

**SILVERDALE WATER DISTRICT
KITSAP COUNTY, WASHINGTON**

**2019
CONDITIONS AND STANDARDS
FOR
CONSTRUCTING IMPROVEMENTS
TO THE WATER AND
RECYCLED WATER SYSTEM**

Water District Office

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Water District Meetings

8:00 A.M., 1st Thursday
of Month at
Water District Office

**CONDITIONS AND STANDARDS
FOR
CONSTRUCTING IMPROVEMENTS TO THE WATER SYSTEM**

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1.0 GENERAL CONDITIONS

1.1 Scope

These are general conditions to all contracts for improvements of the District's water system by Developers.

1.2 Definitions

The following terms, as used in this contract, shall be defined and interpreted as follows:

- a. "Class A Recycled Water": As defined by Washington State Department of Ecology and Washington State Department of Health, reclaimed water that, at a minimum, is at all times an oxidized, coagulated, filtered, disinfected wastewater. The wastewater shall be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of total coliform organism does not exceed 23 per 100 milliliters in any sample.
- b. "Contract Drawings" or "Drawings": All drawings or plans approved by the District.
- c. "Contract Documents": The Contract Documents shall consist of the following and, in the case of conflicting provisions; the first mentioned shall have precedence.
 - 1) Construction Agreement.
 - 2) Change orders after application is signed.
 - 3) Detail drawings and written instructions.
 - 4) Addenda
 - 5) Plans
 - 6) Conditions and Standards
 - 7) Reference Specifications
 - 8) Performance Bond
- d. "Contract" or "This Contract": The Developer to build construction agreement executed by the Developer and the District of which these General Conditions are an integral part.
- e. "Details": The District's standard details as contained in these Conditions and Standards.

- f. "Developer's Equipment": The phrase "Developer's equipment" shall include all items of materials or equipment remaining in the Developer's ownership and removed from the site upon completion of the project.
- g. "Developer": The person, partnership, firm or corporation having an agreement with the District to cause the installation of waterworks improvements to become a part of the District water system upon completion and acceptance. The term shall also include the Developer's agents, engineer, employees and subcontractors. The legal address is shown in the construction agreement.
- h. "District": Silverdale Water District is a Washington municipal corporation controlled by three elected commissioners. Any matter addressed to the "District" under these conditions and standards shall first be examined by the General Manager. The Manager may, at his/her election, refer any matter to other District employees, the District Engineer, the District Attorney, or the Board of Commissioners for their consideration.
- i. "Engineer": The District Engineer or his or hers duly authorized personnel, acting as agents for the District in the administration of this contract, for the benefit of the District in accordance with the Contract Documents.
- j. "Equipment": The machinery, accessories, appurtenances, and manufactured articles to be furnished and/or installed under the contract.
- k. "Extension": The system of water mains and appurtenances or other water system improvements to be constructed in whole or in part through the performance of this contract.
- l. "Material or Materials": These words shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise) and any other classes of material to be furnished in connection with the contract.
- m. "Or Equal": Any manufactured article, material, method or work which, in the opinion of the District, is equally desirable or suitable for the purposes intended in these specifications and contract as compared with similar articles specifically mentioned herein.
- n. "Plans": The plans shall mean all official drawings or reproductions of drawings made or to be made pertaining to the work provided for in the Contract or to any structure connected therewith.
- o. "Points": Wherever reference is made to the Surveyors points, this shall mean all marks, bench marks, reference points, stakes, hubs, tacks, etc., established by the Developer for maintaining horizontal and vertical control of the work.
- p. "Recycled Water": Effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated,

- q. "Reference Specifications": Reference specifications shall mean the technical specifications of other agencies incorporated or referred to herein.
- r. "Shop Drawings": All shop details, structural steel pipe, machinery, equipment, schedules, bending diagrams, reinforcing steel and other detail drawings furnished by the Developer as required and provided for in the specifications.
- s. "Specifications": The specifications shall mean the prescribed directions, requirements, explanations, terms and provision pertaining to the various features of work to be done or manner and method of performance and the manner and method of measurements and payments. They also include directions, requirements and explanations as set forth in the plans.
- t. "Supplemental Drawings and Instructions": The District may furnish, at its sole discretion, upon written request of the Developer with reasonable promptness, additional instructions by means of drawings or documents necessary, in the opinion of the District, for the proper execution of the work. All such drawings and instructions shall be consistent with the Contract Documents.
- u. "Surety": Any firm or corporation executing a surety bond or bonds payable to the District securing the performance of the contract either in whole or in part.
- v. "Words and Phrases": Wherever the words "as directed", "as required", "as permitted", or words of like effect are used, it shall be understood that the direction, requirement or permission of the District is intended. The words, "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary or proper in the judgment of the District. The words, "approved", "acceptable", "satisfactory", and words of like import shall mean approval or acceptable to the District.
- w. "Work": The work necessary to manufacture and deliver the machinery, equipment and material and/or furnish all labor, tools, materials, equipment, construction equipment, working drawings, where required, and other necessities for the construction or erection of the structures shown and called for in the plans, specifications and contract and the act of constructing or erecting such structures complete.

1.3 Plans and Specifications: Omissions and Discrepancies

The Developer shall carefully study and compare all drawings and specifications and other instructions and shall, prior to ordering materials or performing work, report in writing to the District any error, inconsistency, or omission in respect to

design, mode of construction or cost which the Developer may discover. If the Developer, in the course of this study or in the accomplishment of the work, finds any discrepancy between the drawings and the physical condition or the locality as represented in the drawings, or any such errors or omissions in respect to design, mode of construction or cost in drawings or in the layout as given by points and instructions, it shall be the Developer's duty to inform the District immediately in writing, and the District shall promptly check the same. Any work done after such discovery will be done at the Developer's risk.

1.4 Status of the District

- a. The District shall have general supervision and direction of the work, PROVIDED, HOWEVER, nothing contained herein or elsewhere in the Contract Documents shall be construed as requiring the District to direct the method or manner of performing any work by the Developer under this contract. The District has the authority to stop work whenever, in its opinion, such stoppage may be necessary to ensure proper execution of the contract.
- b. It is understood and agreed by and between the parties hereto that the work included in the contract is to be done under the general supervision and to the complete satisfaction of the District, as to the true interpretation and meaning of the contract, plan, specifications and estimates and as to all questions arising as to proper performance of the work shall be final.
- c. The District shall decide any and all questions which may arise as to the quality or acceptability of materials furnished and work performed and all questions as to the acceptable fulfillment and performance of the contract on the part of the Developer. The decision of the District in such matters shall be final.
- d. The District may direct the sequence of conducting work when it is in locations where the District is doing work either by contract or by its own forces or where such other works may be affected by the contract, in order that the conflict may be avoided and the work under these specifications be harmonized with that under other contracts, or with other work being done in connection with, or growing out of operations of the District. Nothing herein contained, however, shall be taken to relieve the Developer of the Developer's obligations or liabilities under the contract.
- e. Neither the District nor its representatives have the authority to waive the obligation of the Developer to perform work in accordance with the Contract Documents. Failure or omission on the part of the District or its representatives to condemn unstable, inferior or defective work and/or labor or material or equipment furnished under the contract shall not release the Developer or the Developer's bond for performing the work in accordance with the Contract Documents.

1.5 Surveys, Permits, Laws and Regulations

- a. The Developer shall furnish all property boundary surveys unless otherwise specified. Permits, permission under franchises, licenses, and bonds of a temporary nature necessary for and during the prosecution of the work and inspection fees in connection therewith shall be secured and paid for by the Developer. Where the District is required to secure such permits, permission under franchises, licenses and bonds, and pay the fees, the Developer shall reimburse the costs incurred by the District to the District.
- b. Developer shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work required by the Contract Documents. If the Developer observes that the Contract Documents or any part thereof are inconsistent or at variance therewith, Developer shall promptly notify the District in writing and any necessary changes shall be made as provided in the contract for changes in the work. If the Developer performs any work contrary to such laws, ordinances, rules and regulations, or prior to obtaining permits, permission under franchises, licenses, and/or bonds, as required to be furnished by or obtained by District, the Developer does so at the Developer's own risk.

