STANDARD SPECIFICATIONS & DRAWINGS

2020

Star Sewer & Water District

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1.1 DEFINITIONS

Abbreviations. Wherever used in this document and printed with initials or capital letters, the abbreviations listed below will have the meanings indicated:

SSWD	-	Star Sewer and Water District
ACHD	-	Ada County Highway District
CDH	-	State of Idaho Department of Health and Welfare, Central District Health
DEQ	-	State of Idaho Department of Environmental Quality
IDWR	-	State of Idaho Department of Water Resources
ITD	-	State of Idaho Transportation Department

A. Approved Construction Plans. The drawings and supplemental drawings approved by the SSWD Engineer, or exact reproductions thereof, showing the location, character, dimensions and details of the work to be done. These plans shall be approved via a letter from the SSWD Engineer.

B. SSWD Engineer. The SSWD Engineer, being a Professional Civil Engineer registered in the State of Idaho, acting within the authority delegated to him/her by the SSWD.

C. Contractor. An individual, partnership, firm or corporation executing a Contract who is primarily responsible for the acceptable performance of the construction, licensed in the State of Idaho as a Public Works Contractor with a specialty license for installation of water and sewer lines and appurtenances.

D. Design Engineer. The professional engineer, licensed in the State of Idaho, who stamps and signs the plans and is responsible for the design of the project.

E. Plumbing Inspector. An individual employed by or contracted by and/or authorized by the SSWD to act within the authority delegated to him or her by the SSWD regarding enforcement of the applicable Plumbing Code.

F. Record Drawings. The official drawings and supplemental drawings, or exact reproductions thereof, showing the locations, dimensions, elevations and details of the work as completed.

G. Specifications and Drawing. The directions, provisions and requirements pertaining to the method and manner of performing the work, to the kind and type of equipment, or to the qualities of materials to be furnished. These shall be the SSWD Standard Specifications and Drawings or any supplemental Specifications and Drawings approved by the SSWD Engineer.

H. Standards and Test Methods. All specifications and test methods of any society, association or organization herein referred to shall be the latest standards and tentative standards as are in force on the date the construction plans are approved. A partial list of said standards is as follows:

AASHTO	-	The American Association of State Highway (and Transportation) Officials
ASTM	-	The American Society for Testing Materials
ANSI	-	American National Standards Institute (formerly ASA - American Standards Association)
AWWA	-	American Water Works Association
ISPWC	-	Idaho Standards for Public Works Construction, latest revision

Water/Wastewater Superintendent. An individual employed by and/or authorized by the SSWD to act within the authority delegated to him or her by the SSWD pertaining to the water/wastewater pumping, storage, distribution system, collection system, treatment, water meter reading and inspection of new water and sewer facilities.

1.2 GENERAL

A. Intent of the Standard Specifications and Drawings. All construction within the SSWD or within the jurisdiction of the SSWD shall be in accordance with these Standard Specifications and Standard Drawings; the approved Construction Plans; all applicable State, Federal, County and local district regulations and Specifications; and in compliance with the SSWD standards. The more stringent of any of these standards shall be the controlling standards or specifications.

All construction plans shall be approved in writing by the SSWD Engineer and, when applicable, the Idaho Department of Environmental Quality (DEQ) and the Ada County Highway District (A.C.H.D.), prior to any construction. This approval will expire one year from the date on the approval letter. If construction is not commenced by the expiration date, plans must be resubmitted for review and approval before construction may proceed.

When the design engineer revises plans previously approved by the SSWD and DEQ, it shall be the responsibility of the design engineer to submit the proposed revisions to the SSWD Engineer & DEQ for approval prior to construction.

Final approval and acceptance of water or wastewater works construction lying within the boundaries of a street or roadway shall be made only after the street or road section is complete.

All water and sewer facilities shall be designed using the new USGS horizontal and control datum. The USGS datum points are based horizontally on the North American Datum of 1983 (NAD 83) and vertically on the North American Vertical Datum of 1988 (NAVD 88).

B. Progress of Construction. Work shall proceed in a systematic manner so that a minimum of inconvenience will result to the public and the SSWD in the course of construction.

Backfilling of any trench shall be accomplished so that no section of approved pipe shall be left open longer than twenty-four (24) hours except by permission

of the SSWD Engineer. Complete backfill and cleanup shall be accomplished after each section of pipe has been inspected and approved.

C. Interfering Structures and Utilities. The Contractor shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. The Contractor shall notify DIGLINE at least forty-eight (48) hours in advance of construction operations in which any utility's facilities may be involved. This shall include, but not be limited to, irrigation water, sanitary sewer, domestic water, storm sewer, telephone, electric, oil and gas.

It shall be the responsibility of the Contractor to locate and expose all existing underground structures and utilities in advance of any trench or similar excavation. The Contractor shall repair and replace any structure or utility damaged by him to a condition equal to or better than the condition prior to the damage.

The Contractor shall remove and replace, or protect miscellaneous structures such as fences, catch basins, drain pipe, culverts, mailboxes, signposts, buildings, drainageways, or other improvements and similar items. The Contractor shall replace these structures in a condition equal to or better than their condition prior to the damage.

All bituminous type pavements requiring surface repair shall be cut prior to any excavation with an approved pavement breaker. The width of pavement cut shall be in accordance with Ada County Highway District (ACHD) or Idaho Transportation Department (IDT) Standards. Pavement removed during excavation shall not be used in the backfill.

If the Contractor encounters existing facilities which will prevent the construction of any facility as shown on the Approved Construction Plans, he shall notify the District Engineer and/or SSWD Representative as to the extent and type of field modification necessary to avoid the interfering structure or utility and receive approval for the modification prior to constructing the alternative. Depending on the magnitude of the modification, the design engineer may be required to submit revised drawings to the SSWD and/or DEQ for approval.

D. Public Safety and Convenience. The Contractor shall comply with all rules and regulations of SSWD, County and State authorities regarding the closing of public streets or highways to the use of public traffic.

The Contractor shall, at all times, conduct his work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by approved signs, barricades and lights where necessary or ordered by the SSWD Engineer and/or SSWD Superintendent for the safety of the traveling public.

The Contractor shall be required to confine construction operations within the dedicated rights-of-way for public thoroughfares or within areas for which construction easements have been obtained unless he has made special arrangements with the affected property owners in advance. During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be restricted from access to his residence or place of

business for a period exceeding eight (8) hours unless the Contractor has made special arrangements with the affected persons.

E. Contractor's Responsibility for Utility Properties and Services. At points where the Contractor's operations are adjacent to or cross properties of communications, irrigation or canal, power, oil, gas, water, sewer and petroleum companies or are adjacent to other property, the Contractor shall be solely and directly responsible to the owners and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the carrying out of the work to be done.

In the event of interruption to utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority. He shall cooperate with the said authority in restoration of service as promptly as possible and shall bear all costs of repair.

F. Land Monuments. The Contractor shall comply with all County, State and Federal laws, ordinances, codes and regulations pertaining to the preservation of land monuments.

G. Construction within Railroad and Highway Rights-of-Way. It shall be the responsibility of the Contractor to procure all permits necessary for construction within the Union Pacific Railroad right-of-way, the Idaho Transportation Department, Division of Highways right-of-way, and the Ada County Highway District right-of-way. The Contractor shall comply with the specifications and requirements stipulated in the permit granted by the Union Pacific Railroad, the Idaho Transportation Department, Division of Highways, or the Ada County Highway District for the Contractor and SSWD to use said rights-of-way for construction and maintenance purposes.

H. Supplemental Specifications. The SSWD recognizes that these Standard Specifications may not cover all situations that might be encountered; however, this does not release the Contractor from properly constructing the work. Any supplemental specification the applicable SSWD Superintendent and/or SSWD Engineer deem necessary for the proper construction of any work shall be prepared and issued to the Contractor prior to commencing construction.

I. Pre-Construction Meeting. A pre-construction meeting shall be held at least three (3) calendar days prior to the Contractor commencing work. The design engineer shall be responsible for notifying all affected utilities, the developer and the contractor(s) of the pre-construction meeting. All affected utilities, Contractors and agencies shall be in attendance at this meeting. Attendance by the developer, design engineer and utility contractor(s) is mandatory and the pre-construction meeting may be canceled if any of the three parties does not attend. The purpose of this meeting will be to outline responsibilities of all affected parties, review of SSWD and agency standards and policies, schedules and establishment of a working understanding among all parties. SSWD shall be notified of the pre-construction meeting at least 48 hours prior to the meeting.

J. Completed Projects. Final inspection of completed water and wastewater projects shall be completed after:

1. All utilities are installed to the satisfaction of the District;

2. All street improvements (curb, gutter, sidewalk, paving etc.) are complete; and

3. Record Drawings for the project have been received by the SSWD no later than thirty (30) days following completion of construction. Four (4) sets of Record Drawings are required: one (1) mylar; two (2) full-size prints; and one (1) electronic (current AutoCad version); (1) PDF of entire plan set on CD. The electronic copy shall use the District's standard vertical and horizontal datums and shall include an overall utility map showing the actual location of installed water and sewer pipelines, facilities, and services.

4. Other deliverables include:
   - Copy of the inspection log
   - Copy of photographic journal
   - All test results certified by the Design Engineer.

A letter accepting the water/wastewater system by the SSWD for ownership and maintenance shall be issued after the project successfully passes the final inspection.

The Contractor or Design Engineer shall be required to submit to the SSWD a set of as-built plans on Mylar as well as on CD-ROM or disc in AutoCAD format and PDF format. The Design Engineer shall provide development basemap files with as-built conditions including parcel lines, easements, sewer, water, storm, pressure irrigation, service lines, and other utilities in GIS format (shapefile) consistent with the SSWD's GIS system. Shapefile shall have all sewer/water surface features such as manholes (both invert and rim), clean-outs, valves, fire hydrants, water meters, etc. Developer shall be responsible for all upgrades of District maps. The CD-ROM shall contain all subdivision coordinates and shall also present, in separate overlays, all separate utilities such as sanitary sewer, storm sewer, water lines, irrigation lines, and all other utilities that are available to the Design Engineer, such as gas lines, power lines, cable T.V. lines, etc. Design Engineer shall provide record drawing information that is compatible with SSWD GIS system for all phases of the development. These record drawings shall also contain all xyz coordinates for all manholes, gate valves, fire hydrants, water meters, water blowoff valves, and the end of each sanitary service line adjacent to the property lines. A xyz coordinate for each storm sewer, catch basin, and all storm sewer manholes shall also be provided on the as-built data. In summary these record drawings shall contain all subdivision information on separate overlays for property lines, street improvements, water lines, sewer lines, storm sewer lines, irrigation lines, sanitary sewer service lines, water service lines, other utility lines, sidewalks, etc. This record drawing information shall be submitted within 30 days of the completion of construction of each final platted phase of the development. The Developer agrees to pay the SSWD for collecting this as-built information, if the Developer has not submitted the required record drawing information within 90 days after the completion of construction of each final platted phase of development. Neither sewer nor water permits will be issued until as-built information has been submitted

K. Guarantee. The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year from the date of SSWD acceptance. The Contractor warrants and guarantees for a period of one (1) year from the date of SSWD acceptance of the system that the complete system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage or other parts of the system resulting from such defects. The SSWD will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustment, or other Work that may be made necessary by such defects, the SSWD may do so and charge the Contractor the cost thereby incurred. When applicable, the Performance Bond shall remain in full force and effect through the guarantee period.

