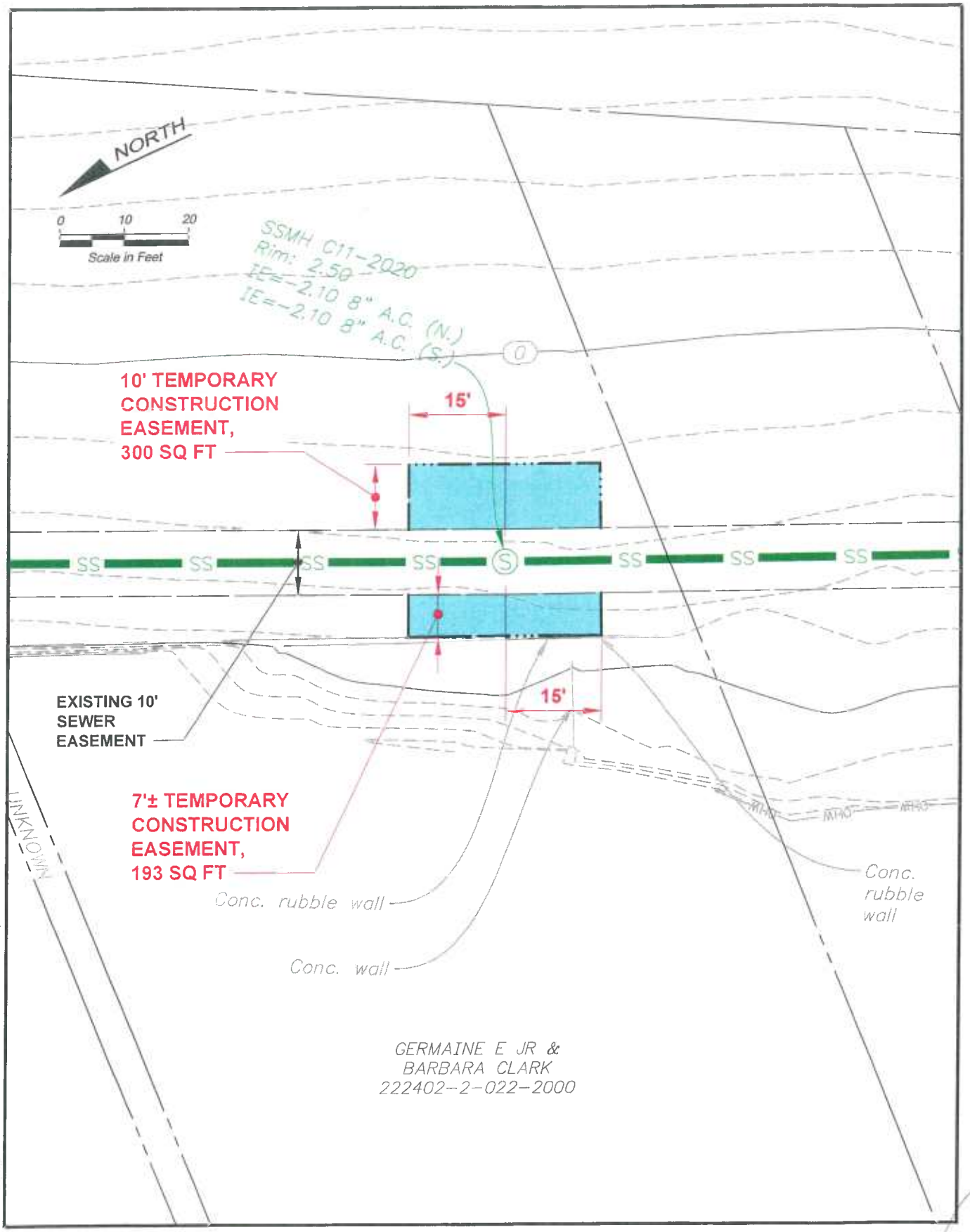
Dated this 3rd day of June, 2016.

Germaine E. Clark
Grantor

Contact Person: JERRY CLARK
Phone: (360) 871-0566 cell (360) 362-2591

Other Information: _____

Exhibit A



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XREFS: X15-10341_Beachline-Esmts, X15-10341_Beachline-Ex Align-Prof, X15-10341_Beachline-Topo

PLOT DATE & TIME
MAR 02 2016 10:50:08

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Clark
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure
1

June 3, 2016 3/3

Jackley

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **4579-000-002-0001**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

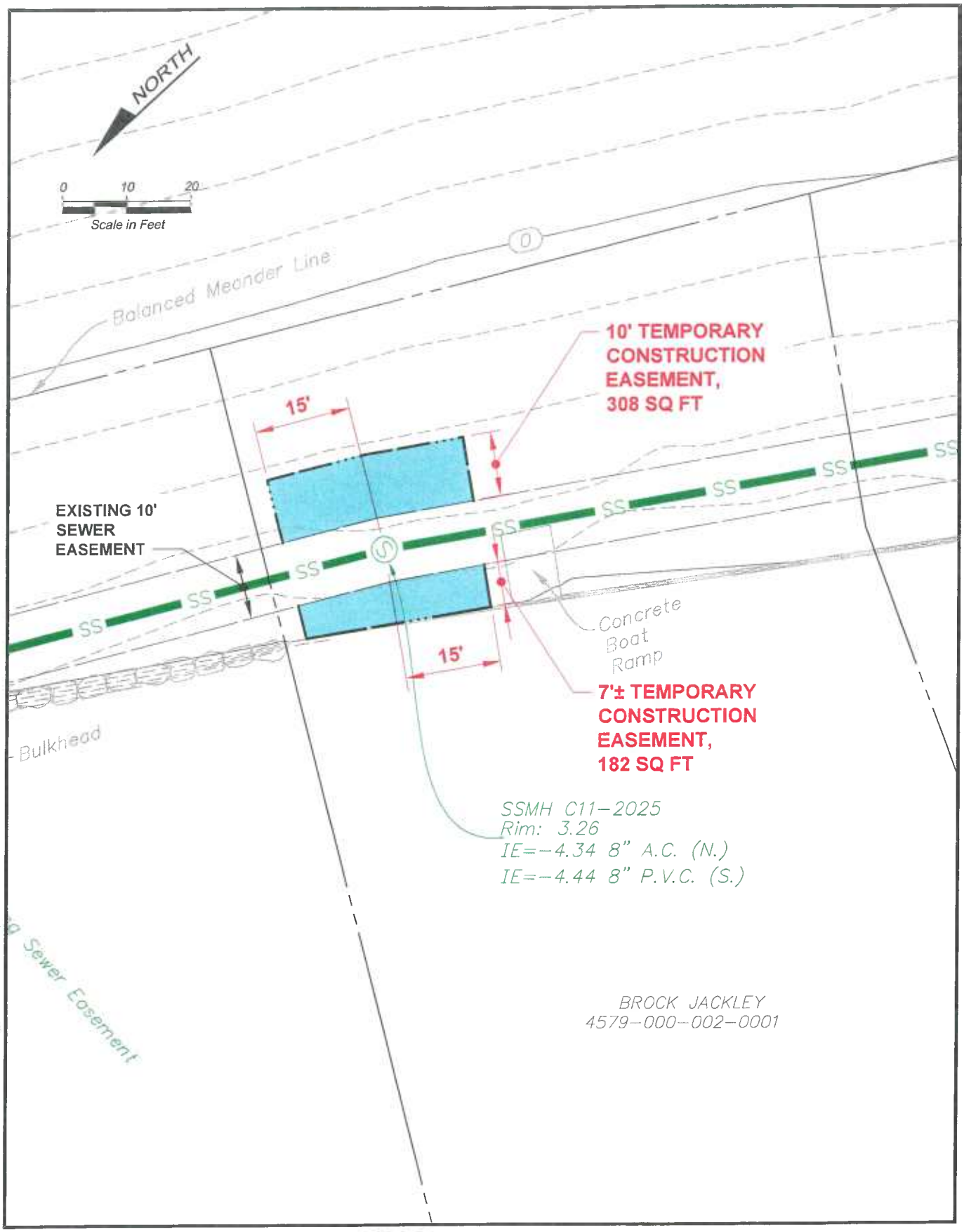
Dated this 7 day of APRIL, 2016.

Bruce Jackley
Grantor

Contact Person: Bruce Jackley
Phone: 360 - 710 - 8888

Other Information: _____

Exhibit A



FILE NAME (UPDATED BY) | PLOT DATE & TIME
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XREFS: X15-10341_Beachline-Esmts, X15-10341_Beachline-Ex Align-Prof, X15-10341_Beachline-Topo

BHC CONSULTANTS

Jackley
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure
1

Akenson

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-055-2000**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense. (INCLUDING EXISTING SEA WALL)

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

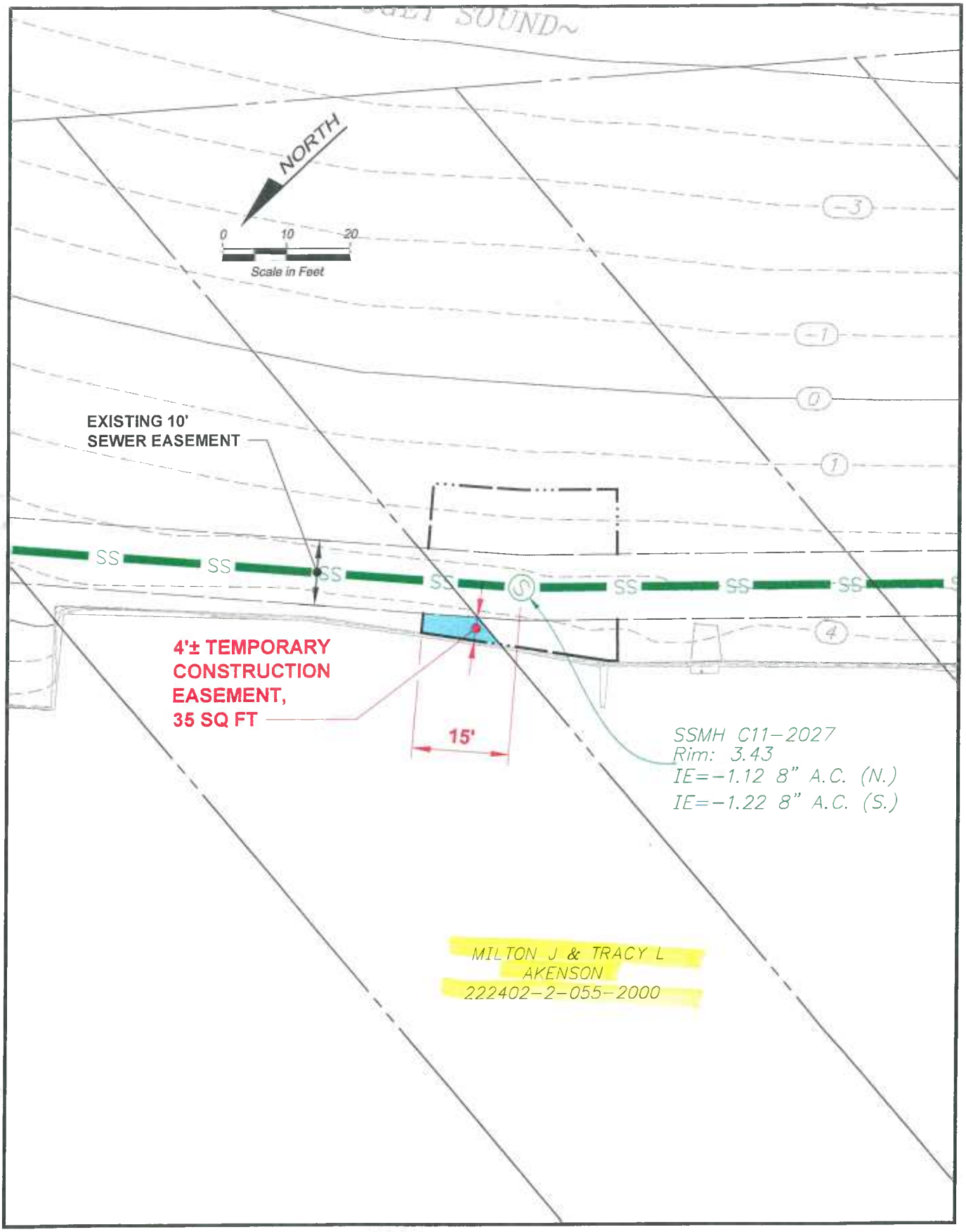
Dated this 1 day of APRIL, 2016.

Grantor

Contact Person: MILTON AKENSON
Phone: 857 449 6651 CELL

Other Information: PLEASE PROVIDE BEFORE AND AFTER PHOTOS OF EXISTING SEA WALL W/ ACCURATE PRECISE MEASUREMENTS FOR PROOF OF "NO MOVEMENT" AFTER CONSTRUCTION
Thank you

Exhibit A



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PLOT DATE & TIME
MAR 02 2016 10:38:13

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Akenson
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

Shirley

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **4579-000-005-0107**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

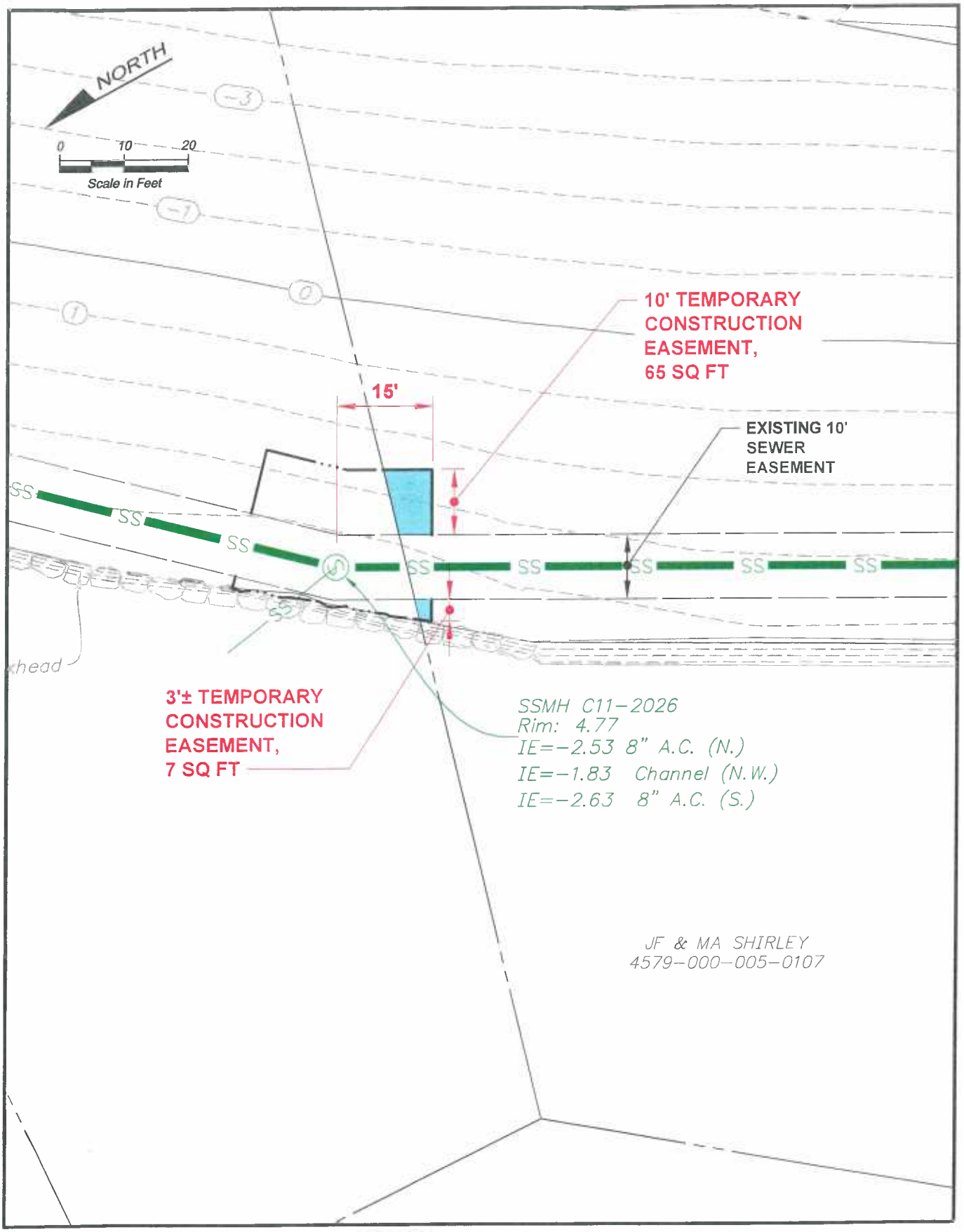
Dated this 3rd day of April, 2016.

Joseph T. Shirley
Grantor

Contact Person: JOSEPH SHIRLEY
Phone: 360-871-3054

Other Information: _____

Exhibit A



FILE NAME (UPDATED BY) | PLOT DATE & TIME
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BHC CONSULTANTS

Shirley
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

Cook

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **4522-003-006-0009**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

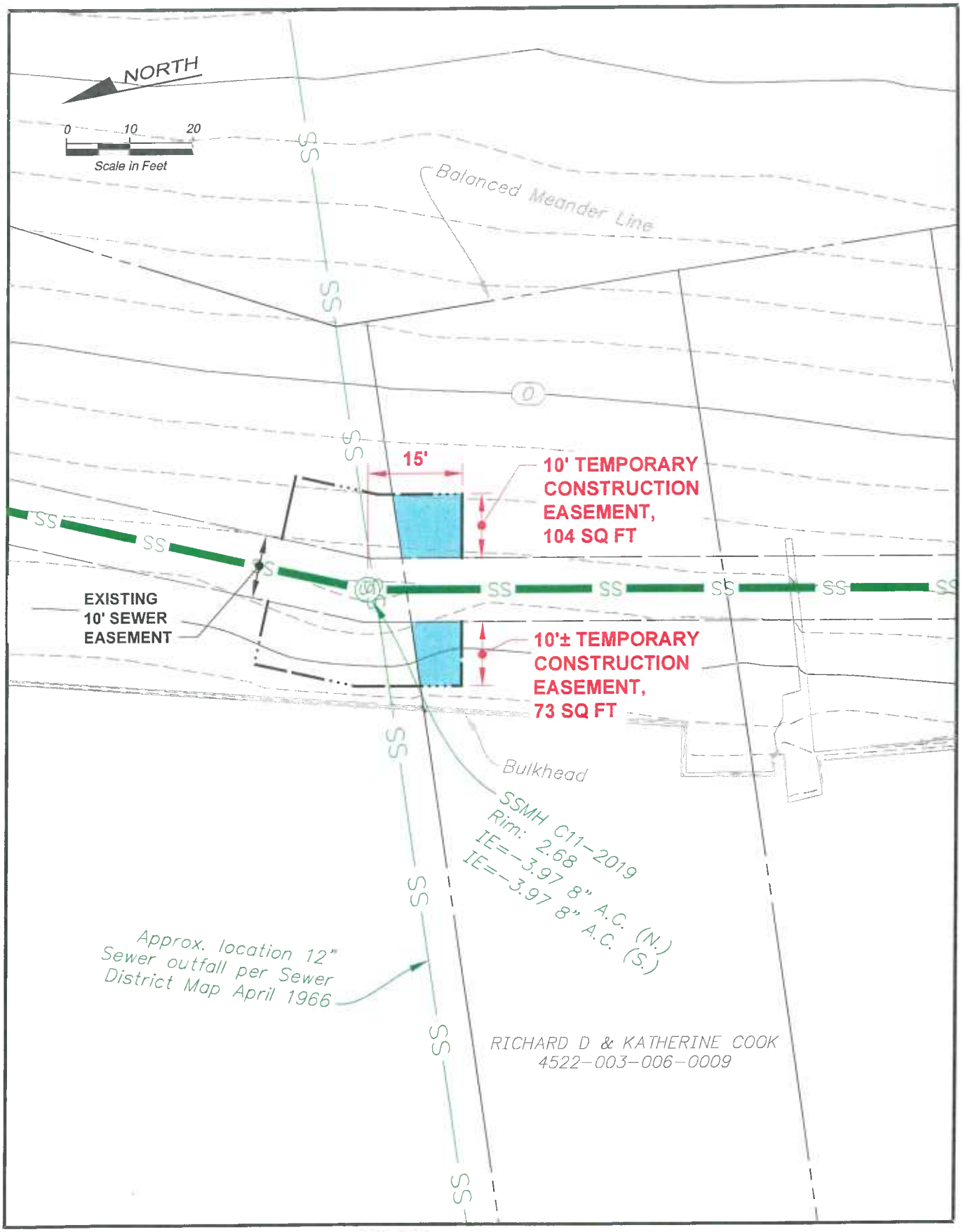
Dated this 1 day of APRIL, 2016.

Richard D Cook
Grantor

Contact Person: RICHARD COOK
Phone: 360-871-1208

Other Information: 360-981-1278

Exhibit A



FILE NAME (UPDATED BY) PLOT DATE & TIME
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XREFS: X15-10341_Beachline-Esmts, X15-10341_Beachline-Ex Align-Prof, X15-10341_Beachline-Topo

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Cook
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

Daeley

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-045-2003**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

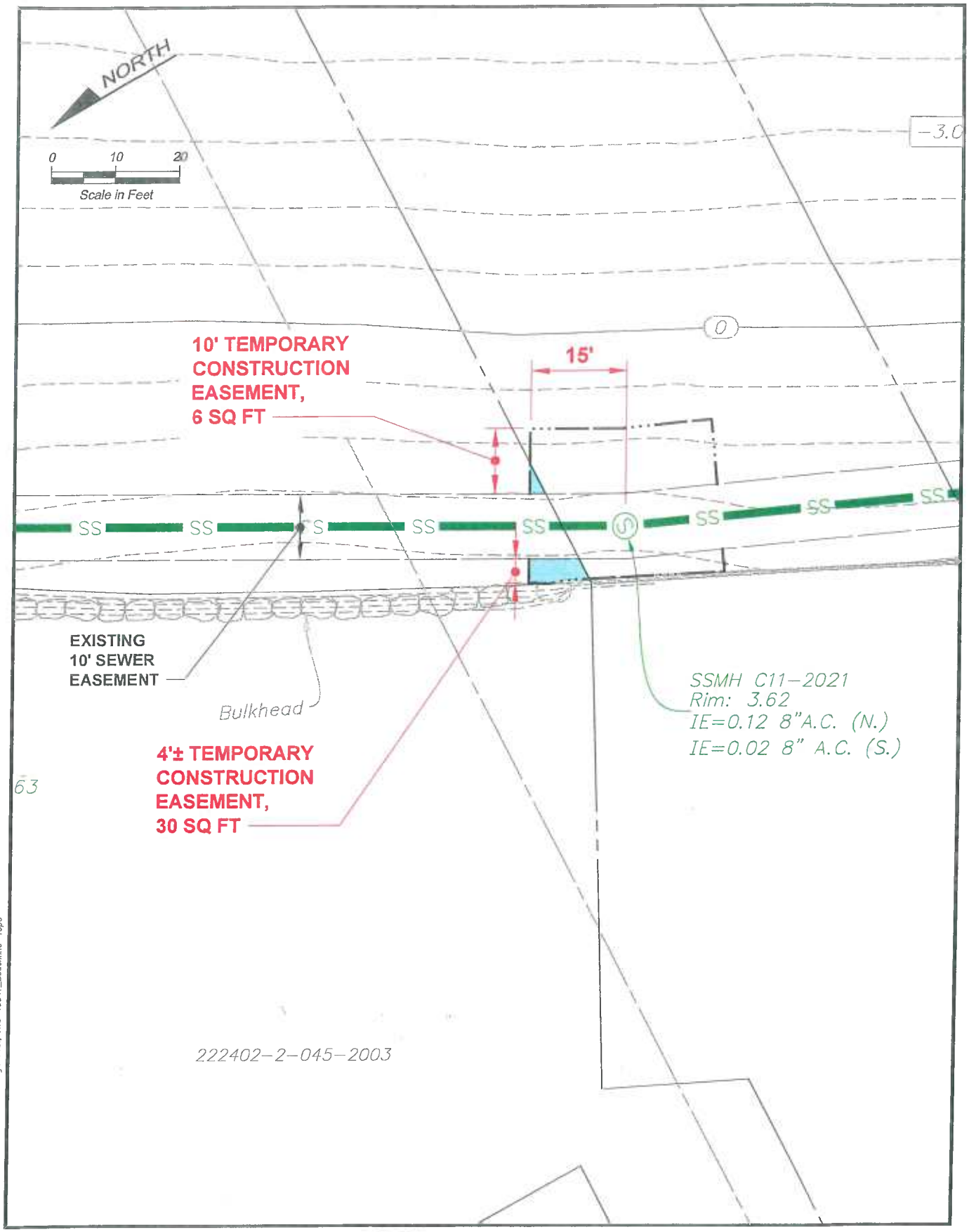
Dated this 31 day of March, 2016.

Tom M. Daeley
Grantor

Contact Person: Tom Daeley
Phone: 253 222 1778

Other Information: _____

Exhibit A



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PLOT DATE & TIME
MAR 02 2016 12:59:29

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

Brown

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-3-065-2006**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

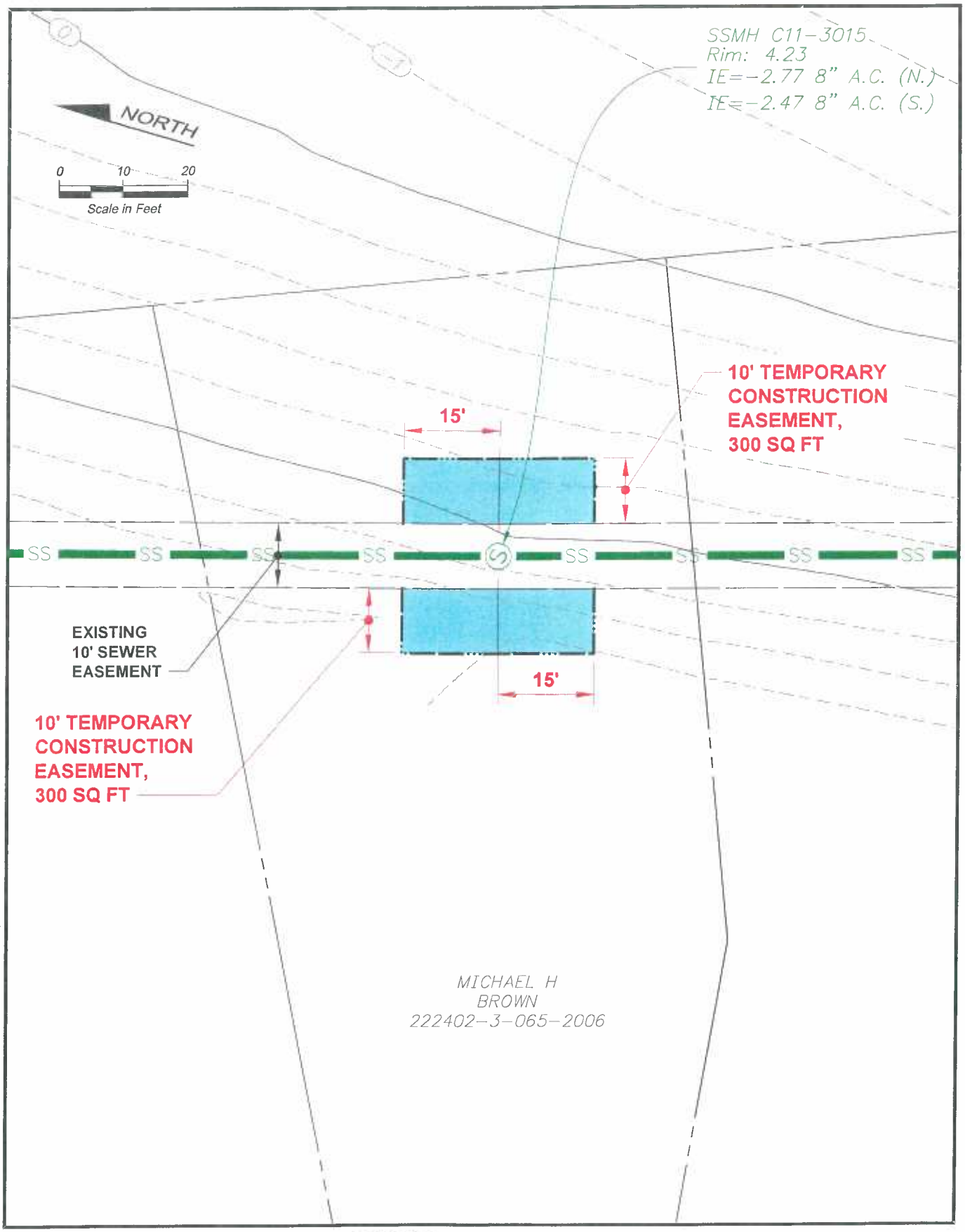
Dated this 1 day of April, 2016.