1.6 Construction Staking, Points, and Instructions

- a. Construction staking shall be provided by the Developer upon satisfactory completion of the items in Paragraph c. of the checklist unless otherwise provided for in Paragraph c. below.
- b. New water mains will be staked on 100-foot intervals with offset stakes for all bends, tees, valves and fittings. All lot corners shall be staked for placement of water services.
- c. The construction staking could be provided by the District upon 48 hours notice. The Developer would provide horizontal control in the form of either road centerline stakes, property stakes, or easement centerline stakes, whichever are necessary, to be utilized by the District's Engineer in providing construction staking. Construction staking will not begin until adequate horizontal control is in place in the field and at the time construction staking is to be commenced. The cost of the staking would then be added to the construction fee.
- d. Developer shall provide reasonable and necessary opportunities and facilities for setting stakes and points. The Developer shall not proceed with the work until the staking has been completed. The work shall be done in strict conformity with such points and instructions.

1.7 Inspection and Tests

- a. Inspection of the work by the District and its' authorized agents shall be strictly for the benefit of the District and nothing contained herein shall be construed to relieve the Developer of the Developer's obligation under this application.

- b. The District and its representatives shall, at all times, have access to the work for the purpose of inspecting and testing wherever it is in preparation or progress, and the Developer shall provide proper facilities for such access and for such inspection and testing.
- c. If any work should be covered up without approval or consent of the District, it must, if required by the District, be uncovered for inspection at the Developer's expense.
- d. The District may order re-examination of questioned work and, if so ordered, the Developer shall uncover the work. If such work were found by the District to be in accordance with the Contract Documents, the District shall pay the cost of re-examination and replacement. If such work were found not in accordance with the Contract Documents, the Developer shall pay such costs.
- e. The Developer shall make reasonable tests of the work at the Developer's expense upon the District's request and shall maintain a record of such tests.
- f. For a performance test to be observed by the District, the Developer shall make whatever preliminary tests are necessary to assure that the material and/or equipment are in accordance with the specifications. If, for any reason, the test observed by the District is unsatisfactory, the Developer shall pay the additional costs incurred by the District for the inspection and supervision of all further testing.
- g. Where work is performed other than during the normal 40-hour week, the Developer shall pay all additional costs of inspection and supervision.
- h. Where the specifications, the District's instructions, laws, ordinances, or any government authority require any work to be specially tested or inspected, the Developer shall give the District timely notice that such test or completed work is ready for inspection.

If the inspecting is by another authority other than the District, the Developer shall give the District timely notice of date fixed for such inspection. Required certificates of inspection by other authority than the District shall be secured by the Developer.

- i. Four (4) scheduled inspections will be performed in addition to regular inspections during construction:
 - 1) Start of construction inspection.
 - 2) Test inspection.
 - 3) Final inspection (or use and operation inspection).
 - 4) End of warranty period inspection.

Inspection during construction will be provided as deemed necessary by the District.

The end of warranty inspection shall be made at least two (2) weeks prior to expiration of the Developer's maintenance bond and shall be conducted by the District.

- j. Written notice of deficiencies, adequately describing the same, shall be given to the Developer upon completion of each inspection and the Developer shall correct these deficiencies within seven (7) days of notice thereof and before final inspection will be made by the District.
- k. A representative of the Contractor shall arrange a time with and accompany the District on the final inspection and any subsequent inspection, if required, thereafter.
- l. Deficiencies discovered at the final inspection shall be corrected within seven (7) days of notice thereof and, in no instance, shall service be provided until said deficiencies are corrected and the improvement passes re-inspection.
- m. A deposit to cover all costs, including actual construction, engineering, and administration, may be required at the discretion of the District to cover correction of deficiencies discovered at the final inspection.
- n. All costs incurred by the District for all inspections shall be at the Developer's expense and will be included in the construction fee.

1.8 Plans and Specifications Accessible

- a. One copy of the plans and specifications shall be constantly accessible at the construction site.
- b. Where shop drawings are required to be submitted for acceptance, one copy of the approved shop drawings shall be kept constantly accessible at the construction site.

1.9 Insurance

The Developer shall carry liability and property damage insurance covering all work under this contract, including that done by subcontractors. This insurance shall name the District as co-insured and shall be primary coverage with any insurance carried by the District classified as additional coverage. Unless otherwise specified, this insurance shall be carried as follows: Bodily injury, each person \$300,000, each accident \$1,000,000, Property damage, each accident \$100,000.

1.10 Material and Equipment: Material and Equipment List

- a. Material and equipment shall be new and shall be as specified in the Contract Documents or, if not specified, shall be of a quality approved by the District. All materials and equipment furnished are warranted by the Developer as new and in accordance with the plans and specifications, if specified therein, and as suitable for the intended purpose. In addition hereto, the Developer shall furnish the District with copies of the supplier's

warranty and adopt the same as the warranty of the Developer and shall also be liable thereon to the District.

- b. The Developer shall file three (3) copies of a materials and equipment list with the District prior to proceeding with construction. This list shall include the quantity, manufacturer, and model number, if applicable, of materials and equipment to be installed under the contract. The District will check this list as to conformity with the plans and specifications. The District will pass upon the list with reasonable promptness, making required corrections. The Developer shall make any required corrections and file two (2) corrected copies with the District within one week after receipt of required corrections. The District's review and acceptance of the lists shall not relieve the Developer from responsibility for suitability for the intended purpose nor for deviations from the drawings and specifications unless the Developer has, in writing, called the District's attention to such deviations at the time of submittal, and secured the District's written approval for such deviation.

1.11 Shop Drawings

The Developer shall check and verify all field measurements and shall submit, with such promptness as to cause no delay in the Developer's work or in that of any contractor, three (3) copies of all shop or setting drawings and schedules (all collectively herein referred to as "shop drawings") required for the work of the various trades. The Developer shall check and approve of the shop drawings prior to submittal to the District. The District shall pass upon them with reasonable promptness making any required corrections, including those related to design and artistic effect. The Developer shall make any corrections required by the District within one week after receipt of the required corrections and shall file with the District two (2) corrected copies and furnish such other copies as may be needed by the District. The District's acceptance of such drawings or schedules shall not relieve the Developer from the responsibility for deviation from drawings or specifications, unless the Developer has in writing called the District's attention to such deviation at the time of submission and secured the District's written approval, nor shall it relieve the Developer from responsibility for errors in shop drawings or schedules.

1.12 Cutting and Fitting

The Developer shall do all cutting and fitting of the Developer's work that may be required to make its several parts come together properly, and fit it to receive or be received by work of other developers or contractors shown or reasonably implied by the drawings and specifications for the completed structure. The Developer shall restore all surfaces damaged by cutting and fitting as the District may direct.

1.13 Labor, Materials, Equipment, Facilities and Workmen

- a. The Developer shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the work, except as otherwise stipulated in the Contract Documents.

- b. The Developer shall, at all times, enforce strict discipline and good order among the Developer's employees and shall not employ on the work any person unfit or not skilled in the work assigned to him. The Developer upon the written request of the District shall forthwith discharge employees or agents of the Developer, who, in the opinion of the District, may impair the quality of the construction.
- c. During the term of this contract, neither party shall employ nor hire any employee of the other party, without the written consent of the other party.
- d. The Developer shall not use any work performed or any information obtained from any employee hired in violation of this provision in making a claim against the District, and also shall be liable to the District, as liquidated damages, in an amount equal to double the amount of salary or wages paid to any such employee so hired in violation hereof.
- e. Necessary sanitary conveniences for the use of workmen on the job, properly secluded from public observation, shall be provided and maintained by the Developer.

1.14 Samples

The Developer shall furnish for approval all samples as directed by the District. The finished work shall be in accordance with approved samples. Approval of samples by the District does not relieve the Developer of performance of the work in accordance with the Contract Documents.

1.15 Determination of Or Equal

The District shall be the sole judge of the question of "or equal" of any supplies or materials proposed by the Developer. The Developer shall pay to the District the cost of tests and evaluations by the District to determine acceptability of alternates proposed by the Developer in accordance with the established rates of the District for time and expense work.

