CITY OF FIFE

Public Works Department
5411 23rd Street East
Fife, WA 98424

City of Fife

Fountain Plaza

Bid Set Specifications

Contract Documents / Legal Documents (LD)
General Requirements – 2014 Standard Specifications & Special Provisions
Technical Specifications – Divisions 2-33

TCF Project No. 2013 - 008
April 20, 2015

TCF Architecture

PROJECT MANUAL

SPECIFICATIONS

FOR

City of Fife
Fountain Plaza

City of Fife
Public Works Department
5411 23rd Street East
Fife, WA 98424

The undersigned Architect of Record hereby certifies that the Technical Specifications (Divisions 02-12,) in this Bid Set Submittal, for the City of Fife Fountain Plaza Project were written by me, or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my Professional Seal and signature.

Architect
TCF Architecture, PLLC
902 North 2nd Street
Tacoma, WA 98403
Phone: (253) 572-3993
Fax: (253) 572-1445

The undersigned Engineer of Record hereby certifies that the Technical Specifications for the Electrical portions of this Project for the Bid Set Submittal for the City of Fife Fountain Plaza, were written by me, or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my Professional Seal and signature. Those sections prepared under my supervision and being certified by my seal and signature below are all electrical specifications in Divisions 26.

The undersigned hereby certifies that the Technical Specification Sections in this Project Manual and listed below were prepared by me or under direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my "Professional Seal."

221113 FACILITY WATER DISTRIBUTION PIPING
221313 FACILITY SANITARY SEWERS
311000 SITE CLEARING AND SITE DEMOLITION
312000 EARTHMOVING
312513 EROSION CONTROL
321313 CONCRETE PAVING, CURBS, AND WALKS
334100 STORM UTILITY DRAINAGE PIPING

Doreen S. Gavin, PE, LEED AP BD+C

Principal

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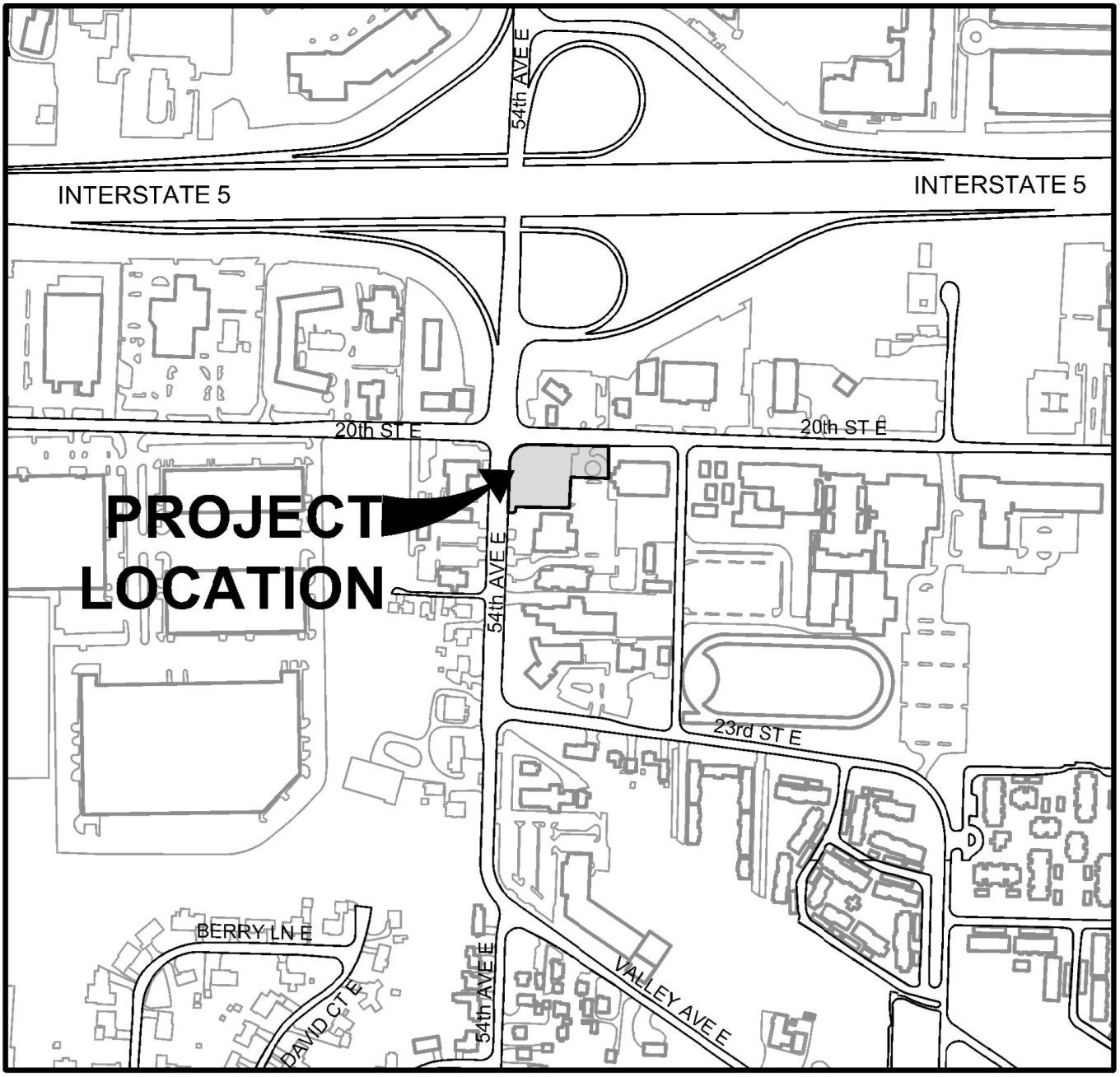
CITY OF FIFE

FOUNTAIN PLAZA



VICINITY MAP

NOT TO SCALE

ADVERTISEMENT FOR BIDS

Notice is hereby given that sealed bids will be received by the City of Fife City Hall up to the hour of 2:00 p.m. on **May 21**, **2015** for the **Fountain Plaza** and will then be opened and publicly read.

A Prebid Meeting will be held on-site at 1:30PM on Thursday May 14, 2015.

The Contract Documents describe the work in its entirety; in general the work consists of the following:

The Project generally includes the following:

- Fountain Plaza
  A portion of "Fountain Park," located at the southeast corner of the intersection of 54th Avenue East and 20th Street East, will be improved to create the new "Fountain Plaza," including clearing and site demolition, earthwork, stormwater drainage, concrete surfacing, landscaping, irrigation and site lighting. Improvements include a new concrete signage/street wall with a precast concrete cap, concrete stair, and metal railings.

  Fountain Relocation and Restoration
  The existing 100-year-old historic Fife Fountain will be relocated from its current location in the parking area, to the new Fountain Plaza, and will be restored at its new location. Additionally, the Fountain will be retrofitted to include a new plumbing system for an active fountain, lighting, and aluminum fabrications for grating within the Fountain.

Prevailing wage requirements are in effect.

Liquidated Damages: The Project must be physically completed within 70 working days. Liquidated damages of $1,000.00 will be assessed for each calendar day of delay in completion of the Project.

Bid proposals will be received only at City Hall located at **5411 23rd Street East, Fife, Washington**. Proposals received after **2:00p.m., May 21, 2015**, will not be considered.

Bid documents, plans, and specifications may be accessed at the following on-line plan service sites:

Fife City Hall
5411 23rd Street East
Fife, WA 98424
http://www.cityoffife.org/?p=city_departments&a=public_works&b=project_bids_and_awards

Builders Exchange of Washington
http://www.bxwa.com/

The Architect for the Project is TCF Architecture, PLLC. **The contact is Randy Cook, Managing Principal253-572-3993, or email at randy@tcfarchitecture.com. The City of Fife contacts for this project are Russ Blount, PE-Public Works Director and Ken Gill, PE-City Engineer. Russ can be reached at 253-922-2496 or rblount@cityoffife.org; Ken can be reached at 253-922-9315 or kgill@cityoffife.org.**

All bids shall be submitted on the prescribed bid forms and in the manner as stated in this advertisement and in the bid document and said bids shall be accompanied by a bid deposit in the form of cash, cashier's

check, certified check, postal money order, or a surety bond to the City of Fife in the amount of five percent (5%) of the total amount of the bid. **Bids submitted on other than the bond form provided by the City may be subject to rejection. Faxed bids and/or surety bond will not be accepted.**

Bids must be submitted in a sealed envelope with the outside clearly marked "sealed bid" with the bid opening date and time, and the project name as it appears in this advertisement and the name and address of the bidder. Bids shall be addressed to the **City Clerk, City of Fife, 5411 23rd Street, Fife, WA 98424**.

The City of Fife reserves the right to reject any or all bids and to waive irregularities in the bid or in the bidding.

No Bidder may withdraw his proposal after **2:00p.m., May 21, 2014**, or before award of Contract, unless said award is delayed for a period exceeding sixty (60) days.

Carol Etgen, MMC
City Clerk

Dates of Publication:

Tacoma News Tribune – April 30, 2015 and May 7, 2015.

INSTRUCTION TO BIDDERS

I. Execution of Contract

A. Execution of Contract:

1. Within 10 days after the date the lowest qualified Bidder receives notification of award, the lowest qualified Bidder shall execute and return the Contract and the required number of copies and shall furnish a performance and payment bond and insurance.

2. At the time of bid submittal, the Contractor shall notify the City in writing of the names of all proposed subcontractors and materials suppliers for the work.

B. Performance Bond/Payment Bond:

1. To be furnished at the time of delivery of the executed Contract.

2. To be in full amount of Contract price.

3. The surety must be authorized to do business in the State of Washington and be satisfactory to the City. Each bond must be approved in writing by the City Attorney.

C. Contract Insurance:

1. Work under the Contract shall not commence until the City has approved the Contractor's insurance. No subcontractors shall commence work until the City has approved subcontractor's insurance.

2. The Contractor and subcontractors shall obtain and maintain Workman's Compensation Insurance during the life of this Contract.

3. Contractor specifically waives its immunity under Title 51 of the Revised Code of Industrial Insurance Act for injuries to its employees, and indemnifies the City from liability for the action brought by those employees.

II. Legal Wages on Public Works

A. Statement of Intent to Pay Prevailing Wages:

1. The Contractor shall submit a Statement for the Contractor and each and every subcontractor to the Industrial Statistician of the Department of Labor and Industries for approval. A $25.00 fee payable to the Department of Labor and Industries shall be included for each statement submitted. Should force account work be authorized by the City, the Contractor shall, at his/her own expense, provide the City with a new statement of Intent to Pay Prevailing Wages if any changes have occurred since the issuance of the original Intent to Pay Prevailing Wages was filed.

2. For contracts in excess of $10,000, the Contractor shall post in a location readily visible to workers at the job site:

   a. A copy of the approved statement of Intent to Pay Prevailing Wages (Labor and Industries [L & I] Form F700-029-000).

b. The address and telephone number of the Industrial Statistician of the Department of Labor and Industries.

3. The statement of Intent to Pay Prevailing Wages shall include the Contractor's registration certificate number or UBI number and prevailing rate of wage for each classification of workers entitled to prevailing wages. Self-employed or owner/operator contractors or subcontractors who perform the actual work will be required to submit a statement regardless of the method of payment.

B. Affidavit of Wages Paid: Following final acceptance of the Project, the Contractor shall submit, for the Contractor and each and every subcontractor, an Affidavit of Wages Paid (L & I Form F700-007-000) form to the Industrial Statistician of the Department of Labor and Industries for approval. A $25.00 fee payable to the Department of Labor and Industries shall be included for each statement submitted. Self-employed or owner/operator contractors or subcontractors who perform the actual work will be required to submit an affidavit regardless of the method of payment.

III. Contract Payments

A. Progress payments, as permitted by the specifications, will be made by the City as work is accomplished. No payments will be made until a certified Intent to Pay Prevailing Wages for the Contractor and all subcontractors has been received by the City.

B. There will be reserved and retained from moneys earned by the Contractor, as determined by the progress estimates, a sum equal to five percent (5%) of such estimates. The retainage may be placed in an escrow or interest bearing account at the Contractor's request.

C. When all work has been completed to the satisfaction of the Department of Public Works, the final payment less retainage will be paid.

D. After acceptance of the contract work by the City Council, a Notice of Completion of Public Work Contract will be forwarded to the State Department of Revenue. The retainage will be held until approval of release from the State has been received or a 60-day period has elapsed, whichever is longer. No retainage may be released until the Affidavit of Wages Paid for Contractor and subcontractors is on file with the City and the City has received from the Department of Revenue a certificate that all taxes, increases, and penalties due have been paid (RCW 60.28.050).

E. After acceptance of the Project by the City Council, a Certificate of Completion will be issued by the City and forwarded to the Contractor. The Certificate will state the warranties and/or guarantees required by the Contract Documents. The issuance will signify the starting and completion of all warranties as may be required.

F. One month prior to expiration of the warranties and/or guarantees, the Public Works Department will conduct a final inspection of the Project. The Contractor will be notified of any material installed or item of work that has failed in accordance with said warranties and/or guarantees. The Contractor will repair said failures within ten (10) working days after notification.

IV. Substitutions During the Bid Period

A. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

B. No substitution will be considered unless written request for approval has been submitted and has been received by the Architect at his/her office at least ten (10) days prior to the date for receipt of bids. Substitution requests for civil, landscape, structural, kitchen, mechanical and electrical products shall be sent directly to those consultants, with a copy of the substitution request sent to the Architect.

C. Each such request shall be submitted with a "Request for Substitution" form, found in the Project Manual immediately following these Instructions To Bidders, and shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting fourth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

D. If the Architect approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner. Substitution request form returned by the Architect is a courtesy only, and bidders/sub-bidders shall rely solely on substitution approvals listed in an addenda.

E. Approval of substitutions after starting work will be made only in exceptional cases where the Contractor submits evidence satisfactory to the Architect that, through no fault of his/her own, specified or otherwise approved items cannot be obtained

SUBSTITUTION REQUEST FORM

TO:

_____

PROJECT: **City of Fife – Fountain Plaza**

We hereby submit for consideration, the following product instead of specified item for above project:

Section: _____ **Specified Item:** _____

Proposed Substitution: _____

Attach complete technical data, including laboratory tests and samples, as applicable.

Detailed comparison of the significant qualities (size, weight, durability, performance and similar characteristics, and including visual effect where applicable) for the proposed substitution in comparison with the original requirements.

List completely, installation changes and changes to Drawings and Specifications required by proposal.

Fill in Blanks Below:

A. Does substitution require change in Drawing dimensions? _____
_____

B. Will Undersigned pay for resulting building design changes including engineering and detailing costs?
_____

C. What effect does substitution have on other trades? _____
_____

D. Differences between proposed substitution and specified item? _____
_____

E. Manufacturer's guarantees and warranties of proposed and specified items are:

_____ Same _____ Different (Explain on attachment)

F. Name and address of 3 similar projects on which product was used, and date of installation: _____
_____
_____

G. Contract completion date is: _____ Same _____ Different (Explain on attachment)

Undersigned attests that the function and quality of the proposed items is equivalent or superior to the specified item and waives its rights to additional payment and time arising in any way from the substitution, including without limitation costs or time that may subsequently be necessitated by failure of the substitution to perform adequately, and for the required work to make corrections thereof.

Submitted by:

_____
Signature

_____
Firm

_____
Address

_____

Date _____

E-mail _____

Telephone & Fax _____

For use by Architect:

_____ Accepted _____ Accepted as Noted

_____ Not Accepted _____ Received Too Late

By _____

Date _____

Remarks _____

_____

_____

End of Form

BIDDER'S CHECKLIST

The following forms and information must be turned in at the time of the Bid opening:

1. Proposal (page LD-7), certify receipt of addenda (if any) in the space provided in the second paragraph.

2. Statement of Bidder's Qualifications (pages LD-8 and LD-9).

3. Proposed Subcontractors (pages LD-10).

4. Noncollusion Certificate (page LD-11), notary required.

5. Certificate as to Corporate Principal (page LD-12), notary required.

6. Bid Bond Form (page LD-13), attach Power of Attorney.

PROPOSAL

City of Fife
5411 23rd Street E
Fife, Washington 98424

Project: **City of Fife Fountain Plaza**

Date: _____

Total Base Bid Amount: _____ **Dollars**
(Including Washington State Sales Tax)

(repeated in written word form) _____

The undersigned, as Bidder, declare that we have personally examined the Project site in the City of Fife, and all of the plans, specifications, and Contract Documents herein contained, and that we will contract with the City of Fife on the form of agreement provided herewith to do everything necessary to perform and complete construction called for in the Contract for the construction of the Project listed above, at the price and on the terms and conditions herein contained in the Contract Documents. Total price for the Contract has been written in words followed by numbers in parentheses.

We agree that the following shall form a part of this proposal: Statement of Bidders Qualifications, Bid Schedule, Non-Collusion Certificate, and Certificate as to Corporate Principal. We acknowledge that addenda numbers _____ to _____ have been delivered to us and have been examined as part of the Contract Documents.

Attached is a proposal guaranty bond duly completed by a guaranty company authorized to carry on business in the state of Washington in the amount of at least five percent (5%) of the total amount of our proposal.

If our proposal is accepted, we agree to sign the Contract and to furnish the performance bond and the required evidence of insurance within ten (10) calendar days after receiving written notice of the award of the Contract. We acknowledge that the City of Fife may forfeit our bid deposit as liquidated damages in the event of our non-compliance with the requirements of this paragraph.

The Bidder agrees to prosecute the work in accordance with this Document and the Standard Specifications. Bidder further agrees to complete the Project within the allotted time as specified in the Contract.

The Bidder understands that the Owner reserves the right to reject any and all proposals, as well as increase or decrease the scope of work, in accordance with **Section 1-04 of the 2014 WSDOT** *Standard Specifications for Road, Bridge, and Municipal Construction*.

_____	_____
Bidder	Telephone
_____	_____
By Authorized Official	
_____	_____
Date	
_____	_____
Contractor's Registration No.	Business Address

All blank lines must be filled in to constitute a completed Bid Form.

STATEMENT OF BIDDER'S QUALIFICATIONS

Each Contractor bidding on work included in these Contract Documents shall prepare and submit the following data:

1. Name of Bidder: _____

2. Business Address: _____

3. How many years have you been engaged in the contracting business under the present firm name?
   _____
   _____

4. Number of contracts now in hand: _____ Total value of contracts: $_____

5. List of more important projects completed by your Company including approximate costs:
   _____
   _____
   _____
   _____

6. List your major equipment: _____
   _____
   _____
   _____
   _____

7. Key personnel to be assigned to project and experience: _____
   _____
   _____

8. References:

   Name and License No.: _____
   Address: _____
   Contact Person and Phone Number: _____

9. Bank References:

   Name: _____
   Address: _____
   Contact Person and Phone Number: _____

10. State of Washington Contractor Registration No.: _____

11. Expiration date of Contractor's Registration: _____

12. Contractor's Surety or Bonding Company: _____

13. Contractor's Agent's Address and Telephone Number: _____
    _____

14. Does the Contractor have the resources to start immediately?_____

15. In addition to the above mentioned bidder qualifications (items 1-15), each bidder must provide Supplemental Qualifications as stated in section 1-03.1(2) *Supplemental Qualifications Criteria* of the Special Provisions contained within the Contract Documents.

_____	_____
Company	Authorized Signature/Title

CITY OF FIFE

NONCOLLUSION CERTIFICATE

STATE OF WASHINGTON)
)ss
COUNTY OF PIERCE)

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 a proposal to the City of Fife for consideration in the award of a Contract on the improvement described as follows:

City of Fife Fountain Plaza

_____
Name of Firm

_____
Title

_____
Signature of Authorized Member

Sworn before me this
_____ day of _____, _____.

_____
(Notary Public) (Corporate Seal)

My commission expires _____, _____.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____ of the corporation named as Contractor in Agreement attached hereto; that _____ who signed said Agreement on behalf of the Contractor, was then _____ of said corporation; that said Agreement was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

By: _____

Title: _____

State of: _____

County of: _____

being duly sworn deposes and says that he is _____ of _____.
(Name of Organization)

Subscribed and sworn before me this
_____ day of _____, _____.

_____
(Notary Public)

My commission expires: _____, _____.

BID BOND FORM

Herewith find deposit in the form of a certified check, cashier's check, cash or bid bond, in the amount of $ _____ ($_____), which is not less than five percent (5%) of the total bid.

Sign here _____

.....

BID BOND

KNOW ALL PEOPLE BY THESE PRESENTS:

That I/we, _____ as Principal, and that I/we, _____ as Surety, are held firmly bound unto the City of Fife, Washington, as Obligee, in the penal sum of $_____ ($_____), for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, by these presents.

The condition of this obligation is such that if the Obligee shall make any award to the Principal for the **Fountain Plaza**, according to the terms of the proposal or bid made by the Principal thereto, and the Principal shall duly make and enter into a Contract with the Obligee in accordance with the terms of said proposal or bid and award and shall give bond for the faithful performance thereof, with Surety or Sureties approved by the Obligee; or if the Principal shall, in case of failure to do so, pay and forfeit to the Obligee the penal amount of the deposit specified in the call for bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the Surety shall forthwith pay and forfeit to the Obligee, as penalty and liquidated damages, the amount of this bond.

Signed, sealed, and dated this _____ day of _____, _____.

_____
Principal

_____
Surety

Note: Power of Attorney shall be attached.

_____
Attorney in Fact

.....

Received return deposit in the sum of $_____ ($_____)

Bond No.: _____

CONTRACT

THIS Agreement, made effective as of the _____ day of _____, 2014, between

CITY OF FIFE, WASHINGTON **("OWNER")**
5411 23rd Street East
Fife, WA 98424

Contact: Tel: Fax:

and

_____ **("CONTRACTOR")**

Contact: Tel: Fax:

Tax Id No.:

for the following Project:

Fife South Campus Master Plan, Fountain Plaza ("PROJECT")

The Owner and Contractor agree as follows:

1. Contract Documents. The Contractor shall complete the Project in accordance with the Contract Documents. The Contract Documents consist of the following in order of precedence:

a. Addenda
b. Contract Form
c. Proposal Form
d. Instructions to Bidders
e. Special Provisions
f. Drawings and technical specifications prepared by TCF Architecture, PLLC
g. Amendments to the 2014 WSDOT Standard Specifications Book
h. 2014 WSDOT Standard Specifications for Road, Bridge, and Municipal Construction, except Sections 1-04.2, 1-08.9, 1-08.10(1) – (4), 1-09.11, and 1-09.13.
i. Contracting Agency's Standard Plans or Details (if any).
j. WSDOT Standard Plans for Road, Bridge, and Municipal Construction

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Project by the Contractor. These Contract Documents complement each other in describing a complete work. Any requirement in one document binds as if stated in all. The Contractor shall provide any work or materials clearly implied in the Contract even if the Contract does not mention it specifically. If any part of the contract requires work that does not include a description of how the work will be performed, the work shall be performed in accordance with standard trade practices.

2. Date of Commencement and Physical Completion Date. The Contractor shall physically complete the Project within **70 calendar days** from receipt of the Notice to Proceed.

3. Contract Sum. Subject to additions and deductions by change order, the contract sum is the bid amount of $_____, including applicable tax. The contract sum shall include all items and services necessary for the proper execution and completion of the Project.

4. Liquidated Damages. Timely performance and completion of the work is essential to the Contracting Agency and time limits are of the essence. In the event Contractor fails to physically complete the work in 70 working days, plus any authorized extensions thereof, the Contractor shall pay Contacting Agency liquidated damages of $1,000.00 for each calendar day of delay in physical completion of the work. No deduction or payment of liquidated damages will, in any degree, release the Contractor from further obligations and liabilities to complete the entire contract.

5. Changes. After execution of the Contract, changes in the Project may be accomplished by change order. Owner, without invalidating the Contract, may order changes in the Project within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract completion date being adjusted accordingly. Change orders shall be in writing signed by the parties.

6. Payment and Performance Bond. Contractor shall make, execute, and deliver a good and sufficient bond equal to the amount of the full contract price with a surety company as surety, conditioned that Contractor shall faithfully perform all the provisions of this contract and pay all laborers, mechanics, and subcontractors and material men and all persons who supply such person or persons, or subcontractors, with provisions and supplies for the carrying on of such work, in the form included in the bid documents. This bond shall be filed with the Owner. The surety must agree to be bound by the laws of the State of Washington and subject to the jurisdiction of the State of Washington.

7. Permits, Fees, Notices, and Compliance with Laws.

7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for all permits, fees, licenses and inspections by governmental agencies necessary for the proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

7.2 Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules, and regulations, and lawful orders of public authorities applicable to performance of the Work.

7.3 Contractor shall obtain a City of Fife business license pursuant to the provisions of Chapter 5.01 FMC prior to receipt of written Notice to Proceed.

8. Termination of Contract. This Contract may be terminated by Owner at any time upon the default of the Contractor or upon public convenience, in which Contractor shall be entitled to just and equitable compensation for any satisfactory work completed prior to the date of termination. Contractor shall not be entitled to any reallocation of cost, profit or overhead. Contractor shall not in any event be entitled to anticipated profit on work not performed because of such termination. Contractor shall use its best efforts to minimize the compensation payable under this Contract in the event of such termination. If the contract is terminated for default, the Contractor shall not be entitled to receive any further payments under the contract until all work called for has been fully performed. Any extra cost or damage to Owner resulting from such default(s) shall be deducted from any money due or coming due to the Contractor. The Contractor shall bear any extra expenses incurred by Owner in completing the work, including all increased costs for

completing the work, and all damage sustained, or which may be sustained by Owner by reason of such default.

9. Warranty Contractor warrants that: (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required and permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract. The Contractor further agrees to correct any defects in materials, workmanship, or installation of the Work which shall develop or be discovered within one (1) year after final acceptance of the Work.

10. Indemnification/Hold Harmless. The Contractor shall defend, indemnify and hold Owner, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the sole negligence of Owner. Should a court of competent jurisdiction determine that this Agreement is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Contractor and Owner, its officers, officials, employees, and volunteers, the Contractor's liability hereunder shall be only to the extent of the Contractor's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes the Contractor's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this section shall survive the expiration or termination of this Agreement.

11. Independent Contractor. Contractor is and shall be at all times during the term of this Agreement an independent contractor.

12. Disputes. Any action for claims arising out of or relating to this Agreement shall be governed by the laws of the State of Washington. Venue shall be in Pierce County Superior Court.

13. Attorneys Fees. In any suit or action instituted to enforce any right granted in this Agreement, the substantially prevailing party shall be entitled to recover its costs, disbursements, and reasonable attorneys fees from the other party.

14. Extent of Agreement/Modification. This Agreement, together with attachments or addenda, represents the entire and integrated Agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. This Agreement may be amended, modified or added to only by written instrument properly signed by both parties.

OWNER: CITY OF FIFE	CONTRACTOR:
By: _____ *(Signature)*	By: _____ *(Signature)*
Name:_____ *(Printed Name)*	Name: _____ *(Printed Name)*
Date: _____	Title: _____
	Date: _____

PERFORMANCE & PAYMENT BOND WITH GUARANTY

Name of Project: **Fountain Plaza**

Contractor (Principal) _____

Project/Contract # _____

Surety _____

Bond Amount $_____

Bond #_____

1. Date and Parties

This performance and payment bond with guaranty is dated, for reference purposes only, the _____ day of _____, 20__ and is executed by _____ _____, as Principal(s), and _____, as Surety.

2. General Recitals

A. Principal has entered into a public works contract (the "Contract") with the City of Fife for certain work described as follows:

_____
_____

(the "Work").

B. This bond is furnished in accordance with RCW 39.08 to secure faithful performance of the Contract and payment of all persons covered under RCW 39.08.010.

3. Bond Amount

The Principal and the Surety agree and do jointly and severally bind themselves, their heirs, executors, administrators, and assigns, unto the City in the sum of _____ dollars ($ _____).

4. Agreement to Perform

A. Principal, his or its heirs, executors, administrators, successors, or assigns, shall abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract, and shall faithfully perform all the provisions of the Contract and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of the Contract that may hereafter be made, at the time and in the manner therein specified.

B. Principal shall pay all laborers, mechanics, and subcontractors and material suppliers, and all persons who shall supply such person or persons, or subcontractors, with provisions and supplies for the carrying on of such Work.

C. The Principal further agrees to correct any defects in materials, workmanship, or installation of the Work which shall develop or be discovered within one (1) year after final acceptance of the Work.

5. Indemnity Agreement

A. The Principal hereby agrees to indemnify and hold the City harmless from any and all claims that may be made against the City resulting directly or indirectly from any action or inaction of the Principal or his agents, employees or independent contractors relating directly or indirectly to work performed or to be performed under the terms of this agreement. This indemnity and hold harmless shall include City Costs related to defending against said claims, or in enforcing the terms of this agreement.

B. For purposes of this document, the term “City Costs” shall mean all City expenditures, obligations or debt incurred, including, but not limited to: construction, labor, equipment and material costs; City staff time; legal consultant fees; engineering consultant fees; financial consultant fees; publication, service or process and filing fees; mailing fees; cost of right-of way, real property and easement acquisition; and fees and costs to other governmental jurisdictions, that are made or incurred by the City, whether or not legal action is commenced.

6. Obligation of Surety

A. If the Principal (or any of the employees, subcontractors, or lower tier subcontractors of the Principal) fails to abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract, or fails to faithfully perform any of the provisions of the Contract or fails to well and truly perform and fulfill any of the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of the Contract that may hereafter be made, at the time and in the manner therein specified, then the Surety shall be liable to the City for City Costs resulting from said failure to perform, but not to exceed the Bond amount.

B. If the Principal (or any subcontractors or lower tier subcontractors of the Principal) fails to pay any laborers, mechanics, or subcontractors or material suppliers, and all persons who shall supply such person or persons, or subcontractors, with provisions and supplies for the carrying on of such Work, then the Surety shall be liable to the City for City Costs resulting from such failure to pay and to the persons covered by RCW 39.08.010, but not to exceed the Bond amount.

C. If the Principal fails to correct any defects in materials, workmanship, or installation of the Work which shall develop or be discovered within one (1) year after final acceptance of the Work, then the Surety shall be liable to the City for City Costs resulting from such failure, but not to exceed one tenth of the Bond amount.

D. The Surety agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any change, extension of tie, alterations or additions to the terms of the Contract or the Work or to the specifications.

E. The Surety agrees that modifications and changes may be made in the terms and provisions of the Contract without notice to Surety, and any such modifications or changes increasing the total amount to be paid to the Principal shall automatically increase the obligation of the Surety on this Bond in a like amount. However, such increase shall not exceed twenty-five percent (25%) of the original amount of this Bond without the consent of the Surety.

7. Address for Notices

All notices required hereunder shall be considered properly delivered when personally delivered, when received by facsimile, or on the third day following mailing, postage prepaid, certified mail, return receipt requested, to:

Principal:	Surety:
_____	_____
Name	Name
_____	_____
Street address	Street address
_____	_____
City, State and zip code	City, state and zip code
_____	_____
Facsimile number	Facsimile number

8. Default

A. If the Principal (or any of the employees, subcontractors, or lower tier subcontractors of the Principal) fails to faithfully, fully, and timely perform the Contract or any amendments thereto as required hereunder, or fails to pay any laborers, mechanics, or subcontractors or material suppliers, or any persons who shall supply such person or persons, or subcontractors, with provisions and supplies for the carrying on of such Work, then the City shall notify the Principal and the Surety that such failures must be cured to the satisfaction of the City Public Works Department within seven days from the date of the Notice, or such longer time as may be determined by the City Public Works Director. If the failures are not so cured and approved within the period stated in the notice then the Surety, upon written demand by the City, shall immediately tender to the City the full amount of the Bond (less any amount previously paid to claimants in accordance with RCW 39.08) and the City will complete the Work and/or make the payments, as the case may be, deduct from the amount tendered the City Costs, and refund the remainder, if any, to the Surety.

B. If the Principal fails to correct any defects in materials, workmanship, or installation of the Work, as required hereunder, then the City shall notify the Principal and Surety that the Work must be corrected to the satisfaction of the City Public Works Department within seven days from the date of the Notice, or such longer time as may be determined by the City Public Works Director. If the Work is not corrected and approved within the period stated in the notice, then the Surety, upon written demand by the City, shall immediately tender to the City one tenth of the Bond amount (or the total amount remaining on the Bond whichever is less), and the City will correct the Work, and deduct from the amount tendered the City Costs. The City shall retain the remainder until the end of the warranty period. If at the end of the warranty period the tendered monies have not been expended for City Costs associated with correction of Work, then the remaining amount shall be refunded to the Surety.

C. If the amount of the Bond is inadequate to pay for City Costs, either because the City Costs exceed the Bond amounts or the Surety is no longer solvent or fails to timely tender the appropriate amount, then the City shall forthwith notify the Principal and he shall tender the deficiency to the City within five days of said notification. If the City commences legal action to collect said deficiency then the prevailing party in said legal action shall be entitled to judgment for their reasonable costs and attorney fees incurred therein. Each Principal is jointly and severally liable for the obligations set forth herein.

9. Action by Claimants.

A. All such persons mentioned in RCW 39.08.010 shall have a right of action in his, her, or their own name or names on the Bond for work done by such laborers or mechanics, and for materials furnished or provisions and goods supplied and furnished in the prosecution of the Work: PROVIDED, That such persons shall not have any right of action on this Bond for any sum whatever, unless within thirty days from and after the completion of the Contract with an acceptance of the Work by the City Council, the laborer, mechanic or subcontractor, or material supplier, or person claiming to have supplied materials, provisions or goods for the prosecution of such Work, shall present to and file with the City a notice in writing in accordance with RCW 39.08.030.

B. Every person, firm or corporation furnishing materials, supplies or provisions to be used in the construction, performance, carrying on, prosecution or doing of any of the Work, shall, not later than ten days after the date of the first delivery of such materials, supplies or provisions to any subcontractor or agent of any person, firm or corporation having a subcontract for the construction, performance, carrying on, prosecution or doing of such Work, deliver or mail to the Principal a notice in writing stating in substance and effect that such person, firm or corporation has commenced to deliver materials, supplies or provisions for use thereon, with the name of the subcontractor or agent ordering or to whom the same is furnished and that the Principal and the Bond will be held for the payment of the same, and no suit or action shall be maintained in any court against the Principal or this Bond to recover for such material, supplies or provisions or any part thereof unless the provisions of this section and RCW 39.08.065 have been complied with.

10. Modification.

This document cannot be modified, nor the obligations created hereunder terminated, without the City's express written consent.

11. Governing Law--Venue.

Any action for claims arising out of or relating to this Agreement shall be governed by the laws of the State of Washington. Venue shall be in Pierce County Superior Court.

PRINCIPAL:

_____

By:_____

Title _____

SURETY:

_____

By:_____

Title _____

PRINCIPAL:

_____

By:_____

Title _____

Accepted by the City this _____ day of

_____, 20__.

By:_____

Title _____

[Power of Attorney must be attached to Bond]

DIVISION 1
SPECIAL PROVISIONS TO GENERAL REQUIREMENTS

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CITY OF FIFE SPECIAL PROVISIONS NOT APPLICABLE TO TECHNICAL SPECIFICATIONS DIVISIONS 2-33

INTRODUCTION TO THE SPECIAL PROVISIONS

(August 14, 2013 APWA GSP)

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 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 either 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 project-specific Special Provisions are not labeled as such. The GSPs are labeled under the headers of each GSP, with the effective date of the GSP and its source. For example:

(March 8, 2013 APWA GSP)
(April 1, 2013 WSDOT GSP)

Also incorporated into the Contract Documents by reference are:

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

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

DIVISION 1
GENERAL REQUIREMENTS

DESCRIPTION OF WORK

This Contract provides for the completion of the City of Fife Fountain Plaza, all in accordance with the attached Contract Plans, these Contract Provisions, and the Standard Specifications.

These Contract Documents describe the work in its entirety. The work consists of:

Fountain Plaza
A portion of "Fountain Park," on the corner of 54th Avenue East and 20th Street East, will be improved to create the new "Fountain Plaza," including clearing and site demolition, earthwork, stormwater drainage, concrete surfacing, landscaping, irrigation and site lighting. Other construction systems include a new concrete signage/street wall with a precast concrete cap, concrete stair, and metal railings.

Fountain Relocation and Restoration
The existing 100-year-old historic Fife Fountain will be relocated from its current location in the parking area east of Area B, to the new Fountain Plaza, and will be restored at its new location. Additionally, the Fountain will be retrofitted to include a new plumbing system for an active fountain, lighting, and aluminum fabrications for grating within the Fountain

1-01 DEFINITIONS AND TERMS

1-01.3 Definitions
(March 8, 2013 APWA GSP)

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

Dates

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.

Notice to Proceed Date

The date stated in the Notice to Proceed on which the 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.

Supplement this Section with the following:

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.

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.

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

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

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

Traffic

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

1-02 BID PROCEDURES AND CONDITIONS

1-02.1 Prequalification of Bidders

Delete this Section and replace it with the following:

1-02.1 Qualifications of Bidder
(January 24, 2011 APWA GSP)

Before award of a public works contract, a bidder must meet at least the minimum qualifications of RCW 39.04.350(1) to be considered a responsible bidder and qualified to be awarded a public works project.

1-02.2 Plans and Specifications
(June 27, 2011 APWA GSP)

Delete this section and replace it with the following:

Information as to where Bid Documents can be obtained or reviewed can be found in the Call for Bids (Advertisement for Bids) for the work.

After award of the contract, 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")	4	Furnished automatically upon award.
Contract Provisions	4	Furnished automatically upon award.
Large plans (e.g., 22" x 34")	4	Furnished only upon request.

Additional plans and Contract Provisions may be obtained by the Contractor from the source stated in the Call for Bids, at the Contractor's own expense.

1-02.4(2) Subsurface Information
(March 8, 2013 APWA GSP)
The second sentence in the first paragraph is revised to read:

The Summary of Geotechnical Conditions and the boring logs, <u>if and when included</u> as an appendix to the Special Provisions, shall be considered as part of the Contract.

1-02.5 Proposal Forms
(June 27, 2011 APWA GSP)

Delete this section and replace it with the following:

The Proposal Form provides for a Lump Sum Price Proposal. The bidder shall complete spaces on the proposal form including: the total bid amount; signatures; date; 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 Form unless otherwise specified.

1-02.6 Preparation of Proposal
(June 27, 2011 APWA GSP)

Supplement the second paragraph with the following:

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.

Delete the last paragraph, and replace it with the following:

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
(March 8, 2013 APWA GSP)

Supplement this section with the following:

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.

If so stated in the Contract Provisions, bidder must use the bond form included in the Contract Provisions.

Cash will not be accepted for a bid deposit.

1-02.9 Delivery of Proposal
(August 15, 2012 APWA GSP, Option A)

Delete this section and replace it with the following:

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

If the project has FHWA funding and requires DBE Written Confirmation Documents or Good Faith Effort Documentation, then to be considered responsive, the Bidder shall submit with their Bid Proposal, written Confirmation Documentation from each DBE firm listed on the Bidder's completed DBE Utilization Certification, form 272-056A EF, as required by Section 1-02.6.

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

1-02.13 Irregular Proposals
(March 13, 2012 APWA GSP)

Revise item 1 to read:

1. A proposal will be considered irregular and will be rejected if:
   a. The Bidder is not prequalified <u>when so required</u>;
   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.

1-02.14 Disqualification of Bidders

(March 8, 2013 APWA GSP, Option B)

Delete this Section and replace it with the following:

A Bidder will be deemed not responsible if the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended; or does not meet the following Supplemental Criteria:

1. **Delinquent State Taxes**

   A Criterion: The Bidder shall not owe delinquent taxes to the Washington State Department of Revenue without a payment plan approved by the Department of Revenue.

   B. Documentation: The 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 , or if they are so listed, they must submit a written payment plan approved by the Department of Revenue, to the Contracting Agency by the deadline listed below.

2. **Federal Debarment**

   A Criterion: The Bidder shall not currently be debarred or suspended by the Federal government.

   B. Documentation: The Bidder shall not be listed as having an "active exclusion" on the U.S. government's "System for Award Management" database (www.sam.gov).

3. **Subcontractor Responsibility**

   A Criterion: The Bidder's standard subcontract form shall include the subcontractor responsibility language required by RCW 39.06.020, and the Bidder shall have an established procedure which it utilizes to validate the responsibility of each of its subcontractors. The Bidder's subcontract form shall also include a requirement that each of its subcontractors shall have and document a similar procedure to determine whether the sub-tier subcontractors with whom it contracts are also "responsible" subcontractors as defined by RCW 39.06.020.

   B. Documentation: The Bidder, if and when required as detailed below, shall submit a copy of its standard subcontract form for review by the Contracting Agency, and a written description of its procedure for validating the responsibility of subcontractors with which it contracts.

4. **Prevailing Wages**

A Criterion: The Bidder shall not have a record of prevailing wage violations as determined by WA Labor & Industries in the five years prior to the bid submittal date, that demonstrates a pattern of failing to pay workers prevailing wages, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.

B. Documentation: The Bidder, if and when required as detailed below, shall submit a list of all prevailing wage violations in the five years prior to the bid submittal date, along with an explanation of each violation and how it was resolved. The Contracting Agency will evaluate these explanations and the resolution of each complaint to determine whether the violation demonstrate a pattern of failing to pay its workers prevailing wages as required.

5. **Claims Against Retainage and Bonds**

A Criterion: The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects in the three years prior to the bid submittal date, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its subcontractors, suppliers, and workers, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.

B. Documentation: The Bidder, if and when required as detailed below, shall submit a list of the public works projects completed in the three years prior to the bid submittal date that have had claims against retainage and bonds and include for each project the following information:

- Name of project
- The owner and contact information for the owner;
- A list of claims filed against the retainage and/or payment bond for any of the projects listed;
- A written explanation of the circumstances surrounding each claim and the ultimate resolution of the claim.

6. **Public Bidding Crime**

A Criterion: The Bidder and/or its owners shall not have been convicted of a crime involving bidding on a public works contract in the five years prior to the bid submittal date.

B. Documentation: The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder and/or its owners have not been convicted of a crime involving bidding on a public works contract.

7. **Termination for Cause / Termination for Default**

A Criterion: The Bidder shall not have had any public works contract terminated for cause or terminated for default by a government agency in the five years prior to the bid submittal date, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.

B. Documentation: The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder has not had any public works contract terminated for cause or terminated for default by a government agency in the five years prior to the bid submittal date; or if Bidder was terminated, describe the circumstances. .

8. **Lawsuits**

A Criterion: The Bidder shall not have lawsuits with judgments entered against the Bidder in the five years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency

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

As evidence that the Bidder meets the mandatory and supplemental responsibility criteria stated above, the apparent two lowest Bidders must submit to the Contracting Agency by 12:00 P.M. (noon) of the second business day following the bid submittal deadline, a written statement verifying that the Bidder meets all of the mandatory and supplemental criteria together with supporting documentation including but not limited to that detailed above (sufficient in the sole judgment of the Contracting Agency) demonstrating compliance with all mandatory and supplemental responsibility criteria. The Contracting Agency reserves the right to request such documentation from other Bidders as well, and to request further documentation as needed to assess Bidder responsibility. The Contracting Agency also reserves the right to obtain information from third-parties and independent sources of information concerning a Bidder's compliance with the mandatory and supplemental criteria, and to use that information in their evaluation. The Contracting Agency may (but is not required to) consider mitigating factors in determining whether the Bidder complies with the requirements of the supplemental criteria.

The basis for evaluation of Bidder compliance with these mandatory and supplemental criteria shall include any documents or facts obtained by Contracting Agency (whether from the Bidder or third parties) including but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly by the Contracting Agency from others for whom the Bidder has worked, or other public agencies or

private enterprises; and (iii) any additional information obtained by the Contracting Agency which is believed to be relevant to the matter.

If the Contracting Agency determines the Bidder does not meet the bidder responsibility criteria 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 two (2) business days of the Contracting Agency's determination by presenting its appeal and any additional information to the Contracting Agency. The Contracting Agency will consider the appeal and any additional information before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Contracting Agency will not execute a contract with any other Bidder until at least two business days after the Bidder determined to be not responsible has received the Contracting Agency's final determination.

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

1-02.15 Pre Award Information
(August 14, 2013 APWA GSP)

Revise this section to read:

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. <u>Obtain, and furnish a copy of, a business license to do business in the city or county where the work is located.</u>
7. Any other information or action taken that is deemed necessary to ensure that the bidder is the lowest responsible bidder.

1-03 AWARD AND EXECUTION OF CONTRACT

1-03.1(2) Supplemental Qualifications Criteria (New)

In addition, the Contracting Agency has established Contracting Agency-specific and/or project-specific supplemental criteria, in accordance with RCW 39.04.350(2), for determining Bidder responsibility, including the basis for evaluation and the deadline for appealing a determination that a Bidder is not responsible. These criteria are contained below and listed in the Advertisement for Bid:

- Supplemental Criteria 1: The Contractor shall have access to and commit to use a Series 600 (60 Metric Ton, or larger) track excavator, or similar equipment, for use in installing the main line sanitary sewer line.
- Supplemental Criteria 2: The Contractor shall have experience in installing gravity utility lines within a Public right-of-way or easement which contains existing utilities, in poor soil conditions with a high ground water table. Experience shall mean: that the field superintendent or foreman assigned to the project has successfully installed over 2,000 linear feet of gravity utility lines in non-granular soil conditions with a depth in excess of 18-feet where dewatering was required, within the last 5 years counting from the date of the bid submittal deadline.

As evidence that the Bidder meets the project specific responsibility criteria above, the apparent two lowest Bidders must submit to the Contracting Agency within 24 hours of the official bid tabulation by the City documentation demonstrating compliance with the above.

At a minimum documentation will include but is not limited to Construction drawings, Geotechnical Report and dewatering plans, time frame of construction, owner work was performed for, and a reference (name, title, phone number, e-mail address) whom is familiar with the work for the Contracting Agency to make contact with.

If the Contracting Agency determines the apparent low Bidder does not meet the project specific bidder responsibility criteria as defined 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 its appeal to the Contracting Agency. The Contracting Agency will consider the appeal before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Contracting Agency will not execute a contract with any other Bidder until at least two business days after the Bidder determined to be not responsible has received the final determination.

1-03.3 Execution of Contract

(October 1, 2005 APWA GSP)

Revise this section to read:

> <u>Copies of the Contract Provisions, including the unsigned Form of Contract, will be available for signature by the successful bidder on the first business day following award. The number of copies to be executed by the Contractor will be determined by the Contracting Agency.</u>

Within 10 calendar days after the award date, 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 20 additional calendar days for return of the documents, provided the Contracting Agency deems the circumstances warrant it.

1-03.4 Contract Bond
(October 1, 2005 APWA GSP)

Revise the first paragraph to read:

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, materialperson, 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).

1-04 SCOPE OF WORK

1-04.4 Changes

1-04.4(1) Minor Changes

This section is deleted in its entirety.

1-05 CONTROL OF WORK

1-05.4 Conformity With and Deviations from Plans and Stakes
(April 1, 2013 WSDOT GSP)

Section 1-05.4 is supplemented with the following:

Contractor Surveying - Roadway

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Project Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of the roadbed, drainage, surfacing, paving, channelization and pavement marking, illumination and signals, guardrails and barriers, and signing. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at the Contractors expense.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, the centerlines of all alignments, by placing hubs, stakes, or marks on centerline or on offsets to centerline at all curve points (PCs, PTs, and PIs) and at points on the alignments spaced no further than 50 feet.

3. Establish clearing limits, placing stakes at all angle points and at intermediate points not more than 50 feet apart. The clearing and grubbing limits shall be 5 feet beyond

the toe of a fill and 10 feet beyond the top of a cut unless otherwise shown in the Plans.

4. Establish grading limits, placing slope stakes at centerline increments not more than 50 feet apart. Establish offset reference to all slope stakes. If Global Positioning Satellite (GPS) Machine Controls are used to provide grade control, then slope stakes may be omitted at the discretion of the Contractor

5. Establish the horizontal and vertical location of all drainage features, placing offset stakes to all drainage structures and to pipes at a horizontal interval not greater than 25 feet.

6. Establish roadbed and surfacing elevations by placing stakes at the top of subgrade and at the top of each course of surfacing. Subgrade and surfacing stakes shall be set at horizontal intervals not greater than 50 feet in tangent sections, 25 feet in curve sections with a radius less than 300 feet, and at 10- foot intervals in intersection radii with a radius less than 10 feet. Transversely, stakes shall be placed at all locations where the roadway slope changes and at additional points such that the transverse spacing of stakes is not more than 12 feet. If GPS Machine Controls are used to provide grade control, then roadbed and surfacing stakes may be omitted at the discretion of the Contractor.

7. Establish intermediate elevation benchmarks as needed to check work throughout the project.

8. Provide references for paving pins at 25-foot intervals or provide simultaneous surveying to establish location and elevation of paving pins as they are being placed.

9. For all other types of construction included in this provision, (including but not limited to channelization and pavement marking, illumination and signals, guardrails and barriers, and signing) provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

10. Contractor shall determine if changes are needed to the profiles or roadway sections shown in the Contract Plans in order to achieve proper smoothness and drainage where matching into existing features, such as a smooth transition from new pavement to existing pavement. The Contractor shall submit these changes to the Project Engineer for review and approval 10 days prior to the beginning of work.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control, and descriptions of two additional primary control points for every additional three miles of project length. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
Slope stakes	±0.10 feet	±0.10 feet
Subgrade grade stakes set 0.04 feet below grade	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Stationing on roadway	N/A	±0.1 feet
Alignment on roadway	N/A	±0.04 feet
Surfacing grade stakes	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Roadway paving pins for surfacing or paving	±0.01 feet	±0.2 feet (parallel to alignment) ±0.1 feet (normal to alignment)

The Contracting Agency may spot-check the Contractor's surveying. These spot checks will not change the requirements for normal checking by the Contractor.

When staking roadway alignment and stationing, the Contractor shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances.

The Contractor shall calculate coordinates for the alignment. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the work. The Contracting Agency will require up to seven calendar days from the date the data is received.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Stakes shall be marked in accordance with Standard Plan A10.10. When stakes are needed that are not described in the Plans, then those stakes shall be marked, at no additional cost to the Contracting Agency as ordered by the Engineer.

1-05.7 Removal of Defective and Unauthorized Work
(October 1, 2005 APWA GSP)

Supplement this section with the following:

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.

1-05.11 Final Inspection

Delete this section and replace it with the following:

1-05.11 Final Inspections and Operational Testing

(October 1, 2005 APWA GSP)

1-05.11(1) Substantial Completion Date

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. The Engineer may also establish the Substantial Completion Date unilaterally.

If, after this inspection, the Engineer concurs with the Contractor that the work is substantially complete and ready for its 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 therefor.

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) Final Inspection and Physical Completion Date

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. 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 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.

1-05.11(3) Operational Testing

It is the intent of the Contracting Agency to have at the Physical Completion Date a complete and operable system. Therefore when the work involves the installation of machinery or other mechanical equipment; street lighting, electrical distribution or signal systems; irrigation systems; buildings; or other similar work it may be desirable for the Engineer to have the Contractor operate and test the work for a period of time after final inspection but prior to the physical completion date. Whenever items of work are listed in the Contract Provisions for operational testing they shall be fully tested under operating conditions for the time period specified to ensure their acceptability prior to the Physical Completion Date. During and following the test period, the Contractor shall correct any items of workmanship, materials, or equipment which prove faulty, or that are not in first class operating condition. Equipment, electrical controls, meters, or other devices and equipment to be tested during this period shall be tested under the observation of the Engineer, so that the Engineer may determine their suitability for the purpose for which they were installed. The Physical Completion Date cannot be established until testing and corrections have been completed to the satisfaction of the Engineer.

The costs for power, gas, labor, material, supplies, 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, when required by the Engineer, shall not affect a manufacturer's guaranties or warranties furnished under the terms of the contract.