Grantor

Contact Person: Michael Brown
Phone: 425-791-4751

Other Information: _____

Exhibit A



FILE NAME (UPDATED BY) PLOT DATE & TIME
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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Brown
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure
1

Muth

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-001-2005**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

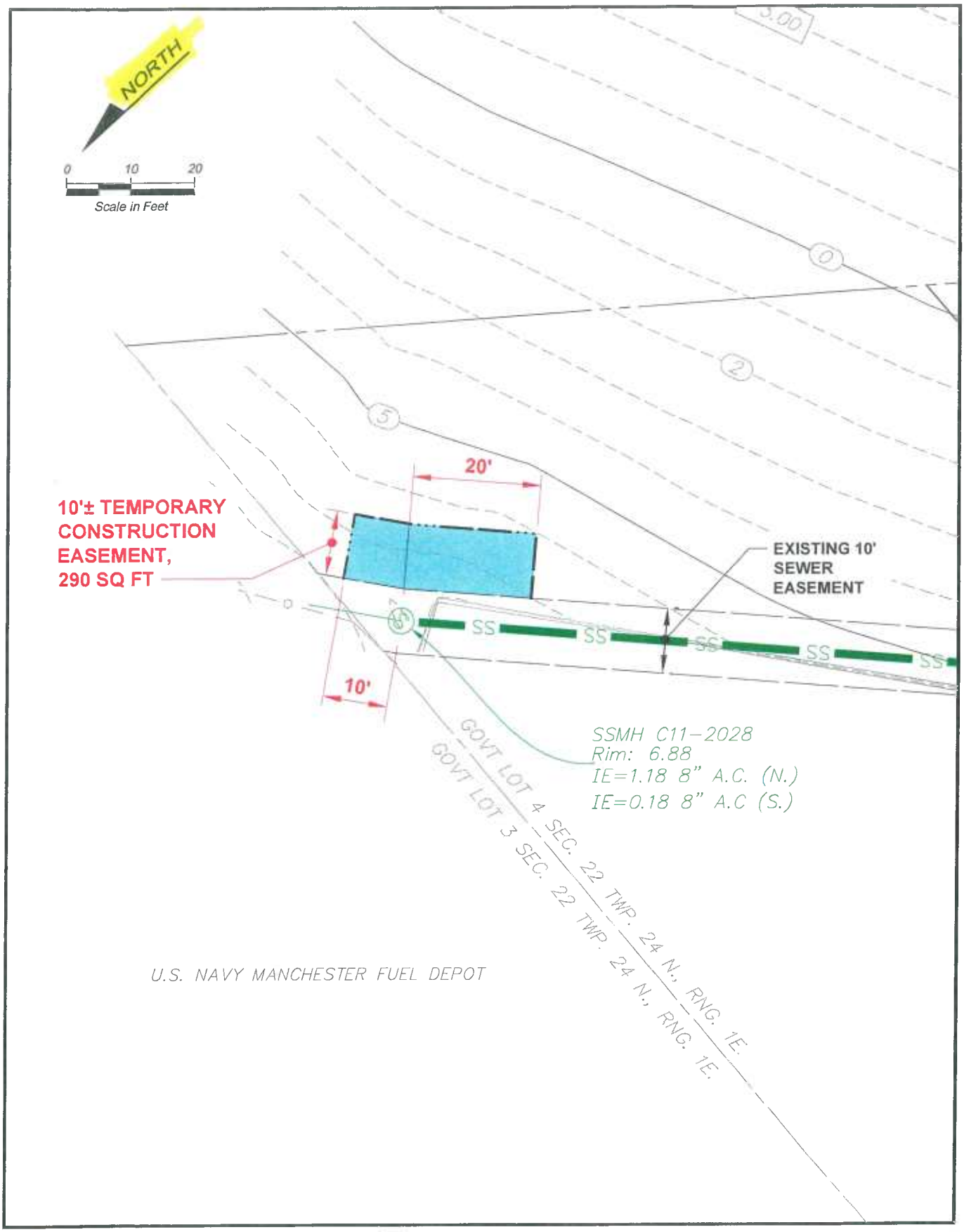
Dated this 3rd day of Feb, 2016.

Gerald Muth
Grantor

Contact Person: Gerald Muth
Phone: 360-871-6565

Other Information: _____

Exhibit A



FILE NAME (UPDATED BY) | PLOT DATE & TIME
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BHC CONSULTANTS

Muth
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

Guariz

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-056-2009**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

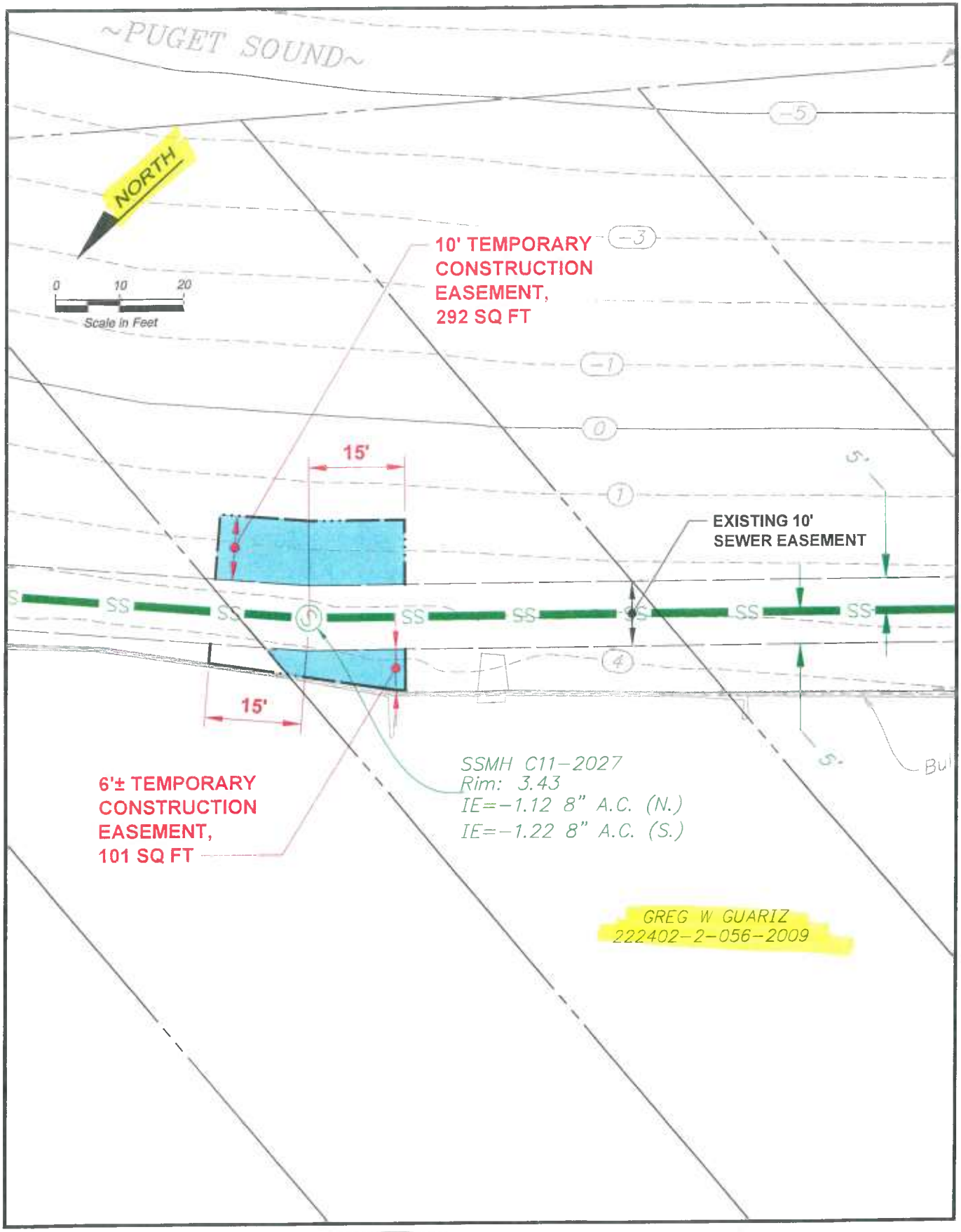
Dated this 2nd day of February, 2016.

Greg W. Guariz
Grantor

Contact Person: Greg Guariz
Phone: 360 871 8657
8657

Other Information: _____

Exhibit A



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PLOT DATE & TIME MAR 02 2016 12:43:47

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Guariz
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

Chase

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **4516-001-001-0006**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

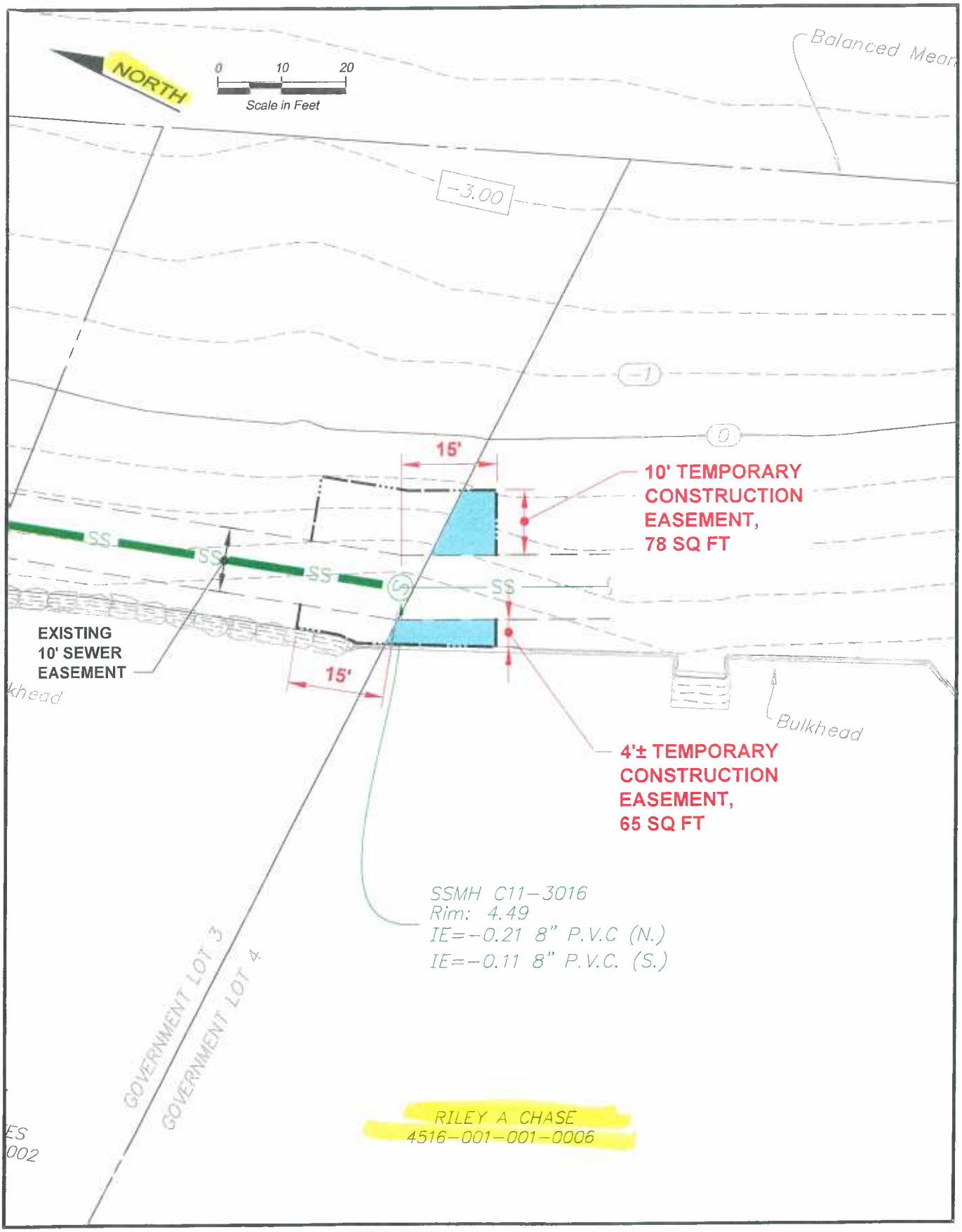
Dated this 16 day of February, 2016.

_____
Grantor

Contact Person: Riley Chase
Phone: 360-710-2084

Other Information: _____

Exhibit A



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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Chase
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure
1

Cohrs

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-039-2001**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

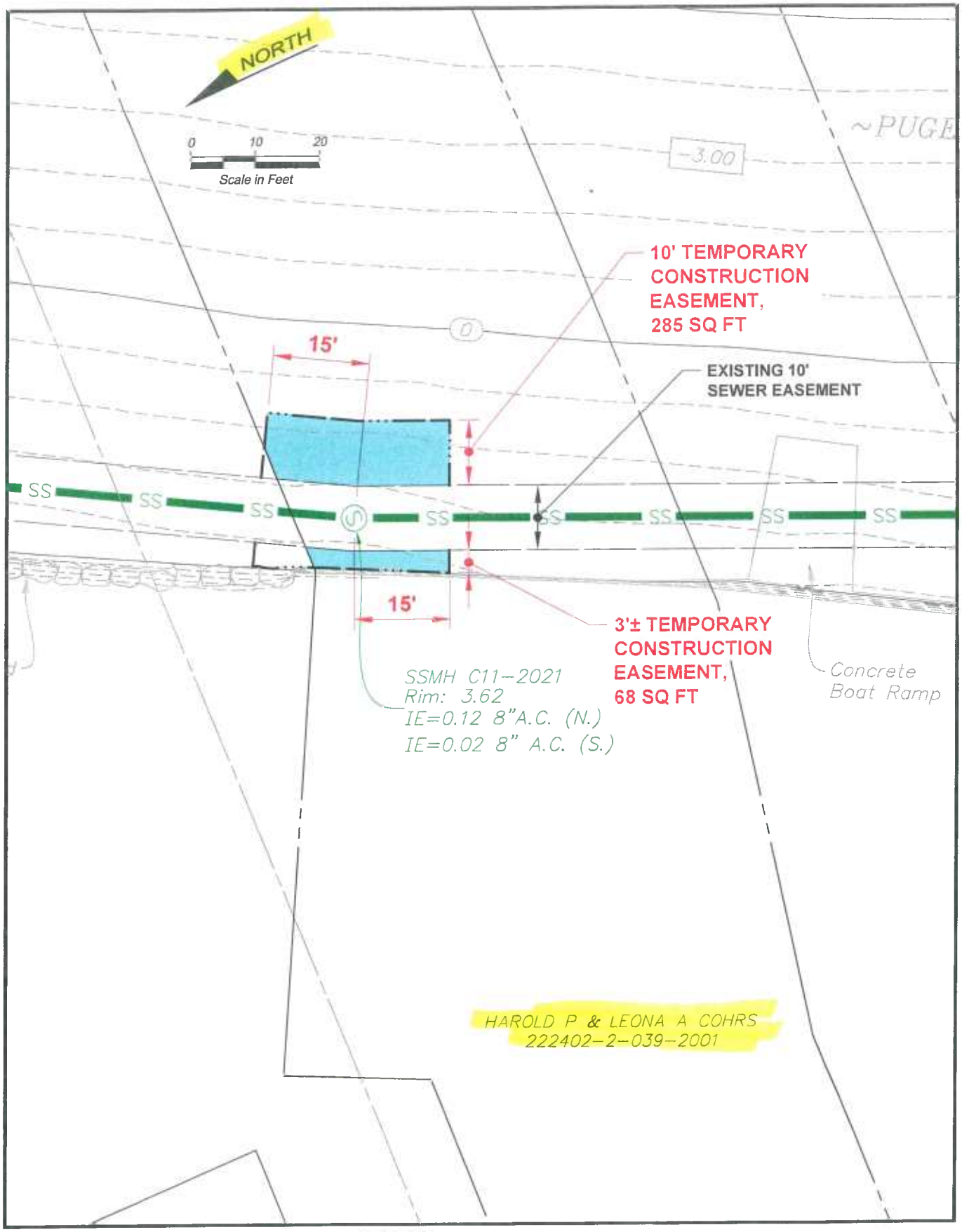
Dated this 11 day of February, 2016.

_____
Grantor

Contact Person: Harold Cohrs
Phone: 253-677-4960

Other Information: _____

Exhibit A



FILE NAME (UPDATED BY) | PLOT DATE & TIME
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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Cohrs
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure
1

Hayford

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-2-056-2006**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

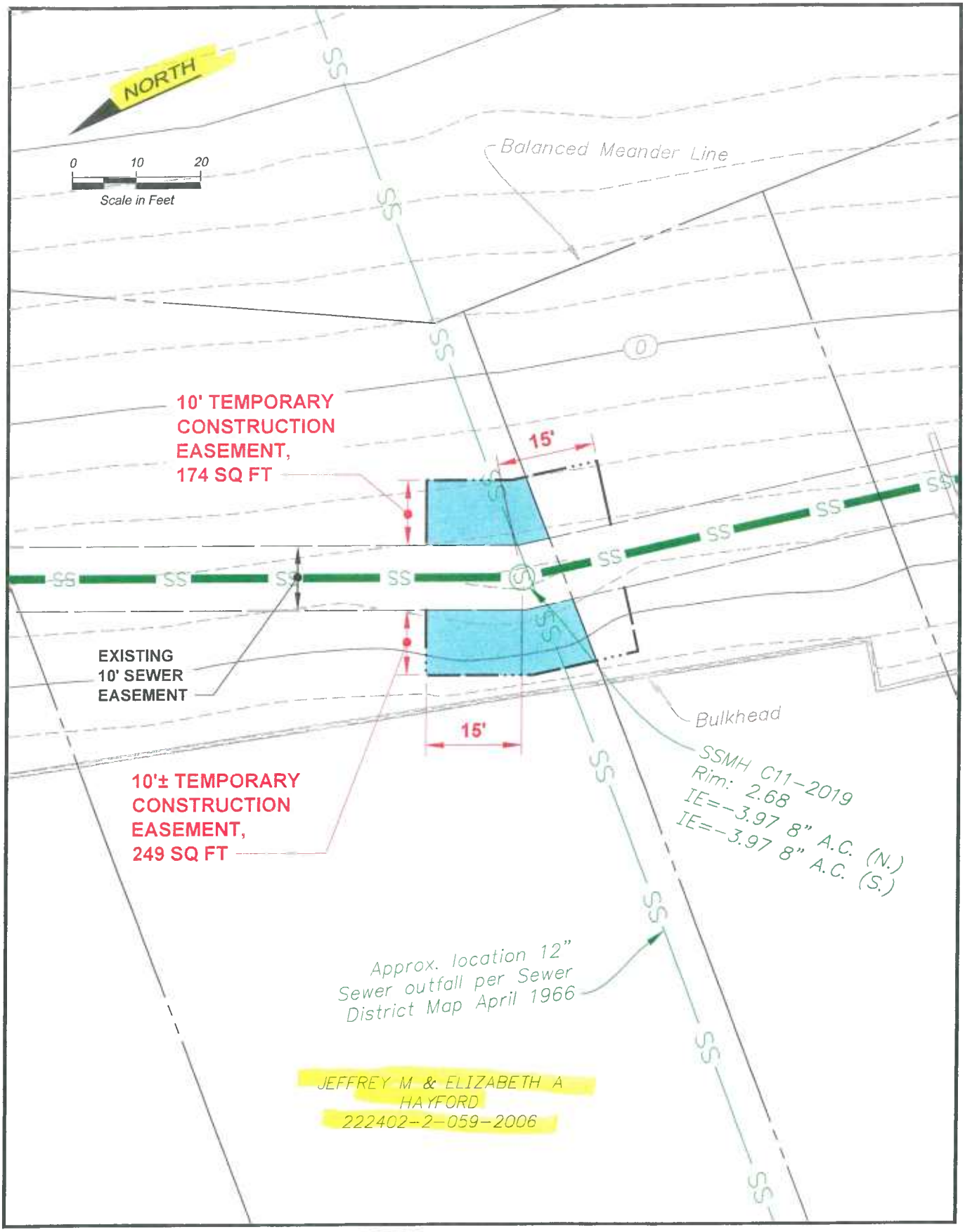
Dated this 2 day of FEBRUARY, 2016.

Grantor

Contact Person: JEFF HAYFORD
Phone: 206-972-5664

Other Information: LIZ HAYFORD 253-318-5700

Exhibit A



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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Hayford
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

Preuss

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **222402-3-051-2002**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

2. According to the plans, no private improvements will be disturbed. However, in the event any private improvements existing on the above-described property are disturbed or destroyed, they will be replaced in as good condition as they were immediately before the property was entered upon by Kitsap County and at the County's expense.

3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

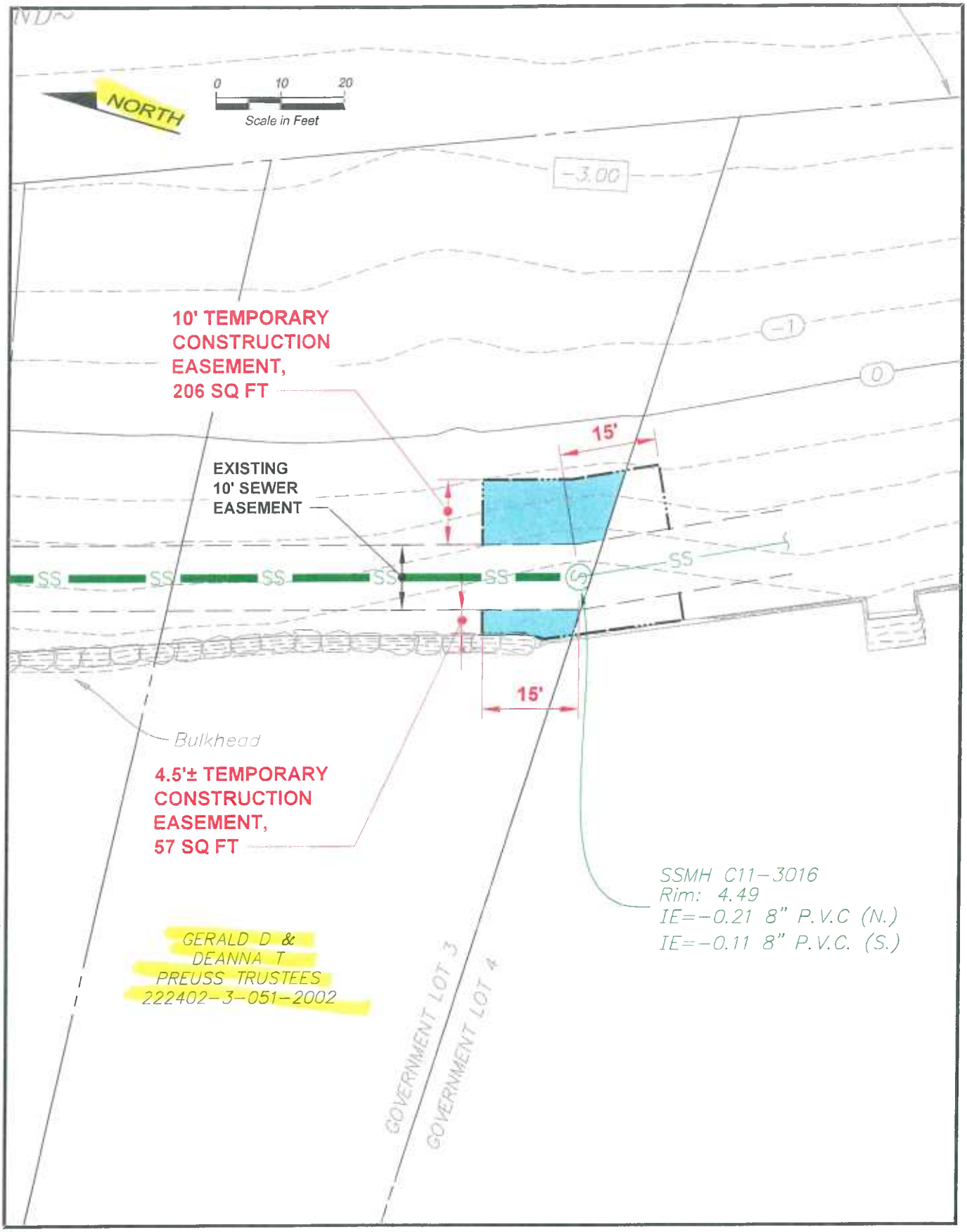
Dated this 15 day of FEBRUARY, 2016.

Gerald D Preuss / Deanna Preuss
Grantor

Contact Person: GERALD PREUSS
Phone: 360-871-3491 CELL: 360-710-1490

Other Information: _____

Exhibit A



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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Preuss Trustees
Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

Common Area of Short Plat 4026R-2

TEMPORARY RIGHT OF ENTRY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned does hereby grant and convey unto Kitsap County, A Political Subdivision of the State of Washington, and assigns a **Temporary Right of Entry** over and across the following described land for the purpose of accessing and repairing existing sewer facilities running along the beach in accordance with the Manchester Pump Station 45, 46, and 47 upgrade project. The attached Exhibit A represents the area in which the County and assigns will need to access via the beach and maneuver equipment outside of the existing sewer easement.

Property known as Kitsap County Assessor Numbers: **4579-000-006-0205**

It Is Hereby Agreed As Follows:

1. Kitsap County and assigns will be repairing and upgrading sanitary sewer facilities and may need to utilize equipment to perform improvements. This work will require Kitsap County Public Works' staff and assigns to temporarily enter private property by shore to perform these tasks. If beach access is not possible, the owner will be notified immediately to discuss an alternate route to the sewer facility.

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4. This Temporary Construction Easement shall be in effect for **Eighteen (18) months from the start date of construction or until project completion,** whichever occurs first. The property owner assumes no obligation under this agreement other than permitting access for completion of these specific tasks.

Dated this 13th day of February, 2016.

Charles E. Prestrud

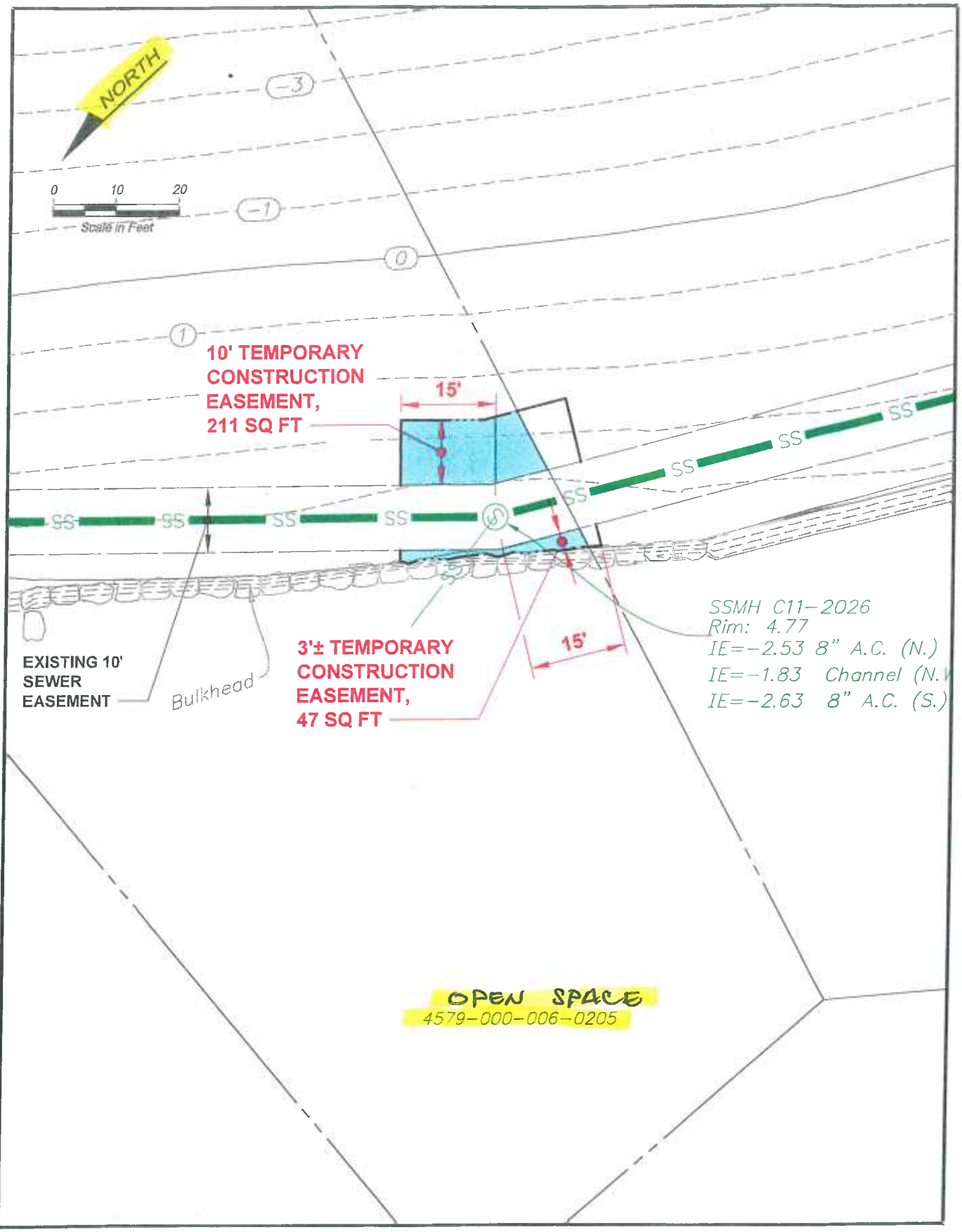
Grantor - Prestrude

Contact Person: Charles Prestrud
Phone: 206 440-4752

@question Other Information: Will beach access be limited during construction? If so, approximately when and for how long?

cprestrud@Gmail.com

Exhibit A



FILE NAME (UPDATED BY) | PLOT DATE & TIME
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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

Common Area of Short Plat 4026R-2

TEMPORARY RIGHT OF ENTRY

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3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

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Dated this 16 day of February, 2016.