L. Inspections. The SSWD will provide personnel to observe the Contractor's installation of the water and sewer line improvements as shown on the Approved Construction Plans. The Contractor is responsible for materials and workmanship to be in accord with the approved construction plans and these Standard Specifications and Drawings, whether or not SSWD personnel are on-site to verify same. Project inspection shall be conducted on a daily basis under the auspices and control of the design engineer. Prior to any construction, new or repair of existing utility service, the District shall be notified in writing of the inspector's name, a statement of qualifications, office location, phone number, and emergency telephone numbers. The on-site inspector shall keep a written and photographic log detailing the daily activities of the project. The written and photographic log shall consist of the minimum:

- A written description of the daily activities including materials used and construction practices employed.
- A photographic journal of all connections to existing District utilities, pipe intersections, connections, valves, and manhole connections, identified by stations represented on the plans.

The Contractor shall not perform work outside of the standard workday, Monday through Friday, legal holidays excepted, 8:00 A.M. to 5:00 P.M. unless written arrangements are made with the SSWD. Inspections required outside of the standard workday shall be scheduled with the SSWD a minimum of seventy-two (72) hours in advance, and the Contractor shall pay a fee of one-and one-half (1-1/2) times the inspector's wage, including benefits, and SSWD vehicle costs.

M. Standard Notes and Drawings. Each set of project development plans shall contain a sheet of Standard Notes: "General" -- "Water" – and "Sewer" as shown below. The plan set shall also include sheets containing the applicable Standard Drawings attached to this document.

N. Fees. Developer/Property Owner shall be responsible for all fees, reimbursements, and costs in accordance with District policies.

O. Contractors and land owners are required to comply with the SSWD sewer pretreatment resolution.

GENERAL

1. All work shall be done in accordance with the Specifications, the SSWD Standard Specifications and Drawings, the City of Star, the requirements of the Ada County Highway District, and the ISPWC latest edition.

2. All Contractors, Subcontractors and/or Utility Contractors shall attend a pre-construction conference a minimum of three (3) working days prior to start of work.

3. Take all lot dimensions, easements and certain off-site easements from the plat of:_____, a copy of which is attached to these plans.

4. The Contractor shall maintain all existing drainage and irrigation facilities within the construction area until the drainage and irrigation improvements are in place and functioning.

5. All Contractors working within the project boundaries are responsible for compliance with all applicable safety laws of any jurisdictional body. The Contractor shall be responsible for all barricades, safety devices and control of traffic within and around the construction area.

6. All material furnished on or for the project must meet the minimum requirements of the approving agencies or as set forth herein, whichever is more restrictive. Contractors must furnish proof that all materials installed on this project meet the requirements at the request of the approving agency and/or the Design Engineer.

7. The locations of existing underground utilities are shown in an approximate way only. The Contractor shall determine the exact location of all existing utilities before commencing work. The Contractor assumes all responsibility for any and all damages caused by his failure to exactly locate and preserve any and all underground utilities.

8. Work subject to approval by any political subdivision or agency must be approved prior to (A) backfilling trenches for pipe; (B) placing of aggregate base; (C) placing of concrete; (D) placing of asphalt paving. Work done without such approval does not relieve the Contractor from the responsibility of performing the work in an acceptable manner.

9. The Contractor shall keep on site at all times a copy of the approved construction plans on which is recorded the actual locations of the constructed pipe line and any other utilities encountered. The Contractor shall provide these locations to the Design Engineer for use in the production of record drawings per Section 1.2.J.3 prior to final approval of the pipe line installation.

10. The Contractor shall paint fire hydrant ID number assigned by the fire department using a 3-inch stencil with white paint approved by the fire department and at a location on the fire hydrant approved by the fire department

WATER

1. Construct the water system to conform with the latest edition of standards in the "Idaho Rules for Public Drinking Water Systems" (IDAPA 58.01.08), the SSWD Standard Specifications and Drawings and the latest edition of the I.S.P.W.C.

Where discrepancies arise between the SSWD and the ISPWC, the most restrictive requirement shall apply.

2. All water pipe and fittings shall comply with applicable portions of Section 3.1 of the SSWD Standard Specifications and Drawings. Water mains shall be AWWA C-900, or C-909, Class 150 PVC.

3. Five (5) feet of cover shall be provided for all water mains located in a section-line road. Five feet of cover may be necessary for some mid-section line roads; see plans. Four (4) feet of cover shall be provided for all other water mains.

4. The horizontal separation of water and sewer mains shall be a minimum of ten (10) feet. Where it is necessary for sewer (sanitary sewer, storm drain, and irrigation) and water lines to cross each other, and the sewer line is less than eighteen (18) inches below or above water main, the sewer line shall be Class 200 ASTM D-2241 PVC pipe with water-tight joints, or equal construction, for a distance of ten (10) feet on both sides of water line in accordance with Section 542.07 of the Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08. One full length of both water and sewer lines shall be centered at the crossing point so that all joints will be as far from the crossing as possible. In lieu of constructing or reconstructing the sewer to conform to water main standards, the water line may be sleeved in AWWA C 900 Class 200 PVC for a distance of ten (10) feet on both sides of the crossing.

5. Locate subsurface storm water disposal facilities (including unlined ponds, infiltration beds and drywells) at least 25 feet from main water lines. This requirement does not apply to catch basins or sand and grease vaults.

6. Place No. 12 direct burial wire along the north and east side of water mains and service lines, per Standard Drawing No. 7.04(W).

7. The Contractor shall notify the SSWD two (2) working days before initial construction begins and shall also request inspection of water lines and appurtenances twenty-four (24) hours in advance of backfilling.

8. Construct, pressure-test, flush and disinfect all water distribution systems in accordance with applicable portions of Section 3.1 of the SSWD Standard Specifications and Drawings.

9. Place water service lines in a two (2) inch diameter schedule 80 water class pipe wherever the service line crosses a storm water disposal facility (i.e. seepage beds, drainage swales).

10. The Contractor shall be responsible for providing continuous water service to all existing water users affected by construction.

11. The Contractor shall be responsible for locating and marking all existing service connections per Standard Drawing 7.08(W).

12. Secure and anchor all tees, plugs, caps, bends, and other locations where unbalanced forces exist by suitable thrust blocking as shown on Standard Drawing 7.09(W).

13. Only plan approved by the SSWD Engineer or his authorized representative shall be used by the project contractor(s).

14. The Contractor shall flow test all fire hydrants. The fire department shall be present for flow testing of all fire hydrants.

15. Contractor shall notify residences/establishments at least 24 hours prior to shutting down water service. All shutdowns shall be coordinated with SSWD.

SEWER

1. All work shall be done in accordance with the latest edition of the "Wastewater Rules" (IDAPA 58.01.16) ISPWC and the supplemental SSWD Standard Specifications. Where discrepancies arise between the SSWD and the ISPWC, the most restrictive requirement shall apply.

2. Approval and acceptance of all sewer construction will be by the SSWD for sewer mains and service stubs, and by the Plumbing Bureau for the piping from the sewer stub to and including plumbing inside buildings. . Such inspections shall not relieve the contractor from the responsibility of performing the work in an acceptable manner in accordance with the approved construction plans and Standard Specifications and Drawings.

3. All sewer pipe shall be bell and spigot, polyvinyl chloride (PVC), SDR 35, ASTM D-3034, unless otherwise specified. All sewer pipe shall comply with applicable portions of Section 4.1 of the SSWD Standard Specifications and Drawings.

4. Locate service lines to the points shown on the drawings or as marked by the Surveyor/Engineer in the field. Mark and construct service lines in accordance with the Standard Drawings 7.16(S) and 7.17(S). The service marker shall be in place for the final inspection.

5. The SSWD will inspect all public sewer construction whether within public right-of-way or easement. The Contractor will notify the SSWD forty-eight (48) hours prior to start of construction, and again twenty-four (24) hours prior to pouring concrete collars.

6. Maintain groundwater levels one foot (1') or more below the pipe invert, per ISPWC, during pipe laying and pipe joining operations and while making sewer taps. Clean and restore to their original state any ditches and storm drain facilities that are silted due to the Contractor's dewatering efforts. Bedding and pipe zone material shall be three-quarter inch (3/4") rock chips unless otherwise approved.

7. Install sewer service lines prior to street improvements.

8. Construct sanitary sewer manholes in accordance with Section 4.3 of the Standard Specifications, and Drawings 7.21(S), 7.22(S), 7.24(S), 7.25(S), 7.26(S) as applicable.

9. The Contractor shall test all sewer lines in accordance with Section 4.1.C of the SSWD Standard Specifications and Drawings and Sections 501.3.4 and 502.3.12 of the ISPWC.

10. Place sewer service lines in a six (6) inch diameter water class pipe wherever the service line crosses a stormwater disposal facility (i.e., seepage beds, drainage swales).

11. The separation of water and sewer mains shall be per water note # 4.

12. When cover over a sewer pipe is less than three (3) feet from top of pipe to subgrade or top of pipe to natural ground, use "Class 200 water pressure pipe", ASTM D 2241, SDR 21, including service lines and fittings.

13. Only plans approved by the SSWD engineer shall be used by the project contractor.

14. The Contractor shall conduct a television inspection upon completion of the sewer lines and provide a videotape of the inspection prior to final acceptance of the sewer, per Section 4.3 of the Standard Specifications.

15. The Contractor's surveyor shall verify each manhole invert elevation during placement. The surveyor shall also verify the pipe invert elevation 100 feet from each manhole to confirm pipe grade.

16. The Contractor shall furnish manholes with manhole identification numbers labeled on the inside.

●● END OF SECTION ●●

2.1 EXCAVATION AND BACKFILL

A. Excavation. Excavation shall conform to Section 202, EXCAVATION AND EMBANKMENT of ISPWC, except as modified herein.

B. Backfill Materials.

1. Aggregate for Foundation Stabilization. Foundation stabilization material shall consist of Type II Aggregate Material as defined in ISPWC Section 304, Paragraph 2.2 and Section 801.

TYPE II AGGREGATE (Maximum size shall be 3 inches)

Sieve Size	Percent Passing
3 inch (75 mm)	100
No. 4 (4.75 mm)	25-60
No. 100 (0.075 mm)	0-12

2. Select Bedding & Backfill– Sewer. Select material for pipe bedding and backfill in the pipe zone shall be Type I bedding material as defined in ISPWC Section 305, Paragraph 2.2 and Section 802. The bedding material shall be placed 4 inches below bottom of the pipe to 12 inches above the top of the pipe for the full width of the trench.

3. Select Bedding & Backfill– Water. Select material for pipe bedding and backfill within the pipe zone shall be sand with 100% passing the No. 4 sieve and less than 3% passing the No. 200 sieve (ISPWC Type III). The bedding material shall be placed 6 inches below bottom of the pipe to 12 inches above the top of the pipe for the full width of the trench.

4. Water for Backfill. The Contractor must arrange with the District before using any water from the SSWD's water system. The Contractor shall take water only from the points and at the time specified by the District. Water used by the Contractor shall be metered at the point taken and a charge shall be assessed by the SSWD unless other arrangements are made with the District.

C. Workmanship.

1. Trench Foundation Stabilization. Trench foundation stabilization shall conform to Section 304, TRENCH FOUNDATION STABILIZATION, of ISPWC, except as modified herein.

2. Pipe Bedding. Pipe bedding shall conform to Section 305, PIPE BEDDING, of ISPWC, except as modified herein.

3. Trench Backfill. Trench backfill shall conform to Section 306, TRENCH BACKFILL, of ISPWC, except as modified herein.

4. Protection. Protect and retain all above-ground and below-ground utilities, benchmarks, survey monuments, adjacent land, crops, existing roads, driveways, railroads, irrigation canals and permanent structures.

5. Clearing the Right-of-Way. Complete right-of-way clearing, if necessary, prior to commencing trenching in accordance with Section 201, CLEARING AND GRUBBING, of ISPWC. The Contractor shall observe all Federal and State laws relating to burning permits and local regulations relating to burning materials. Under no conditions shall excavated materials be permitted to cover brush prior to its clearing and disposal.