Add the following new section:

1-05.12(1) One-Year Guarantee Period
(March 8, 2013 APWA GSP)

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. 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
(August 14, 2013 APWA GSP)

Delete the sixth and seventh paragraphs of this section.

1-05.15 Method of Serving Notices
(March 25, 2009 APWA GSP)

Revise the second paragraph to read:

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.

Add the following new section:

1-05.16 Water and Power
(October 1, 2005 APWA GSP)

The Contractor shall make necessary arrangements, and shall bear the costs for power and water necessary for the performance of the work, unless the contract includes power and water as a pay item.

Add the following new section:

1-05.17 Oral Agreements
(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.

Add the following new section:

1-05.18 Record Drawings

The Contractor shall maintain one set of full size plans for Record Drawings, updated with clear and accurate red-lined field revisions on a daily basis, and within 2 business days after receipt of information that a change in Work has occurred. The Contractor shall not conceal any work until the required information is recorded.

This Record Drawing set shall be used for this purpose alone, shall be kept separate from other Plan sheets, and shall be clearly marked as Record Drawings. These Record Drawings shall be kept on site at the Contractor's field office, and shall be available for review by the Contracting Agency at all times. The Contractor shall bring the Record Drawings to each progress meeting for review.

The preparation and upkeep of the Record Drawings is to be the assigned responsibility of a single, experienced, and qualified individual. The quality of the Record Drawings, in terms of accuracy, clarity, and completeness, is to 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. Items that must be shown on the markups include but are not limited to:

- Actual dimensions, arrangement, and materials used when different than shown in the Plans.
- Changes made by Change Order or Field Order.
- Changes made by the Contractor.
- Accurate locations of storm sewer, sanitary sewer, water mains and other water appurtenances, 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.).

If the Contract calls for the Contracting Agency to do all surveying and staking, the Contracting Agency will provide the elevations at the tolerances the Contracting Agency requires for the Record Drawings.

When the Contract calls for the Contractor to do the surveying/staking, the applicable tolerance limits include, but are not limited to the following:

	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

Making Entries on the Record Drawings:

- Use erasable colored pencil (not ink) for all markings on the Record Drawings, conforming to the following color code:
- Additions - Red
- Deletions - Green
- Comments - Blue
- Dimensions - Graphite
- 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.
- Date all entries.
- 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 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. The Contractor shall submit final Record Drawings to the Contracting Agency. Contracting Agency acceptance of the Record Drawings is one of the requirements for achieving Physical Completion.

1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.1 Laws to be Observed
(October 1, 2005 APWA GSP)

Supplement this section with the following:

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 Industrial Safety and Health Act of 1973 (WISHA).

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.

1-07.2 State Taxes

Delete this section, including its sub-sections, in its entirety and replace it with the following:

1-07.2 State Sales Tax
(June 27, 2011 APWA GSP)

The Washington State Department of Revenue has issued special rules on the State sales tax. Sections 1-07.2(1) through 1-07.2(3) 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 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).

1-07.7 Load Limits

(March 13, 1995 WSDOT GSP)

Section 1-07.7 is supplemented with the following:

If the sources of materials provided by the Contractor necessitates hauling over roads other than State Highways, the Contractor shall, at the Contractor's expense, make all arrangements for the use of the haul routes.

1-07.13(4) Repair of Damage

Section 1-07.13(4) is revised to read:

The Contractor shall promptly repair all damage to either temporary or permanent work as directed by the Engineer. For damage qualifying for relief under Sections 1-07.13(1), 1-07.13(2) or 1-07.13(3), payment will be made in accordance with Section 1-04.4. Payment will be limited to repair of damaged work only. No payment will be made for delay or disruption of work.

1-07.15 Temporary Water Pollution/Erosion Control

1-07.15(1) Spill Prevention, Control, and Countermeasures Plan

Delete the heading "Payment" and all paragraphs of Section 1-07.15(1) that follow:

1-07.17 Utilities and Similar Facilities

Section 1-07.17 is supplemented with the following:

Contractor shall maintain operational service to all public utilities in as continuous a manner as possible. Where services are to be shut down, Contractor shall notify affected parties in writing a minimum of 3 working days in advance of the time and period of shutdown. Contractor shall make every effort to schedule shutdowns to periods of anticipated minimum usage. No utility will be allowed to be shut down for more than 6 hours per day.

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

Public and private utilities or their contractors will furnish all work necessary to adjust, relocate, replace or construct their facilities unless otherwise provided for in the Plans or these Special Provisions. Such adjustment, relocation, replacement or construction will be done during the prosecution of the work for this project.

The following telephone numbers of utility companies known or suspected of having facilities within the project limits are supplied for the Contractor's convenience:

Buried Cable Locating Assistance:	(800) 424-5555
Qwest / Century Link	811
Puget Sound Energy:	(800) 321-4123
City of Fife Public Works Department:	(253) 922-9315

The Contractor shall give forty-eight (48) hours' notice to all utility companies/agencies involved where work is to take place and in all other respects comply with the provisions of Chapter 19.122 RCW. Notice shall include, but not be limited to, the utility companies/agencies serving the area.

If any damage is done to an existing utility, the Contractor shall notify an authority of the particular utility company involved. That utility will dispatch a crew to repair the damages at

the Contractor's expense, or authorize the Contractor to repair the damage at his (the Contractor's) expense. The Contractor shall repair all damaged City-owned utilities in accordance with the Contract Documents. The Contractor shall immediately notify the City of Fife Construction Inspector when any damage occurs to any existing utility

1-07.18 Public Liability and Property Damage Insurance

Delete this section in its entirety, and replace it with the following:

1-07.18 Insurance
(January 24, 2011 APWA GSP)

1-07.18(1) General Requirements

A. The Contractor shall obtain the insurance described in this section from insurers approved by the State Insurance Commissioner pursuant to RCW Title 48. The insurance must be provided by an insurer with a rating of A-: VII or higher in the A.M. Best's Key Rating Guide, which is licensed to do business in the state of Washington (or issued as a surplus line by a Washington Surplus lines broker). 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.

B. 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 (see C. below).

C. 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.

D. The insurance policies shall contain a "cross liability" provision.

E. The Contractor's and all subContractors' insurance coverage shall be primary and non-contributory insurance as respects the Contracting Agency's insurance, self-insurance, or insurance pool coverage.

F. The Contractor shall provide the Contracting Agency and all Additional Insureds with written notice of any policy cancellation, within two business days of their receipt of such notice.

G. Upon request, the Contractor shall forward to the Contracting Agency a full and certified copy of the insurance policy(s).

H. The Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by the Contracting Agency.

I. 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.

J. 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):

- the Contracting Agency and its officers, elected officials, employees, agents, and volunteers
- TCF Architecture, PLLC and its subconsultants associated with this project.

The above-listed entities shall be additional insured(s) 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.

1-07.18(3) Subcontractors

Contractor shall ensure that each subcontractor of every tier obtains and maintains at a minimum the insurance coverages listed in 1-07.18(5)A and 1-07.18(5)B. 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 Certificate(s) of Insurance and endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the work. The certificate and endorsements 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 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 <u>not</u> satisfy this requirement.
3. Any other amendatory endorsements to show the coverage required herein.

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

A policy of Commercial General Liability Insurance, including:

Per project aggregate
Premises/Operations Liability
Products/Completed Operations – for a period of one year following final acceptance of the work.
Personal/Advertising Injury
Contractual Liability
Independent Contractors Liability
Stop Gap / Employers' Liability
Explosion, Collapse, or Underground Property Damage (XCU)
Blasting (only required when the Contractor's work under this Contract includes exposures to which this specified coverage responds)

Such policy must provide the following minimum limits:

$1,000,000	Each Occurrence
$2,000,000	General Aggregate
$1,000,000	Products & Completed Operations Aggregate
$1,000,000	Personal & 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

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

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.

1-07.18(5)E All Risk Builder's Risk

1. *(May 10, 2006 APWA GSP)*

Contractor shall purchase and maintain Builders Risk insurance covering interests of the Contracting Agency, the Contractor, Subcontractors, and Sub-subcontractors in the work. Builders Risk insurance shall be on a all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including flood, earthquake, theft, vandalism, malicious mischief and collapse. The Builders Risk insurance shall include coverage for temporary buildings, debris removal, and damage to materials in transit or stored off-site. Such insurance shall cover "soft costs" including but not limited to design costs, licensing fees, and architect's and engineer's fees. Builders Risk insurance shall be written in the amount of the completed value of the project, with no coinsurance provisions.

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

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 any of their Subcontractors, Sub-subcontractors, agents and employees, each of the other, for damages caused by fire or other perils to the extent covered by Builders Risk insurance or other property insurance applicable to the work. The policies shall provide such waivers by endorsement or otherwise.

1-07.18(5)F Excess or Umbrella Liability

2. (May 10, 2006 APWA GSP)

The Contractor shall provide Excess or Umbrella Liability coverage at limits of $$1$$ million per occurrence and annual aggregate. This excess or umbrella liability coverage shall apply, at a minimum, to both the Commercial General and Auto insurance policy coverage.

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

1-07.18(5)G Pollution Liability

(May 10, 2006 APWA GSP)

The Contractor shall provide a 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:

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

Such Pollution Liability policy shall provide the following minimum coverage:

$$1$$ each loss and annual aggregate

1-07.23 Public Convenience and Safety

1-07.23(1) Construction Under Traffic

The second paragraph of this section is to be revised as follows:

To disrupt public traffic as little as possible, the Contractor shall permit traffic to access driveways, unless:

1. The property owners and tenants have been provided 48-hours written notification of driveway closure, and
2. Construction activities are accruing directly in front of the driveway access.

Driveway closures will be allowed for a maximum of 4-hours and only during working hours, unless written approval has been granted by the City.

All property owners and tenants whose access route is restricted due to detours shall be provide written notice by the contractor. The Written notice shall provide the detour route, dates and times in which the detour will be in-place.

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. 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. Maintain the striping on the roadway at the Contractors expense. 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.
3. Maintain existing permanent signing. Repair of signs will be at the Contracting Agency's expense, except those damaged due to the Contractor's operations.
4. Keep drainage structures clean to allow for free flow of water. Cleaning of existing drainage structures will be at the Contracting Agency's expense when approved by the Engineer, except when flow is impaired due to the Contractor's operations.
5. The Contractor shall maintain adequate access through parking area to the east of Site Area A, and shall not disrupt fire access required by the Pierce County Fire Department to their Facility.

1-07.23(3) Communication/Dissemination of Information (new)

The following section is to be added:

The Contractor will attend a weekly construction meeting throughout the duration of the project. Information regarding schedule specifics, traffic disruptions, and water and sewer service disruptions will be provided by the Contractor and reviewed at such meetings

The Contractor will provide and distribute adequate written notice (two working days at a minimum) prior to driveway closures or utility shutdowns.

The Contractor will provide Owner/Engineer a minimum five (5) working day written notice prior to utility (i.e., sewer and water) shut-offs to specific properties.

1-07.24 Rights of Way

(October 1, 2005 APWA GSP)

Delete this section in its entirety, and replace it with the following:

Street right of way lines, limits of easements, and limits of construction permits are indicated in the Plans. The Contractor's construction activities shall be confined within these limits, unless arrangements for use of private property are made.

Generally, the Contracting Agency will have 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 in the Bid Documents 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 may be included in the Contract Provisions or made available to the Contractor as soon as practical after they have been obtained by the Engineer.

Whenever easements or rights of entry have not been acquired prior to advertising, these areas are so noted in the Plans. The Contractor shall not proceed with any portion of the work in areas where right of way, easements or rights of entry have not been acquired until the Engineer certifies to the Contractor that the right of way or easement is available or that the right of entry has been received. If the Contractor is delayed due to acts of omission on the part of the Contracting Agency in obtaining easements, rights of entry or right of way, the Contractor will be entitled to an extension of time. The Contractor agrees that such delay shall not be a breach of contract.

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, 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 Completion Date will be established.

1-08 PROSECUTION AND PROGRESS

Add the following new section:

1-08.0 Preliminary Matters
(May 25, 2006 APWA GSP)

Add the following new section:

1-08.0(1) Preconstruction Conference
(October 10, 2008 APWA GSP)

Prior to the Contractor beginning the work, a preconstruction conference will be held between the Contractor, the 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 of all lump sum items in a Schedule of Values;
2. A preliminary schedule of working drawing submittals; and
3. A list of material sources for approval if applicable.

Add the following new section:

1-08.0(2) Hours of Work
(March 8, 2013 APWA GSP)

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

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

Permission to work between the hours of 10:00 p.m. and 7:00 a.m. during weekdays and between the hours of 10:00 p.m. and 9:00 a.m. on weekends or holidays may also be subject to noise control requirements. Approval to continue work during these hours may be revoked at any time the Contractor exceeds the 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. 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:

- 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.
- On non-Federal aid projects, requiring the Contractor to reimburse the Contracting Agency for the costs in excess of straight-time costs for Contracting Agency representatives who worked during such times.
- Considering the work performed on Saturdays, Sundays, and holidays as working days with regard to the contract time.
- Considering multiple work shifts as multiple working days with respect to contract time, even though the multiple shifts occur in a single 24-hour period.

Add the following new section:

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 an inspector will be present, and a survey crew may be required at the discretion of the Engineer. In such case, the Contracting Agency may deduct from amounts due or to become due to the Contractor for the costs in excess of the straight-time costs for employees of the Contracting Agency required to work overtime hours.

The Contractor by these specifications does hereby authorize 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(2) Progress Schedule Types

1-08.3(2)B Type B Progress Schedule

Delete the 1st sentence of Section 1-08.3(2)B and replace with the following:

The Contractor shall submit a preliminary Type B Progress Schedule no later than 5 calendar days prior to the Preconstruction Conference.

1-08.3(4) Measurement

Delete this Section 1-08.3(4)

1-08.3(5) Payment

Revise Section 1-08.3(5) as follows:

All cost for Providing Type B Progress Schedules and Weekly Look-Ahead Schedules are considered incidental to other items of Work in the Contract. Monthly Progress Payments will not be processed unless the required schedules are complete and updated as required.

1-08.4 Prosecution of Work

Delete this section in its entirety, and replace it with the following:

1-08.4 Notice to Proceed and Prosecution of Work

(June 27, 2011 APWA GSP)

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 work until the Notice to Proceed has been given by the Engineer. The Contractor shall commence construction activities on the project site within ten days of the Notice to Proceed 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.

When shown in the Plans, the first order of work shall be the installation of high visibility fencing to delineate all areas for protection or restoration, as described in the Contract. Installation of high visibility fencing adjacent to the roadway shall occur after the placement of all necessary signs and traffic control devices in accordance with 1-10.1(2). Upon construction of the fencing, the Contractor shall request the Engineer to inspect the fence. No other work shall be performed on the site until the Contracting Agency has accepted the installation of high visibility fencing, as described in the Contract.

1-08.5 Time for Completion

(August 14, 2013 APWA GSP, Option A)

Revise the third and fourth paragraphs to read:

Contract time shall begin on the first working day following <u>the Notice to Proceed Date</u>.

This Project shall be physically completed within 70 working days.

Each working day shall be charged to the contract as it occurs, until the contract work is physically complete. If substantial completion has been granted and all the authorized working days have been used, charging of working days will cease. 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. Within 10 calendar days after the date of each statement, the Contractor shall file a written protest of any alleged discrepancies in it. 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. By not filing such detailed protest in that period, the Contractor shall be deemed as having accepted the statement as correct. <u>If the</u>

Contractor is approved 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.

Revise the sixth paragraph to read:

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 before the Completion Date can be established:

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. Certified Payrolls (per Section 1-07.9(5)).
   b. Material Acceptance Certification Documents
   c. Quarterly Reports of Amounts Credited as DBE Participation, as required by the Contract Provisions.
   d. Final Contract Voucher Certification
   e. Copies of the approved "Affidavit of Prevailing Wages Paid" for the Contractor and all Subcontractors
   f. Property owner releases per Section 1-07.24

1-08.7 Maintenance During Suspension

Revise the second paragraph to read:

At no expense to the Contracting Agency, the Contractor shall provide through the construction area a safe, smooth, and unobstructed roadway, sidewalk, and path for public use during suspension (as required in Section 1-07.23 or the Special Provisions). This may include a temporary road or detour.

1-09 MEASUREMENT AND PAYMENT

1-09.6 Force Account

(October 10, 2008 APWA GSP)

Supplement this section with the following:

The Contracting Agency has estimated and included in the Proposal, dollar amounts for all items to be paid per force account, only to provide a common proposal for Bidders. All such dollar amounts are to 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 those estimates. Payment will be made on the basis of the amount of work actually authorized by Engineer.

1-09.7 Mobilization

Delete this Section in its entirety:

1-09.8 Payment For Material On Hand

Item 3 in the first paragraph of this Section is revised as follows:

Only Pipe, Manholes, Catch Basins, water valves, and fire hydrants will be considered for payment under Materials On Hand.

The last paragraph of Section 1-09.8 is revised to read:

The Contracting Agency will not pay for material on hand when the invoice cost is less than $2,000. As materials are used in the work, credits equaling the partial payments for them will be taken on future estimates. Each month, no later than the estimate due date, the Contractor shall submit a letter to the Project Engineer that clearly states:

a. the amount originally paid on the invoice (or other record of production cost) for the items on hand,
b. The bid item the materials are to be used under.
c. The dollar amount of the material incorporated into each of the various work items for the month, and
d. The amount that should be retained in material on hand items. If work is performed on the items and the Contractor does not submit a letter, all of the previous material on hand payment will be deducted on the estimate. Partial payment for materials on hand shall not constitute acceptance. Any material will be rejected if found to be faulty even if partial payment for it has been made.

1-09.9 Payments

(March 13, 2012 APWA GSP)

Delete the first four paragraphs and replace them with the following:

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, using the Schedule of Values listing indicated below, 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. 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. Lump Sum Items in the Schedule of Values — partial payment for lump sum Bid items will be a percentage of the price in the Proposal based on the Engineer's determination of the amount of Work performed, with consideration given to, but not exclusively based on, the Contractor's lump sum breakdown for that item.
2. Materials on Hand — 100 percent of invoiced cost of material delivered to Job site or other storage area approved by the Engineer.
3. 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), on non FHWA-funded projects;
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.

Supplement this section with the following:

The following listing shall be used by the Contractor as a minimum breakdown for Schedule of Values items required for the Project:

Schedule of Values Listing

Contractor Overhead
Mobilization
Bonds/Insurance (Actual amounts)
Submittals
Punch List and Closeout
Temporary Facilities (water, power, fencing, etc.)
Supervision
Concrete Reinforcement
Concrete – foundations, footings
Concrete – Walls, stairs
Concrete – Sidewalks, plaza
Precast Concrete – Materials
Precast Concrete – Labor
Metal Fabrications – Materials
Metal Fabrications – Labor
Decorative Metal Railings – Materials
Decorative Metal Railings – Labor
Water Repellants
High Performance Coatings – Materials
High Performance Coatings – Labor

Signage

Site
- Survey and Layout
- Erosion Control
- Site Clearing and Demolition
- Earthwork – Excavation and Hauling
- Earthwork – Import and Compaction
- Water Distribution Piping
- Sanitary Sewer
- Electrical Site Distribution
- Electrical Site Lighting
- Stormwater Drainage – Materials
- Stormwater Drainage – Labor
- Landscaping – Accessories
- Landscaping Planting – Materials
- Landscaping Planting – Labor
- Irrigation

Fountain
- Fountain Relocation
- Fountain Restoration
- Fountain Plumbing
- Fountain Electrical

1-10 Temporary Traffic Control

1-10.4 Measurement

This Section is deleted in its entirety:

1-10.5 Payment

This Section is deleted in its entirety:

TECHNICAL SPECIFICATIONS (Replacement Sections)

All other Standard Specifications for all Sections after Division 1 are hereby replaced with the following new Technical Specification Sections.

DIVISION 2 – EXISTING CONDITIONS (Not Used)

DIVISION 3 – CONCRETE

033000 CAST-IN-PLACE CONCRETE
034500 ARCHITECTURAL PRECAST CONCRETE

DIVISION 4 – MASONRY

040342.01 FOUNTAIN RESTORATION

DIVISION 5 – METALS

055000 METAL FABRICATIONS
057300 DECORATIVE METAL RAILINGS

DIVISION 6 – WOOD, PLASTICS, AND COMPOSITES (Not Used)

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

071900 WATER REPELLENTS

DIVISION 8 – OPENINGS (Not Used)

DIVISION 9 – FINISHES

099600 HIGH=PERFORMANCE COATINGS

DIVISION 10 – SPECIALTIES

101400 SIGNAGE

DIVISION 11 – EQUIPMENT (Not Used)

DIVISION 12 – FURNISHINGS

129300 SITE FURNISHINGS

DIVISION 13 – SPECIAL CONSTRUCTION (Not Used)

DIVISION 14 – CONVEYING SYSTEMS (Not Used)

DIVISION 21 – FIRE SUPPRESSION (Not Used)

DIVISION 22 – PLUMBING

221113 FACILITY WATER DISTRIBUTION PIPING
221313 FACILITY SANITARY SEWERS

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (Not Used)

DIVISION 25 – INTEGRATED AUTOMATION (Not Used)

DIVISION 26 – ELECTRICAL

260000	ELECTRICAL GENERAL CONDITIONS
260519	WIRE AND CABLES
260526	GROUNDING AND BONDING
260533	RACEWAY
262419	MOTOR CONTROLLERS

DIVISION 27 – COMMUNICATIONS (Not Used)

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY (Not Used)

DIVISION 31 – EARTHWORK

311000	SITE CLEARING AND SITE DEMOLITION
312000	EARTH MOVING
312513	EROSION CONTROL
	Attachment: BMP C160
	Attachment: Construction Storm Water Pollution Prevention Plan

DIVISION 32 – EXTERIOR IMPROVEMENTS

321313	CONCRETE PAVING, CURBS, AND WALKS
328000	IRRIGATION SYSTEM
329000	PLANTING
329113	SOIL PREPARATION
329222	TOP SAND
329223	SODDING

DIVISION 33 – UTILITIES

334100	STORM UTILITY DRAINAGE PIPING

END OF SPECIAL PROVISIONS

Appendix A

Pierce County Prevailing Wage Rates

Effective March 2015

(The following wage rate listing became effective March 2015. These rates may be revised by the State in September 2015)

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: 4/22/2015

County	Trade	Job Classification	Wage	Holiday	Overtime	Note
Pierce	Asbestos Abatement Workers	Journey Level	$42.67	5D	1H	
Pierce	Boilermakers	Journey Level	$64.29	5N	1C	
Pierce	Brick Mason	Brick And Block Finisher	$44.46	5A	1M	
Pierce	Brick Mason	Journey Level	$51.32	5A	1M	
Pierce	Brick Mason	Pointer-Caulker-Cleaner	$51.32	5A	1M	
Pierce	Building Service Employees	Janitor	$9.47		1	
Pierce	Building Service Employees	Shampooer	$10.08		1	
Pierce	Building Service Employees	Waxer	$10.08		1	
Pierce	Building Service Employees	Window Cleaner	$13.22		1	
Pierce	Cabinet Makers (In Shop)	Journey Level	$28.36		1	
Pierce	Carpenters	Acoustical Worker	$52.32	5D	4C	
Pierce	Carpenters	Bridge, Dock And Wharf Carpenters	$52.32	5D	4C	
Pierce	Carpenters	Carpenter	$52.32	5D	4C	
Pierce	Carpenters	Carpenters on Stationary Tools	$52.45	5D	4C	
Pierce	Carpenters	Creosoted Material	$52.42	5D	4C	
Pierce	Carpenters	Floor Finisher	$52.32	5D	4C	
Pierce	Carpenters	Floor Layer	$52.32	5D	4C	
Pierce	Carpenters	Scaffold Erector	$52.32	5D	4C	
Pierce	Cement Masons	Journey Level	$52.38	7A	1M	
Pierce	Divers & Tenders	Diver	$105.37	5D	4C	8A
Pierce	Divers & Tenders	Diver On Standby	$59.50	5D	4C	
Pierce	Divers & Tenders	Diver Tender	$54.82	5D	4C	
Pierce	Divers & Tenders	Surface Rcv & Rov Operator	$54.82	5D	4C	
Pierce	Divers & Tenders	Surface Rcv & Rov Operator Tender	$51.07	5A	4C	
Pierce	Dredge Workers	Assistant Engineer	$54.75	5D	3F	
Pierce	Dredge Workers	Assistant Mate (Deckhand)	$54.33	5D	3F	
Pierce	Dredge Workers	Boatmen	$54.75	5D	3F	
Pierce	Dredge Workers	Engineer Welder	$55.79	5D	3F	

Pierce	Dredge Workers	Leverman, Hydraulic	$56.92	5D	3F	
Pierce	Dredge Workers	Mates	$54.75	5D	3F	
Pierce	Dredge Workers	Oiler	$54.33	5D	3F	
Pierce	Drywall Applicator	Journey Level	$52.32	5D	1H	
Pierce	Drywall Tapers	Journey Level	$52.37	5P	1E	
Pierce	Electrical Fixture Maintenance Workers	Journey Level	$17.76		1	
Pierce	Electricians - Inside	Cable Splicer	$61.96	5C	1G	
Pierce	Electricians - Inside	Journey Level	$58.35	5C	1G	
Pierce	Electricians - Inside	Lead Covered Cable Splicer	$65.55	5C	1G	
Pierce	Electricians - Inside	Welder	$61.96	5C	1G	
Pierce	Electricians - Motor Shop	Craftsman	$15.37		1	
Pierce	Electricians - Motor Shop	Journey Level	$14.69		1	
Pierce	Electricians - Powerline Construction	Cable Splicer	$69.95	5A	4D	
Pierce	Electricians - Powerline Construction	Certified Line Welder	$63.97	5A	4D	
Pierce	Electricians - Powerline Construction	Groundperson	$43.62	5A	4D	
Pierce	Electricians - Powerline Construction	Heavy Line Equipment Operator	$63.97	5A	4D	
Pierce	Electricians - Powerline Construction	Journey Level Lineperson	$63.97	5A	4D	
Pierce	Electricians - Powerline Construction	Line Equipment Operator	$53.81	5A	4D	
Pierce	Electricians - Powerline Construction	Pole Sprayer	$63.97	5A	4D	
Pierce	Electricians - Powerline Construction	Powderperson	$47.55	5A	4D	
Pierce	Electronic Technicians	Journey Level	$32.39		1	
Pierce	Elevator Constructors	Mechanic	$82.67	7D	4A	
Pierce	Elevator Constructors	Mechanic In Charge	$89.40	7D	4A	
Pierce	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	$9.47		1	
Pierce	Fence Erectors	Fence Erector	$22.56		1	
Pierce	Flaggers	Journey Level	$36.17	7A	3I	
Pierce	Glaziers	Journey Level	$54.91	7L	1Y	
Pierce	Heat & Frost Insulators And Asbestos Workers	Journeyman	$61.18	5J	1S	
Pierce	Heating Equipment Mechanics	Journey Level	$70.37	7F	1E	
Pierce	Hod Carriers & Mason Tenders	Journey Level	$44.00	7A	3I	
Pierce	Industrial Power Vacuum Cleaner	Journey Level	$9.47		1	
Pierce	Inland Boatmen	Boat Operator	$54.57	5B	1K	
Pierce	Inland Boatmen	Cook	$50.95	5B	1K	
Pierce	Inland Boatmen	Deckhand	$51.19	5B	1K	
Pierce	Inland Boatmen	Deckhand Engineer	$52.18	5B	1K	
Pierce	Inland Boatmen	Launch Operator	$53.40	5B	1K	

Pierce	Inland Boatmen	Mate	$53.40	5B	1K	
Pierce	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Cleaner Operator, Foamer Operator	$9.73		1	
Pierce	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Grout Truck Operator	$11.48		1	
Pierce	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Head Operator	$12.78		1	
Pierce	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Technician	$9.47		1	
Pierce	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Tv Truck Operator	$10.53		1	
Pierce	Insulation Applicators	Journey Level	$52.32	5D	4C	
Pierce	Ironworkers	Journeyman	$61.62	7N	1O	
Pierce	Laborers	Air, Gas Or Electric Vibrating Screed	$42.67	7A	3I	
Pierce	Laborers	Airtrac Drill Operator	$44.00	7A	3I	
Pierce	Laborers	Ballast Regular Machine	$42.67	7A	3I	
Pierce	Laborers	Batch Weighman	$36.17	7A	3I	
Pierce	Laborers	Brick Pavers	$42.67	7A	3I	
Pierce	Laborers	Brush Cutter	$42.67	7A	3I	
Pierce	Laborers	Brush Hog Feeder	$42.67	7A	3I	
Pierce	Laborers	Burner	$42.67	7A	3I	
Pierce	Laborers	Caisson Worker	$44.00	7A	3I	
Pierce	Laborers	Carpenter Tender	$42.67	7A	3I	
Pierce	Laborers	Caulker	$42.67	7A	3I	
Pierce	Laborers	Cement Dumper-paving	$43.46	7A	3I	
Pierce	Laborers	Cement Finisher Tender	$42.67	7A	3I	
Pierce	Laborers	Change House Or Dry Shack	$42.67	7A	3I	
Pierce	Laborers	Chipping Gun (under 30 Lbs.)	$42.67	7A	3I	
Pierce	Laborers	Chipping Gun(30 Lbs. And Over)	$43.46	7A	3I	
Pierce	Laborers	Choker Setter	$42.67	7A	3I	
Pierce	Laborers	Chuck Tender	$42.67	7A	3I	
Pierce	Laborers	Clary Power Spreader	$43.46	7A	3I	
Pierce	Laborers	Clean-up Laborer	$42.67	7A	3I	
Pierce	Laborers	Concrete Dumper/chute Operator	$43.46	7A	3I	
Pierce	Laborers	Concrete Form Stripper	$42.67	7A	3I	
Pierce	Laborers	Concrete Placement Crew	$43.46	7A	3I	
Pierce	Laborers	Concrete Saw Operator/core Driller	$43.46	7A	3I	
Pierce	Laborers	Crusher Feeder	$36.17	7A	3I	
Pierce	Laborers	Curing Laborer	$42.67	7A	3I	

Pierce	Laborers	Demolition: Wrecking & Moving (incl. Charred Material)	$42.67	7A	3I	
Pierce	Laborers	Ditch Digger	$42.67	7A	3I	
Pierce	Laborers	Diver	$44.00	7A	3I	
Pierce	Laborers	Drill Operator (hydraulic,diamond)	$43.46	7A	3I	
Pierce	Laborers	Dry Stack Walls	$42.67	7A	3I	
Pierce	Laborers	Dump Person	$42.67	7A	3I	
Pierce	Laborers	Epoxy Technician	$42.67	7A	3I	
Pierce	Laborers	Erosion Control Worker	$42.67	7A	3I	
Pierce	Laborers	Faller & Bucker Chain Saw	$43.46	7A	3I	
Pierce	Laborers	Fine Graders	$42.67	7A	3I	
Pierce	Laborers	Firewatch	$36.17	7A	3I	
Pierce	Laborers	Form Setter	$42.67	7A	3I	
Pierce	Laborers	Gabian Basket Builders	$42.67	7A	3I	
Pierce	Laborers	General Laborer	$42.67	7A	3I	
Pierce	Laborers	Grade Checker & Transit Person	$44.00	7A	3I	
Pierce	Laborers	Grinders	$42.67	7A	3I	
Pierce	Laborers	Grout Machine Tender	$42.67	7A	3I	
Pierce	Laborers	Groutmen (pressure)including Post Tension Beams	$43.46	7A	3I	
Pierce	Laborers	Guardrail Erector	$42.67	7A	3I	
Pierce	Laborers	Hazardous Waste Worker (level A)	$44.00	7A	3I	
Pierce	Laborers	Hazardous Waste Worker (level B)	$43.46	7A	3I	
Pierce	Laborers	Hazardous Waste Worker (level C)	$42.67	7A	3I	
Pierce	Laborers	High Scaler	$44.00	7A	3I	
Pierce	Laborers	Jackhammer	$43.46	7A	3I	
Pierce	Laborers	Laserbeam Operator	$43.46	7A	3I	
Pierce	Laborers	Maintenance Person	$42.67	7A	3I	
Pierce	Laborers	Manhole Builder-mudman	$43.46	7A	3I	
Pierce	Laborers	Material Yard Person	$42.67	7A	3I	
Pierce	Laborers	Motorman-dinky Locomotive	$43.46	7A	3I	
Pierce	Laborers	Nozzleman (concrete Pump, Green Cutter When Using Combination Of High Pressure Air & Water On Concrete & Rock, Sandblast, Gunite, Shotcrete, Water Bla	$43.46	7A	3I	
Pierce	Laborers	Pavement Breaker	$43.46	7A	3I	
Pierce	Laborers	Pilot Car	$36.17	7A	3I	
Pierce	Laborers	Pipe Layer Lead	$44.00	7A	3I	
Pierce	Laborers	Pipe Layer/tailor	$43.46	7A	3I	
Pierce	Laborers	Pipe Pot Tender	$43.46	7A	3I	

Pierce	Laborers	Pipe Reliner	$43.46	7A	3I	
Pierce	Laborers	Pipe Wrapper	$43.46	7A	3I	
Pierce	Laborers	Pot Tender	$42.67	7A	3I	
Pierce	Laborers	Powderman	$44.00	7A	3I	
Pierce	Laborers	Powderman's Helper	$42.67	7A	3I	
Pierce	Laborers	Power Jacks	$43.46	7A	3I	
Pierce	Laborers	Railroad Spike Puller - Power	$43.46	7A	3I	
Pierce	Laborers	Raker - Asphalt	$44.00	7A	3I	
Pierce	Laborers	Re-timberman	$44.00	7A	3I	
Pierce	Laborers	Remote Equipment Operator	$43.46	7A	3I	
Pierce	Laborers	Rigger/signal Person	$43.46	7A	3I	
Pierce	Laborers	Rip Rap Person	$42.67	7A	3I	
Pierce	Laborers	Rivet Buster	$43.46	7A	3I	
Pierce	Laborers	Rodder	$43.46	7A	3I	
Pierce	Laborers	Scaffold Erector	$42.67	7A	3I	
Pierce	Laborers	Scale Person	$42.67	7A	3I	
Pierce	Laborers	Sloper (over 20")	$43.46	7A	3I	
Pierce	Laborers	Sloper Sprayer	$42.67	7A	3I	
Pierce	Laborers	Spreader (concrete)	$43.46	7A	3I	
Pierce	Laborers	Stake Hopper	$42.67	7A	3I	
Pierce	Laborers	Stock Piler	$42.67	7A	3I	
Pierce	Laborers	Tamper & Similar Electric, Air & Gas Operated Tools	$43.46	7A	3I	
Pierce	Laborers	Tamper (multiple & Self-propelled)	$43.46	7A	3I	
Pierce	Laborers	Timber Person - Sewer (lagger, Shorer & Cribber)	$43.46	7A	3I	
Pierce	Laborers	Toolroom Person (at Jobsite)	$42.67	7A	3I	
Pierce	Laborers	Topper	$42.67	7A	3I	
Pierce	Laborers	Track Laborer	$42.67	7A	3I	
Pierce	Laborers	Track Liner (power)	$43.46	7A	3I	
Pierce	Laborers	Traffic Control Laborer	$38.68	7A	3I	8R
Pierce	Laborers	Traffic Control Supervisor	$38.68	7A	3I	8R
Pierce	Laborers	Truck Spotter	$42.67	7A	3I	
Pierce	Laborers	Tugger Operator	$43.46	7A	3I	
Pierce	Laborers	Tunnel Work-Compressed Air Worker 0-30 psi	$64.99	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 30.01-44.00 psi	$70.02	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 44.01-54.00 psi	$73.70	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 54.01-60.00 psi	$79.40	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 60.01-64.00 psi	$81.52	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 64.01-68.00 psi	$86.62	7A	3I	8Q

Pierce	Laborers	Tunnel Work-Compressed Air Worker 68.01-70.00 psi	$88.52	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 70.01-72.00 psi	$90.52	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Compressed Air Worker 72.01-74.00 psi	$92.52	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Guage and Lock Tender	$44.10	7A	3I	8Q
Pierce	Laborers	Tunnel Work-Miner	$44.10	7A	3I	8Q
Pierce	Laborers	Vibrator	$43.46	7A	3I	
Pierce	Laborers	Vinyl Seamer	$42.67	7A	3I	
Pierce	Laborers	Watchman	$32.87	7A	3I	
Pierce	Laborers	Welder	$43.46	7A	3I	
Pierce	Laborers	Well Point Laborer	$43.46	7A	3I	
Pierce	Laborers	Window Washer/cleaner	$32.87	7A	3I	
Pierce	Laborers - Underground Sewer & Water	General Laborer & Topman	$42.67	7A	3I	
Pierce	Laborers - Underground Sewer & Water	Pipe Layer	$43.46	7A	3I	
Pierce	Landscape Construction	Irrigation Or Lawn Sprinkler Installers	$17.07		1	
Pierce	Landscape Construction	Landscape Equipment Operators Or Truck Drivers	$14.55		1	
Pierce	Landscape Construction	Landscaping Or Planting Laborers	$17.07		1	
Pierce	Lathers	Journey Level	$52.32	5D	1H	
Pierce	Marble Setters	Journey Level	$51.32	5A	1M	
Pierce	Metal Fabrication (In Shop)	Fitter	$15.25		1	
Pierce	Metal Fabrication (In Shop)	Laborer	$10.32		1	
Pierce	Metal Fabrication (In Shop)	Machine Operator	$13.98		1	
Pierce	Metal Fabrication (In Shop)	Welder	$13.98		1	
Pierce	Millwright	Journey Level	$53.42	5D	4C	
Pierce	Modular Buildings	Journey Level	$9.47		1	
Pierce	Painters	Journey Level	$37.80	6Z	2B	
Pierce	Pile Driver	Journey Level	$52.57	5D	4C	
Pierce	Plasterers	Journey Level	$50.42	7Q	1R	
Pierce	Playground & Park Equipment Installers	Journey Level	$9.73		1	
Pierce	Plumbers & Pipefitters	Journey Level	$63.57	5A	1G	
Pierce	Power Equipment Operators	Asphalt Plant Operator	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Assistant Engineers	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Barrier Machine (zipper)	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Batch Plant Operator: Concrete	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Bobcat	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Brokk - Remote Demolition Equipment	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Brooms	$51.97	7A	3C	8P

Pierce	Power Equipment Operators	Bump Cutter	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Cableways	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Chipper	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Compressor	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Over 42m	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Concrete Finish Machine -laser Screed	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Conveyors	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Cranes, 100 Tons - 199 Tons, Or 150 Ft Of Boom (including Jib With Attachments)	$55.79	7A	3C	8P
Pierce	Power Equipment Operators	Cranes, 200 Tons To 300 Tons, Or 250 Ft Of Boom (including Jib With Attachments)	$56.36	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: 20 Tons Through 44 Tons With Attachments	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: 45 Tons Through 99 Tons, Under 150' Of Boom (including Jib With Attachments)	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: A-frame - 10 Tons And Under	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: Friction 100 Tons Through 199 Tons	$56.36	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: Friction Over 200 Tons	$56.92	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: Over 300 Tons, Or 300' Of Boom (Including Jib With Attachments)	$56.92	7A	3C	8P
Pierce	Power Equipment Operators	Cranes: Through 19 Tons With Attachments A-frame Over 10 Tons	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Crusher	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Deck Engineer/deck Winches (power)	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Derricks, On Building Work	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Dozers D-9 & Under	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Drill Oilers: Auger Type, Truck Or Crane Mount	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Drilling Machine	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Elevator And Man-lift: Permanent And Shaft Type	$51.97	7A	3C	8P
Pierce	Power Equipment Operators		$54.75	7A	3C	8P

		Finishing Machine, Bidwell And Gamaco & Similar Equipment				
Pierce	Power Equipment Operators	Forklift: 3000 Lbs And Over With Attachments	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Forklifts: Under 3000 Lbs. With Attachments	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Grade Engineer: Using Blueprints, Cut Sheets,etc.	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Gradechecker/stakeman	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Guardrail Punch	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Horizontal/directional Drill Locator	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Horizontal/directional Drill Operator	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Hydralifts/Boom Trucks Over 10 Tons	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Hydralifts/boom Trucks, 10 Tons And Under	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Loader, Overhead 8 Yards. & Over	$55.79	7A	3C	8P
Pierce	Power Equipment Operators	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Loaders, Overhead Under 6 Yards	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Loaders, Plant Feed	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Loaders: Elevating Type Belt	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Locomotives, All	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Material Transfer Device	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Mechanics, All (Leadmen - $0.50 Per Hour Over Mechanic)	$55.79	7A	3C	8P
Pierce	Power Equipment Operators	Motor Patrol Grader - Non-finishing	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Motor Patrol Graders, Finishing	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Outside Hoists (elevators And Manlifts), Air Tuggers,strato	$54.33	7A	3C	8P
Pierce	Power Equipment Operators		$54.75	7A	3C	8P

		Overhead, Bridge Type Crane: 20 Tons Through 44 Tons				
Pierce	Power Equipment Operators	Overhead, Bridge Type: 100 Tons And Over	$55.79	7A	3C	8P
Pierce	Power Equipment Operators	Overhead, Bridge Type: 45 Tons Through 99 Tons	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Pavement Breaker	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Pile Driver (other Than Crane Mount)	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Plant Oiler - Asphalt, Crusher	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Posthole Digger, Mechanical	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Power Plant	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Pumps - Water	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Quad 9, HD 41, D10 And Over	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Quick Tower - No Cab, Under 100 Feet In Height Based To Boom	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Remote Control Operator On Rubber Tired Earth Moving Equipment	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Rigger And Bellman	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Rollagon	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Roller, Other Than Plant Mix	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Roller, Plant Mix Or Multi-lift Materials	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Roto-mill, Roto-grinder	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Saws - Concrete	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Scraper, Self Propelled Under 45 Yards	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Scrapers - Concrete & Carry All	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Scrapers, Self-propelled: 45 Yards And Over	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Service Engineers - Equipment	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Shotcrete/gunite Equipment	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Shovel , Excavator, Backhoe, Tractors Under 15 Metric Tons.	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$55.79	7A	3C	8P
Pierce	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$56.36	7A	3C	8P
Pierce	Power Equipment Operators	Slipform Pavers	$55.24	7A	3C	8P
Pierce	Power Equipment Operators		$55.24	7A	3C	8P

		Spreader, Topsider & Screedman				
Pierce	Power Equipment Operators	Subgrader Trimmer	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Tower Bucket Elevators	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Tower Crane Over 175'in Height, Base To Boom	$56.36	7A	3C	8P
Pierce	Power Equipment Operators	Tower Crane Up: To 175' In Height, Base To Boom	$55.79	7A	3C	8P
Pierce	Power Equipment Operators	Transporters, All Track Or Truck Type	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Trenching Machines	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Truck Crane Oiler/driver - 100 Tons And Over	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Truck Crane Oiler/driver Under 100 Tons	$54.33	7A	3C	8P
Pierce	Power Equipment Operators	Truck Mount Portable Conveyor	$54.75	7A	3C	8P
Pierce	Power Equipment Operators	Welder	$55.24	7A	3C	8P
Pierce	Power Equipment Operators	Wheel Tractors, Farmall Type	$51.97	7A	3C	8P
Pierce	Power Equipment Operators	Yo Yo Pay Dozer	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Asphalt Plant Operator	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Assistant Engineers	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Barrier Machine (zipper)	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Batch Plant Operator: Concrete	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Bobcat	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Brokk - Remote Demolition Equipment	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Brooms	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Bump Cutter	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cableways	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Chipper	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Compressor	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Over 42m	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Concrete Finish Machine -laser Screed	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure	$54.33	7A	3C	8P

Pierce	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Conveyors	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes, 100 Tons - 199 Tons, Or 150 Ft Of Boom (including Jib With Attachments)	$55.79	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes, 200 Tons To 300 Tons, Or 250 Ft Of Boom (including Jib With Attachments)	$56.36	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: 20 Tons Through 44 Tons With Attachments	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: 45 Tons Through 99 Tons, Under 150' Of Boom (including Jib With Attachments)	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: A-frame - 10 Tons And Under	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: Friction 100 Tons Through 199 Tons	$56.36	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: Friction Over 200 Tons	$56.92	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: Over 300 Tons, Or 300' Of Boom (Including Jib With Attachments)	$56.92	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Cranes: Through 19 Tons With Attachments A-frame Over 10 Tons	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Crusher	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Deck Engineer/deck Winches (power)	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Derricks, On Building Work	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Dozers D-9 & Under	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Drill Oilers: Auger Type, Truck Or Crane Mount	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Drilling Machine	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Elevator And Man-lift: Permanent And Shaft Type	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Forklift: 3000 Lbs And Over With Attachments	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Forklifts: Under 3000 Lbs. With Attachments	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Grade Engineer: Using Blueprints, Cut Sheets,etc.	$54.75	7A	3C	8P

Pierce	Power Equipment Operators-Underground Sewer & Water	Gradechecker/stakeman	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Guardrail Punch	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Horizontal/directional Drill Locator	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Horizontal/directional Drill Operator	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Hydralifts/Boom Trucks Over 10 Tons	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom Trucks, 10 Tons And Under	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Loader, Overhead 8 Yards. & Over	$55.79	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Loaders, Overhead Under 6 Yards	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Loaders, Plant Feed	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Loaders: Elevating Type Belt	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Locomotives, All	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Material Transfer Device	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Mechanics, All (Leadmen - $0.50 Per Hour Over Mechanic)	$55.79	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Motor Patrol Grader - Non-finishing	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Motor Patrol Graders, Finishing	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Outside Hoists (elevators And Manlifts), Air Tuggers,strato	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Overhead, Bridge Type Crane: 20 Tons Through 44 Tons	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Overhead, Bridge Type: 100 Tons And Over	$55.79	7A	3C	8P
Pierce			$55.24	7A	3C	8P

	Power Equipment Operators-Underground Sewer & Water	Overhead, Bridge Type: 45 Tons Through 99 Tons				
Pierce	Power Equipment Operators-Underground Sewer & Water	Pavement Breaker	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Pile Driver (other Than Crane Mount)	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Plant Oiler - Asphalt, Crusher	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Posthole Digger, Mechanical	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Power Plant	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Pumps - Water	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Quad 9, HD 41, D10 And Over	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Quick Tower - No Cab, Under 100 Feet In Height Based To Boom	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Remote Control Operator On Rubber Tired Earth Moving Equipment	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Rigger And Bellman	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Rollagon	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Roller, Other Than Plant Mix	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Roller, Plant Mix Or Multi-lift Materials	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Roto-mill, Roto-grinder	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Saws - Concrete	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Scraper, Self Propelled Under 45 Yards	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Scrapers - Concrete & Carry All	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Scrapers, Self-propelled: 45 Yards And Over	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Service Engineers - Equipment	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Shotcrete/gunite Equipment	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Shovel , Excavator, Backhoe, Tractors Under 15 Metric Tons.	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$54.75	7A	3C	8P

Pierce	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$55.79	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$56.36	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Slipform Pavers	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Spreader, Topsider & Screedman	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Subgrader Trimmer	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Tower Bucket Elevators	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Tower Crane Over 175'in Height, Base To Boom	$56.36	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Tower Crane: Up To 175' In Height, Base To Boom	$55.79	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Transporters, All Track Or Truck Type	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Trenching Machines	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/driver - 100 Tons And Over	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/driver Under 100 Tons	$54.33	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Truck Mount Portable Conveyor	$54.75	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Welder	$55.24	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Wheel Tractors, Farmall Type	$51.97	7A	3C	8P
Pierce	Power Equipment Operators-Underground Sewer & Water	Yo Yo Pay Dozer	$54.75	7A	3C	8P
Pierce	Power Line Clearance Tree Trimmers	Journey Level In Charge	$45.75	5A	4A	
Pierce	Power Line Clearance Tree Trimmers	Spray Person	$43.38	5A	4A	
Pierce	Power Line Clearance Tree Trimmers	Tree Equipment Operator	$45.75	5A	4A	
Pierce	Power Line Clearance Tree Trimmers	Tree Trimmer	$40.84	5A	4A	
Pierce	Power Line Clearance Tree Trimmers	Tree Trimmer Groundperson	$30.74	5A	4A	
Pierce	Refrigeration & Air Conditioning Mechanics	Mechanic	$64.86	5A	1G	
Pierce	Residential Brick Mason	Journey Level	$23.77		1	
Pierce	Residential Carpenters	Journey Level	$40.14	5D	4C	
Pierce	Residential Cement Masons	Journey Level	$52.38	7A	1M	
Pierce	Residential Drywall Applicators	Journey Level	$40.14	5D	4C	
Pierce	Residential Drywall Tapers	Journey Level	$52.37	5P	1E	

Pierce	Residential Electricians	JOURNEY LEVEL	$29.29		1	
Pierce	Residential Glaziers	Journey Level	$37.30	7L	1H	
Pierce	Residential Insulation Applicators	Journey Level	$18.70		1	
Pierce	Residential Laborers	Journey Level	$20.99		1	
Pierce	Residential Marble Setters	Journey Level	$22.67		1	
Pierce	Residential Painters	Journey Level	$26.13		1	
Pierce	Residential Plumbers & Pipefitters	Journey Level	$44.27	5A	1G	
Pierce	Residential Refrigeration & Air Conditioning Mechanics	Journey Level	$37.72	5A	1G	
Pierce	Residential Sheet Metal Workers	Journey Level (Field or Shop)	$42.58	7F	1R	
Pierce	Residential Soft Floor Layers	Journey Level	$42.41	5A	3D	
Pierce	Residential Sprinkler Fitters (Fire Protection)	Journey Level	$42.48	5C	2R	
Pierce	Residential Stone Masons	Journey Level	$22.67		1	
Pierce	Residential Terrazzo Workers	Journey Level	$9.47		1	
Pierce	Residential Terrazzo/Tile Finishers	Journey Level	$19.32		1	
Pierce	Residential Tile Setters	Journey Level	$9.47		1	
Pierce	Roofers	Journey Level	$45.12	5A	2O	
Pierce	Roofers	Using Irritable Bituminous Materials	$48.12	5A	2O	
Pierce	Sheet Metal Workers	Journey Level (Field or Shop)	$70.37	7F	1E	
Pierce	Shipbuilding & Ship Repair	Boilermaker	$39.82	7M	1H	
Pierce	Shipbuilding & Ship Repair	Carpenter	$33.71	6E	1B	
Pierce	Shipbuilding & Ship Repair	Electrician	$33.71	6E	1B	
Pierce	Shipbuilding & Ship Repair	Heat & Frost Insulator	$61.18	5J	1S	
Pierce	Shipbuilding & Ship Repair	Laborer	$19.10		1	
Pierce	Shipbuilding & Ship Repair	Machinist	$33.71	6E	1B	
Pierce	Shipbuilding & Ship Repair	Operator	$33.71	6E	1B	
Pierce	Shipbuilding & Ship Repair	Painter	$38.74	6A	1R	
Pierce	Shipbuilding & Ship Repair	Pipefitter	$33.71	6E	1B	
Pierce	Shipbuilding & Ship Repair	Rigger	$15.77		1	
Pierce	Shipbuilding & Ship Repair	Sandblaster	$38.74	6A	1R	
Pierce	Shipbuilding & Ship Repair	SHEET METAL	$35.83		1	
Pierce	Shipbuilding & Ship Repair	Shipfitter	$33.71	6E	1B	
Pierce	Shipbuilding & Ship Repair	Trucker	$15.75		1	
Pierce	Shipbuilding & Ship Repair	Warehouse	$13.75		1	
Pierce	Shipbuilding & Ship Repair	Welder/burner	$33.71	6E	1B	
Pierce	Sign Makers & Installers (Electrical)	Sign Installer	$26.17		1	
Pierce	Sign Makers & Installers (Electrical)	Sign Maker	$20.33		1	
Pierce	Sign Makers & Installers (Non-Electrical)	Sign Installer	$33.43		1	

Pierce	Sign Makers & Installers (Non-Electrical)	Sign Maker	$22.79		1	
Pierce	Soft Floor Layers	Journey Level	$42.41	5A	3D	
Pierce	Solar Controls For Windows	Journey Level	$10.31		1	
Pierce	Sprinkler Fitters (Fire Protection)	Journey Level	$69.74	5C	1X	
Pierce	Stage Rigging Mechanics (Non Structural)	Journey Level	$13.23		1	
Pierce	Stone Masons	Journey Level	$51.32	5A	1M	
Pierce	Street And Parking Lot Sweeper Workers	Journey Level	$12.06		1	
Pierce	Surveyors	All Classifications	$35.68	Null	1	
Pierce	Telecommunication Technicians	Journey Level	$28.29		1	
Pierce	Telephone Line Construction - Outside	Cable Splicer	$36.96	5A	2B	
Pierce	Telephone Line Construction - Outside	Hole Digger/Ground Person	$20.49	5A	2B	
Pierce	Telephone Line Construction - Outside	Installer (Repairer)	$35.40	5A	2B	
Pierce	Telephone Line Construction - Outside	Special Aparatus Installer I	$36.96	5A	2B	
Pierce	Telephone Line Construction - Outside	Special Apparatus Installer II	$36.19	5A	2B	
Pierce	Telephone Line Construction - Outside	Telephone Equipment Operator (Heavy)	$36.96	5A	2B	
Pierce	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	$34.34	5A	2B	
Pierce	Telephone Line Construction - Outside	Telephone Lineperson	$34.34	5A	2B	
Pierce	Telephone Line Construction - Outside	Television Groundperson	$19.45	5A	2B	
Pierce	Telephone Line Construction - Outside	Television Lineperson/Installer	$25.89	5A	2B	
Pierce	Telephone Line Construction - Outside	Television System Technician	$30.97	5A	2B	
Pierce	Telephone Line Construction - Outside	Television Technician	$27.77	5A	2B	
Pierce	Telephone Line Construction - Outside	Tree Trimmer	$34.34	5A	2B	
Pierce	Terrazzo Workers	Journey Level	$46.96	5A	1M	
Pierce	Tile Setters	Journey Level	$46.96	5A	1M	
Pierce	Tile, Marble & Terrazzo Finishers	Journey Level	$20.74		1	
Pierce	Traffic Control Stripers	Journey Level	$43.11	7A	1K	
Pierce	Truck Drivers	Asphalt Mix	$22.49		1	
Pierce	Truck Drivers	Dump Truck	$22.56		1	
Pierce	Truck Drivers	Dump Truck And Trailer	$22.56		1	
Pierce	Truck Drivers	Other Trucks	$30.20		1	
Pierce	Truck Drivers	Transit Mixer	$33.17	6I	2H	

Pierce	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	$16.09		1	
Pierce	Well Drillers & Irrigation Pump Installers	Oiler	$15.39		1	
Pierce	Well Drillers & Irrigation Pump Installers	Well Driller	$18.30		1	

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Cast in Place Architectural Walls
4. Other concrete applications as indicated.