1.16 Royalties and Patents

The Developer shall be liable for all suits brought against the District by reason of infringement of patent rights or license on any material, machine, appliance or process that the Developer may use on the work or incorporate into the finished job except where specifically exempted by special provisions. The Developer shall defend and hold harmless from any such suit costs of defense and any judgment, which may be made or entered against District thereon.

1.17 Payment of Prevailing Wages

When working directly for the District the contractor shall pay prevailing wages to workmen, laborers, and mechanics as provided in the laws of the place of work subject to investigation in light of current practice of the County Auditor and current statutes.

1.18 Protection of Work and Property and Safety

- a. The Developer shall continuously maintain adequate protection of the work from damage and shall protect the District's property from injury or loss arising in connection with or during the existence of this contract. The Developer shall make good any such damage, injury or loss except as may be directly due to errors in the Contract Documents or caused by agents or employees of the District.

The Developer shall adequately protect adjacent property from damage or loss occasioned by performance of the work. Developer shall provide and maintain all passageways, guard fences, lights, and other facilities for protection required by public authority or local conditions.

- b. Developer shall bear the risk of loss or damage for all finished or partially finished work until the District accepts the entire improvement.
- c. Developer shall take all necessary precautions for the safety of employees on the work and shall comply with all applicable provisions of Federal, State and municipal safety laws and building codes. Developer shall erect and properly maintain, at all times, as required by the conditions and progress of the work, all necessary safeguards for protection of workmen and the public, shall post danger signs warning against known or unusual hazards; and Developer shall designate a responsible member of Developer's organization on the construction site whose duty shall be the prevention of accidents. Developer shall report the name and position of such person so designated in writing to the District.

1.19 Existing Utilities or Obstructions

- a. Developer shall not enter upon or place materials on other private premises except by written consent of the individual owners, and Developer shall save District harmless from all suits and actions of every kind and description that may result from Developer's use of private property.
- b. Underground utilities of record shall be shown on the construction plans insofar as it is possible to do so. These, however, are shown for convenience only and District assumes no responsibility for improper locations or failure to show utility locations on the construction plans.
- c. Developer shall take adequate precautions to protect existing lawns, trees and shrubs outside rights-of-way, sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto. Developer shall, at Developer's own expense, completely repair any damage thereto caused by Developer's operations to the satisfaction of the District, except as otherwise provided in other sections of these specifications.

1.20 Replacing Improvements

Whenever it is necessary in the course of construction to remove or disturb culverts, driveways, roadways, pipelines, monuments, property stakes, or other existing improvements without limiting the generality thereof and whether on private or public property, they shall be replaced to a condition equal to that existing before they were so removed and disturbed.

1.21 Superintendence and Supervision

Developer shall keep on the construction site during the progress of the work a competent superintendent and any necessary assistants, all satisfactory to the District. The superintendent shall not be changed except with the consent of the District, unless the superintendent proves to be unsatisfactory to the Developer and ceases to be in Developer's employ. The superintendent shall represent the Developer in Developer's absence and all directions given to the superintendent shall be as binding as though given to the Developer. Instructions to the Developer shall be confirmed in writing upon Developer's request in each case. Developer shall give efficient supervision to the work, using Developer's best skill and attention.

1.22 Warranties of Developer

Upon completion of the improvement work and approval thereof by the District and simultaneously with the acceptance of title by the District, Developer warrants to District as follows:

- a. Developer is owner of the property and the same is free and clear of all encumbrances and that Developer has good right and authority to transfer title thereto to the District and will defend the title of District against the claim of all third parties claiming to own the same or claiming an encumbrance against the same; and
- b. That the water system improvement is in proper working condition, order and repair, and that it is adequate and fit for the intended purpose of use as a water system and as an integral part of the water supply and distribution system of District; and
- c. That for a period of one year from the date of final acceptance and transfer of title of the improvement to the District, all parts of the improvement shall remain in proper working condition, order and repair, except where abused or neglected by the District; and Developer shall repair or replace, at its own expense, any work or material which may prove to be defective during the period of this warranty. Developer shall obtain warranties and guarantees from its subcontractors and/or suppliers where such warranties or quantities are specifically required herein and shall deliver copies to the owner upon completion of the work. When corrections of defects occurring within the warranty period are made, Developer shall further warrant corrected work for one year after acceptance of the correction by the District.

1.23 Correction of Defects Occurring Within Warranty Period

When defects occurring within the warranty period are discovered, Developer shall start work to remedy any such defects within seven (7) days of mailing notice of discovery thereof by District and shall complete such work within a reasonable time.

In emergencies, where damage may result from delay and where loss of service may result, corrections may be made by District immediately upon discovery, in which case the cost thereof shall be borne by the Developer. In the event the Developer does not commence and/or accomplish corrections within the time specified, the work shall be otherwise accomplished and the Developer shall pay the cost of it.

Developer shall be responsible for any expense incurred by the District resulting from defects in the Developer's work, including actual damages, cost of materials and labor expended by District in making emergency repairs and cost of engineering, inspection and supervision by District, as well as reasonable attorney's fees to be fixed by the court in any action which District may commence against Developer to enforce the provisions hereof.

1.24 Indemnity

Developer shall indemnify, defend and save harmless District from and against all losses and claims, demands, payments, suits, actions, recoveries and judgments of every nature and description brought and recovered against District by reason of any act or omission of Developer, Developer's subcontractors, agents, and/or employees arising directly or indirectly from the performance of the contract or in the guarding of the work. Developer will, after reasonable notice of any such suit or action, defend and pay the expense of defending any suit which may be commenced against District arising therefrom.

1.25 Subletting and Subcontracting

Developer agrees that Developer is fully responsible to District for the acts and omissions of subcontractors and persons either directly or indirectly employed by subcontractors, as well as the acts and omissions of persons directly employed by Developer. Consent to sub-contracting part of the work shall, in no way, release Developer from responsibility under the contract and Developer will be held, in all respects, accountable for the same as if no consent had been given. Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and District.

1.26 Separate Contract: Interference With Other Developers

District reserves the rights to perform work with its own forces or let other contract for work under similar general conditions in connection with this project or other projects. Developer shall afford District and other contractors reasonable opportunity for the execution of their respective work and shall properly connect and coordinate Developer's work with theirs.

1.27 **“As Built” Drawings**

Upon completion of the improvement the District will provide to the Developer a copy of the plans with the "as built" dimensions and changes marked on them. The Developer will then have the changes made and the "as built" dimensions and 15 foot easement added to the original drawings. The Developer will then provide to the District, two paper copies and a PDF copy of the revised plans that have been signed and stamped by the design engineer, together with a computer disk containing the plans with the "as built" revisions and 15 foot easement in AutoCAD. The projected coordinate system of the as built in AutoCAD to be provided to the District shall be NAD_1983_StatePlane_Washington_North_FIPS-4601_Feet.

2.0 MATERIALS OF CONSTRUCTION

2.1 General

All materials shall be new and undamaged. Unless otherwise approved by the District, the same manufacturer of each item shall be used throughout the work.

All reference specifications herein shall be of the latest revision.

2.2 Water Main Materials

Water mains to be constructed within the Silverdale Water District service area boundary shall be ductile iron unless otherwise specified by the District.

2.3 Recycled Water Materials

Recycled Water Mains to be constructed within the Silverdale Water District service area boundary shall be HDPE or ductile iron unless otherwise specified by the District. All HDPE recycled water piping and appurtenances shall be either colored purple (Pantone 522 to other shades of purple acceptable to the District) and embossed or integrally stamped or marked "CAUTION: RECYCLED WATER - DO NOT DRINK". The warning shall be stamped on opposite sides of the pipe and repeated every three feet or less.

Recycled ductile iron water shall be spiral wrapped with identification tape around the pipe with maximum 12-inch spacing between stripes. The identification tape shall be at least 3 inches wide, pantone purple 512 with black 2-inch high lettering which shall read "CAUTION RECYCLED WATER – DO NOT DRINK" printed at 2 foot interval.