6. Trenches. Excavate to the lines and grades shown on the approved construction plans or as ordered by the SSWD Engineer or his designated representative. The width of the trench at the top of the pipe shall be a minimum of 24 inches wider than the outside diameter of the pipe. The trench shall be adequately and properly timbered or shored. The Contractor shall be responsible for the adequacy of all shoring, sheeting, and bracing and ensure conformance with all OSHA requirements.

7. Except where stones, cemented gravels, or unstable conditions due to groundwater occur, trench excavation shall first be made to a plane 1 inch above the finished grade. The final or finished excavation, including bell holes and shaped subgrade, shall be made just ahead of pipe laying. Remove all irregularities in the trench bottom by appropriate excavation or backfill. Bell holes shall be excavated for bell and spigot pipe of sufficient dimensions to permit pipe laying to work freely and to positively avoid the bell carrying any weight or loading stresses and so that the pipe slab shall have a firm bearing of not less than three-quarters of the length of the barrel. In dry trench conditions, the subgrade shall be rounded for approximately 1/2 of the outside diameter of the pipe, as shown in the Standard Drawings, before the pipe is laid. Keep trenches free of water, unless otherwise approved by the SSWD Engineer or his designated representative, until the pipe is laid and the joints are completed.

8. Location of Excavated Materials. During trench excavation, locate the excavated material so it will not completely obstruct the traveled roadways or streets. Unless otherwise approved, all streets and roadways shall be kept open to at least one-way traffic. The Contractor shall be responsible for traffic control around and adjacent to the construction zone.

9. Removal of Water. The Contractor shall provide and maintain ample means and devices to promptly remove and dispose of all water entering the trench excavation during the time the trench is being prepared for pipe laying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. The Contractor shall obtain written approval from applicable agencies for discharging water into canals, drainage systems or drains and from property owners on whose property the discharged water may flow over, on or through. The Contractor shall comply with all local, state and federal ordinances, rules and regulations

regarding discharge of water to public waters. Ditches and storm drain facilities that are silted due to the Contractor's dewatering shall be cleaned and restored to their original state.

10. Trench Backfill. After initial backfill in the pipe zone, the trench shall be backfilled in accordance with ACHD standards or requirements if within the public right-of-way, future public right-of-way, parking lot or private street. Backfill above the pipe zone for other installations may be backfilled with the excavated material; provided, however, rocks over 8 inches maximum dimension and other deleterious material, if present in the excavated material, are removed. Material containing frost shall not be used for backfill. The first 1 foot of backfill above the initial backfill shall be given careful attention as to composition. The entire backfill is to be firmly compacted, as specified in Ada County Highway District Detailed Specifications and Standard Drawings, Section 303, or as approved by the SSWD Engineer or his designated representative.

11. Excess Excavation Material. The Contractor shall remove and dispose of all excavated materials not required, or unsuitable for backfill including lumped subsoil, boulders and rocks.

12. Surface Runoff Water. The Contractor shall at all times protect any open trench from the entrance of surface water due to storm runoff, irrigation or mishandling of any water by any Contractor within the work area. In the event that water does enter a trench, the SSWD Engineer or his designated representative may require the Contractor to furnish, at no additional cost to the SSWD, the required foundation stabilization gravel to provide a suitable foundation for laying the pipe.

13. Dust Control. Provide dust control 7 days per week, 24 hours per day. The Contractor shall provide adequate dust control within 2 hours of notification by the SSWD Engineer or his designated representative of deficient dust control.

2.2 SURFACE REPAIR

A. General. This section covers the work and materials necessary to replace all pavement and gravel surfacing or cultivated land that has been damaged directly or indirectly by the construction. The work shall be done in accordance with the details shown in the "Approved Construction Plans", as specified in the Ada County Highway District (ACHD) Detailed Specifications and Standard Drawings, as specified in the Standard Specifications for Highway Construction for the State of Idaho Transportation Department, Division of Highways (IDOT), or as specified herein. The most stringent specification shall prevail.

B. Material.

1. Rock for Surface Replacement and Base. Crushed rock for resurfacing and leveling course shall be crushed rock or gravel, 3/4-inch minus, conforming to Sections 303 and 703 of the ITD Standard Specifications and/or Section 802 of the ISPWC Specifications.

2. Bituminous Surface Repair. Materials for the bituminous surface repair shall conform to the requirements of Section 405 of the ITD Standard Specification and/or Sections 803 and 805 of the ISPWC Standard Specifications.

3. Prime Coat. The material for the prime coat or tack coat shall conform to Sections 403 and 702 of the ITD Standard Specifications and/or Section 806 of the ISPWC Standard Specifications for Grade MC 70.

4. Topsoil. The topsoil consists of native materials removed from the upper 12 inches of the trench excavation. All large cobbles, branches, roots or other large items shall be removed from the topsoil before replacement in the trench.

C. Workmanship.

1. General. All workmanship for the bituminous or gravel surface repair called for on the Standard Drawings and specified herein shall meet the requirements of the Ada County Highway District, the ITD Standard Specifications or the ISPWC Standard Specifications, whichever is more stringent.

2. Cold Weather Surface Repair. In the event the season or weather does not permit application of bituminous surfacing, backfill that portion of the trench designated to receive bituminous surface repair in accordance with Section 2.1 of these Standard Specifications, with 3/4 inch maximum crushed gravel and a temporary asphalt covering as specified by the ISPWC. When the season or weather permits, remove the gravel and temporary asphalt to the depth of the required bituminous surface and complete the trench surface repair as shown on the Standard Drawings.

3. Topsoil Surface Repair.

a. General. Backfill that portion of the trench designated to receive topsoil as a surface repair in accordance with Section 2.1 of these Standard Specifications. This type of backfill is intended for use through dedicated easements where lawn, sod, shrubs, topsoil, fences or other items must be removed and/or replaced by the Contractor because of trench excavation and backfilling operations.

b. Notification of Property Owners. Where this type of backfill is required, the Contractor shall first notify the affected property owner(s) of the impending construction work through the easement.

c. Removal. The Contractor shall then carefully remove all shrubs, fences and other above-ground items, carefully cut and remove all lawn sod, and remove the topsoil to a depth of at least 12 inches (or the depth of the actual topsoil, if less than 12 inches) with the width of the lawn sod and topsoil removal being at least 2 feet wider, 1 foot per side, than the excavated trench width. Pile the topsoil separately from and do not mix it with the remainder of the excavated material.

d. Trench Backfill. After completion of backfilling and compaction within the pipe zone, the remainder of the trench shall be backfilled in lifts with the material in each lift being evenly wetted

and compacted to at least ninety-two (92%) percent of its standard maximum density. The top 12 inches of the trench (or the actual topsoil depth referred to above) shall be backfilled in 6 inch lifts with the removed topsoil. Minimum finished depth of topsoil over all trenches where topsoil existed prior to excavation shall be not less than 10 inches. The topsoil backfill shall be evenly wetted and compacted to eighty-five (85%) percent of its standard maximum density. The Contractor shall then replace the lawn sod, shrubs, fences, and other items that may have been removed from within the easement area and shall clean up and remove any rocks, dirt, or other debris that remains from the work.

e. Clean Up and Property Owner Approval. Upon completion of the work within the easement, the Contractor shall secure a written release from all affected property owners indicating their acceptance of the work. In lieu of removing and replacing the lawn sod, the Contractor may, with the agreement of the property owner, replant the lawn or pay the property owner to replant the lawn. Such agreements shall be documented in the above referenced final letter of acceptance from the property owner(s). Excess excavated material shall be hauled away and disposed of by the Contractor at approved waste sites.

f. Property Owner Access. During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access to all property owners to their property. No persons shall be denied access to their residence or place of business for a period exceeding 8 hours unless the Contractor has made a special arrangement with the affected person(s).

●● END OF SECTION ●●

3.1 WATER PIPE AND FITTINGS

A. Materials

1. PVC Pressure Pipe (8-Inch through 12-Inch). Polyvinyl chloride (PVC) water pipe shall be a minimum of 8-inch, meeting ANSI/AWWA C 900 for sizes 8-inch through 12-inch shall be Class 150, DR18. The outside diameter shall be cast iron equivalent. The joints shall be bell and spigot end with ASTM F 477 elastomeric gaskets. With the exception of cul-de-sacs not requiring fire hydrants, the minimum pipe size shall be 8-inches in diameter. Six inch diameter lines may be used in residential areas for cul-de-sacs beyond the last fire hydrant location.

2. PVC Pressure Pipe (8-Inch through 12-Inch). Polyvinyl chloride pressure pipe shall be a minimum of 8-inch, meeting ANSI/AWWA C 909, for sizes 8-inch through 12-inch, may be used at contractor's option. The outside diameter shall be cast iron equivalent. The joints shall be bell and spigot end with ASTM F 477 elastomeric gaskets.

3. PVC Pressure Pipe (14-Inch through 20-Inch). Polyvinyl chloride (PVC) water pipe, meeting ANSI/AWWA C 905 for sizes 14-inch through 20-inch shall be Class 150, DR18. The outside diameter shall be cast iron equivalent. The joints shall be bell and spigot end with ASTM F 477 elastomeric gaskets.

4. Fittings. Fittings shall be Class 350 mechanical joint ductile iron, Class 250 flanged ductile iron or Class 250 gray iron conforming to ANSI/AWWA C 110. All fittings shall be cement mortar lined in accordance with ANSI/AWWA C 104. T-bolts shall meet the most current provisions of ANSI/AWWA C111/A21.11 standards. Joints for the fittings shall be mechanical joint type conforming to ANSI/AWWA C 110 unless two (2) or more fittings, including valves, are installed back-to-back, in which case, the fittings or valves shall be connected using flange type joints. Tees and crosses shall be flange type unless no other fitting or valve is installed back-to-back, in which case mechanical joint type shall be used. Couplings such as “Dresser” couplings will not be allowed without express permission from the SSWD Engineer, or authorized representative.

5. Thrust Block. Thrust blocks shall be constructed of concrete having a minimum twenty-eight (28) day compressive strength of three thousand (3,000) pounds per square inch (psi) unless otherwise indicated.

6. Finder Wire. No. 12 AWG direct burial single strand copper wire shall be laid adjacent to all water main and service lines. The wire shall be placed along the North and East side of the main and service lines. All wire joints shall be connected with a King "One Step" 30 V twist on watertight wire nut enclosure or approved equal.

B. Workmanship

1. Excavation, Backfill and Bedding. All excavation, backfill and bedding shall conform to the applicable portions of Section 2.1 of these Standard Specifications.

2. Surface Repair. Surface repair shall conform to the applicable portions of Section 2.2 of these Standard Specifications.

3. Depth. The depth of the trench shall be as required to allow for the pipe bedding and to place the top of the pipe at a minimum depth of 4 feet below finish roadway elevation. The depth of cover to top of pipe in section-line roadway sections, or unimproved areas which are expected to be covered by a public roadway in the future, shall be 5 feet.

4. Handling Material. Handle and store all materials to be installed in strict accordance with the manufacturer's recommendations. Protect pipe and gasket material from excessive exposure to sunlight.

5. Cleaning Pipe and Fittings. Wipe the ends of all fittings and pipes clean of all dirt, grease and foreign matter.

6. Placing of Pipe in the Trench. Install pipe in accordance with the manufacturer's recommendations. Take every precaution to prevent foreign material from entering the piping while it is being placed in the line. No debris, tools, clothing or other materials shall be allowed or placed in the pipe during installation. Install pipe bedding material below the pipe prior to placing pipe in trench.

   To facilitate pressure testing, install the pipe as level as possible to prevent air pockets from forming. If high points occur, a temporary air relief valve (provided by the Contractor) to expel trapped air may be required. Use a red brass plug if a temporary air relief valve is installed.