B. Related Sections:

1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
2. Division 32 Section "Concrete Paving, Curbs and Sidewalks" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, ground granulated blast-furnace slag, silica fume, and other pozzolans; subject to compliance with requirements.

B. Cast-in-Place Architectural Concrete: Formed concrete that is exposed to view on surfaces of completed structure or building and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.

1.4 ACTION SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments. See Structural General Notes for mix designs and additional requirements.

1. Indicate in submittal, and on delivery ticket, amounts of mixing water allowed for later addition at Project site, within approved mix design limits.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Formwork Shop Drawings: Detailing fabrication, assembly, and bracing / support of formwork. Shop drawings shall also include form joint layout as well as configuration of form ties.

1. Indicate proposed schedule and sequence of stripping formwork.

E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

F. Submittal – placing and jointing plan indicating location of construction, control and isolation joints at slabs on grade.

G. Preinstallation Conference Agenda

1. Attendees
2. Order and Method of Construction
3. Safety
4. Notifications
5. Spares
6. Redundancy
7. Emergency Procedures
8. Other

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Waterstops.
6. Curing compounds.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Semirigid joint filler.
11. Joint-filler strips.
12. Repair materials.

D. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician. An experienced installer who has completed concrete work similar in material, design and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance

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

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

C. Testing Agency Qualifications for Mix Design (Owner will employ testing agency for field testing): An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

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

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain each admixture from single source from single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures. Provide proof of testing and compliance.

G. Mockups: Not required.

H. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture, and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.

d. Concrete subcontractor.
e. Concrete pumping company.
f. Special concrete finish subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement, if any.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

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

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Deformed-Steel Wire: ASTM A 496/A 496M.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

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

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

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project. See Structural Notes for additional information.

1. Portland Cement: ASTM C 150, Type II gray unless noted otherwise in Division 3 Section “Architectural Precast Concrete” for finished color purposes. Supplement with the following:

a. Fly Ash:

1) Locally manufactured/extracted.
2) ASTM C 618, Class C. If used, proposed mixes containing fly ash shall be submitted for review and approval prior.

B. Slag Ground Granulated Blast Furnace (GGBF) slag shall conform to ASTM C989 Grade 100 or 120. GGBF shall not be permitted unless the mix designs to be used on the project are submitted for review and approval. Submitted mix designs shall include tested concrete strengths and tested values for concrete shrinkage at 28 days.

C. Normal-Weight Locally Extracted Aggregates: ASTM C 33, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Other Admixtures: The Contractor may propose other admixtures, for the Architect's consideration. Such admixtures shall meet ASTM C494.

2.6 LIQUID COATINGS

A. Water Repellants and Anti-Graffiti coatings: See Section 071900.

1. Location: At vertical sign wall face and vertical side walls of stairs.

2.7 CURING MATERIALS

A. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

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

E. Water: Potable.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating.

G. Contractor to identify what curing method is to be used for each portion of the concrete work.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301. See Structural General Notes for mix designs and additional requirements.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows (% replacement equals weight of supplementary cementitious material divided by total cementitious material times 100.):

1. Fly Ash: 15 percent at slabs on grade, 25 percent at walls.

2. Combined Fly Ash and Pozzolan: A minimum of 50 pounds per cubic yard, and a maximum of 25 percent (unless a higher percentage is approved by the architect and structural engineer) if fly ash is locally commercially available at the time of installation.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use a mid-range water-reducing admixture (at a minimum) in pumped concrete, as well as all concrete walls that are to be exposed to view (architectural concrete walls).

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3,000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: Non-Air Entrained: 0.58 / Air Entrained: 0.46

B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4,000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: Non-Air Entrained: 0.44 / Air Entrained: 0.35

C. Cast-in-Place Architectural Concrete Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3,000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: Non-Air Entrained: 0.58 / Air Entrained: 0.46.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Not allowed.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

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

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

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

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

H. Chamfer exterior corners and edges of permanently exposed concrete, unless detailed otherwise.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

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

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

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement. Do not use products that will adversely impact the

finished appearance of the concrete or that are not compatible with finish coatings such as water repellent coatings, if any.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for walls and similar parts of the Work that do not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

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

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

3.4 STEEL REINFORCEMENT

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

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

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

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

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

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Space vertical joints in walls as indicated on structural drawings.
3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction / Control Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas at the maximum spacing indicated on the structural drawings. Coordinate joint locations with architectural drawings at all locations exposed to view. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, and as follows:

1. Sawed Joints - General: At all floors form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

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

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. If allowed, add water subject to the limitations of ACI 301. For slabs, do not add water to concrete during delivery, at Project site, or during placement unless approved by the testing agency.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

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

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the required temperature range.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

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

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

A. Smooth-Formed Finish: Cast concrete walls exposed to public view shall be smooth finished and shall contain NO rock pockets. Sac final finish to achieve uniform smooth surface, as directed by Engineer.

1. Tie holes NOT allowed in the vertical face of the low sign wall exposed to public view.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.

3.9 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before trowel finishing.

C. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Keep wet for entire curing period. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 PROTECTIVE COATINGS INSTALLATION

A. Water Repellants and Anti-Graffiti coatings: See Section 071900

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

D. Install liquid joint filler in saw cut joints in slabs exposed to view following the manufacturer’s recommendations. Install flush to top of slab.

3.13 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or

that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner may engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor as soon as possible, but in no case greater than 48 hours after testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000

SECTION 034500 - ARCHITECTURAL PRECAST CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Architectural precast concrete wall cap

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete"
2. Division 7 Section "Water Repellents" for water-repellent and anti-graffiti finish treatments.

1.3 PERFORMANCE REQUIREMENTS

1. Design framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements as follows:

   a. Upward and downward movement of 1/2 inch (13 mm).

2. Thermal Movements: Provide for in-plane thermal movements resulting from annual ambient temperature changes of 120 deg F (67 deg C).

1.4 SUBMITTALS

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

B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

C. Shop Drawings: Detail fabrication and installation of architectural precast concrete units. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit. Indicate joints, reveals, and extent and location of each surface finish. Indicate details at building corners.

1. Indicate welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.

2. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
3. Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.
4. Include plans and elevations showing unit location and sequence of erection for special conditions.
5. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
6. Indicate relationship of architectural precast concrete units to adjacent materials.
7. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not change the appearance, durability, or strength of units when modifying details or materials and maintain the design concept.
8. Comprehensive engineering analysis signed and sealed by the manufacturer's qualified professional engineer responsible for its preparation. Show governing panel types, connections, and types of reinforcement, including special reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from architectural precast concrete.

D. Samples: For each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches (300 by 300 by 50 mm). Adjust color and/or finish and repeat sample process until Architect approves samples.

E. Welding certificates.

F. Qualification Data: For Installer and fabricator.

G. Material Test Reports: For aggregates.

H. Material Certificates: For the following items, signed by manufacturers:

1. Cementitious materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.

I. Source quality-control test reports.

J. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

1. Certified by Architectural Precast Association at time of bidding and is designated an APA certified plant.

B. Installer Qualifications: An experienced precast concrete erector who has a minimum of five years installation of units similar to those required for this project.

C. Design Standards: Comply with ACI 318 (ACI 318M) and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete".

D. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

E. Welding: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding Code - Steel"; and AWS D1.4, "Structural Welding Code - Reinforcing Steel."

F. Mockups: After sample panel approval but before production of architectural precast concrete units, construct full-sized mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents unless such deviations are specifically approved by Architect in writing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground.

B. Support units during shipment on nonstaining shock-absorbing material.

C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

D. Place stored units so identification marks are clearly visible, and units can be inspected.

E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.

F. Lift and support units only at designated points shown on Shop Drawings.

1.7 SEQUENCING

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fabricators: Subject to compliance with requirements, provide products by one of the following:

1. Olympian Precast, Inc.; Redmond, WA. 425-868-1400
2. Knife River Corp.; Harrisburg, OR. 541-995-6327
3. Or approved substitution during the bid process, per Instructions to Bidders.

2.2 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

B. Precast Configuration: Wall Cap Units as dimensioned on Drawings.

2.3 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

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

C. Galvanized Reinforcing Bars: Galvanize reinforcing bars where bars will be set closer that 1-1/2 inches from the exterior face of a panel. ASTM A 615/A 615M, Grade 60 (Grade 420) deformed bars, ASTM A 767/A 767M, Class II zinc coated, hot-dip

D. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars, assembled with clips.

E. Supports: Suspend reinforcement from back of mold or use bolsters, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated or unless otherwise required to provide precast concrete panel color selected.

B. Supplementary Cementitious Materials:

1. Metakaolin Admixture: ASTM C 618, Class N.
2. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
3. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.

a. Gradation: To match design reference sample.

2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand of same material as coarse aggregate, unless otherwise approved by Architect.

D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

G. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Manufacturers: Davis Colors.

H. Color / Mix: As selected by Architect from manufacturer's standard colors.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.

C. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.

D. Wrought Carbon-Steel Bars: ASTM A 675/A 675M, Grade 65 (Grade 450).

E. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

F. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563 (ASTM A 563M); and flat, unhardened steel washers, ASTM F 844.

G. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563 (ASTM A 563M); and hardened carbon-steel washers, ASTM F 436 (ASTM F 436M).

H. Zinc-Coated Finish: For exterior steel items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M or ASTM A 153/A 153M.

1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.

I. Welding Electrodes: Comply with AWS standards.

2.6 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144, or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

1. Color: As selected by Architect from manufacturer’s standard colors, compatible with selected pigment for concrete mix.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Limit use of fly ash and silica fume to 25 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 (ACI 318M) or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi (34.5 MPa) minimum.
2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.8 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.
2. Edge and Corner Treatment: As detailed.

2.9 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.

D. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.

2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
3. Place reinforcement to maintain at least 3/4-inch (19-mm) minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
4. Place reinforcing steel and prestressing strand to maintain at least 3/4-inch (19-mm) minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches (38 mm) when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
5. Install reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses.

F. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

G. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.

H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 117.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

I. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.

J. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that will not show in finished structure.

K. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

L. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.10 FABRICATION TOLERANCES

A. Fabricate architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.11 FINISHES

A. Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved sample panels and as follows:

1. Smooth trowel finish with very light sand blast finish.
2. Treat surfaces after installation with water repellant and anti-graffiti coating per Division 7.

2.12 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

B. Owner may employ an independent testing agency to evaluate architectural precast concrete fabricator's quality-control and testing methods.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting surface and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not install precast concrete units until supporting cast-in-place concrete has attained minimum allowable design compressive strength or supporting steel or other structure is complete.

3.2 INSTALLATION OF PRECAST CONCRETE

A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.

B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.

1. Install temporary steel or plastic spacing shims or bearing pads as precast concrete units are being installed. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
3. Unless otherwise indicated, maintain uniform joint widths of 3/8 inch.

C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

D. Grouting Connections: Grout connections where required or indicated. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

3.3 ERECTION TOLERANCES

A. Erect architectural precast concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Field welds will be subject to visual inspections and nondestructive testing according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS

A. Repair architectural precast concrete units if permitted by Architect. The Architect reserves the right to reject repaired units that do not comply with requirements.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet (6 m).

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.6 CLEANING

A. Clean surfaces of precast concrete units exposed to view.

B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.
3. Clean precast concrete to a level and with procedures acceptable to and in preparation for application of water repellant and anti-graffiti coatings specified under other sections.

END OF SECTION 034500

SECTION 040342.01 - RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, general Conditions, and Special Provisions apply to this Section.

B. References

1. Conformance to the Secretary of the Interior's Standards for the Treatment of Historic Properties (1995) should apply to all work involving historic building materials and site features.
2. Preservation Brief 42. "The Maintenance, Repair and Replacement of Historic Cast Stone." National Park Service, U.S. Department of the Interior.
3. Preservation Brief 2. (1998). "Repointing Mortar Joints in Historic Masonry Buildings." National Park Service, U.S. Department of the Interior.
4. Preservation Brief 15. (1987). "Preservation of Historic Concrete: Problems and General Approaches." National Park Service, U.S. Department of the Interior.
5. Cast Stone Institute
   10 West Kimball Street
   Winder, GA 30680-2535
6. National Precast Concrete Association
   10333 North Meridian Street, Suite 272
   Indianapolis, IN 46290
7. Architectural Precast Association
   P.O. Box 08669
   Fort Myers, FL 33908-0669

1.2 SUMMARY

A. Section includes:

1. Stabilization plan development.
2. Cast stone repairs.
3. Cast stone cleaning.
4. Rebar cleaning and coating.
5. Metal light box cleaning and coating.

B. Related Sections

1. Moving of fountain, refer to Structural and Architectural.
2. Coating material for basin, refer to Mechanical and Architectural.
3. Plumbing and electrical work for fountain, refer to Mechanical and Architectural.

1.3 ACTION SUBMITTALS

A. Product Data: Include manufacturer's material safety data sheets and production application directions relative to cleaning, coating, and repair materials, and finishes. Include manufacturer's data substantiating that materials comply with requirements indicated.

B. Submittals: Include a signature block for date submitted, contractor/supplier, and date approved to be recorded by the project architect. All submittals should include: a description of means and methods, listing of all projects to be used, proposed schedule and sequencing, and listing of what work will be done on and what work off-site, and MSDS sheets for all products used. This applies to both on and off-site work.

C. Mockups: Provide the following mockups as noted below prior to implementing work. Identify mockup locations in coordination with Owner/Architect.

1. Cast stone patching material color match samples for verification of color, pattern, and texture selected and compliance with requirements indicated.
2. Cast stone repairs for verification of color, pattern, and texture selected and compliance with requirements indicated.
3. Cast stone cleaning section on the basin consisting of a three by three feet sample area for verification of compliance with requirements indicated.
4. Rebar finish coat color match for verification of color, pattern, and texture selected and compliance with requirements indicated.

1.4 QUALITY ASSURANCE

A. Contractor Qualifications: Engage an experienced contractor with prior experience involving work on National Register of Historic Places listed properties. Persons assigned to project by contractor should have had prior experience with historic buildings.

B. Installer Qualifications: Engage an experienced Installer who is an authorized representative of the specialty product manufacturer for installation and maintenance of the manufacturer's products.

1. The Installer using Jahn products should be Jahn product certified.

1.5 PROJECT CONDITIONS

A. Field Conditions: Confirm all field conditions prior to implementing work.

B. Documentation: Take digital color photographs during construction (minimum 5 megapixel) documenting existing conditions and work completed. Provide two copies of these images on DVDs to the Owner/Architect upon project close-out.

PART 2 - PRODUCTS

2.1 MATERIALS/PRODUCTS

A. General: Supplier shall be responsible for furnishing all components required for complete installation of products.

B. Cast Stone Crack Repairs: Use a hydraulic lime mortar slurry or lime mortar such as Jahn M25 or equal. Follow manufacturer directions.

C. Metal Coating:

1. Metal cleaner to remove rust and expose bare metal prior to application of corrosion inhibitor/primer. Compatible with corrosion inhibitor/primer. Follow manufacturer directions.
2. Corrosion inhibitor/primer for coating exposed metal/rebar surfaces. Compatible with finish coat. Follow manufacturer directions.
3. Finish coat to protect metal, suitable for metal application and protection in exterior locations. Color match finish coat to cast stone to minimize visibility. Compatible with corrosion inhibitor/primer coating. Follow manufacturer directions.

D. Spall Repairs Partially Attached:

1. Nylon or stainless pins to mechanically anchor the spall. Size anchors and distribution pattern appropriate to size of spall. Keep pin diameters and lengths to minimum needed. Follow manufacturer directions.
2. Epoxy compatible with cast stone to chemically anchor pins. Follow manufacturer directions.
3. Hydraulic lime mortar slurry or lime mortar such as Jahn M25 or equal color matched to cast stone to fill pin holes. Recess pins below outer cast stone plane. Follow manufacturer directions.

E. Spall Repairs Detached:

1. Jahn Adhesive or equal mineral based product to reattach spall. Product should be water based and contain no latex or acrylic bonding agents or additives. Follow product recommendations for application, curing, and cleaning.
2. Should pins be necessary use only nylon or stainless steel and keep pin diameters and lengths to the minimum needed. Follow manufacturer directions.
3. Hydraulic lime mortar slurry or lime mortar such as Jahn M25 or equal color matched to cast stone to fill pin holes. Recess pins below outer cast stone plane. Follow manufacturer directions.

F. General Cleaning

1. Utilize gentle cleaner to remove biological growth and atmospheric staining, such as ProSoCo's Enviro Klean ReVive or Diedrich 101 Masonry Restorer. Follow manufacturer directions.

PART 3 - EXECUTION

3.1 JOB CONDITIONS - INSPECTION/PREPARATION

A. General

1. Time delivery and installation of products to avoid delaying other trades whose work is dependent on or affected by such products, and to comply with protection and storage requirements.
2. Verify that conditions are correct, proper for installation of products.
3. Verify job dimensions, be responsible for same.
4. Coordinate with other trades where necessary to make provisions for installation.
5. For work specified to be installed, do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.

B. Stabilization Plan

1. Develop prior to moving, a stabilization plan for the fountain basin and column addressing protection methods to ensure the fountain remains intact through the moving process. Submit plan to Architect/Owner for review and approval prior to undertaking work.
2. Include materials and method for binding the basin together through nylon webbing or other approved method to counter the through cracking on the basin walls in order to keep the basin from separating during the move.
3. Include materials and method for stabilizing the column to prevent tipping during the move.

3.2 INSTALLATION

A. General

1. Do not install products which are observed to be defective in any way.
2. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
3. Match all patch material to existing conditions, not original aggregate and binder color. The intent is for new patches to be as non-visible as possible.
4. Perform work in locations shown on Drawings.
5. Remove lower plaques from basin and provide to Owner for relocation.

B. Spall Repairs Partially Attached: This occurs at spalls that remain partially attached. The intent is to retain these in place to the greatest degree possible. Utilize nylon or stainless pins to mechanically anchor the spall. Size anchors and distribution pattern appropriate to size of spall. Keep pin diameters and lengths to minimum needed. Chemically anchor pins with epoxy compatible with cast stone application. Recess pins below outer cast stone plane and fill holes with a hydraulic lime mortar slurry or lime mortar such as Jahn M25 or equal color matched to cast stone.

C. Spall Repairs Detached: This occurs at spalls that have separated from the underlying substrate but a substantial piece remains intact. The intent is to reattach these pieces. Reattach with Jahn Adhesive or equal mineral based product. Product should be water based and contain no latex or acrylic bonding agents or additives. Follow product recommendations for application, curing, and cleaning. Should pins be necessary use only nylon or stainless steel and keep pin diameters

and lengths to the minimum needed. Recess pins below outer cast stone plane and fill holes with a hydraulic lime mortar slurry or lime mortar such as Jahn M25 or equal color matched to cast stone.

D. Cast Stone Crack Repairs: Clean out cracks removing all soiling and loose material. Fill cracks with a hydraulic lime mortar slurry or lime mortar such as Jahn M25 or equal. Work material into cracks. Follow product recommendations for application, curing, safety, and cleaning. Finish cracks out flush with surrounding surfaces. Do not drill holes for injection or mechanically widen the cracks.

E. Metal Coating: This occurs at locations with insufficient cast stone to create a suitable bond for a cast stone patch. Scrape rust and corroded metal off rebar with stiff wire bristle brush to clean metal. Use a metal cleaner if necessary to remove rust and expose bare metal prior to application of corrosion inhibitor/primer. Coat exposed metal surfaces with corrosion inhibitor/primer. Coat exposed metal surfaces with a finish coat to protect metal. Finish coat to be suitable for metal application and protection in exterior locations. Color match finish coat to cast stone to minimize visibility. Minimize over paint onto adjacent cast stone. Allow for coating product recommended curing and drying between coast and prior to installing the final coat.

F. Metal Electrical Box Coating: This occurs at electrical light boxes at the top of the column. Remove cover plates. Refer to Metal Coating above for metal treatment at each location.

3.3 PROTECTION

A. General: While installing products protect adjacent surfaces against damage, stains. Protect products during, after installation against damage of every nature so that there will be no indication of use or damage at time of final project acceptance.

3.4 CLEANING/REPAIRING

A. General Cleaning:

1. Cleaning should remove surface soiling and biological growth; however, the intent is not for the fountain to look like new. There is a level of existing patina that is acceptable to retain as its removal would result in damage to the cast stone. The mockup will define cleaning level expectations.
2. Pressure wash cast stone to clean soiling from surface. Employ hot water a low pressure (less than or equal to 300 psi) using a fan tip nozzle (40-degree) at a working distance of 18-inches from the surfaces. Scrub stubborn soiling with a synthetic or natural fiber brush to release.
3. Do not use muriatic or other harsh acids. The marble aggregate will be easily damaged by harsh acids.
4. Do not use oscillating tips on the pressure washer. The aggressive water action will quickly abrade the cast stone.
5. Leave entire work in neat, orderly, clean condition.

END OF SECTION 040342.01

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Aluminum Fabrications

1.3 SUBMITTALS

A. Shop Drawings: Shall be submitted for approval prior to fabrication. Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of all metal fabrications and their connections. Show anchorage and accessory items.
2. Provide for alternating tread stairs, ladders, ships ladders and ladder cages.

B. Samples: Shall be submitted for approval prior to fabrication:

1. Aluminum Grating / Support Assembly

a. Grating bars
b. Vertical support members

C. Mock-ups: Provide full size mock-up of grating section and vertical supports, including hinging and lock-down elements.

1.4 QUALITY ASSURANCE

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

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

C. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.

B. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).

2.4 FABRICATION, GENERAL

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

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form exposed work with accurate angles and surfaces and straight edges.

D. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

F. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

G. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

H. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 ALUMINUM GRATING ASSEMBLIES

A. Fountain Grating: Provide all aluminum members as indicated on drawings

1. Aluminum Alloy 6063-T4
2. Bar Sizes: 1” x 0.25”

B. Grating Supports: Provide horizontal and vertical members as indicated on drawings.

1. Aluminum Alloy 6063-T4
2. Sizes: 0.125” wall, square tube sections and angles, sizes as indicated on drawings
3. Base Plates: 0.25” thick, size as indicated on drawings.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.7 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified), unless indicated otherwise on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

END OF SECTION 055000

SECTION 057300 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel and iron decorative railings for all interior guardrails and handrails, stair railings.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for coordination of railing installation in concrete.
2. Division 09 Section “High Performance Coatings” for high performance painting of steel railings

1.3 DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, visual separation, or wall protection.

1.4 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of railings assembled from standard components.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

1. Fittings and brackets.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not suit structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.2 STEEL AND IRON

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Tubing: ASTM A 500 (cold formed).

C. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.

D. Plates, Shapes, and Bars: ASTM A 36/A 36M.

E. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Make up wire-rope assemblies in the shop to field-measured dimensions with fittings machine swaged. Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount is available for tensioning wire ropes. Tag wire-rope assemblies and fittings to identify installation locations and orientations for coordinated installation.

D. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

E. Form work true to line and level with accurate angles and surfaces.

F. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

G. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

H. Connections: Fabricate railings with welded connections unless otherwise indicated.

I. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.

J. Mechanical Connections: Where mechanical connections are shown or are otherwise allowed, connect members with concealed mechanical fasteners and fittings unless detailed otherwise. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

K. Form changes in direction as follows:

1. By radius bends of radius indicated, or if not indicated, as approved by the Architect.

L. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

M. Close exposed ends of hollow railing members with welded end caps.

N. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

P. Provide inserts and other anchorage devices for connecting railings to concrete work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior steel and iron railings including hardware, after fabrication.
2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
4. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. Preparing Galvanized Railings for Shop Priming where indicated: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

D. Finish: Primer and high performance coating as specified in Division 09 “High Performance Coatings”.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings, and for properly transferring loads to in-place construction.

3.2 ANCHORING POSTS

A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Payment for these services will be made by Owner.

B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Railings will be tested according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.

C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and will comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 CLEANING

A. Wash both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 Section "High Performance Coatings”.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.5 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057300

SECTION 071900 - WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes clear water-repellent coatings and anti-graffiti coatings for the following vertical and horizontal surfaces:

1. All exposed exterior vertical concrete surfaces.
2. Precast concrete wall cap.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for curing compounds, curing and sealing compounds, and penetrating liquid floor treatments.

1.3 PERFORMANCE REQUIREMENTS

A. Performance Testing: Provide water repellents and anti-graffiti coatings that comply with test-performance requirements indicated, as evidenced by reports of tests performed by manufacturer by a qualified independent testing agency on manufacturer's standard products applied to substrates simulating those on Project using same application methods to be used for Project.

1. Manufacturer’s representative shall perform preconstruction tests on field mock-ups.
2. Select sizes and configurations of assemblies to adequately demonstrate capability of water repellents to comply with performance requirements.
3. Notify Architect seven days in advance of the dates and times when assemblies will be constructed.

B. Absorption: Minimum 90 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens.

1. Hardened Concrete: ASTM C 642.

C. Permeability: Minimum 95 percent water-vapor transmission in comparison of treated and untreated specimens, per ASTM D 1653.

D. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per NCHRP Report 244 Series IV.

E. Chloride-Ion Intrusion in Concrete: NCHRP Report 244, Series II tests.

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1. Reduction of Water Absorption: 80 percent.
2. Reduction in Chloride Content: 85 percent.
3. Series IV tests: 99% reduction in chloride absorption.

1.4 SUBMITTALS

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

1. Include manufacturer's printed statement of VOC content.

B. Samples: For each type of water repellent and substrate indicated, 12 by 12 inches (300 by 300 mm) in size, with specified water-repellent treatment applied to half of each Sample.

C. Manufacturer Certificates: Signed by manufacturers certifying that water repellents comply with requirements.

D. Qualification Data: For Installer.

E. Preconstruction Testing Reports: For water-repellent-treated substrates.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for assemblies.

G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Test Application: Apply a finish sample for each type of water repellent and substrate required in the presence of the manufacturer’s representative and Architect. Duplicate finish of approved sample.

1. Locate each test application as directed by Architect.
2. Size: 25 sq. ft. (2.3 sq. m).
3. Final approval by Architect of water-repellent application will be from test applications.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

D. Start of Application: The manufacturer’s representative shall be on-site to observe the installation at the beginning of initial installation, and shall provide a written report to the Architect of their observations and any corrective actions required.

1.6 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

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1. Ambient temperature is above 40 deg F (4.4 deg C) during and 24 hours after installation.
2. Ambient temperature of the surface is less than 100 deg F.
3. Concrete surfaces and mortar have cured for more than 28 days.
4. Rain or snow is not predicted within 24 hours.
5. Application proceeds more than 24 hours after surfaces have been wet.
6. Substrate is not frozen, or surface temperature is above 40 deg F (4.4 deg C).
7. Windy conditions do not exist that may cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

A. Special Warranty – Water Repellents: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in Part 1 "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Ten years on material and labor from date of Substantial Completion.

B. Special Warranty – Antigraffiti Coatings: Manufacturer’s standard form in which Manufacturer and Applicator agree that the Antigraffiti coating System will be free of defects related to workmanship or material deficiency for a period of five (5) years from the date of Substantial Completion of this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 PENETRATING WATER REPELLENTS

A. Proprietary-Blend, Clear Penetrating Water Repellent – for use at all locations indicated in Article 1.2.A of this Section: Water repellent shall be a solvent based alkyltrialkoxy silane water repellent system with a minimum of 40% active content. VOC content shall be 600 g/l or less.

1. Products:

a. Degussa Corporation: Protectosil Chem-Trete PB VOC. No substitutes.

2.3 ANTIGRAFFITI COATING

A. Proprietary-Blend, Antigraffiti Coating – For use at all surfaces receiving a water repellent coating: Clear, water-borne, breathable fluorosilane antigraffiti treatment. VOC content shall be 0g/l.

1. Products:

a. Degussa Corporation: Protectosil Antigraffiti. No substitutes.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to water-repellent manufacturer's written instructions, to ensure that surface is dry enough.

1. Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of water repellents.

B. Test for pH level, according to water-repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.

C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.

D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Water Repellent Coating: Apply a heavy-saturation coating of water repellent on surfaces indicated for treatment using rollers or brushes or equipment that will not atomize the material. Apply amounts as recommended by the manufacturer but not more than 125 to 150 square feet per gallon. Comply with manufacturer's written instructions.

C. Antigraffiti Coating: Apply two coats of antigraffiti coating on all surfaces that are scheduled to receive a water repellent coating, using low-pressure spray equipment. Apply after water repellent coating is applied and cured as recommended by the manufacturer. Apply amounts as recommended by the manufacturer. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated.

3.3 CLEANING

A. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

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3.4 SCHEDULE

A. Water Repellent Coating: See paragraph 1.2 A herein.

B. Anti-Graffiti Final Coat:

1. Apply to all surfaces scheduled to receive water repellent coating
2. Apply to faces of dimensional character signage.

END OF SECTION 071900

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SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of high-performance coating systems on steel substrates listed in Part 2 of this specification.

B. Related Sections:

1. Division 05 Section Decorative Metal Railings

1.3 DEFINITIONS

A. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

B. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application and cure instructions.

B. Samples: Provide for each type of topcoat product indicated. Samples will not be returned other than copies of approved sample finishes (draw-downs):

1. Color Sample Box: If requested by the Architect, submit one manufacture's color box with the full line of color samples in approximately 4 x 6 inch sample size.
2. Color Wheel: If requested by the Architect, submit one full spectrum color wheel for each of the various coatings involved, for Architect's use for color selections; submit additional color wheels or the like for specialty coatings of other manufacturers where different from general paint supplier.
3. Applied Finish Samples: Submit samples in accordance with the following as directed:

   a. Where requested, and before commencing work, prepare samples on final substrate. For railings, provide n sample steel piping, 6" length.
   b. Prepare (4) sets of 8 ½" x 11" paint sample cards of each color, texture, and sheen.
   c. Furnish additional required samples until colors, finishes, textures are reviewed and accepted by the Architect (followed by written authorization to proceed).
   d. Mark on each sample the paint manufacturer's name, color name, and color code formula.

e. Allow ample time for the selection of colors; do not proceed with this work until colors are approved.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: TNEMEC is used in this specification as a basis of design. Other manufacturers, with equivalent products, may submit as a substitution during the bid process per Instructions to Bidders.

B. Products: Subject to compliance with requirements, provide product listed in other Part 2 articles for the paint category indicated.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.
3. Provide products of same manufacturer for each coat in a coating system.
4. Where the factory prime coat is not compatible with the specified primer and/or finish coats, provide a seal coat to make surface ready for specified primer and finish coats.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

D. Colors: As selected by Architect from manufacturer's full range, or custom colors where requested by Architect.

2.3 EXTERIOR HIGH-PERFORMANCE COATING SYSTEMS

A. Ferrous Metal:

1. Locations: Steel railings, galvanized after fabrication as specified in Division 05.
2. Finish Coatings

a. Primer Coat: TNEMIC FC 27 TYPOXY, 3.0 to 5.0 mils DFT.
b. Color Coat: TNEMEC Series 73 ENDURA-SHIELD, 3.0 to 5.0 mils DFT.

2.4 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

D. Galvanized-Metal Substrates: Remove grease and oil residue from 100% of galvanized metal surfaces by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings. Clean galvanized metal in accordance with ASTM D 6386.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions, this specification section, and recommendations in SSPC Vol.1&ll, "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for coating and substrate indicated.
2. System used shall be at the Contractor’s discretion as necessary to produce the highest quality finish, unless a specific system is specified herein.
3. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.

4. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Omit primer on metal surfaces that have been shop primed and touchup painted, if specifically allowed herein.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified NACE level 3 testing and inspecting agency to inspect and test coatings for dry film thickness.

1. Contractor shall spot repair and restore coated surfaces damaged by testing.
2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 099600

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Dimensional signage characters.
2. Logo graphic.

B. Related Sections include the following:

1. Division 03 “Cast in Place Concrete” for coordination with concrete for embedment.

1.3 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 ACTION SUBMITTALS

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

B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide elevation drawings to scale showing signage and logos.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Aluminum.

D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Dimensional Characters: Full-size Samples of each type of dimensional character (letter, number, and graphic element).

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1 current addition.

1. Interior Code Signage: Provide signage to meet requirements of accessibility regulations, and requirements of authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

C. Text Information Supplied by Owner (For all Signage): Copy/ text noted herein to be supplied by Owner during shop drawing process, Contractor shall provide Owner minimum 60 days advanced notice of when such information will be needed.

1.9 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Deterioration of finishes beyond normal weathering.
   b. Deterioration of embedded graphic image.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.

2.2 DIMENSIONAL CHARACTERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ACE Sign Systems, Inc.
2. Advance Corporation; Braille-Tac Division.
3. A. R. K. Ramos.
4. ASI-Modulex, Inc.
5. Bunting Graphics, Inc.
6. Charleston Industries, Inc.
7. Gemini Incorporated.
8. Grimco, Inc.
9. Innerface Sign Systems, Inc.
10. Metal Arts; Div. of L&H Mfg. Co.
11. Mills Manufacturing Company.
12. Mohawk Sign Systems.
13. Nelson-Harkins Industries.
14. Signature Signs, Incorporated.
15. Or approved substitution during the bid process, per Instructions to Bidders.

B. Locations: As indicated on Drawings.

C. Cutout Characters: Provide characters with square-cut, smooth, eased edges. Comply with the following requirements:

1. Aluminum Sheet: 0.50 inch (12.70 mm) thick.

   a. Finish: Painted.
   b. Anti-graffiti Coating: Apply to signage faces per Section 071900 “Water Repellants.”
   c. Color: As selected by Architect from manufacturer's full range.
   d. Font: As selected by Architect
   e. City Logo: Contractor will be provided with electronic media of City Logo.

f. Letter Height: As indicated on Drawings.

2. Mounting: Adhesive Projected with concealed non-corroding studs, as indicated on Drawings for substrates encountered.

2.3 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.4 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify that items, including anchor inserts, are sized and located to accommodate signs.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.

B. Exterior signs installed on exterior walls shall have all holes and penetrations into wall sealed to prevent water entry.

C. Exterior signs installed on exterior walls shall have all holes and penetrations into wall sealed to prevent water entry.

D. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.

1. Flush Mounting: Mount characters with backs in contact with wall surface.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 12 93 00 – SITE FURNISHINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. This Section includes the following site and street furnishings:

1. Park Benches

B. Related Sections include the following:

1. Section 31 20 00 – Earthwork
2. Section 32 13 13 – Concrete

C. Products furnished but not installed under this Section include base plates and anchor bolts to be cast in concrete footings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.

B. Samples for Initial Selection: For units with factory-applied color finishes.

C. Product Schedule: For site furnishings. Use same designations indicated on Contract Drawings.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of site furnishings through one source from a single manufacturer.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include but are not limited to the following:
   1. Park Benches.

B. Products: Subject to compliance with requirements.

2.2 PARK BENCHES

A. Description:

   1. Thea Foss Model TF-3 (6' reversible bench, surface mounting, powder coated) or approved equal.

      a. Color: Black.
      b. Provide stainless steel anchor bolts and stainless steel acorn nut caps.

B. Quantity: Two (2).

PART 3 – EXECUTION

3.1 EXAMINATION

A. With Installer present, examine areas and conditions for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Install site furnishings after paving has been completed.

C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Contract Drawings.

D. Cut anchor bolts so acorn nuts fit tight and flush with top of base.

3.3 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION 12 93 00

SECTION 221113 – FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes water-distribution piping and related components for the fountain and irrigation water service.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

A. PE: Polyethylene plastic.

B. PP: Polypropylene plastic.

C. PVC: Polyvinyl chloride plastic.

D. RTRF: Reinforced thermosetting resin (fiberglass) fittings.

E. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1.4 REFERENCE STANDARDS

A. Washington State Department of Transportation (WSDOT).

B. City of Fife Public Works Standards.

1.5 SUBMITTALS

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

B. Certification

1. Provide a letter, signed by the supplier and reviewed and also signed by an officer of the general contractor's company, certifying that the following products to be incorporated into the work meet the requirements specified.

2. Products

a. Pipe and Fittings
b. Water Meter

C. Record Drawings: At Project closeout, provide surveyed as-builts of all installed water-service piping. Survey shall be completed by a Washington State licensed surveyor.

D. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.

E. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

1. Wiring Diagrams: Power, signal, and control wiring for alarms.

F. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. 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.

D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

G. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 Annex G for materials for water-service piping and specialties for domestic water.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Owner's written permission.

1.9 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

A. PE, AWWA Pipe: SIDR 7; with PE compound number required to give pressure rating not less than 200 psig. Conform to City of Fife Standards and the latest versions of ASTM D2239, ASTM D1248, and AWWA C901.

2.2 JOINING MATERIALS

A. Refer to Division 33 Section "Common Work Results for Utilities" for commonly used joining materials.

B. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.3 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.4 CORPORATION STOP AND CURB STOP

A. Conform to City of Fife Standard Detail W2.

2.5 WATER METERS

A. Water meters will be furnished by the Contractor.

B. Service connection shall conform to City of Fife Standard Detail W2.

2.6 BACKFLOW PREVENTERS

A. Double-Check, Reverse Backflow-Prevention Assemblies:

1. Conform to City of Fife Standard Plan W18.

2.7 PROTECTIVE ENCLOSURES

A. Protective enclosures shall meet the requirements of City of Fife Standard Plan W18.

B. Freeze-Protection Enclosures:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Hot Box, Inc.

C. Enclosure Bases:

1. Description: 4-inch minimum thickness precast concrete, of dimensions required to extend at least 6 inches beyond edges of enclosure housings. Include openings for piping.

2.8 ALARM DEVICES

A. Alarm Devices, General: UL 753 and FMG approved, of types and sizes to mate and match piping and equipment.

B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig working pressure; designed for horizontal or vertical installation; with 2 single-pole, double-throw circuit switches to provide isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000, “Earth Moving” for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

B. Install piping at indicated location and elevation. Ensure that minimum vertical clearance at 6 inches is provided where crossing other utilities.

C. Install components with pressure rating equal to or greater than system test pressure.

D. Install piping free of sags and location and elevation. Ensure that 6-inch vertical clearance is provided where crossing other utilities.

E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

F. Install fittings for changes in direction and branch connections.

G. Piping Connections: Unless otherwise indicated, make piping connections as specified below:

1. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.

H. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

I. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

J. Do not use unions for underground piping.

K. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on piping in vaults.

L. Underground water-service piping NPS 3/4 to NPS 3 shall be the following:

1. PE, ASTM pipe.

M. Underground water-service piping NPS 4 to NPS 8 shall be the following:

1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

N. Water Meter Box Water-Service Piping NPS 3/4 to NPS 2 shall be same as underground water-service piping and meet City of Fife Standard drawing.

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

B. Drawings indicate valve types to be used.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

A. See Division 33 Section “Common Work Results for Utilities” for piping-system common requirements.

3.5 PIPING INSTALLATION

A. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

B. Install PE pipe according to ASTM D 2774 and ASTM F 645.

C. Bury piping with depth of cover over top at least 36 inches.

D. Extend water-service piping and connect to water-supply source and fountain-water-piping systems at outside face of fountain vault in locations and pipe sizes indicated.

1. Terminate water-service piping at fountain vault until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to fountain-water-piping systems when those systems are installed.

E. Sleeves are specified in Division 33 Section “Common Work Results for Utilities”.

F. Mechanical sleeve seals are specified in Division 33 Section “Common Work Results for Utilities.”

G. See Division 22 Section “Domestic Water Piping” for potable-water piping inside the building.

3.6 JOINT CONSTRUCTION

A. See Division 33 Section “Common Work Results for Utilities” for basic piping joint construction.

B. Make pipe joints according to the following:

1. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer’s written instructions.

3.7 WATER METER INSTALLATION

A. Install water meters, piping, and specialties according to utility company’s written instructions.

3.8 ROUGHING-IN FOR WATER METERS

A. Rough-in piping and specialties for water meter installation according to utility company’s written instructions.

3.9 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.

C. Do not install bypass piping around backflow preventers.

D. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.10 WATER METER BOX INSTALLATION

A. Install water meter boxes in paved areas flush with surface.

B. Install water meter boxes in grass or earth areas with top flush with surface.

3.11 CONCRETE VAULT INSTALLATION

A. Install precast concrete vaults according to ASTM C 891.

3.12 PROTECTIVE ENCLOSURE INSTALLATION

A. Install concrete base level and with top flush with surface.

B. Install protective enclosure over valves and equipment.

C. Anchor protective enclosure to concrete base.

3.13 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. See Division 33 Section “Common Work Results for Utilities” for piping connections to valves and equipment.

C. Connect water-distribution piping to existing water main in conformance with City of Fife Standard Plans.

D. Connect water-distribution piping to interior fountain piping.

E. Connect waste piping from concrete vault drains to see Section 334100, "Storm Utility Drainage Piping" for connection to storm-sewer piping.

F. Ground equipment according to Section 260526, "Grounding and Bonding for Electrical Systems."

G. Connect wiring according to Section 260519, "Low-Voltage Electrical Power Conductors and Cables."

3.14 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

3.15 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate 6 to 8 inches below finished grade, directly over piping. Underground warning tapes are specified in Section 312000, "Earth Moving."

3.16 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113

SECTION 221313 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure and pressure couplings.
3. Expansion joints and deflection fittings.
4. Cleanouts.
5. Encasement for piping.

1.3 DEFINITIONS

A. FRP: Fiberglass-reinforced plastic.

B. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Cleanouts.
2. Pipe.
3. Locate wire.

B. Certification: Provide a letter, signed by the supplier and reviewed and also signed by an officer of the general contractor's company, certifying that the following products to be incorporated into the work meet the requirements specified.

1. Pipe and gaskets.
2. Cleanouts.
3. Locate wire.

C. Television Inspection Report: Prepared by a firm licensed to perform such analysis, submitted to Architect a minimum of 14 days before work and a second time 14 days after work is completed, prior to final surfacing construction is scheduled. The following shall be submitted:

1. Video tape or CD of pipe and structures.
2. Written report documenting stationing of sags, improper joints, connections, or other areas of concern.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than 14 days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.
3. Bypass pumping will be required to maintain the fire station. The fire station is on emergency service and will remain open 24 hours a day.

B. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

C. Locate existing structures and piping to be closed and abandoned.

D. Prior to beginning the work, locate and TV inspect the existing side sewer, and excavate, expose, and obtain the elevation of all connections to existing utilities. When discrepancy exists between the plans and existing conditions, the Contractor shall notify the engineer immediately.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable codes for materials and installation of the Work of this section. Codes include, but are not limited to, the Uniform Plumbing Code (UPC).

B. City of Fife Public Works.

C. WSDOT Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2014 edition. All references to measurement and payment shall be deleted from consideration; and the terms agreed to in the contract substituted thereof.

1.8 PROJECT RECORD DOCUMENTS

A. Submit record drawings.

B. Drawings shall include surveyed invert elevations, rim elevations, and identify any discovery of uncharted utilities. Survey information shall be provided by a surveyor licensed in the State of Washington.

C. Conform to City of Fife Public Works.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON, GRAVITY SEWER PIPE AND FITTINGS

A. Pipe: ASTM A 746, for push-on joints. Class 50. Conform to WSDOT Specification 9-05.13.

B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.

C. Compact Fittings: AWWA C153, ductile iron, for push-on joints.

D. Gaskets: AWWA C111, rubber.

2.2 DUCTILE-IRON, PRESSURE PIPE AND FITTINGS

A. Push-on-Joint Piping:

1. Pipe: AWWA C151. Conform to WSDOT Specification 9-05.13.
2. Standard Fittings: AWWA C110, ductile or gray iron.
3. Compact Fittings: AWWA C153.
4. Gaskets: AWWA C111, rubber, of shape matching pipe and fittings.

B. Mechanical-Joint Piping:

1. Pipe: AWWA C151, with bolt holes in bell.
2. Standard Fittings: AWWA C110, ductile or gray iron, with bolt holes in bell.
3. Compact Fittings: AWWA C153, with bolt holes in bells.

4. Glands: Cast or ductile iron; with bolt holes and high-strength, cast-iron or high-strength, low-alloy steel bolts and nuts.
5. Gaskets: AWWA C111, rubber, of shape matching pipe, fittings, and glands.

C. Gaskets: ASTM F 477, elastomeric seals.

2.3 PVC PIPE AND FITTINGS

A. PVC Gravity Sewer Piping:

1. Pipe: ASTM D 3034, SDR 35, PVC sewer pipe with bell-and-spigot ends for gasketed joints. Conform to WSDOT Specification 9-05.12(1).
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

2.4 NONPRESSURE-TYPE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

2.5 CLEANOUTS

A. PVC Cleanouts:

1. Conform to detail on plans.

2.6 ACCESSORIES

A. Tracing Wire: Brightly colored No. 12 AWG insulated copper wire with plastic covering.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000, “Earth Moving.”

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

D. Install gravity-flow, nonpressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at slope indicated.
2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
3. Install ductile-iron, gravity sewer piping according to ASTM A 746.
4. Install ABS sewer piping according to ASTM D 2321 and ASTM F 1668.
5. Install PVC profile sewer piping according to ASTM D 2321 and ASTM F 1668.
6. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.
7. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.

E. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

F. Install gravity-flow piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.

G. Extend sanitary sewerage piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.

H. Conform to City of Fife requirements.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure, drainage piping according to the following:

1. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
2. Join ABS sewer piping according to ASTM D 2321 and ASTM D 2751 for elastomeric-seal joints.
3. Join PVC cellular-core sewer piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.
4. Join PVC corrugated sewer piping according to ASTM D 2321.

5. Join PVC profile sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
6. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
7. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
8. Join dissimilar pipe materials with nonpressure-type, flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts per detail on plans.

3.5 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Section 221316, "Sanitary Waste and Vent Piping."

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.6 TRENCH BACKFILL

A. Trench backfill for sanitary sewer work shall conform to the following:

1. Pipe Bedding: WSDOT 9-03.16.

B. Conform to Contract Documents and City of Fife requirements.

3.7 CLOSING ABANDONED SANITARY SEWER SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed.

1. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Backfill to grade according to Section 312000, "Earth Moving."

3.8 IDENTIFICATION

A. Materials and their installation are specified in Section 312000, "Earth Moving." Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.

1. Use detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.9 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:

   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test to Owner and Engineer.

5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:

   a. Fill sewer piping with water. Test with pressure of at least 10-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
   b. Close openings in system and fill with water.
   c. Purge air and refill with water.

d. Disconnect water supply.
e. Test and inspect joints for leaks.

6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

a. Test plastic gravity sewer piping according to ASTM F 1417.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.10 CLEANING

A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

3.11 PROTECTION

A. Protect finished installation from any disturbance.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress. Damaged materials shall be replaced at the Contractor's expense.

END OF SECTION 221313

SECTION 260000 - ELECTRICAL GENERAL CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 GENERAL

A. Conform to the General Conditions, Supplementary Conditions, and related work in other Divisions for all work in Division 26. See Division 1 for sequence of work.

1.3 WORK INCLUDED

A. It is the intention of this division of the specifications, and the accompanying drawings, to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation, all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown in the plans. The work shall include all materials, appliances and apparatus not specifically mentioned herein or noted on the plans, but which are necessary to make a complete working installation of all electrical systems shown on the plans or described herein. Equipment and devices furnished and installed under other divisions of this specification (or by the Owner) shall be connected under this division. The drawings and specifications are complementary and what is called for in either is binding as if called for in both.

B. By submitting a bid, the Contractor is acknowledging that he has made a thorough examination of the Contract Documents, existing site and building conditions, and has determined that these documents do sufficiently describe the scope of construction work required under this Contract.

1.4 SCOPE OF BASIC BID

A. Included in Division 26 work is all work and related items necessary to provide all electrical installations except as specifically excluded. In general, this includes all labor, equipment, tools, etc., to complete the electrical work.

1.5 RELATED WORK

A. Temporary Power and Lighting

B. Mechanical Control Wiring

C. Cutting and Patching

D. Trenching, backfill, and asphalt work

1.6 STANDARDS AND REGULATIONS

A. The work shall comply with the latest edition of the applicable Standards and Codes of the following:

ASTM	American Society for Testing and Materials
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
---	State Electrical Code
NESC	National Electrical Safety Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
U.L.	Underwriters Laboratories Inc.
IPCEA	Insulated Power Cable Engineers Associated
CBM	Certified Ballasts Manufacturers
---	Federal, State and Local Building Codes
ETL	Electrical Testing Laboratories

B. If any conflict occurs between Government adopted Code Rules and this specification, the codes are to govern. Nothing in these drawings and specifications shall be construed to permit work not conforming to governing codes. Also, this shall not be construed as relieving the Contractor from complying with any requirements of the plans and specifications which may be in excess of, but not in conflict with, requirements of the Governing Codes.

1.7 PERMITS & FEES

A. The Contractor shall obtain and pay for all licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. The Contractor shall arrange for inspection of work by the inspectors and shall give the inspectors all necessary assistance in their work of inspection.

B. The Contractor shall consult with and follow the requirements of the local fire, power, telephone, and television utilities serving the area and shall coordinate his work with them.

C. Utility connection and hook-up charges for power, telephone and television shall be paid by the Owner directly to the utility. The Electrical Contractor is required to provide any and all coordination necessary to support the utility connection, file for application of service (or assist the Owner in filing for application of service) and coordinate dates for service with the utilities.