2.4 Recycled Water Tracer Tape

Tracer tape shall be 6 inches wide and have white or black lettering on a purple (Pantone 512 or other shade acceptable to the District) field stating "CAUTION: RECYCLED WATER - DO NOT DRINK." See Standard Details for installation.

2.5 Ductile Iron Pipe

Ductile iron pipe shall be cement-lined standard thickness Class 50 unless otherwise specified and shall conform to the standards of ANSI / AWWA C151 / A-21.51 and ANSI / AWWA C104 / A-21.4.

Rubber gasket pipe joints to be push-on-joint (Tyton) or mechanical joint (M.J.) in accordance with ANSI / AWWA C111 / A-21.11 unless otherwise specified.

Flanged joint shall conform to ANSI / AWWA C115 / A-21.15.

Standard thickness cement lining shall be in accordance with ANSI / AWWA C104 / A-21.4.

The Contractor shall furnish certification from the manufacturer of the pipe and gasket being supplied that the inspection and all of the specified tests have been made and the results thereof comply with the requirements of this standard.

2.6 High Density Polyethylene (HDPE) Pipe

HDPE Pipe shall be made of materials conforming to polyethylene code designation of PE 4710 with DR11 as the Standard Dimension ratio. The HDPE pipe shall be iron pipe size (IPS) with purple stripes for reclaimed water and blue stripes for potable water.

PE 4710 material shall meet the requirements of ASTM D3350 and shall meet or exceed a cell classification of 445474 per ASTM 3350. PE 4710 rework material generated in the manufacturer's own plant may be blended with virgin PE 4710 compound. Rework not meeting PE 4710 and recycled compounds shall not be used. PE 4710 compound shall meet or exceed the physical properties shown in the following table:

Property Value	Specification	Unit	Nominal Value
Material Designation	PPI/ASTM	NA	PE 4710 DR 11
Cell Classification	ASTM D 3350	NA	445474 or Higher
Density (Natural Compound)	ASTM 1505 or ASTM D792	g/cm ³	0.947-0.955
High Load Melt Index	ASTM D 1238	g/10 min	6-18
Flexular Modulus	ASTM D 790	Psi	110,000-160,000
Tensile Strength	ASTM D 638	Psi	3,500-4,000
Slow Crack Growth (PENT)	ASTM D 1473	hrs	>500
HDB @ 73 F	ASTM D 2837 and PPI TR-3	psi	1,600
HDB @ 140 F	ASTM D 2837 AND PPI TR-3	psi	1,000
HDS @ 73 F	PPI TR-4	Psi	1,000
UV Stabilizer	ASTM D 1603 OR ASTM D 4218	%C	2.0-2.5

Pipe shall be designed for water at 73 F and lower using a design factor of 0.63. The manufacturer shall also provide temperature factors for pressure ratings at temperatures above 73 F. Unpigmented areas in the pipe are not acceptable. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids or other such defects.

The Contractor shall furnish certification from the manufacturer of the pipe and fittings being supplied that the inspection and all of the specified tests have been made and the results thereof comply with the requirements of this standard.

2.7 High Density Polyethylene (HDPE) Fittings

The butt fusion fittings shall be manufactured in accordance with ASTM D 3261 for molded fittings or AWWA C906 for fabricated fittings except PE 4710 compound as specified herein shall be used. Fittings shall contain 2.0 to 2.5 percent carbon black that is well dispersed throughout the fitting wall when tested in accordance to ASTM D 1603 or ASTM D 4218. Unpigmented areas in the pipe are not acceptable. The fittings shall be homogeneous throughout and free of visible

cracks, holes, foreign inclusions, voids or other such defects.

Butt fusion fittings including flange adapters and backup rings, molded and fabricated fittings (e.g., elbows and tees) shall have at least the same pressure class rating as the pipe. The butt fusion ends shall meet AWWA C906 specifications for OD and minimum wall thickness for the mating pipe. The maximum wall thickness of the fitting butt fusion end shall not exceed 1.27 times the mating pipe minimum wall thickness. Fabricated fittings shall be manufactured using data logger that records temperature, fusion, pressure, and provides a graphic representation of the fusion cycle as part of the quality control.

2.8 Polyvinyl Chloride (PVC) Pipe

PVC pipe shall not be permitted.

2.9 Asbestos Cement Pipe

Asbestos cement pipe will not be accepted.

2.10 Ductile Iron and Cast Iron Fittings

Ductile iron and cast iron fittings shall be short body, cement lined, and for pressure rating of 150 psi, unless otherwise noted. Metal thickness and manufacturing process shall conform to applicable portions of ANSI / AWWA C110 / A-21.10.

Standard cement lining in accordance with ANSI / AWWA C104 / A-21.4.

Rubber gaskets for push-on-joint (Tyton) or mechanical joint (M.J.) in accordance with ANSI / AWWA C111 / A-21.11.

Gasket material for flanges shall be neoprene, Buna N, chlorinated Butyl, or cloth-inserted rubber.

Type of ends shall be specified as push-on-joint (Tyton), mechanical joint (M.J.), plain end (P.E.), flanged (FL.) or screw.

2.11 Schedule Steel Pipe and Fittings

Schedule steel pipe and fittings shall conform to ANSI B36.10. Fittings and protective coating shall be as specified.

2.12 Galvanized Iron Pipe and Fittings

Where galvanized iron pipe is specified, the pipe shall be standard weight, Schedule 40, steel pipe per Standard Specifications for black and hot-dipped, zinc-coated (galvanized) welded and seamless steel pipe for ordinary uses (ASTM A120). Fittings for steel pipe 4 inches in diameter and smaller shall be malleable iron threaded type with a pressure rating of 150 psi. Dimensions shall conform to ANSI B16.3. Threading shall conform to ANSI B2.1. Material shall conform to ASTM A 47, Grade 32510. All fittings shall be banded and hot-dip galvanized inside and out.

Unions shall be malleable iron with a pressure rating of at least 150 psi. Material shall conform to ASTM A 47, Grade 32510. Unions shall be ground joint, bronze to iron type.

2.13 Recycled Water Valves

All reclaimed water valves and outlets shall be of a type, or secured in a manner, that permits operation only by authorized personnel. See Standard Details.

2.14 Gate Valves

The minimum requirements for buried gate valves shall, in design, material and workmanship, conform to the Standards of ANSI / AWWA C509. See Standard Details.

Buried gate valves shall be iron body, bronze mounted, resilient-seated, clockwise closing, non-rising stem. The operating stems shall be equipped with Standard two-inch (2") operation nut and O-ring stem seals, and shall be suitable for installation with the type and class of pipe being installed. Ends to be as specified.

Gate valves not buried (4" and larger) shall be the same as above with hand wheel unless specified for outside screw and yoke (O.S. & Y).

Gate valves not buried (3" and smaller) shall be Red and White 291 union bonnet gate valve or equal. Ends to be as specified.

2.15 Butterfly Valves

The minimum requirements for buried butterfly valves shall, in design, material and workmanship, conform to the standard of ANSI / AWWA C-504, Class 150B.

Buried butterfly valves shall be iron body, rubber-seated, clockwise closing, tight-closing butterfly valves with standard two-inch (2") operation nut, suitable for installation with the type and class of pipe being installed; ends to be as specified.

Valves not buried shall be specified on the plans.

2.16 Air and Vacuum Valves

The air and vacuum valves shall be equal to APCO combination air release valves, APCO No. 143C or 145C. Installation shall be in accordance with the detail included at the end of these Conditions and Standards. The air and vacuum valve shall be located at the high point of the line or as directed by the District.

2.17 Fire Hydrants

Hydrants shall be dry barrel type and conform to ANSI / AWWA C502 and shall be

equivalent to the Clow Medallion Hydrant. Hydrants shall have a minimum five-inch (5") main valve opening, two 2.5" outlets and a 4.5" steamer/pumper port; such outlets and port shall have national standard threads.

The steamer/pumper port shall include a 5" Snap-Tite STORZ adaptor and cap equivalent to FSA 50 45 NST STORZ adaptor and FSB 50 blind cap with stainless steel cable, as manufactured by Snap-Tite, Inc. A setscrew shall be provided through the NST portion of the adaptor. Hydrants shall be traffic type with break flange and stem coupling. O-ring stem seals shall be provided. See Standard Details.