7. Preventing Trench Water from Entering Pipe. At times when pipe installation is not in progress, close the open ends of the pipe by a watertight plug or other means approved by the SSWD Engineer or Water Superintendent, and do not permit trench water to enter the pipe. This provision shall apply during breaks in construction as well as overnight. If water is in the trench, leave the seal in place until the trench is pumped free of any standing water. Groundwater entering the pipe will cause contamination of the pipe and great difficulty in obtaining a negative bacteriological test. Any water pipe that trench water enters shall be removed from job site and new pipe installed.

8. Cutting Pipe. Cut pipe for inserting valves, fittings or closure pieces in a neat and workmanlike manner without damage to the pipe or lining and with a smooth end at right angles to the axis of the pipe. When cutting pipe in the field, follow the pipe manufacturer's recommendations, and recondition the cut end so that it may be used for the next joint. Grind back or dress the outside of the cut as recommended by the pipe manufacturer and approved by the SSWD Engineer or authorized representative.

9. Bell End to Face Direction of Laying. Unless otherwise directed, lay pipe with the bell end facing in the direction of the laying. For lines on an appreciable slope, bells shall face upgrade.

10. Permissible Deflection at Joints. Where it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstruction, or to plumb valve stems, the amount of deflection allowed shall not exceed that recommended by the manufacturer or that specified by the SSWD Engineer or authorized representative. Long radius curves shall not be allowed unless specifically approved by the SSWD Engineer.

11. Alignment. Unless installing pipeline as described in Paragraph 10, above, install pipelines in a straight line, and in no case shall a deviation from the straight line at any joint exceed 1 inch.

12. Unsuitable Conditions for Laying Pipe. Do not lay pipe in water or when, in the opinion of the SSWD Engineer or authorized representative, trench conditions are unsuitable.

13. Jointing Mechanical Joint Cast and Ductile Iron Fittings. Install mechanical joint cast and ductile iron fittings in accordance with the manufacturer's recommendations.

14. Jointing Pipe. Lay and joint piping in strict accordance with the manufacturer's recommendations. The Contractor shall provide all special tools and devices such as special jacks, chokers, and similar items required for the installation. Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer, and no substitutes will be permitted under any circumstances.

15. Mechanical Couplings. Before coupling, thoroughly clean each pipe end of oil, scale, rust and dirt for at least 8 inches back from the end to provide a seat for the coupling gaskets. The pipe coating need not be removed if it presents a smooth surface and is securely bonded to the pipe. Install couplings in accordance with the manufacturer's instructions. Take care to wipe the gaskets clean before they are installed. If necessary, lubricate them with soapy water for installation on the pipe ends. Tighten coupling bolts progressively, drawing up the bolts on opposite sides until all bolts have a uniform tightness per manufacturer's recommendation.

16. Anchorage.

    a. Limiting Degree of Bend. Anchor all tees, plugs, caps, and bends and other locations where unbalanced forces exist securely by suitable thrust blocking as shown on Standard Drawing No. 7.09(W) or hereinafter specified.

    b. Thrust Blocks. Place blocking between the undisturbed ground and the fitting to be anchored. The quantity of concrete and the area of bearing on the pipe shall be as shown on the Standard Drawings or as directed by the SSWD Engineer. Place the blocking so that, unless specifically shown otherwise on the

Standard Drawings, the pipe and fitting joints will be accessible to repair.

17. Disinfection. Disinfect the new lines prior to connection to the existing Municipal Water System in accordance with the Standard for Disinfection Watermains prepared by the American Water Works Association (ANSI/AWWA C 651, latest revision). This shall include bacteriological testing at the Contractor's expense. One test is required for each dead end line, and samples on the main line shall be taken as directed by the Water Superintendent. A copy of the bacteriological test results shall be received and approved by the District prior to the new system being opened to the existing SSWD system.

    Flushing and sampling of the disinfected water line shall be done after being scheduled with the water department and when a water department representative is present on site. The contractor shall furnish the necessary sample bottles and deliver to the testing laboratory.

    Chlorinated water shall remain in the pipeline for 72 hours and shall be flushed from the pipeline within five 5 days after its introduction.

18. Notification. Notify all affected businesses and residences of all water system shutdowns or interruptions 48 hours in advance.

19. Utility Markers. Furnish and install blue Carsonite utility markers at each right-of-way line for all crossings, and at 500’ intervals for pipe not buried beneath asphalt.

20. Locate Wire Termination Box. Furnish and install locate wire termination boxes at 500’ intervals for pipe not buried beneath asphalt.

21. Marking Tape. Furnish and install marking tape, composed of 3 inch blue 4 mil polyethylene, at a minimum of 2’ above the constructed water line. The tape shall be labeled, “Caution – Buried Water Line Below” in 1-1/2 inch minimum black lettering.

22. Dead End Waterlines. All water mains installed on cul-de-sacs or similar dead end streets shall have a hydrant located at the end of the waterline. All water main stubs and dead end mains stubbed for future extension shall have a minimum of a 4-inch blow-off or flushing hydrant. Dead-end water mains shall terminate with a valve followed by at least 10 feet of watermain with an end cap and thrust block clearly marked at the surface. New waterlines within 500 feet of existing waterlines shall be looped.

23. Pressure Reducing Valves. All water services with typical water pressures that exceed 85 psi shall be equipped with a private pressure reducing valve that meets State Drinking Water Standards. Individual pressure reducing valves shall be reviewed and approved by the Department of Environmental Quality prior to installation. If the master plan or the District calls for a regional pressure reducing valve assembly, Contractor/Developer shall be responsible for construction such station in accordance with District standards at Developer’s cost.

C. Testing

1. Hydrostatic Tests. Conduct pressure and leakage tests on all newly laid pipe or any valved section of it, or both. The Water Superintendent will monitor the tests as conducted by the Contractor. The Contractor shall furnish all necessary assistance, equipment, and material and shall make all taps in the pipe as required for the tests. The Contractor shall test the finder wire for continuity prior to placement of final surface coverings. When any section of pipe is provided with concrete thrust blocking, the pressure test shall not be made until at least five days have elapsed after the concrete thrust blocking is installed. If high-early strength cement is used for the concrete, the time may be reduced to two days.

   The test pressure shall be 150 pounds per square inch (psi).

   a. Duration. The duration of each pressure test shall be a minimum of 120 minutes.

   b. Expelling Air. Before applying the specified test pressure, expel all air from the pipe.

   c. Procedure. Slowly fill each valved section of pipe with water to replace any water lost; and apply the specified test pressure, measured at the point of lowest elevation by a gauge of at least 150 psi measuring capability divided into 2 psi increments, by means of a pump connected to the pipe in a satisfactory manner.

      Then valve off the pump, and hold the pressure in the line for the test period. At the end of the test period, operate the pump until the test pressure is again attained. The pump suction shall be in a clean, disinfected bucket, barrel, or similar device, or through a meter so that the amount of water required to restore the test pressure may be measured accurately. Fill water mains with water from SSWD's system only.

   d. Leakage. Leakage shall be defined as the quantity of water necessary to restore the specified test pressure at the end of the test period. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the following formula.

      $$L = \frac{ND(P)^{1/2}}{7400}$$

      in which

      L = allowable leakage in gallons per hour
      N = number of joints in the length of pipe tested
      D = nominal diameter of pipe in inches
      P = average test pressure during the leakage test in pounds per square inch

      Should any test of pipe laid disclose leakage greater than that

allowed above, the Contractor shall, at his own expense, locate and repair the defective joints or pipe until the leakage is within the specified allowance.

D. Non-Potable Pipeline Crossing

When water lines must cross over or under non-potable pipelines, a minimum of 18 inches vertical separation must be achieved. If the 18 inch vertical separation cannot be achieved, the Contractor, at his option, must either reconstruct the non-potable pipeline with water line materials for a distance of 10 feet on either side of the crossing, or place the water pipeline in a Class 200 PVC sleeve for a distance of 10 feet on either side of the crossing. All construction of crossings shall also comply with Section 542.07 of the Idaho Regulations for Public Drinking Water Systems (IDAPA 58.01.08), latest edition.

E. Cross Connection Control

There shall be no arrangement or connection by which any unsafe substance, domestic well, fire lines or unapproved water systems may enter the SSWD Domestic Water System.

Requirements for a Cross Connection Control Program are outlined in Section 543 of the Idaho Regulations for Public Drinking Water Systems, latest edition, published by the Department of Environmental Quality, and in the "Manual for Accepted Procedure and Practice in Cross Connection Control" - AWWA, latest edition.

1. Backflow Prevention. Provide an appropriate backflow prevention device that is registered with the Star Sewer and Water District (District) for all irrigation connections to the potable water system.

2. Costs of Compliance. All costs associated with the purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the financial responsibility of the property owner. All costs associated with any disconnect fees associated with the enforcement of this article are the sole responsibility of the user.

3. Residential Service Connections. Any residential property which has been determined to have an actual or potential cross connection and/or has violated the plumbing code or this article in any way shall be required to install an approved backflow prevention assembly in accordance with this article.

4. New Construction. When a building is constructed on commercial premises, and the end use of the building is not determined or could change, a reduced pressure principle backflow prevention assembly shall be installed at the service connection to provide protection of the public water supply in the event of the most hazardous use of the building.

5. Testing and Repairs. Backflow prevention assemblies shall be tested and repaired in accordance with the requirements set out in the IDAPA.

6. Temporary Meters and Hydrant Valves. Backflow protection will be required on temporary meters and all hydrant valves. The type of

assembly will be commensurate with the degree of hazard and will be determined on a case by case basis by the superintendent.

7. Backflow Prevention Assembly Requirements. The superintendent shall determine the type of backflow assembly to be installed within the area served by the District. All assemblies shall be installed at the service connection unless it is determined by the superintendent to install the assembly at an alternate location for premises protection or at the point of use. The cross connection shall be eliminated or an assembly shall be required to be installed in each of the following circumstances, but the superintendent is in no way limited to the following circumstances:

   A. Where the nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the potable water supply.

   B. Where premises having any one or more cross connections or potential cross connections as that term is defined in this article and the IDAPA.

   C. When a cross connection survey report form is required by the District to be filled out and returned and it has not been received.

   D. Where internal cross connections are present that are not correctable.

   E. When intricate plumbing arrangements exist or plumbing subject to frequent changes are present that make it impractical to ascertain whether or not cross connections exist.

   F. When there is unduly restricted entry so that surveys for cross connections cannot be made with sufficient frequency to assure that cross connections do not exist.

   G. When materials, chemicals or any substance or apparatus is being used that, if backflow occurred, contamination would result.

   H. When installation of an approved backflow prevention assembly is deemed to be necessary in the judgment of the superintendent to accomplish the purposes of these regulations.

   I. On any premises having an auxiliary water supply.

   J. In the event a point of use assembly has not been tested or repaired as required by the IDAPA 58.01.08 or as amended, and this article.

   K. If it is determined that additions or rearrangements have been made to the plumbing system without obtaining proper permits.

   L. All high health hazard premises are required to have premises isolated by installing a reduced pressure principle assembly in accordance with this article.

M. The following facilities will require an RP assembly at the meter. The following types of facilities will fall into one of the above categories where a backflow prevention assembly is required to protect the public water supply. A backflow prevention assembly shall be installed at these facilities unless the District and department determine that no hazard exists.

1) Sewage treatment plants

2) Chemical or other industrial plants

3) Agricultural chemical storage, formulations and distribution facilities

4) Petroleum storage facilities

5) Mortuaries

6) Hospitals

7) Piers and docks

8) Laboratories

9) Food processing plants

10) Tank truck fill stations

11) Car washes

12) Other facilities specified by the Superintendent

8. Cross Connections Regulated.

A. No cross connections shall be created, installed, used or maintained within the territory served by the District except in accordance with this article.