1.8 DEFINITIONS

A. When "Provide" is used, it shall be interpreted as "furnishing and installing complete in operating condition".

B. When "Drawings" is used, it shall be interpreted as "all Contract Drawings for all Disciplines".

C. When "Contractors" is used, it shall be interpreted as the Electrical Contractor.

1.9 INTENT OF DRAWINGS

A. The electrical drawings are intended to serve as working drawings for general layout. The equipment layout is diagrammatic and unless specifically dimensioned or detailed, does not indicate all fittings, hardware or appurtenances required for a complete operating installation.

B. Anything shown on the drawings but not covered in the specifications, or anything covered in the specifications but not shown on the drawings, shall be as if covered in both. In case of conflict between the drawings and specifications, the Engineer will select the method to be used. The Contractor shall be responsible for verifying all measurements before proceeding with the work.

C. Wiring diagrams are not intended to indicate the exact course of raceways or exact location of outlets. Raceway and outlet locations are approximately correct and are subject to revision as may be necessary or desirable at the time of installation. Precise location in every case shall be subject to the Engineer's approval.

1.10 PROTECTION

A. The Contractor shall store and guard all equipment before installation and shall protect same, and replace any equipment that has been damaged prior to final acceptance. See Section 016000 for detailed requirements.

1.11 HOUSEKEEPING

A. All electrical materials shall be kept stored in an orderly fashion protected from heat, cold, and the weather.

B. All marred surfaces shall be refinished and painted after installation.

C. All debris shall be removed from premises during work, as directed, and at completion of job.

1.12 TEMPORARY USE

A. Temporary or interim use of any and all portions of the electrical system shall be under the supervision of the Electrical Contractor.

B. Temporary power and lighting for use during construction shall be provided per the requirements of the Division 1 specifications.

1.13 AS-BUILT DRAWINGS

A. The Contractor shall maintain, in addition to any reference drawings, an as-built set of prints, on which all deviations from the original design shall be drafted in a neat, legible manner with red colored pencil. This red lined set shall identify all drawing revisions including addenda items, change orders, and Contractor revisions. The Contractor is responsible to revise panel schedules and load calculations as required.

B. Drawings shall show locations of all concealed raceway runs larger than 1", giving the number of conductors and size of raceway. Underground ducts shall be shown with cross section elevations. All pipe, raceway, manholes or lines of other trades shall be included.

C. The Contractor shall update all references to specific products to indicate products actually installed on project. This shall include, but not be limited to, lighting fixtures, baseboard heaters, etc.

D. Upon completion of the Division 26 Work, the Contractor shall deliver the red lined drawings and one set of neatly drafted as-built drawings on electronic media in AutoCAD R-2013 format and mylar to the Engineer for transmittal through the Engineer to the Owner.

E. See Section 270000 for additional requirements of low voltage systems.

1.14 WARRANTY

A. Provide a written warranty that the Division 26 work is free from mechanical and electrical defects. Contractor shall replace and repair, to the satisfaction of the Engineer, any parts of the installation which may fail within a period of 12 months after the certificate of final acceptance, provided that such failure is due to defects in material or workmanship, or failure to follow the specifications and drawings.

B. See Section 270000 for additional requirements of low voltage systems.

1.15 INSTRUCTIONS AND MANUALS

A. Operation and maintenance data shall be submitted in accordance with Section 017800.

B. Manuals shall contain shop drawings, wiring diagrams, operating and maintenance instructions, replacement parts lists, and equipment nameplate data for all equipment and systems installed under the project. Signal equipment submittals shall contain step-by-step circuit description information designed to acquaint maintenance personnel with equipment operation in each mode of operation. Manuals shall contain original brochures supplied by manufacturers. Xerox copies of originals will not be accepted.

C. Each type of device provided shall be identified in the O & M Manual using the same identification as shown on the drawings and specifications. The information included must be the exact equipment installed not the complete "line" of the Manufacturer. Where sheets show the equipment installed and other equipment, the installed equipment shall be neatly and clearly identified on such sheets. Parts lists shall give full ordering information assigned by the original parts manufacturer. Relabeled and/or renumbered parts information as reassigned by equipment supplier is not acceptable. The following information shall be provided for each device:

1. Manufacturer's name, address and phone number.
2. Local supplier's name, address and phone number.
3. Complete parts lists, including quantities and manufacturer's part numbers.
4. Installation instructions.
5. Recommended maintenance items including maintenance procedure and recommended interval of maintenance listed in hours of operation, calendar unity or other similar time unit.

D. The O & M Manual shall be assembled as detailed in Section 017000. As a minimum, the following sections shall be broken out:

1. Light Fixtures
2. Lamps and Ballasts - referenced to each fixture type
3. Motor Controls

E. Wiring Diagrams for each system shall be complete for the specific system installed under the Contract. "Typical" Line Diagrams will not be acceptable unless properly marked to indicate the exact field installation.

1.16 WORK NOT INCLUDED

A. Indicated motors, controls, and equipment as described in other divisions shall be furnished by other trades, but shall be moved, set and wired to electrical controls and power supply by the Electrical Contractor.

B. Work to be included under this Contract shall be defined on drawings and in these specifications. Any details beyond these limits are meant only to give installation clarity to that portion which is a part of this Contract.

1.17 INSTRUCTION PERIODS

A. Upon completion of the work and after all tests and final inspection of the work by the authority(s) having jurisdiction, the Contractor shall demonstrate and instruct the Owner's designated operation and maintenance personnel in the operation and maintenance of the various electrical systems. The Contractor shall arrange scheduled instruction periods with the Owner. The Contractor's representatives shall be superintendents or foremen knowledgeable in each system and suppliers representatives when so specified.

B. Costs for time involved by Contractor shall be included in the bid.

1.18 COMPLETION OF WORK

A. Upon completion of the Division 26 work, the Contractor shall comply with requirements of Section 017000 for project closeout.

B. Arrange for and obtain all required inspections and certificates pertaining to the Division 26 work and deliver the certificates to the Engineer in triplicate.

C. Prior to or at the time of final inspection, the Contractor shall, as outlined in detail in the specifications, complete the delivery of all the following items:

1. Completion Letter
2. Certificate of Final Inspection, in triplicate form.
   Electrical Inspector COMPLETION OF WORK
   260000 – 1.17

3.	Warranty to Owner (with copy for Engineer	SUPPLEMENTARY GENERAL CONDITIONS 260000- 1.13
4.	Marked Set, Electronic Media Set on CD in AutoCAD R-2013 Format, and Mylar Set of " As-Built" Electrical Drawings	GENERAL AS-BUILT DRAWINGS 260000– 1.12
5.	* Receipt from person to whom delivered the following spare glasses, plastic diffusers, lamps, and ballast fuses.	LIGHTING FIXTURES 265000
6.	Wiring diagrams, Maintenance Manuals, Operation Instructions, and Brochures (5 sets minimum)	GENERAL, INSTRUCTIONS & MANUALS – 260000– 1.14

* Secure delivery instructions from Architect for delivery to Owner.

1.19 SHOP DRAWING SUBMITTALS

A. The Contractor shall submit to the Architect as described in Section 016000.

B. Shop drawings shall be submitted complete, at one time and each item indexed with dividers and separated per specification section and shall be, but not limited to the items of equipment listed below:

1. Disconnect Switches
2. Fuses
3. Lighting Fixtures (Complete)
4. Wiring Devices
5. Back Boxes
6. Coverplates
7. Raceways and Connectors
8. Copper Wire

*See Section 270000 for further requirements.

C. Within 10 working days after the date of the letter rejecting any items of equipment, lighting fixtures, or materials as not in accordance with the specifications, Contractor shall submit a new list of items he proposes to furnish and install in place of those items rejected. If the Contractor fails to submit this new list within the above specified time, or if any items on this second list are rejected as not being in accordance with these specifications, the Engineer may select the items which the Contractor shall furnish and install without change in Contract price or time of completion.

D. The acceptance of a manufacturer's name or product by the Engineer does not relieve the Contractor of the responsibility for providing materials and equipment which comply in all details with the requirements of the Contract Documents. The Contractor shall be solely responsible for submitting materials at such a time to allow a minimum of two weeks for Engineer's review.

E. Electrical Drawings for the project have been developed by the Engineer using AutoCAD™ Revision 2012 software. These drawing files will be made available to the Contractor for development of shop drawings and/or "As-Builts" for a fee of $20.00 per sheet.

1.20 SCHEDULE OF VALUES

A. Provide Schedule of Values per Division 1 and related project requirements.

B. Division 26 Breakdown: Provide schedule of values for the following categories (as a minimum):

1. Electrical Mobilization
2. Electrical Submittals
3. Electrical General Project Management, General Design, General Coordination
4. Branch Circuit Materials Rough-in
5. Branch Circuit Materials Rough in – Labor
6. Branch Circuit Trim – Materials
7. Branch Circuit Trim – Labor
8. Light Fixtures
9. Light Fixtures – Labor
10. Intercom
11. Commissioning
12. Electrical Punchlist, Closeout, and Owner Training

C. The dollar value for "Electrical Punchlist, Closeout, and Owner Training" shall in no case be less than 2% of the total dollar value of the Division 26 work (or as indicated in Division 01, whichever is higher).

D. The Contractor is advised that in addition to payments held out for retainage and project final completion (i.e. "Electrical Punchlist, Closeout, and Owner Training"), as specified above and in Division 1, the Owner reserves the right to withhold 10% of the funds for any of the above categories until the systems (of that category) have been proven to operate as specified and have been completely tested and adjusted.

PART 2 - PRODUCTS

2.1 COMPETITIVE PRODUCTS

A. Any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. The Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Engineer, expressed in writing, is equal to that specified. However, any manufacturer not listed as an accepted Bidder for a specific item must be submitted for acceptance in writing in accordance with Section 016000.

2.2 MANUFACTURER/EQUIPMENT PRIOR APPROVALS

A. Any manufacturer/equipment not listed as an approved substitute for a specified item must be submitted for acceptance in accordance with Section 016000, in writing, with detailed information to include:

1. Manufacturer's Catalog Data
2. Complete Physical and Technical Data
3. Wiring Diagrams
4. Detailed reference (written or highlighted) noting compliance with the appropriate Specification Section and all applicable Specification item numbers within that Section
5. Complete type written index cross referencing all proposed substitutes and specified items
6. Detailed reference to specified items (written or highlighted) noting equal quality and performance of proposed substitute equipment
7. Other descriptive data, as required by the Engineer

B. If substitute material is determined to be acceptable by the Engineer, it will be included in a subsequent Addenda, prior to bidding. The acceptance of a manufacturer's name or product by the Engineer does not relieve the Contractor of the responsibility for providing materials and equipment which comply in all details with the requirements of the Contract Documents.

C. Only materials which are specified or published in addenda as acceptable shall be used.

2.3 MATERIALS

A. All materials must be of the quality herein specified. All materials shall be new, of the best quality and free from defects. They shall be designed to ensure satisfactory operation and operational life in the environmental conditions which will prevail where they are being installed.

B. Each type of material shall be of the same make and quality. The materials furnished shall be standard products of the manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design.

C. All materials shall be U.L. or E.T.L. listed for the purpose for which they are used.

D. Equipment in compliance with U.L. standards but not bearing their label is not acceptable. If the manufacturer cannot arrange for labeling of an assembled unit at the factory the unit shall be field evaluated per the Washington State Administrative Code (WAC) and the electrical inspector's requirements.

2.4 COMPLETE SYSTEM

A. All the systems mentioned shall be complete and operational in every detail except where specifically noted otherwise. Mention of certain materials in these specifications shall not be construed as releasing the Contractor from furnishing such additional materials and performing all labor required to provide a complete and operable system.

2.5 NAMEPLATES

A. Provide nameplates constructed of plastic (black on white) laminated material engraved through black surface material to white sublayer (attach with screws on NEMA 1 enclosures). EXCEPTION (1): Emergency distribution system component labeling - white letters on red background. Exception (2): Series rated systems shall be yellow background with white letters.
   1. Switch and Receptacle Labels: Refer to Section 262726
   2. Motor Starter and Disconnect Labels: Refer to Section 262816
   3. Special Equipment/Outlet Labels: Refer to Appropriate Sections.

PART 3 - EXECUTION

3.1 GENERAL

A. Careful consideration shall be given to clearances under and over beams, pipes and ducts, to provide proper headroom in all cases. Check drawings to determine heights of all suspended ceilings and size of pipe shafts where raceway and wire-ways shall run. Coordinate installation of Division 26 wiring and equipment with Division 23 and other trades. Where insufficient room for proper installation appears, obtain clarification from Engineer before any installation is begun.

B. Cutting and Patching:
   1. Obtain permission from the Architect and/or Owner's Representative prior to cutting. Locate cuttings so they will not weaken structural components. Cut carefully and only the minimum amount necessary. Cut concrete with diamond core drills except where space limitations prevent the use of such drills.
   2. All construction materials damaged or cut into during the installation of this work must be repaired or replaced with materials of like kind and quality as original materials by skilled labor experienced in that particular building trade.

3.2 COORDINATION

A. The Contractor is responsible for accomplishing Division 26. The work shall coordinate with that of the other Contractors and/or other trades doing work in the building and shall examine all Drawings, including the several Divisions of Mechanical, Structural, Civil and Architectural, for Construction Details and necessary coordination. Specific locations of construction features and equipment shall be obtained from the Contract Documents, field measurements, and/or from the trade providing the material or equipment. No extra costs will be allowed for failure to obtain this information.

B. All conflicts shall be reported to the Engineer in writing before installation for decision and correction. Special attention is called to the following items:

   1. Switches located on "strike" side of door.
   2. Location of grilles, pipes, sprinkler heads, ducts and other mechanical equipment so that all electrical outlets, lighting fixtures and other electrical outlets and equipment are clear from and in proper relation to these items.

3. Location of cabinets, counters, and doors so that electrical outlets, lighting fixtures and equipment are clear from and in proper relation to these items.
4. Type and height of ceiling
5. All device measurements referenced on drawings or specifications are to be centered of device unless noted otherwise.

C. The Contractor will not be paid for work requiring reinstallation due to lack of coordination or interference with other Contractors or trades. This includes, but is not limited to, removing, replacing, relocating, cutting, patching, and finishing.

D. Device and fixture locations may be changed within 15 feet without extra charge if so desired by the Engineer, before installation.

3.3 REQUESTS FOR INFORMATION (RFI)

A. It is our intent to provide a timely response for RFIs regarding Division 26 Work. To further expedite this process, where a suggestion can be determined or derived at by the initiator of the RFI, it is required this suggestion be supplied with the submitted RFI. If no suggestion is given where one is possible, the RFI will be returned as incomplete.

3.4 CLEANING AND PAINTING

A. All equipment, whether exposed to the weather or stored indoors shall be covered to protect it from water, dust and dirt.

B. After installing, all metal finishes shall be cleaned and polished, cleaned of all dirt, rust, cement, plaster, grease and paint.

C. All equipment with a primer coat of paint shall be given two (2) or more coats of a finish enamel and scratched surfaces be refinished to look like new. Markings, identification and nameplates shall be replaced.

3.5 EQUIPMENT IDENTIFICATION

A. Provide identifying engraved bakelite nameplate on all equipment, including pull boxes, to clearly indicate its use, area served, circuit identification, voltage, and any other useful data.

B. Each auxiliary system, including communications, shall be clearly labeled to indicate its function.

3.6 DEVIATION

A. Deviation from the shop drawings in construction or installation of equipment shall not be made unless Shop Drawings showing proposed deviations are submitted to and approved by the Engineer. If any equipment is furnished under this or other divisions with current, voltage or phase ratings that differ from those shown on the drawings, the Contractor shall notify the Engineer in writing immediately and shall not connect said equipment until instructed as to

required changes by the Architect. No extension of time will be granted as a result of such changes.

3.7 EXCAVATIONS

A. All excavations are to be so conducted so that no walls or footings shall be disturbed in any way.

B. Remove all surplus earth not needed for backfilling and dispose of same as directed.

3.8 WIRING METHODS

A. All low voltage wiring shall be in Raceway with Junction Boxes and Fittings where concealed in walls and in inaccessible ceiling space.

B. All branch circuit, signal and communication wiring shall be installed in raceway with junction boxes and fittings.

C. Provide access panels as needed for pull boxes and equipment located above ceiling or behind walls.

D. Multiple feeder runs shall be rod-hung, using a strut-type channel with individual one-hole clamps, back-plates and machine screws.

E. Any low voltage cables that are not terminated at both ends shall be tagged and labeled per code.

F. See Section 270000 for additional requirements of low voltage systems.

3.9 PENETRATIONS OF FIRE RATED ELEMENTS

A. Must be made such as to retain that rating.

3.10 HANGERS AND SUPPORTS

A. Provide hangers, brackets, and suspension rods and supplementary steel to support equipment.

B. Hangers provided under other divisions shall not be used for support of Division 26 equipment unless permitted by Architect/Engineer.

3.11 CHASES AND OPENINGS

A. Provide to the masonry and concrete trades all templates and details of chases, openings in floors and walls as required for Division 26 equipment installation.

3.12 PAINTING

A. Painting in general will be covered under another division of this specification, except items furnished under Division 26 that are scratched, marred in shipment or installation, shall be refinished by the Division 26 Contractor.

3.13 WORKMANSHIP AND OBSERVATION

A. Workmanship shall be of the best quality and none but competent workers shall be employed under the supervision of a competent foreman. All completed work shall represent a neat and workmanship like appearance.

B. All work and materials shall be subject to observation at any and all times by representatives of the Engineer.

3.14 MISCELLANEOUS

A. Provide complete seismic anchorage and bracing for the lateral and vertical support of conduit and electrical equipment, as required by the International Building Code.

B. Conduits that cross seismic separations shall be installed with flexible connections suitable to accommodate conditions. Secure raceways on each side of a separation and provide a minimum of 36” length of flexible conduit to span separation.

3.15 CABLE AND WIRING ROUTED UNDERGROUND OR UNDERSLAB

A. All cables and conductors, both line voltage and low voltage, routed underground or underslab, shall be U.L. listed for installation in wet locations, per NEC and WAC codes.

END OF SECTION 260000

SECTION 260519 - WIRES AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 WORK INCLUDED

A. Provide all wire, cable, and terminations complete.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE (COPPER, 600-VOLT)

A. Interior and Above Grade: All wires to be Type THW or RHW. Type THWN/THHN or XHHW wire may be utilized at Contractors option, subject to code requirements. Wire and cables shall be brought to project in original containers bearing the underwriters label. Provide Type AVA wire where conductors are subject to temperature above 167 Degrees F.

B. Underground: All conductors to be type USE. Increase Raceway size when necessary to accommodate conductors per code. Exception: Underground conductors completely contained in code recognized Raceway and boxes may be Type THW, THWN or XHHW.

2.2 SPLICES

A. Above Grade: Solder-less type only. Pre-insulated "twist-on" type (limited to size #10 and smaller). Bolt on compression type with application of preformed insulated cover, heat shrinkable tubing or plastic insulated tape acceptable for all sizes.

B. Below Grade: Splices below grade shall be in handholes and shall be made watertight with epoxy resin type splicing kits similar to Scotchcast.

2.3 TERMINATIONS

A. Compression set, bolted or screw terminal.

B. Conductors #12 and smaller shall utilize eye or forked tongue type compression set terminator when termination is to a bolted or screw set type terminal block or terminal cabinet.

2.4 PLASTIC CABLE TIES

A. Nylon or equivalent, locking type.

PART 3 - EXECUTION

3.1 GENERAL

A. Install all wiring in Raceway unless shown or specifically authorized otherwise.

3.2 WIRE SIZE

A. No. 12 AWG minimum for power and lighting circuits.

B. Provide solid wire for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger (600) volts.

3.3 TESTS

A. In addition to the factory testing of all equipment and cable, the Contractor shall test all wiring connections for continuity and ground before any fixtures or other loads are connected. Tests shall be made with a 500V minimum DC "Megger" type tester. If tests indicate faulty insulation (less that 2 megohms), such defects shall be corrected and tested again. Contractor shall provide all apparatus to make tests and shall bear all expenses of required testing. Routine operation tests shall be made on all pieces of equipment to demonstrate that working parts are in operating condition. Results of all tests shall be recorded and submitted to the Architect. The Contractor shall immediately replace all parts, which fail to pass the test.

B. Measure the OHMIC value of the Electric Service Entrance metallic "System Ground" with reference to "Earth Ground" using the "Multiple Ground Rod Fall-In-Potential" method and suitable instruments. Maximum resistance to ground shall be less than 10 ohms. If this resistance cannot be obtained with the ground system shown, notify the Architect immediately for further instructions. Provide OHMIC test results to Engineer.

C. All circuits both in and out of the building shall test out free of grounds, short circuits and other defects.

D. Check and record catalog number and ampere size of controller overload heaters installed, nameplate full-load amperes, and actual operating amperes of each motor. IMPORTANT: Submit recorded data in triplicate to the Engineer. Check proper load balance on the electrical system, direction of rotation, lubrication, and overload protection of all motors before placing in operation.

E. Provide a log of ampere reading for all panels from phase to neutral for 4 wire panels and from phase to phase for 3 wire panels. These readings shall be taken with all loads activated.

F. The final test of all equipment shall be made on dates designated by the Architect/Engineer and all readings shall be made in his presence.

G. Feeders shall be checked to ensure all phases are energized before connecting to their respective motors. Each motor shall rotate in the proper direction for its respective load. Prior to rotation test, all bearings shall be inspected for proper lubrication.

H. Minimum megger test for equipment shall be as follows:

Equipment Maximum Voltage Rating	Minimum Test Resistance
1,000-Volts or less	2 Megohms

I. Provide certification of torque values for feeder and service entrance conductors per equipment manufacturer's recommendation.

3.4 CONDUCTOR SIZES, REFERENCED ON PLANS

A. Copper, type THW or RHW unless noted.

3.5 PULLING

A. Use no mechanical means for pulling No. 8 AWG conductors and smaller. Powdered soap stone or approved spray cream shall be the only lubricant used.

3.6 STRIPPING INSULATION

A. Do not ring the cable, always pare or pencil.

3.7 TAPING

A. If used shall be half lapped synthetic tape.

3.8 CONDUCTORS IN PANELS AND SWITCHBOARDS

A. Conductors in panels, switchboards, and terminal cabinets shall be neatly grouped and formed in a manner to "Fan" into terminals with regular spacing.

3.9 CABLE SUPPORTS

A. Provide conductor support devices as required by code in vertical cable runs.

3.10 RACEWAY SIZES REFERENCED ON DRAWINGS

A. Raceways are sized for copper, type THW, unless otherwise noted. Size all Raceways per code unless specifically noted to be larger on the drawings.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 WORK INCLUDED

A. A grounding system shall be provided for neutral ground and equipment ground as required by code.

B. An isolated grounding system shall be provided for all isolated ground receptacles as allowed by Code (2011 NEC 250-146, paragraph D).

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

A. Copper, code size, with physical protection where subject to damage. Bare or green insulated.

2.2 GROUND RODS

A. 3/4" x 8'-0" copper clad steel.

2.3 ISOLATED GROUND BARS

A. Provide in all panels containing isolated ground circuits.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide all grounding for electrical systems and equipment as required by codes and as specified herein.

3.2 GROUND RODS

A. Provide as shown and/or required. Connect the ground conductor to each rod.

3.3 SIZE OF GROUND WIRE

A. As required by code. Where ground wire is exposed to physical damage or is used outside of building, protect with conduit.

3.4 GROUND CONNECTION OF WATER PIPING

A. Metal internal piping shall be grounded, as part of this Contract. This includes jumpers for dielectric fittings.

3.5 GROUND CONNECTION OF BUILDING STEEL

A. Structural metal shall be grounded, as part of this Contract.

3.6 CONNECTION TO THE GROUND BUS

A. Provide connections in accordance with the codes; including but not limited to raceway systems, switchboard/panelboard frames, service neutral, separately derived systems, electrically operated equipment and devices. No device or equipment shall be connected for electrical service which has a neutral conductor connected to a grounding conductor or to the frame within the device or equipment.

3.7 METHOD OF CONNECTION

A. Make all ground connections and ground cable splices by thermal welding. Grounding lugs, where provided as standard Manufacturer's items on equipment furnished, may be used.

3.8 FLEXIBLE RACEWAY

A. Shall not be used for grounding. Install separate ground conductor in all flexible raceway.

3.9 PVC RACEWAY

A. Install separate ground conductor in all PVC raceway as required per code.

3.10 DROP CORDS

A. Shall have a grounding wire and be connected with a grounding type plug and receptacle.

END OF SECTION 260526

SECTION 260533 - RACEWAY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 WORK INCLUDED

A. Provide Raceway System complete.

PART 2 - PRODUCTS

2.1 GALVANIZED RIGID STEEL CONDUIT (GRS)

A. General: Hot dipped galvanized.

B. Fittings: Galvanized malleable iron or noncorrosive alloy compatible with galvanized conduit. Erickson couplings, watertight split couplings (O.Z. type or equivalent) permitted. Running thread or set screw type fittings not approved.

2.2 INTERMEDIATE METAL CONDUIT (IMC)

A. General: Hot Dipped galvanized.

B. Fittings: Galvanized malleable iron or noncorrosive alloy compatible with galvanized conduit. Erickson couplings, watertight split couplings (O.Z. type or equivalent) permitted. Running thread or set screw type fittings not approved.

2.3 ELECTRICAL METALLIC TUBING (EMT)

A. General: Hot dipped galvanized.

B. Fittings: Raintight; steel or malleable iron type using a split corrugated compression ring and tightening nut or stainless steel locking disc. Steel set screw fittings are acceptable. Indenter, drive-on and pressure cast or die cast type set screw are not acceptable.

2.4 FLEXIBLE METAL CONDUIT

A. Dry Locations:

1. General: Galvanized flexible steel for dry locations.
2. Fittings: Malleable iron or steel, Thomas and Betts "squeeze" type or equal.

B. Damp and Wet Locations:

1. Liquid Tight: Polyvinyl chloride (PVC) weatherproof cover over flexible steel conduit.
2. Fittings: Thomas and Betts "Super-Tite" or equal.

2.5 SURFACE METAL RACEWAY

A. Formed steel or aluminum type. Standard factory finish. Where color choice is available, consult Architect/Engineer for selection prior to ordering.

2.6 RIGID NON-METALLIC CONDUIT (PVC)

A. Schedule 40 rigid polyvinyl chloride type unless otherwise noted.

2.7 RIGID ALUMINUM CONDUIT

A. Permitted only in specified locations.

B. Fittings copper free cast aluminum.

PART 3 - EXECUTION

3.1 GENERAL

A. Install Raceway concealed in construction unless noted otherwise on the Drawings or specifically approved in writing by the Architect/Engineer.

B. Cut Raceway ends square, ream and extend maximum distance into all couplings and connectors.

C. Provide and install manufactured end caps on all Raceway ends during construction to prevent the entrance of water or dirt. Tape, as a cover, not permitted.

D. Swab out all Raceways before pulling wires.

E. All elbows for GRS and PVC Raceway shall be factory elbows. For all other Raceway, use factory ells for bends of 1-1/4" and larger diameter.

F. Raceway shall not penetrate sheet metal ducts unless permission is granted by Architect/Engineer. All sleeves shall be provided for Raceway installation.

G. Provide 2 - 3/4" C.O. stub into accessible ceiling space from all recessed panelboards or systems terminal boxes.

3.2 GALVANIZED RIGID STEEL CONDUIT

A. All Connections shall be watertight. Install for all Raceways in concrete or where subject to damage.

3.3 INTERMEDIATE METAL CONDUIT

A. Intermediate metal conduit is permitted as a substitute for galvanized rigid steel conduit except where GRS is required by code.

3.4 ELECTRICAL METALLIC TUBING

A. Install for wiring in masonry, frame construction, furred ceilings and above suspended ceilings. May be used for exposed work in unfinished areas where not subject to damage. Where construction involves masonry work, surface cut masonry units wherever such masonry units are to remain unplastered or uncovered in complete construction.

3.5 RIGID ALUMINUM CONDUIT

A. May be used in lieu of galvanized rigid steel conduit where Raceway is run above grade or inside of buildings; rigid aluminum conduit not permitted where Raceways are encased in or attached to concrete or are below grade.

3.6 RACEWAYS UNDERGROUND

A. Galvanized rigid steel conduit - painted with two coats of bitumastic paint - or galvanized rigid steel conduit with 15 mil. polyvinyl chloride (PVC) jacket (repair abrasions with PVC base paint or PVC)

B. PVC Raceways may be used for underground runs when permitted by code. Field bends, when necessary, shall be formed only with factory recommended heater. Penetrations through floor and walls shall be galvanized rigid steel conduit. PVC, if used, shall be increased in size from that shown to include code required ground wire. Bends in excess of 10 degrees shall be GRS.

C. Arrange and slope Raceways entering building to drain away from building.

D. Ground wires shall be provided in all PVC Raceway.

3.7 INSERTS, SHIELDS AND SLEEVES

A. Furnish and set in place, in advance of pouring slabs and walls, all inserts and sleeves needed to execute Division 26 equipment installation.

B. Where supports in slabs are required after wall has been poured, use a drilled-in threaded insert, installed as recommended by Manufacturer.

C. Sleeves shall be provided for all wall penetrations.

3.8 RACEWAYS THAT STUB UP THROUGH FLOOR

A. Install at such depth that the exposed Raceway is vertical and no curved section of the elbow is visible.

B. PVC Raceway shall not be stubbed through floors.

3.9 SEALING OF RACEWAY PENETRATIONS

A. Exterior Wall Surfaces Above Grade: Seal around all penetrations with caulking approved by Engineer. For concrete construction above ground level, cast Raceway in wall or core drill wall and hard pack with a mixture of equal parts of sand and cement.

B. Exterior Surfaces Below Grade: Cast Raceway into wall (or floor) or use manufactured seal assembly (such as O.Z. type "FSK") cast in place.

C. Roofs: Provide mopped, lead, roof jack where Raceway penetrates roof membrane.

D. Fire Rated Floors, Walls, Ceiling/Roofs: Concrete or masonry, seal around Raceway penetration with Dow Corning 3-6548 silicone RTV foam or approved equal. Plaster or gypsum wallboard, seal around Raceway penetration with plaster, fire tape per local Fire Marshal's requirements.

3.10 SEALING OF RACEWAYS

A. Seal interior of all Raceways which pass through buildings roofs, floors or through outside walls of the building, above or below grade. Seal on the end inside the building using duct sealing mastic, non-hardening compound type, specially designed for such service to maintain the integrity of the seal of the wall, floor or roof. Pack around the wires in the Raceways.

3.11 HANGARS FOR RACEWAYS

A. In suspended ceiling spaces Contractor may, at his option, attach 1/2" or 3/4" EMT Raceways to the ceiling suspension system where such system is structurally suitable; in which case, provide clips manufactured for the purpose.

B. When more than two Raceways will use the same routing, group together on a patented channel support system (such as Unistrut).

3.12 SURFACE METAL RACEWAY

A. Install parallel to building surface (i.e., wall, ceiling, floor). Fasten to surface as recommended by Manufacturer. Mount so Raceway is in the least obvious location.

3.13 FLEXIBLE CONDUIT

A. Flexible conduit shall be used only for connection to motors and equipment subject to vibration with 90 degrees loop minimum to allow for isolation and for lay-in fluorescent fixtures above T-Bar ceilings. For fixture installations, one end of flex must terminate in rough-in junction box. Flex conduit shall not be installed over 6' long or used to connect from fixture to fixture. Use liquid tight for pumps, equipment which is regularly washed down, and equipment in damp locations. Provide ground wire.

3.14 COLOR CODING

A. General: Provide color bands of tape or paint one inch (25 mm) wide for Raceways up to two inch (51 mm) in diameter and one-half the Raceway diameter for larger Raceways, applied at panel and pullbox locations within each room, and 50 ft. (15.25 m) on centers within an area.

B. Color Banding:
120/208 Volt ..... Gray

C. The colors shall match the colors used on the boxes - See Section 260532.

3.15 PULL CORDS

A. Nylon type shall be included in all installed empty Raceway.

END OF SECTION 260533

SECTION 262419 - MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 WORK INCLUDED

A. Work under this section includes all requirements for motor controls to be furnished under the electrical portion of the work on all electrical motor driven equipment. Individually mounted starters shall be provided by Division 26 Contractor. Motor controls shall conform to NEMA Standards for each specific purpose.

B. The Division 26 Contractor shall furnish all motor controllers not included with equipment furnished under other divisions of these specifications or by Owner. The Division 26 Contractor shall install all motor controllers including all controllers not factory assembled into equipment furnished under other divisions of these specifications or by Owner.

1.3 MOTOR VOLTAGE INFORMATION

A. Voltages available are 208 Volt, 3 Phase, and 115 Volt Single Phase.

B. Circuits are designed (in general) for motors as follows:

1. Smaller than 1/2 H.P. - 115 Volts, Single Phase 1/2 H.P. and larger - 208 Volts, 3 Phase

C. Verify motor sizes and voltages provided under other divisions and notify General Contractor immediately if any discrepancies are noted.

1.4 REGULATORY REQUIREMENTS

A. Provide motor protection switches of the appropriate NEMA size. For units not using NEMA rating, use equivalent NEMA size.

PART 2 - PRODUCTS

2.1 MOTOR STARTERS

A. Magnetic Motor Starters: Unless noted otherwise, shall be full voltage non-reversing with three overloads sized to suit nameplate amperes of motor served, motor "On" and "Off" pilot lights, "Hands-Off-Auto" switch, and auxiliary contacts for interlocking.

B. Combination Motor Starter/Disconnect: Shall be fused switch type with all features of Paragraph A above. In addition, provide disconnect switch auxiliary contacts for disconnection of externally powered control circuits where applicable. Fuses shall be sized in accordance with motor manufacturer's requirements.

C. Manual Starters: Shall be toggle switch or push-button type, lockable in the "Off" position, with overload relays, pilot light and enclosure pursuant to Paragraph D below. Manual starters shall only be used where specifically shown or called out on the drawings and only for single phase, fractional horsepower motors.

D. Enclosures: All motor controllers shall be contained in an enclosure suitable for the environment in which the controller is mounted, and shall be weatherproof when exposed to weather.

E. Overload Devices: Shall be melting alloy or bimetallic type. One overload shall be provided for each phase. Provisions shall be made for resetting the overload devices from outside the starter enclosure. Provide ambient compensated overload devices only when the motor is at a constant temperature and the controller is subject to a separate, varying temperature. Automatic reset overload devices are not permitted.

2.2 ACCEPTABLE MANUFACTURERS

A. Square D

B. Allen Bradley

C. General Electric

D. Cutler-Hammer

2.3 NAMEPLATES

A. Pursuant to Section 260000, Paragraph 2.05, provide nameplates permanently attach (with screws on NEMA 1 enclosures) on each controller, nameplates with the following information: Load served, voltage, phase, short circuit rating, panel/circuit number and where applicable fuse size and type.

2.4 FAN SHUTDOWN RELAYS

A. Contractor shall provide relay(s) with sufficient contacts to shutdown all fans over 2000 cfm upon receipt of Fire Alarm. See Section 283100. Coordinate coil voltage with Fire Alarm System Supplier.

2.5 POWER FACTOR CORRECTION

A. Provide power factor correction capacitors for all motors 25 horsepower and above. Capacitor size when indicated on the drawings is an approximation only. Final size shall be determined by the Contractor based on the recommendations of the motor manufacturer to bring the power

factor to between 0.9 and 0.95. All capacitors are to be fused, with blown fuse indicators mounted on the front of the unit. Provide discharge resistors when required by code.

PART 3 - EXECUTION

3.1 FINISHED AREAS

A. In finished areas, mount motor protection switches flush and install suitable coverplates.

3.2 HEATERS

A. Install heaters co-related with full-load current of motors provided.

3.3 OVERLOADS

A. Set overload devices to suit motors provided.

3.4 SUPPORTS

A. Securely mount to equipment, wall or acceptable mounting frame.

3.5 MECHANICAL EQUIPMENT NAMEPLATE RATINGS

A. The Division 260000 Contractor shall verify that the nameplate ratings of the mechanical equipment, when they arrive on site, are consistent with the ampacity called out on the drawings. The Contractor shall bring any discrepancies to the Engineers attention prior to installation of conduit and wiring.

END OF SECTION 262419

SECTION 311000 - SITE CLEARING AND SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. In general, work of this section includes, but is not limited to the following:

1. Protecting existing vegetation to remain.
2. Removing existing trees and other vegetation within clearing limits.
3. Clearing and grubbing within clearing limits.
4. Stripping and stockpiling topsoil.
5. Removing surface features including, but not limited to concrete, asphalt, concrete retaining walls, fences, etc.
6. Disconnecting, demolition, and capping existing utilities.
7. Potholing existing utilities at points of connection identified on plans.
8. Protect existing utilities to remain.

B. Related Sections:

1. Sections 1-07.16(1) and 1-07.16(3) in “Protection and Restoration of Property” for temporary utility services, construction and support facilities, security and protection facilities.
2. Section 312513, “Erosion Control” for temporary erosion control measures and requirements of the National Pollutant Discharge Elimination System (NPDES) under the Washington State Department of Ecology’s (DOE) General Permit for Stormwater Discharges from Construction Activities.
3. Section 312000, “Earth Moving” for soil materials, excavation, backfilling, and site grading.

1.3 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: See Landscape Definitions.

D. Utilities: Underground pipes, vaults, conduits, ducts, and cables, as well as underground services within buildings.

E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.

G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other manmade stationary features constructed above or below ground surface.

1.4 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Submit under provisions of Section 1-06 "Control of Materials."

B. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

C. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

A. Maintain at least one copy of the WSDOT Specifications and project plans and specifications onsite.

B. Field inspection of Erosion Sediment Control measures will be performed by the Contractor as required by the City of Fife and DOE permits.

C. Tests and analysis of aggregate material will be performed in accordance with ANSI/ASTM D1557, ASTM D2922, ASTM D3017, ASTM D4318, and ASTM C136, as applicable.

D. If tests indicate materials do not meet specified requirements, change material and retest or obtain written approval of the Engineer. Costs associated with the retesting of materials will be the responsibility of the Contractor.

E. Pre-installation Conference: Conduct conference at project site to comply with requirements in Sections 1-04 "Scope of Work" and 1-05 "Control of Work."

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

C. Utility Locator Service: Contractor shall utilize a utility locate service and shall notify affected utility companies before starting work. Contractor shall comply with all of said utility companies' requirements.

D. The locations of existing underground utilities are approximate only, and have not been independently verified by the Owner or the Owner's Representative. The Contractor shall determine the exact locations of all existing utilities before commencing work. All damages that happen due to the Contractor's failure to locate exactly and preserve all underground utilities that are designated to remain shall be repaired at Contractor's own expense.

E. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

1.8 REGULATORY REQUIREMENTS

A. Conform to all City of Fife requirements of NPDES under the DOE General Permit for Stormwater Discharges from Construction Activities. See Section 312513, "Erosion Control" for additional information.

B. Conform to applicable agency code for dust control, runoff control, and disposal of the demolished material.

C. Obtain, post, and pay for required permits from authorities according to provisions of the Contract, including General and Supplemental Conditions and Division 01 Specification Sections.

D. Notify affected utility companies before starting work and comply with their requirements.

E. Do not close or obstruct roadways, sidewalks, or hydrants without appropriate permits or written authorization. Maintain emergency access as required by the local jurisdiction.

F. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials, or when uncovering buried tanks.

G. Pay all related disposal fees and charges and conform to all regulations for materials disposed offsite, including asbestos-lined cement water main, asbestos-containing building materials, storage tanks, tires, appliances, and any environmentally hazardous substances.

H. Conform with DOE and Environmental Protection Agency (EPA) requirements for removal and disposal of all hazardous substances including but not limited to, asbestos, articles containing PCBs and storage tanks.

1.9 REFERENCE STANDARDS

A. WSDOT Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2014 edition. All references to measurement and payment shall be deleted from consideration, and terms agreed to in the Contract substituted therefore.

B. WSDOT Standard Plan: Standard Plans for Road and Bridge Construction, prepared by the Washington State Department of Transportation, current issue in effect at the bid date.

C. Conform to OSHA (Occupational Safety and Health Act) requirements.

D. Conform to WISHA (Washington State Industrial Safety and Health Act) for trench safety.

1.10 COORDINATION

A. Coordinate work under provisions of Sections 1-04 “Scope of Work” and 1-05 “Control of Work.”

1.11 INTENT

A. It is the intent of this Specification that the Contractor provide the Work defined herein complete in every respect, and in accordance with good practices involved in the clearing and demolition of site improvements above and below surface grade, and the requirements of this Specification, regardless of whether or not full details of such completeness, workmanship, or practices are contained herein.

B. It is the intent of the Work under this Contract to conduct all clearing and demolition necessary to complete all of the Work of this project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that clearing limits are identified and consistent with proposed improvements.

C. Mark location of utilities to be removed or relocated.

D. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

E. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

F. Schedule and conduct pre-work conference with Owner, Architect, City, and Utility Company representative.

G. Protect existing site improvements to remain from damage during construction.

H. Restore damaged improvements to their original condition, as acceptable to Owner.

I. Provide, erect, relocate, and maintain temporary barriers and security devices as required by Sections 1-07.16(1) and 1-07.16(3) in "Protection and Restoration of Property." Facilities shall conform to Manual of Uniform Traffic Control Devices (MUTCD) and City of Fife requirements.

J. Restrict site access to the designated construction entrance and as authorized by Owner.

K. Conform to construction sequence as indicated on the plans.

L. Provide neat sawcut at meet line with adjacent concrete or asphalt pavement to remain.

M. Conform to local jurisdiction and utility requirements for removal of underground tanks.

N. Pothole and locate utilities at all locations where a proposed utility will cross or connect to an existing utility. Verify clearances and tie-in elevations prior to commencing work. Coordinate with Engineer where conflicts occur. Backfill potholes with Aggregate for Gravel Base, WSDOT 9-03.10.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining onsite as specified on the plans.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Execution: Verify that the limits of clearing and demolition are defined. Mark location of utilities. Clearly and separately identify the location of utilities near the demolition area that are not to be demolished. Conduct demolition activities to avoid interrupting services to utilities that remain.

B. Contractor will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

C. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place. Demolished materials shall be removed and disposed of offsite by the Contractor at an approved disposal area.

D. Utility pipelines to be demolished should be capped at the property line or as shown on the plans. Demolished materials shall be removed and disposed of offsite by the Contractor in an approved disposal area. The utility removal trenches shall be backfilled as required under Section 312000, “Earth Moving.”

E. Locate, identify, and disconnect utilities indicated to be abandoned in place.

F. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than 2 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect’s written permission.

G. Contractor shall provide coordination with all serving utility agencies.

H. Contractor shall not damage existing utilities to remain and shall include in the Base Bid all costs to clean and repair any disturbed utility to remain.

I. If workers enter any trench or other excavation 4 feet or more in depth that does not meet the open pit requirements of WSDOT Section 2-09.3(3)b, it shall be shored and cribbed. All trench safety systems shall meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW.

J. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions, and grubbing roots.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Completely remove stumps, roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.

B. Fill depressions caused by clearing and grubbing operations with appropriate fill material unless further excavation or earthwork is indicated.

C. Remove debris, rock, and extracted plant life from site and haul to an approved offsite disposal location. Do not burn or bury materials onsite.

D. Within a distance of 10 feet beyond the proposed building footprint, all roots and organic matter shall be removed and disposed offsite at an approved location.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil, and dispose of sod, grass, and roots offsite at an approved location.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying non-organic subsoil.

1. Strip surface soil of unsuitable topsoil including trash, debris, weeds, roots, and other waste materials and remove from project site.
2. Consult Geotechnical Study regarding depths of topsoil likely to be encountered.
3. Topsoil may be used on the project site as indicated on the Landscape drawings and specifications.
4. Contractor shall be responsible for any screening or amending as required by Landscape documents.
5. Topsoil stockpiles intended for use shall be covered with plastic and secured.

3.7 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent improvements.

B. Conduct operations with minimum interference to public or private accesses. Maintain protected egress and access at all times.

C. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property.

D. Sprinkle work with water to minimize dust. Provide hoses, hydrant meters, backflow prevention, and water connections for this purpose per requirements of the City of Fife.

E. Remove and dispose of existing asphalt pavement as indicated. Asphalt materials shall be removed from the site and shall be disposed of at an agency-approved location for acceptance of asphalt materials.

F. Remove demolished plant materials and miscellaneous demolition debris from site and haul to an approved disposal location.

G. Burial or burning of material to be removed is not permitted onsite. Maintain site in clean condition.

H. Blasting is not allowed.

I. Pay all related disposal fees and charges for materials disposed of offsite, including asbestos-containing materials if applicable, appliances, and misc. debris.

3.8 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Concrete walks shall be removed to nearest construction joint as approved by engineer.
3. Replace materials designated to remain that are damaged due to Contractor's operations at no additional cost to owner.

C. Contractor shall review topographical survey construction documents, geotechnical reports, and environmental reports, and shall visit the site in order to make his own determination of the site improvements to be demolished and removed, and shall include all associated costs for removal of above- and below-grade improvements in his bid.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 – EARTHMOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
2. Excavating and backfilling for structures.
3. Subbase course for concrete walks and pavements.
4. Subbase course and base course for asphalt paving.
5. Subsurface drainage backfill for walls and trenches.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.
7. Wet weather earthwork.
8. Rough and final grading the site.

B. Related Sections:

1. Sections 1-07.16(1) and 1-07.16(3) in "Protection and Restoration of Property" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
2. Divisions 21, 22, 23, 26, 27, 28, and 33 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
3. Section 311000 "Site Clearing and Site Demolition" for site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.
4. Section 312513 "Erosion Control" for temporary erosion control.
5. Sections 329113 "Soil Preparation," 329222 "Top Sand," and 329223 "Sodding" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
6. Section 329000 "Planting" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 REFERENCE STANDARDS

A. WSDOT Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2014 edition**.** All references to measurement and payment shall be deleted from consideration; and the terms agreed to in the contract substituted therefore.

B. WSDOT Standard Plan: Standard Plans for Road and Bridge Construction prepared by the Washington State Department of Transportation, current issue in effect at the bid date.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from offsite for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work**.**
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: Onsite underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

L. Wet Weather Earthwork: Earthwork performed between October 1 and April 30, or during wet weather, regardless of the time of year.

1.5 SUBMITTALS

A. Samples for the following:

1. 30-lb. samples sealed in airtight containers, of each proposed soil material from onsite or borrow sources. Submit samples to City Engineer at least 72 hours in advance of intended use.

B. Submit under provisions of Section 1-06 “Control of Materials” and as further provided.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each onsite or borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D1557 for each onsite or borrow soil material proposed for fill and backfill.

D. Certification:

1. Provide a letter, signed by the supplier and reviewed and also signed by an officer of the general contractor’s company, certifying that the following products to be incorporated into the work to meet the requirements specified.
2. Products

a. Crushed Surfacing
b. Imported Structural Fill
c. General Site Fill
d. Gravel for Pipe Bedding
e. Gravel Backfill for Trench Backfill
f. Quarry Spalls
g. Pea Gravel
h. Gravel Backfill for Drywells
i. 1/4-Inch Minus Crushed Rock

E. Pre-Excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE

A. Field inspection and testing will be performed by the City Engineer.

B. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

C. Pre-Excavation Conference: Conduct conference at City of Fife City Hall or project job trailer.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

D. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Sections 1-07.16(1) and 1-07.16(3) in "Protection and Restoration of Property" and Section 312513 "Erosion Control," are in place.

E. Do not commence earth moving operations until plant-protection measures specified on the plans are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

1.8 REGULATORY REQUIREMENTS

A. Secure site development and right-of-way use permits and conform to permit requirements.

B. Conform to agency codes for dust control, runoff control, and disposal of demolished and cleared materials.

C. Notify affected utility companies before starting work and comply with their requirements.

D. If any materials that appear to be hazardous are encountered during excavation, discontinue work and immediately notify both Owner and Architect.

E. Contractor shall pay all applicable fees for permits not already acquired by owner.

1.9 INTENT

A. It is the intent of this Specification that the Contractor provide the Work defined herein, complete in every respect, and in accordance with the good practices of the trades involved in the excavation, transport, placement, grading, backfilling and compaction of earthen materials and the requirements of this Specification, regardless of whether or not full details of such completeness, workmanship, or practices are contained herein.

B. It is the intent of this Specification that all Work comply with all applicable federal, state, and local codes, ordinances, and regulations. Nothing in the Specifications or Drawings is to be construed to allow Work not conforming to such codes. Contractor shall be responsible for complying with the regulations and code requirements.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, SW, and SP according to ASTM D 2487 or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, GP, SC, SP, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. General Site Fill: WSDOT Specification 9-03.14(3), Common Borrow or Onsite Materials free of sod, organic, vegetative and other deleterious materials containing less than 15 percent passing a US No. 200 Sieve based on the fraction passing the US No. 4 sieve.

E. Gravel Backfill for Trench Backfill: WSDOT 9.03.19, Bank Run Gravel for Trench Backfill.

F. Gravel for Pipe Bedding: Conform to WSDOT Specification 9-03.12(3), Gravel Backfill for pipe zone bedding.

G. Crushed Surfacing: WSDOT Specification 9.03.9(3) for crushed surfacing top and base course.

H. Quarry Spalls: WSDOT Specification 9-13.6.

I. Imported Structural Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

J. Pea Gravel: 3/8 inch.

K. Gravel Backfill for Drywells: WSDOT Specification 9-03.12(5).

L. Crushed Rock for Surfacing:

1. 1/4-Inch Minus Crushed Rock (#4 to Dust), Crushed Rock Surfacing shall be manufactured from ledge rock, talus, or gravel in accordance with the provisions of WSDOT Specification Sections 3-01 and 9-03 for Crushed Surfacing Top Course, except that it shall meet the following specifications for grading:

Sieve Size	Percent Passing
No. 4 sieve	98 - 100
No. 10 sieve	55 - 60
No. 40 sieve	18-20
No. 200 sieve	4-6

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced. Conform to WSDOT Specification 9-33.

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
4. Tear Strength: 56 lbf; ASTM D 4533.
5. Puncture Strength: 56 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.1 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced. Conform to WSDOT Specification 9-33.

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 90 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.

6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

D. Verify survey control elevations and protect survey controls and benchmarks.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

C. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

E. Contractor shall include dewatering for the construction of building foundations, installation of utilities and excavations in the Base Bid.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Contractor shall make their own determination regarding the import of fill materials or the hauling offsite of excess materials as necessary to attain the indicated elevations. Import of fill material and the hauling offsite of excess material shall be included in the Base Bid. Removal of all displaced soil from utility trench and footing excavations shall be included in the base bid.

C. Fill and backfill materials may be stockpiled in areas onsite that do not interfere with other portions of the work. Contractor shall protect stockpiled soils from wind or erosion by covering with plastic sheeting and securing, or other effective methods. Remove subsoil not being reused from site. Shortage of material caused by premature disposal of any material by the Contractor shall be replaced by the Contractor at their own expense.

D. Direct surface water away from excavation and stockpile site to prevent erosion or deterioration of materials.

E. Remove soil stockpiles; leave area in a clean and neat condition. Grade site surface to prevent standing surface water.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a minimum of 5 feet and a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements specified on the plans.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches unless otherwise indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
4. Excavate trenches 6 inches deeper than elevation required to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements specified on the plans.

3.8 SUBGRADE INSPECTION

A. Notify City Engineer when excavations have reached required subgrade.

B. If City Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy, pneumatic-tired equipment, such as a fully loaded dump truck weighing not less than 15 tons, to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Proof-roll shall be observed by City Engineer.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by City Engineer, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by City Engineer, without additional compensation.