2.18 Valve Boxes

Valve boxes shall be cast iron, 2-piece, slip type with base corresponding to the size of the valve, equal to Rich Manufacturing Co. or Olympic Foundry Co. The box shall be coal tar painted by the manufacturer using its standard. The cover shall have the word(s) "WATER" for Potable Water or "RECYCLED WATER" for Reclaimed Water cast in it and shall be equal to 940 Seattle deep lid. See Standard Details.

2.19 Water Meters

Meters shall conform to ANSI / AWWA C700, C701, C702, C703 and C704, as appropriate. Meters shall have sealed register to prevent condensation, atmospheric corrosion and abrasion. 5/8", 3/4" and 1" meters shall be Sensus SR II. Larger meters shall be Sensus Omni C2. All recycled water meters shall be labeled as such and have purple registers. All meters shall read in cubic feet and programmed to read in 1 cubic foot. See Standard Details.

2.20 Meter Setter

Meter setters, if required, shall have double purpose couplings, angle valve with drilled wings for padlock, check valve on outlet, and shall be 12 inches (12") high unless otherwise specified, equal to the Ford Meter Box Company, "Coppersetter". 1-1/2" and 2" meter setters shall include bypass, as shown in Standard Details.

2.21 Corporation Stop

Corporation stops shall be brass in accordance with ANSI / AWWA C800. Corporation stops for 1", 1-1/2", and 2" services shall be equal to Ford. See Standard Details.

2.22 Pipe Saddle

Pipe saddles shall be malleable iron, ductile iron or bronze or stainless steel, tapped IPS, with stainless steel strap equal to Romac 101S or 202S. Double strap saddles shall be used for 1.5" and larger service lines.

2.23 Concrete Meter Box

Concrete meter boxes shall be complete with steel lid, equal to Fog Tite No. 1D for 5/8" and 3/4" meters, Fog Tite No. B-10 for 1" meters and Fog Tite No. 2 with hinged steel inspection cover for 1-1/2" and 2" meters. Concrete boxes for reclaimed facilities shall be labeled as such and have purple lids. See Standard Details.

2.24 Plastic Meter Box

Plastic meter boxes shall be complete with plastic cover with hinged cast iron reading lid equal to those manufactured by Carson Industries, Inc. Plastic boxes for recycled facilities shall be labeled as such and have purple lids.

2.25 Copper Service Pipe

Copper service pipe may be required by the District. Copper service pipe shall be Type K, soft annealed copper service pipe, conforming to ASTM B-88. The tubing shall be coupled using flare-type compression fittings, conforming to ANSI / AWWA C800, minimum 150 psi.

2.26 Plastic Service Pipe

Plastic service pipe shall be manufactured from high molecular weight polyethylene (PE 3406) and shall conform to ANSI / AWWA C901, pressure class 200, copper tubing size. The pipe shall bear the seal of the National Sanitation Foundation for potable water pipe. 1" pipe joints shall be made with flared fittings. 1-1/2" and 2" pipe joints shall be made with fittings equal to Mueller 110 compression fittings with stainless steel liner.

2.27 Hydrant Guard Posts

Hydrant guard posts shall be reinforced concrete posts, 8" x 8" x 6' long or 9" diameter x 6' long. Equivalent to Fog Tite Meter Seal Co.

2.28 Valve Marker Posts

Valve marker posts shall be reinforced concrete posts, 4" x 4" x 42 inches long, equal to Fog Tite Meter Seal Co.

2.29 Concrete Blocking

Concrete blocking shall be 1:3:6 mix with 6-inch maximum slump. See Standard Detail #11.

2.30 Bolts in Piping

Bolts shall be either high strength cast iron or high strength low alloy steel, coated with a rust resistant lubricant, in accordance with ANSI / AWWA C111 / A-21.11. Galvanized, stainless steel or brass bolts may be required for special applications.

2.31 Flange Gaskets

Gasket material shall be neoprene, Buna N, chlorinated Butyl, or cloth-inserted rubber in accordance with ANSI AWWA C111 / A-21.11.

2.32 Gravel

Foundation gravel shall be coarse graded gravel or crushed rock passing a three-inch mesh. Pit run gravel passed through a three-inch screen may be used provided that it is, in the opinion of the District, properly graded and otherwise suitable. Bedding gravel within three inches of the pipe shall pass a 3/4-inch mesh and shall contain only negligible amounts of material finer than No. 30 sieve.

2.33 Shoring

Shoring and sheeting, when required, shall be of Standard Grade Douglas fir, except where special conditions require better material. The material may be unsurfaced.

2.34 Controlled Density Fill

CDF shall conform to the following specifications:

- a. Portland Cement – Type I or II, AASHTO M85
- b. Fly Ash – Class F, ASTM C-618
- c. Fine Aggregate – Class 1 or 2, WSDOT 9-03

CDF shall be used in the following proportions for one (1) cubic yard. Batch weights may vary depending on specific weights of aggregates.

- | | | |
|----|-----------------|--------------------|
| a. | Portland Cement | 50 lbs. |
| b. | Fly Ash | 300 lbs. |
| c. | Fine Aggregate | 3000 lbs. |
| d. | Water | 300 lbs. (maximum) |

Add sufficient water to provide a 3" to 10" slump

2.35 Locator Wire

Locator wire to be solid core insulated copper wire, 14 gauge or larger. All splices in the locator wire shall be made using a 3M direct bury splice kit, model DBY. The kit shall be installed per the manufactures specifications. The wires shall be tied in a knot six (6) to eight (8) inches from the splice. Locate wire installed along water main shall be colored blue. Locate wire installed along recycled water main shall be colored purple.

2.36 Control Conduit

Conduit to be used for the installation of control wires shall be schedule 40 PVC

electrical conduit.

2.37 Pull Box

The pull boxes for the control conduit shall be concrete with a steel lid equal to Fog Tite J-11 type 1 galvanized pull box.

2.38 Underground Vaults for Meters and Control Valves

The underground vaults shall be concrete vaults with 3 feet square diamond plate lids equal to either Pacific International Pipe Enterprises, Inc., Utility Vault Co., or Old Castle Pre Cast. The vaults shall have a galvanized steel ladder and a cast iron floor drain.

2.39 Paint System for Small System Pump Houses

The paints and the paint products of Benjamin Moore & Co., mentioned in the following specifications are set up as standards of quality. The usual "approved or equal" clause shall apply. No request for substitution will be considered which decreases the film thickness designated and/or the number of coats to be applied or which offers a change from the generic type of coating specified. See Standard Details.

a. Exterior Siding

Primer – Fresh Start Moorwhite Penetrating Alkyd Primer (100)
Finish – MoorGard Latex House Paint (103)
Color - Annapolis Gray 70

b. Exterior Trim

Primer - Fresh Start Moorwhite Penetrating Alkyd Primer (100)
Finish - MoorGard Latex House Paint (103)
Color - Chrome Green 41

c. Ferrous Metal Door

Primer – M06 Alkyd Primer
Finish – M22 Urethane Alkyd Gloss Enamel
Color - Annapolis Gray 70

2.40 Roofing for Small System Pump Houses

The roofing shall be standing seam metal roofing as manufactured by Taylor Metal Products, Inc. of Salem, Oregon or equal. The roofing material shall be 26 gauge steel per ASTM A-446 with a G-90 galvanized substrate coating per ASTM A-525, a baked-on epoxy base primer (0.2 mil.) and a baked-on finish coating of silicone modified polyester paint (0.8 mil.) totaling a nominal 1.0 mil. dry film thickness. See Standard Details.

2.41 Door Locks for Small System Pump Houses

The lockset shall be a heavy-duty deadbolt lockset as manufactured by Schlage, Model B660P 626, 5 PIN. Lockset shall have a key on the outside and a lever on the inside. Two keys shall be provided to the District upon installation. A standard passage knob shall also be provided, Schlage Model A10S Plymouth 626.