B. The Superintendent may carry out or cause surveys to be carried out to determine if any actual or potential cross connections exist. If found necessary, an assembly commensurate with the degree of hazard will be required to be installed at the service connection.

C. The owner, occupant or person in control of the property is responsible for all cross connection control within the premises.

D. All premises found to have a high hazard cross connection shall install a reduced pressure backflow assembly at the service connection in accordance with this article.

E. It is responsibility of the property owner/occupant to purchase, install, test, repair and maintain all backflow assemblies.

F. If there is a change in ownership of any and all property within the District's service area, it shall be the responsibility of the new owner to determine that all assemblies are in compliance with this article.

F. Insulation

Where it is necessary to construct aerial crossings of obstacles, provide insulation between the water pipe and carrier pipe as approved by the District.

3.2 VALVES

A. Materials

1. Double Eccentric Butterfly Valves. All buried and above ground valves shall be DEX Double Eccentric Butterfly Valves with flanged ends factory leak tested in accordance with AWWA C504. Valves 6-inch and larger shall be DEX Double Eccentric Butterfly Valves with 2-inch operator nut and worm-gear actuator, ductile iron body and disc, 316 stainless steel retaining ring, 2205 duplex stainless steel shaft, 316L welded stainless steel seat, and fusion-bonded epoxy interior and exterior coating. All above ground valve installations shall be equipped with a valve position indicator and hand wheel operator. All below ground installations shall be equipped with valve can and cover. Valves smaller than 6-inch shall be Series 160 valve with a ductile iron body, 316 stainless steel disc, 420 stainless steel shaft, EPDM seat, and fusion-bonded epoxy interior and exterior coating. All above ground valve installations shall be equipped with a valve position indicator and lever operator.

2. Resilient Seated Gate Valves. When approved for use in writing by the District, gate valves shall be ductile iron flanged valves that meet the requirements of ANSI/AWWA C 509, latest revision. Resilient seated gate valves shall be manufactured by Waterous, Clow or Mueller. The gate valves shall be 200 psi working pressure; non-rising bronze stem with O-ring rubber gaskets, with a 2-inch square operating nut, opening counter-clockwise with interior (per ANSI/AWWA C550) and exterior coating.

3. Valve Boxes. All gate valves shall be fitted with a standard adjustable cast iron valve box and 5-1/4 inch lid, stamped "WATER" as manufactured by Tyler, No. 6855, or approved equal.

B. Workmanship

1. General. Set valves and joint them to the pipe in the manner specified in Section 3.1 of these Standard Specifications. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve with the box cover flush with the surrounding surface, or such other level as may be directed by the SSWD Engineer or Water Superintendent.

When valve boxes are located in surfaces other than asphalt, they shall be encircled by an asphalt or concrete collar, for 4 feet in diameter by 8 inches thick, with re-bar.

When valve boxes are located in agricultural land, they shall be marked with a steel T-bar fence post driven 24 inches into the ground, projecting 48 inches above the ground and having the top 12 inches painted blue.

2. Tracer Wire. Tracer wire at all valves shall be located on the outside of the valve box and pass between the valve box and the slip top. The wire is not allowed to come into the valve box from the bottom.

3. Valve Configuration. All tees as a minimum shall have one valve on the run and one valve on the branch. All crosses shall have valves on all legs.

C. Air Release Valves

1. Air release valves shall be placed in high spots in transmission lines that do not have service taps that can extinguish air accumulation. Valves shall be ARI D-040 model, AV-Tek Inc Polyamide fiberglass reinforced model, or approved equal.

3.3 FIRE HYDRANTS

A. Materials

1. Fire Hydrants. All fire hydrants shall be a "compression type" and shall conform to the latest edition of ANSI/AWWA C 502 Specifications. Hydrants shall have a 5 foot setting; minimum 5-1/4 inch diameter valve opening; 150 psi working pressure; one 4-1/2 inch diameter National Standard Thread pumper nozzle (equipped with a Storz fitting); and two 2-1/2 inch diameter National Standard Thread fire hose nozzles. The valve operator shall open left (counterclockwise) and be so indicated on the top casting. The hydrant shall be equipped with a breakaway traffic flange just above the ground level, a drain that automatically opens when the hydrant is closed, a 6 inch diameter supply pipe, an oil reservoir, a weather shield and nut and a bronze-to-bronze seat and ring. Manufacturer shall be Waterous, Mueller or East Jordan Iron Works, or approved equal.

2. Auxiliary Valves. These shall be 6 inch auxiliary gate valves conforming to the applicable requirements of Section 3.2 of these Standard Specifications. The valves shall be flanged on one end to fit the flanged end of the tee in the water main, and the opposite end shall be furnished with a mechanical joint to fit the 6 inch diameter supply pipe.

3. Valve Box. The valve boxes and covers shall conform to the requirements of Section 3.2 of these Standard Specifications.

4. Fire Hydrant Reflectors. Reflectors shall conform to the following:

a.	Housing:	High Impact Plastic, Traffic Bearing
b.	Reflective Lens:	Acrylic
c.	Size:	4”x 4” x 3/4”, nominal
d.	Reflex Area:	1.6 square inches per side
e.	Manufacturer:	Astro Optics Corp., 847-428-3181,

B. Workmanship

1. General. All hydrants shall stand plumb and have their nozzles parallel with or perpendicular to the centerline of the streets with the pumper nozzle facing the street. Set hydrants to the established grade with nozzles at least 16 inches above the ground level or as directed by the SSWD Engineer or Water Superintendent. Install fire hydrants as shown on the Standard Drawings. Testing shall be done in accordance with the latest edition of ANSI/AWWA C-600 and AWWA Manual of Practice M-17.

   Brace the bowl of each hydrant well against unexcavated earth at the end of the trench with cast-in-place concrete blocking, and/or in combination with Uni-Flange Series 1300 joint restrainer, or equal, as shown on Standard Drawing 7.10(W).

2. Fire Hydrant Reflectors. The Contractor shall provide fire hydrant reflectors which will be installed by the local fire department.

3. Contractor shall paint fire hydrant ID number assigned by the fire department using a 3-inch stencil with white paint and at a location on the fire hydrant approved by the fire department.

3.4 WATER SERVICE CONNECTIONS

A. Materials

1. Corporation Stop Valves shall be Ford B-1001-4G, Mueller B-25000 or AY McDonald 4701B-3T ball corporation stop valves threaded on the inlet. All corporation stop valves shall be 1 inch in diameter or larger.

2. Service Saddles. Service saddles shall be Ford FS101 or Romac Style 101S for 1 inch taps or Ford FS202 or Romac Style 202S for 1 1/2 inch or 2 inch taps. All saddles shall have a stainless steel band specifically sized for ANSI/AWWA C 900 water pipe.

3. Water Service Connection Pipe. All one-inch through two-inch water service connection pipe shall be 5100 ultra-high molecular weight polyethylene pipe conforming to ASTM D2239, SIDR7, designation PE 3408 iron pipe size.

4. Curb Stops. Curb stops shall be of the size required to match the water service connection pipe as specified and shall be Mueller B-20283, or Ford B11-444 for 1 inch service.

5. Meter Vaults. Meter vaults for three-quarter and one-inch located in vehicular traffic areas shall be 20 inch diameter [single or double service] corrugated metal pipe (CMP) slotted so as to not transmit shock or bear on the water service connection pipe. Meter vaults located out of street travel-way or driveway shall be constructed of polyvinyl chloride (PVC). One and one-half inch and 2 inch meter vaults shall be 30 inch diameter CMP. See Standard Drawings 7.05(W) and 7.06(W).

6. Tapping Sleeve. Tapping sleeves shall be constructed of 18-8 (Type 304) stainless steel with removable stainless steel bolts and a 360° gasket. Tightening nuts shall be on the flange side of the tapping sleeve.

7. Frames and Covers. Frames and covers for meter vaults located outside vehicular traffic areas shall be Nicor 16.25" polymer ring and lids. The pentagon nut shall be 1-1/32 inch. Frame and cover for meter vaults located in a vehicular traffic area shall be Nicor 21" polymer ring and lids. Both covers shall have the Star Sewer and Water District logo on the lid. A touch read lid shall be provided.

8. Meter Yoke. ¾" meter yokes shall be Mueller B-24101-142, AY McDonald #60-318JDMD-33x18 or Ford VBHC93-18" with padlock wings on inlet valve, or 1 inch VHH94-18 with outlet extension with double purpose coupling for connecting to iron pipe on the outlet side. The meter yokes shall have a vertical check valve on the house side and a valve on the street side with a locking nut. The yoke shall have 18 inch copper extension, with male or female connections.

9. Locating Wire Required.

B. Workmanship

Install the corporation stop valves in the service saddles in accordance with the manufacturer's recommendations. Provide corporation stop valves with the proper coupling in order to accommodate the water service connection pipe and install them before the water mains are pressure-tested, flushed or disinfected.

Install the water service connection pipe and all fittings at the maximum depth that standard installation practice will permit.

Install curb stops in the meter vault on the "street" side.

Install meter vaults on firm, undisturbed earth. They shall not transmit shock or bear on the water service pipe. If over-excavation occurs for the meter vault, set the vault to grade using precast concrete blocks. Setting the vault on backfill is not allowed. Meter lid elevations will comply with Standard Drawing 7.07 (W).

3.5 BORING AND JACKING

A. Horizontal boring and jacking for pipe installation shall conform to the specifications contained in Section 308 of the ISPWC with these exceptions:

1. Paragraph 1.4, SUBMITTALS: The SSWD does not require submission

of the listed submittals although other agencies or parties may. Both plan and profile details of the installation must, however, be included in the development plans.

2. Paragraph 2.2.B, STEEL CASING PIPE: Casing pipe diameter shall be a minimum of 4 inches larger than outside bell diameter of the carrier pipe.

3. Paragraph 2.4.A., CARRIER PIPE SKIDS: All carrier pipe skid proposals must be approved either by the District Engineer as part of the plan approval process or by the Water Department in the field. Carrier pipe skids must also meet or exceed ISPWC 308.2.4.

4. Paragraph 2.6, ANNULAR SPACE BACKFILL: backfill in the annular space between the carrier pipe and the casing shall not be gunite concrete, low strength grout or 3/8 inch minus gravel.

B. Aerial Crossings. Aerial water crossings will be evaluated on a case-by-case basis. Insulation between the carrier pipe and the casing may be required to prevent freezing within the carrier pipe. The Engineer shall include detailed design drawings, both plan and profile views, of any proposed aerial water crossing. Minimum requirements are:

1. Minimum steel casing wall thickness shall be 0.375 inches.

2. Water-tight “boots” shall be provided at both ends of the casing to ensure groundwater does not enter casing.

3. Abutments or piers for the casing shall be designed by the Engineer and included in the development plans.

3.6 SPECIAL INSURANCE REQUIREMENTS

A. Where a contractor is to tap into one of the City’s mainlines, the tapping contractor shall have a minimum of $1,000,000 liability insurance with no more than a $1,000 deductible, unless otherwise approved by the district.

B. The Contractor shall be responsible for any damage caused to existing water lines during the tapping process.

●● END OF SECTION ●●

4.1 SEWER PIPE

Polyvinyl chloride sewer pipe shall be used for sewer line construction, unless specifically approved by the District engineer.