3.9 OVER-EXCAVATION

A. Subgrade areas shall be examined and approved by the City Engineer.

B. Where the undisturbed condition of native soils or where the excavated subgrade is inadequate for support of the planned construction, the Contractor will be directed in writing by the City Engineer to perform over-excavation to adequate supporting soils. The in-place volume to be excavated shall be determined and agreed upon by the Owner and Contractor prior to commencement of work. The excavated space shall be filled and compacted to the adjacent grade elevation with Imported Structural Fill material. The excavated material shall be disposed of offsite at a permitted location.

C. Authorized over excavation and associated backfill shall be quantified at the time of work by the Owner and agreed upon by the Contractor. Payment shall be based on the agreed quantity as measured and determined by the City Engineer, and according to contract provisions for changes in the work.

D. An adjustment of the Contract Sum and Contract Time shall not be considered or provided for over-excavation work at or below subgrades that become unsuitable because they are left exposed, saturated, damaged, or adversely affected by the Contractor's work.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
2. Stockpiled soil materials shall be protected from rain by covering with plastic sheeting in accordance with WSDOT 8.01.3(4).

3.12 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
8. Subgrade shall be inspected and approved by the City Engineer.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.13 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

D. Backfill voids with gravel backfill soil while removing shoring and bracing.

E. Place and compact initial backfill of specified material (gravel backfill), free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
2. Trench backfill greater than 2 feet below finish grade shall be compacted to at least 90 percent of maximum dry density based on ASTM D1557.
3. Trench backfill less than 2 feet below finish grade shall be compacted to at least 95 percent of maximum dry density based on ASTM D1557.

F. Cobbles and boulders shall not be used for trench backfill.

G. Place and compact final backfill of specified material (gravel backfill) soil to final subgrade elevation.

H. Coordinate backfilling with utilities testing.

I. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 SOIL FILL

A. Fill areas to contours and elevations indicated with unfrozen materials conforming to the requirement for type of fill material specified.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. General Site Fill:

1. For general site grading, provide moisture-controlled General Site Fill material which is approved for re-use as determined by the City Engineer. Contractor shall moisture-condition soils as necessary to meet compaction requirements.

2. When directed by the City Engineer, soils contaminated with deleterious material or which are soft and yielding shall be over-excavated and replaced with Structural Fill.
3. Contractor shall make their own determination regarding the import of fill materials or the hauling offsite of excess materials as necessary to attain the indicated elevations. Import of fill material and the hauling offsite of excess material shall be included in the Base Bid. Removal of all displaced soil from utility trench and footing excavations shall be included in the base bid.

D. Pavement and Surfacing Fill

1. Provide Structural Fill at all paved and surfaced embankment areas. Extend the embankment at least 5 feet beyond asphalt paved areas.

E. Fountain Fills:

1. All fill below the fountain plaza shall be Imported Structural Fill as approved by the City Engineer.
2. Contractor shall make their own determination regarding the import of fill materials or the hauling offsite of excess materials as necessary to attain the indicated elevations. Import of fill material and the hauling offsite of excess material shall be included in the Base Bid. Removal of all displaced soil from utility trench and footing excavations shall be included in the base bid.

F. Place fill material in continuous layers and compact to a firm and unyielding condition. Unless directed otherwise by the City Engineer, compact all fills, in loose layers not exceeding 8 inches, with approved mechanical compacting devices and material to attain the required minimum compaction.

G. Make grade changes gradual. Blend slopes into level areas.

3.15 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
3. Limit the areas that are stripped of topsoil and exposed during wet weather. The Contractor is responsible for over-excavating of material beneath subgrade that becomes unsuitable because it is left exposed, saturated, damaged, or adversely affected by the Contractor's work.

3.16 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and backfill soil material greater than 2 feet below finish grade to 90 percent, and less than 2 feet below finish grade to 95 percent.

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1/10 foot.
2. Walks: Plus or minus 1/10 foot.
3. Pavements: Plus or minus 1/10 foot.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

D. Any work that is determined not to conform shall be reworked by the Contractor to bring into conformance at the Contractor's expense.

3.18 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Section 334100 "Storm Utility Drainage Piping."

B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 90 percent of maximum dry unit weight according to ASTM D 698.

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 95 percent of maximum dry unit weight according to ASTM D 698.
2. Place and compact impervious fill over drainage backfill in 6-inch-thick compacted layers to final subgrade.

3.19 BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:

1. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Shape base course to required crown elevations and cross-slope grades.
3. Place base course 6 inches or less in compacted thickness in a single layer.
4. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of Structural Fill and compact simultaneously with each base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.20 WET WEATHER EARTHWORK

A. Onsite soils are moisture sensitive. These soils will become unstable and unsuitable when wet.

B. Slope the ground surface within and surrounding the construction area to promote runoff away from work areas and to prevent ponding of water.

C. Work areas should be covered with plastic to protect from rainfall. Measures such as sloping, ditching, dewatering, and installation sumps shall be employed.

D. Earthwork should be accomplished in small sections to minimize exposure to wet conditions. Each section should be small enough so that the removal of unsuitable soil and placement and compaction of clean structural fill can be accomplished on the same day.

E. Fill material used between October 1 and April 30 shall be moisture-conditioned Imported Structural Fill.

F. Do not leave soil uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, should roll the surface to seal out as much water as possible.

G. Limit the areas that are stripped of topsoil and exposed during wet weather.

H. In-place soil or fill soil that becomes unsuitable for compaction shall be removed and replaced with Imported Structural Fill.

I. Grading and earthwork shall not be performed during periods of heavy, continuous rainfall.

3.21 FIELD QUALITY CONTROL

A. Special Inspections: The City Engineer will perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material and maximum lift thickness comply with requirements.
3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow City Engineer to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will review compaction of soils in place. Inspections and/or tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.

F. When the City Engineer reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.22 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 312513 - EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. In general, work of this Section includes, but is not limited to, the following:

1. Conform to all requirements of the Construction Stormwater Pollution Prevention Plan (CSWPPP).
2. Provide Certified Erosion and Sediment Control Lead (CESCL).
3. Provide and maintain temporary erosion control measures.
4. Prevent pollution or excess turbidity in State waters.
5. Removal of temporary erosion control measures after completion of project.

B. Related Requirements:

1. Sections 1-07.16(1) and 1-07.16(3) in "Protection and Restoration of Property" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
2. Section 311000, "Site Clearing and Site Demolition."
3. Section 312000, "Earth Moving" for soil materials, excavating, backfilling, and site grading.
4. Sections 329113 "Soil Preparation," 329222 "Top Sand," and 329223 "Sodding" for hydroseed seed mix.

1.3 REFERENCE STANDARDS

A. WSDOT Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2014 edition. All references to measurement and payment shall be deleted from consideration, and terms agreed to in the contract substituted therefore.

B. Conform to OSHA (Occupational Safety and Health Act) requirements.

C. Conform to WISHA (Washington State Industrial Safety and Health Act) for trench safety.

D. Construction Stormwater Pollution Prevention Plan (CSWPPP) included at end of this section.

E. NPDES General Permit for Stormwater Discharges Associated with Construction Activities by Washington State Department of Ecology (DOE): The Owner has applied for this Construction Stormwater General Permit as the permit holder. Contractor shall sign form as required to transfer the permit holder to the Contractor.

1. http://www.ecy.wa.gov/programs/wq/stormwater/construction/permitdocs/cswgppermit120110.pdf

1.4 DEFINITIONS

A. NPDES: National Pollution Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction Activities.

B. CSWPPP: Construction Stormwater Pollution Prevention Plan.

C. CESCL: Certified Erosion and Sediment Control Lead. Certification courses currently approved by DOE are noted at the following links:

1. http://www.ecy.wa.gov/programs/wq/stormwater/cescl.html
2. www.cpesc.net

D. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

E. Utilities: On-site and off-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

F. Wet Weather: Between dates of October 1 and April 30.

G. ESC: Erosion and Sediment Control.

1.5 MATERIALS OWNERSHIP

A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.6 SUBMITTALS

A. Submit under provisions of Section 1-06 "Control of Materials" and as further provided.

B. Submit proof of certification for the CESCL.

C. Submit copies of CESCL field reports, ESC Maintenance Reports and stormwater sampling reports to Owner and Architect within 24 hours of each inspection. Submit monthly drainage monitoring reports to DOE, as required by the NPDES permit.

D. Certification

1. Provide a letter, signed by the supplier and reviewed and also signed by an officer of the General Contractor's company, certifying that the following products to be incorporated into the work meet the requirements specified.
2. Products:

a. Silt Fence
b. Catch Basin Sediment Barrier
c. Quarry Spalls
d. Plastic Sheeting
e. Mulch

E. At completion of project, submit copy of Site Log Book documenting construction practices, stormwater sampling reports, monthly DOE Discharge Monitoring Report, ESC measures, and checklists used during the project.

F. Copy of the NPDES Permit with the Contractor listed as the "Permittee." See 1.8.G, this Section.

G. Copy of the NPDES termination notice from DOE.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. The Contractor shall utilize a utility locate service and shall notify affected utility companies before starting work and comply with all their requirements. The Contractor shall conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

C. The locations of existing underground utilities are approximate only and have not been independently verified by the Owner or its representative. The Contractor shall determine the exact location of all existing utilities before commencing work and shall be fully responsible for any and all damages that happen due to the Contractor's failure to locate exactly and preserve all underground utilities that are designated to remain.

D. The Owner is applying for the NPDES Permit. The Contractor shall cooperate with the Owner to affect the "Permittee" status transfer from the Owner to the Contractor prior to the start of work.

1.8 QUALITY ASSURANCE

A. Maintain a copy of the NPDES permit, CSGP, and CSWPPP on the project site.

B. Maintain at least one copy of the WSDOT Standard Specifications for Road, Bridge and Municipal Construction, and project plans and specifications on-site.

C. Field inspection and testing will be performed by the City Engineer.

D. Tests and analysis of aggregate material will be performed in accordance with ANSI/ASTM D1557, ASTM D2922, ASTM D3017, ASTM D4318, and ASTM C136, as applicable.

E. If tests indicate materials do not meet specified requirements, change material and retest or obtain written approval of the Engineer. Costs associated with the retesting of materials will be the responsibility of the Contractor.

F. Construction Conference: Conduct conference at Project site to comply with requirements in Sections 1-04 “Scope of Work” and 1-05 “Control of Work.”

G. The Contractor shall provide and designate a Certified Erosion and Sedimentation Control Lead (CESCL) who shall be responsible for monitoring the installation, performance, maintenance, and review of ESC measures, and for compliance with all permit conditions. The CESCL shall be designated prior to commencement of work on the site.

1. CESCL shall have completed the training and certification requirements of BMP C160 of the Washington State DOE Stormwater Management Manual for Western Washington. A copy of BMP C160 is attached to this Specification section.
2. CESCL shall maintain a site log book.

H. CESCL responsibilities include:

1. Be on-site or available on-call during the project duration.
2. Implement the TESC and the CSWPPP.
3. Oversee maintenance practices identified on the plans for the erosion control measures.
4. Conduct or provide for inspection and monitoring activities.
5. Identify other potential pollution sources and make sure they are mitigated.
6. Identify deficiencies in the TESC measures and make sure they are corrected.
7. The responsibilities listed at BMP C160.

1.9 REGULATORY REQUIREMENTS

A. Conform to all requirements of the NPDES under the DOE General Permit for Stormwater Discharges Associated with Construction Activities and the CSWPPP. Contractor is responsible for agency fees/penalties associated with non-compliance. Contractor and their CESCL shall be responsible for maintaining all required records in regard to the following:

1. Construction activities.
2. Inspections.

3. Stabilization measures.
4. Maintenance.
5. Stormwater discharges and sampling for turbidity and pH.

B. Conform to applicable agency code for dust control.

C. Obtain, post, and pay for required permits from authorities according to provisions of the Contract, including General and Supplemental Conditions and Division 01 Specification Sections.

D. Proposed erosion control facilities are minimum requirements for anticipated site conditions. During the construction period, the erosion control facilities shall be maintained, expanded, and/or modified as needed to comply with City of Fife erosion control policies and the NPDES Permit.

1.10 COORDINATION

A. Coordinate work under provisions of Sections 1-04 “Scope of Work” and 1-05 “Control of Work.”

B. Erosion control measures shall be maintained, coordinated, adjusted, and added to address changes in site conditions and construction phases at no additional cost to the Owner.

1.11 INTENT

A. It is the intent of this Specification that the Contractor provide the Work defined herein complete in every respect, and in accordance with the good practices involved in the installation of erosion control facilities, including modifying facilities as needed for storm events and changing site conditions, and the requirements of this Specification, regardless of whether or not full details of such completeness, workmanship, or practices are contained herein.

PART 2 - PRODUCTS

2.1 EROSION AND SEDIMENT CONTROL MATERIALS

A. Silt Fence: Conform to detail. Geotextile fabric shall meet the following standards:

Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film wovens (#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)	100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

B. Catch Basin Sediment Barrier: Streamguard Basin Insert #3003, from Bowhead Manufacturing. Conform to detail.

C. Construction Entrance: Conform to detail.

D. Quarry Spalls: Conform to WSDOT 8-15.3(6).

E. Plastic Sheeting: Conform to WSDOT 9-14.5.

F. Hydroseeding: Refer to Sections 329113 “Soil Preparation,” 329222 “Top Sand,” and 329223 “Sodding” and requirements as indicated on drawings.

G. Mulch: Air dried hay or straw; free from undesirable seed and coarse material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are satisfactory to receive the work of this Section. Do not begin the work of this Section until unsatisfactory conditions are corrected. Beginning the work of this Section constitutes the Contractor’s acceptance of site conditions as satisfactory.

B. CESCL shall be responsible for ESC measures. The CESCL shall be designated prior to commencement of work on-site.

3.2 INSTALLATION AND CONDUCT OF WORK

A. Install temporary erosion control measures as indicated on the Drawings, or as directed by the Owner's Representative or the City of Fife Inspector prior to beginning any work that will disturb the existing vegetation on the site.

B. Install erosion control measures to minimize impacts to the existing site conditions and to allow proper performance.

C. Conduct all work in order to prevent water pollution as set forth at Section 1-07.15 of WSDOT Specifications and the NPDES Permit.

D. Straw mulch shall be applied with a 2-inch minimum thickness with no bare spots.

E. Erosion and sediment control measures shall be in place and functional as identified in the Contract Documents and as necessary to prevent stormwater pollution at all times.

F. Provide and maintain additional temporary erosion control measures at no additional cost to the Owner as necessary due to weather, environmental conditions, Contractor operations, and to comply with governing agency and permitting requirements.

G. Prevent pollution or excess turbidity in State waters as identified in the CSWPPP and NPDES permits.

H. Contractor shall, prior to any work being performed on the site, post a weatherproof sign at the site perimeter that provides the CESCL name, phone and fax numbers, and address information. Sign and text must be of sufficient size that the information can be easily read from a distance of 10 feet, as determined by the Architect. Sign placement location shall be approved by the Architect.

I. Contractor shall conform to requirements of the NPDES Permit, the CSGP, and the site specific CSWPPP. The Owner is applying for the NPDES Permit and the Contractor shall accept transfer coverage of the Permit coverage from the Ownership to start of work. The site specific CSWPPP is attached to this section.

3.3 MAINTENANCE AND INSPECTION

A. Temporary erosion control measures shall be maintained as required to achieve proper performance, as indicated in the Contract Documents and required by the Owner's Representative, permit agency, and as required by DOE.

B. Use care during maintenance of erosion control facilities so as not to discharge collected sediment into the protected area.

C. CESCL shall inspect erosion control measures at least once every calendar week and within 24 hours of any discharge from the site. Inspections shall commence when clearing work begins and continue until site work is substantially complete and permitting jurisdiction has accepted project as complete.

D. CESCL shall conduct turbidity and pH sampling as required by DOE General Permit for Stormwater Discharges Associated with Construction Activities.

3.4 REMOVAL

A. When approved by the City of Fife Inspector and the Owner, remove temporary facilities when the need for the facilities no longer exists.

B. Clean sediment and/or pollutants from facilities that are to remain.

3.5 CLEAN-UP

A. Upon completion of the work of this Section, remove all rubbish, trash, and debris resulting from operations.

B. Remove materials, equipment, and tools; leave the site in a neat and orderly condition acceptable to the Owner's Representative.

C. At the completion of the site improvements and after the work area has been stabilized with final surfacing and landscaping or seeding, the contractor shall remove all temporary erosion control mechanisms and facilities.

3.6 WASTE MANAGEMENT

A. See Sections 1-04 "Scope of Work" and 1-07 "Legal Relations and Responsibility to the Public," and the requirements of Part 1 of this section for requirements related to waste management.

3.7 PERMIT TERMINATION

A. The contractor is responsible for completing and submitting the "Notice of Termination Form" to close the NPDES CSGP at the completion of construction.

END OF SECTION 312513

SECTION 312513
ATTACHMENTS

1. ..... BMP C160
2. ..... CSWPPP

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

Construction Stormwater Pollution Prevention Plan

PREPARED FOR:

City of Fife
5411 23rd Street East
Fife, WA 98424

PROJECT:

City of Fife – Phase I Improvements
2120211.10

PREPARED BY:

Sheri Greene
Project Administrator

David C. Nason, PE
Civil Project Manager

REVIEWED BY:

Doreen S. Gavin, PE, LEED AP BD+C
Principal

DATE:

August 2014

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Doreen S. Gavin, PE, LEED AP BD+C
Principal
(253) 383-2422
dgavin@ahbl.com

DATE:

August 2014

DOREEN S. GAVIN
STATE OF WASHINGTON
23467
REGISTERED
PROFESSIONAL ENGINEER
8/13/14

I hereby state that this Construction Stormwater Pollution Prevention Plan for the City of Fife – Phase I Improvements project has been prepared by me or under my supervision, and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that the City of Fife does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

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A-3 .....FEMA Flood Map
A-4 .....TESC Plan
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BMP C201 .....Grass-Lined Channels
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BMP C233 .....Silt Fence

Exhibit 4

Construction Stormwater General Permit – Proposed New Discharge to an Impaired Water Body

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1.0 INTRODUCTION

In 1972, Congress passed the Federal Water Pollution Control Act (FWPCA), also known as the Clean Water Act (CWA), to restore and maintain the quality of the nation's waterways. The ultimate goal was to make sure that rivers and streams were fishable, swimmable, and drinkable. In 1987, the Water Quality Act (WQA) added provisions to the CWA that allowed the Environmental Protection Agency to govern stormwater discharges from construction sites. The National Pollutant Discharge Elimination System (NPDES) General Permit includes provisions for development of a Stormwater Pollution Prevention Plan (SWPPP) to maximize the potential benefits of pollution prevention and sediment and erosion control measures at construction sites.

The proposed project will disturb more than 1 acre of area, and therefore is required to obtain an NPDES General Permit for Stormwater Associated with Construction Activities.

The 2005 Department of Ecology (DOE) *Stormwater Management Manual for Western Washington (SMMWW)* requires a Construction Stormwater Pollution Prevention Plan (SWPPP) for projects that add or replace more than 2,000 square feet of impervious surfaces. The proposed project will exceed this threshold; therefore, a Construction SWPPP is required.

Development, implementation, and maintenance of the Construction SWPPP will provide the selected General Contractor with the framework for reducing soil erosion and minimizing pollutants in stormwater during construction of the proposed project. The Construction SWPPP will:

- Define the characteristics of the site and the type of construction that will occur.
- Describe the practices that will be implemented to control erosion and the release of pollutants in stormwater.
- Create an implementation schedule to ensure that the practices described in this Construction SWPPP are in fact implemented, and to evaluate the plan's effectiveness in reducing erosion, sediment, and pollutant levels in stormwater discharged from the site.
- Describe the final stabilization/termination design to minimize erosion and prevent stormwater impacts after construction is complete.

This Construction SWPPP:

- Identifies the SWPPP Coordinator with a description of this person's duties.
- Identifies the Stormwater Pollution Prevention (SWPP) Team that will assist in implementation of the Construction SWPPP during construction.
- Describes the existing site conditions, including existing land use, for the site, the soil types at the site, as well as the location of surface waters that are located on or next to the site.
- Identifies the body or bodies of water that will receive runoff from the construction site, including the ultimate body of water that receives the stormwater.
- Identifies the drainage areas and potential stormwater contaminants.

- Describes the stormwater management controls and various Best Management Practices (BMPs) necessary to reduce erosion, sediment, and pollutants in stormwater discharge.

- Describes the facility monitoring plan and how controls will be coordinated with construction activities.

- Describes the implementation schedule and provisions for amendment of the plan.

2.0 PROJECT DESCRIPTION

This report accompanies the erosion control and TESC plans for the City of Fife Phase I Improvements project.

The proposed improvements include the development of two areas indicated as Area A and Area B. Area B includes the relocation of an existing water fountain located, in the City of Fife swimming pool and Community Center parking lot on Parcel No. 0420072016, to the open space southeast of the intersection of 20th Street East and 54th Avenue East on Parcel No. 0420072800. New sidewalk, stairs, and landscaping are also proposed around the relocated water fountain. Area A is undeveloped area located between the Fife Community Center and City of Fife Community Development on Parcel No. 0420072130 where a building was recently demolished. This area will be developed into an open space area with a gravel event area located along 54th Avenue East, an even lawn area in the eastern portion of the property, and associated sidewalks. These improvements will add approximately 0.7 acre of new and replaced impervious surfaces (see the Vicinity Map in Exhibit A-1).

The site soils are classified as Sultan silt loam per online Natural Resources Conservation Service (NRCS) soils maps. These soils consist of 0 to 36 inches of ashy slit loam over 22 inches of silt loam over stratified sand to silty clay loam. Groundwater can be 18 to 24 inches below finished grade. The soils are classified as hydrologic soil group C/D.

3.0 EXISTING SITE CONDITIONS

The City of Fife is planning to redevelop their project site bounded by 20th Street East, 54th Avenue East, and 23rd Street East in multiple phases referred to as the Fife South Campus. This portion of the project is Phase I of the improvements.

Site A is located on the City of Fife Community Development site located at 5411 23rd Street East. The improvements are occurring in the northern portion of the site immediately north of the Community Development building, south of the Fife Community Center, and east of 54th Avenue East. The majority of the site is a low area with a few catch basins or overflow located on the northern and southern portions of the project site. The existing stormwater facilities for Site A include a series of catch basins that convey stormwater to the northeast or southwest.

Site B is located at the Fountain Memorial Park located in the southeast corner of the intersection of 20th Street East and 54th Avenue East. There is a high point in the middle of the project area that sheet flows water in all directions. Stormwater drains to catch basins located in the fire station site to the south, 54th Avenue East to the west, 20th Street East to the north, and the parking lot to the east.

Per previous projects and discussions with the City of Fife, the site is assumed to be saturated forest in the pre-developed condition. For modeling purposes, SAT, Forest, Flat is used in the Western Washington Hydrology Model (WWHM) to model the pre-developed condition of the site.

The project site has little to no offsite areas draining to the site.

The project is located in the Fife Ditch Drainage Basin.

To our knowledge, there are no known historical drainage problems on the proposed project site.

4.0 ADJACENT AREAS AND DRAINAGE

Inspection of topographic maps and a site visit indicate that drainage Site A sheet flows to a series of catch basins that flow to the northwest or southeast. In the proposed conditions, Area A will discharge stormwater from the project site at an existing catch basin located at the southeast corner of the site. From the catch basin, stormwater will flow east through City property for approximately 190 feet in a 12-inch pipe. This pipe connects to a catch basin located in an access road along the west side of the Fife High School football field. The catch basin then conveys runoff north along the access road for approximately 550 feet in a pipe that has a diameter of at least 24 inches. This pipe connects to an existing manhole in 20th Street East. The conveyance system in 20th Street East directs runoff west and to a series of ditches, which flow north to the Hylebos Waterway in Commencement Bay.

Runoff from the north and east portions of Area B sheet flows north into the 20th Street East right-of-way and connects to the same conveyance system that runoff from Area A does. Runoff from the south and west portions of Area B sheet flows west into the 54th Avenue East right-of-way, where it is collected in a catch basin and conveyed south for approximately 120 LF in a 12-inch pipe. It is then directed west for approximately 60 feet across the road in a 24-inch pipe. This pipe connects to an oil/water separator and then continues west in another 24-inch pipe onto the sites located at 2098 and 2024 24th Avenue East. Based on input from meeting with the City of Fife, the 24-inch storm line outlets into a set of storm ponds that outlet to the south into Wapato Creek. From there, the Wapato Creek then flows north to the Hylebos Waterway in Commencement Bay.

5.0 CRITICAL AREAS

There are no known sensitive or critical areas on the project site. There are no known groundwater wells or septic systems onsite or within 100 feet of the site. The site is located in an aquifer recharge area, as defined by the City of Fife Hydrologic Map. There is no known basin plan for the area.

The project is located within the Fife Ditch Watershed, as defined by the City of Fife Watershed Map.

6.0 SOILS

The site soils are classified as Sultan silt loam per online Natural Resources Conservation Service (NRCS) soils maps. These soils consist of 0 to 36 inches of ashy slit loam over 22 inches of silt loam over stratified sand to silty clay loam. Groundwater can be 18 to 24 inches below finished grade. The soils are classified as hydrologic soil group C/D.

7.0 POTENTIAL EROSION PROBLEMS

There are no known historic problems such as flooding or erosion on the site. There are no known potential erosion problems that will be created onsite.

8.0 CONSTRUCTION STORMWATER POLLUTION PREVENTION ELEMENTS

The purpose of this section is to describe how each of the 12 Construction Stormwater Pollution Prevention (SWPP) elements has been addressed and to identify the type and location of BMPs used to satisfy the required element. If a Construction SWPP element is not applicable to the project, a reason is provided.

8.1 Mark Clearing Limits

Prior to beginning land-disturbing activities, clearing limits will be marked with high visibility plastic or metal fence (BMP C103). Significant vegetation to remain will be marked and protected by fencing.

8.2 Establish Construction Access

One formal quarry spall construction entrance is proposed along 54th Avenue East to access Area A. Construction vehicle ingress and egress will be limited to this entrance. As construction proceeds, the Contractor may move the entrance. If sediment tracking should occur, the Contractor will be required to sweep the impacted roadways. Dump trucks hauling material to and from the site will be covered by a tarp.

8.3 Control Flow Rates

Flow control is required for the City of Fife Phase I Improvements project since it is adding more than 5,000 square feet of new impervious surfaces. Flow control facilities for the project include a control structure at the outlet of the underground perforated pipe detention facility. The detention facility has been designed to detain developed volumes and flow rates to match the pre-developed discharge rates.

8.4 Install Sediment Controls

As part of the initial construction activities, BMPs will be installed to trap sediment onsite. The identified BMPs include Stabilized Construction Entrance (BMP C105), Sediment Trap (BMP C240), Silt Fencing (BMP C233), and use of Inlet Protection (BMP C220) for existing catch basins and proposed catch basins within the project area and in adjacent streets that may receive runoff.

8.5 Stabilize Soils

To protect soil from the erosive forces of raindrops, flowing water, and wind, the following BMPs will be implemented:

- All disturbed areas that will remain unworked will be stabilized with temporary hydroseed within 2 days (October 1 - March 31) or 7 days (April 1 - September 30).
- After fertilizing, all areas that will not be impacted by construction will be seeded (BMP C120).
- Topsoil stockpiles will be stabilized with plastic coverings (BMP C123).
- Dust control (BMP C140) will be provided by sprinkling the site with water.
- Permanent erosion control measures will include site paving and seeding of exposed soils.

8.6 Protect Slopes

Slopes on the site will be protected to minimize erosion. Temporary and permanent seeding (BMP C120) will be used to reduce erosion of exposed soils on slopes. Runoff collection methods include interceptor dikes and swales. Building area will occupy the majority of the cleared site area. Exposed sloped areas will be reduced greatly once the building pad has been constructed. Temporary and permanent seeding and nets and blankets will sufficiently protect slopes from erosion.

8.7 Protect Drain Inlets

Storm drain inlets shall be protected so that surface water runoff does not enter the conveyance system without first being filtered. Inlets shall be inspected weekly, at a minimum, and daily during storm events. Storm Drain Inlet Protection (BMP C220) will be provided.

8.8 Stabilize Channels and Outlets

Interceptor swales are not proposed for the project because offsite contribution is minimal.

8.9 Control Pollutants

All waste materials will be collected and stored in a securely closed metal dumpster. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of once per week, and the trash will be hauled to the local landfill. No construction materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. All sanitary waste will be collected from the portable units a minimum of three times per week. Good housekeeping and spill control practices will be followed during construction to minimize stormwater contamination from petroleum products, fertilizers, and concrete.

Table 1 below lists several pollutants that are commonly found on construction sites that have the potential to contaminate storm runoff. These pollutants will be present, mainly in areas of building and pavement construction. The Contractor and the SWPPP/TESC Coordinator will be responsible for identifying areas where these pollutants are being used and monitor runoff coming from these areas. Pollutant sources will be covered with plastic if contaminated runoff is observed from these areas. If contaminated runoff is found in the sediment trap or soils, the Erosion Control Specialist will direct the Contractor to remove the polluted water/soil and dispose of it in an approved area offsite.

Table 1 – Potential Construction Site Stormwater Pollutants

Trade Name Material	Chemical/Physical Description[1]	Stormwater Pollutants[1]
Pesticides (insecticides, fungicides, herbicide, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous
Plaster	White granules or powder	Calcium sulphate, calcium carbonate, sulfuric acid
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates
Asphalt	Black solid	Oil, petroleum distillates

Trade Name Material	Chemical/Physical Description[1]	Stormwater Pollutants[1]
Concrete	White solid	Limestone, sand
Glue, adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquid	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic
Curing compounds	Creamy white liquid	Naphtha
Wastewater from construction equipment washing	Water	Soil, oil & grease, solids
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Erosion	Solid Particles	Soil, Sediment

[1] Data obtained from MSDS when available

8.9.1 Required BMPs

The following BMPs or equivalent measures are required of all businesses and agencies during concrete pouring and asphalt application at temporary sites:

- Employees must be educated on the pollution hazards of concrete and asphalt application and cutting.

- Loose aggregate chunks and dust must be swept or shoveled and collected (not hosed down a storm drain) for recycling or proper disposal at the end of each work day, especially at work sites such as streets, driveways, parking lots, sidewalks, curbs, and gutters where rain can readily pick up the loose material and carry it to the nearest stormwater conveyance. Small amounts of excess concrete, grout, and mortar can be disposed of in the trash.

- Storm drain covers or similarly effective containment devices must be placed over all nearby drains at the beginning of each day. Shovel or vacuum slurry and remove from the site. All accumulated runoff and solids must be collected and properly disposed at the end of each work day, or more often if necessary.

- Exposed aggregate washing, where the top layer of unhardened concrete is hosed or scraped off to leave a rough finish, must be done with a mechanism for containment and collection of the discarded concrete slurry (such as the storm drain covers mentioned above). The easiest way to contain the washwater will be to direct the washings to a hole in the ground where the water can percolate into the ground and the solids later covered with soil.

- If directed to a drain, a catch basin filter insert must be used to remove the solids. This is especially useful if the activity must proceed on rainy days.

- Cleaning of concrete application and mixing equipment or concrete vehicles on the work site must be done in a designated area where the rinse water is controlled. The rinse water must either be collected for proper disposal or put into a hole in the ground where the water can percolate away and the solids later covered with soil or recovered and disposed or recycled.

The use of any treatment BMP must not result in the violation of groundwater, surface water, or drinking water quality standards.

8.10 Control Dewatering

Large volumes of dewatering of construction areas or utilities are not anticipated because groundwater is not likely to be encountered at elevations of proposed utility construction.

8.11 Maintain BMPs

Temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure performance of their intended functions.

Sediment control BMPs such as silt fencing, slope blankets, and drain inlet protection shall be inspected weekly or after a runoff-producing event. Temporary erosion and sediment control BMPs will be removed within 30 days after final site stabilization is achieved. The following inspection and maintenance practices will be used to maintain erosion and sediment controls:

- Built-up sediment will be removed from silt fencing when it has reached one-third the height of the fence.

- Silt fences will be inspected for depth of sediment, tears in the fabric, attachment to the fence posts, and to determine that fence posts are firmly in the ground. Accumulated sediment will be removed from behind the fence.

- Check dams will be inspected for depth of sediment. Accumulated sediment will be removed when it reaches 6 inches in depth.

- Temporary and permanent seeding will be inspected for bare spots, washouts, and healthy growth.

- The Contractor CESCL will provide erosion control inspection services and stormwater disposal monitoring through construction. The City of Fife Inspector will be notified of daily construction activities and scheduled meetings between the Erosion Control Inspector and the Contractor.

The maintenance inspection report will be made after each inspection. Copies of the report forms to be completed by the SWPPP Coordinator are attached as Exhibit 2 of this Construction SWPPP. Completed forms will be provided to the City Inspector and will also be maintained onsite during the entire construction project. If construction activities or design modifications are made to the site plan that could impact stormwater, or if AHBL determines that the measures are not adequate to prevent erosion and the discharge of sediment from the site (based on turbidity measurements), this Construction SWPPP will be amended appropriately. The amended Construction SWPPP will have a description of the new activities that contribute to the increased pollutant loading and the planned source control activities.

8.12 Manage the Project

The following practices will be required during construction to properly manage activities:

- Comply with seasonal work limitations and, most importantly, complete all construction activity by August 2014.
- Inspect, maintain, and repair BMPs.
- Identify a Certified Erosion and Sediment Control Lead (CESCL).
- Maintain the Construction SWPPP, including narrative and plans, onsite at all times.

9.0 CONSTRUCTION SEQUENCE AND PHASING

9.1 Construction Sequence

The construction sequence is described below:

1. Arrange and attend a pre-construction meeting with the City of Fife.
2. Stake/flag clearing and construction limits.
3. Construct all temporary erosion control BMPs according to the TESC plan. Install inlet sediment protection in existing catch basins.
4. Install construction entrance.
5. Demolish existing site features indicated for removal.
6. Maintain erosion control measures in accordance with City of Fife standards and manufacturer recommendations.
7. Rough grade site. All grading shall be done in conformance with the grading plan.
8. Construct storm system and install inlet sediment protection to new basins.
9. Apply erosion control mulch and seeding, straw mulch or equal, to areas that will not be brought to final grade or permanently vegetated within 7 days of exposure during the dry season, and 2 days of exposure during the wet season (October 1 – April 30).
10. Relocate erosion control measures or install new measures so that, as the site conditions change, the erosion and sediment control is always in accordance with the City of Fife Construction SWPPP minimum requirements.
11. Final grade site and install final surface treatments. Ensure that surface water is positively directed toward proposed storm collection facilities.
12. Remove remaining temporary erosion control items once site has been stabilized and upon approval of the City of Fife.

9.2 Construction Phasing

Phased construction is not anticipated for this project.

10.0 CONSTRUCTION SCHEDULE

Construction is scheduled to begin in summer of 2014. Construction is expected to be completed in fall of 2014. Based on the construction schedule, construction will be ongoing during the wet season. During construction, measures will be taken to prevent the transportation of sediment from the site to receiving waters. These measures include the use of:

- Stabilized Construction Entrance (BMP C105)
- Temporary and Permanent Seeding (BMP C120)
- Mulching (BMP C121)
- Plastic Covering (BMP C123)
- Dust Control (BMP C140)
- Storm Drain Inlet Protection (BMP C220)
- Silt Fence (BMP C233)

11.0 FINANCIAL/OWNERSHIP RESPONSIBILITIES

City of Fife is the party responsible for financial and ownership responsibilities.

12.0 CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL)

The General Contractor shall be required to provide a CESCL prior to construction. Once this individual is identified, the City Inspector will be notified.

The Contractor will designate their CESCL here:

Name: _____

Address: _____

Phone: _____

Fax Number: _____

The CESCL is required to meet Washington State DOE certification requirements. The City Inspector will be provided with CESCL information.

The duties of the CESCL include:

- Implement the Construction SWPPP/TESC plan with the aid of the SWPP Team.
- Oversee maintenance practices identified as BMPs in the Construction SWPPP.

- Conduct or provide for inspection and monitoring activities.
- Sample stormwater for turbidity using a turbidity meter.
- Identify other potential pollutant sources and make sure they are added to the plan.
- Identify any deficiencies in the Construction SWPPP and make sure they are corrected.
- Ensure that any changes in construction plans are addressed in the Construction SWPPP.

To aid in the implementation of the Construction SWPPP, the members of the SWPP Team include the following: General Contractor, CESCL, City of Fife Inspector, City of Fife, the geotechnical engineering consultant, and AHBL.

The General Contractor will ensure that all housekeeping and monitoring procedures are implemented, while the CESCL will ensure the integrity of the structural BMPs. The SWPP Team will observe construction and erosion control practices and recommend revisions or additions to the Construction SWPPP and drawings.

This analysis is based on data and records either supplied to or obtained by AHBL, Inc. These documents are referenced within the text of the analysis. The analysis has been prepared utilizing procedures and practices within the standard accepted practices of the industry. We conclude that this project, as proposed, will not create any new problems within the existing downstream drainage system. This project will not noticeably aggravate any existing downstream problems due to either water quality or quantity.

AHBL, Inc.

David C. Nason, PE
Civil Project Manager

DN/lsk

August 2014

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Exhibit 1

A-1 .....Vicinity Map
A-2 .....Existing Conditions Basin Map
A-3 .....FEMA Flood Map
A-4 .....TESC Plan
A-5 .....TESC Notes and Details

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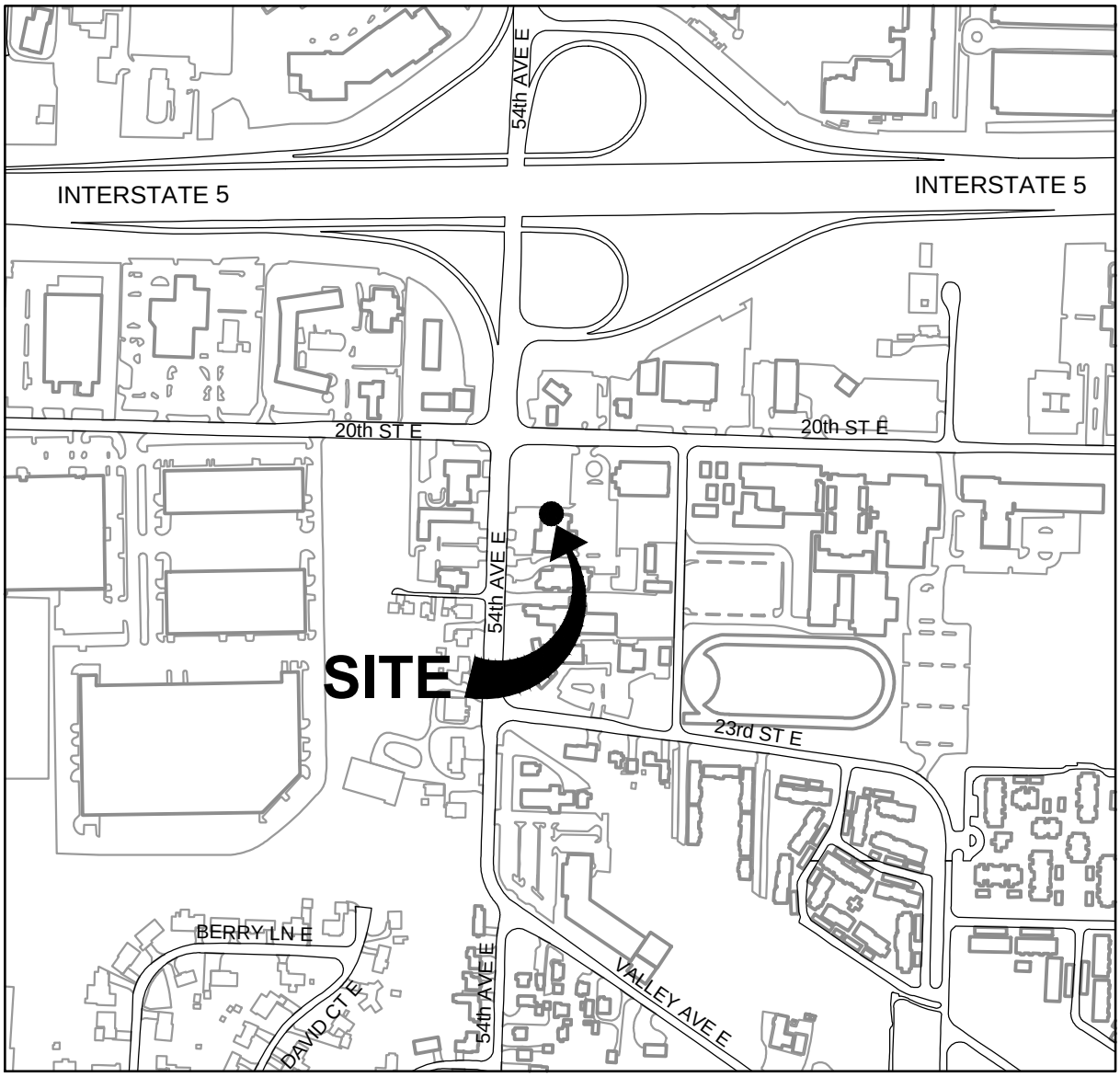

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FIFE SOUTH CAMPUS
PHASE I IMPROVEMENTS

VICINITY MAP

A-1

FIFE SOUTH CAMPUS

A PORTION OF THE SW 1/4 OF THE NW 1/4 OF SEC. 07, TWN. 20 N., RGE. 04 E. W.M.
CITY OF FIFE, PIERCE COUNTY, WASHINGTON.

LEGAL DESCRIPTION

XXXXXXXXXX

VERTICAL DATUM

NGVD 29
CITY OF FIFE VERTICAL BENCHMARK FS-11
SCRIBED "X" IN NE CORNER OF SIDEWALK AT NORTHEAST ENTRANCE TO FOUNTAIN MEMORIAL PARK AT SOUTHEAST QUADRANT OF 20TH STREET EAST AND 54TH AVENUE EAST.
ELEVATION: 11.84

BASIS OF BEARING

NAD 83/91
WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE
PIERCE COUNTY HORIZONTAL CONTROL
HOLDING COUNTY MONUMENT NUMBERS 492 AND 493.

POINT NO. 492
N=699124.7994
E=1176584.6648
BRASS DISK WITH "X" NORTH OF THE INTERSECTION OF FRANK ALBERT ROAD EAST W/ INDUSTRY DRIVE.

POINT NO. 493
N=696440.3629
E=1176434.5341
BRASS DISK WITH PUNCH 500' NORTH OF THE INTERSECTION OF FRANK ALBERT ROAD EAST W/ NORTH LEVEE ROAD.

A LINE BETWEEN THE TWO FOUND MONUMENTS BEARS
NORTH 03°12'04" EAST.

UTILITY NOTES

1. SURFACE UTILITY FACILITIES ARE SHOWN HEREON PER FIELD LOCATED VISIBLE EVIDENCE. THERE MAY BE UTILITIES THAT EXIST ON THIS SITE OTHER THAN THOSE GRAPHICALLY DEPICTED HEREON.

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3. ALTHOUGH LOCATIONS OF UNDERGROUND UTILITIES BASED ON UTILITY LOCATOR MARKINGS AND RECORD DATA (SUCH AS AS-BUILT OR UTILITY DESIGN DRAWINGS) ARE DEEMED RELIABLE, AHBL, INC. ASSUMES NO LIABILITY FOR THE ACCURACY OF SAID DATA.

4. CALL 1-800-424-5555 BEFORE ANY CONSTRUCTION.

RELIANCE NOTE

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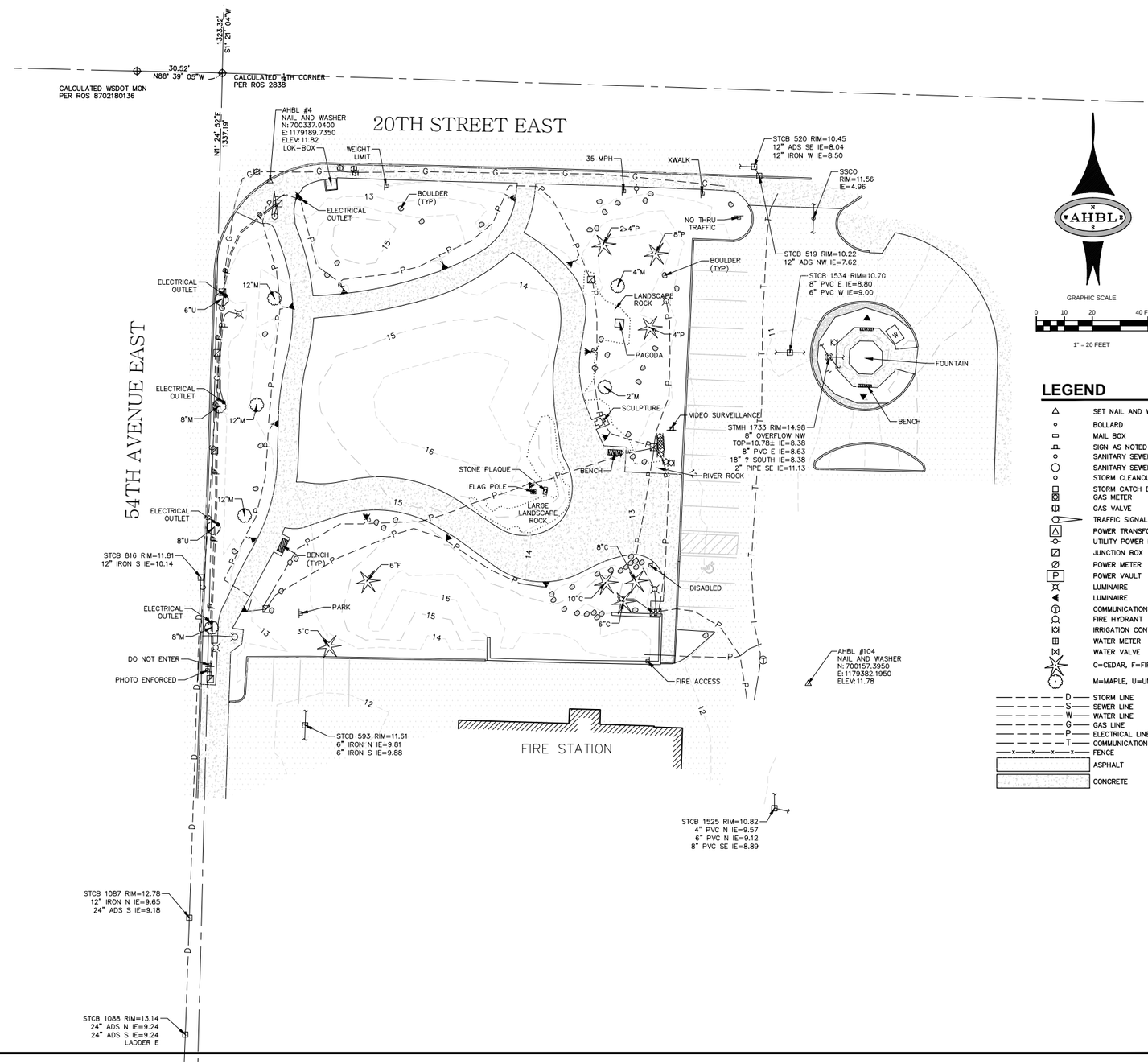
EQUIPMENT USED

3" TOTAL STATION UTILIZING STANDARD FIELD TRAVERSE METHODS FOR CONTROL AND STAKING.

SURVEYOR'S CERTIFICATE

I, DAVID C. FOLLANSBEE, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF WASHINGTON, HEREBY CERTIFY THAT THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION IN MAY 2014 , AT THE REQUEST OF TCF ARCHITECTURE, PLLC.

DAVID C. FOLLANSBEE, PLS 45161 DATE



LEGEND

- SET NAIL AND WASHER
- BOLLARD
- MAIL BOX
- SIGN AS NOTED
- SANITARY SEWER CLEANOUT
- SANITARY SEWER MANHOLE
- STORM CLEANOUT
- STORM CATCH BASIN
- GAS METER
- GAS VALVE
- TRAFFIC SIGNAL POLE
- POWER TRANSFORMER
- UTILITY POWER POLE
- JUNCTION BOX
- POWER METER
- POWER VAULT
- LUMINAIRE
- LUMINAIRE
- COMMUNICATIONS MANHOLE
- FIRE HYDRANT
- IRRIGATION CONTROL VALVE
- WATER METER
- WATER VALVE
- C=CEDAR, F=FIR, P=PINE
- M=MAPLE, U=UNKNOWN
- D — STORM LINE
- S — SEWER LINE
- W — WATER LINE
- G — GAS LINE
- P — ELECTRICAL LINE
- T — COMMUNICATION LINE
- x — FENCE
- ASPHALT
- CONCRETE

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Project Title:
FIFE SOUTH CAMPUS

Client:
TCF ARCHITECTURE, PLLC
902ND NORTH 2ND STREET
TACOMA, WA98403-1931
RANDY COOK

Job No.
2120211.50

Issue Set & Date:
MAY 13, 2014

DAVID C. FOLLANSBEE STATE OF WASHINGTON 45161 REGISTERED PROFESSIONAL LAND SURVEYOR
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3.
2.
1.