2.42 Chain Link Fence

The fence shall be seven feet (7') in height, six feet (6') fabric and one foot (1') barbed wire. All metal parts shall be hot-dipped galvanized and all posts, gate catches and stops shall be set in concrete. See Standard Details.

a. Fabric for chain link fence

Fabric shall be open-hearth nine (9) gage steel wire woven into a fabric. Wire shall be galvanized (1.2 ounces of zinc per square foot). Top and bottom selvages to have twisted and barbed finish.

b. Posts

Line & Brace Posts shall be hot-dipped galvanized, one and one-half inch (1-1/2") I.D., weight 2.72 pounds per foot.

End, Corner and Pull Posts shall be hot-dipped galvanized, two-inch (2") I.D. weight 3.65 pounds per foot.

Gate Posts shall be hot-dipped galvanized, three and one-half inch (3-1/2") I.D., weight 9.1 pounds per foot.

c. Top Rails

Top rails shall be hot-dipped galvanized, one and one-quarter inches (1-1/4") I.D, weight 2.27 pounds per foot, provided with couplings approximately every twenty feet (20').

d. Barbed Wire

The barbed wire shall be of the four (4) point pattern, composed of two (2) strands of no. 12-1/2 gage steel wire with metal barbs spaced at approximately five-inch (5") centers. All wire and barbs shall be hot-dipped galvanized.

e. Gates

Gate frames shall be of welded frame construction using structural grade steel pipe with braces. A suitable gate catch and locking device shall be provided. All welded connections shall be brushed clean and treated with cold galvanized process, Devcon Z.

f. Fittings

All fittings shall be malleable iron, cast iron or pressed steel and shall be hot-dipped galvanized.

g. Tension Wire

Tension wire shall be 7 gauge coil spring steel wire of good commercial quality and shall have a zinc coating averaging 0.8 ounce per S.F. of surface area. All tension wire attachments shall be hot-dipped galvanized steel.

3.0 METHODS OF CONSTRUCTION

3.1 General

Except as otherwise noted herein, all work shall be accomplished as recommended in applicable American Waterworks Association (AWWA) specifications, THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, and according to the recommendations of the manufacturer of the material or equipment used.

3.2 Alignment

Unless otherwise specified, the location of the water mains, valves, hydrants and principal fittings, including modifications, will be staked by the Developer, upon 48 hours notice by the Contractor.

The Developer may elect to stake the entire job, however, in no event will he stake less than the entire job or one full field crew day in advance of construction. Pipe shall be laid closely to specified alignment. Alignment deviation is not to exceed 0.5 feet. Replacement of stakes lost or destroyed shall be made at the Contractor's expense.

3.3 Separation Requirements

A 10 foot horizontal and 18 inch vertical separation shall be maintained between any reclaimed water line and potable or sanitary sewer lines. At sites where this is not possible, review and approval procedures and design considerations described in Washington State Department of Ecology and Washington State Department of Health's Pipeline Separation Design and Installation Reference Guide, Version 9 (or as updated) shall be used.

When crossing a minimum vertical separation of 18 inches shall be maintained between reclaimed water lines and potable water lines. At sites where this is not possible, review and approval procedures and design considerations described in Washington State Department of Ecology and Washington State Department of Health's Separation Design and Installation Reference Guide, Version 9 (or as updated) shall be used. See Standard Details.

3.4 Trench Excavation

Clearing and grubbing where required shall be performed within the easement or public right-of-way and as permitted by the property owner or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the Contractor.

Trenches shall be excavated to the line and depth designated by the District to provide a minimum of 36 inches of cover over the pipe, unless otherwise shown on the contract drawings. No additional compensation will be made for deeper excavation made for localized grade change or installing water line under existing culverts or other utilities. Except for unusual circumstances where approved by the District, the trench sides shall be excavated vertically and the trench width shall be

excavated only to such widths as are necessary for adequate working space. The minimum trench width at the top of the pipe shall normally be the outside diameter of the pipe barrel plus 16 inches. The trench shall be kept free from water until jointing is complete. Surface water shall be diverted so as not to enter the trench. The Contractor shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out. Gravel required in the bottom of the trench due to action of weather or workmen shall be furnished by the Contractor without expense to the District.

The Contractor shall perform all excavation of every description and of whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth of 6 inches below water main grade, the trench shall be backfilled to grade with material satisfactory to the District and thoroughly compacted. Trenching operations shall not proceed more than 500 feet in advance of pipe laying, except with written approval of the District.

When trenching operations cut through concrete pavement, the pavement shall be removed to width of 18 inches greater than the top width of the trench. The concrete shall be cut on a straight line. Asphalt paving shall be cut ahead of the trenching equipment to prevent excessive tearing up of the surfacing and to eliminate ragged edges. If damage occurs to the edge, the edge shall be re-cut to original requirements of straightness and bevel.

3.5 Sheeting and Shoring

The Contractor shall provide and install shoring and sheeting as necessary to protect workmen, the work, and existing buildings, utilities and other properties. All shoring and sheeting above the pipe shall be removed prior to backfilling. All sheeting below the top of the pipe shall be cut off and left in place. Removal of shoring shall be accomplished in such a manner that there will be no damage to the work or to other properties. All shoring and sheeting shall be to the Contractor's design and the cost of installing and removing shoring and sheeting shall be included in the bid price of trenching and backfilling.

3.6 Laying Ductile Iron Pipe

Work shall be accomplished in accordance with AWWA Specifications.

The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint. Bolts on mechanical pipe and fittings shall be tightened uniformly with a "Torque" wrench that measures the torque applied. For 3" pipe the torque applied shall be 45 to 60 foot-pounds. For 4" to 24" pipe the torque applied shall be 75 to 90 foot-pounds. Installation of push-on joint (Tyton) pipe shall be in accordance with the manufacturer's instructions.

3.7 Laying HDPE Pipe

Work shall be accomplished in accordance with AWWA Specifications.

- a. Unsuitable Material. The material thus removed shall be replaced by suitable surplus material obtained from trench excavation within the limits of the project or shall be bank run gravel Class B, which shall be deposited and compacted in eight-inch (8") layers by mechanical compaction. No extra compensation shall be paid for removal of unsuitable material or replacement with suitable material from the site.
- b. Compaction of Backfill Under Pavement or on Roadway Shoulders. At locations where paved streets, driveways or sidewalks will be constructed or reconstructed over the trench, or where provided for in the special provisions or directed by the Engineer, the backfill shall be spread in layers and be compacted by mechanical tampers. In such cases the backfill material shall be placed in successive layers, not exceeding eight inches (8") in thickness and each layer shall be compacted with mechanical tampers to a density equal to ninety-five percent (95%) of the theoretical maximum density (ASTM designation D-1557, Method. Mechanical tamping will always be required below utilities crossing the trench to prevent their rupture when additional backfill is placed or compacted above. Tamping will not be paid for separately.
- c. Fusion Process for Electrofusion Couplings
 - a. Butt and saddle fusion pipe and fittings shall be in accordance with ASTM F2620 and the manufacturer's recommended joining procedure.
 - b. Electrofusion of pipe and fittings shall be performed in accordance with ASTM F1290 and the electrofusion fitting manufacturer's recommended procedure.
 - c. Pipe and fittings shall be fused by qualified fusion technicians, as documented by the fusion provider. Training records for qualified fusion technicians shall be available to Owner or Engineer upon request.
 - d. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine. Joint data shall be submitted as part of the As-Recorded information, in accordance with this specification.
 - e. Butt fusion machines shall incorporate the following properties, including the following elements:
 - i. HEAT PLATE – Heat plates and the non-stick coatings on heating surfaces shall be in good condition without heating surface gouges or scratches. The non-stick coating shall be intact, clean and free of any contamination. Heater controls and temperature indicators shall function properly, and electrical cords and connections shall be in good condition. The heat plate shall maintain a uniform and consistent temperature on all areas of the heating surfaces on both sides of the heat plate.