A. Materials

1. Polyvinyl Chloride (PVC) Pipe and Fittings

a. Gravity Sewer Pipe and Fittings. PVC gravity sewer pipe and fittings shall meet the requirements of ASTM D 3034, SDR 35, for pipe diameter 4-15 inch, and ASTM F679, minimum wall thickness T-1, for pipe diameter 18-27 inch.

b. Shallow Cover Gravity Sewer Pipe and Fittings. When cover over a sewer pipe is less than three (3) feet from the top of pipe to subgrade or top of pipe to natural ground, Class 200 water pressure pipe, ASTM D2241,SDR21, shall be used for the lateral and service line pipes. Fittings such as saddle outlets, wyes & tees, shall be compatible in construction with the lateral pipe.

c. Marking. All pipe shall be marked at intervals of no less than five feet with normal pipe size, SDR number, Type, appropriate ASTM number, and working pressure.

d. Couplings. All PVC sewer pipe shall have an integral belled gasket pocket coupling at one end. In special circumstances, as deemed appropriate by the SSWD Engineer, spigot ends of PVC sewer pipe may be connected utilizing a rigid PVC slip-coupling or mechanical joint type coupling. All connecting fittings shall be of rigid design.

e. Gaskets. The surface of the gasket shall be smooth and free of pits, cracks, blisters, air marks and other imperfections that would impair its use.

f. Pipe Length. Normal lengths of pipe shall be 13 or 20 feet. Other pipe lengths may be provided if required, however, no pipe length used shall be less than 5 feet.

B. Workmanship

1. Excavation and Backfill. All excavation and backfill shall conform to the applicable portions of Section 2.1 of these Standard Specifications.

2. Surface Repair. All surface repair shall conform to the applicable portions of Section 2.2 of these Standard Specifications.

3. Slope and Manhole Spacing. Pipe slopes shall conform to Paragraph 33.41 of the Ten State Standards. Sub-standard slopes will only be allowed with written authorization of the SSWD Engineer. Manhole spacing shall not exceed distances listed in Paragraph 34.1 of the Ten State Standards.

4. Preparation of Pipe and Fittings. Examine pipe and fittings for defects and damage prior to installation. Clean the pipe of all dirt and foreign material. Prepare pipe joints using specified gasket and manufacturer's recommended lubricant. Install pipe in accordance with manufacturer's recommendations.

5. Handling. The Contractor shall provide and use proper implements, tools, and facilities for the safe and proper protection of the work. Handle pipe in such a manner as to avoid damage to the machined ends. Carefully lower the pipe into the trench to prevent damage to the pipe. Under no circumstances drop or dump pipe into the trench.

6. Installation. Install the pipe upgrade with the bell end upgrade unless otherwise approved by the SSWD Engineer or his designated representative. Install the pipe in accordance with the manufacturer's recommendations. Plug and block open ends of the sewer pipe when installation is not in progress.

7. Alignment and Grade.Establish line and grade by "Laser beam" method in conformance to the approved construction plans. No variation is allowed unless previously approved by the SSWD Engineer. Take measurements for grade at the pipe invert because of permissible variation in pipe wall thickness. The Contractor shall constantly check position of laser beam from surface hubs provided by the design engineer to insure laser beam is on alignment and grade. If the laser beam is found out of position, the Contractor shall stop work and make necessary corrections to the laser beam equipment and installed pipe.

8. Pipe Jointing. Apply sufficient pressure in making the joint to assure that the joint is "home" as defined in the standard installation instructions provided by the pipe manufacturer. Apply sufficient restraint at the pipe line to assure that joints, once "home," are held so by tamping fill material under and alongside the pipe or otherwise.

9. Connection To Existing Sewer System. When installing new sewer that is connected to the existing sewer system, the Contractor shall isolate the new system by installing a temporary air-tight plug in the first new manhole upstream from the existing system. Prevent groundwater from entering the existing sewer system at all times.

10. Variance Limits. The maximum deviation from design line and grade shall be 0.02 feet.

11. Utility Markers. Furnish and install green Carsonite utility markers at each right-of-way line for all crossings, and at 500' intervals for pipe not buried beneath asphalt.

12. Locate Wire Termination Box. Furnish and install locate wire termination boxes at 500' intervals for pipe not buried beneath asphalt.

13. Marking Tape. Furnish and install marking tape, composed of 3 inch green 4 mil polyethylene, at a minimum of 2' above the constructed water line. The tape shall be labeled, "Caution – Buried Sewer Line Below" in

1-1/2 inch minimum black lettering.

14. Sewer Stubs. Terminate pipeline with manhole when stub extends greater than 50 feet unless otherwise approved by District.

C. Testing

1. Air Testing for Sewer Lines (24-Inch and Smaller)

a. Amount of Testing. The Contractor may air test all sewer lines for his own benefit after backfilling and settling of the trenches. The Contractor shall retest all sewer lines in the presence of the SSWD Inspector after all utilities have been installed, and prior to installation of the street surfacing, and shall furnish all equipment and personnel required to perform the tests. Failure to have District personnel present during all testing is sufficient reason for requirement to retest. Design engineer shall provide certification of testing and testing results to the District. The testing shall be scheduled with the District at least 24 hours in advance. A pipe line that has been installed, passed the initial air test, but for other reasons not finally accepted by the SSWD, shall, if it remains unused for an extended period of time, be subjected to another air pressure and alignment test.

Air testing of any sewer pipe with less than three feet of bury, from top of pipe to subgrade, shall be done after all road base gravel is installed and compacted.

An additional air test will be required on any installed sewer line, even if previously final inspected, if other utility excavation occurs in the area above and/or adjacent to the sewer line.

b. Leakage Allowance. The leakage allowance requirement of the air test shall be considered satisfied if the time required for the pressure to decrease from 3.5 pounds per square inch (psi) to 3.0 psi greater than the average groundwater back pressure above the center of the pipe is not less than that shown in Table 1.

TABLE 1

	HOLDING TIME CHART (Min:Sec)							
Pipe Diam. (in)	100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	4:43	4:57	4:57	5:56	6:55	7:54	8:54
12	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:24	17:47	22:48	28:30	34:11	39:53	45:35	51:17

c. Testing Procedure. The low pressure air test is a test which determines the rate at which air under pressure leaves an isolated section of pipeline. This rate indicates the presence or absence of pipe damage and/or pipe of poor quality. The test procedure is described as follows:

(1) The section of pipe to be tested is plugged at each end. The ends of all branches, laterals and wyes which are to be included in the test are sealed or plugged. All plugs shall be carefully braced to prevent slippage and blowout due to internal pressure. One of the plugs provided must have an inlet tap or other provision for connecting an air hose. For safety purposes, the Contractor shall use a "remote" air inlet hose to pressurize and de-pressurize the sewer line. All pressure gauges, valves and instrumentation required for the test shall be located at ground level.

(2) Connect one end of the air hose to the inlet tap on the plug and connect the other end of the hose to portable air control equipment. The air control equipment shall consist of pressure gauges to monitor the air pressure inside the

pipe. The air control equipment can then be connected to a source of air supply such as a portable air compressor. The testing apparatus shall be equipped with a pressure release device such as a rupture disk or pressure relief valve to relieve pressure in the pipe in excess of 6 psi.

(3) After the air hoses are properly connected, inject air into the test section. Monitor the air pressure so that the pressure inside the pipe does not exceed 5 psig. Use a liquid-filled pressure gauge with a maximum measuring capacity of 10 psi, graduated into 0.5 psi increments.

(4) When the pressure inside the test section reaches 4 psig, throttle the air supply so that the internal pressure is maintained between 4 and 3.5 psig for at least 2 minutes.

(5) Allow the temperature to stabilize for the two (2) minute period, disconnect the air supply, and allow the pressure to drop to 3.5 psig. At 3.5 psig, use a stopwatch to determine the time required for the pressure to drop to 3.0 psig.

(6) Make the necessary corrections to the pipe if the pressure drop exceeds 0.5 psi in a period shorter than that shown in Table 1 and re-test the pipe.

d. Testing Sewer Lines Larger Than 24 Inches. Gravity sewer larger than 24-inch diameter shall be hydrostatically tested in accordance with Section 3.4.D of Section 501 of the ISPWC.

2. Deflection Testing for Sewer Lines.

a. Amount of Testing. All gravity sewers constructed of flexible pipe shall be deflection tested no sooner than thirty days after trench backfill and compaction have been completed.

b. Testing Procedure. The maximum allowable deflection shall be five (5%) percent of the pipe diameter. Conduct testing after the line has been completely flushed. The Contractor shall furnish a standard mandrel for testing. Pull the mandrel through the pipe by hand from manhole to manhole and if a deflected pipe is encountered, pull it through from the other end to determine the limits of failure. If testing reveals an over-deflected pipe, uncover it and, if not damaged from over deflection or from excavation activities, correct and reinstall it. Remove from the worksite any pipe damaged beyond repair and replace it with new pipe. Prior to making repairs the Contractor shall submit his proposed method in writing to the SSWD Engineer for approval.

The mandrel shall:

(1) Be a rigid, nonadjustable, odd-numbering-leg (9 legs

minimum) mandrel having an effective length not less than its nominal diameter.

(2) Have a minimum diameter at any point along the full length as follows:

Pipe Material	Nominal Size (Inches)	Minimum Mandrel Diameter (Inches)
PVC ASTM D 3034	6	5.619
(SDR 35) or	8	7.524
(ASTM D 2241,	10	9.405
SDR 21-when	12	11.191
required.)	15	13.849
PVC ASTM F679	18	16.924
(T-1 Wall)	21	19.952
	24	22.446
	27	25.297
	30	28.502

(3) The mandrel shall be fabricated of steel, fitted with pulling rings at each end, and stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size and mandrel OD (e.g., PVC, D 3034-8-inch-7.524-inch).

For pipe diameters nominally 24-inch and larger, deflections shall be determined by a method submitted to and approved by the SSWD Engineer. If a mandrel is selected, the minimum diameter, length and other requirements shall conform to the dimensions and requirements stated above. If "Insta-Tap" tee fittings are used for service connections, a "Go/No-Go" pin gauge shall be used for deflection testing instead of a mandrel.

4.2 SEWER SERVICE CONNECTIONS

A. Materials

1. Service Stub, One-Eighth (1/8) Bend, Pipe, Plugs, Etc. The PVC service stubs, one-eighth (1/8) bends, pipe, and plugs shall be of PVC sewer pipe conforming to the Specifications for PVC pipe and fittings as set forth in Section 4.1.A.1 of these Standard Specifications. Connections between new and existing service lines shall be made with a rigid PVC

coupler having compression-gasketed ends.

2. Service Marker. Marker shall consist of 12 gauge galvanized wire and a wood two by four (2x4) as shown on Standard Drawing 7.17(S).

3. Blocking. Material for blocking shall be 2-inch by 6-inch cedar or redwood pieces of wood of the length as may be required to complete the work, as shown on Standard Drawing No. 7.17(S).

4. Service Connection Tee Fittings. Tee fittings may be "Inserta-Tee" for services installed into existing lines only and shall be approved on a case by case basis. All clamps, straps, nuts, bolts and washers shall be solid stainless steel. Regular Tees shall be used for all new construction.

B. Workmanship

1. Connections

a. Service Connections. Fabricate the tap into the main sewer pipe from standard manufactured fittings (integral tees, wyes, etc.). If a saddle connection is approved, core-drill the hole into the sewer main with the appropriate type of hole saw (e.g., concrete and vitrified clay pipe shall be cut with an industrial grade diamond blade) and the curvature of the saddle shall fit the curvature of the pipe prior to tightening of the band.

b. Service stubs shall be constructed at a minimum slope of 0.02 ft/ft with bends no greater than forty-five-degrees (45) and a minimum of 2 feet of straight pipe between bends. Service stubs shall not exceed 5 feet of depth at the property line, unless otherwise approved by the SSWD Engineer. In those cases where the service main is deeper than required for a specific connection, the service stub may be set vertically or at a forty-five-degree (45) angle with a minimum of 2 feet of straight pipe placed prior to the one-eighth (1/8) bend. When the service stub is set vertically, there will be required a one-quarter (1/4) bend in place of the one-eighth (1/8) bend. See Standard Drawing 7.16(S) for extension of service stubs beyond property line.

c. The Contractor shall use extreme care in backfilling around the sewer service stub connection and service stub pipe to assure a watertight joint. Include the service stub connection and its service stub pipe extension in the air test of the main sewer pipe. If a service stub connection is in a high groundwater area, use a backfill material of 3/4-inch minus roadmix, reject sand or 3/4-inch drain rock for fill around the service stub pipe and at the point of connection. Extend this backfill a minimum of 1 foot above the service stub pipe.

d. Accurate field measurements of the exact location of each service connection shall be recorded for filing with the SSWD Engineer by the Design Engineer prior to backfilling by the Contractor. Where a concrete sidewalk is constructed across the service line the service lines location shall be marked in the concrete sidewalk

with a stamped "S".