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Sheet No.
1
1 of 2 Sheets

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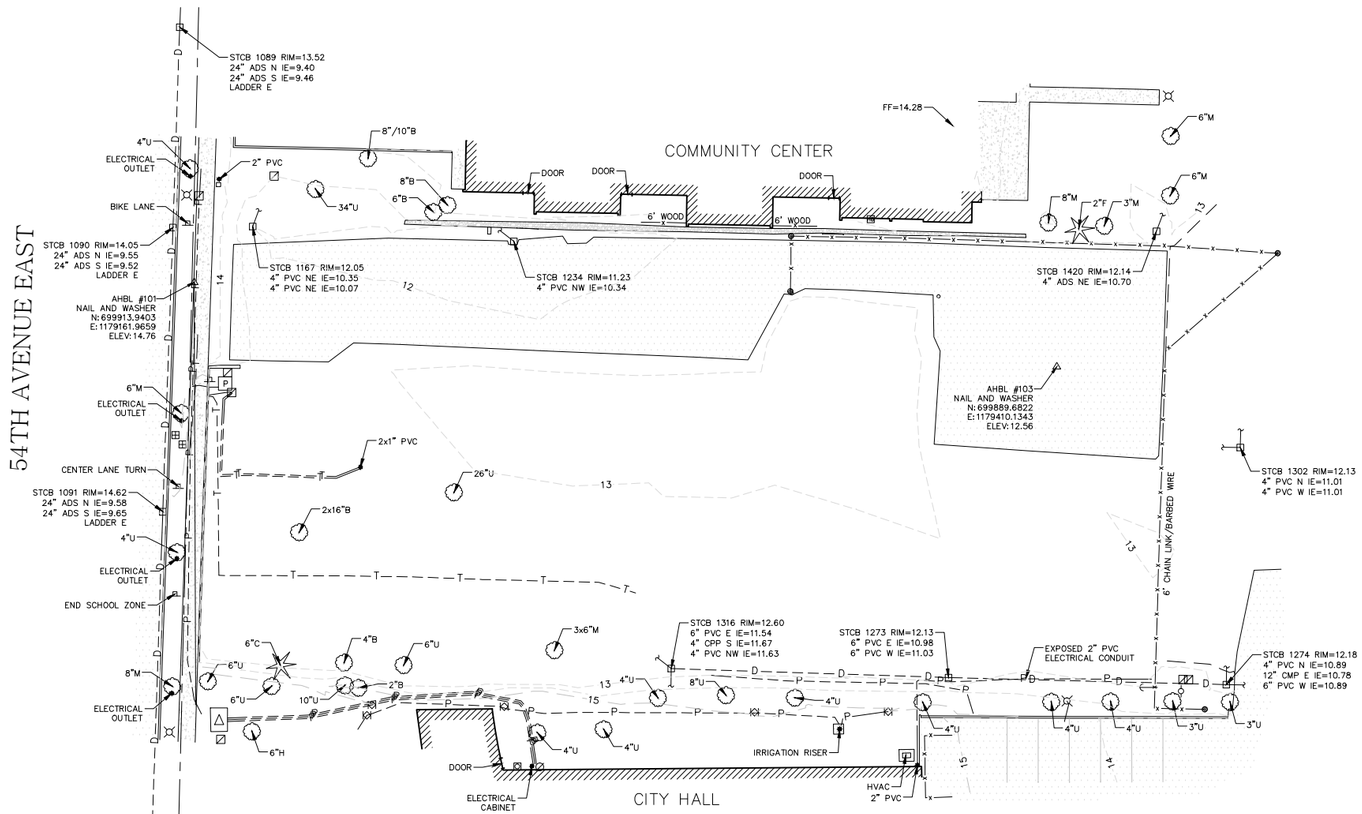

LEGEND

△	SET NAIL AND WASHER
∘	BOLLARD
▭	MAIL BOX
	SIGN AS NOTED
∘	SANITARY SEWER CLEANOUT
◯	SANITARY SEWER MANHOLE
∘	STORM CLEANOUT
☐	STORM CATCH BASIN
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⊠	GAS VALVE
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— — — T —	COMMUNICATION LINE
— x — x —	FENCE
	ASPHALT
	CONCRETE

GRAPHIC SCALE
0 10 20 40 FEET
1" = 20 FEET

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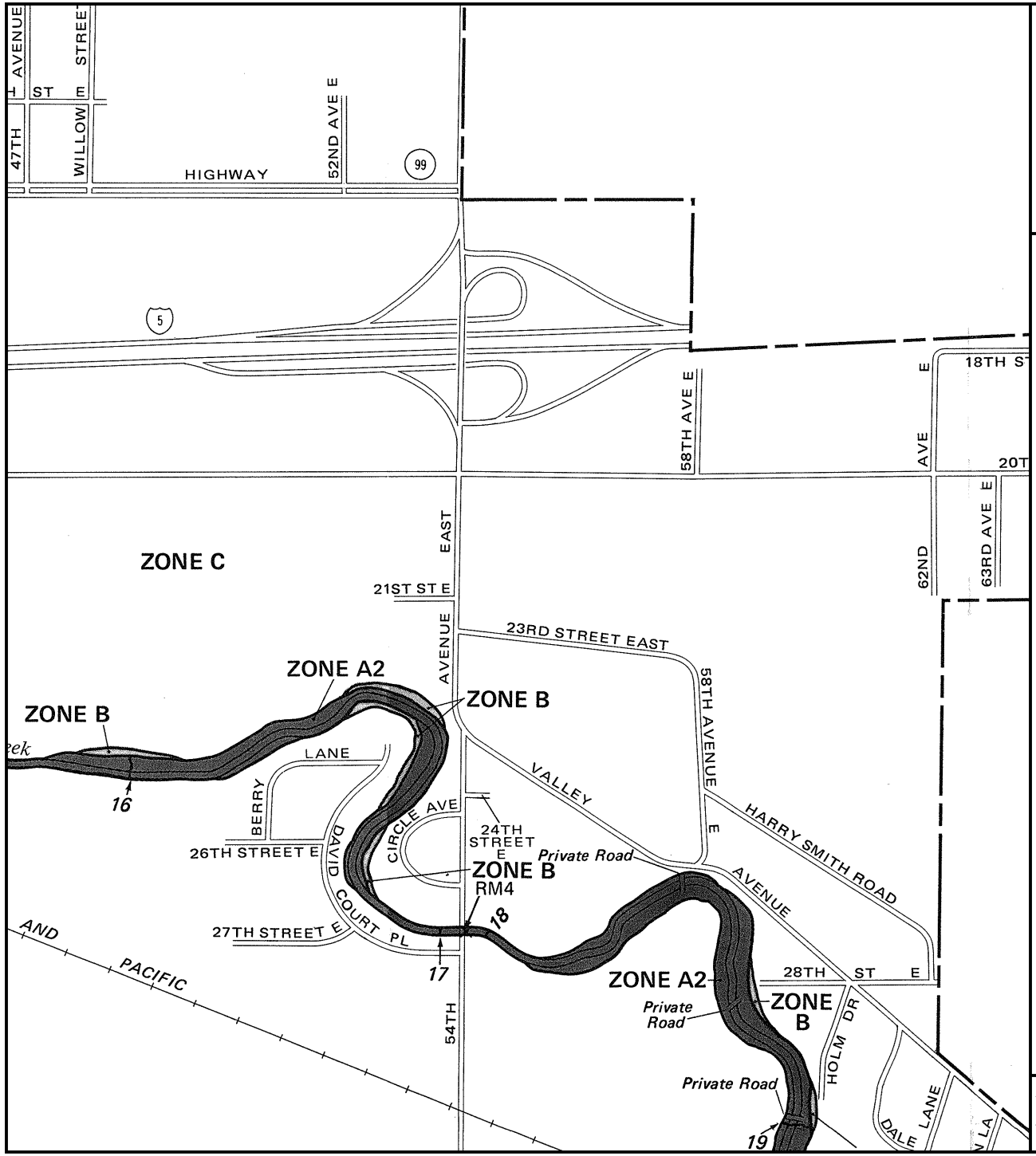


APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
FIFE, WASHINGTON
PIERCE COUNTY

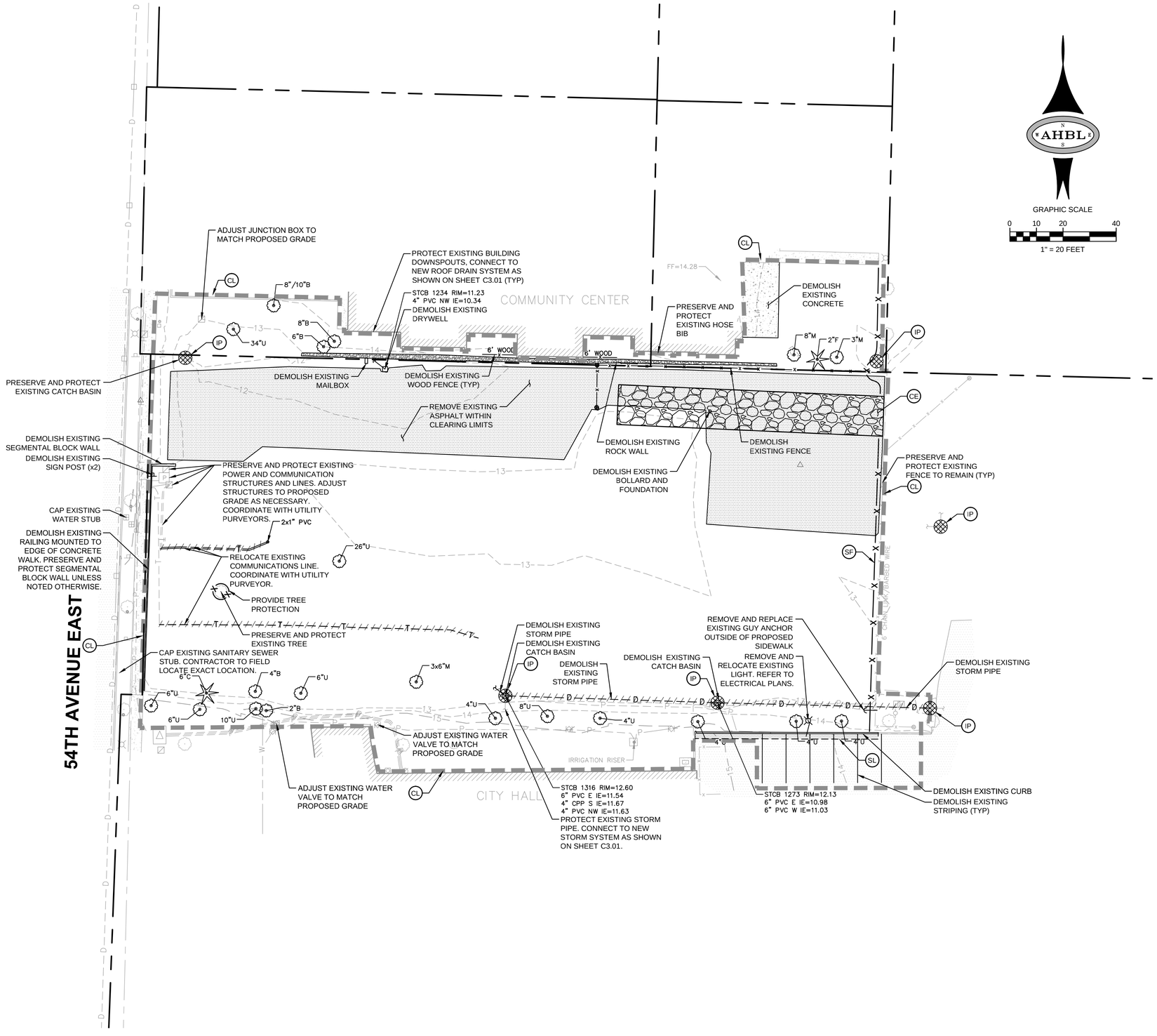
ONLY PANEL PRINTED

COMMUNITY-PANEL NUMBER
530140 0005 B

EFFECTIVE DATE:
NOVEMBER 5, 1980

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



TESC LEGEND:

	IP	INLET PROTECTION	2 / C4.01
		DEMOLISH EXISTING UTILITY	
		DEMOLISH EXISTING CONCRETE	
		DEMOLISH EXISTING ASPHALT	
	CE	CONSTRUCTION ENTRANCE	3 / C4.01
		DEMOLISH EXISTING TREE	
X X	SF	SILT FENCE	1 / C4.01
	CL	CLEARING/PROJECT LIMITS	
	SL	SAWCUT LINE	

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Project Title
CITY OF FIFE
South Campus Phase 1

Project Numbers
2012 - 008

Issue & Revision Dates
PERMIT SET 08.08.2014

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Sheet Title
TESC AND DEMOLITION PLAN - AREA A

Drawn By M. STEWART
Checked By D. NASON

Sheet Number
C1.01

Sheet Number 3 Of 30

Know what's below. Call before you dig.

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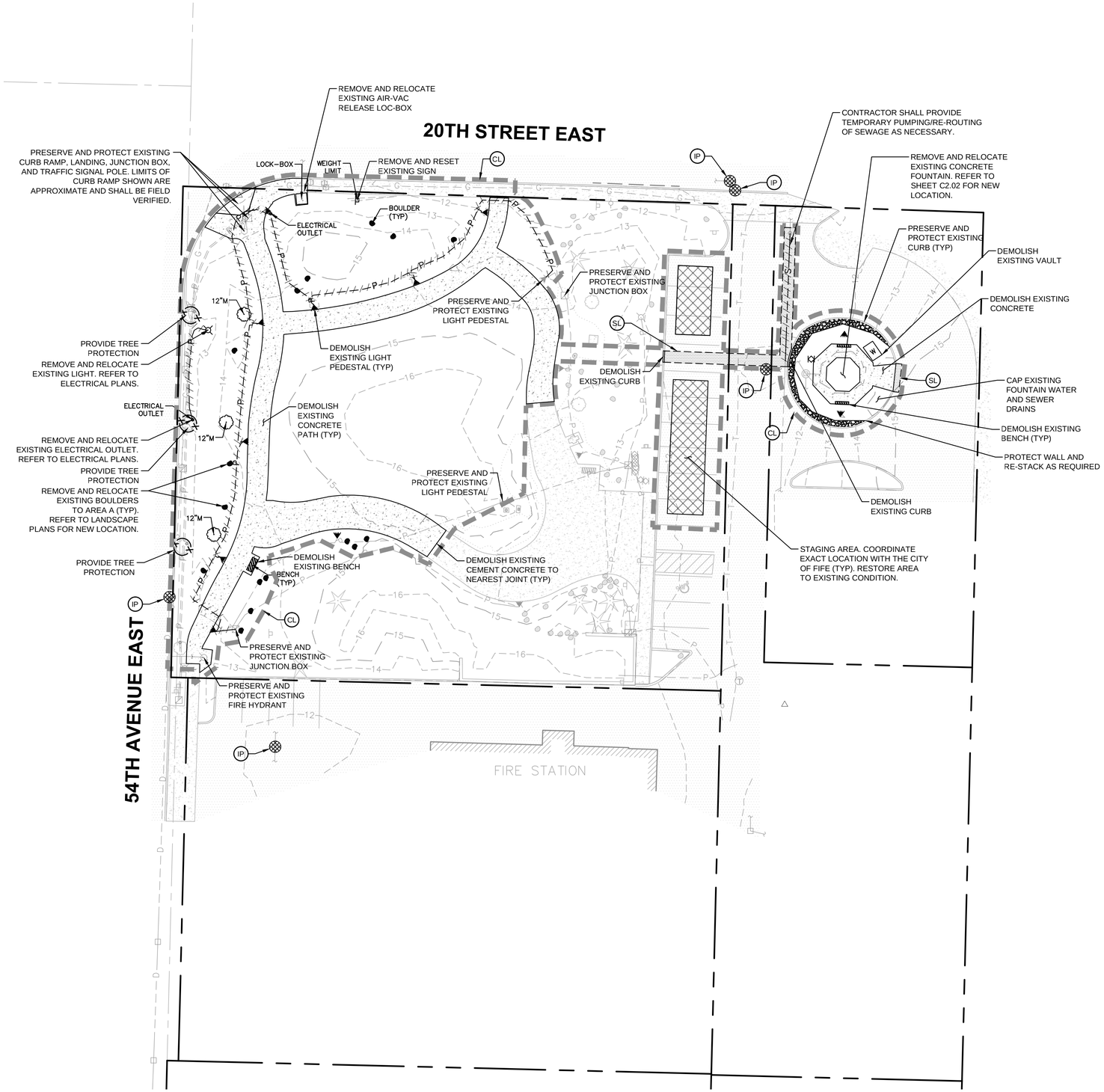

GRAPHIC SCALE

0 10 20 40

1" = 20 FEET

TESC LEGEND:

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		DEMOLISH EXISTING CONCRETE	
		DEMOLISH EXISTING ASPHALT	
	CE	CONSTRUCTION ENTRANCE	3 / C4.01
		DEMOLISH EXISTING WALL	
		DEMOLISH EXISTING TREE	
X X	SF	SILT FENCE	1 / C4.01
	CL	CLEARING/PROJECT LIMITS	
	SL	SAWCUT LINE	
		REMOVE AND RELOCATED EXISTING BOULDER - REFER TO LANDSCAPE PLANS FOR NEW LOCATION	
		DEMOLISH EXISTING LIGHT PEDESTAL	
		STAGING AREA	

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DOREEN S. GAVIN
STATE OF WASHINGTON
23467
REGISTERED
PROFESSIONAL ENGINEER

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Sheet Title

TESC AND DEMOLITION PLAN - AREA B

Drawn By M. STEWART
Checked By D. NASON

Sheet Number

C1.02

Sheet Number 4 Of 30

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CITY OF FIFE GENERAL NOTES

1. ALL SPECIFICATIONS, MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CITY OF FIFE MUNICIPAL CODE, THE LATEST EDITION OF THE WSDOT/APWA STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

2. PLANS AND DETAILS SHALL BE IN ACCORDANCE WITH THE CITY OF FIFE MUNICIPAL CODE AND THE LATEST EDITION OF THE WSDOT/APWA STANDARD PLANS.

3. A COPY OF THE APPROVED PLANS SHALL BE ON SITE DURING CONSTRUCTION.

4. CONSTRUCTION OF PROPOSED IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE APPROVED PLANS. ANY CHANGES FROM THE "APPROVED" PLANS WILL REQUIRE APPROVAL FROM THE DEVELOPER, DEVELOPER'S ENGINEER AND THE CITY OF FIFE.

5. A PRE-CONSTRUCTION MEETING AND ANY REQUIRED PERMITS SHALL BE REQUIRED PRIOR TO ANY WORK ACTIVITY. THE PRE-CONSTRUCTION MEETING SHALL BE HELD AT FIFE CITY HALL, 5411 23RD STREET EAST, FIFE, WA.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE REQUIRED TO CONTROL ON-SITE STORM WATER RUNOFF BY USING APPROVED TEMPORARY OR PERMANENT DRAINAGE EROSION/SILTATION CONTROL PROCEDURES. THE CITY OF FIFE HAS ADOPTED THE 2005 STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN (THE TECHNICAL MANUAL) DEVELOPED BY THE DEPARTMENT OF ECOLOGY.

7. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL CALL ONE-CALL (1-800-425-5555) FOR UTILITY LOCATIONS (WATER, SANITARY SEWER, STORM SEWER, GAS, POWER, TELEPHONE AND CABLE TV).

8. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE TRUE ELEVATIONS AND LOCATIONS OF EXISTING UTILITIES. ANY UTILITY RELOCATIONS SHALL BE AT THE EXPENSE OF THE APPLICANT AND MUST BE IN ACCORDANCE WITH CITY OF FIFE STANDARDS.

9. NO SAW CUTTING IN THE RIGHT-OF-WAY WILL BE ALLOWED WITHOUT PRIOR APPROVAL FROM THE CITY OF FIFE. ONCE APPROVED, EXISTING PAVEMENT SURFACES SHALL BE SAW CUT FULL DEPTH WITH STRAIGHT, UNIFORM EDGES TWELVE INCHES (12") OUT FROM THE EDGE OF EXCAVATION. IF SLOUGHING OCCURS DURING EXCAVATION, THE EXISTING PAVEMENT SHALL BE SAW CUT TO ACHIEVE THE REQUIRED TWELVE INCHES (12") FROM THE EDGE OF EXCAVATION.

10. LANE CLOSURES SHALL BE RESTRICTED TO 9:00 A.M. TO 3:00 P.M. MONDAY THRU FRIDAY. ONE LANE (MINIMUM) SHALL BE RESERVED FOR TRAFFIC (BOTH DIRECTIONS) AT ALL TIMES. WORK IN THE RIGHT-OF-WAY REQUIRES A RIGHT-OF-WAY PERMIT. NIGHT, WEEKEND, OR WORK HOURS OTHER THAN HOURS MENTIONED ABOVE WILL REQUIRE THE CITY OF FIFE ENGINEER'S APPROVAL. A THREE-DAY ADVANCE NOTICE IS REQUIRED. ACCESS TO EXISTING DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.

11. IF WORK IS REQUIRED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL PROVIDE PROOF OF LIABILITY INSURANCE IN AN AMOUNT NO LESS THAN ONE (1) MILLION DOLLARS PER OCCURRENCE AND A $10,000.00 OR 125 PERCENT OF THE COST OF IMPROVEMENTS BEING BUILT IN THE PUBLIC RIGHT OF WAY, WHICH EVER IS GREATER RESTORATION/DEFECT BOND ON CITY OF FIFE FORMS. THE CONTRACTOR SHALL ALSO PROVIDE A TRAFFIC CONTROL PLAN FOR REVIEW AND APPROVAL A MINIMUM OF FIVE (5) DAYS PRIOR TO STARTING THE WORK. ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

12. THE CONTRACTOR SHALL CONTACT PIERCE COUNTY TRANSIT AND THE FIFE SCHOOL DISTRICT FOR COORDINATING BUS STOP OPERATIONS DURING CONSTRUCTION, IF NECESSARY.

13. NO CONSTRUCTION, EXCAVATION, HAULING OR REMOVAL OF FILL SHALL BE PERMITTED BETWEEN THE HOURS OF 10:00 P.M. AND 7:00 A.M. WEEKDAYS OR 10:00 P.M. AND 9:00 A.M. ON WEEKENDS.

14. THE CONTRACTOR WILL BE REQUIRED TO WATER THE SITE, AS NECESSARY, TO REDUCE EMISSIONS AS A RESULT OF CONSTRUCTION ACTIVITY. A HYDRANT PERMIT AND METER IS REQUIRED TO OBTAIN WATER FROM THE CITY OF FIFE WATER SYSTEM. THE CONTRACTOR SHALL SWEEP ALL AFFECTED PUBLIC ROADS, AS NECESSARY, OR AS DIRECTED BY THE CITY, TO REMOVE MUD DEPOSITS AS A RESULT OF CONSTRUCTION ACTIVITY.

15. CUT SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL AND FILL SLOPES SHALL NOT BE STEEPER THAN 1-1/2 HORIZONTAL TO 1 VERTICAL, OR AS RECOMMENDED BY A SOILS ENGINEER. THE CATCH POINTS OF THE TOP OF CUT SLOPES AND BOTTOM OF FILL SLOPES SHALL BE SET BACK FROM THE SITE BOUNDARY LINES IN ACCORDANCE WITH THE FOLLOWING TABLE, UNLESS A RETAINING WALL IS DESIGNED BY THE ENGINEER AND CONSTRUCTED FOR THE PROJECT:

CUT/FILL DEPTH	SET BACK DISTANCE
UNDER 5 FEET	2 FEET
5 FEET AND OVER	HEIGHT/2

16. ISSUANCE OF A PERMIT BY THE CITY OF FIFE DOES NOT IMPLY OR SIGNIFY THAT THE PROPOSED WORK COMPLIES WITH THE REQUIREMENTS OF OR IS ALLOWED BY OTHER COUNTY, STATE OR FEDERAL LAWS, ORDINANCES OR REGULATIONS. APPLICANT WILL ACCEPT SOLE RESPONSIBILITY AND LIABILITY FOR COMPLIANCE WITH ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS.

17. "AS BUILT" DRAWINGS, CERTIFIED BY A LICENSED LAND SURVEYOR OR PROFESSIONAL ENGINEER, ARE REQUIRED FOR RIGHT-OF-WAY IMPROVEMENTS AND ANY SITE CIVIL SITE WORK. THESE DRAWINGS SHALL BE SUBMITTED ON 24" X 36" MYLAR, 3 PAPER COPIES, & ON CD IN ELECTRONIC PDF FORMAT AS APPROVED BY THE CITY, AND RECEIVE APPROVAL FROM THE CITY BEFORE A CERTIFICATE OF OCCUPANCY IS ISSUED.

18. ALL STORM PIPE SHALL BE INSTALLED WITH RUBBER GASKET JOINTS. PIPES SHALL NOT ALLOW INTRUSION OF GROUNDWATER INTO STORM SYSTEM. PIPES SHALL BE INSTALLED WATER TIGHT AND AIR TESTED.

19. ALL EXCAVATIONS IN ROADWAYS SHALL BE BACKFILLED FULL-DEPTH WITH CRUSHED ROCK BASE COURSE COMPACTED TO 95% MDD.

20. ALL CEMENT CONCRETE CURB AND GUTTER IN THE RIGHT-OF-WAY SHALL BE MINIMUM STRENGTH OF 4,000 PSI.

21. ALL SANITARY SEWER AND STORM DRAIN PIPE MUST BE GASKETED PIPE WITH DETECTABLE WARNING TAPE.

22. ALL TYPE II CATCH BASINS NOT DIRECTLY PICKING UP STORM DRAINAGE SHALL HAVE ROUND SOLID LOCKING LIDS. LIDS WILL NOT BE CONSTRUCTED IN THE CURB AND GUTTER LINE OR WHEEL PATH.

23. ALL SANITARY SEWERS IN OR CLOSE TO GUTTER FLOW LINE SHALL HAVE LOCKING LIDS.

24. ALL STRUCTURES LARGER THAN A TYPE I CATCH BASIN SHALL REQUIRE A MINIMUM OF 12" THICKNESS OF 4" TO 8" QUARRY SPALLS FOR BASE UNDER AND MINIMUM OF 12" OUTSIDE OF STRUCTURE, OVER 260# FABRIC PER ASTM D-4632.

25. ALL DRIVEWAYS TO HAVE 6" MINIMUM THICKNESS CONCRETE WITH A MINIMUM STRENGTH OF 4,000 PSI.

26. HDPE STORM PIPE TO MEET ASTM F810-93.

27. ALL UTILITY HARDWARE CASTINGS TO INCLUDE SANITARY SEWER MANHOLES, STORM DRAIN MANHOLES, WATER GATE VALVE BOXES, SEWER AND STORM CLEAN OUTS REQUIRED TO HAVE CONCRETE COLLARS. THE CONCRETE COLLAR TO BE 12" WIDE BY 8" THICK, UP TO 2" BELOW RIM IN ALL PAVED AREAS, AND UP TO TOP OF RIM IN LANDSCAPING.

TEMPORARY EROSION & SEDIMENTATION CONTROL (TESC) NOTES

1. TEMPORARY EROSION/WATER POLLUTION PREVENTION MEASURES SHALL BE REQUIRED IN ACCORDANCE WITH DOE STANDARDS. THE EROSION/WATER POLLUTION PREVENTION MEASURES SHOWN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. SHOULD THE TEMPORARY EROSION/WATER POLLUTION PREVENTION MEASURES SHOWN NOT PROVE ADEQUATE TO CONTROL EROSION AND SEDIMENTATION MIGRATION OUTSIDE THE PROJECT AREA(S), THE APPLICANT/CONTRACTOR SHALL INSTALL ADDITIONAL MEASURES AS NECESSARY TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.

2. ALL TEMPORARY EROSION/WATER POLLUTION PREVENTION MEASURES SHALL BE REGULARLY INSPECTED AND MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION AND REMOVED UPON PROJECT COMPLETION AND FULL STABILIZATION OF PROPOSED WORK.

3. CONSTRUCTION OF GROUNDWATER DEWATERING SYSTEM, IF NECESSARY, SHALL BE IN ACCORDANCE WITH THE WSDOT STANDARD SPECIFICATION 6-02.3(6)C. SLURRY FROM DEWATERING SHALL BE CONTAINED AND LEGALLY DISPOSED OF OFFSITE AT THE EXPENSE OF THE APPLICANT/CONTRACTOR.

4. ADDITIONAL MEASURES, SUCH AS REGULAR STREET SWEEPING MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ADJACENT TO THE PROPOSED WORK AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

5. FIRE HYDRANT PERMIT AND METER REQUIRED TO OBTAIN WATER USAGE FROM CITY OF FIFE WATER SYSTEM.

6. REMOVE EROSION CONTROL MEASURES ONCE SITE HAS BEEN STABILIZED CONSTRUCTION DEBRIS HAS BEEN REMOVED.

7. CONTRACTOR TO MONITOR STORMWATER RUNOFF LEAVING SITE. CONTRACTOR TO EMPLOY ADDITIONAL TESC MEASURES NECESSARY TO ENSURE NPDES COMPLIANCE.

8. CONTRACTOR TO TRANSFER NPDES PERMIT INTO THEIR NAME.

DEMOLITION NOTES

1. BOLD ITEMS TO BE REMOVED AND SAVED OR DISPOSED AS NOTED.

2. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL UTILITIES HAVE BEEN DISCONNECTED PRIOR TO COMMENCING DEMOLITION.

3. DEMOLITION: IT IS THE INTENT OF THE WORK UNDER THIS CONTRACT TO INCLUDE THE DEMOLITION OF ALL EXISTING BUILDINGS, PAVING, UTILITIES, BOLLARDS, GATES FENCES AND OTHER EXISTING SITE IMPROVEMENTS INCLUDING THEIR UNDERGROUND COMPONENTS AS INDICATED BY THIS DRAWING AND AS REQUIRED FOR NEW CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FULLY REVIEW THE SITE CONDITIONS AND TO CORRELATE THESE OBSERVATIONS WITH THE PROJECT WORK AND INCLUDE ALL NECESSARY DEMOLITION, WHETHER SHOWN OR NOT, AND INCLUDE ALL SUCH COSTS IN THE BASE BID.

4. CLEARING: IT IS THE INTENT OF THE WORK UNDER THIS CONTRACT TO CONDUCT ALL CLEARING NECESSARY TO BE ABLE TO COMPLETE ALL THE WORK OF THIS PROJECT.

5. CONTRACTOR SHALL LEGALLY DISPOSE OFF THE OWNER'S PROPERTY, ALL DEMOLISHED AND REMOVED MATERIALS, UNLESS INDICATED OTHERWISE.

6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETELY COORDINATE UTILITY DEMOLITION WITH NEW CONSTRUCTION. CONTRACTOR SHALL ENSURE THAT ADEQUATE FIRE PROTECTION IN ACCORDANCE WITH THE FIRE MARSHAL REQUIREMENTS IS PROVIDED FOR THE SURROUNDING BUILDINGS.

7. CONTRACTOR SHALL PROTECT ALL TREES BEYOND THE CLEARING LIMITS AND THOSE WITHIN THE CLEARING LIMITS NOTED TO REMAIN FROM CONSTRUCTION DAMAGE. SEE LANDSCAPE DRAWINGS FOR ADDITIONAL TREE PROTECTION REQUIREMENTS.

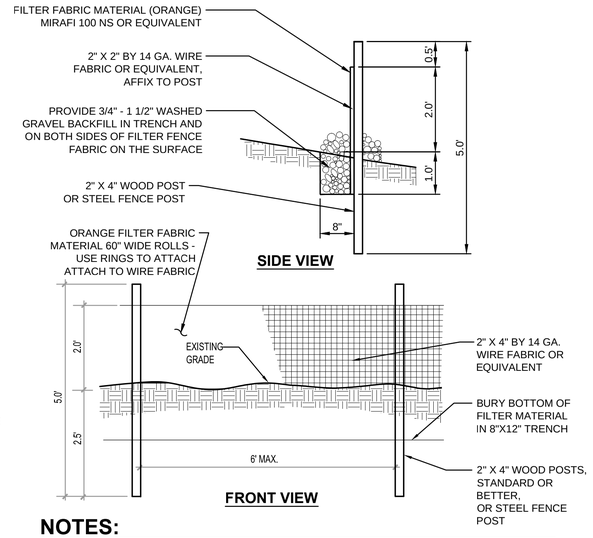
8. COORDINATE POWER DEMOLITION WITH PUGET SOUND ENERGY AND ELECTRICAL PLANS.

9. ANY ABANDONED SIDE SEWERS SHALL BE PLUGGED OR CAPPED PER CH. 7 SECTION 722.0 OF THE UNIFORM PLUMBING CODE.

10. COORDINATE WITH THE CITY OF FIFE PUBLIC WORKS FOR WATER METER REMOVAL AND DISCONNECTION OF SERVICES.

11. UNLESS OTHERWISE NOTED, DEMOLISH UTILITIES TO PROPERTY LINE. CAP AT PROPERTY LINE. SIDE SEWERS SHALL BE PLUGGED AND CAPPED IN ACCORDANCE WITH SECTION 722.0 OF THE UNIFORM PLUMBING CODE.

12. REFER TO LANDSCAPE PLANS FOR ADDITIONAL LANDSCAPE-RELATED DEMOLITION REQUIREMENTS.



NOTES:

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST WITH A MINIMUM SIX-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST.

2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS (WHERE FEASIBLE). THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF SIX FEET APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 30")

3. A TRENCH SHALL BE EXCAVATED, ROUGHLY EIGHT INCHES WIDE AND TWELVE INCHES DEEP, UPSLOPE AND ADJACENT TO THE WOOD POST TO ALLOW THE FILTER FABRIC TO BE BURIED.

4. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST ONE INCH LONG, TIE WIRES, OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF FOUR INCHES AND SHALL NOT EXTEND MORE THAN THIRTY SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE.

5. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND TWENTY INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN THIRTY SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.

6. WHEN EXTRA-STRENGTH FILTER FABRIC AND CLOSER POST SPACING ARE USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE, THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POSTS WITH ALL OTHER PROVISIONS OF STANDARD NOTE (S) APPLYING.

7. THE TRENCH SHALL BE BACKFILL WITH 3/4 INCH MINIMUM DIAMETER WASHED GRAVEL.

8. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

9. FILTER FABRIC FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

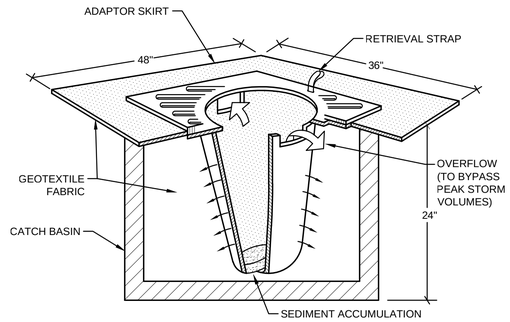
10. CONTRIBUTING LENGTH TO FENCE SHALL NOT BE MORE THAN 100 FEET.

11. DO NOT INSTALL BELOW AN OUTLET PIPE OR WEIR.

12. DO NOT DRIVE OVER OR FILL OVER FILTER FABRIC FENCE.

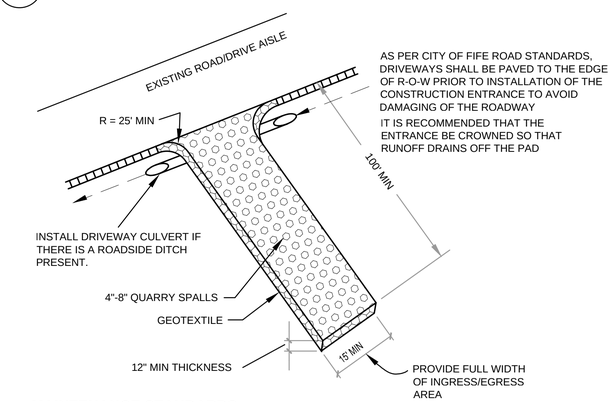
1 SILT FENCE

NOT TO SCALE



2 INLET SEDIMENT PROTECTION

NOT TO SCALE



MAINTENANCE STANDARDS

1. QUARRY SPALLS SHALL BE ADDED IF THE PAD IS NO LONGER IN ACCORDANCE WITH THE SPECIFICATIONS.

2. 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 STREET SWEEPING, AN INCREASE IN THE DIMENSIONS OF THE ENTRANCE, OR THE INSTALLATION OF A WHEEL WASH. IF WASHING IS USED, IT SHALL BE DONE ON AN AREA COVERED WITH CRUSHED ROCK, AND WASH WATER SHALL DRAIN TO A SEDIMENT TRAP OR POND.

3. ANY SEDIMENT THAT IS TRACKED ONTO PAVEMENT SHALL BE REMOVED IMMEDIATELY BY 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 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 SHALL BE CONSIDERED. THE SEDIMENT WOULD THEN BE WASHED INTO THE SUMP.

4. ANY QUARRY SPALLS THAT ARE LOOSENED FROM THE PAD AND END UP ON THE ROADWAY SHALL BE REMOVED IMMEDIATELY.

5. IF VEHICLES ARE ENTERING OR EXITING THE SITE AT POINTS OTHER THAN THE CONSTRUCTION ENTRANCE(S), FENCING SHALL BE INSTALLED TO CONTROL TRAFFIC.

3 CONSTRUCTION ENTRANCE

NOT TO SCALE

Know what's **below.**
Call before you dig.

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Project Title
CITY OF FIFE
South Campus Phase 1

Project Numbers
2012 - 008

Issue & Revision Dates
PERMIT SET 08.08.2014

DOREEN S. CAVIN
STATE OF WASHINGTON
23467
REGISTERED
PROFESSIONAL ENGINEER

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Sheet Title
NOTES AND DETAILS

Drawn By M. STEWART
Checked By D. NASON

Sheet Number
C4.01

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Exhibit 2

Inspection Logs

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City of Fife – Phase I Improvements

Stormwater Pollution Prevention Plan

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Inspector: Date:

Inspector's Qualifications:

Days since last rainfall: Amount of last rainfall: inches

Stabilization Measures

Drainage Area	Date Since Last Disturbance	Date of Next Disturbance	Stabilized (yes/No)	Stabilized With	Condition

Stabilization required:

To be performed by: _____ On or before: _____

City of Fife – Phase I Improvements

Stormwater Pollution Prevention Plan

Inspection and Maintenance Report Form

Perimeter Structural Controls:

Date:

Silt Fence

Drainage Area Perimeter	Has Silt Reached 1/3 of Fence Height?	Is Fence Properly Secured?	Is There Evidence of Washout or Overtopping?

Maintenance required for silt fence and straw bales:

To be performed by: _____ On or before: _____

City of Fife – Phase I Improvements

Stormwater Pollution Prevention Plan

Inspection and Maintenance Report Form

Changes required to the pollution prevention plan:

Reasons for changes:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: _____

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Exhibit 3

Best Management Practices (BMPs)

BMP C105.....Stabilized Construction Entrance
BMP C120.....Temporary and Permanent Seeding
BMP C121.....Mulching
BMP C123.....Plastic Covering
BMP C140.....Dust Control
BMP C151.....Concrete Handling
BMP C152.....Sawcutting and Surface Pollution Prevention
BMP C160.....Certified Erosion and Sediment Control Lead
BMP C200.....Interceptor Dike and Swale
BMP C201.....Grass-Lined Channels
BMP C207.....Check Dams
BMP C220.....Storm Drain Inlet Protection
BMP C233.....Silt Fence

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BMP C105: Stabilized Construction Entrance

Purpose

Construction entrances are stabilized to reduce the amount of sediment transported onto paved roads by vehicles or equipment by constructing a stabilized pad of quarry spalls at entrances to construction sites.

Conditions of Use

Construction entrances shall be stabilized wherever traffic will be leaving a construction site and traveling on paved roads or other paved areas within 1,000 feet of the site.

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 4.2 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').
- 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.
- Hog fuel (wood-based mulch) may be substituted for or combined with quarry spalls in areas that will not be used for permanent roads. Hog fuel is generally less effective at stabilizing construction entrances and should be used only at sites where the amount of traffic is very limited. Hog fuel is not recommended for entrance stabilization in urban areas. The effectiveness of hog fuel is highly variable and it generally requires more maintenance than quarry spalls. The inspector may at any time require the use of quarry spalls if the hog fuel is not preventing sediment from being tracked onto pavement or if the hog fuel is being carried onto pavement. Hog fuel is prohibited in permanent roadbeds because organics in the subgrade soils cause degradation of the subgrade support over time.
- Fencing (see BMPs C103 and C104) 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.

Maintenance Standards

- Quarry spalls (or hog fuel) 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 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 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 shall be considered. The sediment would then be washed into the sump where it can be controlled.
- 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 BMPs C103 and C104) 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.

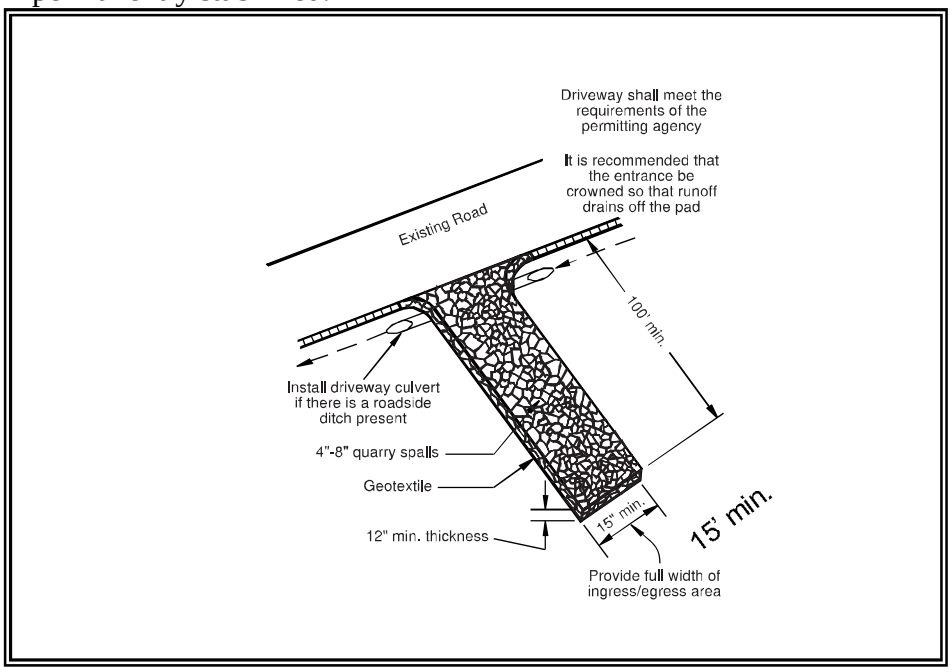


Figure 4.2 – Stabilized Construction Entrance

BMP C121: Mulching

Purpose

The purpose of mulching soils is to provide 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. Only the most common types are discussed in this section.

Conditions of Use

As a temporary cover measure, mulch should be used:

- On disturbed areas that require cover measures for less than 30 days.
- As a cover for seed 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.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see Table 4.7. Note: Thicknesses 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.

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 4.7 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 1000 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. Straw should be used only if mulches with long-term benefits are unavailable locally. 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 1000 sf or 1500 - 2000 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 purchased from supplier with Solid Waste Handling Permit (unless exempt).	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.
Chipped Site Vegetation	Average size shall be several inches. Gradations from fines to 6 inches in length for texture, variation, and interlocking properties.	2" minimum thickness	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	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; approx. 100 tons per acre (approx. 800 lbs. per cubic yard)	This material is often called “hog or hogged fuel.” It is usable as a material for Stabilized Construction Entrances (BMP C105) and as a mulch. 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).

BMP C122: Nets and Blankets

Purpose

Erosion control nets and blankets are intended to prevent erosion and hold seed and mulch in place on steep slopes and in channels so that vegetation can become well established. In addition, some nets and blankets can be used to permanently reinforce turf to protect drainage ways during high flows. Nets (commonly called matting) are strands of material woven into an open, but high-tensile strength net (for example, coconut fiber matting). Blankets are strands of material that are not tightly woven, but instead form a layer of interlocking fibers, typically held together by a biodegradable or photodegradable netting (for example, excelsior or straw blankets). They generally have lower tensile strength than nets, but cover the ground more completely. Coir (coconut fiber) fabric comes as both nets and blankets.

Conditions of Use

Erosion control nets and blankets should be used:

- To aid permanent vegetated stabilization of slopes 2H:1V or greater and with more than 10 feet of vertical relief.
- For drainage ditches and swales (highly recommended). The application of appropriate netting or blanket to drainage ditches and swales can protect bare soil from channelized runoff while vegetation is established. Nets and blankets also can capture a great deal of sediment due to their open, porous structure. Synthetic nets and blankets can be used to permanently stabilize channels and may provide a cost-effective, environmentally preferable alternative to riprap. 100 percent synthetic blankets manufactured for use in ditches may be easily reused as temporary ditch liners.

Disadvantages of blankets include:

- Surface preparation required;
- On slopes steeper than 2.5:1, blanket installers may need to be roped and harnessed for safety;
- They cost at least $4,000-6,000 per acre installed.

Advantages of blankets include:

- Can be installed without mobilizing special equipment;
- Can be installed by anyone with minimal training;
- Can be installed in stages or phases as the project progresses;
- Seed and fertilizer can be hand-placed by the installers as they progress down the slope;
- Can be installed in any weather;
- There are numerous types of blankets that can be designed with various parameters in mind. Those parameters include: fiber blend, mesh strength, longevity, biodegradability, cost, and availability.

Design and Installation Specifications

- See Figure 4.4 and Figure 4.5 for typical orientation and installation of blankets used in channels and as slope protection. Note: these are typical only; all blankets must be installed per manufacturer's installation instructions.
- Installation is critical to the effectiveness of these products. If good ground contact is not achieved, runoff can concentrate under the product, resulting in significant erosion.
- Installation of Blankets on Slopes:
  1. Complete final grade and track walk up and down the slope.
  2. Install hydromulch with seed and fertilizer.
  3. Dig a small trench, approximately 12 inches wide by 6 inches deep along the top of the slope.
  4. Install the leading edge of the blanket into the small trench and staple approximately every 18 inches. NOTE: Staples are metal,"U"-shaped, and a minimum of 6 inches long. Longer staples are used in sandy soils. Biodegradable stakes are also available.
  5. Roll the blanket slowly down the slope as installer walks backwards. NOTE: The blanket rests against the installer's legs. Staples are installed as the blanket is unrolled. It is critical that the proper staple pattern is used for the blanket being installed. The blanket is not to be allowed to roll down the slope on its own as this stretches the blanket making it impossible to maintain soil contact. In addition, no one is allowed to walk on the blanket after it is in place.
  6. If the blanket is not long enough to cover the entire slope length, the trailing edge of the upper blanket should overlap the leading edge of the lower blanket and be stapled. On steeper slopes, this overlap should be installed in a small trench, stapled, and covered with soil.
- With the variety of products available, it is impossible to cover all the details of appropriate use and installation. Therefore, it is critical that the design engineer consults the manufacturer's information and that a site visit takes place in order to insure that the product specified is appropriate. Information is also available at the following web sites:
  1. WSDOT: http://www.wsdot.wa.gov/eesc/environmental/
  2. Texas Transportation Institute: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm

- Jute matting must be used in conjunction with mulch (BMP C121). Excelsior, woven straw blankets and coir (coconut fiber) blankets may be installed without mulch. There are many other types of erosion control nets and blankets on the market that may be appropriate in certain circumstances.
- In general, most nets (e.g., jute matting) require mulch in order to prevent erosion because they have a fairly open structure. Blankets typically do not require mulch because they usually provide complete protection of the surface.
- Extremely steep, unstable, wet, or rocky slopes are often appropriate candidates for use of synthetic blankets, as are riverbanks, beaches and other high-energy environments. If synthetic blankets are used, the soil should be hydromulched first.
- 100 percent biodegradable blankets are available for use in sensitive areas. These organic blankets are usually held together with a paper or fiber mesh and stitching which may last up to a year.
- Most netting used with blankets is photodegradable, meaning they break down under sunlight (not UV stabilized). However, this process can take months or years even under bright sun. Once vegetation is established, sunlight does not reach the mesh. It is not uncommon to find non-degraded netting still in place several years after installation. This can be a problem if maintenance requires the use of mowers or ditch cleaning equipment. In addition, birds and small animals can become trapped in the netting.

Maintenance Standards

- Good contact with the ground must be maintained, and erosion must not occur beneath the net or blanket.
- Any areas of the net or blanket that are damaged or not in close contact with the ground shall be repaired and stapled.
- If erosion occurs due to poorly controlled drainage, the problem shall be fixed and the eroded area protected.

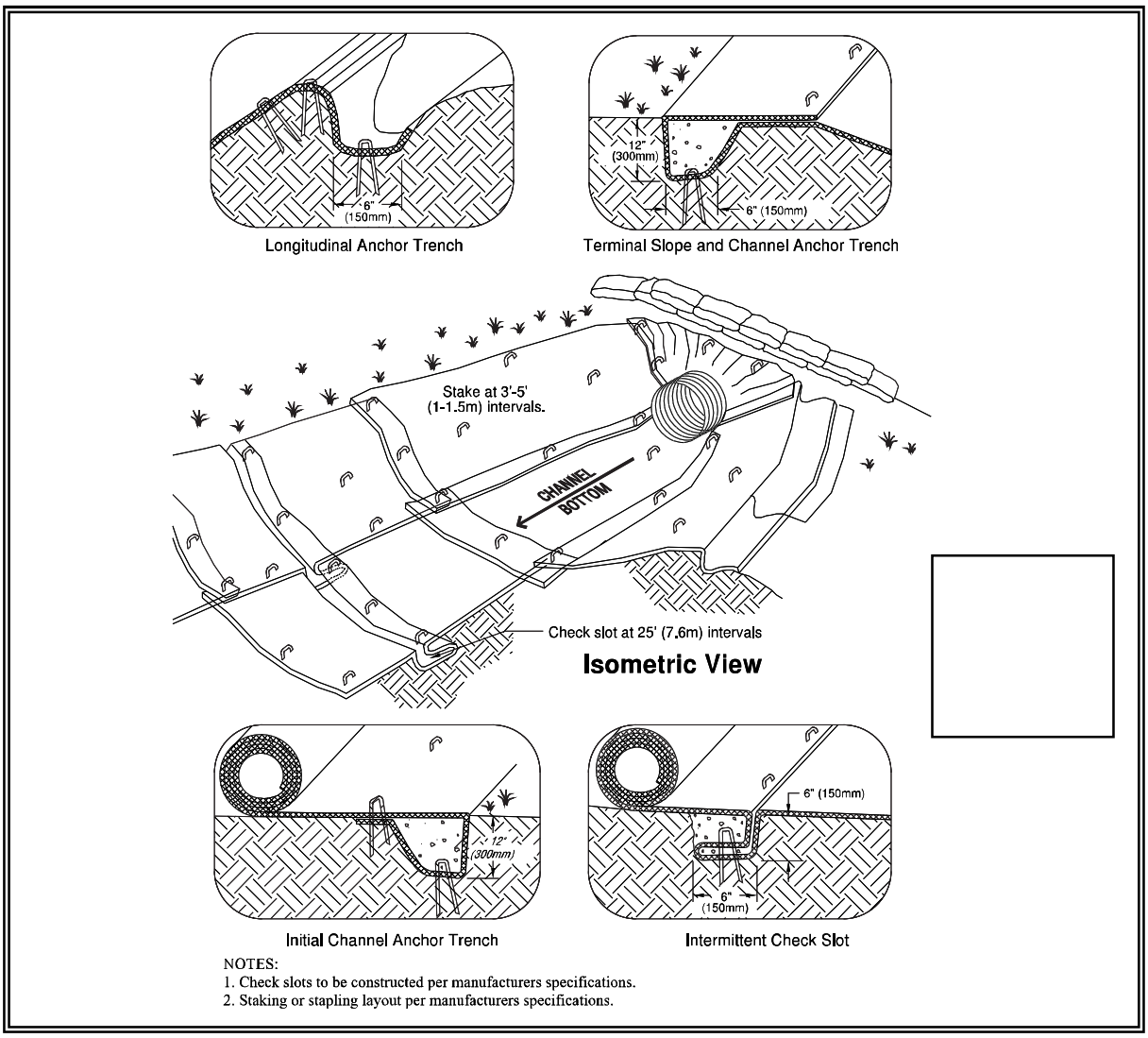


Figure 4.4 – Channel Installation

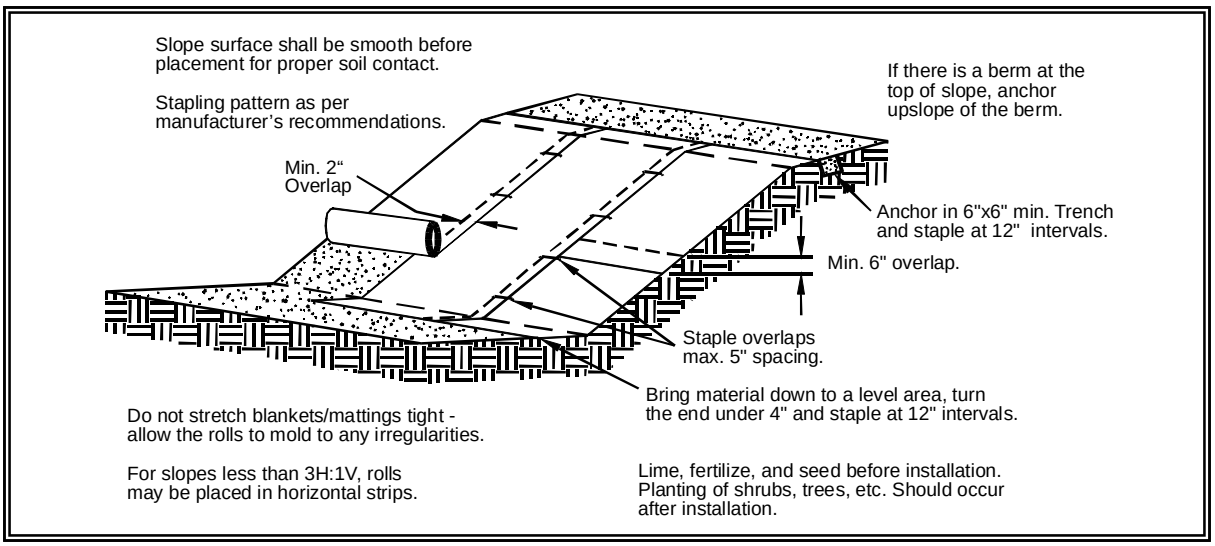


Figure 4.5 – Slope Installation

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.
- Clear plastic sheeting can be used over newly-seeded areas to create a greenhouse effect and encourage grass growth if the hydroseed was installed too late in the season to establish 75 percent grass cover, or if the wet season started earlier than normal. Clear plastic should not be used for this purpose during the summer months because the resulting high temperatures can kill the grass.
- Due to rapid runoff caused by plastic sheeting, this method shall not be used upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- 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, water collection measures must be installed 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. At no time is clean runoff from a plastic covered slope to be mixed 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; and,
    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, all seams should be taped;
  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 pound a wooden stake through each 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.
- If the plastic begins to deteriorate due to ultraviolet radiation, it must be completely removed and replaced.
- When the plastic is no longer needed, it shall be completely removed.
- Dispose of old tires appropriately.