- ii. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi for hydraulic fusion machines. Clamps shall be in good condition with proper inserts for the pipe size being fused.
 - iii. GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.
 - iv. DATA LOGGER - The current version of the pipe supplier’s recommended and compatible software shall be used. Protective case shall be utilized for the hand held wireless portion of the unit. Data logger operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.
- f. Other equipment specifically required for fusion processes shall include the following:
- v. Pipe rollers shall be used to support pipe to either side of the butt fusion machine and provide for vertical and lateral pipe alignment straight through the butt fusion machine.
 - vi. A protective enclosure that provides for full machine motion of the clamps, heat plate, fusion assembly and carriage shall be provided for fusion in inclement and/or windy weather. Pipe ends shall be covered or blocked where open pipe ends could allow prevailing winds to blow through the pipe.
 - vii. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.
- g. Joint Recording, each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine that shall register and/or record the parameters required by the manufacturer and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician’s joint report.

3.8 Laying Galvanized Iron Pipe

The galvanized iron pipe, valves and fittings shall be threaded. Joints shall be made up in accordance with good plumbing practice. Threads shall be coated with Teflon paste before connecting.

3.9 Backfilling

Backfilling and surface restoration shall closely follow installation of the pipe, so that not more than 500 feet of pipe is left exposed without express approval of the District. Selected backfill material shall be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill shall be placed and compacted in layers not more than 18 inches thick, except that under roadways, all backfill material shall be placed in layers not more than 8 inches thick and compacted to the density of

the existing subgrade. Where governmental agencies other than the owner have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having the jurisdiction. Compaction shall be by tamping or wheel rolling, unless other methods are required by the agency having jurisdiction. If suitable backfill material is not available from trenching operations, the District may order the placing of bedding gravel around the water main.

3.10 Highway Crossings

The Contractor may use any method that provides satisfactory results and is acceptable to the District and the governmental agency having control of the road, provided that the Contractor restores the roadway to its original condition. Normally, highway crossings require the placing of a steel pipe casing by jacking or tunneling and laying the water main within this casing. In case of tunneling, subsequent low pressure grouting through the pavement may be required.

3.11 Fire Hydrant Installation

Fire hydrants shall be set as shown in the Standard Details with a three-foot level area around the hydrant. Shackle rods are to be used to tie the hydrant to the gate valve. The tee on the main line shall have a standard thrust block. Hydrants above ground shall be painted with paint equal to Benjamin Moore & Co. Industrial Coatings, M22 Urethane Alkyd Gloss Enamel, Safety Yellow 15. Tops to be painted according to the Kitsap County Fire Flow Ordinance.

Above 1500 GPM	Safety Blue 35
1000 GPM to 1500 GPM	Safety Green 41
500 GPM to 1000 GPM	Safety Orange 65
Below 500 GPM	Safety Red 21

The Contractor shall cover the fire hydrant with a plastic garbage bag until approved for service by the Silverdale Water District. Fire hydrant guard posts shall be installed around the fire hydrants as directed by the District. See Standard Detail No. 1.

3.12 Gate Valve Installation

Gate valves shall be set in the ground vertically and shall be opened and shut under pressure to check operation and, at the same time, show no leakage.

3.13 Valve Box Installation

Valve boxes shall be installed vertically and shall set flush in pavement and in gravel roads. In other areas the tops shall be set 1 inch above ground. The lid is to be installed with the lid tabs pointing in the direction of the water main. See Standard Detail No. 13.

3.14 Valve Marker Installation

When specified, concrete marker posts, shall be set for all valves except auxiliary hydrant valves. The post shall be set at right angles to the road from the valve and shall be situated in a safe and reasonably conspicuous location, normally on the property line. Distance to valve shall be neatly stenciled on the post with two-inch numerals.

3.15 Concrete Blocking

Concrete blocking shall be cast in place and have a minimum of 1/4 square foot bearing against the fitting and two square feet bearing area against undisturbed soil. Blocking shall bear against fittings only and shall be clear of joints so as to permit taking up or dismantling joint. All bends and tees shall be blocked in accordance with Standard Blocking Details. The Contractor shall install blocking which is adequate to withstand full test pressure as well as to continuously withstand operating pressures under all conditions of service. For concrete blocking based on 200 psi test pressure with safe soil bearing load of 2,000 pounds per square foot, see Standard Details.

3.16 Air and Vacuum Release Valve Installation

Installation shall be as shown on the Standard Detail.

Iron piping and fittings shall be galvanized. Location of the air release valves as shown on the plans is approximate. The installation shall be set at the high point of the line. Water line must be constructed so the air release valve may be installed in a convenient location. See Standard Details.

3.17 Hydrostatic//Leakage Tests

After sterilization, flushing, passage of the preliminary bacteria sample(s) taken by the District and prior to acceptance of the work, the installation shall be subjected to a hydrostatic pressure test of 200 psi at the highest elevation of the portion of system being tested. The test pressure shall not be more than 225 psi, at the lowest elevation. The test pressure shall not exceed the rated pressure of any resilient seated gate valve or butterfly valve. No valve shall be operated in either the opening or closing direction at a differential pressure above its rated pressure.

The water pumped into the system for the pressure test shall be chlorinated to a minimum concentration of fifty (50) PPM. The test shall be for a minimum period of 15 minutes, at the discretion of the District. At the conclusion of the test period the system shall be re-pumped to the initial pressure. The volume of water used will be measured and must be within the limits set forth in AWWA C-600-82, Section 4.2.

Any leaks or imperfections developing under said pressure shall be remedied by the Contractor before final acceptance of work. The Contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests

shall be made after corporation stops are installed. Insofar as is practical, tests shall be made with pipe joints, fittings, and valves exposed for inspection.

Upon passage of the pressure test, each valve in the installation will be tested for leakage by systematically closing each valve and relieving the pressure behind it.

The Contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition, the air in the line has been released, and that the system will pass the test before requesting the District to witness the test. The District shall then witness the test. If the test does not pass the first time, additional tests will be required; and the cost to the Developer will increase unnecessarily.

Upon passing of the pressure test the system must be flushed and additional bacteria sample(s) taken by the Water District.

3.18 Sterilization and Flushing of Water Mains

Sterilization of the water mains shall be accomplished by the Contractor in accordance with the requirements of the state health department and in a manner satisfactory to the District. During construction calcium hypochlorite granules shall be placed at the upstream end of each length of pipe laid such that, upon filling the main, the initial concentration of chlorine will be 50 mg/l.

The following table lists the approximate weight and volume of 65% high-test calcium hypochlorite required per 20 feet length of pipe.

Pipe Diameter (in.)	Calcium Hypochlorite Granules (oz.)	Volume (fl. oz.)
4	0.13	0.1 (1 tsp.)
6	0.30	0.24 (1/2 tbs.)
8	0.53	0.43 (1 tbs.)
10	0.84	0.68 (1 ½ tbs.)
12	1.18	0.96 (2 tbs.)

When installation is complete, the mains shall be filled with water such that the maximum velocity of flow will be less than 1 fps. All air pockets shall be bled from the system during the filling operation. All valves and hydrants shall be operated while the chlorine solution is in the system. During the soaking period all valves and hydrants shall be open, except the connection to the existing system. After a minimum soaking period of 24 hours, the new system shall be flushed at a minimum velocity of 2.5 fps until no trace of chlorine remains. The District must be notified when the flushing is to be done and of the planned method of disposal of the chlorinated water. After an additional 24-hour minimum period, the Water District shall take bacteria samples from the system.

Flushing of chlorinated water shall be done in such a way that NO chlorinated water enters a storm sewer or stream. The chlorinated water may be discharged to a field or undeveloped land where the water will not run into a storm sewer or stream.

During the entire time the water is flowing the water must be monitored to determine its course. Temporary dams must be used if necessary to retain the water. If it cannot be assured that NO chlorinated water enters a storm sewer or stream, then the water must be transported to a suitable location, dumped into a sanitary sewer, or dechlorinated using sulfur dioxide or a comparable chemical. The dechlorination process must be approved by the District. If the chlorinated water is dumped into a sanitary sewer, a permit must be obtained from the Kitsap Co. Public Works Dept.

3.19 Replacing Road Surfacing

The Contractor shall restore all roadway and driveway surfaces excavated or disturbed to a condition equal to that previously existed and acceptable to the governmental agency having control of the road and/or the District.