2. Service Marker. Prior to completion of backfilling, a 12 gauge galvanized wire and a wood two-by-four (2x4) shall be attached to the end of the service stub pipe and brought to a point of 4 feet above the surface of the ground. The wire shall be adequately fastened to the two-by-four (2x4) to insure that it remains in position during and after backfilling. The exposed length of two-by-four (2x4) shall be painted florescent green. See Standard Drawing 7.17(S). Indicate the depth of the service pipe to the nearest inch on the marker as dictated in ISPWC 504.3.6.C.

3. Home Builder Connection to Service Stub. Connection to a service stub which is below the existing water table at the time of the house connection shall be made by the use of gasketed sewer fitting or approved flexible connector properly adapted for the connection. A service stub, located in water above the connection, shall be backfilled with 3/4-inch rock chips to one (1) foot above the level of the water table. The permit holder for the sewer service connection shall be responsible to see that the proper backfilling is accomplished and that the connection is inspected by an inspector, duly authorized by the Pluming Bureau, prior to being covered.

4.3 MANHOLES AND CLEANOUTS

A. MATERIALS

1. Concrete. Concrete used in the construction of a manhole base shall be so proportioned and mixed as to meet a 2,500 psi compression test after 28 days. There shall be a minimum of five (5) sacks of cement per cubic yard of concrete.

   a. Forms. Forms for a manhole base shall be matched boards, plywood, or other form material approved by the SSWD Engineer.

   b. Precast Manhole Base. An optional precast manhole base with approved pipe connections may be used with SSWD Engineer's approval.

   2. Precast Manhole Sections. Precast sections for manholes shall be a minimum 48 inch diameter reinforced concrete conforming to ASTM C 478, and have a minimum wall thickness of 4-1/4 inches. Cones shall be eccentric for manholes with an overall depth greater than 4'-0" with the vertical wall placed on the upstream side and rotated forty-five (45) degrees; and concentric for those less than 4'-0". Cones shall have the same ~~a~~ wall thickness and reinforcement as that of manhole sections. The tops and bottoms of cones shall be parallel. Manholes shall comply with Standard Drawings 7.21(S) through 7.24(S). See Section 5.7 for requirements of manholes receiving lift station discharges.

3. Manhole Section Joint Sealant. The joints for the precast concrete

manholes shall be joined with sure-seal mastic (such as Ramnek) or approved equivalent. All manhole base, barrel and cone joints shall be sealed with manhole joint exterior wrap as specified in ISPWC Section 502.2.9.A.

4. Manhole Extensions. The precast concrete grade rings used between the top of the cone and the base of the manhole ring shall be constructed of 3,000 psi concrete and have a minimum thickness of 2 inches and shall be of standard construction.

   In general, manhole extensions having a minimum thickness of 6 inches and a maximum height of 12 inches will be used on all manholes. Concrete collars shall be as shown on Standard Drawing 7.25(S) or 7.26(S), as appropriate.

5. Manhole Frames and Covers. All manhole frames and covers shall comply with Standard Drawing 7.19(S) or approved equal. Watertight manhole covers are required when the rim elevation of the manhole is located less than 0.5 feet above the base flood elevation.

6. Plugs. Permanent plugs shall be made of 3/4-inch aggregate concrete for a minimum of 12 inches in length and capable of withstanding internal or external pressure without leakage. The opening of the pipe shall be completely filled and thoroughly plugged.

7. Connection to Existing Manholes. The Contractor shall provide all diversion facilities and perform all work necessary to maintain sewage flow in the existing sewers during connection to and modification of a manhole. Existing manhole base or grouting shall be core drilled where necessary, and re-grouted to provide a smooth flow through the existing manhole. Install a rubber ring at locations where PVC pipe contacts concrete manholes or channels.

8. Cleanouts. Concrete used shall conform to that required in manhole construction. Cleanout cover and casing shall be of cast iron and labeled "sewer cleanout." Pipe shall conform to Section 4.1.A.1. of these Standard Specifications and shall be a minimum of 8 inches in diameter. See Standard Drawings 7.18(S) and 7.18B(S). Upon approval from the District, cleanouts may be constructed for temporary use only at subdivision phase lines.

9. Manhole Steps. Manholes more than 4 feet deep shall be equipped with steps conforming to the following requirements. Measurement of the depth of manholes shall be made between the cover elevation and the invert of the lowest pipe in the manhole. The top step shall be located no more than 3'-0" below the top of cover elevation and the bottom step shall be no greater than 1'-0" above the top of the manhole shelf. At the option of the Contractor, either of the following manhole steps may be used:

   a. Aluminum Steps. Aluminum steps shall be forged of 6061-T6 alloy having a minimum of tensile strength of 38,000 psi. The cross section shall be not less than 3/4 inch wide by 7/8 inch deep, with two non-skid grooves not to exceed 1/8 inch deep and

1/8 inch wide.

b. Plastic Coated Steps. Plastic-coated steel steps shall be 1/2 inch steel reinforced bar covered with a polypropylene plastic as manufactured by M.A. Industries, Inc., or approved equal.

c. Fiber Glass Steps or other Non-Metalic Steps approved by the District Engineer.

The manhole steps shall be grouted into the precast or cast-in-place sections of the manhole. Grout shall be a non-shrink grout that shall be of comparable strength to the concrete used in the manhole sections.

10. Service Lines Entering Manhole. Not permitted.

B. WORKMANSHIP

1. General. Unless modified herein, workmanship shall conform to Section 502 of the ISPWC.

2. Manholes.

a. Concrete Base. The concrete base for the precast manhole shall be constructed so that the first section of precast manhole barrel section has a uniform bearing throughout the full circumference of the manhole wall. Deposit sufficient mastic on the concrete base to provide a watertight seal between the base and the manhole wall. For subsequent sections, fill joints completely with mastic. Trowel or trim interior and exterior surfaces smooth on standard tongue-and-groove joints. Clean the excess mastic from the inside of the joint and grout any voids flush with the inside wall of the manhole with cement based mortar. The invert elevation of the manhole channel shall be within 0.04 foot of the elevation shown on the approved construction plans. Manhole walls shall be constructed true to line and grade and shall be rigid and watertight. “Pick-holes” shall be filled using non-shrink grout and trowelled smooth. Any visible leakage shall be cause for rejection.

b. Ring and Covers. The cast iron manhole rings and covers shall be installed on the tops of the manhole to prevent infiltration of surface or ground water into the manholes. The manhole rings shall be set so the tops of the covers are flush with the surface of the adjoining pavement or ground surface unless otherwise shown on the approved construction plans, or as directed by the SSWD Engineer.

c. Manhole Extensions. Manhole extensions shall be built as shown on Standard Drawings 7.25(S) and/or 7.26 (S) for manholes, and to a height as approved by the SSWD Engineer. Extensions shall be added on manholes in existing streets and driveways and where otherwise directed by the SSWD Engineer. All rings shall be laid straight and true. Set grade rings in a bed of non-shrink

grout or mortar troweled smooth with the inside of the manhole. Apply non-shrink grout between metal frame and top grade ring. Mastic may be used if pre-approved by the SSWD Engineer. Inside joints shall be grouted full with non-shrink cement mortar and finished flush with the inside surface of the rings.

d. Manhole Lid Elevations. Manholes rim elevations shall be set at an elevation at least 0.5 feet above the base flood elevation in areas inside the 100 year flood plain and be equipped with a watertight lid unless otherwise approved in writing by the District staff or Engineer.

3. Connection of Sewer Lines to Existing Manholes. Existing manholes shall be core drilled to provide a neat and smooth opening. The connection shall be made with a KOR-N-SEAL flexible connector, or approved equal, to provide a water-tight connection. The end of the new pipe shall be trimmed flush with the inside wall.

4. Cleanouts. Cleanouts are not allowed unless specifically approved by the SSWD on a case by case basis. If approved, the cleanouts shall conform to ISPWC SD-506.

5. Testing. Sanitary sewer manholes shall be tested prior to permitting such sewer manhole to be open to the collection system. Testing shall be in accordance to current edition of the ISPWC. District personnel or designated representative shall be present during testing. Failure to have District personnel or designated representative during all testing is sufficient reason for requirement to retest. Design engineer shall provide certification of testing and testing results to the District.

4.4 TELEVISION INSPECTION AND CLEANING

The Contractor shall conduct a television inspection upon completion of the sewer lines and provide a videotape of the inspection prior to final acceptance of the sewer. Eleven (11) months after final acceptance of the sewer line by the SSWD, the SSWD will inspect the sewer line utilizing closed circuit television and will video-tape the inspection. Should there be evidence of inconsistencies as compared to the original installation which, in the opinion of the SSWD Engineer, warrant replacement or repair, the Contractor shall, upon order of the SSWD Engineer, correct those defects as required under the Contractor's one-year guarantee. After the necessary corrections have been made by the Contractor, the corrections will be verified by an additional television inspection performed by the Contractor. The cost for all television inspections completed during the warranty period shall be paid for by the Contractor.

The protocol is required when TVing and Cleaning sewer lines for the municipality.

1. The following shall be included for video sewer line taping:

   ☐ Name and address of the Company providing service

   ☐ Date of Inspection

   ☐ Project and Project Phase

- ☐ Operator of the equipment
- ☐ Cleaner of the system
- ☐ Tape Number
- ☐ Start Indicators of Cam
- ☐ Directional Heading
- ☐ Type of Pipe being serviced
- ☐ Size of pipe being serviced
- ☐ Length of pipe being serviced
- ☐ Current distance along line segment
- ☐ Location of each service connection
- ☐ Length of pipe sticks
- ☐ Depth of manholes
- ☐ Flow rate %
- ☐ Weather at time of service, including temperatures and conditions
- ☐ Name of SSWD
- ☐ Manhole IDs as per the approved construction plans

2. A representative from the SSWD should be present during service.
3. Camera shall be centered in the pipelines when taping.
4. For each service connection a camera view up into the service line needs to be provided. Angle shots of service connection will not be accepted.
5. When camera blackouts occur, camera will be backed up 10 feet and then resume taping of the line segment.
6. Document beginning and ending of any dip and sags including location and depth.
7. The Contractor will provide one video copy of all taped sewer lines and a comb-bind, typed report detailing the information that coincides with the video taping that was performed. Video and database information shall be presented to the District in a format consistent with the District's maintenance software.
8. The cleaning of a sewer line will abide by all ISPWC standards. Some of the ISPWC standards are mentioned below:
   a. Dye testing.
   b. Vacuum testing of manholes.
   c. Pressure testing of sewer and service stub cuts.

d. Pipe will be grouted before cleaning begins in manholes.

e. Sewer lines will be balled off with a test plug of existing manhole before cleaning begins (for new subdivisions). If the sewer line is not balled off, the operator will extend the cleaning six line segments down stream beyond initial cleaning, ball off, and then re-clean.

f. While retrieving debris out of the sewer line, the vacuum pipe of the hydro vac will be in the sewer line when cleaning nozzle is within 76 feet from manhole to prevent debris from going down stream.

g. All manholes on the project shall be washed down and vacuumed out.

h. Cleaning will be done with a hydro vac.