BMP C140: Dust Control

Purpose

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

Conditions of Use

- In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition, if stable. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to Stabilized Construction Entrance (BMP C105).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to the increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control, especially in eastern Washington. Since the wholesale cost of PAM is about $ 4.00 per pound, this is an extremely cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.

- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
- 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 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

Quantities of erosion prevention and sediment control materials can be kept on the project site at all times to be used for 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 to be used 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 that will cover numerous situations includes:

Material	Measure	Quantity
Clear Plastic, 6 mil	100 foot roll	1-2
Drainpipe, 6 or 8 inch diameter	25 foot section	4-6
Sandbags, filled	each	25-50
Straw Bales for mulching,	approx. 50# each	10-20
Quarry Spalls	ton	2-4
Washed Gravel	cubic yard	2-4
Geotextile Fabric	100 foot roll	1-2
Catch Basin Inserts	each	2-4
Steel "T" Posts	each	12-24

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. This BMP is intended to minimize and eliminate concrete process water and slurry from entering waters of the state.

Conditions of Use

Any time concrete is used, these management practices shall be utilized. Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Design and Installation Specifications

- Concrete truck chutes, pumps, and internals shall be washed out only into formed areas awaiting installation of concrete or asphalt.
- Unused concrete remaining in the truck and pump shall be returned to the originating batch plant for recycling.
- Hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels shall be washed off only into formed areas awaiting installation of concrete or asphalt.
- Equipment that cannot be easily moved, such as concrete pavers, shall only be washed in areas that do not directly drain to natural or constructed stormwater conveyances.
- Washdown from areas such as concrete aggregate driveways shall not drain directly to natural or constructed stormwater conveyances.
- When no formed areas are available, washwater and leftover product shall be contained in a lined container. Contained concrete shall be disposed of in a manner that does not violate groundwater or surface water quality standards.

Maintenance Standards

Containers shall be checked for holes in the liner daily during concrete pours and repaired the same day.

BMP C152: Sawcutting and Surfacing Pollution Prevention

Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. This BMP is intended to minimize and eliminate process water and slurry from entering waters of the State.

Conditions of Use

Anytime sawcutting or surfacing operations take place, these management practices shall be utilized. Sawcutting and surfacing operations include, but are not limited to, the following:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

Design and Installation Specifications

- Slurry and cuttings shall be vacuumed during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance.
- Collected slurry and cuttings shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
- Process water that is generated during hydro-demolition, surface roughening or similar operations shall not drain to any natural or constructed drainage conveyance and shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
- Cleaning waste material and demolition debris shall be handled and disposed of in a manner that does not cause contamination of water. If the area is swept with a pick-up sweeper, the material must be hauled out of the area to an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

BMP C153: Material Delivery, Storage and Containment

Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in a designated area, and installing secondary containment.

Conditions of Use

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g. Polyacrylamide)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds
- Hazardous chemicals such as acids, lime, adhesives, paints, solvents and curing compounds
- Any other material that may be detrimental if released to the environment

Design and Installation Specifications

The following steps should be taken to minimize risk:

- Temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.

- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.

Material Storage Areas and Secondary Containment Practices:

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.
- Temporary secondary containment facilities shall provide for a spill containment volume able to contain precipitation from a 25 year, 24 hour storm event, plus 10% of the total enclosed container volume of all containers, or 110% of the capacity of the largest container within its boundary, whichever is greater.
- Secondary containment facilities shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- Secondary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each secondary containment facility shall be covered during non-working days, prior to and during rain events.
- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit).
- The spill kit should include, at a minimum:
    - 1-Water Resistant Nylon Bag
    - 3-Oil Absorbent Socks 3”x 4’
    - 2-Oil Absorbent Socks 3”x 10’
    - 12-Oil Absorbent Pads 17”x19”
    - 1-Pair Splash Resistant Goggles
    - 3-Pair Nitrile Gloves
    - 10-Disposable Bags with Ties
    - Instructions

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

- 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: www.ecy.wa.gov/programs/wq/stormwater.

  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, 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 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.

- 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, and

      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.

Minimum Requirements for ESC Training and Certification Courses

General Requirements

1. The course shall teach the construction stormwater pollution prevention guidance provided in the most recent version of:
    a. The Washington State Dept. of Ecology Stormwater Management Manual for Western Washington,
    b. Other equivalent stormwater management manuals approved by Ecology.

2. Upon completion of course, each attendee shall receive documentation of certification, including, at a minimum, a wallet-sized card that certifies completion of the course. Certification shall remain valid for three years. Recertification may be obtained by completing the 8-hour refresher course or by taking the initial 16-hour training course again.

3. The initial certification course shall be a minimum of 16 hours (with a reasonable time allowance for lunch, breaks, and travel to and from field) and include a field element and test.
    a. The field element must familiarize students with the proper installation, maintenance and inspection of common erosion and sediment control BMPs including, but not limited to, blankets, check dams, silt fence, straw mulch, plastic, and seeding.
    b. The test shall be open book and a passing score is not required for certification. Upon completion of the test, the correct answers shall be provided and discussed.

4. The refresher course shall be a minimum of 8 hours and include a test.
    a. The refresher course shall include:
        i. Applicable updates to the Stormwater Management Manual that is used to teach the course, including new or updated BMPs; and
        ii. Applicable changes to the NPDES General Permit for Construction Activities.
    b. The refresher course test shall be open book and a passing score is not required for certification. Upon completion of the test, the correct answers shall be provided and discussed.
    c. The refresher course may be taught using an alternative format (e.g. internet, CD ROM, etc.) if the module is approved by Ecology.

Required Course Elements

1. Erosion and Sedimentation Impacts
    a. Examples/Case studies

2. Erosion and Sedimentation Processes
    a. Definitions
    b. Types of erosion
    c. Sedimentation
        i. Basic settling concepts
        ii. Problems with clays/turbidity

3. Factors Influencing Erosion Potential
    a. Soil
    b. Vegetation
    c. Topography
    d. Climate

4. Regulatory Requirements
    a. NPDES - Construction Stormwater General Permit
    b. Local requirements and permits
    c. Other regulatory requirements

5. Stormwater Pollution Prevention Plan (SWPPP)
    a. SWPPP is a living document – should be revised as necessary
    b. 12 Elements of a SWPPP; discuss suggested BMPs (with examples)
        1. Mark Clearing Limits
        2. Establish Construction Access
        3. Control Flow Rates
        4. Install Sediment Controls
        5. Stabilize Soils
        6. Protect Slopes
        7. Protect Drain Inlets
        8. Stabilize Channels and Outlets
        9. Control Pollutants
        10. Control De-watering
        11. Maintain BMPs
        12. Manage the Project

6. Monitoring/Reporting/Recordkeeping
    a. Site inspections/visual monitoring
        i. Disturbed areas
        ii. BMPs
        iii. Stormwater discharge points
    b. Water quality sampling/analysis
        i. Turbidity
        ii. pH
    c. Monitoring frequency
        i. Set by NPDES permit
        ii. Inactive sites - reduced frequency

d. Adaptive Management
    i. When monitoring indicates problem, take appropriate action (e.g. install/maintain BMPs)
    ii. Document the corrective action(s) in SWPPP
e. Reporting
    i. Inspection reports/checklists
    ii. Discharge Monitoring Reports (DMR)
    iii. Non-compliance notification

Instructor Qualifications

1. Instructors must be qualified to effectively teach the required course elements.

2. At a minimum, instructors must have:

    a. Current certification as a Certified Professional in Erosion and Sediment Control (CPESC), or
    b. Completed a training program for teaching the required course elements, or
    c. The academic credentials and instructional experience necessary for teaching the required course elements.

3. Instructors must demonstrate competent instructional skills and knowledge of the applicable subject matter.

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 erosion. Construction procedures that limit land clearing, provide timely installation of erosion and sedimentation controls, and restore protective cover quickly can significantly reduce the erosion potential of a site.

Design Considerations

- Avoid rainy periods.
- Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding in order to revegetate cut and fill slopes as the work progresses.

BMP C220: Storm Drain Inlet Protection

Purpose To prevent coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use Where storm drain inlets are to be made operational before permanent stabilization of the disturbed drainage area. Protection should be provided for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless the runoff that enters the catch basin will be conveyed to a sediment pond or trap. Inlet protection may be used anywhere to protect the drainage system. It is likely that the drainage system will still require cleaning.

Table 4.9 lists several options for inlet protection. All of the methods for storm drain inlet protection are prone to plugging and require a high frequency of maintenance. Drainage areas should be limited to 1 acre or less. Emergency overflows may be required where stormwater ponding would cause a hazard. If an emergency overflow is provided, additional end-of-pipe treatment may be required.

Table 4.9
Storm Drain Inlet Protetion

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.

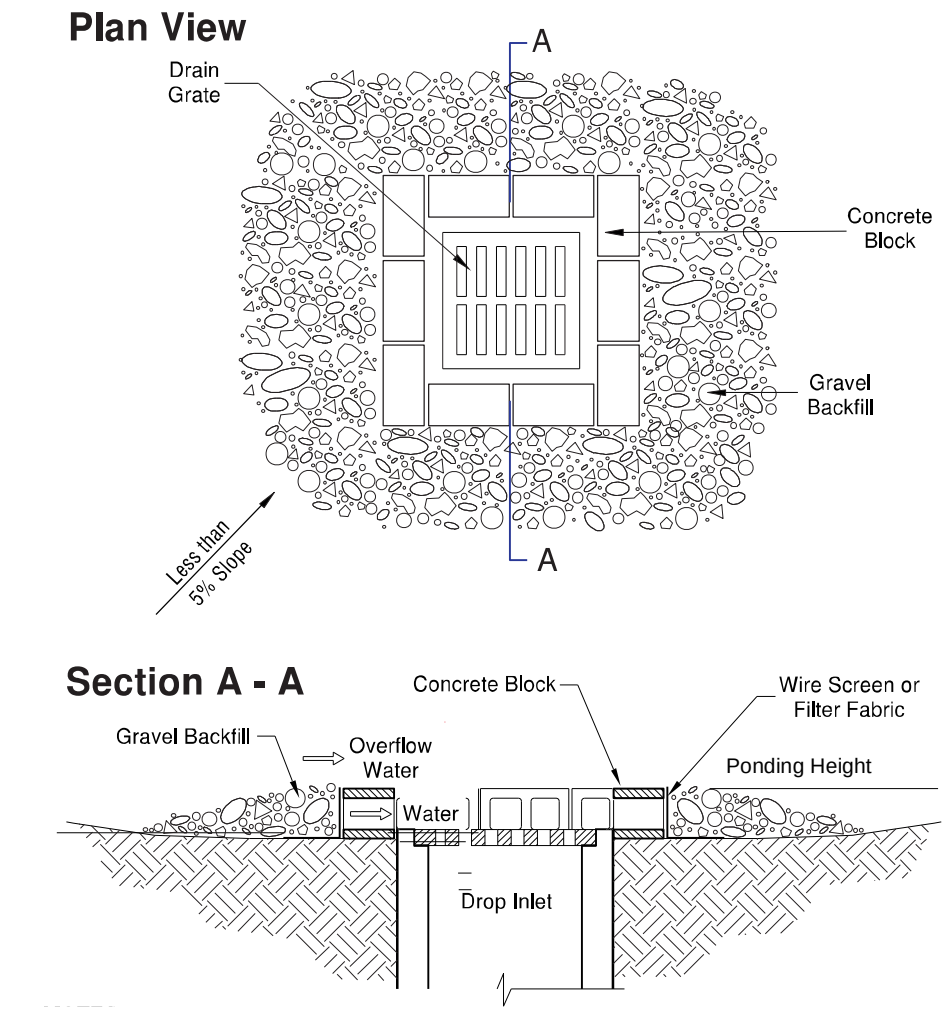
Design and Installation Specifications

Excavated Drop Inlet Protection - An excavated impoundment around the storm drain. Sediment settles out of the stormwater prior to entering the storm drain.

- Depth 1-2 ft as measured from the crest of the inlet structure.
- Side Slopes of excavation no steeper than 2:1.
- 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.
- It may be necessary to build a temporary dike 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 4.14.

- Height 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 2:1 or flatter.
- An alternative design is a gravel donut.
- Inlet slope of 3:1.
- Outlet slope of 2:1.
- 1-foot wide level stone area between the structure and the inlet.
- Inlet slope stones 3 inches in diameter or larger.
- Outlet slope use gravel ½- to ¾-inch at a minimum thickness of 1-foot.



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 dowslope side of the structure.

Figure 4.14 – 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.

- Hardware cloth or comparable wire mesh with ½-inch openings.
- Coarse aggregate.
- 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.
- If more than one strip of mesh is necessary, overlap the strips.
- Place coarse aggregate over the wire mesh.
- The depth of the gravel should be at least 12 inches over the entire inlet opening and extend at least 18 inches on all sides.

Catchbasin Filters - Inserts should be designed by the manufacturer for use at construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. The maintenance requirements can be reduced by combining 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.

- 5 cubic feet of storage.
- Dewatering provisions.
- High-flow bypass that will not clog under normal use at a construction site.
- The catchbasin filter is inserted 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.

- Wire mesh with ½-inch openings.
- 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 an inlet with concrete blocks and gravel. See Figure 4.14.

- 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.

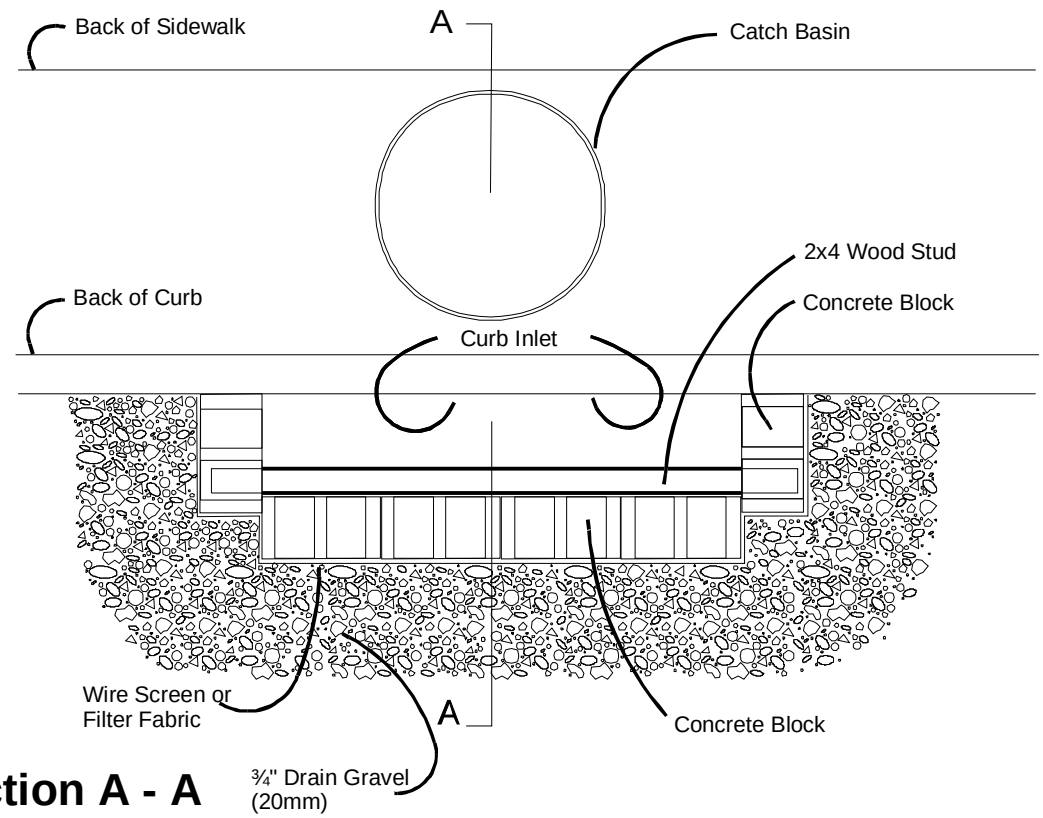
Curb and Gutter Sediment Barrier – Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure 4.16.

- 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

- Catch basin filters should be inspected frequently, especially after storm events. If the insert becomes clogged, it should be cleaned or replaced.
- For systems using stone filters: If the stone filter becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Since cleaning of gravel at a construction site may be difficult, 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.

Plan View



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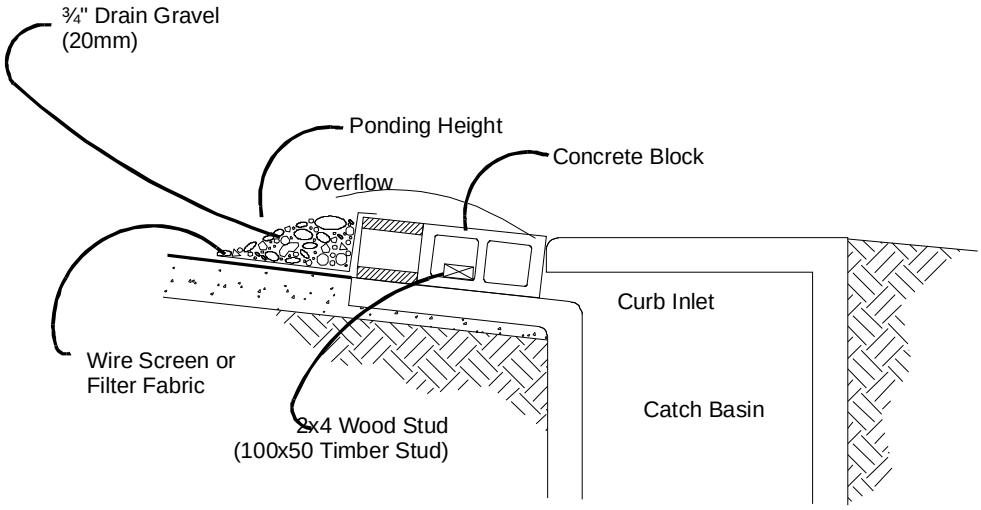
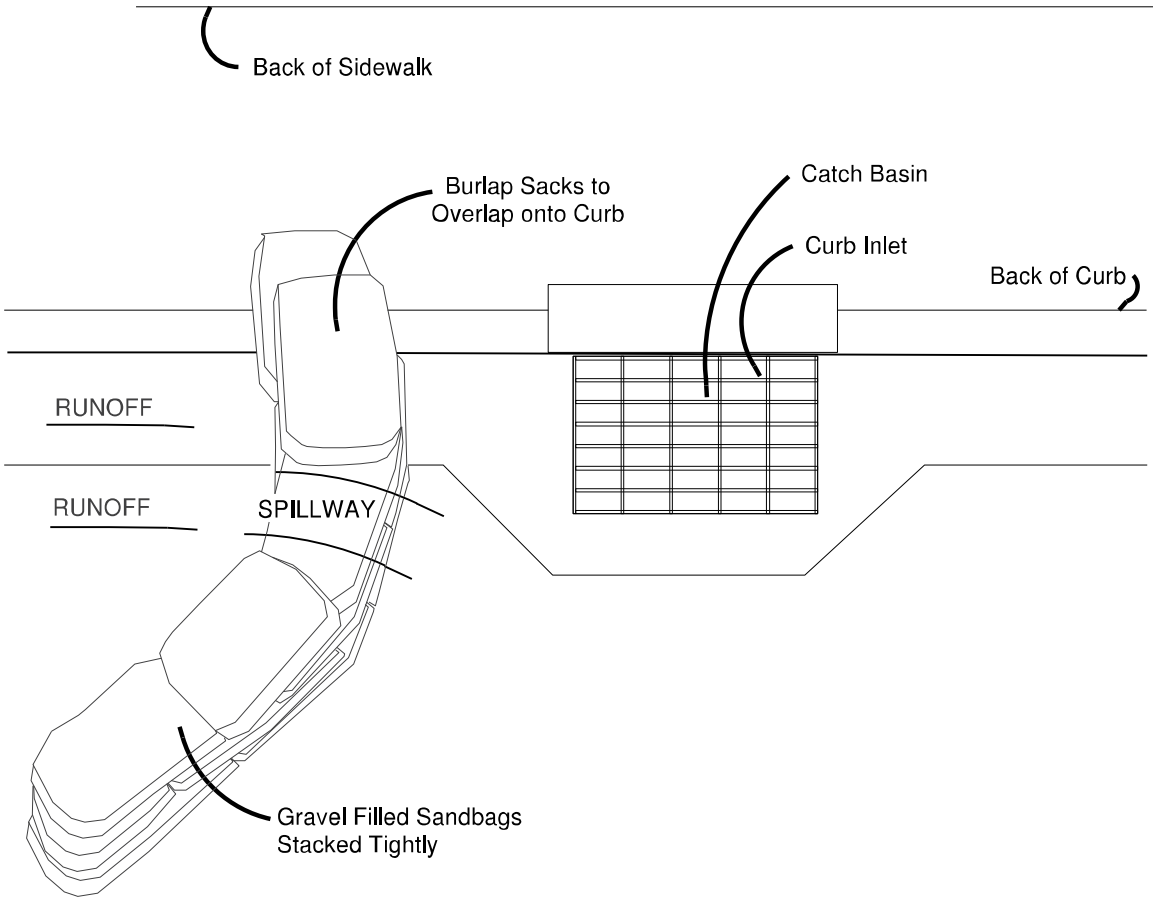


NOTES:
1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

Figure 4.15 – Block and Gravel Curb Inlet Protection

Plan View



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 4.16 – Curb and Gutter Barrier

BMP C235: Straw Wattles

Purpose

Straw wattles are temporary erosion and sediment control barriers consisting of straw 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. Straw wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length. The wattles are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes. See Figure 4.21 for typical construction details.

Conditions of Use

- Disturbed areas that require immediate erosion protection.
- Exposed soils during the period of short construction delays, or over winter months.
- On slopes requiring stabilization until permanent vegetation can be established.
- Straw wattles are effective for one to two seasons.
- If conditions are appropriate, wattles can be staked to the ground using willow cuttings for added revegetation.
- Rilling can occur beneath wattles if not properly entrenched and water can pass between wattles if not tightly abutted together.

Design Criteria

- It is critical that wattles are installed 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. Excavated material should be spread evenly along the uphill slope and compacted using hand tamping or other methods.
- Construct trenches at contour intervals of 3 to 30 feet apart 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.
- At a minimum, wooden stakes should be approximately 3/4 x 3/4 x 24 inches. Willow cuttings or 3/8-inch rebar can also be used for stakes.

Maintenance Standards

- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.
- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.
- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.

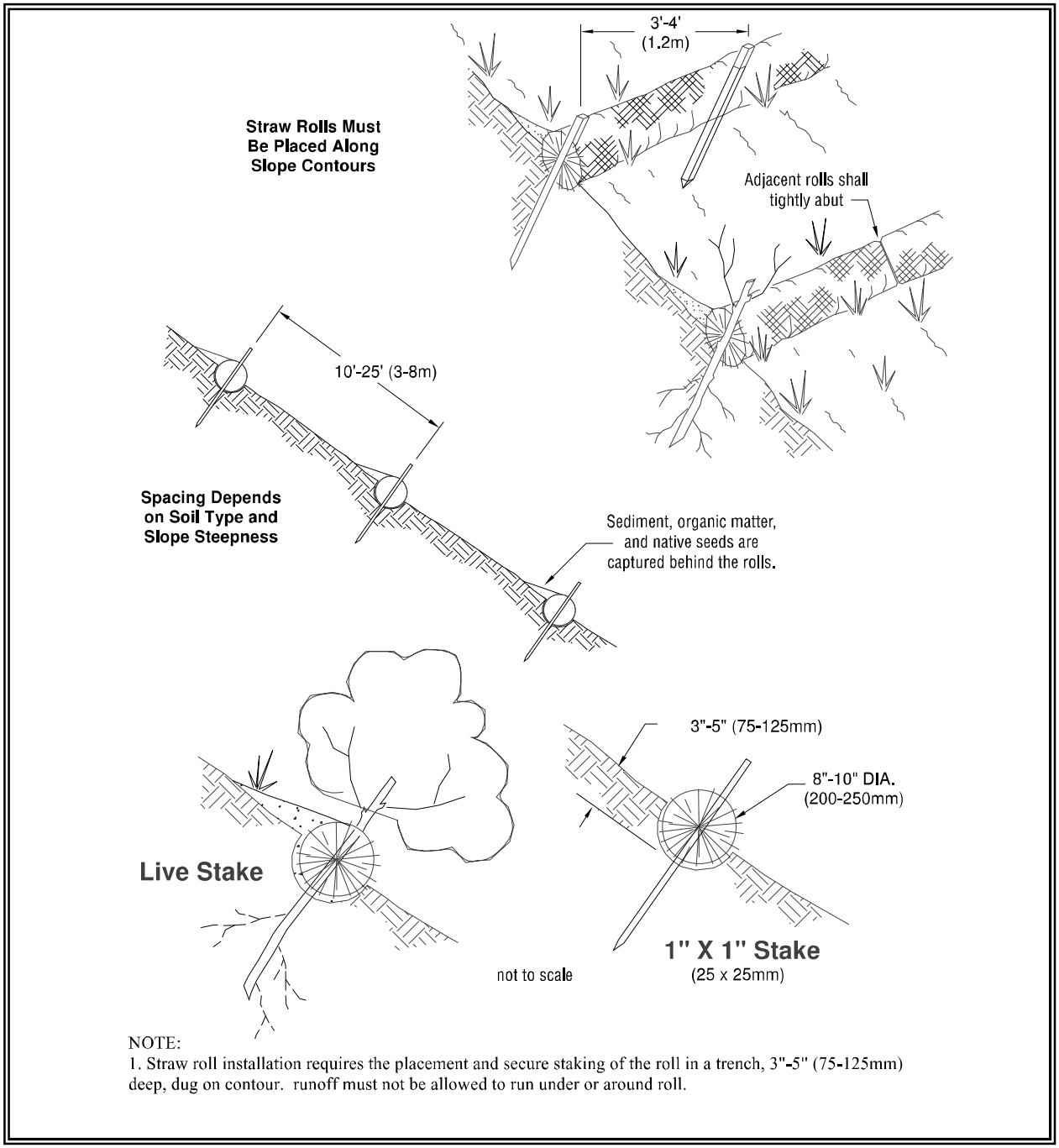


Figure 4.21 – Straw Wattles

Exhibit 4

Construction Stormwater General Permit – Proposed New Discharge to an Impaired Water Body

DEPARTMENT OF ECOLOGY
State of Washington

Construction Stormwater General Permit
Proposed New Discharge to an Impaired Water Body

Part 1. Site Information		
1a. Site or Project Name: City of Fife - Phase I Improvements		
1b. Site Address or Location Description: 2001 54Th Ave & 5411 23rd St E	City: Fife	County: Pierce
1c. Impaired Water Body: Wapato Creek and Fife Ditch		
1d. Impairment Pollutant(s): Fecal Coliform Bacteria, Ammonia and Dissolved Oxygen		

Part 2. Discharge Certification

Ecology will not grant coverage under the Construction Stormwater General Permit (CSWGP) for new discharges to an impaired water body if the discharge will cause or contribute to a violation of water quality standards. An impaired water body may be a Category 4 (with an approved Total Maximum Daily Load [TMDL] plan or other pollution control plan), or a Category 5 (no approved TMDL in place). For Ecology to determine whether permit coverage is appropriate, the site operator (Permittee) must select one of the three options below, complete this form, and provide the required documentation to Ecology.

Select the one option below that most clearly applies to your site.* Additionally, submit documentation that supports the chosen option. This same documentation must also be included as part of your SWPPP and kept on site when the SWPPP is prepared.

☐ 2a. The pollutant(s) for which the water body is impaired is/are not present on the site. Documentation of this finding is contained within the SWPPP. (If the water body is impaired for more than one pollutant, check this box only if NONE of the impairment pollutants are present on site).

☒ 2b. Stormwater will not be exposed to the pollutant(s) for which the water body is impaired, and the SWPPP details procedures taken to prevent exposure on site. (This statement must be true for all pollutants for which the water body is impaired. If any impairment pollutant does not meet 2a or 2b, you must complete 2c).

☐ 2c. You don't expect the discharge to cause or contribute to an exceedance of a water quality standard. Provide Ecology with data to support this statement, and retain such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrates one of the following:

i. For discharges to waters without an EPA-approved or established TMDL (water cleanup plan), the discharge of the impairment pollutant(s) will meet in-stream water quality criteria at the point of discharge to the water body.

ii. For discharges to waters with an EPA-approved or established TMDL, there is sufficient remaining wasteload allocation in the TMDL to allow the construction stormwater discharge and that existing dischargers to the water body are subject to compliance schedules designed to bring the water body into attainment with water quality standards.

**If none of the above options apply to your site, your site will not be eligible for coverage under the permit.*

Part 3. Signature

3a. *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

_____/_____ _____.

Printed Name / Company (Operator/Permittee only) Title

_____ _____.

Signature of Operator/Permittee* Date

* Federal regulations require this application is signed by one of the following:

A. For a corporation: By a principal executive officer of at least the level of vice president.
B. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively.
C. For a municipality, state, federal, or other public facility: By either a principal executive officer or ranking elected official.

Please sign and return this document to the following address:

Washington Department of Ecology - Stormwater
PO Box 47696
Olympia, WA 98504-7696

If you have questions, please call:

Location	Contact Name	Phone	E-mail
Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Skagit, Snohomish, Spokane, Stevens, Walla Walla, Whatcom, and Whitman counties	Shawn Hopkins	360-407-6442	shawn.hopkins@ecy.wa.gov
Island, King (except Seattle), and San Juan counties	Clay Keown	360-407-6048	clay.keown@ecy.wa.gov
City of Seattle and Kitsap, Pierce, and Thurston counties	Josh Klimek	360-407-7451	josh.klimek@ecy.wa.gov
Benton, Chelan, Clallam, Clark, Cowlitz, Douglas, Grays Harbor, Jefferson, Kittitas, Klickitat, Lewis, Mason, Okanogan, Pacific, Skamania, Wahkiakum, and Yakima counties	Joyce Smith	360-407-6858	joyce.smith@ecy.wa.gov

If you need this document in a format for the visually impaired, call the Water Quality Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

City of Fife – Phase I Improvements
Pierce County, Washington

Construction Stormwater Pollution Prevention Plan

AMENDMENT #1
DISCHARGE TO AN IMPAIRED WATER BODY – Wapato Creek and Fife Ditch

Stormwater discharge from the proposed project may discharge to Wapato Creek and Fife Ditch, which have been declared as "Impaired Waterbodies." The impaired pollutants are Fecal Coliform Bacteria and Temperature. The project, construction and the completed use, is not anticipated to cause or contribute to a violation of water quality standards. The following measures are to be implemented during construction, and also the following elements of the completed project show the justification that the use will not cause nor contribute to a violation of a water quality standard.

CONSTRUCTION

1. FECAL COLIFORM BACTERIA
   A. There is no fecal source on the site and farm animals are not present.
   B. Excavation will not occur on or around septic tanks or drainfields.
   C. Port-a-potties will not be placed in an area where accidental spills could discharge into waters.
2. AMMONIA
   A. This chemical will not be present at the site.
3. DISSOLVED OXYGEN
   A. Implement erosion and sedimentation control Best Management Practices (Erosion and Sediment Control Measures) to prevent stormwater runoff from conveying soil/sediment into the waterbody including but not limited to:
      1. Preserve natural vegetation to the maximum extent possible
      2. Placement of silt fence
      3. Placement of construction entrance
      4. Temporary and permanent seeding

SECTION 321313 - CONCRETE PAVING, CURBS, AND WALKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Curbs and gutters.
2. Walkways.

B. Related Sections include the following:

1. Section 033000, “Cast-in-Place Concrete” for general building applications of concrete.
2. Section 312000, “Earth Moving” for subgrade preparation, grading, and subbase course.
3. Section 321373, “Concrete Paving Joint Sealants” for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.

1.3 REFERENCE STANDARDS

A. WSDOT Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2014 edition. All references to measurement and payment shall be deleted from consideration; and terms agreed to in the contract substituted therefore.

B. WSDOT Standard Plan Standard Plans for Road and Bridge Construction, prepared by Washington State Department of Transportation, current issue in effect at bid date.

1.4 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.5 SUBMITTALS

A. Submit under provisions of Section 1-06 “Control of Materials” and as further provided.

B. Product Data: For each type of manufactured material and product indicated.

C. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

1. Aggregates.

E. Material Certificates:

1. Provide a letter, signed by the supplier and reviewed and also signed by an officer of the General Contractor's company, certifying that all products to be incorporated into the work meet the requirements specified.
2. Products:

a. Cementitious materials.
b. Admixtures.
c. Curing compounds.
d. Applied finish materials.
e. Bonding agent or epoxy adhesive.
f. Joint fillers.

F. Field quality-control test reports.

G. Minutes of preinstallation conference.

H. Mockups.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

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

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

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

C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Sections 1-04 "Scope of Work" and 1-05 "Control of Work."

1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete producer.
d. Concrete pavement subcontractor.

G. Accessibility: Comply with ICC/ANCI A 117.1-2003: Accessible and Usable Buildings and Facilities.

1.7 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable codes for materials and installation of the Work of this section. Codes include, but are not limited to, the following:

1. WISHA (Washington Industrial Safety and Health Act).
2. Local codes for work on public or private property.

B. Conform to City of Fife requirements for all work performed within public rights-of-way.

1.9 ENVIRONMENTAL REQUIREMENTS

A. See WSDOT Specification 5-04.3(16) for additional information.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 CONCRETE MATERIALS

A. Conform to WSDOT Specification 8-14.2 for sidewalks.

B. Conform to WSDOT Specification 8-04.3 for curbs.

C. Conform to WSDOT Specification 5-05.2 for driveways.

2.4 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

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

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:

1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

1. Available Products:

a. Burke by Edeco; True Etch Surface Retarder.
b. ChemMasters; Exposee.
c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
d. Euclid Chemical Company (The); Surface Retarder S.
e. Kaufman Products, Inc.; Expose.
f. Metalcrete Industries; Surftard.
g. Nox-Crete Products Group, Kinsman Corporation; Crete-Nox TA.
h. Scofield, L. M. Company; Lithotex.
i. Sika Corporation, Inc.; Rugasol-S.
j. Vexcon Chemicals, Inc.; Certi-Vex Envioset.

2.5 CONCRETE MIXTURES

A. Prepare concrete mixtures in accordance with WSDOT Specifications:

1. For curbs and gutters, WSDOT Specification 8-04.
2. For sidewalks, WSDOT Specification 8-14.
3. For driveways, WSDOT Specification 8-06.
4. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4000 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
3. Slump Limit: 3 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 5 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements as follows:

1. Fly Ash or Pozzolan: 25 percent.
2. Ground Granulated Blast-Furnace Slag: 50 percent.
3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

F. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete mixes larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Section 312000, "Earth Moving."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 15 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.

3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Screed pavement surfaces with a straightedge and strike off.

J. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

K. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

L. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.

M. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

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

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

O. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CEMENT CONCRETE WALKS

A. Conform to detail and WSDOT Specification 8-14.2 for on-site improvements.

1. Provide joint control and surface treatment as indicated on plans.
2. Provide 2 percent maximum transverse slope unless otherwise indicated.
3. Provide 3/8-inch by 4-inch premolded joint filler expansion at 10-foot maximum interval, unless indicated otherwise. Provide sealant at all expansion joints.
4. Provide tooled contraction joints as indicated on landscape plans.
5. Conform to landscape plans and architectural plans for additional special finishes and score patterns.
6. Conform to detail shown and WSDOT Specification 8-14.3.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Joint Spacing: 3 inches.
5. Contraction Joint Depth: Plus 1/4 inch, no minus.
6. Joint Width: Plus 1/8 inch, no minus.
7. Slopes: Slopes shall meet accessibility requirements of 2 percent maximum at landings, 2 percent maximum cross slope, and 5 percent maximum longitudinal slope.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 5000 sq. ft. or fraction thereof of each concrete mix placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

E. Pervious Concrete: Pervious concrete shall be protected from sediment and debris entering pavement and underlying system.

1. Soil stockpiles on porous pavement shall be separated from the pavement with plastic sheeting.
2. If sediment or debris is allowed to enter the pervious concrete, the pavement shall immediately be cleaned with vactor truck. If areas of pervious concrete are allowed to be plugged with sediment or debris, the Contractor shall remove plugged areas and replace with pervious concrete to match.

END OF SECTION 321313

SECTION 32 80 00 – IRRIGATION SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

B. Fife Campus Drawings: All sections of the standard specifications applicable to any and all parts of this project shall govern except as specifically modified in this section.

C. References:

1. City of Fife Standards.
2. American Society for Testing and Materials (ASTM).
3. American Water Works Association (AWWA).
4. State of Washington Standards
5. National Electrical Code (NEC).
6. Standard Specifications for Municipal Public Works Construction – Washington State Chapter (latest edition).
7. State of Washington – Department of Health.
8. City of Fife Parks Standards.

D. Related work in other sections of these specifications includes but is not limited to:

1. Section 32 90 00 – Planting
2. Section 32 92 23 – Sodding

1.2 SUMMARY

A. This Section includes but is not limited to the following:

1. To furnish and install a new, complete, and electronically-operated irrigation system as indicated on the Contract Drawings and specified herein, including but not limited to: piping, valves, sprinklers, specialties, controls, and wiring.
2. The irrigation system will be supplied with potable water. The water source is a new 1.5" water meter (by others) and 2" RPBA backflow preventer.
3. Coordinate work with other trades as applicable to avoid conflicts and to maintain schedule.
4. Connect new equipment to existing system when locations are verified in the field, protect existing irrigation equipment designated to remain, and coordinate new equipment with existing to ensure 100% problem-free operation of the entire system.

1.3 DEFINITIONS

A. "Mainline Piping:" Downstream from point of connection to water distribution piping up to and including the control valves and quick couplers. Piping is under constant pressure when the system is activated.

B. "Lateral Line Piping:" Downstream from control valves and quick couplers to sprinklers and specialties. Piping is under pressure during individual zone operation.

C. The "Owner" may be the actual project owner or an owner-selected representative.

D. The following are industry abbreviations for plastic materials:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. FRP: Fiberglass-reinforced plastic.
3. PA: Polyamide (nylon) plastic.
4. PP: Polypropylene plastic.
5. PE: Polyethylene plastic.
6. PTFE: Polytetrafluoroethylene plastic.
7. PVC: Polyvinylchloride plastic.
8. TFE: Tetrafluoroethylene plastic.

1.4 QUALITY ASSURANCE

A. Prior to construction of this project, Contractor shall provide the Owner's Representative with written evidence that all Contractor staff assigned to solvent welding duties of PVC pipe or fittings are in possession of up-to-date certification cards issued by the manufacturer representative of the specified solvent cement. If Contractor's staff are not in possession of current certification cards, the Contractor shall schedule and complete a training seminar (conducted by solvent cement manufacturer representative) and provide written evidence of training completion for each staff member to the Owner's Representative prior to construction. Only staff that are certified shall be permitted to solvent weld pipe and fittings.

1.5 PERFORMANCE REQUIREMENTS

A. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments as required to avoid obstructions such as site furnishings, signs, and light standards. Maintain the overlap coverage designated by the sprinkler spacing shown on the Contract Drawings. Avoid overspray onto walks and structures as practical.

B. The Contractor shall perform all system layouts. The Owner's Representative may or may not inspect the system layout prior to installation. System components not properly located shall be reinstalled by the Contractor at no additional cost to the Owner.

C. Minimum Working Pressures: The following are minimum pressure requirements, unless otherwise noted, for piping, valves, and specialties:

1. Mainline Piping: 280 psi.
2. Lateral Line Piping: 200 psi.

1.6 SUBMITTALS

A. Solvent Weld Certification: See Part 1.4 above.

B. Product Data: Material and equipment composite data sheets shall be submitted for the following:

1. Valve boxes
2. PVC pipe
3. RPBA Assembly (See Civil)
4. Backflow Enclosure (See Civil)
5. Quick Coupling Valves (including key and hose swivel)
6. Master Valve
7. Control Valves
8. Control and Trace Wire
9. Wire Splices (all types)
10. Swing Joints
11. Sprinkler Heads / Nozzles

C. Submit the number of copies required by the Contract Documents. Clearly index, label, and highlight products to be utilized.

D. Operation and Maintenance Manuals: The Contractor shall provide four (4) sets of the following:

1. Guarantee/warranty certificates for all equipment used.
2. Contractor’s written one year guarantee/warranty for the entire system.
3. List of authorized distributors and service centers for all products installed on the project. Include contact names, addresses, and phone numbers.
4. Instruction manuals for all equipment used.
5. Parts lists and "exploded" view drawings showing part numbers for each item.
6. Detail drawings of all areas that were unable to be shown clearly on the Project Record Drawings.
7. Reduced and laminated zone chart.
8. Contractor's name, date, and contact information.

Provide the above information in three ring binders, clearly indexed, tabbed, and highlighted, with the project title, location, address, and date clearly and typed in bold lettering (minimum 24 pt. Arial) on the front cover.

E. The Contractor shall submit the following items to the Owner's Representative prior to final acceptance:

1. Warranty Cards on all equipment so warranted.
2. Project Record Drawing plans as detailed in these Specifications.
3. Operations and Maintenance Manuals per Part 1.6 D above.
4. Extra Materials per Part 1.9 A below.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect stored PVC piping from direct sunlight. Support pipe as necessary to prevent sagging and bending.

B. Provide safe and secure storage for all material required for system installation.

1.8 PROJECT CONDITIONS

A. Contractor shall bear all costs to locate and verify all underground utility locations within the site. Avoid damage to existing utilities, plant material, and structures. Contact Utility Locate Services at 1-800-424-5555 and/or a private locating service prior to any work, to have existing utilities located and marked on site. Contractor is responsible for any damage caused.

B. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and even then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Owner no fewer than two (2) working days in advance of any proposed interruption of water service. Do not proceed with interruption of water service without Owner's written permission.

C. Utilities and Existing Structures: The exact location of existing structures, equipment, and overhead or underground utilities shall be solely the responsibility of the Contractor. He shall conduct his work so as to prevent interruption of service or damage to them. Protect existing structures, equipment, and utility services and repair damages.

D. Finish Grades: Verify the correctness of all finish grades within the work area to ensure proper soil-coverage depth over pipe lines and finished elevations of all sprinkler heads, valve boxes, and irrigation equipment.

E. Adjustments: Make minor adjustments to avoid fixed obstructions and to ensure the overlap coverage designated by the sprinkler spacing on the Contract Drawings.

F. Product Storage: During construction and storage, protect materials from damage and prolonged exposure to sunlight.

G. Keep premises free from rubbish, debris, and excavated trench material at all times. Store materials so as not to interfere with the operation of the Project.

H. System Operation: System shall be under fully automatic operation for three (3) days prior to the start of grassing operations.

I. Timing and Scheduling: The Turf Contractor shall determine application rates and timer cycling. Adjustments, repairs, etc. other than programming are the responsibility of the Irrigation Contractor.

J. At the Contractor's expense, provide hand watering of all existing and proposed planting areas required at any time during the project.

1.9 EXTRA MATERIALS

A. Prior to final acceptance, the Contractor shall provide to the Owner (at no additional cost to the Owner), the keys and/or other tools necessary to activate, operate, and drain the system, including but not limited to the following:

1. Two (2) quick coupling valve keys w/ hose swivels.
2. Two (2) quick coupling valve cover keys.
3. Two (2) of each type of rotor head installed.
4. Five (5) of each type of spray head installed and five (5) nozzles for each spray pattern.
5. All extra nozzle sets not utilized during the installation.
6. Two (2) valve box cover keys.
7. Two (2) controller keys.

1.10 PROJECT RECORD DRAWINGS

A. The Contractor shall maintain a current record of all facilities / equipment installed (including existing equipment repaired, replaced, or relocated), and record any deviations (including horizontal and vertical dimensions) on the plans. All deviations to the plans shall be pre-approved by the Owner's Representative.

B. Upon completion of the system installation and prior to final acceptance, the Contractor shall provide the Owner's Representative with a NEAT, CLEAN, LEGIBLE, and reproducible set of Project Record Drawings of the completed irrigation system. Any pipe not installed in accordance with the Contract Drawings shall be dimensioned to a permanent structure for location after burial. All quick coupling valves, automatic valves, manual valves, electrical splice boxes, etc. shall be dimensioned on the Project Record Drawings to two (2) permanent monuments (preferably buildings or hardscapes).

C. The Project Record Drawing records shall be updated daily and shall be available daily for review by the Owner or Owner's Representative.

D. At the controller, provide a reduced-scale, "as-built" schematic drawing of the irrigation system. Laminate the drawing in plastic and mount inside of the controller cabinet door or on the control panel.

E. On all Project Record Drawings, provide the Irrigation Contractor's name, the system installation date, and contact information.

1.11 SYSTEM PROTECTION

A. As part of the warranty, the Contractor shall be responsible for winterizing the irrigation system prior to the onset of the freezing season. The Contractor will also be required to reactivate the system in the spring season. Each event must be accomplished within the one (1) year maintenance period. The Contractor will notify the Owner in writing (with at least 72 hours' notice) when this work will be performed. Winterizing and spring start-up shall be done in the presence of the Owner's maintenance staff. The Contractor will be liable for all damages resulting from failure to comply.

B. When using compressed air to winterize (deactivate) the system, do so in two (2) short cycles at no more than 75 psi pressure. Do not use a compressor with high pressure and low volume or allow the pipe connected to the compressor to get hot to the touch. The Contractor shall winterize the system prior to irrigation system substantial completion approval and acceptance if freezing weather occurs or is forecast. In such an event, the Contractor shall, as directed by the Owner's Representative, reactivate the system for final inspection and acceptance.

C. Winterization and reactivation prior to final acceptance will not satisfy the warranty period requirement to winterize and reactivate the irrigation system.

D. Fill and repair depressions and replace construction materials damaged from settlement or repair of irrigation trenches, throughout the warranty period.

E. Adjust sprinkler heads as necessary to maintain the overlap coverage designated by the sprinkler spacing on the Contract Drawings and to keep spray off of structures, out of roadways, and off of pavements throughout the warranty period.

F. Replace defective parts throughout the warranty period.

1.12 TRAINING

A. Contractor shall provide onsite, hands-on training for Owner's maintenance staff. Training shall include proper procedures for irrigation system operation, maintenance, and winterizing. Duration and content of training shall be sufficient to ensure adequate understanding of system operation and maintenance to enable the Owner to operate, maintain, and winterize the system after the departure of the Contractor. The Owner's Representative shall be notified of this session at least 72 hours in advance. Contractor shall coordinate a mutually agreeable training schedule with the Owner.

1.13 FINAL APPROVAL

A. Final approval will be considered upon satisfactory completion of the following: all performance tests, receipt of acceptable Project Record Drawing documents and extra materials, training session, receipt of signed and approved permits, and substantial completion approval from the Owner's Representative.

PART 2 – PRODUCTS

2.1 GALVANIZED PIPE AND FITTINGS

Not used.

2.2 PIPE THREAD TAPE / COMPOUND

A. Teflon tape.

2.3 POLYVINYL CHLORIDE (PVC) PIPE, FITTINGS AND CEMENT

A. Polyvinyl chloride pipe shall be PVC 1120 or 1220.

1. Mainline Pipe:

a. Up to and including 3" diameter: Schedule 40 PVC

2. Lateral Line Pipe:

a. Up to and including 3" diameter: CL 200 PVC

3. Sleeves: SCH 40 PVC

B. Risers on swing joints shall be Schedule 80, conforming to ASTM D1784.

C. Solvent weld fittings shall be manufactured by Lasco, Spears, or approved equal and installed as follows:

1. Mainline Fittings: Schedule 40.
2. Lateral Line Fittings: Schedule 40 except as noted on drawings.
3. Valve and Quick Coupler Fittings: Schedule 40.

D. Solvent welding compounds shall be IPS "Weld-On" products:

1. Primer: P-70, purple.
2. Cement: P-711, gray (heavy bodied).

2.4 PIPE AND WIRE SLEEVES

A. Pipe sleeve shall be twice the size of the insert pipe traveling through it. No more than one (1) pipe shall be installed in each sleeve.

B. Install separate sleeves for control wires (2" diameter minimum or as shown on drawings).

C. Sleeve under all paved surfaces whether indicated on the plan or not.

D. Extend all sleeves 12" past any pavement edge.

E. Mark sleeve ends with a 2" x 4" wooden stake driven 18" into grade with 24" exposed. "IR Sleeve" shall be imprinted in on each stake in black, waterproof ink. The top of each stake shall be painted with fluorescent pink marking paint and shall be further marked with three (3) wraps of fluorescent pink flagging tape. Remove stakes after irrigation lines are installed.

F. No additional payment shall be made under any circumstances for locating sleeves.

2.5 GATE VALVES

A. Gate valves shall be Kennedy/Mueller Ken-Seal II – #4057 (up to 2½") or #4561N (3" and larger), sized per plan, with a fusion-coated cast-iron body, non-rising stem, and resilient-coated wedge with a minimum 200 psi operating pressure rating. Mainline isolation valves shall be the same size as the mainline.

B. Provide one (1) set of valve-operating keys per Part 1.9 A above. Keys shall be 36" long, ¾" inch stock with "tee" handle, and painted with rust-resistant paint.

2.6 BACKFLOW PREVENTER

A. See Civil.

2.7 PRESSURE GAUGES

A. Not used.

2.8 QUICK COUPLING VALVES

A. Quick coupling valves shall be Rainbird 44-LRC. Valve shall have brass construction, two-piece body design, stainless steel spring, purple, locking, thermoplastic cover, and pressure rated to 125 psi. The valve shall have a manufacturer's limited warranty of not less than five (5) years.

B. Provide two (2) 44K keys and two (2) SH-1 hose swivels per Part 1.9 A above.

2.9 MASTER VALVE

A. Not used.

2.10 AUTOMATIC CONTROL VALVES

A. Automatic control valves shall be as follows:

1. Valves Up to 2": Rainbird PEB series, glass-filled, nylon construction, normally closed, forward flow design, with flow-control handle, internal bleed, and 200 psi rated. Valve sizes as noted in the valve schedule on Sheet L1.01 of the Contract Drawings.

B. Install Rainbird PRS-Dial pressure regulating modules on valves as indicated on the valve schedule.

C. Each valve shall be tagged with a Rainbird VID Series or Christy's ID-STD-Y2 valve ID tag (yellow).

2.11 SPRINKLER HEADS

A. As noted on the Contract Drawings.

2.12 SPRINKLER AND QUICK COUPLING VALVE SWING JOINTS (RISERS)

A. Swing joints for sprinkler heads shall be as described on Contract Drawings.

B. Swing joint for quick coupling valve shall as described on Contract Drawings.

C. Swing joints shall not be installed perpendicular to or parallel with the supply line.

2.13 VALVE BOXES AND VAULTS

A. Valve boxes shall be a combination of polyolefin and fibrous material. Extensions may be required to bring the valve box to the proper level. Utilize "tee" style covers unless specified otherwise. All unions shall be accessible within the valve box. Boxes shall be as follows:

1. Automatic Valves:

   a. At Grade Boxes: Carson 1419 with bolt-down cover. Coordinate requirements with City of Fife's irrigation personnel. The cover shall be bolted down with stainless steel bolts. Box shall be green.

2. Quick Coupling Valves:

   a. At Grade Boxes: Carson 910 with 910-4B cover. Box and cover shall be green.

3. Mainline Gate Valves: 6" diameter PVC pipe or Ametek or Carson Roadway Extension with a 10" valve box on top per detail. Carson 910 with 910-4B cover. Box and cover shall be green. Box and cover at point of connection shall be gray.
4. Splice Boxes Coiled 24-Volt Wire to CCU: Carson 1419-12 with 1419-4B bolt down cover or equal. Cover is to be gray and marked "Electrical."