Norma K Smith

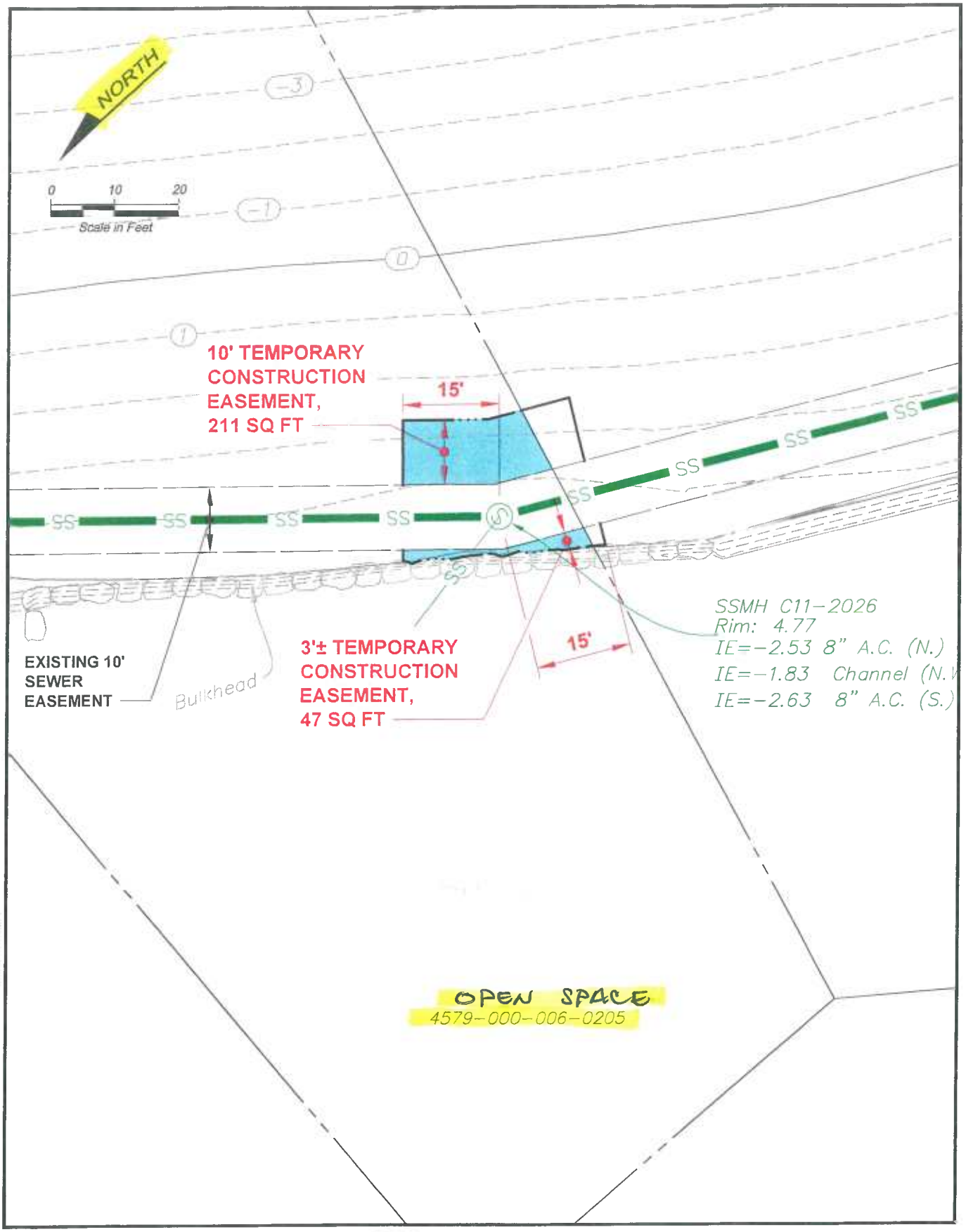
Grantor - Smith

Contact Person: NORMA K. Smith

Phone: 623 214 0546 AZ 360 871 6700 WA

Other Information: _____

Exhibit A



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BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and
Beach Lines Rehabilitation
March 2016

Figure
1

Common Area of Short Plat 4026R-2

TEMPORARY RIGHT OF ENTRY

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Property known as Kitsap County Assessor Numbers: **4579-000-006-0205**

It Is Hereby Agreed As Follows:

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3. The Grantee (Kitsap County) also agrees to indemnify and save harmless the Grantor (Property Owner) from any liability arising from the activities contemplated herein.

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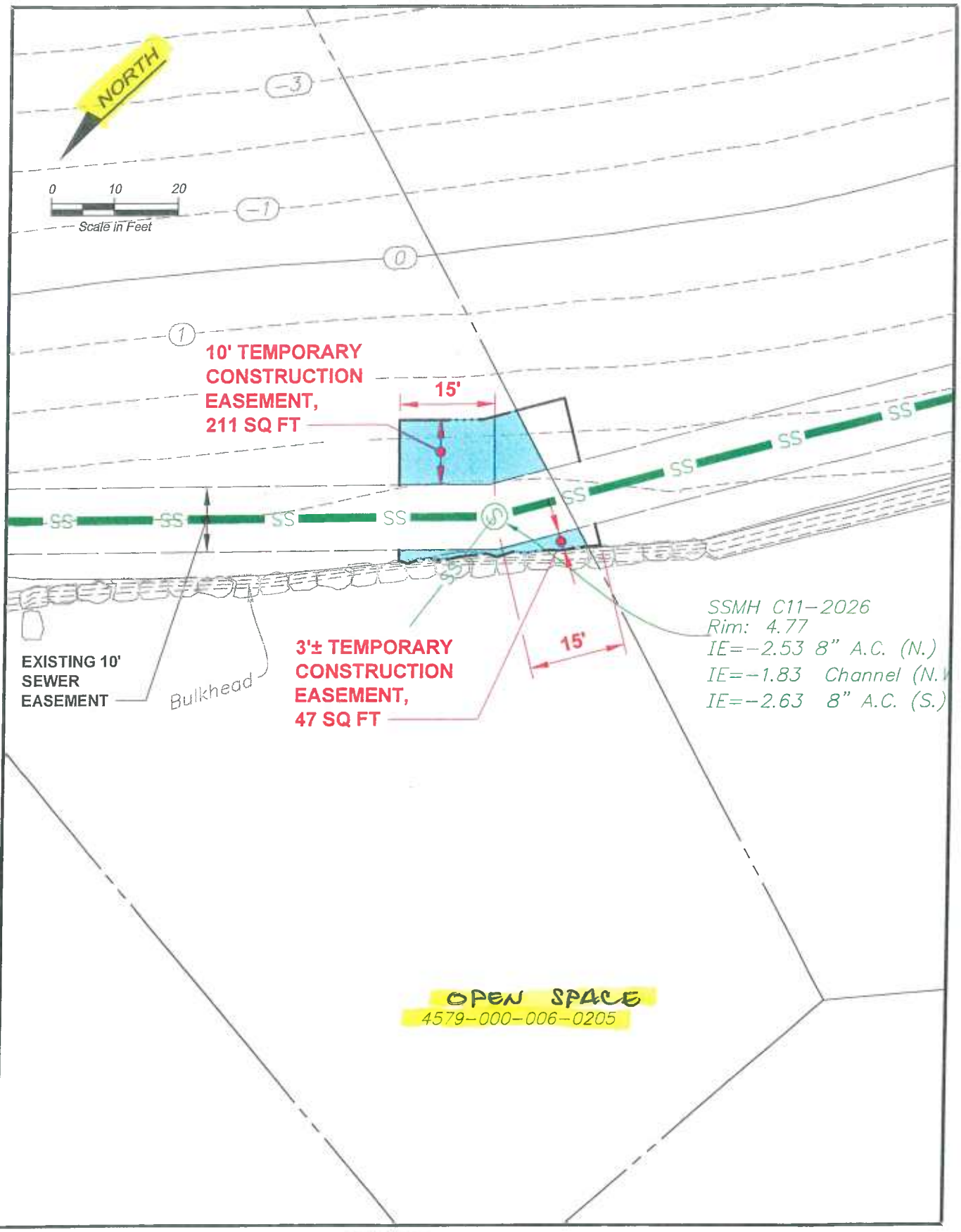
Dated this 26 day of February, 2016.

Michele Wainwright
Grantor - Wainwright

Contact Person: 360 Michele Wainwright
Phone: 360 769 2292

Other Information: _____

Exhibit A



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FILE NAME (UPDATED BY)

BHC CONSULTANTS

KITSAP COUNTY 18 57 WASHINGTON

Temporary Construction Easement
Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation
March 2016

Figure **1**

APPENDIX G

PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

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KITSAP COUNTY DEPARTMENT OF PUBLIC WORKS
614 DIVISION STREET (MS-26), PORT ORCHARD, WA 98366-4699 | KITSAP1: 360.337.5777 | KITSAPGOV.COM

Aug. 24, 2015

Mr. Lazaro Eleuterio
Washington State Dept. of Ecology
3190 160th Ave. SE
Bellevue, WA. 98008

RE: Manchester Project Number KiCoPW-00037

Dear Lazaro,

Attached please find the Historic & Cultural Resource Review for the above referenced project.

Please contact me if you have any questions or need any additional information.

Regards,

Barbara Zaroff, P.E.

Barbara Zaroff
Kitsap County Sewer Utility
bzaroff@co.kitsap.wa.us
(360) 981-1767

WASHINGTON DEPARTMENT OF ECOLOGY E.O. 05-05 OR SECTION 106 NHPA PROJECT REVIEW

HISTORIC & CULTURAL RESOURCES REVIEW

GENERAL PROJECT INFORMATION	
GRANT OR LOAN RECIPIENT: Kitsap County – Public Works	
SITE NAME(S): Manchester	
GRANT OR LOAN NAME: Manchester Shoreline Sewer Facility	
GRANT OR LOAN NUMBER: WQC-2016-KiCoPW-00037	**GRANT OR LOAN TYPE (e.g., Centennial, 319):** SRF
GRANT OR LOAN RECIPIENT CONTACT INFORMATION	
RECIPIENT CONTACT PERSON (if different than above):: Barbara Zaroff	
ADDRESS: 12351 Brownsville Hwy	
CITY, STATE: Poulsbo, WA	**PHONE #:** (360) 981-1767
ZIP, COUNTY: 98370	**EMAIL:** bzaroff@co.kitsap.wa.us
FUNDING AGENCY INFORMATION (*to be completed by the Ecology Project Manager*)	
ECY PROJECT MANAGER:	**PHONE #:** ( ) -
ECY FINANCIAL MANAGER:	**PROJECT MGR EMAIL:**
ECY PROGRAM:	
FUND(ING) (e.g., Land and Livestock Program):	
Notes:	

[1]

[1] If you need this document in a format for the visually impaired, call Water Quality Reception at Ecology, (360) 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

PLEASE DESCRIBE THE TYPE OF WORK TO BE COMPLETED

(Be as detailed as possible to avoid having to provide additional information;
If more than one site, list information for all locations)

Do you have an Inadvertent Discovery Plan (IDP) in place[2]? Yes ☒ / No ☐

Provide a detailed description of the proposed project:

Kitsap County is proposing system rehabilitations to the existing sewer system located along the shore of Puget Sound in the unincorporated village of Manchester. The improvements generally include the rehabilitation of Pump Stations 45 – Daniels, 46 – Caraway, and 47 – Hemlock (PS45, PS46, PS47), which includes installation of new pump station vaults, wet wells, beach manholes, and reconnection of sanitary sewer lines (i.e., gravity and force main) to the system. In addition, approximately 175 feet (ft) of sanitary sewer force main will be replaced to the west of the proposed PS45. The project also includes installation of approximately 3,330 ft of cured in place pipe liner in the existing beach line (installed from existing manholes) and reconnection of side sewers.

Current status is 30% design level drawings have been completed.

Describe the existing project site conditions:

The existing pump stations, sewer lines, and manholes are located on beach areas near or within tidal influence.

PS45 is a beach line pump station located at the easternmost portion of East Daniels Loop. The pump station conveys sewage directly west approximately 250 lineal ft through a 4-inch diameter force main and discharges into a gravity manhole in East Daniels Loop. PS45 is equipped with two 3.7 horsepower (hp) submersible pumps, each rated for a pumping capacity of 200 gallons per minute (gpm).

PS46 is a beach line pump station located at the end of East Caraway Road. The pump station pumps nearly vertical (approximately 20 ft) through a 4-inch diameter force main and discharges to an adjacent beach front manhole. PS46 is equipped with two 2.8 hp submersible pumps, each rated for a pumping capacity of 200 gpm.

PS47 is a beach line pump station located at the end of East Hemlock Street. The pump station conveys sewage directly west approximately 210 lineal ft through a 4- inch diameter force main into a gravity manhole located at the intersection of Nubling Ave East and East Hemlock Street. PS47 is equipped with two 2.8 hp submersible pumps, each rated for a pumping capacity of 200 gpm.

[2] Ecology requires an IDP for all funded projects. You must submit an approved IDP to Project Manager before beginning project. For an IDP template, contact your Project Manager or download one here: http://www.ecy.wa.gov/programs/wq/funding/GrantLoanMgmtDocs/Eng/GrantLoanMgmtEngRes.html

Describe the proposed ground disturbing activities, including specific information on the length, width and depth of ground disturbance. Include disturbance such as access roads:

Each existing pump station will be removed, achieving an increase in habitat. The new pump stations will be relocated and constructed as an elevated concrete structure to ensure equipment and access to the facility will be above the anticipated flood elevation.

PS 45 proposed dimensions, all above grade: 25'-0" x 18'-0" x 3'-0" max
PS 46 proposed dimensions, all above grade: 22'-0" x 13'-0" x 3'-0" max
PS 47 proposed dimensions, all above grade: 33'-6" x 13'-0" x 3'-0" max

PS 45:
New fill in floodplain = 22 CY
Volume in floodplain removed = 47 CY
Net gain in floodplain volume = 25 CY

PS 46:
New fill in floodplain = 18 CY
Volume in floodplain removed = 54 CY
Net gain in floodplain volume = 36 CY

PS 47:
New fill in floodplain = 21 CY
Volume in floodplain removed = 0 CY
Net fill in floodplain volume = 21 CY

Summary, Pump Stations: Net Gain in Floodplain Volume = 40 CY

Additionally, there are four manholes (C11-3015, C11-3011, C11-2028, and C11-2019) that are part of the CIPP portion of the project which will be raised to allow for easier maintenance of the manholes, conforming to the rest of the existing beachline manholes. Risers and a concrete collar will be incorporated to elevate each buried manhole.

Risers have been assumed to be 18" in height (based on the most conservative surveyed depth of the manholes), and 4' in diameter.

Collars have been estimated at 18" thick and 6' in diameter, and are at grade (not buried).

Collars:
New Fill in floodplain = 6 CY
Volume in floodplain removed = 0 CY
Net fill in floodplain volume = 6 CY

Risers:
New Fill in floodplain = 3 CY
Volume in floodplain removed = 0 CY
Net fill in floodplain volume = 3 CY

Summary, Manholes: Net fill in Floodplain Volume = 9 CY

SUMMARY, PUMP STATIONS AND MANHOLES: 31 CY Net Gain in Floodplain Volume

Describe the results from the DAHP WISAARD (instructions below) https://fortress.wa.gov/dahp/wisaard/:

Cascadia Archaeology, LLC (CA) was retained by BHC Consultants, on behalf of Kitsap County, to aid in meeting the requirements of cultural resource preservation regulations. CA has completed a Phase I Assessment consisting of archival research, including a review of records in WISAARD, and research of the environmental context of the project to assess the likelihood of historic or prehistoric cultural resources being present within the Area of Potential Effects to Historic Properties (APE). The report is appended to this document. The APE is considered to have at least a moderate probability for archaeological resources. In particular, PS47 is located by a stream that ethnographies indicate was the location of a summer camp. Three prehistoric lithic scatter sites are within one mile of the APE. No eligible historic structures are expected to be found within the APE.

After the Phase I Assessment report was completed, a geotechnical report became available (Landau 2015). It was reported that peat, which was interpreted as "post-glacial, intertidal estuary deposit," was present at 4 to 8 ft. below surface at the PS46 location, and at 17 to 27 ft. below surface at the PS47 location. Fill overlays the peat. Peat deposits in the Puget Sound and the San Juan Islands have contained faunal and cultural material dating to the early Holocene that possess significant scientific and cultural value. A Clovis projectile point, which dates to ca. 11,000 years Before Present, was found approximately 1.5 miles from the APE. The point was found on the relatively level top of a glacial upland ridge in a wetland area, and may be associated with peat deposits overlying glacial drift sand (LeTourneau 2010; Stein et al. 2004).

Is your site considered "moderately" to "highly sensitive" using the DAHP WISAARD Statewide Predictive Layer? Yes ☒ No ☐ Unknown ☐ Note: See attached Continuation Sheet for map.

If YES, for sites with known historic resources/properties, include that location in your project boundaries (the proposed Area of Potential Effect[3]) or show it on your map. The Area of Potential Effect is the project boundary expanded to include any eligible properties that may be affected by the project activities.

Do you have knowledge of any ground disturbing work or previous cultural resource review within the project boundaries/Area of Potential Effect within the past 5 years?

Yes ☒ Unknown ☐ Lineal survey crossing the APE near the public boat launch. No cultural resources identified (Kelly 2012).

[3] Area of Potential Effect as defined under 36 CFR 800.16(d) of the National Historic Preservation Act and may be different from the project/site boundaries. The *Area of potential effects (APE)* means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

ATTACH A MAP OR AERIAL IMAGE SHOWING THE PROJECT LOCATION, AREA OF POTENTIAL EFFECT, AND NEARBY IDENTIFYING FEATURES (ROADS, WATER). USGS QUADS PREFERRED

Provide additional information, photos, or maps for the review in a separate document as an attachment.

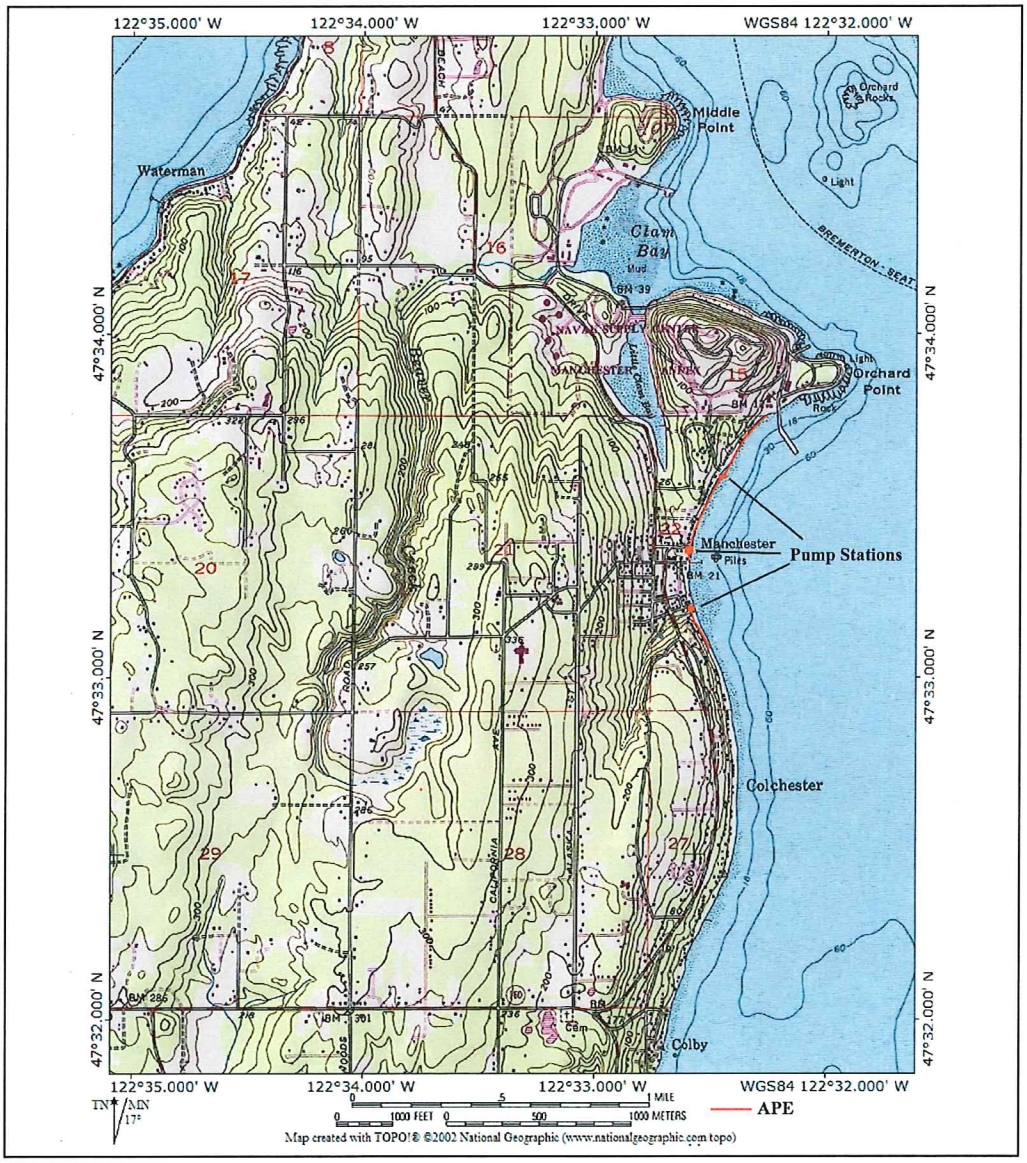
Project Location:

REQUIRED: **Township:** 24 **Range:** 2 **Section:** 22

Address: E. Daniels Loop **City:** Manchester (unicorporated) **County:** KP

Lat: 47° 33.596 *(Example: 46.305257)* **Long:** -122° 32.464'W *(Example: -120.546214)*

Coordinates are for the north end of the APE.



Will structures 50 years or older be altered or demolished[4]? Yes ☐ No ☒

The pump stations and associated pipelines were constructed ca. 1967; therefore, it is a possibility they would meet the 50 year age criterion to be considered an historic structure prior to completion of all elements of the proposed project ca. 2018.

If "Yes", visit the DAHP Historic Property Compliance Website and complete an online EZ-2 form[5].

Finished? Send this form to:

YOUR ECOLOGY PROJECT MANAGER

For specific questions on archaeological resources and historic properties, contact:

Department of Archaeology and Historic Preservation or Robert Whitlam, Ph.D.
State Archaeologist, DAHP
P.O. Box 48343
Olympia, WA 98504-8343

(360) 586-3080
rob.whitlam@dahp.wa.gov

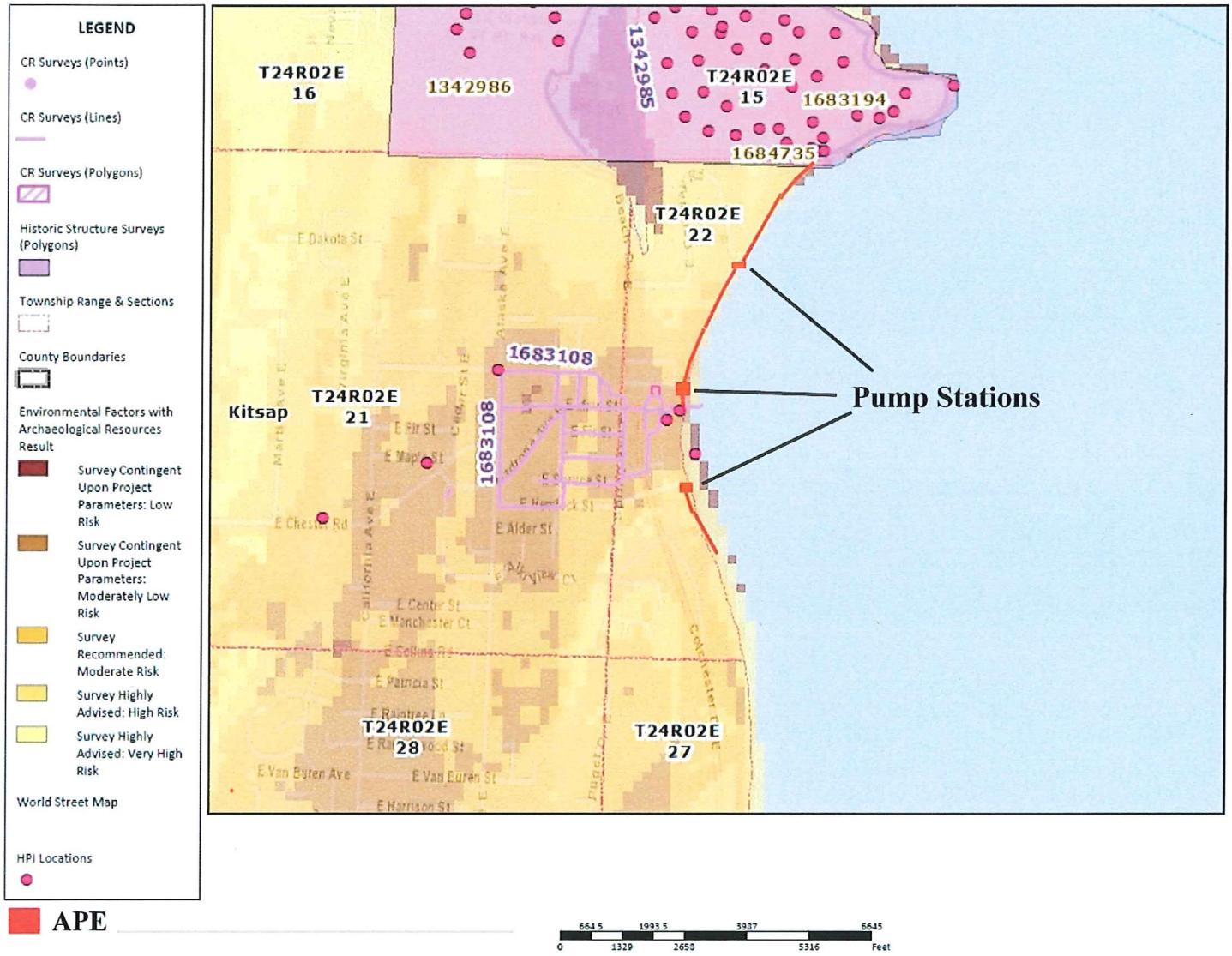
This form may only initiate consultation. For some projects, Ecology, affected tribes, DAHP or other agencies may require additional information to complete review such as plans, specifications, and photographs. An historic property inventory form may need to be completed by a qualified preservation professional.

[4] Questions on historic infrastructure? Please contact: Russell Holter (Preservation Design Reviewer), Phone: 360-890-0174 (cell), Email: Russell.Holter@dahp.wa.gov.

[5] For online EZ 2 form, go to: http://www.dahp.wa.gov/compliance-historic-buildings-2
See "Compliance Documents" > *EZ – 2 Form (Determination of Eligibility) and EZ-2 Form Tutorial.)*

Continuation Sheet

APE, Historic Structures (if still standing), and Prior Cultural Resources shown on WISAARD's Statewide Predictive Model



APE

References Cited

Kelly, Katherine
2012 Cultural Resources Assessment for the Manchester Stormwater LID Retrofit Project, Manchester, WA. Report prepared for Kitsap County Public Works. On file at the DAHP, Olympia, Washington.

Landau Associates
2015 *Draft Geotechnical Report Manchester Pump Station 45, 46, and 47 Rehabilitations, Kitsap County, Washington.* Prepared for BHC Consultants.

LeTourneau, Philippe
2010 A Clovis Point from the Pacific Northwest Coast. *Current Research in the Pleistocene* 27:115-117.

Stein, Julie K.
2004 State of Washington Archaeological Inventory Form, 45KP139. On file at the Department of Archaeology and Historic Places, Olympia, Washington.

CASCADIA ARCHAEOLOGY

May 7, 2015

Adam Schuyler, PE, PMP
Project Manager
BHC Consultants, LLC
1601 Fifth Avenue, Suite 500
Seattle, WA 98101

Tyler Whitehouse, PE
Project Engineer
BHC Consultants, LLC
950 Pacific Avenue, Suite 710
Tacoma, WA 98402

RE: Phase 1 Cultural Resources Assessment for the Manchester PS 45, 56, and 47 and Beach Line Rehabilitation

Dear Mr. Schuyler and Mr. Whitehouse,

This memorandum presents the results of the Phase 1 assessment as to the probability of cultural resources being present within the Area of Potential Effects (APE) for the project referenced above. This assessment consisted of archival research including a records check of previously recorded sites, historic structures, and other locations such as ethnographic sites and traditional cultural properties in the vicinity of the APE (Figure 1). Additionally, reports of previous archaeological investigations in the vicinity were consulted for pertinent information.

NOTE: This memorandum contains confidential information regarding culturally sensitive locations; it is not for general distribution.