3.20 Service Connections

Service connections shall be made using saddles as hereinbefore specified and of the size and type suitable for use with the main being connected to. Installation shall be as shown in Standard Details.

3.21 Installation of Service Lines For Single Family Residential Developments

The Developer will install the service line and angle meter valve to the property line of each lot, as shown in Standard Details.

3.22 Installation of Commercial Services and Meters

The Developer will provide and install the service line, meter and meter box, as shown in Standard Details.

3.23 Installation of All Other Services

The Water District will provide and install service line, meter and meter box, as shown in Standard Details. The installation charge will be as shown in the current Silverdale Water District Schedule of Charges.

3.24 Connections to Existing Pipelines

Connections may be made to existing pipes under pressure with the use of a tapping machine. The size and type of pipe must be determined. Then the appropriate sized stainless steel tapping sleeve complete with tapping gate valve may be installed.

Where cut-ins are permitted to be made in existing pipes, the work shall be conducted at such a time and in such a manner as to minimize the interruption of service. The District must approve cut-in time. Necessary pipe, fittings and gate valves shall be assembled at the site ready for installation prior to the shutting-off of water in the existing main. Once the water has been shut off, the work shall be prosecuted vigorously and shall not be halted until the line is restored to service. Unless specifically provided for elsewhere in these specifications, the Contractor

shall have the responsibility of giving at least 48 hours' notice to the Water District's Inspector of intention to disrupt service.

All materials shall be swabbed with chlorine and then washed with clean water.

3.25 Asbestos Cement Pipe Cutting and Tapping

When existing asbestos cement pipe is encountered on a project, all cutting, tapping, removal and disposal of said pipe shall be in conformance with the current Policies and Procedures of the Kitsap County Health Department, the Puget Sound Air Pollution Control Agency and other public offices with jurisdiction in this matter. At this time the policy is that:

- a. Pipe shall be "snapped off" rather than being cut with an abrasive saw.
- b. Abandoned pipe shall be left in the trench or disposed of in an approved method.

3.26 Pump and Pressure Reducing Stations

Pipe, fittings and equipment shall be supported and blocked against static and dynamic loading in accordance with Section, "Concrete Blocking", and the equipment manufacturer's recommendations.

All exposed piping shall be supported by anchors, brackets, or hangers, secured to the concrete as shown on plans or as required. All metallic supports shall be painted or galvanized after fabrication and secured with galvanized bolts and anchors. All supports shall be of ample strength for the duty required. All pressure piping shall be adequately blocked against surge.

Drain lines from pumps and other equipment shall be piped to a below grade drainage system which shall discharge to a storm sewer or natural drainage course. If this cannot be done a sump pump must be installed. See Standard Detail No. 9.

3.27 Locator Wire

Installation of water mains and service lines shall include locator wire buried along the entire length of the pipe. Locator wire to be 14 gauge or larger and shall be connected to a bolt on each above ground hydrant flange with 6" of slack at the end for connecting the locator device. Locator wire to be run to 12" above ground at each meter, blow off, and air/vacuum valve. All splices in the locator wire shall be made using a 3M direct bury splice kit, model DBY. The kit shall be installed per the manufacture specifications. The wires shall be tied in a knot six (6) to eight (8) inches from the splice. See Standard Details.

3.28 Control Conduit

The control conduit shall be installed at the bottom of the ditch at least 6" from the water main as shown on the standard detail. All elbows shall be long sweep factory made. Field bends when necessary, shall be formed with a factory recommended heater. Provide and install manufactured end caps on all conduit ends during construction to prevent the entrance of water or dirt. The District will install Jet-Line

prior to acceptance. See Standard Details.

3.29 Underground Vault

The vaults shall be installed level on a bedding of sand. The concrete exterior below grade shall be painted with two coats of coppers bitumastic black solution or equal. The floor drain shall be extended to daylight. A sump pump shall be installed if the drain will not drain by gravity. All underground vaults shall have a standard "confined space" sign securely attached to the lid.

3.30 Painting of Small System Pump Houses

Painting shall be done at such time as the Contractor and District may agree upon in order that dust-free and neat work is obtained. All painting shall be done strictly in accordance with the manufacturer's instructions and shall be performed in a manner satisfactory to the District. All surfaces to be painted shall be prepared in a workmanlike manner with the objective of obtaining a clean and dry surface.

On metal surfaces, the painter shall apply each coat of paint at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. If material has thickened or must be diluted for application by spray gun, the coating shall be built up to the same film thickness achieved with undiluted material. In other words, one (1) gallon of paint as originally furnished by the manufacturer must not cover a greater square foot area when applied by spray gun than when applied unthinned by brush. Deficiencies in film thickness shall be corrected by the application of additional coat(s) of paint.

Where thinning is necessary, only the products of the manufacturer furnishing the paint, and for the particular purpose, shall be allowed, and all such thinning shall be done strictly in accordance with the manufacturer's instructions.

3.31 Chain Link Fence

All posts, gate catches and stops shall be set in concrete. The line posts shall be installed with thirty inches (30") burial. The end and corner posts shall be installed with thirty-six inches (36") burial. The postholes shall be twelve inches (12") in diameter. The spacing of the fence posts shall be at a maximum of ten feet (10').

Braces shall be constructed of hot-dipped galvanized brace material same as top rail. They shall be spaced midway between top rail and ground and extend from terminal post to first adjacent line post. Braces to be securely fastened to posts by suitable pressed steel connections, then trussed from line post back to terminal post with three-eighths inch (3/8") round rod.

All intermediate line posts shall be fitted with extension arms of pressed steel. Each arm shall carry three (3) strands of barbed wire, securely fastened with wire ties. Terminal posts shall be extended one foot (1') to receive barbed wire.

The fabric shall be attached to the line posts, tension wire and top rail using 12 gauge galvanized wire ties at 24-inch intervals. See Standard Details.

3.32 Trenching Under Existing Asbestos Cement Pipelines

Any time a trench is dug under an existing asbestos cement water line the following requirements must be met if the trench width is greater than the diameter of the asbestos cement water line. Either the trench must be backfilled with CDF all the way from the bottom of the trench to the bottom to the asbestos water line, or the asbestos cement water line must be replaced with ductile iron pipe for a minimum distance of two feet (2') on either side of the trench.

If the asbestos water line is to be replaced, Romac transition couplings shall be used to connect the ductile iron pipe to the AC pipe. Necessary pipe and fittings shall be assembled at the site ready for installation prior to the shutting-off of water in the existing main. Once the water has been shut off, the work shall be prosecuted vigorously and shall not be halted until the line is restored to service. The work shall be conducted at such a time and in such a manner as to minimize the interruption of service. The Contractor shall have the responsibility of giving at least 48 hours' notice to the Water District of intention to disrupt service.

Removal and disposal of asbestos cement pipe shall be in conformance with the current Policies and Procedures of the Kitsap County Health Department, the Puget Sound Air Pollution Control Agency and other public offices with jurisdiction in this matter. At this time the policy is that:

- a. Pipe shall be "snapped off" rather than being cut with an abrasive saw.
- b. Abandoned pipe shall be left in the trench or disposed of in an approved method.

3.33 Pressure Reducing Valves on Services

If the static pressure at the service is above 70 PSI a pressure-reducing valve shall be installed on the customer's side of the meter per the standard detail. The pressure-reducing valve shall be adjusted to 60 PSI at the customer's building. If the building is above the service, adjust the pressure at the service to 60 PSI plus the pressure differential from the service to the building. If the building is below the service, adjust the service pressure to 60 PSI minus the pressure differential from the service to the building. The pressure differential is calculated by dividing the difference in elevation between the service and the building by 2.31.

3.34 Abandonment of Wells

All wells that are not in use or intended to be in use in the future must be abandoned per the provisions of WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells" published by the State of Washington Department of Ecology. A well driller licensed under the provisions of WAC 173-162 must perform the well abandonment. The well abandonment must be recorded and reported to the Department of Ecology within 30 days.

4.0 STANDARD DETAILS

2019 - Residential Water Details – see separate document

2019 - Non Residential Water Details – see separate document

2019 – Recycled Water Details – see separate document