2.14 DRAIN ROCK

A. Drain rock shall be 5/8" washed pea gravel.

2.15 FLOW METER

A. Not used.

2.16 CONTROLLER/RAIN METER

A. Existing units.

2.17 DEDUCT WATER METER

A. Not used.

2.18 CONTROL WIRES AND PIPE LOCATOR

A. For automatic control valves, AWG direct burial, #14 single strand copper wire designed for 24-50 volts and shall be UL approved for UF (underground feeder). UL and UF designations must be clearly marked on the insulation jacket of the wire. Copper conductor must exceed ASTM B3 or B8 specifications. The white colored wire will always be the common and the yellow colored wire will always be the spare leads (auxiliary wires). Hot (signal) leads shall be red. Paige, Service Wire Co. 7079D, or approved equal.

B. Locator wires for below-grade piping shall be #14 bare copper, UL approved as ASTM B3 or ASTM B8 rated.

2.19 DETECTABLE MARKING TAPE

A. Shall be detectable, 3" wide, blue color, reading "Caution Irrigation Water Line Buried Below" and 3" wide, yellow color, reading "Caution Irrigation Wire Buried Below". Manufactured by Christy Enterprises, (800) 258-4583.

B. Place as detailed on Contract Drawings.

2.20 ELECTRICAL TAPE

A. Electrical tape shall be black plastic, ¾" wide, minimum 0.007" thick, and all-weather type.

2.21 ELECTRICAL WIRE SPLICES

A. Automatic control valve wire splices shall be 3M DBY, or DBR, no substitutions. All splices shall be made within a valve box. At each splice, the wire is to be tagged with a non-fading plastic marker with the zone number permanently marked on the tag. An identical tag shall be attached to the zone control valve. Doublers or devices which split or share zones shall not be used.

2.22 ELECTRICAL CONDUIT

A. This specification pertains only to low voltage wiring. All 120-volt power specifications are referred to in the Electrical sections.

B. Conduit above finish grade shall be rigid galvanized steel with zinc-protected threads. Fittings shall be of the same material with hot dipped galvanized finish.

C. Conduit within a building shall be EMT where permitted by Code. Fittings shall be suitable for this product.

D. Conduit within the ground shall be Schedule 40 Rigid PVC. Fittings shall be suitable for this product. Any run over 400' will require a pull box in the middle of the run or every 400'. Pull boxes shall be 10" round with "ELECTRICAL" labeled on the lid. All elbows shall be "long radius" type.

E. All equipment furnished and installed shall be in accordance with National, State, and City Electrical Codes, established safety codes and applicable local codes and ordinances.

2.23 CONCRETE THRUST BLOCKING

A. Not required.

PART 3 – EXECUTION

3.1 EXISTING CONDITIONS

A. Verify that the proper flow and dynamic pressure are available at the point of connection or downstream of the meter prior to beginning any irrigation work.

1. Flow = 65 gallons per minute (gpm.).
2. Dynamic Pressure @ 50 gpm = 60 psi.
3. Static Water @ 90.0.

Immediately notify the Owner's Representative in writing if flow and pressure vary from indicated above.

B. Prior to beginning any trenching, verify that the subgrade is at the correct design grade and has been approved by the Owner's Representative.

C. Operate the existing adjoining irrigation system from the controller in the presence of the Owner's Representative to verify the system is 100% operational. Note and photograph any deficiencies in the existing system and submit documentation to the Owner's Representative.

3.2 PREPARATION

A. Stake the locations of all and obtain Owner's Representative approval before commencing installation. Bring any potential discrepancies to the attention of the Owner's Representative before installation.

B. Locations of equipment shown on Contract Drawings are approximate. Actual placement may vary as required to achieve the full, overlap coverage required on the plans without spraying onto buildings, sidewalk, fences, adjacent pavements, etc.

C. Make necessary adjustments in layout as required to connect to the point of connection should such equipment not be located as shown, and as may be required to work around new construction, at no increase in Contract award.

3.3 GENERAL CONSIDERATIONS

A. Install unions adjacent to valves and to final connections to other components with 2½" or smaller pipe connections.

B. Install flanges adjacent to valves and to final connections to other components with 3" or larger pipe connections.

C. Install dielectric fittings to connect piping of dissimilar metals.

D. Transition Fittings: Use transition fittings for plastic-to-metal pipe connections.

E. Reassembly work has to be done after the fittings have been coated, a new coat shall be applied to the disturbed surface.

3.4 PVC PIPE TRENCHING AND BACKFILLING

A. Install PVC piping in dry weather when temperature is above 40° Fahrenheit. Allow joints to cure at least 24 hours at temperatures above 40° Fahrenheit before testing unless otherwise recommended by manufacturer.

B. Mainline pipe shall be installed with a minimum of 18", and a maximum of 24", of pipe cover with blue marking tape 6" below finish grade.

C. Lateral line pipe shall be installed with a minimum of 12", and maximum of 18", of pipe cover.

D. Install pipe with manufacturer's markings facing up (twelve o'clock).

E. Soils for backfill shall be rock-free material or the pipes shall be sand bedded. Sand shall be placed to a minimum depth of 2" below the pipe and 4" above and along side the pipe (approx. 1 CF of sand per LF of trench). The Contractor will be compensated for sand bedding per Section 7.01 of the General Conditions. Do not proceed with any sand bedding prior to inspection / approval by the Owner's Representative.

F. Pipe shall be laid on stable soil with trench bottom evenly graded (without humps or depressions). Ledge rock, boulders and cobbles 1" or larger shall be removed so that there is no contact with any piping. Voids remaining from the removal of large rocks shall be filled and compacted with select material. Install piping free of sags or bends.

G. Where multiple irrigation pipes share a common trench, trench shall be sufficiently wide (or piping shall be arranged) to allow 4" minimum of horizontal separation and 6" minimum of vertical separation between piping, while maintaining specified minimum and maximum cover over piping. Irrigation pipes shall be located in a separate trench from any domestic water piping.

H. Backfill around pipe and fittings shall be free from large rocks and shall be well tamped. Trenches shall be backfilled in compacted, 6" maximum thickness lifts to a level that is even with subgrade (or surrounding grade). Raise backfill to a slight mound and compact with an approved compactor or vibrator. Compaction by vehicle or equipment wheels is prohibited. All

roots, rocks, and surplus excavations shall be removed from the site. Contractor is responsible for all trench settlement during the warranty period of the Contract.

I. The trenches shall be thoroughly compacted to 90% density at optimum moisture content. Submit compaction test results from one location in each lateral trench and three random locations in each mainline. Cost for testing shall be the Contractor's responsibility.

3.5 WELDING OF PLASTIC PIPE AND FITTINGS

A. All gasketed and solvent weld plastic pipe shall be installed in accordance with manufacturer's installation instructions. Great care shall be taken to ensure that the inside of the pipe is absolutely clean. Pipe ends (not being worked) shall be protected and not left open. Cleaning of cutting burrs is mandatory.

B. For solvent weld pipe, PVC pipe ends shall be cut at a 90° angle to the pipe length and shall be cleaned (use approved reaming tool) of all burrs prior to cementing. Pipe ends shall be wiped clean with a rag that has been lightly wetted with PVC thinner. Joints shall be completely free of moisture or condensation.

C. Cement shall be applied with a light coat on the inside of the fitting and a heavier coat on the outside of the pipe (no further back from the end of pipe than the fitting would slip). Application of cement on the interior of the fittings shall be quantified to ensure no cement shall be pushed into the flow stream of the pipe. Pipe shall be inserted into the fitting and given a quarter turn to seat the cement. Excess cement shall be wiped from the outside of the pipe. Cement that becomes unduly thick or heavy shall not be thinned and re-used. CONTRACTOR SHALL DISPOSE OF SAME. Pipe shall be tested as indicated elsewhere in these specifications.

D. Allow 15 minutes (minimum) set-up time for solvent weld joints before moving or handling. Pipe shall be partially center-loaded to prevent arching or slipping. No water shall be permitted in the pipe for at least 10 hours to permit solvent weld set and cure. Backfilling shall be done when the pipe is not in an expanded condition due to heat or pressure. Cooling of the pipe can be accomplished by operating the system for a short period of time before backfilling, or by backfilling in the early part of the morning before the heat of the day. Before pressure testing, allow 24 hours cure time for solvent weld joints.

E. Lateral line pipe may be longitudinally bent at a ratio of 200 times the outside diameter (o.d.) of the pipe over the length of one (1) full stick of pipe [i.e.: 1½" pipe (1.9" o.d.) can be bent to a minimum radius of 1.9 x 200 or 380" (31.7') over 20'].

3.6 PIPE AND WIRE SLEEVES

A. Pipe Sleeves: Provide pipe sleeves under paved areas as required whether or not they are shown on Contract Drawings. Provide multiple parallel pipe sleeves where shown on plans or as specified.

B. Wire Sleeves: Install electrical wiring in a separate sleeve from irrigation piping. Provide a minimum of three (3) – 2" diameter conduits for the controller, or as many conduits as required to accommodate all of the control wires and central control communication cables, into the

proposed building at the designated location of the controller. Verify locations with Owner if different than shown on Contract Drawings and adjust at Contractor's cost.

C. Terminate conduits in a valve box outside the building using a Carson 1419-12 valve box with Carson 1419-B cover as described in Part 2.13 above

3.7 PRESSURE TESTS

A. Before any testing, all piping shall be thoroughly flushed. Center loading of the pipe is permissible prior to testing, but all pipe end joints, fittings, gate valves, and automatic valve stub outs shall be exposed for inspections during the pressure test.

B. Mainlines shall be filled from the point of connection until all air is removed from the mainline. Smaller sections of the mainline can be tested by closing the gate valves that isolate that particular section of piping. All mainline pipe, fittings, gate, and automatic valves shall be subjected to a hydrostatic pressure test of 125 psi for a minimum of two continuous hours, with no allowable pressure loss.

C. Lateral lines shall be tested at 75 psi. Test following swing joint or riser installation. All swing joints and fixed risers shall be capped. All pipe end joints, fittings, and swing joints shall be left exposed for inspection. Prior to inspection, lines shall be filled with water and all air shall be purged from the laterals. Inspection of lateral lines will be done visually.

D. Rejected systems or any portions thereof shall be repaired and re-tested as specified.

E. Contractor shall furnish all equipment, materials, and labor for all testing. The Contractor shall notify the Owner or Owner's Representative at least 72 hours prior to the test so an inspector may witness the test.

3.8 GATE VALVES

A. Gate valves shall be installed per detail at mainline depth. Valves shall be installed in a 6" PVC pipe collar or plastic roadway valve box (depending upon actual depth), topped with a 10" valve box with locking lid.

3.9 REDUCED PRESSURE ASSEMBLY

A. (See Civil).

3.10 DEDUCT WATER METER

A. Not used.

3.11 MANUAL DRAIN VALVE

A. Not used.

3.12 QUICK COUPLING VALVES

A. Owner shall approve all locations prior to construction. Quick coupling valves shall be installed per detail shown on Contract Drawings.

B. Quick Coupling Valves shall be installed a minimum of 12", and maximum of 36" from pavement or lawn edge (except at point of connection). The maximum distance from the top of the quick coupler to the top of the valve box shall be 3". Make sure quick coupler key easily passes the top of the valve box when fully engaged. The valve shall be installed inside a 10" round valve box. Care must be taken to prevent excessive water backup within the valve box.

C. A 6" layer of washed drain rock shall be placed in the bottom of the valve box, encased in a layer of geotextile fabric.

D. Thoroughly flush mainline before installing Quick Coupling Valves.

3.13 MASTER VALVE

A. Not used.

3.14 AUTOMATIC CONTROL VALVES

A. Automatic Valves shall be installed per detail shown on Contract Drawings in specified valve boxes, one valve per valve box. Flush supply lines before installing automatic valves. Use valve-box extensions as necessary to extend box completely below bottom of valve.

B. Before installation of automatic valves, the mainline shall be flushed and pressure tested. Begin installation only after mainline test has been certified by Owner's Representative. Install only one (1) valve per valve box as detailed on the Drawings, below grade.

C. Use Schedule 80 TOE nipple and Schedule 80 fittings and pipe from the mainline to the valve. Use valve box extensions to insure that the box extends at least 10" below the bottom of the valve. The maximum distance from the flow control handle to the top of the valve box shall be 6". The valve shall be installed inside a 12" x 18" standard valve box. Care must be taken to prevent excessive water backup within the valve box. A 6" layer of drain rock shall be placed in the bottom of the valve box. Group valves where practical. Locate valve boxes 6" from and perpendicular or parallel to walk edge, building, and walls. Provide 12" between boxes where valves are grouped together.

D. For pressure regulating valves (Dial-PRS), set downstream pressure using a pressure gauge assembly to obtain optimum sprinkler performance.

3.15 SPRINKLER HEADS

A. Install pop-up sprinklers as shown on Contract Drawings (Contractor shall take steps necessary to avoid filling the sprinkler cavity with back-washed sand or soil). Sprinklers in turf areas shall be installed in a manner that permits reel type mowers to pass over (reels and rollers)

sprinklers without interference. Install all pop-up sprinkler bodies perpendicular (90° angle) to slope. Adjust radii of sprinklers to obtain the overlap coverage required on the drawings.

B. Backfill around heads shall be approved native or import topsoil, well compacted. Sprinklers shall be installed flush with sidewalks and curbs and exactly 3" from any paved edge. All heads shall be set perpendicular to finish grade unless otherwise specified on the plans. Refer to details shown on Contract Drawings.

C. Thoroughly flush lines before installing sprinkler heads.

D. Refer to installation details on Contract Drawings for all sprinkler heads.

3.16 SPRINKLER AND QUICK COUPLING VALVE SWING JOINTS (RISERS)

A. On rotor, spray, and quick coupling valve triple swing joints or flexible swing joints, apply two (2) wraps of Teflon tape around threaded outlet connection (to sprinkler or quick coupling valve). Threaded connections shall be watertight. Do not over tighten.

3.17 VALVE BOXES

A. At Grade Boxes:

1. Install valve boxes plumb and flush with finish grade, so that a reel type mower may pass over without interference. Box shall be supported on continuous brick foundation per detail. Valve box archway shall not rest on piping - provide a minimum of 1" clearance around any piping.
2. Provide filter fabric cover over all below grade openings to prevent debris from contaminating the drain rock.

B. If construction debris washes into the automatic valve or quick coupling valve boxes prior to project completion, remove existing gravel and replace with new gravel.

3.18 EXISTING IRRIGATION CONTROLLER

A. Coordinate hook-up of valves and sequencing with Owner's Representative to assure system operates according to the Owner's requirements.

3.19 FLOW METER

A. Not used.

3.20 CONTROL WIRES FOR VALVES, PIPE TRACER WIRE AND SPLICES

A. Control wires shall be taped together at 15' intervals and shall then placed at the side (approx. 4" separation) of the mainline. Provide 3' minimum coil expansion loops at all directional changes.

B. There shall be a separate "hot" lead for each automatic valve. A single common wire may be used to reach all valves on an individual controller, but common wires shall not be shared between controllers. Spare wires shall be installed as noted on the plans. Install auxiliary wires to pass through each intermediate valve box, providing an 18" minimum loop. Seal ends of spare wires.

C. Minimum size of copper wire for this project is #14 UF. The control wires shall be color coded as follows:

1. Projects with a single controller

a. Neutral Wire (common): white
b. Signal Wire (controller): red
c. Auxiliary Wires (spare): yellow

D. All wire from controller to valves shall be rated Underground Feeder (UF).

E. All splices shall be within a valve box. No splices are permitted between controller and the valves. At each splice, the wire is to be tagged with a non-fading plastic marker with the zone number permanently marked on the tag. A second, matching tag must also be included at the control valve itself. All splices shall be encapsulated in the device specified in the paragraph for "Electrical Wire Splices" and shall be contained in a plastic valve box where a valve is installed.

F. Install one (1) #14 bare copper locator (trace) wire, taped to top of all lateral and mainline pipe. Tie all bare copper wire together in one continuous web.

G. Trace wire shall be visible and accessible at point of connection, all gate valves, all quick-coupling valves, and all remote control valves.

H. Provide yellow marking tape 6" below finish grade over electrical conduits.

3.21 COMMUNICATION WIRE

A. Not used.

3.22 CONCRETE THRUST BLOCKING

A. Not used.

3.23 SYSTEM FLUSHING

A. The entire system shall be flushed prior to the installation of the sprinkler heads. After capping all risers, Contractor shall remove the cap nearest the automatic valve, flush and recap. Contractor shall then repeat this process by removing the next nearest cap. Repeat this process until the last head on the circuit is flushed. Valve zones with spray sprinklers on swing pipe risers to be flushed with pressure regulating valve adjusted to less than 75 psi.

3.24 PRELIMINARY COVERAGE TEST

A. Prior to any seeding or sodding, the system shall be tested to ensure full coverage of any proposed irrigated areas. The test shall be of sufficient duration so that moisture is visibly apparent on the bare soil or sand areas and that the system is covering as specified.

3.25 LABELING AND IDENTIFYING

A. Install all valve ID tags as specified herein.

B. Provide a reduced and laminated version of the system layout and mount per the Owner's direction next to the control panel, see Part 1.10 D above.

3.26 FINAL REVIEW

A. Prior to request for final review, accomplish the following:

1. Complete the installation.
2. Balance the system by adjusting pressure-regulating devices and flow controls on valves.
3. Confirm proper operation of controller. Perform diagnostic test for controller and operation of hand held remote and rain sensor.
4. Verify that all existing equipment operates properly as identified in Part 3.1 above.
5. Test for proper operation of all new [and existing] equipment.
6. Clean sediment from valve boxes so that drain rock (below valves) and wiring (including auxiliary wire) is clearly visible.
7. Submit Operation and Maintenance manuals to the Owner's Representative for review.
8. Complete "Project Record Drawing" documents and submit for review by the Owner's Representative.
9. Submit specified extra materials, miscellaneous keys, spare parts, and required tools and deliver them to the Owner's Representative.

3.27 PERFORMANCE TEST

A. A performance test is part of the final review.

B. Upon completion of the system installation and after the pressure tests have been completed and the system has been adjusted, the Contractor shall operate the system in the presence of the Owner's Representative.

C. Coverage check: Each automatic valve shall be operated to determine proper sprinkler coverage. Excessive water on non-landscaped areas will be checked carefully. If applicable, during the coverage check, check operation via the remote control device.

D. Controller shall be tested for manual and automatic operation and for operation of rain sensor and hand held remote.

E. After the system performance test, the Owner's Representative may request up to 5% of the total sprinkler nozzles be substituted at no additional cost.

3.28 CLEAN-UP

A. The contractor is responsible for maintaining a clean and safe working environment throughout the project site. Regular policing of the project site of trash and project debris will be required.

B. Disposal to all trash will be the Contractors' responsibility.

END OF SECTION 32 80 00

SECTION 32 90 00 – PLANTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. This Section includes:

1. Installing plant material as shown on the Contract Drawings.
2. Installing mulch, and tree stakes.

1.3 RELATED SECTIONS

A. Coordinate related work and requirements specified in other parts of the Contract Documents, including but not limited to the following:

1. Section 32 80 00 – Irrigation System
2. Section 32 91 13 – Soil Preparation

1.4 REFERENCES

A. Refer to the following standards:

1. WSDA Washington State Department of Agriculture – Rules Relating to Standards for Nursery Stock.
2. American Standard for Nursery Stock, ANSI Z60.1.
3. Hortus Third, Cornell University.

1.5 DEFINITIONS

A. "Balled and Burlapped Stock:" Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than sizes indicated or diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.1.

B. "Container Grown Plant:" Exterior plants grown and marketed in a container which generally prevents the growth of roots beyond its side walls or bottom, with a fully developed root system which holds the rootball together when the container is removed. Container and plant sizes

shall not be less than sizes indicated or diameter and depth recommended by ANSI Z60.1 for type and size of shrub required.

C. "Finish Grade:" Elevation of finished surface of planting soil.

D. "Planting Soil:" See Section 32 91 13 – Soil Preparation.

E. "Subgrade:" Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

1.6 SYSTEM DESCRIPTION

A. Materials, equipment, and labor for planting; reestablishing finish grading of planting areas following planting; protection and immediate maintenance; guarantee and replacement; and related items necessary to complete the work indicated.

B. Quantities: Determine exact amounts from Contract Drawings.

1.7 SUBMITTALS

A. Submit the following:

1. Notification: Within thirty (30) days after the award of Contract, submit documentation that plant materials have been ordered, purchase order number, and sample of each plant species.
2. Samples: Mulch – ½ cubic foot.
3. Warranties: Plant Material (Written Warranty on Contractor's letterhead).
4. Maintenance Data: Include special directions essential for Owner's maintenance program during guarantee/warranty period.

1.8 QUALITY ASSURANCE

A. Supplier, installer qualifications: Contractor to have at least five (5) years experience performing comparable work.

B. Pre-Installation Meeting:

1. All plants shall be reviewed by the Owner's Representative on site prior to planting.
2. Stake all tree locations for approval prior to excavating pits.
3. Plant two (2) trees and stake in the presence of the Owner's Representative prior to planting all other trees.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Products Excluding Plant Materials:

1. Labeling: Furnish standard products in unopened manufacturer's standard containers bearing original labels showing quantity, analysis and name of manufacturer.
2. Storage: Store materials and products with protection from weather or other conditions which would damage or impair their effectiveness.

B. Acceptance of Contractor-Procured Plant Materials:

1. Owner Acceptance of Plant Materials at Delivery: Owner's Representative to review plant materials upon delivery to verify that plants are undamaged, healthy and satisfactory for which to provide the Warranty requirements described in these Specifications.
2. Unsatisfactory Conditions: Contractor to notify Owner's Representative immediately if unsatisfactory conditions are found that will not allow the plants to be warranted as described in these Specifications.
3. Acceptance of Warranty Responsibility: The Contractor, by accepting delivery of plant material, without providing written notification of unsatisfactory conditions, assumes Warranty responsibilities for the plant material as described in these specifications.
4. Unloading: The Contractor has responsibility for removing plant material from delivery vehicle.
5. Protection Prior to Installation: Protect from sun and drying winds from delivery until planted in final location on site. Heel-in all rootballs if not planted the same day as delivered.
6. Proper Plant Handling: Handle and protect plants, roots, rootballs, and new buds to prevent plant injuries. Pickup all plants from the rootball or container, not the trunk.
7. Unsatisfactory Materials: Immediately remove unsatisfactory materials from site.
8. Verification of Species: All plant material shall be delivered with tags or labels identifying species and variety (as applicable). Incorrect species shall be removed from the site immediately.

1.10 PROJECT SITE CONDITIONS

A. Environmental Requirements: Plant during periods normal for optimum growth, as determined by season, weather conditions, and accepted practice. Contractor may conduct planting operations under unseasonable conditions, without additional compensation, by accepting full responsibility for any subsequent resulting losses.

B. Underground Conditions:

1. Locate utility lines and underground obstructions to avoid damage during excavation.
2. Contractor shall repair and replace damaged buildings, equipment, underground utilities, irrigation equipment, paving, surfacing, stairs, and other work damaged as a result of Contractor's operations.
3. Locate and clearly mark irrigation pipe, wire, valves, and other underground equipment.

1.11 SEQUENCING AND SCHEDULING

A. Coordinate ordering of materials with Owner immediately following General Contract award. Ensure that specified sizes and quantities are furnished.

B. Planting Schedule: Contractor is responsible for using good horticultural practices and judgment regarding timing of planting.

1.12 WARRANTY

A. Warranty Period for this work is as stated in General Conditions and begins at Owner acceptance. Warranty period for all plant material shall be one year from date of Owner acceptance.

1. Guarantee replacement: Acceptance of sample plants does not constitute acceptance of all plants. Final acceptance of plants shall occur at Owner acceptance of the completed project.

    a. Plant Materials: Warrant to be healthy and thriving.
    b. Remove and replace immediately during the Guarantee Period: Dead, diseased, dying, broken, or missing plant materials (except as noted below). Use specified plant and plant as specified; guarantee until acceptable, active, healthy growth is evident.
    c. Contractor's Responsibility: During Guarantee Period, Contractor is not held responsible for replacing plants destroyed or damaged by vandalism, accidents caused by vehicle (other than Contractor's), or Acts of God, provided that you have exercised due care to protect the work.
    d. When required replacement time falls during non-planting season, Contractor may request Owner's permission to defer planting until proper season. If granted, immediately remove dead plants, including roots, from site.
    e. Backfill pits properly with topsoil. Finish grade and leave in acceptable condition until proper planting season occurs. Replace with plants of same kind and size as those originally planted. Plant as originally specified.

1.13 MAINTENANCE

A. The maintenance period shall continue until final acceptance. At a minimum, maintenance shall include: watering; weed and pest control; and temporary barriers as required to insure healthy, thriving plant growth.

PART 2 – PRODUCTS

2.1 MATERIAL - GENERAL

A. Comply with Quality Assurance provisions, references, specifications, and manufacturer's data.

2.2 PLANT MATERIALS

A. Meet or exceed following reference standards for quality, size, and condition:

1. WSDA Rules Related to Standards for Nursery Stock.

2. ANSI Z60.1-2004: American Standard for Nursery Stock.
3. American Joint Committee of Horticultural Nomenclature: Standardized Plant Names.

B. Plant abbreviations (see Contract Drawings for complete plant list):

B&B	Balled and burlapped	S	Small
BR	Bare root	M	Medium
br	Branches	L	Large
cal	Caliper	EXL	Extra large
cont	Container	NCN	No common name
dia	Diameter	oc	On center
gal	Gallon	tri-spaced	Triangular spaced

2.3 PLANTING SOIL

A. Tree Pits and Planting Beds: See Section 32 91 13 – Soil Preparation.

2.4 TREE STAKING & GUYING MATERIALS

1. Stakes: Douglas fir with pointed end.
2. Tree Guying "Arbortie:" Flat woven flexible synthetic fiber ¾" wide with a break strength of 900 lbs. Color: Olive Green. Available from Deep Root Partners, L.P., Burlingame, CA 1-800-458-7668.

2.5 MULCH

A. Available from L.R.I. (253) 847-7555. A coarse grade material derived from well-decomposed yard waste. Compost shall be produced by a permitted solid waste composting facility. All pieces shall be smaller than 2" in any direction. Submit sample.

PART 3 – EXECUTION

3.1 PRE-PLANTING INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes Contractor's acceptance of conditions as satisfactory.

B. Contaminants:

1. Verify existing soil conditions for contaminants that may have been discarded by other trades, such as thinner and plaster.
2. Report findings in writing immediately to Owner's Representative before placing topsoil.

C. Adverse Drainage Conditions: Notify Owner's Representative in writing of adverse drainage conditions affecting plant growth.

3.2 FINISH GRADING

A. Finish subgrade and obtain approval of Owner's Representative before you start planting or place any soil. Finish subgrade shall be smooth and conform to the final finish grade after soil placement. Allow for added soil in individual plantings as specified.

3.3 PREPARATION

A. Field Measurements:

1. Verify actual plant layout in relation to Contract Drawings: Make adjustments as required by Owner's Representative.
2. In ornamental grass planting areas, follow specified distances on center rather than estimated number of plants, be it a larger or smaller quantity.

B. Plant Locations:

1. Stake all tree locations with 3' wood stakes for acceptance by Owner's Representative.
2. Make required field adjustments as directed by Owner's Representative.
3. Avoid obstructions such as irrigation equipment.

C. Protect the public, adjacent properties, surfaces, and surrounding areas to prevent harm during Work of this Section.

3.4 INSTALLATION

A. Install the Work in accordance with References and Specifications.

3.5 PLANTING

A. Preparation:

1. Before planting, soak dry rootballs.
2. Prune broken roots ½" or greater in diameter. Make clean cuts.
3. Plant when plant materials are available and weather conditions are consistent with good horticultural practice.

B. Plant Pits:

1. Dig plant pits and plant according to details shown on Contract Drawings. Waste excess pit spoils evenly over subgrade.
2. If you encounter clay soil or unusual conditions likely to be detrimental to new plantings, notify Owner's Representative immediately.
3. Remove unsuitable material excavated from plant holes and dispose of it legally off project site.
4. Install plants with POSITIVE drainage away from rootball, unless otherwise noted.

C. Planting:

1. Hold plant in center of hole, approximately 2" above normal growing position and backfill with soil approximately halfway.
2. Backfill to within 5" of finish grade; fill hole with water and allow to settle.
3. Backfill to finish grade with specified planting soil.
4. Raise plants settling below finish grade to correct elevation.

D. Plant Tags:

1. Remove and dispose of nursery labels, tags and stakes.
2. Do not remove yellow, plastic lock-seals with serial numbers until end of Warranty period.

E. Soil:

1. Place soil to a uniform depth as shown on the Contract Drawings.

3.6 TREE STAKING

A. Stake as shown on contract drawings.

1. Tying Tree to Stakes:

a. Hold trunk in one hand, pull top to one side and release. Height at which trunk will snap back to upright is Base Height.
b. Attach tree ties to trunk 6" above Base Height.
c. Install "Arbortie" per manufacturer's instructions.
d. Cut off any remaining stake 2" above upper tree tie.

3.7 MULCHING

A. Before installing mulch, obtain acceptance of the Owner's Representative of planting areas, grades, soil depths, and plant locations.

B. Install mulch layer at all trees, and ornamental grasses to the limits and depths as shown on the contract drawings.

C. At plant trunks and stems, taper mulch back from root ball crown so mulch does not touch bark.

3.8 FINAL INSPECTION

A. Remove defective materials; in their place, install new materials, as specified. Furnish in same variety and current size of existing healthy plant materials, subject to one (1) year guarantee beginning at the date of new installation. Remove any weeds.

3.9 CLEANING

A. Sweep paving clean. Leave installations properly planted, clean, and orderly; premises free from scatterings and other residue of work. Leave site neat and clean at end of each working day.

1. Remove and dispose on site such items as excess earth, clippings, trimmings, leaves, litter, and debris.
2. Rake planting areas to an even, fine grade. Wash hard surfaces clean.
3. Remove flag labels from plantings.

3.10 PROTECTION OF COMPLETED WORK

A. Install barriers as necessary and required to protect the work during Guarantee Period, or for shorter period as directed.

3.11 PLANT ESTABLISHMENT

A. Contactor to adjust irrigation as required to maintain plants.

END OF SECTION 32 90 00

SECTION 32 91 13 – SOIL PREPARATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Basics: Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. This section includes:

1. Subgrade preparation.
2. Topsoil for planting areas.

B. Related sections include the following:

1. Section 32 80 00 – Irrigation System
2. Section 32 90 00 – Planting

1.3 REFERENCES

A. ASTM D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort.

1.4 DEFINITIONS

A. "Percent Compaction": The required in-place dry density of the material, expressed as a percentage of the maximum dry density of the same material determined by ASTM D1557 test procedure.

B. "Soil Subgrade": The soil surface on which topsoil material is placed.

C. "Finished Grades": The final grade elevations indicated on the Grading Drawings.

D. "Acceptance": Wherever the terms "acceptance" or "accepted" are used herein, they mean acceptance by the Owner’s Representative in writing.

E. "Grading Drawings": Plans, sections, and profiles showing finished surface grades.

F. "Elements with Fixed Elevations": Paths, paving, concrete pads, headers, footings, foundations, walls, and other structures with fixed-spot elevations.

1.5 SUBMITTALS

A. Topsoil: Submit product data and one-gallon sample for each type of Topsoil material.

1.6 SITE CONDITIONS

A. Environmental Protection:

B. Soil Moisture Content: Do not work soil when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in air or that clods will not break readily.

PART 2 – PRODUCTS

2.1 TOPSOIL

A. Topsoil shall be a mixture of weed-free compost (40%) and Loamy Sand (60%) screened through a 3/8" screen.

B. Compost: Well composted, stable, and weed-free organic matter, pH range of 5.5 soluable salt content of 5 to 10 decisiemens/m; not exceeding 0.5% inert contaminants and free of substances toxic to plantings, and as follows:

1. Organic Matter Content: 50% to 60% of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Subgrade:

1. Verification: Verify that the subgrades have been graded to within one tenth of a foot (0.10') of the grades shown on the Grading Drawings.
2. Notification of Discrepancies: Notify the Owner’s Representative in writing of any discrepancies.

B. Tree Planting:

1. Pre-Planting Inspection: Topsoil material shall not be installed until a pre-planting inspection has been completed.

3.2 PREPARATION

A. Protection of Existing Conditions:

1. General: Use precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the Work.

B. Surface Preparation:

1. Inspection: Inspect subgrade soil for stones over 2" in diameter, sticks, oils, chemicals, plaster, concrete, and other deleterious materials.
2. Removal: Do all Work when necessary to remove the deleterious materials before and after subgrade preparation.

3.3 PREPARING SUBGRADE

A. Plow with a rototiller or other approved equipment to the depth shown on the Contract Drawings.

3.4 TOPSOIL PLACEMENT

A. Place topsoil as detailed on the Contract Drawings.

B. Spillage:

1. Take precautions to prevent spillage when hauling on or adjacent to any public street or highway.
2. In the event that spillage occurs, remove all spillage and sweep, wash, or otherwise clean such streets or highways as required by local City, County or State authorities.

C. Dust Control: Use water trucks or temporary irrigation and take all precautions needed to prevent a dust nuisance to adjacent public or private properties.

D. Erosion: Correct erosion and siltation damage at no cost to the Owner.

E. Settlement Repair: Correct settlement within the Warranty period at no cost to the Owner.

3.5 FINISH GRADING OPERATIONS

A. General: Grade with uniform slope between points where elevations are given or between such points and existing grades, unless indicated otherwise.

B. Soil Surface Tolerances:

1. Planting Areas: Bring finished soil surface to within 0.10' of finish grades indicated on Grading Drawings. Grade flatter areas at tighter tolerance if required to provide positive drainage.
2. Allowances: Make proper allowances for settlement, spoils from plant pits, etc.

C. Surface Drainage:

1. Slope finish grades to continuously drain surface water.
2. Slope finish grades to drain surface water to catch basins, area drains or trench drains as shown on the Contract Drawings.

D. Depressions and Loose Material: Fill and compact depressions, and remove all loose material to finish surface true to line and grade, presenting a smooth, compacted, and unyielding surface.

E. Rounded Sculptural Landforms: Blade soil surface parallel with contours to achieve smooth, rounded landforms as shown on the Grading Drawings. Hand rake final finish grade. All sculptural landforms must be reviewed and approved by the Owner's Representative prior to seeding.

3.6 PROTECTION

A. Erosion: Correct erosion and siltation damage at no cost to the Owner.

B. Settlement Repair: Correct settlement within the Warranty period at no cost to the Owner.

C. Drainage: Keep surface of topsoil material in such condition that it will drain readily and effectively.

D. Materials, Tools, and Equipment: In handling materials and operating tools and equipment, protect the compost material from damage by laying down planks, plywood, or other accepted protective materials where required.

E. Vehicular Traffic: Do not allow vehicles to travel in a single track. If ruts are formed, blade smooth.

F. Storage of Materials: Topsoil material to be covered with plastic tarpaulins for protection from leaching.

3.7 CLEANUP

A. Daily: Keep all areas of Work clean, neat, and orderly at all times.

B. Final: Clean up and remove all deleterious materials and debris from the entire work area prior to Final Completion.

END OF SECTION 32 91 13

SECTION 32 92 22 – TOP SAND

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.2 SUMMARY

A. This Section includes:

1. Top Sand
2. Testing of Materials

B. Coordinate related work and requirements specified in other parts of the Contract Documents, including but not limited to the following:

1. Section 32 80 00 – Irrigation
2. Section 32 92 23 – Sodding

1.3 DEFINITIONS

A. "Rootzone": Top Sand.

B. "USGA": United States Golf Association

1.4 SUBMITTALS

A. Submit samples and certified test results on top sand. See Part 2.2 below.

PART 2 – PRODUCTS

2.1 TOP SAND

A. Top Sand shall meet the following specifications (ASTM D422 or ASTM C136):

Sieve Size	% Passing
#4	100%
#8	95-100%
#16	85-100%
#30	50-75%
#60	0-30%

#100	0-10%
#140	0-5%
#200*	0-2%
#270*	0-1%

* Indicates wet sieve test.

B. Top Sand, if washed, shall be freshwater washed. However, washing is not a requisite if the sieve analysis can be met without washing.

2.2 TESTING

A. Testing Top Sand

1. The Contractor shall pay for and provide the Owner with a ½ cubic foot sample and with a certified test lab report of the sieve analysis of the product listing compliance with the same sieve sizes specified. Owner shall make the final determination in establishing compliance with sieve requirements. The testing laboratory shall be an independent, professional laboratory, approved by the Owner.

B. Testing During Placement of the Top Sand

1. During the course of importation of the materials, the Contractor shall be responsible for continually testing the materials to insure that they continue to meet the Specifications. Failure to do so may require that the Contractor remove non-qualifying material from the site at the Contractor's own cost.
2. No material shall be brought to the site that does not meet the specification.
3. The Owner will have the option to take random samples for testing at their own laboratory. In the event that any sample taken and tested by the Owner reveals that non-qualifying material is being imported, the Contractor shall cease all importation until the Owner is assured that the Contractor is meeting the specifications. In the event that the Owner's test results and the Contractor's test results are at variance, and either test result reveals the material to be non-complying, the Contractor shall be responsible for obtaining the services of a third party professional testing laboratory, which, in turn shall analyze samples selected by the Owner. Such analysis shall be turned over to the Owner for resolution. The Owner shall make the final determination in establishing compliance with the physical properties requirements.

PART 3 – EXECUTION

3.1 PREPARATION FOR TOP SAND

A. Complete the drainage and irrigation for the entire area to receive Top Sand.

B. Reestablish the subgrade.

C. Obtain approval of drainage, irrigation and reestablished subgrade before placing any Top Sand. Keep equipment off of the subgrade if excess rainfall has softened it.

3.2 TOP SAND MATERIAL PLACEMENT

A. Verify that subgrade has been reestablished after the drainage and irrigation work is completed and approved (for the entire area to receive Top Sand).

B. Root Zone material shall be placed over the field and then spread onto the field with a tracked piece of equipment.

C. Do not drive rubber tired vehicles across excavated trenches unless trenches are bridged with ½" steel sheet (approximately 4' x 8' size). During delivery of materials, trenches shall be guided by a field worker to insure that no trenches are crossed without protection.

D. Wet the material completely and grade to the finish grade.

E. PRESCRIBED DEPTH SHALL BE COMPACTED DEPTH. Finish grades shall be verified with laser plane equipment in the presence of the Owner. Finish Grade Tolerance: Plus 0.05'; minus 0.00'.

END OF SECTION 32 92 22

SECTION 32 92 23 – SODDING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.2 SECTION INCLUDES

A. Sodding.

1.3 SUMMARY

A. Related Work in other sections of these specifications includes, but is not limited to:

1. Section 32 80 00 – Irrigation System
2. Section 32 92 22 – Top Sand

1.4 SUBMITTALS

A. Seed Analysis: A complete analysis of the seed used for Sod shall be submitted by the Contractor, including the percent of pure seed, germination, other crop seed, inert and weed, and the germination test date. All crop seed in excess of one percent must be itemized.

B. Fertilizer Certification: Submit duplicate copies of all invoices for all fertilizer showing the grade furnished.

C. Schedule: Maintenance shall be continuous until the Project as a whole is accepted.

PART 2 – PRODUCTS

2.1 SOD

A. Sod shall be as follows:

1. Mixture: 60% Perennial Turf Type Ryegrass
   20% Hybrid Kentucky Bluegrass
   20% Fescue
   Ryegrass: 60% by weight
   TARA perennial ryegrass
   DANDY perennial ryegrass
   SHERWOOD perennial ryegrass

Bluegrass:	20% by weight
	MARQUIS Kentucky bluegrass
	America Kentucky bluegrass
	MERIT Kentucky bluegrass
Fescue:	20% by weight
	SPARTAN Hard Fescue

2.2 SOD GROWING MEDIUM

A. Growing medium: Sod shall be grown on a medium with the following composition:

Sand	65%	Organic Matter	5-6%
Silt	30%	Ph	7.0
Clay	5%		

B. Sod shall contain no sod netting and/or poly mesh.

C. Sod shall be harvested in 50'-long, 42"-wide rolls.

D. Sod shall contain no more than 1% other grasses, none of which is coarse or of an undesirable variety.
   1. Sod shall be free of weeds, pests, and diseases.
      Contains no more than 1% Poa Anna (annual bluegrass).
   2. Not less than 10 months old and not more than 14 months old, healthy and with a dense, vigorous, well-developed root structure.
   3. Cut from fields no more than 24-hours before delivery to job site.

2.3 FERTILIZER

A. Initial Application for incorporation with all Sodding:
   1. Scotts Starter fertilizer or approved equal with the following characteristics:
      a. 20-27-5 (NPK analysis).
      b. 50% of the nitrogen shall be derived from 38% urea formaldehyde.
      c. Potash shall be derived from sulfate of potash.
      d. Fertilizer shall be retained by Taylor standard sieves as follows:
         1) No. 4 sieve retains 0%.
         2) No. 20 sieve retains 65%.
         3) No. 80 sieve retains 95%.
   2. Preparation for Delivery: Fertilizer shall be packaged in new, waterproof, fifty pound (50 lb) bags, clearly labeled as to weight, manufacturer, and content.

B. For Use After the First Mowing or for All Resodding:

   1. Use 27-2-14 fertilizer with the following characteristics:
      a. The following shall contain the following per ton: Nitrogen shall be totally derived from miloganite (1,020 lbs.) and 38% urea formaldehyde (160lbs.). Phosphoric acid shall be derived from miloganite. Potash shall be derived from sulfate of potashmagnesia. The fertilizer shall contain 4% magnesium, 3% iron, and 5% sulphur.
      b. The fertilizer shall be retained by Taylor standard sieves as follows:

1) No. 4 sieve retains 0%.
2) No. 20 sieve retains 65%.
3) No. 80 sieve retains 95%.

2. Preparation for Delivery: The fertilizer shall be packaged in new, waterproof, non-overlaid, fifty pound (50 lb.) bags, clearly labeled as to weight, manufacturer, and content.

2.4 LIME

A. Lime for incorporation into the Top Sand prior to sodding shall meet the following specifications:
   1. Lime shall be fine ground dolomite lime.
   2. Preparation for Delivery: Lime shall be packaged in new, waterproof, fifty pound (50 lb.) bags, clearly labeled at to weight, manufacturer, and content.

PART 3 – EXECUTION

3.1 PREPARATION

A. Irrigation and Finish Grade:

The complete irrigation system shall be operating and approved for coverage and the final finish grade approved prior to fertilizing and sodding.

B. Starter Fertilizer and Lime:

After the area to be sodded has been brought to finish grade, in accordance with these Specifications and Contract Drawings, and has been approved by the Owner's Representative, apply Starter Fertilizer 20-27-5 at the rate of fifteen pounds (15 lbs.) per one thousand square feet (1,000 sq. ft.), together with dolomite limestone at the rate of fifty pounds (50 lbs.) per one thousand square feet (1,000 sq. ft.).

C. Finish Grading:

Bring the Top Sand to the finish grade, full. Finish grades shall be plus or minus 0.05 of a foot.

3.2 SODDING

A. Lay Sod within 24-hours of delivery to job site.

B. Install Sod so that joints are tight and smooth on a smooth, moist, lightly compacted surface. Lay Sod so that long edges are parallel to contours and perpendicular to slope. Alternate joints in running bond fashion.

C. Roll Sod to provide uniform surface.

D. Adjust grade irregularities as required. Irregularities of plus or minus one quarter (¼”) inch will be maximum acceptable tolerance.

E. Begin irrigation of Sod immediately following Sod placement.

3.3 SECOND APPLICATION OF FERTILIZER

A. Approximately one (1) week after sodding and before the first mowing, apply the second half of the 20-27-5 fertilizer, (Starter Fertilizer) at the rate of fifteen pounds (15 lbs.) per one thousand square feet (1,000 sq. ft.).

3.4 MOWING

A. Sod shall be mowed a minimum of three times before acceptance. The first mowing shall occur when the grass first reaches two (2") inches in height and then be mowed to a height of one and one half (1½"). Mowing shall continue on a weekly basis thereafter until all grass areas or the Project as a whole is accepted. Mowing shall be done with a mower on soft pneumatic wheels.

3.5 FERTILIZATION AFTER FIRST MOWING

A. After the first mowing, the Contractor shall apply post-seeding fertilizer (27-2-14) at the rate of approximately thirty pounds (30 lbs.) per one thousand square feet (1,000 sq. ft.).

3.6 MAINTENANCE

A. The maintenance of all areas shall include watering, weed treatment and mowing. Maintenance shall continue until the Project is accepted.

3.7 RE-SODDING

A. Re-Sod and fertilize with 27-2-14 at a rate of approximately ten pounds (10 lbs.) per one thousand square feet (1,000 sq. ft.), all areas failing to show a uniform stand of grass after placement, or damage through any cause before final acceptance. The Contractor shall be responsible for protecting and maintaining all areas and continue to fertilize, with 27-2-14 or Ammonium Sulfate at three (3) week intervals at levels and type of fertilization as prescribed by the Owner's Representative.

3.8 INSPECTION AND SUBSTANTIAL COMPLETION

A. After completion of all sodding, the post-planting fertilization which follows the first mowing, and two subsequent mowings, the Owner's Representative will review the planted areas for adequacy. Areas not showing uniform stand of grass, or areas damaged through any other cause prior to this inspection shall be resodded, as herein specified at the Contractor's expense. "Uniform Stand of Grass" is defined as a complete cover of lush, thriving, green grass with no bare spots. It must be emphasized the acceptance may occur after three mowings, maintenance and weekly mowing shall continue until acceptance. This additional maintenance may include disease control, special fertilizers, etc.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by sod work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

END OF SECTION 32 92 23

SECTION 334100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Drawings, Standard Specifications and Special Provisions of the Contract apply to this Section.

B. Section 312000, “Earth Moving” for trenching, bedding, and backfilling.

C. Section 312513, “Erosion Control” for temporary erosion control measures.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure transition couplings.
3. Cleanouts.
4. Stormwater inlets.
5. Pipe outlets.
6. All temporary and permanent storm drainage piping, fittings, and accessories.
7. Cleaning and flushing storm system at completion of project.

1.3 DEFINITIONS

A. CPEP: Corrugated polyethylene plastic pipe.

B. PVC: Polyvinyl chloride plastic pipe.

1.4 SUBMITTALS

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

B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

C. Certification:

1. Provide a letter, signed by the supplier and reviewed and also signed by an officer of the Contractor’s company, certifying that the following products to be incorporated into the work meet the requirements specified.

2. Products:

   a. Pipe
   b. Cleanouts

D. Record Drawings:

1. Record information shall be prepared by a professional land surveyor licensed in the State of Washington.

E. Television Inspection Report: Prepared by a firm licensed to perform such analysis, submitted to Architect minimum of 14-days before final surfacing construction is scheduled. The following shall be submitted:

1. Video tape or CD of pipe and structures.
2. Written report documenting stationing of sags, damaged or improper joints, and connections or other areas of concern or non-conformance. Report shall include proposed repair for all documented problem areas.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

D. Handle catch basins according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Field verify all connection points of existing facilities and contact Architect if proposed improvement cannot be provided.

B. Locate existing structures and piping to be closed and abandoned.

C. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

1.7 REFERENCE STANDARDS

A. WSDOT Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2014 edition. All references to measurement and payment shall be deleted from consideration, and terms agreed to in the contract substituted therefore.

B. WSDOT Standard Plan: Standard Plans for Road and Bridge Construction, prepared by Washington State Department of Transportation, current issue in effect at bid date.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON, CULVERT PIPE AND FITTINGS

A. Pipe: ASTM A 716, for push-on joints. Conform to WSDOT Specification 9-05.13.

B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.

C. Compact Fittings: AWWA C153, for push-on joints.

D. Gaskets: AWWA C111, rubber.

2.2 DUCTILE-IRON, PRESSURE PIPE AND FITTINGS

A. Push-on-Joint Piping:

1. Pipe: AWWA C151, for push-on joints.
2. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.
3. Compact Fittings: AWWA C153, for push-on joints.
4. Gaskets: AWWA C111, rubber, of shape matching pipe and fittings.

B. Mechanical-Joint Piping:

1. Pipe: AWWA C151, with bolt holes in bell.
2. Standard Fittings: AWWA C110, ductile or gray iron, with bolt holes in bell.
3. Compact Fittings: AWWA C153, with bolt holes in bells.
4. Glands: Cast or ductile iron, with bolt holes and high-strength, cast-iron or high-strength, low-alloy steel bolts and nuts.
5. Gaskets: AWWA C111, rubber, of shape matching pipe, fittings, and glands.

2.3 ALUMINUM PIPE AND FITTINGS

A. Corrugated Aluminum Pipe and Fittings: ASTM B 745/B 745M, Type I with fittings of similar form and construction as pipe.

1. Special-Joint Bands: Corrugated steel with O-ring seals.
2. Standard-Joint Bands: Corrugated steel.

2.4 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints. Conform to WSDOT Specification 9-05.19.

1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.

2. Soiltight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.

B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints. Conform to WSDOT Specification 9-05.19.

1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2. Soiltight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

2.5 PVC PIPE AND FITTINGS

A. PVC Gravity Sewer Piping:

1. Pipe: ASTM D 3034, SDR 35, PVC sewer pipe with bell-and-spigot ends for gasketed joints. Conform to WSDOT Specification 9-05.12(1).
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

2.6 CLEANOUTS

A. Cast-Iron Cleanouts:

1. Conform to detail.

B. Plastic Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.7 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

a. Invert Slope: 2 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000, “Earth Moving.”

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer’s written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes or catch basins for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.
2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
3. Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
4. Install corrugated aluminum piping according to ASTM B 788/B 788M.
5. Install PE corrugated sewer piping according to ASTM D 2321.
6. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
7. Install PVC profile gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
8. Install nonreinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
9. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

G. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless cast-iron soil pipe and fittings.
3. Ductile-iron pipe and fittings.
4. Expansion joints and deflection fittings.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
2. Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
3. Join corrugated aluminum sewer piping according to ASTM B 788/B 788M.
4. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
5. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.

6. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
7. Join nonreinforced-concrete sewer piping according to ASTM C 14 and ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
8. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
9. Join dissimilar pipe materials with nonpressure-type flexible couplings.

B. Provide a tee in the roof drain at each building downspout location; provide all fittings required to connect to roof drains. See architectural plans for downspout locations. No above-grade offsets shall be allowed.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Install piping so cleanouts open in direction of flow in sewer pipe.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops flush above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

D. Cleanouts shall be provided at all connections to roof downspouts.

E. Cleanouts for roof drainage connections shall be located within 2 feet of building and shall conform to detail on plan.

3.5 CATCH BASIN AND AREA DRAIN INSTALLATION

A. Installation shall conform to WSDOT Specification Division 7.

B. Construct catch basins to sizes and shapes indicated.

C. Set frames and grates to elevations indicated.

3.6 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's fountain drains specified on plans.

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.

    a. Unshielded flexible couplings for same or minor difference OD pipes.
    b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.7 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8-inch thick, brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

1. Remove manhole or structure and close open ends of remaining piping.

2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade according to Section 312000, "Earth Moving."

3.8 IDENTIFICATION

A. Materials and their installation are specified in Section 312000, "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use warning tape or detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.
3. Locate wire is not required when pipe extends from catch basin to catch basin.
4. Use locate wire along all roof drain systems.
5. The ends of locate wire must be exposed within catch basin or cleanout and maintained.

3.9 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.
2. Place plug in end of incomplete piping at end of day and when work stops.
3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
b. Option: Test plastic piping according to ASTM F 1417.
c. Option: Test concrete piping according to ASTM C 924.

D. Leaks and loss in test pressure constitute defects that must be repaired.

E. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.10 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with potable water. Flush water shall be sent to the sanitary sewer.

END OF SECTION 334100