The APE is considered to have at least a moderate probability for archaeological resources. In particular, Pump Station 47 is by a stream that ethnographies indicate was the location of a summer camp. A small creek, presumed to be the one at the south end of Manchester, was known as $^{Tu}ts^{3}Ek^{3}$ which was translated "salmon eggs" (Hilbert et al. 2001:221). This same location was recorded as a place to camp in summer, in particular, to dry clams (Snyder 1968:130). Other use of the peninsula in the vicinity of the APE is evidenced by nine place names, in addition to $^{Tu}ts^{3}Ek^{3}$, documented by the linguist T.T. Waterman ca. 1920 along the shoreline between the towns of Waterman and South Colby (Hilbert et al. 2001).

Within 1 mile of the APE, three archaeological lithic scatters, 45KP117, -118, and -199, have been recorded on the shore of Little Clam Bay. They are in the active beach zone and likely eroded out of the shoreline bank. A Clovis projectile point, 45KP139, was

P.O. Box 51058 Seattle, WA 98115-1058 Phone: 206-366-0337 Fax: 206-363-5303

found approximately 1.5 miles from the APE. It is mentioned due to the early age (ca. 11,000 years Before Present) of the find. The point was found on the relatively level top of a glacial upland ridge in a wetland area, and may be associated with peat deposits overlying glacial drift sand (LeTourneau 2010; Stein et al. 2004).

The geologic background was completed to better understand the likelihood of cultural material in the APE. Soils present in the project vicinity develop primarily on glacial deposits, so it is unlikely that deeply buried archaeological material is present. The portion of the APE below the ordinary high water mark is not likely to contain significant buried prehistoric archaeological deposits because it is comprised of active Holocene beach and tide flat deposits that started developing after an earthquake on the Seattle Fault uplifted the area approximately 1100 years ago. However, the modern beach could contain surface or near-surface archaeological deposits of material eroded out of adjacent banks or deposited during use of the beach within the last 1100 years. Inland from the active beach, uplifted old beach and shoreline deposits may be preserved that could potentially contain intact archaeological deposits. Additionally, at the mouth of the gully near the south end of the APE buried archaeological deposits may potentially be present in alluvial sediments on the valley floor.

It is unlikely that historic cultural resources are present within the APE. Two structures greater than 50 years old are recorded near the APE. One was determined ineligible for the National Register of Historic Places (NRHP). A shore front home at 2371 Denniston Lane was recommended ineligible; however, an official determination has not been made and its architecture is craftsman style, which the Department of Archaeology and Historic Preservation tends to consider eligible for listing to the NRHP and/or Washington Heritage Register. GoogleEarth images indicate that the only structures within the APE that span the beach are two docks at the Port of Manchester, which were replaced in 2013-2014 (Port of Manchester 2015). Archaeological monitoring of renovations to the Port of Manchester exposed post-European contact debris but only one artifact was confirmed as being 50-plus years old (Norman 1999). The Pump Stations that will be rehabilitated were constructed ca.1967 (Adam Schuyler, personal communication 2015), and thus do not meet the age criteria to be considered an historic resource.

Recommendations regarding the cultural resources field survey
The results of this assessment do not substantially modify the proposed field survey design. Subsurface probes are proposed to be placed at 40 m intervals along the sections of beach line, with an additional 1-2 probes at each pump station. Probes might be placed at less than 40 m intervals in the vicinity of Pump Station 47. In the field, some locations may be determined to not require subsurface survey, such as in the vicinity of the Port of Manchester.

Sincerely,

Teresa M. Trost

Teresa Trost, R.P.A.

P.O. Box 51058 Seattle, WA 98115-1058 Phone: 206-366-0337 Fax: 206-363-5303

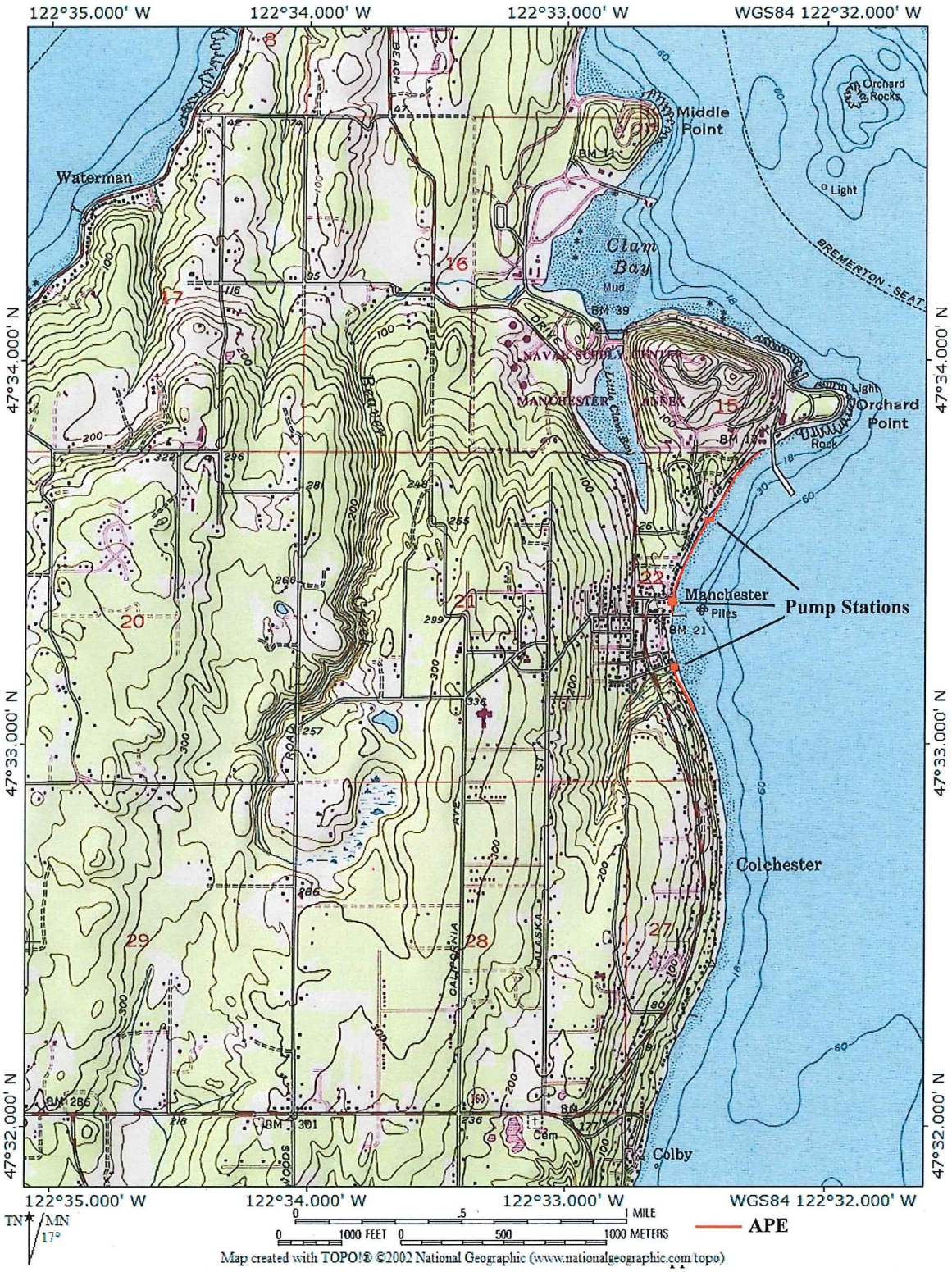


Figure 1. Approximate location of Area of Potential Effects (APE) shown on 7.5' USGS quadrangle Bremerton East, WA (1981); Section 22 in T. 24 N, R. 2 E.

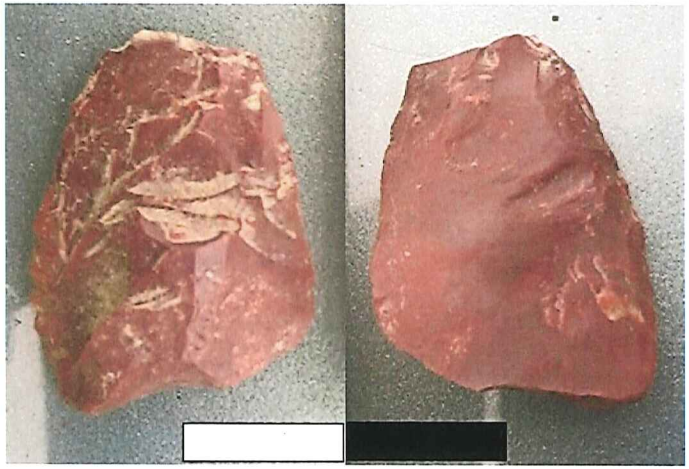
I might implement the IDP / UDP if …

I see chipped or ground stone artifacts.

Note: All scales are in centimeters.

I might implement the IDP / UDP if …

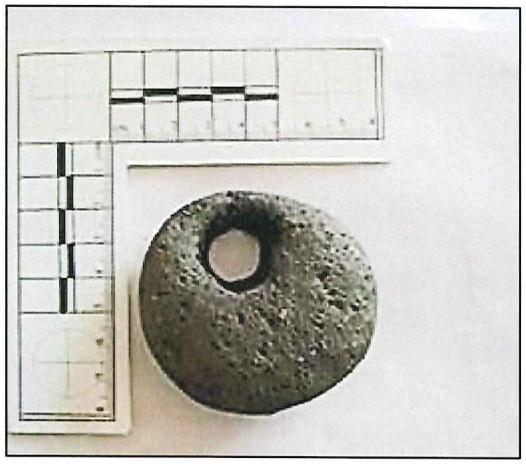
I see chipped or ground stone artifacts.



Note: All scales are in centimeters.

I might implement the IDP / UDP if …

I see ground or pecked stone artifacts.



- Striations or scratching
- Unusual or unnatural shapes
- Unusual stone
- Etching
- Perforations
- Pecking
- Regularity in modifications
- Variability of size, function, and complexity

I might implement the IDP / UDP if …

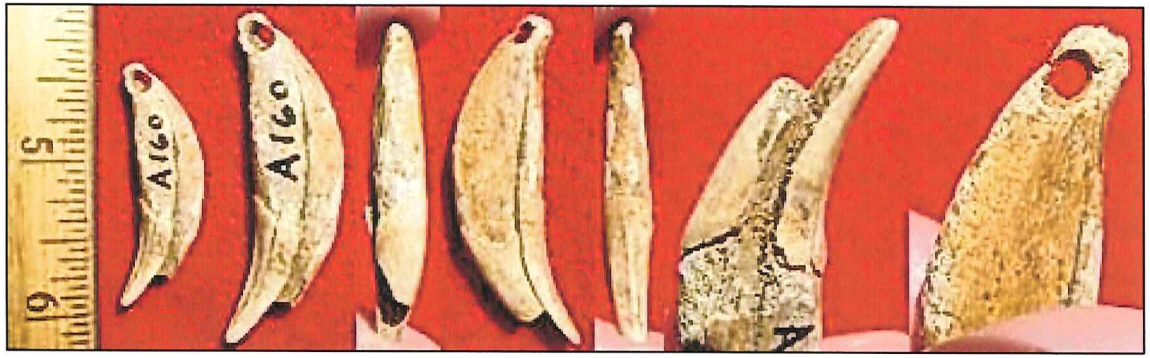
I see bone or shell artifacts.

- Often smooth
- Unusual shape
- Carved
- Often pointed if used as a tool
- Often wedge shaped like a "shoe horn"

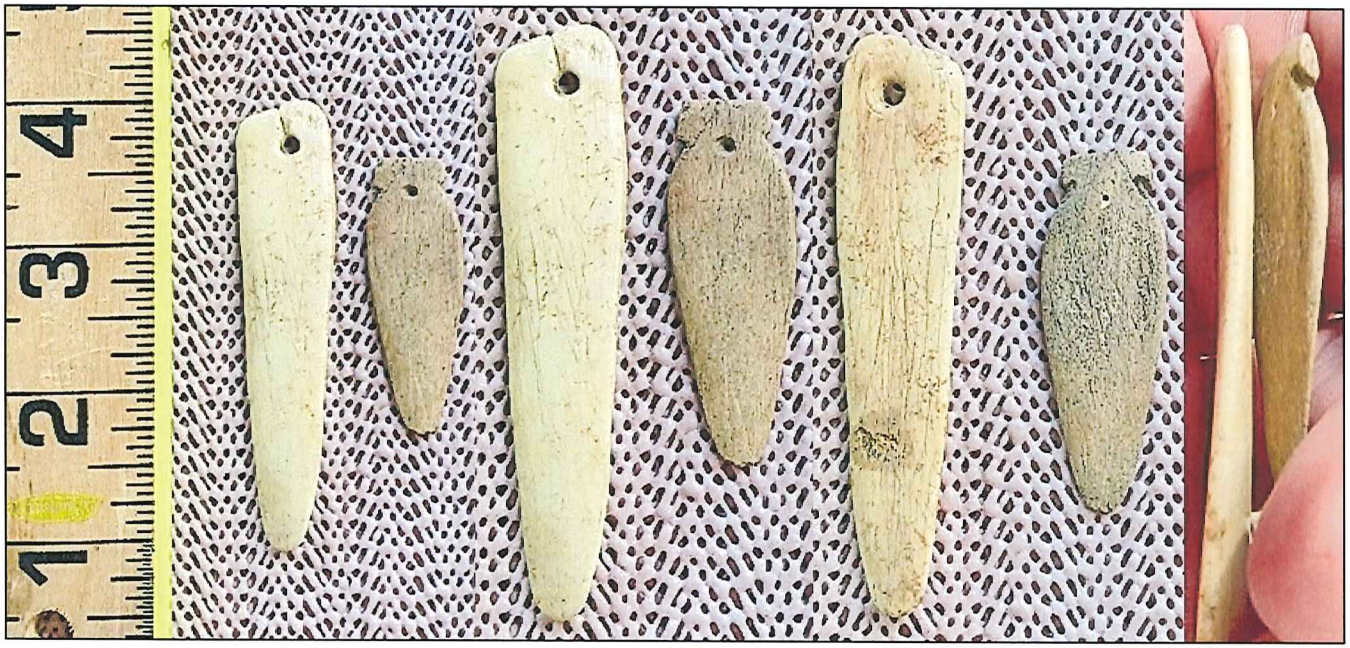
Bone Awls from Oregon and Bone Wedge from California

I might implement the IDP / UDP if …

I see bone or shell artifacts.



- Often smooth
- Unusual shape
- Perforated
- Variability of size



I might implement the IDP / UDP if …

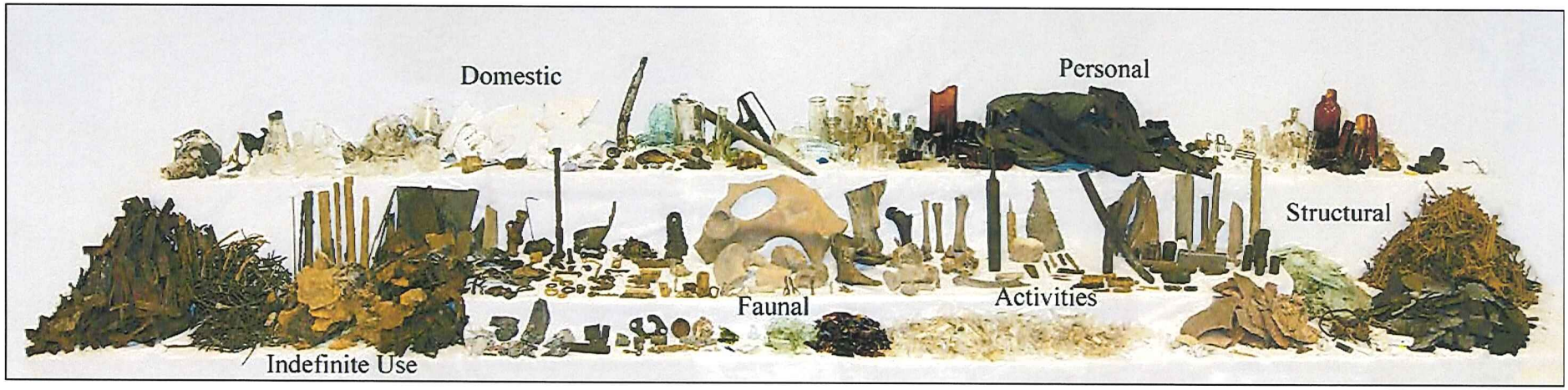
I see fiber or wood artifacts.

- Wet environments needed for preservation
- Variability of size, function, and complexity
- Rare

Artifacts from Mud Bay, Olympia, Washington

I might implement the IDP / UDP if …

I see historic period artifacts.



Artifacts from Downtown Seattle, Alaskan Way Viaduct (Upper Left and Lower) and Unknown Site (Upper Right)

I might implement the IDP / UDP if …

I see strange, different or interesting looking dirt, rocks, or shells

- Human activities leave trace: in the ground that may or ma not have artifacts associated with them
- "Unusual" accumulations of rock (especially fire-cracked rock)
- "Unusual" shaped accumulations of rock (e.g., similar to a fire ring)
- Charcoal or charcoal-stainec soils
- Oxidized or burnt-looking so
- Accumulations of shell
- Accumulations of bone or artifacts
- Look for the "unusual" or out of place (e.g., rock piles or accumulations in areas with few rock)

I might implement the IDP / UDP if …

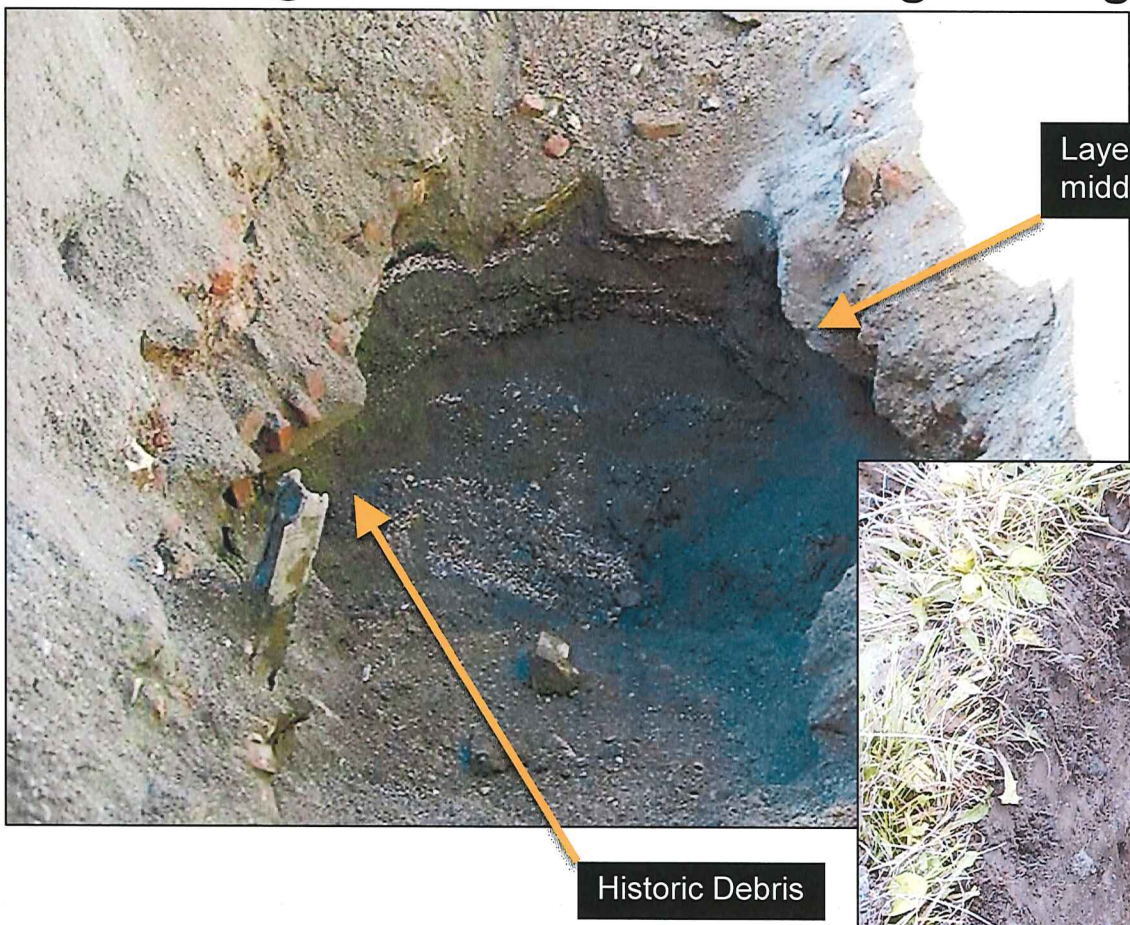
I see strange, different or interesting looking dirt, rocks, or shells

- "Unusual" accumulations of rock (especially fire-cracked rock)
- "Unusual" shaped accumulations of rock (e.g., similar to a fire ring)
- Look for the "unusual" or out of place (e.g., rock piles or accumulations in areas with few rock)

Site on Muckleshoot Indian Reservation, near WSDOT ROW along SR 164

I might implement the IDP / UDP if …

I see strange, different or interesting looking dirt, rocks, or shells



- Often have a layered or "layer cake" appearance
- Often associated with black or blackish soil
- Often have very crush and compacted shell

I might implement the IDP / UDP if …

I see historic foundations or buried structures.

PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

MANCHESTER PUMP STATIONS 45, 56, AND 47
AND BEACH LINE REHABILITATION
KITSAP COUNTY WASHINGTON
June 23, 2015

1. INTRODUCTION

Kitsap County is proposing system rehabilitations to the existing sewer system located along the shore of Puget Sound in the unincorporated village of Manchester. The improvements generally include the rehabilitation of Pump Stations 45, 46, and 47 (PS45, PS46, PS47), which includes installation of new pump station vaults, wet wells, beach manholes, and reconnection of sanitary sewer lines (i.e., gravity and force main) to the system. In addition, approximately 175 feet (ft) of sanitary sewer force main will be replaced to the west of the proposed PS45. The project also includes installation of approximately 3,330 ft of cured in place pipe liner in the existing beach line (installed from existing manholes) and reconnection of side sewers.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include:

- An accumulation of shell, burned rocks, or other food related materials,
- Bones or small pieces of bone,
- An area of charcoal or very dark stained soil with artifacts,
- Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years,
- Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

STEP 1: STOP WORK. If any employee, contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work in the immediate area of the discovery must stop (typically a 10 foot radius, but depends on site conditions). The discovery location should be secured at all times. Do not call or speak with the media about the remains specifically.

If human remains are encountered, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed (See Section 5).

STEP 2: NOTIFY MONITOR. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions.

STEP 3: NOTIFY PROJECT MANAGEMENT. Contact the Project Manager:

Project Manager:
Adam Schuyler, BHC Consultants, LLC
(206) 357-9955 or (206) 505-3400

If you can't reach the Project Manager, contact the project's alternate point of contact:

Alternate Contact:
Erika Schuyler or Tyler Whitehouse, BHC Consultants, LLC
(206) 505-3400

The Project Manager or their designated Alternate Contact will make all other calls and notifications. A complete listing of Contacts is provided in Section 7.

4. FURTHER CONTACTS AND CONSULTATION

A. Project Manager's Responsibilities:

- Protect Find: The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource (typically a 10 foot radius, but depends on site conditions). Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.

- Direct Construction Elsewhere On-site: The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.

- Identify Find: The Project Manager will ensure that a qualified professional archaeologist examines the find to determine if it is archaeological. This will either be an archaeological consultant hired by the Project or staff from DAHP.

    - If the discovery is determined not archaeological, work may proceed with no further delay.

    - If the discovery is determined to be archaeological, the Project Manager will continue with notification.

    - If the discovery is human remains, potentially human remains, a burial, or funerary objects, the Project Manager will follow the the procedure described in Section 5. *Do not call 911.*

- Contact the Department of Archaeology and Historic Preservation (DAHP)

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
(360) 586-3066 or (360) 586-3064

Dr. Rob Whitlam
State Archaeologist
(360) 586-3080

Dr. Guy Tasa
State Physical Anthroplogist
(360) 586-3534 or (360) 790-1633

- Notify involved federal or permitting agencies (if any).

Lazaro Eleuterio
Washington State Department of Ecology
(425) 649-7027

Barbara Zaroff
Kitsap County
(360) 981-1767

- Notify the interested and affected Tribes.

Tribes consulted on this project are:

Dennis Lewarch, Tribal Historic Preservation Officer (THPO) Suquamish Tribe	(360) 394-8529
Kris Miller, THPO Skokomish Indian Tribe	(360) 426-4232 ext. 215
Josh Wisniewski, THPO Port Gamble S'Klallam Tribe	(360) 633-1899
Gideon Cauffman, Cultural Resources Jamestown S'Klallam Tribe	(360) 681-4638
Bill White, Cultural Resources Lower Elwha Klallam Tribe	(360) 460-1617
Richard Young, Cultural Resources Tulalip Tribes	(360) 716-2652

5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect.

If the project occurs on federal lands (e.g., national forest or park, military reservation) or Indian lands (e.g., reservations, allotments, communities) the provisions of the Native American Graves Protection and Repatriation Act of 1990 apply, and the responsible federal agency will follow its provisions. Note that state highways that cross federal and Indian lands are on easements and are not owned by the state.

If the project occurs on non-federal lands, it will comply with applicable state laws, and the following procedure:

A. Notify Law Enforcement Agency or Coroner's Office (*Do not call 911*):

   In addition to the actions described in Sections 3 and 4, the Project Manager will immediately notify the local law enforcement agency or coroner's office.

   The coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will notify DAHP.

   Kitsap County Sheriff, Port Orchard (360) 337-7101

B. Participate in Consultation:

   Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains.

C. Further Activities:

   - Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
   - When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

6. PROCEEDING WITH CONSTRUCTION

Project construction outside the discovery location may continue while documentation and assessment of the cultural resources proceed. A Professional Archaeologist must determine the boundaries of the discovery location. In consultation with DAHP and affected tribes, the Project Manager will determine the appropriate level of documentation and treatment of the resource. If federal agencies are involved, the agencies will make the final determinations about treatment and documentation.

Construction may continue at the discovery location only after the process outlined in this plan is followed and DAHP (and the federal agencies, if any) determine that compliance with state and federal laws is complete.

7. LIST OF CONTACTS

POSITION	NAME	PRIMARY PHONE	ALTERNATE PHONE
Project Manager	Adam Schuyler	(206) 357-9955	(206) 505-3400
Project Manager (Alternate) BHC Consultants, LLC	Erika Schuyler or Tyler Whitehouse	(206) 505-3400	
SHPO DAHP	Dr. Allyson Brooks	(360) 586-3066	(360) 586-306
State Archaeologist DAHP	Dr. Rob Whitlam		
State Physical Anthropologist DAHP	Dr. Guy Tasa	(360) 586-3534	(360) 790-1633
Washington State Department of Ecology	Lazaro Eleuterio	(425) 649-7027	
Kitsap County	Barbara Zaroff	(360) 981-1767	
THPO Suquamish Tribe	Dennis Lewarch	(360) 394-8529	
THPO Skokomish Indian Tribe	Kris Miller	(360) 426-4232 ext. 215	
THPO Port Gamble S'Klallam Tribe	Josh Wisniewski	(360) 633-1899	
Cultural Resources Jamestown S'Klallam Tribe	Gideon Cauffman	(360) 681-4638	
Cultural Resources Lower Elwha Klallam Tribe	Bill White	(360) 460-1617	
Cultural Resources Tulalip Tribes	Richard Young	(360) 716-2652	
Kitsap County Sheriff, Port Orchard		(360) 337-7101	

APPENDIX H

PRELIMINARY INTERIM OPERATION PLAN

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TECHNICAL MEMORANDUM

Date:	**August 12, 2016**
To:	**Lazaro Eleuterio, Ph.D., CDT, PE**
From:	**Adam Schuyler, PE, PMP**
CC:	**Barbara Zaroff, PE (Kitsap County); Tyler Whitehouse, PE (BHC)**
Subject:	**Kitsap County** **Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation** **Preliminary Interim Operation Plan**
Project No:	**15-10341.00**

Purpose

The purpose of the Preliminary Interim Operation Plan (Plan) for the Manchester Pump Stations 45, 46, & 47 and Beach Lines Rehabilitation project (Project) is to provide information that describes how Kitsap County (County) will remain in compliance with the NPDES permit while construction activities are performed.

Contract Documents Interim Operation Requirements

The intent of the Contract Documents is that the existing facilities will remain in service as much as possible, but there are design elements that will require temporary bypass systems be designed, constructed, and operated by the Contractor. Once the construction contract is awarded, the Contractor will be required to submit their own temporary bypass systems plan that will be reviewed by the County and BHC for compliance with the NPDES requirements as specified in the Contract Documents.

The Contract Documents were developed to meet the requirements of WAC 173-240-070 which states, “The content and format of the plans and specifications must be as stated in the State of Washington, ‘Criteria for sewage works design,’ and shall include a list of the facility design criteria and a plan for interim operation of facilities during construction.” The temporary bypass systems are the responsibility of the Contractor, but they are constrained by the requirements of the Contract Documents, particularly the following items:

- Section 1-04.12 - Temporary Facilities
- Section 1-08.3(2)C - Construction Sequencing and Constraints
- Section 01 59 00 - Temporary Bypass Systems
- General Notes on Drawing G-4

- Notes on Drawings D45-1, C45-1, E45-1, D46-1, C46-1, E46-1, D47-1, C47-1, and E47-1 for the pump stations
- Notes on Drawings BL-1, BL-2, and BL-3 for the beach lines rehabilitation

The above listed items are attached to this memorandum.

The Final Interim Operation Plan developed by the Contractor will be reviewed by the County and BHC and submitted to Ecology.

KITSAP COUNTY PUBLIC WORKS WASTEWATER DIVISION

MANCHESTER PUMP STATIONS
45, 46, & 47 AND
BEACH LINES REHABILITATION

Bid Set

August 2016

FORMAL BID KC CONTRACT #

Volume 1 of 2

Funded in Part by the Washington State Department of Ecology

1-04.11(3) Corrective Action

Any violation of the above requirements, as determined by the Contracting Agency, will be sufficient grounds for the Contracting Agency to order the cleanup work to be performed by others. The costs for such corrective action shall be deducted from any monies due or to become due to the Contractor.

1-04.12 Temporary Facilities

Section 1-04.12 is added as the following:
(Local Agency SP)

The Contractor shall furnish, for the duration of the project, a temporary field trailer(s) for his use as well as the Contracting Agency's use within a reasonable distance of the project site. Temporary facility installation shall meet the construction safety requirements of OSHA, State, and other governing agencies and the noise limitations shall meet the requirements in Section 1-07.5(5) in the Special Provisions. Contractor shall be responsible for providing telephones, fax machines, and copier and shall pay for installation and monthly service charges for all utilities, including telephone, copy machines, and fax machines. Provide and pay for equipment service contracts for all furnished equipment.

Upon completion of the work, and subject to approval of the Engineer, the Contractor shall completely remove all temporary facilities. Temporary utilities shall be removed to the temporary service connection point, and capped or terminated.

All disturbed surfaces shall be restored to the condition which existed prior to installation of temporary facilities or utilities. All roadway surfaces or other improvements which have been damaged by construction activities shall be repaired or replaced by the Contractor, as directed.

1-04.12(1) Space Allocation

On-site space is limited. Arrangements for additional space required for Contractor's staging and storage of materials and equipment (in addition to that allocated), shall be made for locations off site as described below.

Due to the limited space available outside project limits (and within the existing right of way and temporary construction easements), the Contractor shall make the necessary arrangements with nearby property owner(s) in order to establish an area(s) for the temporary facilities and storing of equipment and materials. All costs associated with third parties arrangements shall be considered incidental to the construction and shall be included in the costs of other items of work involved in the project.

1-04.12(2) Contractor's Work Area

Contractor shall limit operations and storage of equipment and materials to the areas designated on the Plans, unless written agreements have been obtained from third parties that allow the use of areas outside those described on the Plans. Contractor shall provide a copy of all such third party agreements to the Owner prior to using areas described by the agreement. All such agreements shall contain provisions that hold the Owner harmless from any and all damages and costs associated with the use of said areas. Contractor shall be solely responsible for the use of said areas.

Contractor shall maintain the area(s) during construction and shall proceed with the work in an orderly manner, maintaining the construction site free of debris and unnecessary equipment or materials. Material shall be stored on pallets or racks off the ground and in a manner to allow access for inspection.

1-04.12(3) Temporary Water for Construction and Testing

Contractor shall be responsible for obtaining a source of temporary water for construction and testing and potable water required by construction personnel. Provide water from off-site sources as necessary. Contractor shall determine availability and make arrangements, and pay all costs, with the local utility for temporary construction water, including metering equipment.

1-04.12(4) Temporary Electric Power

Contractor shall verify existing electric service and provide temporary electric power, if required, for use during construction. Electric power should be available at or near the site. The Contractor shall determine the type and amount available and make arrangements with the local utility for obtaining

temporary electric power service, including metering equipment. The Contractor shall provide temporary lighting at least to meet all applicable safety requirements to allow erection, application or installation of materials and equipment, and observation or inspection of the Work. Meet safety requirements of OSHA, State and other governing agencies for electrical installations. Facilities for providing temporary electric power shall meet all noise restriction requirements of Section 1-07.5(5) in the Special Provisions.

The Contractor shall provide all electrical power required for construction, testing, general and security lighting, and all other purposes whether supplied through temporary or permanent facilities.

1-04.12(5) Sanitary Facilities

The Contractor shall provide suitable chemical toilets or water closets at appropriate locations within the site of the work in compliance with the requirements of Section 1-07.4 of the Standard Specifications. Secondary containment shall be provided for each chemical toilet or water closet. At the end of the job such toilets shall be removed.

1-04.12(6) Temporary Telephone Service

Contractor shall furnish onsite telephone service to the temporary field trailer, including fax, for the duration of construction of the Contract and shall be responsible for verifying existing service and making all arrangements with the local telephone utility for providing service as required. Said services shall be provided to the construction trailer(s).

1.04.12(7) Site Access and Parking

All vehicles shall be parked in such a manner so as to not encroach on public right-of-way or be a traffic hazard. Ready access to and through the site by emergency vehicles shall be maintained at all times. The Contractor shall be responsible for control of parking by all of the Contractor's and subcontractor's work force to assure compliance. The Contractor shall anticipate that there may not be sufficient parking space for all of the work force in the construction project area. If this is the case, Contractor shall arrange for carpooling and/or off-site parking and shuttle service, as necessary.

1.04.12(8) Removal of Temporary Facilities

Upon completion of the work, and subject to approval of the Engineer, the Contractor shall completely remove all temporary facilities. Temporary utilities shall be removed to the temporary service connection point, and capped or terminated.

All disturbed surfaces shall be restored to the condition which existed prior to installation of temporary facilities or utilities. All roadway surfaces or other improvements which have been damaged by construction activities shall be repaired or replaced by the Contractor, as directed.

END OF SECTION 1-04

1-08.3(2)C Construction Sequencing and Constraints

Section 1-08.3(2)C is added as the following:
(Local Agency SP)

Continuous operation of the Contracting Agency's facilities is of critical importance. The Contractor shall schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified. The Contractor shall not proceed with work affecting a facility's operation without obtaining Contracting Agency's and Engineer's advance written approval of the need for, and duration of, such work.

Where existing facilities are to be modified during the course of work, the Contractor shall obtain Engineer's review of submittals for temporary shutdown, demolition, modification, connections between new and existing work, and other related work and shall conform to other Contract conditions as applicable.

The Contractor shall be responsible for developing the sequence of the work and for ensuring that current operations are not interrupted or compromised.

At least two weeks prior to starting the work, Contractor shall coordinate with the Engineer and Contracting Agency's representative to develop a work schedule which will permit facilities to function as normally as practical. A portion of the construction work will be required outside normal working hours to avoid undesirable conditions. The Contractor shall do this work at such times and at no additional cost to the Contracting Agency. Connections between existing facilities and new work shall not be made until all necessary inspection and tests have been completed on the new work and the new work is found to conform in all respects to the requirements of the Contract Documents.

Connection to existing services or utilities, or other work that requires temporary shutdown of any existing operations or utilities, shall be planned in detail with appropriate scheduling of the work and coordinated with the Contracting Agency or Engineer. The approved schedule for shutdown or restart shall be indicated on the Contractor's Progress Schedule, and at least seven (7) calendar days of advance written notice shall be given to the Contracting Agency and Engineer so that they may witness the shutdown, tie-in, and startup.

The Contracting Agency and Engineer consider the Contractor's schedule and construction sequencing to be paramount to ensure that the work is properly planned, coordinated, and executed. A number of pump stations feed or are fed by the facilities that will be replaced by the work under this contract. Those pump stations are currently and continuously receiving and pumping sewage and their functions shall not be interrupted except as specified herein or as specifically allowed by Contracting Agency. The Contractor shall properly coordinate and execute the work to avoid interference with normal operations. Work during low flow periods (between the hours of 12 am and 5 am) and sewer bypassing will be required to complete portions of the work. Such work shall be minimized to the extent possible through proper sequencing and execution of the work.

Specific Work Constraints are as follows:

1. Any and all Work conducted below the Ordinary High Water (OHW) mark delineated on the Drawings shall be performed between **August 1** and **August 31** in accordance with the project's Hydraulic Project Approval (HPA) permit, unless otherwise approved by the Washington State Department of Fish and Wildlife (WDFW) and Kitsap County. This restrictive time period shall be termed the WDFW Fish Window within these Contract Documents.
    a. The project shall be physically completed utilizing a maximum of two (2) WDFW Fish Windows, to occur in Years 2017 and 2018.
    b. The following Work at a minimum shall be completed within the 2017 WDFW Fish Window:
        i. Install Beach Manhole SSMH C11-2051 and 8-inch gravity sewer outlet to above the OHW mark (reference Drawing C45-1).

ii. Install Beach Manhole SSMH C11-2047 and 8-inch gravity sewer outlet to above the OHW mark (reference Drawing C46-1).

iii. Install Beach Manhole SSMH C11-2049 and 8-inch gravity sewer inlet to above the OHW mark (reference Drawing C46-1).

c. All other Work below OHW mark shall be sequenced by the Contractor such that a maximum of two (2) WDFW Fish Windows are utilized to physically complete all project Work. Other Work to be completed during WDFW Fish Window(s) generally includes, but may not be limited to, the following:

i. Beach line CIPP rehabilitation.

ii. Beach line manhole rehabilitation.

iii. Existing pump stations removal and abandonment.

iv. Installation of PS-47 Beach Manhole SSMH C11-3030.

v. Installation of storm drain piping.

vi. Removal of beach debris.

vii. Shoreline stabilization.

d. Contractor shall obtain accurate tide tables and shall familiarize themselves with the tidal variations during this time period to adequately plan and sequence the Work.

e. In accordance with the HPA permit, work below the OHW mark will be allowed from August 31st through February 15th of any calendar year if a biologist approved by the WDFW does not detect surf smelt eggs during a beach survey. The Contractor shall begin Work within seventy-two hours of the survey and shall complete the Work within two weeks of the survey. The Contractor shall pay for all costs to obtain an approved biologist and conduct the survey in accordance with the HPA permit. Since Work between August 31st and February 15th is dependent on the non-detection of surf smelt eggs, no assurance or guarantee is made that Work below the OHW mark will be allowed between August 31st and February 15th. The Contractor will not receive additional compensation or claim for delay for any Work below the OHW mark scheduled to be performed within this time period.

Should the Contractor require a barge or floating vessel to perform the Work, all local, State and other applicable permitting approvals and requirements, insurance and all costs associated shall be the responsibility of the Contractor.

1-08.3(2)E Weekly Progress Meetings

Section 1-08.3(2)E is added as the following:
(Local Agency SP)

To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Engineer will conduct weekly progress meetings with the Contractor throughout the construction period. The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling and resolve other problems that may develop.

Agenda Items

The Contractor shall, to the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding items to be added to the agenda.

Minutes

The Engineer will compile a summary of the discussion of each project meeting and will furnish copies to the Contracting Agency and Contractor. Recipients of copies may make and distribute copies as they deem necessary.

SECTION 01 59 00
TEMPORARY SEWER BYPASS SYSTEMS

PART 1 : GENERAL

1.01 SUMMARY

Work covered in this section includes the requirements for temporary sewer bypass systems. The means and methods of accomplishing and maintaining the bypassing shall be the sole responsibility of the Contractor.

The Contractor shall anticipate that multiple temporary sewer bypass systems will be required over the duration of construction to construct the proposed improvements given the specified work constraints and separated project site locations.

The Interim Operation Plan developed for the Washington State Department of Ecology is included for information only as Appendix H.

1.02 SUBMITTALS

A. Submit in accordance with the provisions of Section 1-06.

B. Submit details of proposed temporary sewer bypass system(s).

1. Bypass Plan: detailed explanation of the proposed sewer bypass system(s), including project specific plans, details, sequencing, duration and assistance required of the Owner. Bypass Plan shall be stamped and signed by a professional engineer registered in the State of Washington.
2. Proposed pumping equipment.
3. Engineering analysis and calculations for each sewer bypass system.
4. Spillage cleanup plan.

C. Temporary Bypass Qualifications.

1.03 CONTRACTOR RESPONSIBILITY

A. BYPASS SYSTEM REQUIREMENTS

1. Bypassing of untreated or partially treated wastewater to surface waters or drainage courses is prohibited during construction. In the event accidental bypassing is caused by the Contractor, the Owner shall immediately be entitled to employ others to stop the bypassing in accordance with the General Conditions.
2. Penalties imposed on the Owner as a result of any bypass caused by the actions of the Contractor, its employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the Owner resulting directly or indirectly from the bypass.

3. Precautions and Protective Measures:

   a. Review existing sewer system plans with the Engineer and Owner.

   b. Verify the size and location of connecting laterals and side sewers.

   c. Provide pumps with sufficient capacity and head.

   d. Provide pumping equipment redundancy and/or standby equipment that can be readily deployed.

   e. Investigate upstream manholes.

   f. Check and test pumping equipment and bypass system(s).

   g. Provide suitably experienced person(s) and training personnel (more than one individual) for operation and maintenance of the system(s), including dealing with emergencies.

   h. Check upstream manhole surcharging after bypassing operations have commenced.

   i. Properly monitor and maintain system during operation.

4. Customer Sewer Service Interruption:

   a. The project will require interruption in sewer service for several customers at different time periods during construction. The Contractor shall notify the County Construction Manager and affected customer(s) not less than 48 hours in advance of service interruption and shall indicate the estimated length of time the service will be interrupted. Temporary sewer bypass systems for an individual customer or customers are not required provided the following conditions are met:

      1) Interruption in service shall be minimized and shall be limited to a maximum 6-hour period, to occur during the hours of 9 AM to 3 PM.

      2) One (1) interruption in service is allowed per day, with a maximum of two (2) interruptions in a week for the same customer.

      3) A customer's service shall not be interrupted more than three (3) separate times during the project.

   b. The Contractor shall provide and bear all costs for temporary sewer bypass systems in accordance with this Section if the above conditions cannot be met, unless otherwise approved by the County Construction Manager.

5. Quality Assurance:

   a. Temporary sewer bypass systems shall be designed, stamped and signed by a registered professional engineer in the State of Washington. Engineer shall have demonstrated experience in the design of pumping systems of comparable size and complexity.

b. Before commencement of any bypassing operation, the Contractor shall obtain the Engineer's acceptance of the Bypass Plan including design, equipment and materials, installation, operation and maintenance.

c. Temporary Bypass Qualifications: Contractor shall have a minimum of five years experience in performing substantially similar temporary bypass operations, and shall submit evidence of satisfactory operation of temporary bypass facilities similar to those specified for at least five projects in accordance with the Specifications.

6. Sewer Bypass System Description:

a. Contractor shall provide a suitable and reliable temporary sewer bypass system around the existing pump stations to perform the work indicated on the Drawings. Temporary piping shall be provided and protected at all times during operation of the temporary bypass system. Two pumps and standby power shall be provided at all times. Pumping system shall have automatic start/stop controls.

b. Pumps shall be solids handling type, suitable for raw sewage application.

c. Contractor will be responsible for properly operating, protecting, maintaining and servicing the bypass equipment for the duration of the temporary bypass. Contractor shall be responsible for bypass pumping equipment, electrical service, fuel, and all other appurtenances and consumables required for operation of the temporary sewer bypass system.

d. Noise levels of equipment shall meet the requirements of Kitsap County and Washington State noise level requirements. Depending on the pumping equipment that is used, meeting this requirement may require the use of sound attenuating enclosures as well as other provisions and measures. If possible, existing power supplies should be used to power the bypass pumping equipment so as to avoid engine-driven pumping units or engine generators. If engine-driven pumps or engine generators are used, equipment shall be located as far from residences as possible. Depending on the situation and subject to the approval of the Owner, the only possible exception or relaxation of this requirement will be in cases where the bypassing equipment will only be operated: 1) during the work week; 2) during normal working hours and; 3) period of bypass operation will be less than one week.

e. Temporary bypassing systems shall be continuously provided from the time that the existing pumping system is made inoperable, until such time as the new pump station (including automatic controls and alarms) is substantially complete, reliable, and accepted by the Owner.

f. The temporary sewer bypass system for each pump station shall be designed to handle a minimum capacity of 100 gpm. If a temporary pumping system is used to bypass, a minimum 100 gpm shall be provided with the largest pump out of service. The pump capacity shall be increased to maintain adequate cleaning velocities (>3.5 fps) within the temporary piping as required.

g. Maintain on-site sufficient equipment, parts, materials and fuel to ensure continuous and uninterrupted operation of the bypass system(s). A minimum of 24-hours of fuel shall be maintained on-site. Standby pumps and generators shall be fueled and operational at all times. Contractor's personnel shall be knowledgeable and trained on how to operate and maintain the bypass equipment.

h. All monitoring shall be fully functional during bypassing.

i. If the bypass system is to be operated when the Contractor is not on-site, the system shall be provided with a monitoring and alarm system that notifies the Contractor and Owner 24 hours a day of a system failure. In the event of a failure, Contractor shall respond immediately and fix the cause of the problem. Contractor shall be on-call 24 hours a day and be able to respond within 30 minutes at all times during sewer bypassing. The Contractor will be required to demonstrate to the satisfaction of the Owner that this requirement can be met and that responsible and appropriately trained personnel will be able to deal with emergencies that could arise. The Contractor is encouraged to consider retaining a company or individual(s) that specialize in the operation and maintenance of bypass sewer systems that require unattended operation.

j. Sewer bypassing shall not cause backup of sewage into residences. Depth of surcharge upstream shall be kept to the minimum necessary. The Contractor will be responsible for repairing any damage to upstream property due to surcharging of the system.

k. All sewer pipes and manholes that were surcharged shall be properly flushed to remove accumulated sewage material.

l. If damaged, restore bypass areas to pre-existing conditions in accordance with the requirements of the Contract Documents.

7. Spills:

a. Contractor is fully responsible for any damage that may result from an inadequate or improper installation, maintenance or operation, or failure of any kind of the bypass system. That responsibility includes but is not limited to the costs associated with cleanup and repair of property damage.

b. Spills or bypasses of sewage to surface waters or drainage courses is prohibited. In the event of sewage spills, the Contractor shall immediately take whatever actions are deemed necessary to stop a spill. Should the Contractor not take immediate action, the Owner will be entitled to take whatever actions are deemed necessary to stop a spill.

c. Costs incurred by the Contractor or Owner, including penalties imposed on the Owner as a result of any sewage spill caused by the Contractor, its employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the Contractor or Owner resulting directly or indirectly from the spill.

8. Work and Assistance by Owner:

a. Operation of the existing pump station facilities, including those operations which may be necessary to facilitate the Contractor's work will be provided by the Owner.

b. For minor assistance and operations, the Contractor shall provide a minimum of 3 days advance notice to the Owner. For more major assistance, Contractor shall provide a minimum of 14 days advance notice to the Owner.

END OF SECTION

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GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 2014 EDITION OF THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (REFERRED TO HEREIN AS THE STANDARD SPECIFICATIONS), PREPARED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND THE WASHINGTON STATE CHAPTER OF THE APWA; KITSAP COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD FOR SANITARY SEWER EXTENSIONS; AND KITSAP COUNTY'S ROAD STANDARDS AND SPECIFICATIONS, AS SUPPLEMENTED BY THE DRAWINGS AND CONTRACT DOCUMENTS.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. THE CONTRACTOR SHALL EMPLOY THE PROPER STANDARD OF CARE FOR ALL WORK AROUND EXISTING OVERHEAD AND UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE ONE CALL AT 1-800-424-5555, KITSAP COUNTY PUBLIC WORKS AT (360) 337-5777 AND THE WSDOT, A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.
4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE A COPY OF THE APPROVED CONSTRUCTION PLANS ON THE CONSTRUCTION SITE AT ALL TIMES.
5. ALL PIPING SHALL BE CLEANED AND TESTED PRIOR TO PAVING IN CONFORMANCE WITH THE SPECIFICATIONS.
6. PRIOR TO BACKFILL, ALL PIPES AND APPURTENANCES SHALL BE INSPECTED BY THE COUNTY. INSPECTION SHALL NOT RELIEVE THE CONTRACTOR OF CORRECTION OF ANY DEFICIENCIES AND/OR FAILURES AS DETERMINED BY SUBSEQUENT TESTING AND INSPECTION.
7. CONTRACTOR SHALL COORDINATE WITH THE COUNTY CONSTRUCTION MANAGER REGARDING TEMPORARY CONSTRUCTION EASEMENTS PRIOR TO CONSTRUCTION ON EASEMENTS.
8. CONTRACTOR SHALL DEVELOP A SANITARY SEWER TEMPORARY BYPASS PLAN PRIOR TO DISRUPTING ANY LIVE SEWERS, INCLUDING MAIN LINES, FORCE MAINS, OR SIDE SEWERS. PLAN SHALL ADDRESS COUNTY COORDINATION NEEDS. SUBMIT PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
9. PHYSICAL CONNECTIONS TO THE EXISTING SEWER SYSTEM SHALL NOT BE MADE UNTIL AUTHORIZED BY THE ENGINEER. SUCH AUTHORIZATION WILL NOT BE GIVEN UNTIL THE CONTRACTOR HAS SATISFIED THE ENGINEER THAT THE NEW GRAVITY SEWER OR FORCE MAIN IS READY TO BE PLACED INTO SERVICE.
10. CONTRACTOR SHALL DEVELOP A WATER LINE TEMPORARY BYPASS PLAN PRIOR TO DISRUPTING ANY LIVE WATER LINES, INCLUDING MAIN LINES OR WATER SERVICE LINES. PLAN SHALL ADDRESS WATER PURVEYOR AND PROPERTY OWNER COORDINATION. SUBMIT PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
11. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR VERIFYING ACCURACY OF ALL UTILITY LOCATIONS SHOWN ON DRAWINGS AND TO FURTHER DISCOVER AND AVOID ALL UTILITIES, SHOWN OR NOT SHOWN, THAT MAY BE IMPACTED BY THE CONTRACTOR'S WORK.
12. CONTRACTOR SHALL ADJUST ALL MAINTENANCE HOLE RIMS, DRAINAGE STRUCTURES, LIDS, VALVE BOXES, UTILITY ACCESS STRUCTURES, AND MONUMENT COVERS TO FINISH GRADE WITHIN AREAS AFFECTED BY THE CONTRACTOR'S WORK.
13. PUMP STATIONS SHALL HAVE TWO POWER SOURCES AT ALL TIMES -- UTILITY POWER AND TEMPORARY OR PERMANENT GENERATOR POWER. THE PRIMARY POWER SOURCE AT NIGHT – 5 PM TO 7 AM – SHALL BE UTILITY POWER.
14. THE OWNER'S TELEMETRY SYSTEM MUST BE OPERATIONAL AT ALL TIMES.
15. CONTRACTOR SHALL RE-ESTABLISH ALL DISTURBED SURVEYING MARKERS OR MONUMENTS USING A LICENSED LAND SURVEYOR IN ACCORDANCE WITH THE SPECIFICATIONS.
16. PROTECTION OF THE ENVIRONMENT: NO CONSTRUCTION RELATED ACTIVITY SHALL CONTRIBUTE TO THE DEGRADATION OF THE ENVIRONMENT, ALLOW MATERIAL TO ENTER SURFACE OR GROUND WATERS, OR ALLOW PARTICULATE EMISSIONS TO THE ATMOSPHERE, WHICH EXCEED STATE OR FEDERAL STANDARDS. ANY ACTIONS THAT POTENTIALLY ALLOW A DISCHARGE TO STATE WATERS MUST HAVE PRIOR APPROVAL OF THE WASHINGTON STATE DEPARTMENT OF ECOLOGY.

EROSION AND SEDIMENT CONTROL NOTES

1. THE OWNER WILL OBTAIN DOE'S CONSTRUCTION STORMWATER GENERAL PERMIT AND TRANSFER TO THE CONTRACTOR AT THE START OF CONSTRUCTION. CONTRACTOR MAY MODIFY THE DRAFT SWPPP INCLUDED AS AN APPENDIX TO THE SPECIFICATIONS TO ADDRESS THE CONTRACTOR'S MEANS AND METHODS OR PREPARE A NEW SWPPP AS REQUIRED BY THE PERMIT. ONCE THE SWPPP IS APPROVED BY DOE, THE CONTRACTOR SHALL FOLLOW ALL CONSTRUCTION STORMWATER GENERAL PERMIT REQUIREMENTS.
2. DISTURBED AREAS SHALL BE STABILIZED WITH TESC BEST MANAGEMENT PRACTICES AS DETAILED IN THE SWPPP. CONTRACTOR SHALL PREVENT EROSION OR SEDIMENT TRANSPORT IN ALL DISTURBED AREAS UNTIL FINAL RESTORATION HAS BEEN ACCOMPLISHED.
3. CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES FOR PREVENTING SILT AND DEBRIS LADEN RUNOFF FROM LEAVING THE PROJECT SITE, ENTERING THE DRAINAGE SYSTEM, OR VIOLATING APPLICABLE WATER QUALITY STANDARDS. FAILURE BY THE CONTRACTOR TO PREVENT SILT OR DEBRIS LADEN RUNOFF OR SEDIMENT FROM BEING TRANSPORTED FROM THE PROJECT SITE MAY RESULT IN A FINE. THE DESIGNATED CONTACT PERSON SHALL BE AVAILABLE BY TELEPHONE ON A 24 HOUR PER DAY BASIS THROUGHOUT CONSTRUCTION AND UNTIL THE PROJECT HAS BEEN COMPLETED AND ACCEPTED BY THE OWNER.
4. TESC MEASURES SHOWN ON THE PLANS AND IDENTIFIED IN THE CONTRACTOR'S SWPPP ARE CONSIDERED BASIC REQUIREMENTS FOR THE ANTICIPATED SITE CONDITIONS. DURING CONSTRUCTION, ADDITIONAL PROVISIONS MAY BE NECESSARY TO MAINTAIN WATER QUALITY. MINOR DEPARTURES FROM THE TESC MEASURES SHOWN ON THE PLANS MAY BE PERMITTED SUBJECT TO THE APPROVAL OF THE COUNTY CONSTRUCTION MANAGER. HOWEVER, EXCEPT FOR EMERGENCY SITUATIONS, MAJOR DEVIATIONS MUST BE APPROVED BY THE ENGINEER. DOCUMENTATION AND RECORD KEEPING OF THESE ACTIVITIES SHALL BE IN ACCORDANCE WITH THE CONTRACTOR'S SWPPP.
5. TESC MEASURES SHALL BE INSPECTED BY THE CONTRACTOR AS DEFINED IN THE SPECIFICATIONS AND IMMEDIATELY AFTER EACH RAINFALL, AND SHALL BE MAINTAINED AS NECESSARY TO INSURE THEIR CONTINUED FUNCTION. ALL SEDIMENT SHALL BE REMOVED FROM SILT FENCES, STRAW BALES, SEDIMENT PONDS, CATCH BASIN INSERTS, ETC. PRIOR TO THE SEDIMENT REACHING APPROXIMATELY ONE-HALF OF THE MAXIMUM POTENTIAL DEPTH.
6. AT NO TIME SHALL CONCRETE, CONCRETE BY-PRODUCTS, VEHICLE FLUIDS, PAINT, CHEMICALS, OR OTHER POLLUTING MATTER BE PERMITTED TO DISCHARGE TO THE TEMPORARY OR PERMANENT DRAINAGE SYSTEM OR TO DISCHARGE FROM THE PROJECT SITE.
7. PERMANENT DETENTION/RETENTION PONDS, PIPES, TANKS, OR VAULTS MAY ONLY BE USED FOR SEDIMENT CONTAINMENT WHEN SPECIFICALLY INDICATED ON THESE PLANS OR OTHERWISE APPROVED BY THE OWNER.
8. SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE TESC MEASURES ARE NO LONGER REQUIRED, SHALL BE REMOVED OR DRESSED TO CONFORM TO THE EXISTING GRADE AND SEEDED.
9. BARE EARTH AREAS WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 15 DAYS SHALL BE IMMEDIATELY STABILIZED WITH APPROVED TESC MEASURES.
10. TESC MEASURES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED AS NECESSARY.
11. CONTRACTOR SHALL KEEP ALL PAVED SURFACES IN THE RIGHT OF WAY CLEAN BY SWEEPING.

SURVEY NOTES

1. THE LOCATION OF UNDERGROUND UTILITIES SHOWN IS APPROXIMATE ONLY AND HAVE BEEN LOCATED FROM VISIBLE EVIDENCE, AS-BUILT MAPS AND PAINT MARKS BY OTHERS. AES CONSULTANTS, INC. MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION SHOWN OR COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE LOCATION OF CRITICAL UNDERGROUND UTILITIES SHOULD BE EXPOSED AND VERIFIED PRIOR TO DESIGN OR CONSTRUCTION. NOTIFY ONE CALL AT 1-800-424-5555 AND ARRANGE FOR FIELD LOCATION OF EXISTING FACILITIES BEFORE ANY CONSTRUCTION.
2. TOPOGRAPHIC SURVEY CONDUCTED BY AES CONSULTANTS, INC., IN FEBRUARY 2015.
3. SANITARY SEWER MANHOLES WERE NOT ENTERED DURING THIS SURVEY. PIPE SIZES AND MATERIALS WERE OBSERVED FROM THE OUTSIDE OF THE MANHOLE AND ARE ESTIMATED.

HORIZONTAL DATUM

HORIZONTAL CONTROL DATUM IS NAD 83(2012) BASED ON GPS OBSERVATIONS WITH CROSS CHECKS TO KITSAP COUNTY SURVEY CONTROL.

VERTICAL DATUM

NGVD 29, PER GPS OBSERVATIONS AND VERTCON.

DESIGN CRITERIA

PUMP STATION 45 - DANIELS REHABILITATION

PUMP TYPE	SUBMERSIBLE
PUMP MANUFACTURER	FLYGT
FORCE MAIN DIAMETER	4-INCH
NO. OF PUMPS	2 (1-DUTY, 1-STANDBY)
PUMP MODEL	NP 3085 SH 3 - ADAPTIVE 256
RATED CAPACITY, EACH PUMP	210 GPM @ 34 FT TDH
RATED PUMP SPEED	3,415 RPM
MOTOR HP, EACH PUMP	4 HP
MOTOR SPEED	3,600 RPM
VOLTAGE/PHASES/HERTZ	230/3/60
SPEED CONTROL	FIXED
FIRM PUMPING CAPACITY	210 GPM (1-DUTY, 1-STANDBY)
STANDBY GENERATOR	25 KW

PUMP STATION 46 - CARAWAY REHABILITATION

PUMP TYPE	SUBMERSIBLE
PUMP MANUFACTURER	FLYGT
FORCE MAIN DIAMETER	4-INCH
NO. OF PUMPS	2 (1-DUTY, 1-STANDBY)
PUMP MODEL	NP 3085 SH 3 - ADAPTIVE 256
RATED CAPACITY, EACH PUMP	265 GPM @ 21 FT TDH
RATED PUMP SPEED	3,415 RPM
MOTOR HP, EACH PUMP	4 HP
MOTOR SPEED	3,600 RPM
VOLTAGE/PHASES/HERTZ	230/3/60
SPEED CONTROL	FIXED
FIRM PUMPING CAPACITY	265 GPM (1-DUTY, 1-STANDBY)
STANDBY GENERATOR	25 KW

PUMP STATION 47 - HEMLOCK REHABILITATION

PUMP TYPE	SUBMERSIBLE
PUMP MANUFACTURER	FLYGT
FORCE MAIN DIAMETER	4-INCH
NO. OF PUMPS	2 (1-DUTY, 1-STANDBY)
PUMP MODEL	NP 3085 SH 3 - ADAPTIVE 256
RATED CAPACITY, EACH PUMP	195 GPM @ 37 FT TDH
RATED PUMP SPEED	3,415 RPM
MOTOR HP, EACH PUMP	4 HP
MOTOR SPEED	3,600 RPM
VOLTAGE/PHASES/HERTZ	230/3/60
SPEED CONTROL	FIXED
FIRM PUMPING CAPACITY	195 GPM (1-DUTY, 1-STANDBY)
STANDBY GENERATOR	25 KW

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

SAMUEL ADAM SCHUYLER — STATE OF WASHINGTON — 39911 — REGISTERED PROFESSIONAL ENGINEER — 8-10-16

TIMOTHY JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
	BUILDING PERMIT SUBMITTAL	04-2016	TJW	RAD
	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Designed: T. Whitehouse, P.E.
Drawn: P. Simon
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: N/A
One Inch at Full Scale — If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

NOTES AND DESIGN CRITERIA

Drawing: G-4
Sheet: 4 of 73
File: P15-10341_G-4
Date: August 2016

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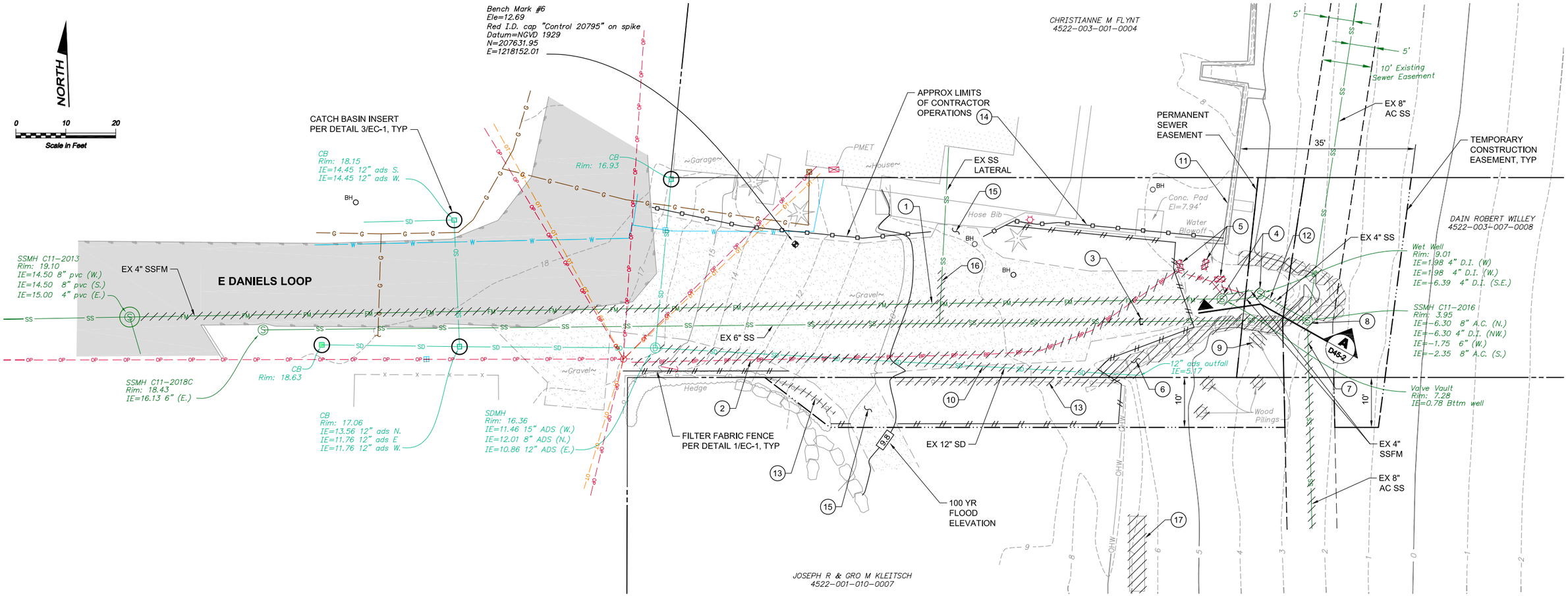
Path: S:\Cad\Kitsap County\15-10341 PS 45 46 47 BL Design\d Filename: P15-10341_G-4 Plot date: Aug 09, 2016-01:28:48pm CAD User: acariaso.
Xref Filename: | X15-10341_TB | Whitehouse | Schuyler_Adam | Dahl | Gibson | Schuyler_Erika |



NOTES:

1. DEMOLITION OF EXISTING PUMP STATION FACILITIES SHALL OCCUR ONLY AFTER COMMISSIONING (INSTALLATION, TESTING, AND CONFIRMED OPERATION) OF THE NEW PUMP STATION, UNLESS OTHERWISE APPROVED BY THE COUNTY.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. SEE SPEC SECTION 02 41 00 FOR ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS.
4. PROTECT ALL EXISTING UTILITIES, STRUCTURES, FACILITIES, TREES, ETC. UNLESS SPECIFICALLY INDICATED TO BE REMOVED.
5. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
6. SEE RESTORATION DWGS FOR REMOVAL OF EXISTING ASPHALT AND GROUND.
7. ADJUST/REMOVE/REINSTALL FILTER FABRIC FENCE AS NECESSARY TO CONSTRUCT IMPROVEMENTS.

CONSTRUCTION NOTES:

1. REROUTE EXISTING FORCE MAIN FOR CONSTRUCTION OF NEW FACILITIES. REMOVE EXISTING FORCE MAIN IN AREA OF NEW IMPROVEMENTS. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY FORCE MAIN AND PLUG AND ABANDON REMAINING EXISTING FORCE MAIN.
2. RELOCATE POWER SERVICE PER ELECT DWGS AND REMOVE EXISTING PUMP STATION POWER SERVICE. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY SERVICE.
3. PLUG AND ABANDON EXISTING SEWER TO EAST, REMOVE EXISTING SEWER TO WEST. SEE DWG C45-1 FOR LIMITS OF NEW IMPROVEMENTS.
4. DECOMMISSION AND REMOVE MECHANICAL, ELECTRICAL, AND MISCELLANEOUS EQUIPMENT FROM EXISTING PUMP STATION WET WELL AND VALVE VAULT. REMOVE DISCHARGE PIPING BETWEEN STRUCTURES. SEE DWG D45-2 FOR ADDITIONAL DEMOLITION DETAILS.
5. RELOCATE EXISTING PUMP STATION ELECT EQUIP FOR USE DURING CONSTRUCTION PER ELECT DWGS. REMOVE ELECT EQUIP FOLLOWING COMMISSIONING OF NEW PUMP STATION.
6. REMOVE EXISTING CONC/ROCK GROIN DURING DEMOLITION OF EXISTING PUMP STATION, SEE R45 DWGS FOR RESTORATION DETAILS. MINOR REMOVAL AND REPLACEMENT WILL BE ALLOWED FOR INSTALLATION OF NEW SEWER AND BEACH MANHOLE.
7. PLUG AND ABANDON EXISTING SEWER, REMOVE AS REQUIRED. MAINTAIN SERVICE DURING CONSTRUCTION, SEE NEW BEACH MANHOLE LOCATION ON DWG C45-1.
8. REMOVE EXISTING SSMH. SEE DWG D45-2 FOR ADDITIONAL DEMOLITION DETAILS.
9. FULLY REMOVE EXISTING CREOSOTE-TREATED WOOD PILINGS, TYP OF 4.
10. REMOVE AND REPLACE EXISTING STORM DRAIN. SEE DWG C45-1 FOR REROUTING.
11. PROTECT EXISTING CONCRETE BULKHEAD DURING CONSTRUCTION IN ACCORDANCE WITH SPEC SECTION 02 41 10.
12. PLUG AND ABANDON EXISTING SEWER.
13. REMOVE CHAINLINK FENCE, GATE AND POST. PROTECT EXISTING HEDGE.
14. INSTALL DELINEATION FENCING PER DETAIL 2/EC-1, COORDINATE OPENINGS WITH HOMEOWNER FOR ACCESS.
15. MAINTAIN DRIVEABLE ACCESS TO PROPERTIES DURING CONSTRUCTION. NOTIFY HOMEOWNERS ONE DAY IN ADVANCE OF ANY CONSTRUCTION ACTIVITY REQUIRING BLOCKAGES OF 30 MINUTES OR MORE. BLOCKAGES SHALL LAST NO LONGER THAN 4 HOURS UNLESS PRIOR APPROVAL IS GIVEN BY THE HOMEOWNER.
16. REMOVE EXISTING SEWER LATERAL IN AREA OF NEW IMPROVEMENTS. SEE DRAWING C45-1 FOR REROUTING.
17. REMOVE APPROXIMATELY 15' x 3' x 3' REINFORCED, CONCRETE ENCASED STYROFOAM CORE BLOCK. ACTUAL LOCATION IS APPROXIMATELY 30' SOUTH OF THE LOCATION DEPICTED ON THIS PLAN.

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SAMUEL ADAM SCHUYLER — STATE OF WASHINGTON — 39911 — REGISTERED PROFESSIONAL ENGINEER — 8-10-16

TERRY JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
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Drawn: P. Simon
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: 1" = 10'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

EXISTING PUMP STATION SITE, TESC AND DEMOLITION PLAN

Drawing: D45-1
Sheet: 26 of 73
File: P15-10341_D45-1
Date: August 2016

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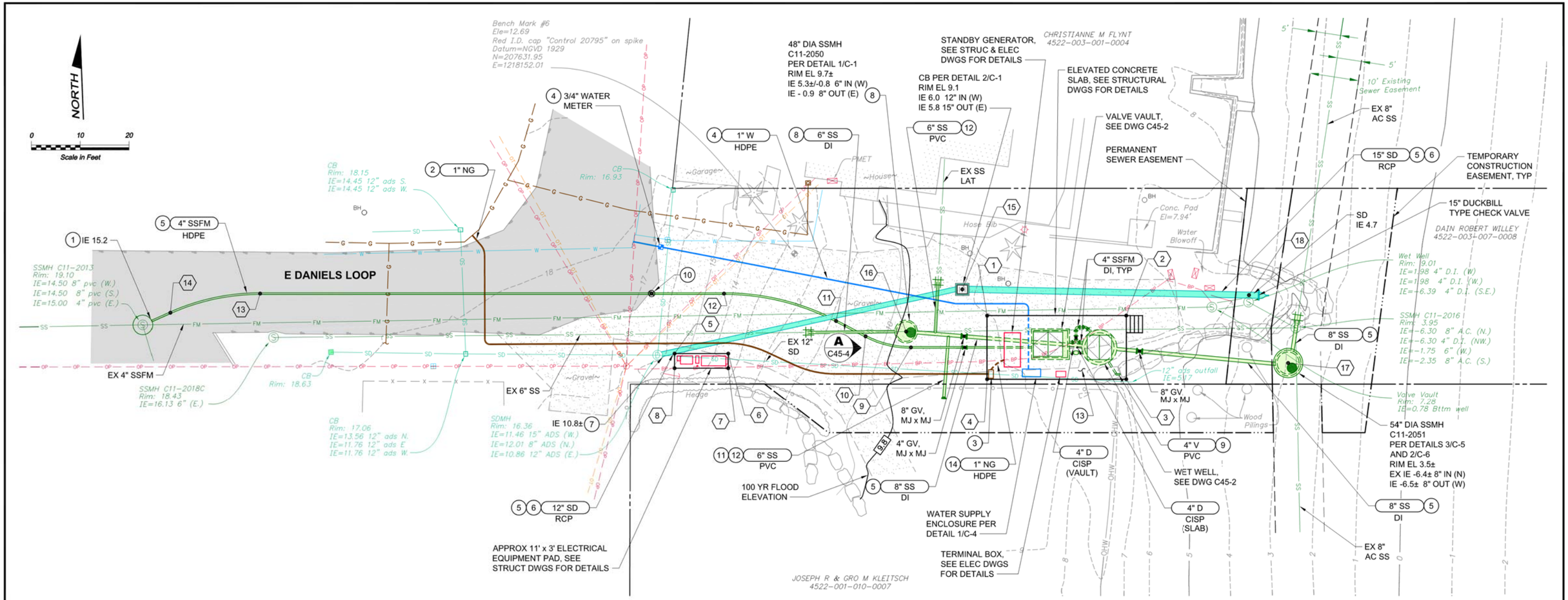

NOTES:

1. EXISTING PUMP STATION FACILITIES ARE SHOWN AND SHALL REMAIN IN SERVICE THROUGHOUT CONSTRUCTION. SEE DEMOLITION DWGS FOR DECOMMISSIONING, DEMOLITION, REMOVAL AND ABANDONING OF EXISTING PUMP STATION FACILITIES. SEE RESTORATION DWGS FOR FINISHED SITE AND RESTORATION PLAN.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
4. ALL SSFM PIPE AND VALVE JOINTS, FITTINGS AND COUPLINGS SHALL BE RESTRAINED.
5. INSTALL BURIED VALVES PER DETAIL 1/C-2.

CONSTRUCTION NOTES:

1. CORE DRILL AND SEAL WITH FLEXIBLE BOOT PER DETAIL 7/C-1.
2. CASCADE NATURAL GAS WILL PROVIDE AND INSTALL NATURAL GAS PIPELINE, CONNECTION TO MAIN, AND METER. CONTRACTOR SHALL EXCAVATE TRENCH PER DETAIL 5/C-5 AND PROVIDE AND INSTALL REQUIRED BACKFILL AND RESTORE SURFACE. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS DOWNSTREAM OF METER. CONTRACTOR SHALL COORDINATE ALL PIPING AND APPURTENANCES INSTALLED BY CASCADE NATURAL GAS WITH EXISTING AND NEW PIPING AND FACILITIES TO AVOID CONFLICT.
3. FINAL LOCATION OF METER TO BE DETERMINED BY COUNTY CONSTRUCTION MANAGER AND ENGINEER IN FIELD.
4. MANCHESTER WATER DISTRICT WILL PROVIDE AND INSTALL ALL MATERIALS AND RESTORE SURFACE FROM CONNECTION TO EXISTING WATER MAIN TO NEW WATER METER. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS AND RESTORE SURFACE DOWNSTREAM OF NEW WATER METER. TRENCH SECTION PER DETAIL 5/C-5. CONTRACTOR SHALL COORDINATE ALL PIPING AND APPURTENANCES INSTALLED BY MANCHESTER WATER DISTRICT WITH EXISTING AND NEW PIPING AND FACILITIES TO AVOID CONFLICT.
5. SEE DRAWING C45-5 FOR PIPE PROFILE.
6. FINAL INSTALLATION SHALL OCCUR AFTER REMOVAL OF ROCK JETTY TO PERMIT FREE DISCHARGE, INSTALL TEMPORARY FLEXIBLE STORM DRAIN DURING CONSTRUCTION.
7. CAREFULLY CUT/CHIP OUT TO REMOVE EXISTING 12" SD AT MANHOLE. CUT/CHIP OUT ADDITIONAL CONCRETE AS REQUIRED TO ACCOMMODATE NEW PIPE EXIT ANGLE. GROUT TO FILL VOIDS AND CREATE A SMOOTH SURFACE, SEAL WITH FLEXIBLE BOOT PER DETAIL 7/C-1.
8. INSTALL OUTSIDE DROP MANHOLE CONNECTION FOR 6" INLET SEWER PER DETAIL 2/C-4.
9. SEE DETAIL 4/C-5 FOR VENT LOCATION AND DETAILS.
10. TRACER WIRE AND HAND HOLE PER DETAIL 4/C-4.
11. EXTEND SEWER LATERAL 3' BEYOND PROPERTY LINE, IE AT TERMINATION = 3.5. CAP PIPE AND MARK LOCATION WITH STAKE AT PROPERTY LINE.
12. CONNECT SIDE SEWER TO NEW SEWER MAIN PER DETAIL 5/C-4.
13. MAINTAIN 8" CLEAR SPACE BETWEEN EDGE OF PUMP STATION SLAB AND ANY EQUIPMENT, PIPING AND OR CONCRETE PADS FOR A FUTURE CURB, FULL PERIMETER OF STRUCTURE.
14. ROUTE NG FROM METER TO GENERATOR BELOW SLAB. TRANSITION FROM BSP TO HDPE WITH TRANSITION SERVICE LINE RISER.

COORDINATE TABLE

PT #	NORTHING	EASTING	DESCRIPTION
1	207617.72	1218190.84	NW CORNER, PS SLAB
2	207616.58	1218219.32	NE CORNER, PS SLAB
3	207603.65	1218218.89	SE CORNER, PS SLAB
4	207604.73	1218190.32	SW CORNER, PS SLAB
5	207612.53	1218126.65	NW CORNER, ELECTRICAL EQUIPMENT PAD
6	207612.09	1218137.64	NE CORNER, ELECTRICAL EQUIPMENT PAD
7	207609.09	1218137.52	SE CORNER, ELECTRICAL EQUIPMENT PAD
8	207609.53	1218126.53	SW CORNER, ELECTRICAL EQUIPMENT PAD
9	207611.84	1218175.06	PT, 4" SSFM
10	207614.48	1218165.87	PC, 4" SSFM
11	207617.85	1218159.97	PT, 4" SSFM
12	207624.36	1218137.25	PC, 4" SSFM
13	207628.15	1218042.39	PT, 4" SSFM
14	207624.98	1218023.88	PC, 4" SSFM
15	207623.27	1218186.05	CB CENTER, APPROXIMATE
16	207615.12	1218174.20	MH CENTER, APPROXIMATE
17	207605.57	1218252.13	MH CENTER, APPROXIMATE
18	207619.75	1218244.69	C/L SD TERMINATION, APPROXIMATE

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TYLER JAMES WHITEHOUSE — STATE OF WASHINGTON — 49543 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

No.	Revision	Date	By	App'd
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Approved: R. Dorn, P.E.

Scale: 1" = 10'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

PUMP STATION AND PIPING PLAN

Drawing: C45-1
Sheet: 28 of 73
File: P15-10341_C45-1
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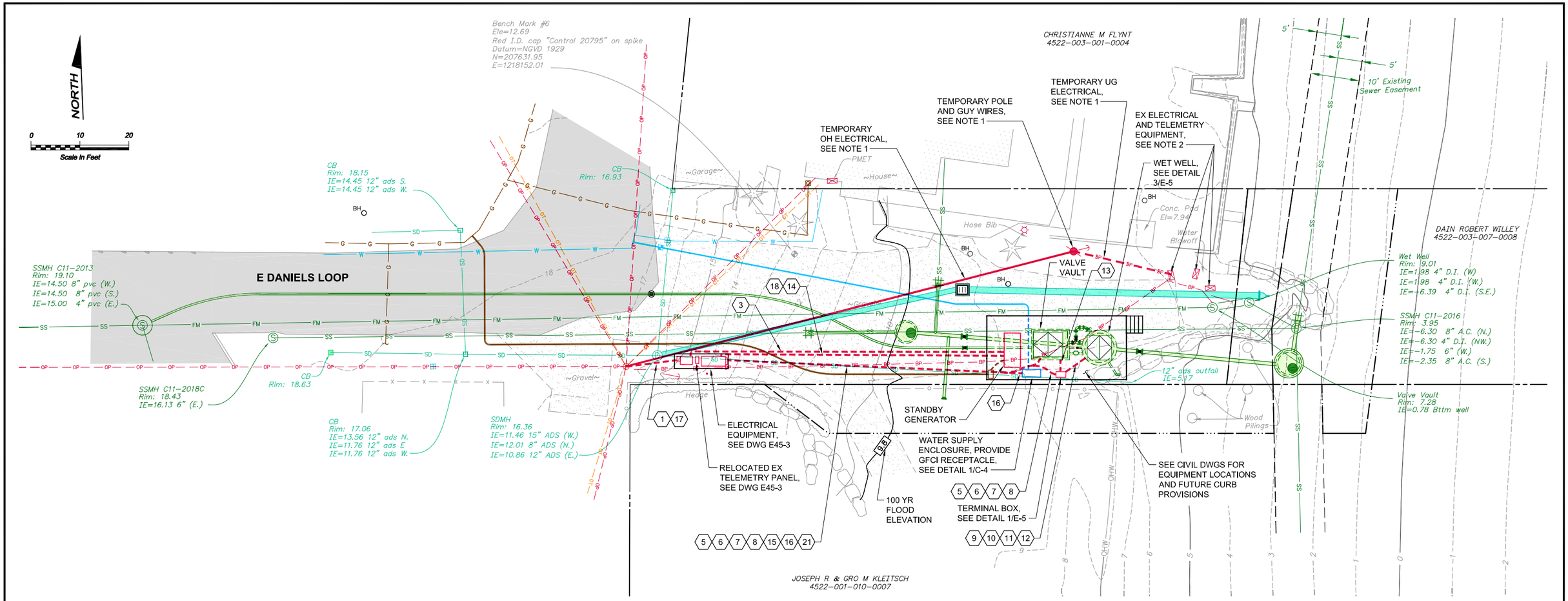

NOTES:

1. PROVIDE AND MAINTAIN A TEMPORARY ELECTRICAL SERVICE TO THE EXISTING PUMP STATION DURING CONSTRUCTION OF NEW STATION. COORDINATE WITH ELECTRIC UTILITY (PSE) AND PAY ALL FEES.
2. PROVIDE TEMPORARY SUPPORTS OR RELOCATE EXISTING EQUIPMENT TO FACILITATE NEW STORM DRAIN INSTALLATION. THE EXISTING STATION SHALL REMAIN IN SERVICE UNTIL ACCEPTANCE OF NEW STATION. PROVIDE TEMPORARY PUMPING DURING CUTOVER AND TESTING OF RELOCATED EQUIPMENT.

LEGEND:

- PROPOSED ELECTRICAL STRUCTURES & EQUIPMENT
- PROPOSED ELECTRICAL CONDUIT
- (#) CONDUIT TAG - SEE DWG E-3

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UNDERGROUND SERVICE

JEFFREY S. GIBSON, STATE OF WASHINGTON, 35800, REGISTERED PROFESSIONAL ENGINEER
8-10-16

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Approved: R. Dorn, P.E.

Scale: As Noted
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

ELECTRICAL SITE PLAN

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File: P15-10341_E45-1
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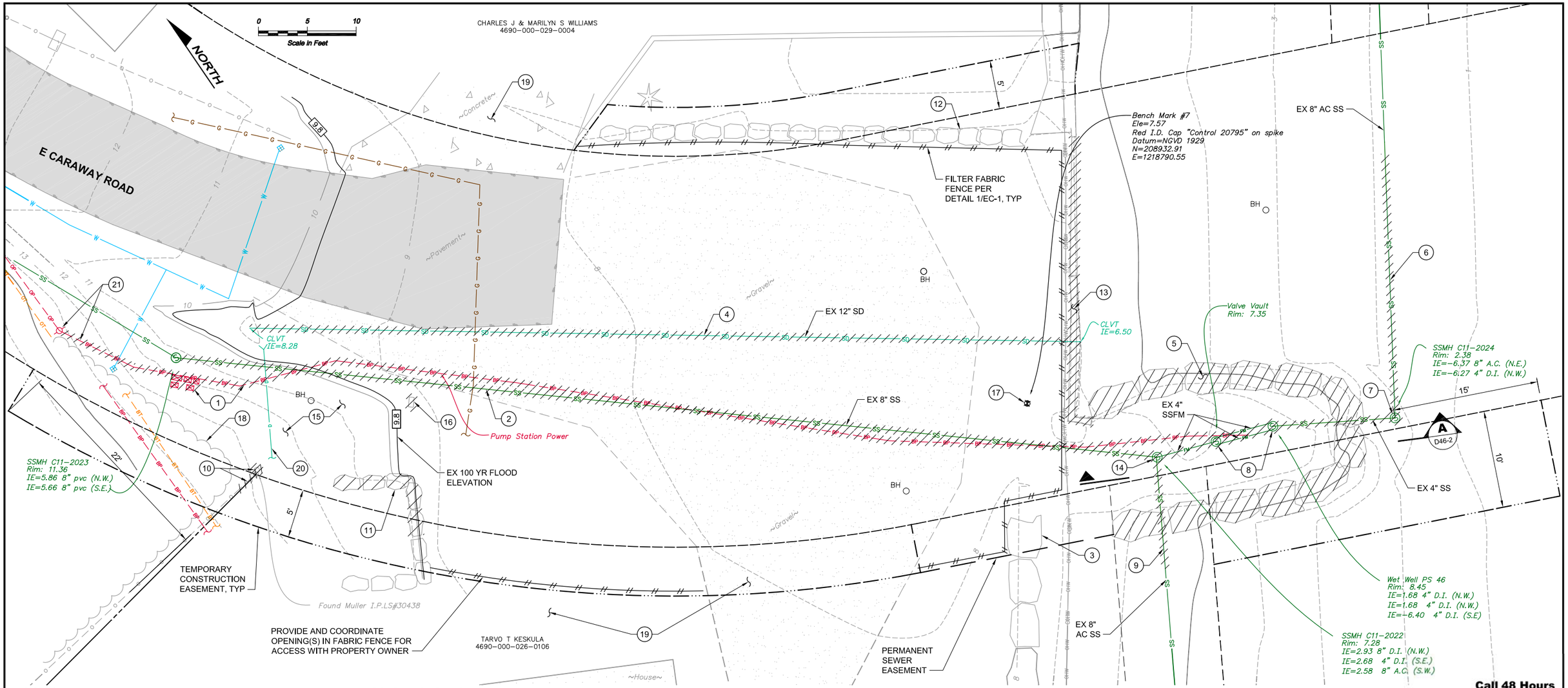

NOTES:

1. DEMOLITION OF EXISTING PUMP STATION FACILITIES SHALL OCCUR ONLY AFTER COMMISSIONING (INSTALLATION, TESTING, AND CONFIRMED OPERATION) OF THE NEW PUMP STATION, UNLESS OTHERWISE APPROVED BY THE COUNTY.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. SEE SPEC SECTION 02 41 00 FOR ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS.
4. PROTECT ALL EXISTING UTILITIES, STRUCTURES, FACILITIES, TREES, ETC. UNLESS SPECIFICALLY INDICATED TO BE REMOVED.
5. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
6. SEE RESTORATION DWGS FOR REMOVAL OF EXISTING ASPHALT AND GROUND.
7. ADJUST/REMOVE/REINSTALL FILTER FABRIC FENCE AS NECESSARY TO CONSTRUCT IMPROVEMENTS.

CONSTRUCTION NOTES:

1. RELOCATE EXISTING PUMP STATION ELECTRICAL EQUIPMENT AND POWER SERVICE PER ELECTRICAL DWGS FOR USE DURING CONSTRUCTION. REMOVE EXISTING PUMP STATION POWER SERVICE. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY ELECTRICAL EQUIPMENT AND POWER SERVICE.
2. REMOVE AND REPLACE EXISTING SEWER. SEE DWG C46-1 FOR REROUTING.
3. REMOVE AND REINSTALL ROCKERY TO TIE INTO NEW ROCKERY WALL.
4. REMOVE AND REPLACE EXISTING STORM DRAIN. SEE DWG C46-1 FOR REROUTING.
5. REMOVE EXISTING CONC/ROCK GROIN DURING DEMOLITION OF EXISTING PUMP STATION, SEE R46 DWGS FOR RESTORATION DETAILS. MINOR REMOVAL AND REPLACEMENT WILL BE ALLOWED FOR INSTALLATION OF NEW MANHOLE AND 8" SS.
6. PLUG AND ABANDON EXISTING SEWER, REMOVE AS REQUIRED. MAINTAIN SERVICE DURING CONSTRUCTION, SEE NEW BEACH MANHOLE LOCATION ON DWG C46-1.
7. REMOVE EXISTING SSMH. SEE DWG D46-2 FOR ADDITIONAL DEMOLITION DETAILS.
8. DECOMMISSION AND REMOVE MECH, ELECT, AND MISC EQUIPMENT FROM EXISTING PUMP STATION WET WELL AND VALVE VAULT. REMOVE FM PIPING ENTERING AND EXITING STRUCTURES. SEE DWG D46-2 FOR ADDITIONAL DEMOLITION DETAILS.
9. REMOVE EXISTING SEWER TO FACILITATE NEW MANHOLE AND PIPING CONNECTION. BYPASS PUMP FROM SSMH C11-2022. SEE DWG C46-1 FOR NEW MANHOLE LOCATION.
10. REMOVE AND REINSTALL EXISTING FENCE TO EDGE OF PROPERTY LINE TO MATCH EXISTING. RE-ESTABLISH PROPERTY MARKER.
11. REMOVE AND REINSTALL EXISTING ROCK WALL PLANTER. SEE DWG FOR R46-1 FOR RESTORATION DETAILS.
12. REMOVE AND REINSTALL ROCKERY AND LANDSCAPING TO MATCH EXISTING.
13. REMOVE EXISTING CONCRETE BULKHEAD AFTER CONSTRUCTION OF NEW PUMP STATION. SEE R46 DWGS FOR RESTORATION DETAILS.
14. REMOVE EXISTING SSMH. INSTALL TEMPORARY FORCE MAIN AND/OR GRAVITY SEWER TO NEW SSMH C11-2049 FOR EXISTING PUMP STATION OPERATION DURING CONSTRUCTION AS REQUIRED. SEE DWG D46-2 FOR ADDITIONAL DEMOLITION DETAILS.
15. CUT/FILL AND REGRADE AREA TO CONSTRUCT NEW IMPROVEMENTS, SEE DWG R46-1 FOR FINISHED GRADE ELEVATIONS.
16. REMOVE AND RELOCATE MAILBOX TO LOCATION DIRECTED BY PROPERTY OWNER.
17. BENCH MARK FOR USE DURING CONSTRUCTION. RE-ESTABLISHMENT AFTER CONSTRUCTION IS NOT REQUIRED.
18. HEAVY SHRUBBERY, TRIM BACK TO CONSTRUCT NEW IMPROVEMENTS AS REQUIRED. PROTECT TREES.
19. MAINTAIN DRIVEABLE ACCESS TO PROPERTIES DURING CONSTRUCTION. NOTIFY HOMEOWNERS ONE DAY IN ADVANCE OF ANY CONSTRUCTION ACTIVITY REQUIRING BLOCKAGES OF 30 MINUTES OR MORE. BLOCKAGES SHALL LAST NO LONGER THAN 4 HOURS UNLESS PRIOR APPROVAL IS GIVEN BY THE HOMEOWNER.
20. REMOVE AND REPLACE 4" CURTAIN DRAIN IN KIND. REROUTE AROUND NEW IMPROVEMENTS.
21. REMOVE SHRUBBERY TO POWER POLE FOR NEW CONDUIT INSTALLATION. REMOVE SHRUBBERY WITHIN A 3 FOOT RADIUS OF EXISTING POWER POLE.

Call 48 Hours Before You Dig
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SAMUEL ADAM MUELLER — STATE OF WASHINGTON — 39911 — REGISTERED PROFESSIONAL ENGINEER — 8-10-16

TIMOTHY JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

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Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

EXISTING PUMP STATION SITE, TESC AND DEMOLITION PLAN

Drawing: D46-1
Sheet: 41 of 73
File: P15-10341_D46-1
Date: August 2016

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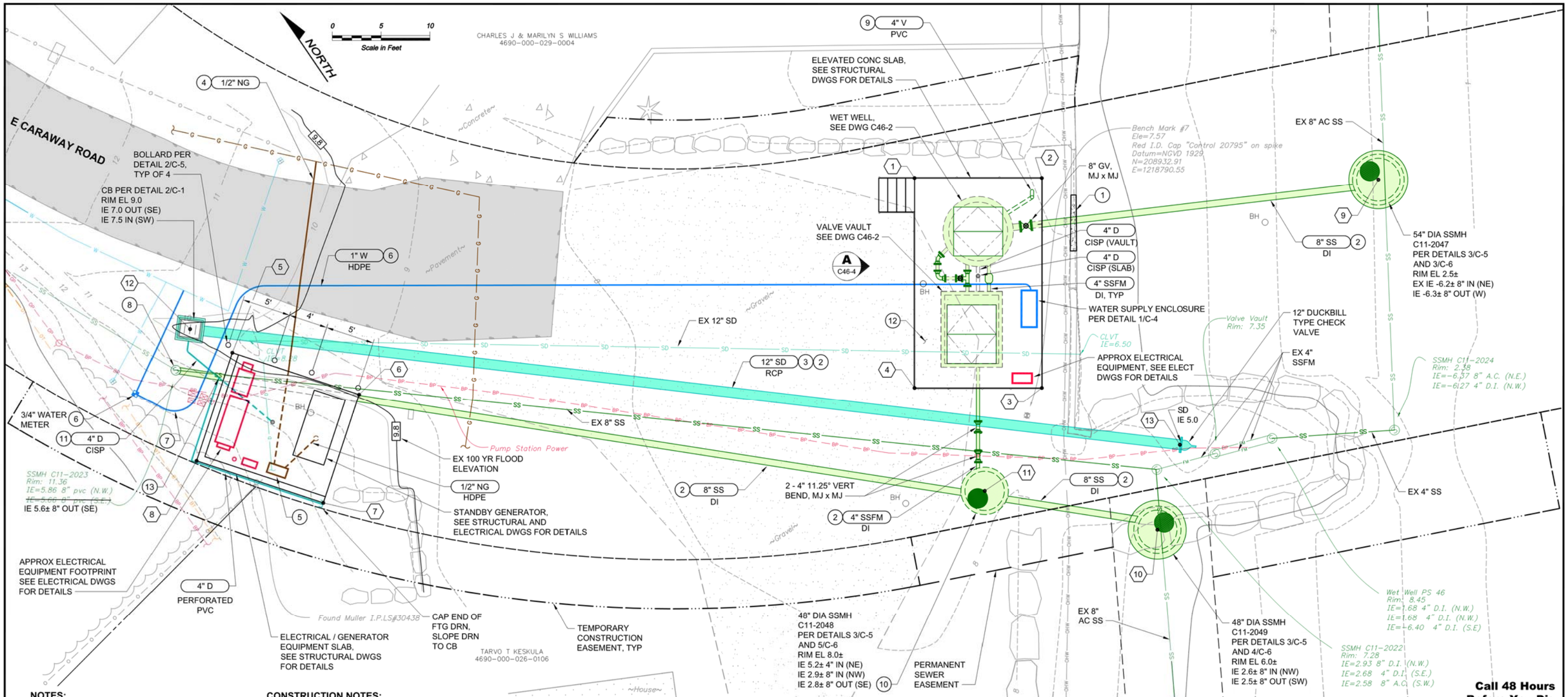

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NOTES:

1. EXISTING PUMP STATION FACILITIES ARE SHOWN AND SHALL REMAIN IN SERVICE THROUGHOUT CONSTRUCTION. SEE DEMOLITION DRAWINGS FOR DECOMMISSIONING, DEMOLITION, REMOVAL AND ABANDONING OF EXISTING PUMP STATION FACILITIES. SEE RESTORATION DRAWINGS FOR FINISHED SITE AND RESTORATION PLAN.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
4. ALL SSFM PIPE AND VALVE JOINTS, FITTINGS AND COUPLINGS SHALL BE RESTRAINED.
5. INSTALL BURIED VALVES PER DETAIL 1/C-2.

CONSTRUCTION NOTES:

1. SAWCUT AND REMOVE A PORTION OF EXISTING CONCRETE BULKHEAD TO FACILITATE CONSTRUCTION OF NEW SEWER. BRIDGE WITH SECURED BOARDS AND STAINLESS STEEL ANCHORAGE DURING CONSTRUCTION UNTIL REMOVED AND REPLACED. PROTECT EXISTING CONCRETE BULKHEAD DURING CONSTRUCTION IN ACCORDANCE WITH SPEC SECTION 02 41 10.
2. SEE DRAWING C46-5 FOR PIPE PROFILE.
3. FINAL INSTALLATION SHALL OCCUR AFTER REMOVAL OF ROCK JETTY TO PERMIT FREE DISCHARGE, INSTALL TEMPORARY FLEXIBLE STORM DRAIN DURING CONSTRUCTION.
4. CASCADE NATURAL GAS WILL PROVIDE AND INSTALL NATURAL GAS PIPELINE, CONNECTION TO MAIN, AND METER. CONTRACTOR SHALL EXCAVATE TRENCH PER DETAIL 5/C-5 AND PROVIDE AND INSTALL REQUIRED BACKFILL AND RESTORE SURFACE. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS DOWNSTREAM OF METER.

4 CONT. CONTRACTOR SHALL COORDINATE ALL PIPING AND APPURTENANCES INSTALLED BY CASCADE NATURAL GAS WITH EXISTING AND NEW PIPING AND FACILITIES TO AVOID CONFLICT.

5. FINAL LOCATION OF METER TO BE DETERMINED BY COUNTY CONSTRUCTION MANAGER AND ENGINEER IN FIELD.
6. MANCHESTER WATER DISTRICT WILL PROVIDE AND INSTALL ALL MATERIALS AND RESTORE SURFACE FROM CONNECTION TO EXISTING WATER MAIN TO NEW WATER METER. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS AND RESTORE SURFACE DOWNSTREAM OF NEW WATER METER. TRENCH SECTION PER DETAIL 5/C-5. CONTRACTOR SHALL COORDINATE ALL PIPING AND APPURTENANCES INSTALLED BY MANCHESTER WATER DISTRICT WITH EXISTING AND NEW PIPING AND FACILITIES TO AVOID CONFLICT.
7. ROUTING IS APPROXIMATE, FIELD ROUTE WITH COUNTY CONSTRUCTION MANAGER.
8. CAREFULLY CUT/CHIP OUT TO REMOVE EXISTING 8" SANITARY SEWER. GROUT TO PROVIDE A SMOOTH, CIRCULAR SURFACE, SEAL PIPE CONNECTION WITH FLEXIBLE BOOT PER DETAIL 7/C-1.
9. SEE DETAIL 4/C-5 FOR VENT LOCATION AND DETAILS.
10. PROVIDE STANDARD PRECAST FLAT TOP WITH MANHOLE FRAME AND COVER PER DETAIL 6/C-1.
11. FIELD ROUTE TO AVOID CONFLICT, MINIMIZE FITTINGS. CONTINUOUSLY SLOPE TO DRAIN.
12. MAINTAIN 8" CLEAR SPACE BETWEEN EDGE OF PUMP STATION SLAB AND ANY EQUIPMENT, PIPING AND OR CONCRETE PADS FOR A FUTURE CURB, FULL PERIMETER OF STRUCTURE.
13. CONNECT FOOTING DRAIN TO SLAB DRAIN WITH FITTINGS AS REQUIRED AND FLEXIBLE COUPLING.

COORDINATE TABLE

PT #	NORTHING	EASTING	DESCRIPTION
1	208959.50	1218794.80	NW CORNER, PS SLAB
2	208952.17	1218805.53	NE CORNER, PS SLAB
3	208934.41	1218793.41	SE CORNER, PS SLAB
4	208941.75	1218782.67	SW CORNER, PS SLAB
5	208984.09	1218727.05	N CORNER, ELECT/GEN EQPT PAD WALL
6	208973.23	1218735.35	E CORNER, ELECT/GEN EQPT PAD
7	208966.15	1218726.07	S CORNER, ELECT/GEN EQPT PAD WALL
8	208977.01	1218717.78	W CORNER, ELECT/GEN EQPT PAD WALL
9	208932.59	1218833.90	MH CENTER, APPROXIMATE
10	208915.77	1218795.01	MH CENTER, APPROXIMATE
11	208929.01	1218782.64	MH CENTER, APPROXIMATE
12	208988.53	1218724.84	CB CENTER, APPROXIMATE
13	208921.62	1218801.79	C/L SD TERMINATION, APPROXIMATE

SAMUEL ADAM MILLER — STATE OF WASHINGTON — 39911 — REGISTERED PROFESSIONAL ENGINEER — 8-10-16

TARA JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

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Checked: A. Schuyler, P.E.
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One Inch at Full Scale — If Not One Inch Scale Accordingly

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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

PUMP STATION AND PIPING PLAN

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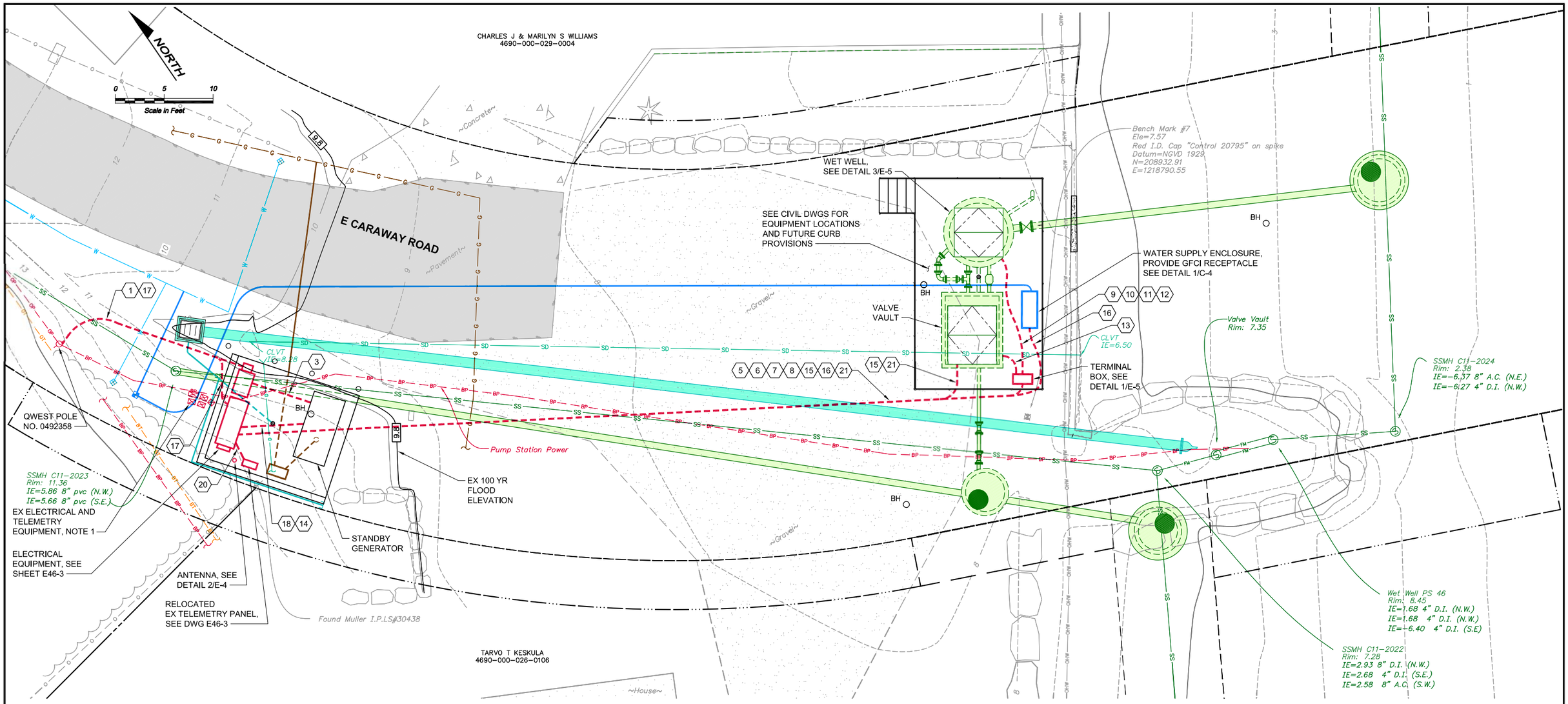

LEGEND:

- PROPOSED ELECTRICAL STRUCTURES & EQUIPMENT
- PROPOSED ELECTRICAL CONDUIT
- (#) CONDUIT TAG - SEE DWG E-3

NOTES:

1. THE EXISTING PUMP STATION SHALL REMAIN IN SERVICE UNTIL FINAL COMMISSIONING OF NEW PUMP STATION. RELOCATE EXISTING SERVICE AND CONTROL EQUIPMENT AS NECESSARY TO FACILITATE CONSTRUCTION OF NEW CONCRETE PAD. COORDINATE WITH ELECTRIC UTILITY (PSE) AND PAY ALL FEES.
2. PROVIDE TEMPORARY PUMPING DURING CUTOVER AND TESTING OF RELOCATED EQUIPMENT.

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JEFFREY S. GIBSON, STATE OF WASHINGTON, 15080, REGISTERED PROFESSIONAL ENGINEER
8-10-16

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
	BUILDING PERMIT SUBMITTAL	04-2016	TJW	RAD
	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Drawn: S. Olsoe
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: As Noted
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

ELECTRICAL SITE PLAN

Drawing: E46-1
Sheet: 54 of 73
File: P15-10341_E46-1
Date: August 2016

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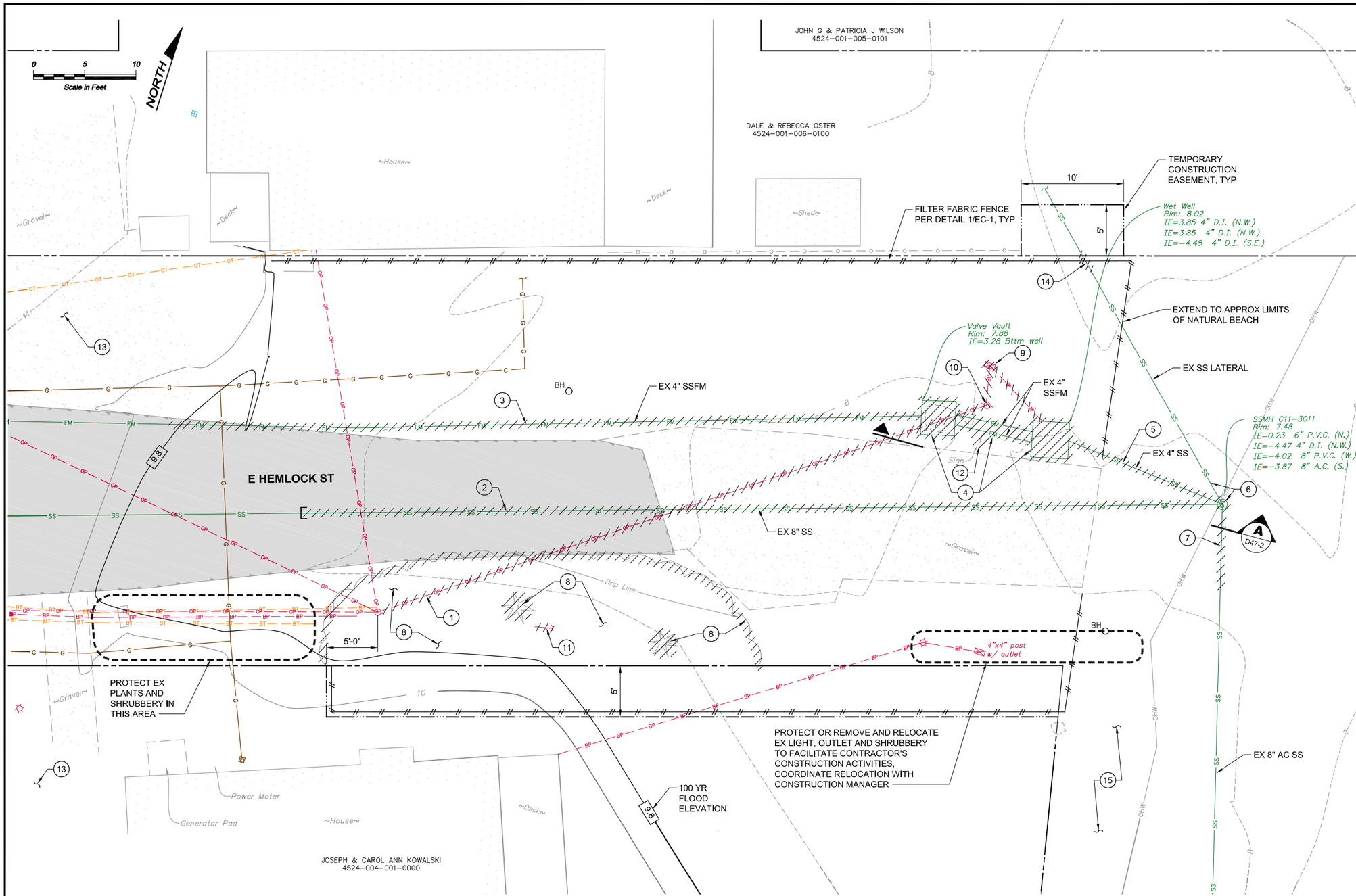
Xref Filename: | X15-10341_PS46-Prop | X15-10341_45-46-47-Topo | X15-10341_TB | Whitehouse | Schuyler_Adam | Dahl | Gibson | Schuyler_Erika | X15-10341_45-46-47-Esmts |



NOTES:

1. DEMOLITION OF EXISTING PUMP STATION FACILITIES SHALL OCCUR ONLY AFTER COMMISSIONING (INSTALLATION, TESTING, AND CONFIRMED OPERATION) OF THE NEW PUMP STATION, UNLESS OTHERWISE APPROVED BY THE COUNTY.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. SEE SPEC SECTION 02 41 00 FOR ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS.
4. PROTECT ALL EXISTING UTILITIES, STRUCTURES, FACILITIES, TREES, ETC. UNLESS SPECIFICALLY INDICATED TO BE REMOVED.
5. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
6. SEE RESTORATION DWGS FOR REMOVAL OF EXISTING ASPHALT AND GROUND.
7. ADJUST/REMOVE/REINSTALL FILTER FABRIC FENCE AS NECESSARY TO CONSTRUCT IMPROVEMENTS.

CONSTRUCTION NOTES:

1. RELOCATE OVERHEAD POWER SERVICE PER ELECT DWGS AND REMOVE EXISTING PUMP STATION POWER SERVICE. FOLLOWING COMMISSIONING OF NEW PUMP STATION, REMOVE TEMPORARY SERVICE.
2. PLUG AND ABANDON EXISTING SEWER, REMOVE AS REQUIRED. SEE DWG C47-1 FOR LIMITS OF NEW IMPROVEMENTS.
3. REMOVE EXISTING FORCE MAIN. SEE DWG C47-1 FOR LIMITS OF NEW IMPROVEMENTS.
4. DECOMMISSION AND REMOVE MECH, ELECT, AND MISC EQUIPMENT FROM EXISTING PUMP STATION WET WELL AND VALVE VAULT. REMOVE DISCHARGE PIPING BETWEEN STRUCTURES. SEE DWG D47-2 FOR ADDITIONAL DEMOLITION DETAILS.
5. PLUG AND ABANDON EXISTING SEWER.
6. MAINTAIN SERVICE OF EXISTING SEWER LATERAL DURING AND AFTER CONSTRUCTION. SEE DWG D47-2 FOR ADDITIONAL DEMOLITION DETAILS. SEE NEW BEACH MANHOLE LOCATION ON DWG C47-1 FOR EXISTING SEWER LATERAL RECONNECTION.
7. REMOVE AS REQUIRED AND CONNECT TO NEW SSMH. MAINTAIN SERVICE DURING CONSTRUCTION, SEE NEW BEACH MANHOLE LOCATION ON DWG C47-1.
8. CAREFULLY REMOVE BOXWOOD SHRUB SCREEN, WRAP IN BURLAP AND DELIVER TO ADJACENT PROPERTY OWNER (KOWALSKI) FOR REPLANTING. REMOVE TREE AND REMAINING HEAVY SHRUBBERY FOR CONSTRUCTION OF NEW IMPROVEMENTS.
9. REMOVE ELECT EQUIP.
10. REMOVE EXISTING POWER POLE.
11. REMOVE AND REPLACE OR RELOCATE POWER POLE GUY WIRE. COORD W/ UTILITY PROVIDER.
12. REMOVE AND REINSTALL SIGN IN LOCATION DIRECTED BY COUNTY.
13. MAINTAIN DRIVEABLE ACCESS TO PROPERTIES DURING CONSTRUCTION. NOTIFY HOMEOWNERS ONE DAY IN ADVANCE OF ANY CONSTRUCTION ACTIVITY REQUIRING BLOCKAGES OF 30 MINUTES OR MORE. BLOCKAGES SHALL LAST NO LONGER THAN 4 HOURS UNLESS PRIOR APPROVAL IS GIVEN BY THE HOMEOWNER.
14. REMOVE EXISTING SEWER LATERAL TO INSTALL CLEANOUT, SEE C47-1 FOR LOCATION.
15. REMOVE CREOSOTE TREATED DRIFT LOGS AND STYROFOAM AS DIRECTED BY THE CONSTRUCTION MANAGER.

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SURVEY CONTROL

BENCH MARK #5 LOCATED AT NW CORNER OF INTERSECTION OF NUBLING AVE E AND E HEMLOCK ST
EL 21.86
MAG NAIL
DATUM=NGVD 1929
N=206551.84
E=1218047.88

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
	BUILDING PERMIT SUBMITTAL	04-2016	TJW	RAD
	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Drawn: P. Simon
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: 1" = 5'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

EXISTING PUMP STATION SITE, TESC AND DEMOLITION PLAN

Drawing: D47-1
Sheet: 57 of 73
File: P15-10341_D47-1
Date: August 2016

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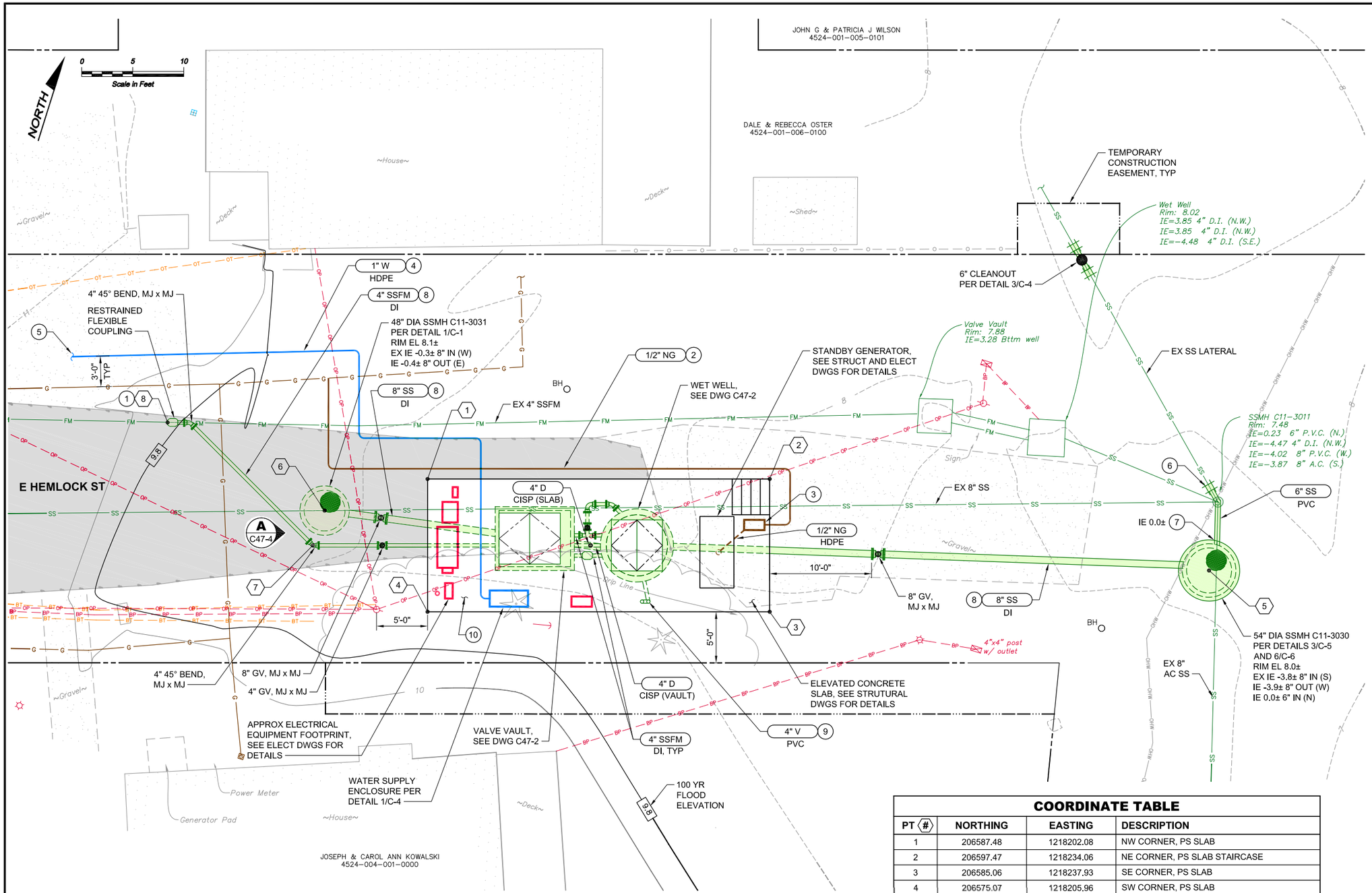

NOTES:

1. EXISTING PUMP STATION FACILITIES ARE SHOWN AND SHALL REMAIN IN SERVICE THROUGHOUT CONSTRUCTION. SEE DEMOLITION DWGS FOR DECOMMISSIONING, DEMOLITION, REMOVAL AND ABANDONING OF EXISTING PUMP STATION FACILITIES. SEE RESTORATION DWGS FOR FINISHED SITE AND RESTORATION PLAN.
2. SEE SPECIAL PROVISIONS SECTION 1-08.3(2)C FOR CONSTRUCTION SEQUENCING AND CONSTRAINTS.
3. MAINTAIN ACCESS TO EXISTING PUMP STATION AND SITE FACILITIES FOR COUNTY STAFF AND SERVICE TRUCKS AT ALL TIMES DURING CONSTRUCTION.
4. ALL SSFM PIPE AND VALVE JOINTS, FITTINGS AND COUPLINGS SHALL BE RESTRAINED.
5. INSTALL BURIED VALVES PER DETAIL 1/C-2.

CONSTRUCTION NOTES:

1. POTHOLE AND VERIFY CONNECTION DEPTH AND LOCATION PRIOR TO CONSTRUCTION. NEW FORCE MAIN SHALL SLOPE UP FROM VALVE VAULT TO CONNECTION POINT. NOTIFY ENGINEER OF ANY DISCREPANCY.
2. CASCADE NATURAL GAS WILL PROVIDE AND INSTALL NATURAL GAS PIPELINE, CONNECTION TO MAIN, AND METER. CONTRACTOR SHALL EXCAVATE TRENCH PER DETAIL 5/C-5 AND PROVIDE AND INSTALL REQUIRED BACKFILL AND RESTORE SURFACE. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS DOWNSTREAM OF METER. CONTRACTOR SHALL COORDINATE ALL PIPING AND APPURTENANCES INSTALLED BY CASCADE NATURAL GAS WITH EXISTING AND NEW PIPING AND FACILITIES TO AVOID CONFLICT.
3. FINAL LOCATION OF METER TO BE DETERMINED BY COUNTY CONSTRUCTION MANAGER AND ENGINEER IN FIELD.
4. MANCHESTER WATER DISTRICT WILL PROVIDE AND INSTALL ALL MATERIALS AND RESTORE SURFACE FROM CONNECTION TO EXISTING WATER MAIN TO NEW WATER METER. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS AND RESTORE SURFACE DOWNSTREAM OF NEW WATER METER. TRENCH SECTION PER DETAIL 5/C-5. CONTRACTOR SHALL COORDINATE ALL PIPING AND APPURTENANCES INSTALLED BY MANCHESTER WATER DISTRICT WITH EXISTING AND NEW PIPING AND FACILITIES TO AVOID CONFLICT.
5. CONTRACTOR TO INSTALL NEW WATER PIPING APPROXIMATE 110 LF TO NEW 3/4" WATER METER INSTALLED AT THE NE CORNER OF HEMLOCK AND NUBLING. RESTORE TRENCH SURFACE WITH EXISTING SOD/GRAVEL TO MATCH EXISTING.
6. CONNECT TO EXISTING 6" SEWER LATERAL WITH FLEXIBLE COUPLING. ROUTE TO NEW SSMH MATCHING EXISTING SLOPE, INSTALL BEND AS REQUIRED.
7. CORE DRILL AND SEAL WITH FLEXIBLE BOOT PER DETAIL 7/C-1.
8. SEE DRAWING C47-5 FOR PIPE PROFILE.
9. SEE DETAIL 4/C-5 FOR VENT LOCATION AND DETAILS.
10. MAINTAIN 8" CLEAR SPACE BETWEEN EDGE OF PUMP STATION SLAB AND ANY EQUIPMENT, PIPING AND OR CONCRETE PADS FOR A FUTURE CURB, FULL PERIMETER OF STRUCTURE.

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COORDINATE TABLE

PT #	NORTHING	EASTING	DESCRIPTION
1	206587.48	1218202.08	NW CORNER, PS SLAB
2	206597.47	1218234.06	NE CORNER, PS SLAB STAIRCASE
3	206585.06	1218237.93	SE CORNER, PS SLAB
4	206575.07	1218205.96	SW CORNER, PS SLAB
5	206601.76	1218277.80	MH CENTER, APPROXIMATE
6	206581.52	1218193.38	MH CENTER, APPROXIMATE
7	206577.93	1218193.29	45 DEGREE BEND, 4" SSFM
8	206585.19	1218176.09	CONNECT TO EX 4" SSFM, APPROXIMATE

SAMUEL ADAM SCHUYLER — STATE OF WASHINGTON — 39911 — REGISTERED PROFESSIONAL ENGINEER — 8-10-16

ERIK JAMES WHITEHOUSE — STATE OF WASHINGTON — 49545 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
	BUILDING PERMIT SUBMITTAL	04-2016	TJW	RAD
	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Designed: T. Whitehouse, P.E.
Drawn: S. Olsoe
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: 1" = 5'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

PUMP STATION AND PIPING PLAN

Drawing: C47-1
Sheet: 59 of 73
File: P15-10341_C47-1
Date: August 2016

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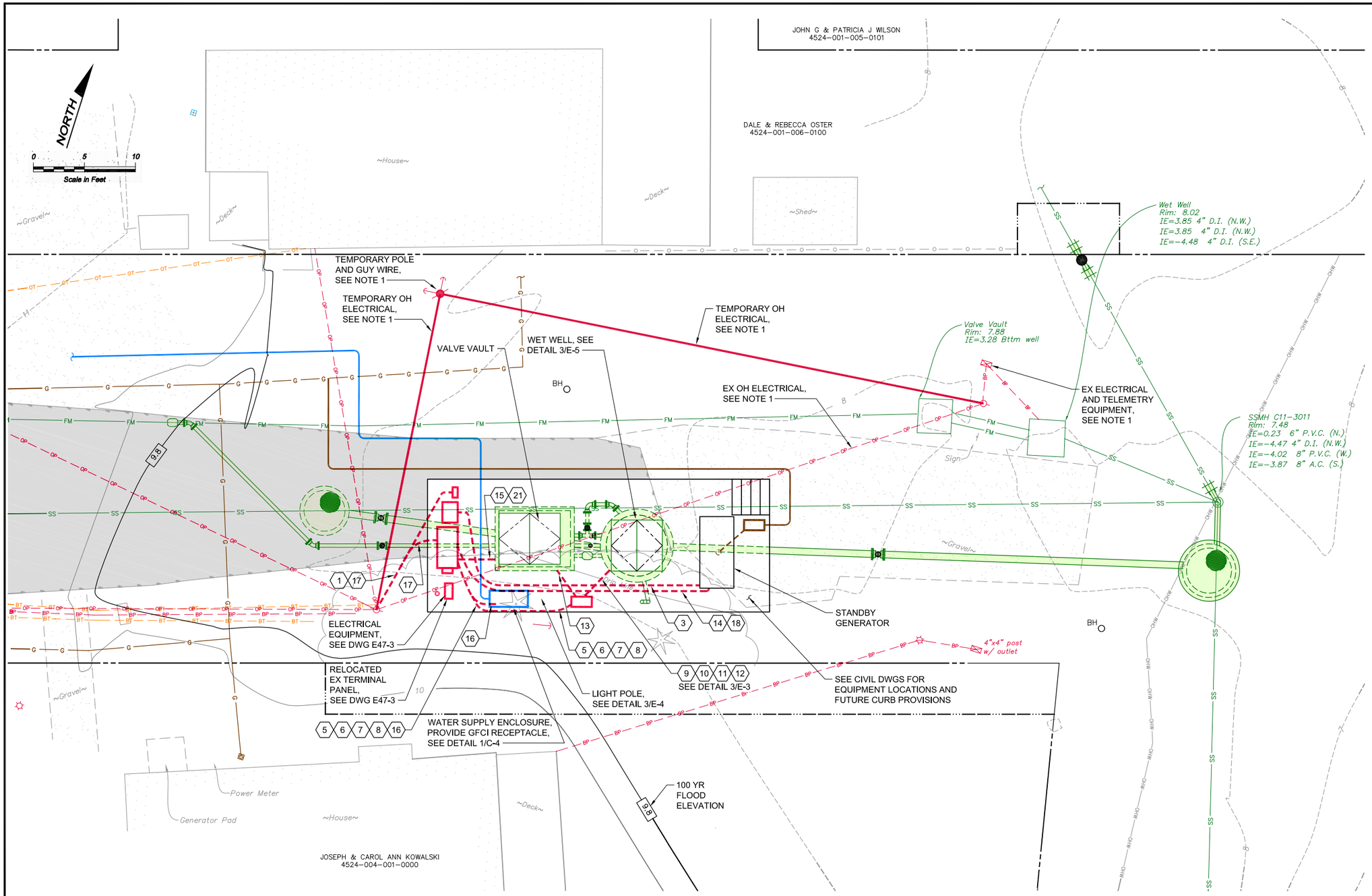

NOTES:

1. THE EXISTING PUMP STATION SHALL REMAIN IN SERVICE UNTIL FINAL COMMISSIONING OF NEW PUMP STATION. RELOCATE OVERHEAD SERVICE TO EXISTING PUMP STATION IF REQUIRED TO FACILITATE CONSTRUCTION OF NEW STATION. COORDINATE WITH ELECTRICAL UTILITY (PSE) AND PAY ALL FEES.

LEGEND:

- PROPOSED ELECTRICAL STRUCTURES & EQUIPMENT
- PROPOSED ELECTRICAL CONDUIT
- TEMPORARY ELECTRICAL
- # CONDUIT TAG - SEE DWG E-3

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UNDERGROUND SERVICE

JEFFREY S. GIBSON, STATE OF WASHINGTON, 13080, REGISTERED PROFESSIONAL ENGINEER
8-10-16

No.	Revision	Date	By	App'd
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Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

ELECTRICAL SITE PLAN

Drawing: E47-1
Sheet: 67 of 73
File: P15-10341_E47-1
Date: August 2016

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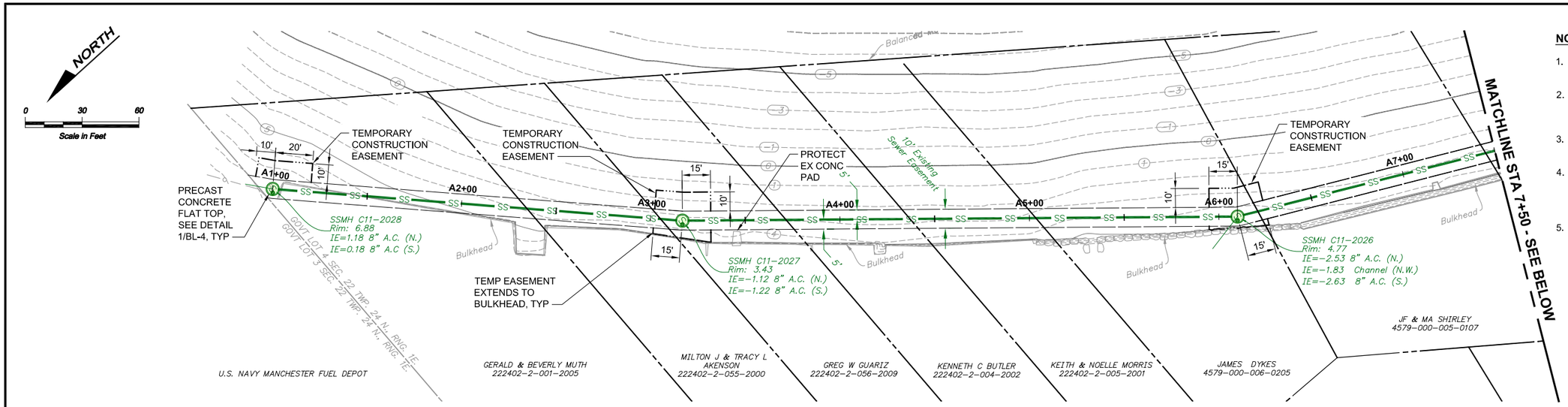
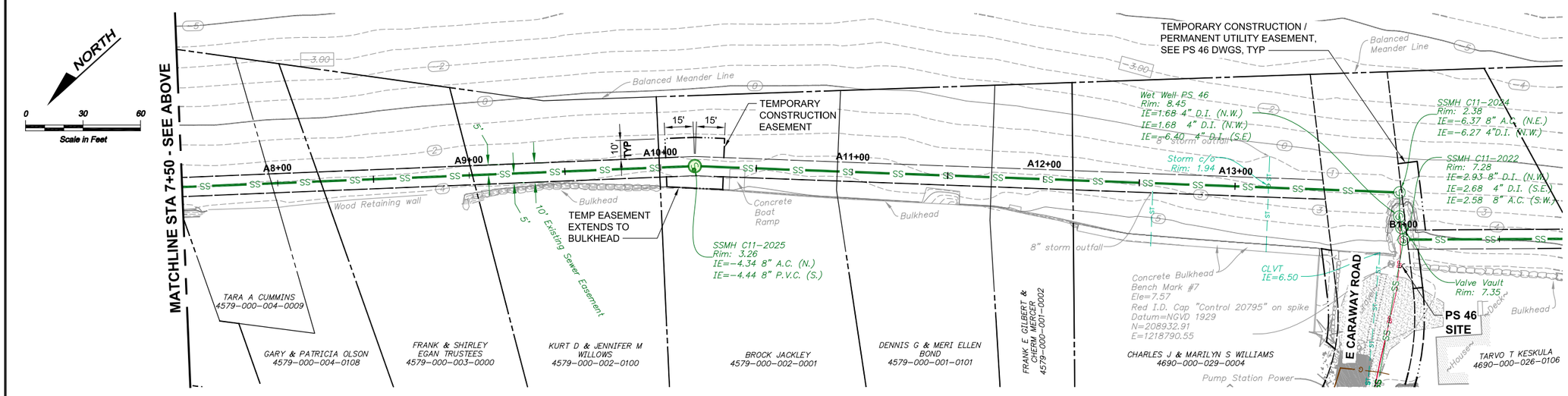


NOTES:

1. EXISTING PIPE MATERIAL CHANGES FROM PVC TO AC ABOUT 10'± SOUTH OF MH C11-2025.
2. ALL SERVICE LATERALS WILL BE UPGRADED WITH A TOP HAT LATERAL MAIN CONNECTION DURING CIPP INSTALLATION. SEE DETAIL 2/BL-4.
3. CONTRACTOR SHALL SUBMIT SEWER BYPASS PLAN PRIOR TO CIPP INSTALLATION.
4. CONTRACTOR SHALL RESTORE BEACH UPON COMPLETION OF IMPROVEMENTS TO EXISTING CONDITIONS PRIOR TO CONSTRUCTION OR BETTER.
5. REMOVE MISCELLANEOUS NON-NATIVE CONCRETE CHUNKS AND BASALT ROCK AT DIFFERENT LOCATIONS ALONG THE BEACH AS DIRECTED BY THE CONSTRUCTION MANAGER. SEE SPEC SECTION 02 41 10 FOR ADDITIONAL INFORMATION.



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CURED IN PLACE PIPE FOR SANITARY SEWER TABLE

UPSTREAM STATION	UPSTREAM MANHOLE	APPROX DEPTH TO PIPE INVERT	DOWNSTREAM STATION	DOWNSTREAM MANHOLE	APPROX DEPTH TO PIPE INVERT	EXISTING PIPE MATERIAL	PIPE SIZE	APPROX RUN LENGTH	APPROX # LATERALS TO REINSTATE
A1+00	C11-2028	6.70 FT	A3+17	C11-2027	4.55 FT	AC	8"	217 FT	2
A3+17	C11-2027	4.65 FT	A6+10	C11-2026	7.30 FT	AC	8"	293 FT	3
A6+10	C11-2026	7.40 FT	A10+18	C11-2025	7.60 FT	AC	8"	408 FT	6
A10+18	C11-2025	7.70 FT	A13+86	C11-2024	8.75 FT	PVC/AC, SEE NOTE 1	8"	368 FT	4

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Approved: R. Dorn, P.E.

Scale: 1" = 30'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
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MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

BEACH LINE SEWER RELINE PLAN STA A1+00 TO A13+86

Drawing: BL-1
Sheet: 70 of 73
File: P15-10341_BL-1
Date: August 2016

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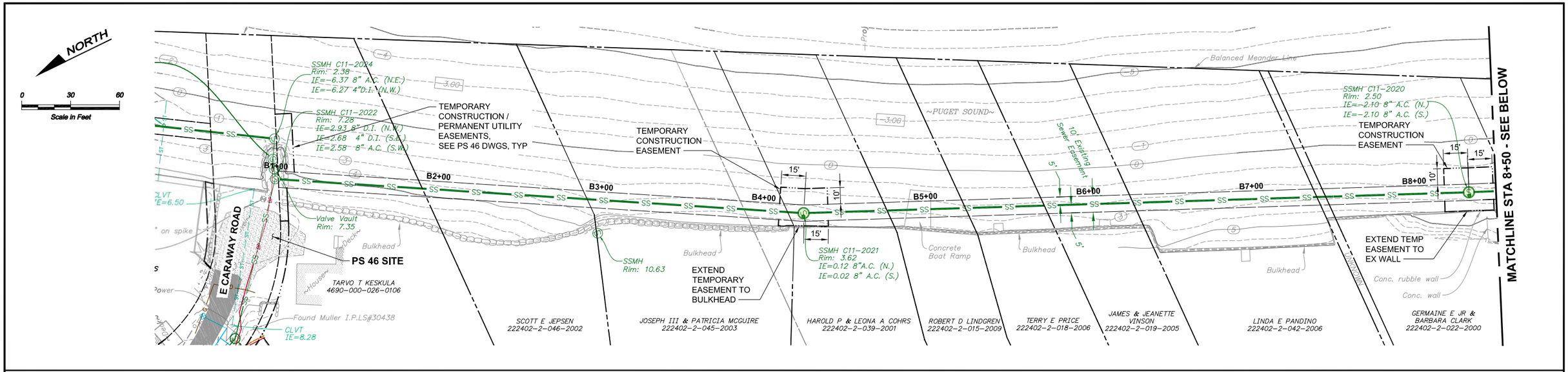
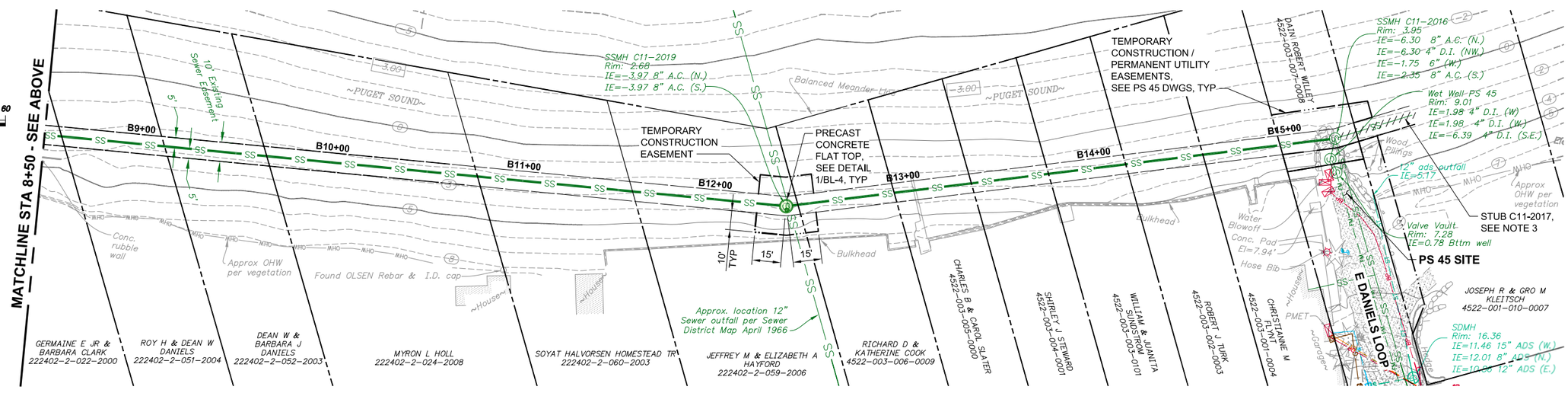
Xref Filename: | X15-10341_Beachline-Topo | X15-10341_Beachline-Ex Align-Prof | X15-10341_TB | Whitehouse | Schuyler_Adam | Dahl | Gibson | Schuyler_Erika | X15-10341_Beachline-Esmts | X15-10341_45-46-47-Esmts |





CURED IN PLACE PIPE FOR SANITARY SEWER TABLE

UPSTREAM STATION	UPSTREAM MANHOLE	APPROX DEPTH TO PIPE INVERT	DOWNSTREAM STATION	DOWNSTREAM MANHOLE	APPROX DEPTH TO PIPE INVERT	EXISTING PIPE MATERIAL	PIPE SIZE	APPROX RUN LENGTH	APPROX # LATERALS TO REINSTATE
B1+00	C11-2022	4.70 FT	B4+25	C11-2021	3.50 FT	AC	8"	325 FT	3
B4+25	C11-2021	3.60 FT	B8+34	C11-2020	4.60 FT	AC	8"	409 FT	5
B8+34	C11-2020	4.60 Ft	B12+38	C11-2019	6.65 FT	AC	8"	404 FT	6
B12+38	C11-2019	6.65 FT	B15+26	C11-2016	10.25 FT	AC	8"	288 FT	6

NOTES:

1. ALL SERVICE LATERALS WILL BE UPGRADED WITH A TOP HAT LATERAL MAIN CONNECTION DURING CIPP INSTALLATION.
2. CONTRACTOR SHALL SUBMIT SEWER BYPASS PLAN PRIOR TO CIPP INSTALLATION, SEE DETAIL 2/BL-4.
3. APPROXIMATELY 40± FEET OF 8" AC PIPE TO BE ABANDONED IN PLACE FROM SSMH C11-2016 TO STUB C11-2017 AND WILL NOT BE LINED WITH CIPP.
4. CONTRACTOR SHALL RESTORE BEACH UPON COMPLETION OF IMPROVEMENTS TO EXISTING CONDITIONS PRIOR TO CONSTRUCTION OR BETTER.
5. REMOVE MISCELLANEOUS NON-NATIVE CONCRETE CHUNKS AND BASALT ROCK AT DIFFERENT LOCATIONS ALONG THE BEACH AS DIRECTED BY THE CONSTRUCTION MANAGER. SEE SPEC SECTION 02 41 10 FOR ADDITIONAL INFORMATION.

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UNDERGROUND SERVICE

SAMUEL ADAM SCHUYLER, STATE OF WASHINGTON, 39991, REGISTERED PROFESSIONAL ENGINEER, 8-10-16

ERIKA K. SCHUYLER, STATE OF WASHINGTON, 41022, REGISTERED PROFESSIONAL ENGINEER, 8/10/16

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Scale: 1" = 30'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

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614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

BEACH LINE SEWER RELINE PLAN STA B1+00 TO B15+26

Drawing: BL-2
Sheet: 71 of 73
File: P15-10341_BL-2
Date: August 2016

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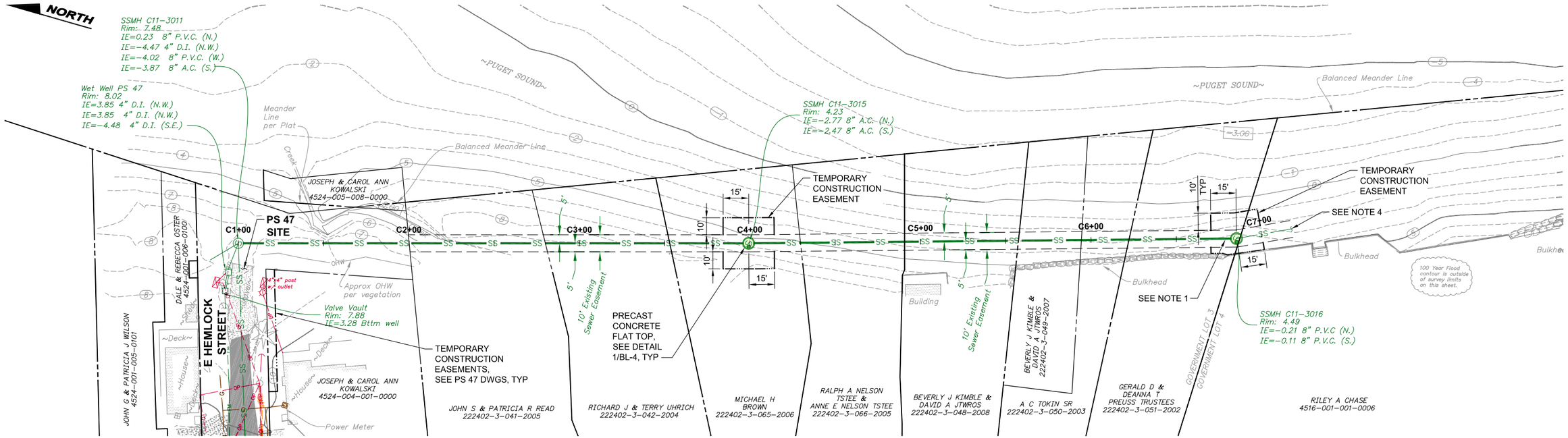
Xref Filename: | X15-10341_BeachLine-Topo | X15-10341_BeachLine-Ex Align-Prof | X15-10341_TB | Whitehouse | Schuyler_Adam | Dahl | Gibson | Schuyler_Erika | X15-10341_Be



CURED IN PLACE PIPE FOR SANITARY SEWER TABLE

UPSTREAM STATION	UPSTREAM MANHOLE	APPROX DEPTH TO PIPE INVERT	DOWNSTREAM STATION	DOWNSTREAM MANHOLE	APPROX DEPTH TO PIPE INVERT	EXISTING PIPE MATERIAL	PIPE SIZE	APPROX RUN LENGTH	APPROX # LATERALS TO REINSTATE
C1+00	C11-3011	11.35 FT	C3+99	C11-3015	7.00 FT	AC	8"	299 FT	3
C3+99	C11-3015	6.7 FT	C6+85	C11-3016	4.7 FT	AC/PVC, SEE NOTE 1	8"	286 FT	7

NOTES:

1. EXISTING PIPE MATERIAL CHANGES FROM AC TO PVC ABOUT ±10' NORTH OF MH C11-3016.
2. ALL SERVICE LATERALS WILL BE UPGRADED WITH A TOP HAT LATERAL MAIN CONNECTION DURING CIPP INSTALLATION, SEE DETAIL 2/BL-4.
3. CONTRACTOR SHALL SUBMIT SEWER BYPASS PLAN PRIOR TO CIPP INSTALLATION.
4. EXISTING 8" PVC PIPE EXTENDS SOUTH FROM SSMH C11-3016. THIS PIPE WILL NOT BE LINED WITH CIPP AND IS NOT INCLUDED IN THE PROJECT.
5. CONTRACTOR SHALL RESTORE BEACH UPON COMPLETION OF IMPROVEMENTS TO EXISTING CONDITIONS PRIOR TO CONSTRUCTION OR BETTER.
6. REMOVE MISCELLANEOUS NON-NATIVE CONCRETE CHUNKS AND BASALT ROCK AT DIFFERENT LOCATIONS ALONG THE BEACH AS DIRECTED BY THE CONSTRUCTION MANAGER. SEE SPEC SECTION 02 41 10 FOR ADDITIONAL INFORMATION.

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

SAMUEL ADAM SCHUYLER — STATE OF WASHINGTON — 39911 — REGISTERED PROFESSIONAL ENGINEER — 8-10-16

ERIKA K. SCHUYLER — STATE OF WASHINGTON — 41022 — REGISTERED PROFESSIONAL ENGINEER — 8/10/16

No.	Revision	Date	By	App'd
	ISSUED FOR BID	08-2016	TJW	RAD
	BUILDING PERMIT SUBMITTAL	04-2016	TJW	RAD
	ECOLOGY SUBMITTAL	02-2016	TJW	RAD

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Designed: E. Schuyler, P.E.
Drawn: P. Simon
Checked: A. Schuyler, P.E.
Approved: R. Dorn, P.E.

Scale: 1" = 30'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

MANCHESTER PUMP STATIONS 45, 46, & 47 AND BEACH LINES REHABILITATION

BEACH LINE SEWER RELINE PLAN STA C1+00 T0 C6+85

Drawing: BL-3
Sheet: 72 of 73
File: P15-10341-BL-3
Date: August 2016

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Path: S:\Cad\Kitsap County\15-10341 PS 45 46 47 BL Design\d Filename: P15-10341_BL-3 Plot date: Aug 11, 2016-09:35:04am CAD User: psimon.
Xref Filename: | X15-10341_BeachLine-Topo | X15-10341_BeachLine-Ex Align-Prof | X15-10341_TB | X15-10341_BeachLine-Esmts | Whitehouse | Schuyler_Adam | Dahl | Gibson | Schuyler_Erika | X15-10341_45-46-47-Esmts |