4.5 BORING AND JACKING

A. Horizontal boring and jacking for pipe installation shall conform to the specifications contained in Section 308 of the ISPWC with the following exceptions:

1. Paragraph 1.4, SUBMITTALS: The SSWD does not require submission of the listed submittals although other agencies or parties may. Both plan and profile details of the installation must, however, be included in the development plans.

2. Paragraph 2.2.B, STEEL CASING PIPE: Casing pipe diameter shall be a minimum of 4 inches larger than outside bell diameter of the carrier pipe if using synthetic, manufactured spacers. If redwood carrier pipe skids are used, the casing pipe diameter shall be a minimum of 8 inches larger than the outside bell diameter of the carrier pipe. The steel casing pipe shall have minimum wall thickness of 0.375 inches.

3. Paragraph 2.4.A., CARRIER PIPE SKIDS: All carrier pipe skid proposals must be approved either by the District Engineer as part of the plan approval process or by the Water Department in the field.

4. Paragraph 2.6, ANNULAR SPACE BACKFILL: backfill in the annular space between the carrier pipe and the casing shall <u>not</u> be gunite concrete, low strength grout or 3/8 inch minus gravel.

B. Aerial Crossings. Aerial sewer crossings will be evaluated on a case-by-case basis. Insulation between the carrier pipe and the casing may be required to prevent freezing within the carrier pipe. The Engineer shall include detailed design drawings, both plan and profile views, of any proposed aerial sewer crossing. Minimum requirements are:

1. Items 1 through 4 in Section 4.5, above.

2. Minimum steel casing wall thickness shall be 0.375 inches.

3. Water-tight “boots” shall be provided at both ends of the casing to ensure groundwater does not enter casing.

4. Abutments or piers for the casing shall be designed by the Engineer and included in the development plans.

●● END OF SECTION ●●

5.1 GENERAL

A. Specification Applicability. This section covers small lift stations, which are generally considered to have a capacity of less than approximately 400 gallons per minute or projected peak inflow of less than 0.8 cfs. Larger proposed lift stations may be subject to additional requirements not included in this section. Small lift stations with unique site characteristics such as exceptional depth, pumping into gravity sewer served by another existing lift station or with a wide range of initial and ultimate in-flows may be required to meet additional requirements not contained in this specification.

B. Other Agencies. Lift stations that will become a part of the SSWD wastewater collection system must be approved by the Idaho Department of Environment Quality prior to construction. DEQ may have additional requirements not contained in this specification. The engineer of any proposed lift station should consult with DEQ and obtain their Wastewater Pump Station Checklist prior to design. Lift stations located within the designated flood plain will need to meet the requirements of the City of Star for flood proofing.

C. ISPWC. Any requirement or specification not covered by this section shall conform to Division 500, Section 505, PRESSURE SEWERS, of ISPWC.

D. Lot. The lift station lot shall be dedicated to the District.

E. Deed Restrictions. The lift station will require 24-hour access. Furthermore, the lift station facilities will require exterior lighting for security purposes and a generator for standby power. The Developer shall, therefore, place the following deed restrictions on each lot sale located within 300 feet of the lift station site:

1. A disclosure statement stating that this lot is located within 300 feet of a potential municipal lift station site to be maintained and operated by the District.

2. Each lot owner, through purchase of said lot, must agree that the District's lift station site can be operated, improved, maintained and expanded as needed to meet present and future population needs as long as all operations, improvements, maintenance, and expansions meet State of Idaho Department of Environmental Quality regulations.

5.2 SUBMITTALS

In addition to subdivision development plan approval, preliminary equipment submittals must be submitted to and approved by the District Engineer prior to subdivision development plan review approval for any proposed sewage lift station. The submittal shall include, at a minimum, the following:

F. Drawings depicting plan, elevation and section views of proposed lift station, electrical and control diagrams.

G. Design criteria and calculations including:

1. Initial and ultimate service area flows (in coordination with District)

2. Wet well volume sizing. Basis: 5 pump starts per hour maximum per pump, 15 minutes emergency storage above high water alarm (if there is no permanent standby power unit with automatic transfer switch on site), and below incoming gravity sewer invert, at peak sewage inflow Maximum fill time at average design flow less than 30 minutes.

3. Pump and pressure main sizing including system curves for initial pump installation and ultimate size pumps. Minimum pressure main size is four (4) inch diameter. Minimum velocity at design pump rate is 2 feet per second.

4. Uplift or buoyancy potential of wet well. Minimum factor of safety is 1.5. Neglect soil friction in buoyancy calculations.

H. Catalog cut sheets of proposed pumps and related appurtenances.

5.3 PIPE, VALVES, AND FITTINGS

A. Materials

1. Pipe. Stainless Steel Pipe 304, Schedule 10, shall be used inside the confines of the wet well and shall be connected with stainless steel bolt pack. Pipe installed from outside the wet well to and through the adjacent valve manhole shall be cement mortar lined ductile iron and shall conform to AWWA C110 and C151 Specifications. All pipe (not buried) shall be grooved end joints that conform to ANSI A21.10/AWWA and AWWA C606 (Victaulic) unless otherwise approved by the District. If flanged ends are approved in writing, they shall have rubber gaskets meeting AWWA C111 Specifications. Pipe installed from the valve manhole to the point of discharge to a gravity sewer shall be polyvinyl chloride (PVC) water grade pipe Class 150, DR18, bell and spigot joints with elastomeric-gaskets conforming to AWWA C900 Specifications.

2. Fittings. Fittings not buried (including fittings in wet wells and vaults) shall be grooved end joints that conform to ANSI A21.10/AWWA and AWWA C606 (Victaulic) unless otherwise approved by the District. All fittings shall comply with the most current edition of the ISPWC.

   Bolts and nuts shall conform to the requirements of ASTM A449 and Section 05 50 00 – Metal Fabrications. Mechanical-type couplings shall be bonded. The Contractor shall have the coupling manufacturer's service representative verify the correct choice and application of couplings and gaskets, and the workmanship, to assure a correct installation. Grooving tools shall be of the same manufacturer as the grooved components.

3. Gate Valves. All gate valves shall meet the requirements of AWWA C-509, latest revision, and shall be flanged, cast iron body, non-rising stem, resilient seated gate, having a minimum working pressure of one-hundred and fifty (150) psi. Valves shall be as manufactured by Waterous, Clow or Tyler and shall have manufacturer's name and pressure rating marked on the valve body.

4. Check Valves. Check valves shall be Valmatic Surgebuster valves with the stainless steel position indicator and stainless steel backflow actuator.

5. Thrust Blocks. As required by Section 3.1.A.5 of these Standard Specifications.

6. Finder Wire. No. 12 AWG direct burial single strand copper. The wire shall be placed along the North and East side of the main and service lines. All wire joints shall be connected with a King "One Step" 30 V twist on watertight wire nut enclosure or approved equal.

7. Combination Sewage Air and Vacuum Relief Valves. Air and vacuum relief valves may be required depending on project specific design. Combination air/vacuum valves shall be ARI D-025 or D-2SB model, AV-Tek Inc Polyamide fiberglass reinforced model, or approved equal.

8. Identification Tape. Identification tape shall be two-inches wide with the marking “Caution – Buried Sewer Line Below”, or equivalent, in 1 ½-inch minimum black letters.

9. Flow Meters. As required in RSWWF 42.8. Flow meters shall be electro-magnetic flow meters manufactured by Endress+Hauser.

10. Alarm. As required in RSWWF 45.

11. Influent Isolation Valve. An influent isolation valve shall be installed on the sewer line(s) that discharge directly into the wet well within 400 feet of the wet well.

B. Workmanship

1. Excavation, Bedding and Backfill. This work shall conform to the applicable portions of Section 2.1 of these Standard Specifications.

2. Pipe. The handling and installation of the pipe shall be as required by Section 3.1(A) and (B), excepting Item 17, of these Standard Specifications.

3. Pipe Identification. Install identification tape 18 to 24 inches below subgrade over all pressure sewer pipes.

4. Testing. Pressure and leakage testing shall be made on all newly laid pipe or any valved section, or both. The District will monitor the tests as conducted by the contractor. The testing procedure shall be in general conformance to that specified in Section 3.1(C) - Testing, of these Standard Specifications.

5. Thrust Block. This work shall conform to the applicable portions of Section 3.1.16.

6. Check Valves. As required in RSWWF 42.52.

5.4 WET WELL

The wet well shall consist of pre-cast concrete, 72-inch or larger diameter manhole barrel sections and manhole base. All interior fasteners, anchors and miscellaneous hardware shall be stainless steel. The entire wet well shall be equipped with a Sprayroq coating, T-Lock PVC liner, or approved equal. Lid shall be HS-25 load rating. Interior steps must meet or exceed ASTM C-478, AASHTO M-199 and other applicable OSHA requirements. A crane base shall also be installed, where required by the District. Wet well shall be equipped with a safety grating underneath the wet well lid. Both lid and grating shall be equipped with pneumatic lift assisting devices.

5.5 SYSTEM PUMPS AND ACCESSORIES

A. General. These specifications and requirements apply to those lift stations proposed to serve a small service area (approximately 500 equivalent residential units). Lift stations proposed to serve larger service areas will be evaluated on a case-by-case basis. The requirements of larger lift stations may be significantly different from the specifications contained in this section.

B. Pumps. The lift station shall be a duplex pump station. Each pump shall be capable of pumping 110% of the projected peak flow generated by its service area. The pumps shall be submersible, non-clog, solids handling pumps capable of passing three-inch solids. The impellers shall be single channel with sloped deflector edge at the impeller blade, adjustable bottom plate with spiral shearing edges, suction inlet with wave shaped tearing edges and coarsely toothed shearing ring on the upper side of the impeller. Pump shall have 6-inch discharge piping and flange connection. Pumps shall be installed 12” off the bottom of the wet well.

C. Motors. Pump motors shall be of explosion-proof design conforming to NFPA 820 requirements. In addition, pump motors shall conform to NEMA MG-1 Part 31 requirements, and shall be a premium efficiency squirrel cage induction NEMA Design B electric motor conforming to the following:

ITEM	VALUE
Installation Environment	Submersible, Air Filled
Enclosure	Explosion Proof
Insulation Class	NEMA Class F or higher
Insulation	Non-Hygroscopic Polyester
Service Factor	1.10 Minimum
Synchronous Speed	1800 RPM Maximum (Variable)

ITEM	VALUE
Voltage	460
Phase	3
Frequency	60 Hz

D. Manufacturer. Submersible wastewater pumps shall be submersible non-clog wastewater pumps capable of pumping raw unscreened sewage in a NEC Class 1, Division 1, Group D hazardous location manufactured by Flgyt, a Xylem brand. Pump systems, including compatible electrical and control panels, made by other manufacturers may be considered if they substantially conform to the requirements listed in this specification. Such proposals must include complete manufacturer's literature, exceptions to the specifications listed herein, reference list of similar installations in place at least five (5) years and location of nearest service facility. Review and approval must occur prior to development plan approval. No substitutions will be considered after review and approval of the development plans.

E. Pump System Components

1. The pump system shall consist of the following components, many of which are manufactured by Flygt, a Xylem brand:

- Two pumps
- Carrier and sealing flange assembly.
- Base plate and elbow assembly
- Rail guide assembly and stainless-steel guide rail pipe with intermediate brackets every 20' of guiderail.
- Pump lifting chain with w/ 2-inch (minimum) diameter stainless steel.

  connecting ring to pump (cables not allowed)
- "Bulldog" type submerged pressure transducer (no floats) or an alternate as approved by the Engineer.
- Mixer pump or Flygt Flush Valve
- Control panel
- Alarm system
- SCADA system compatible with existing SCADA system
- Flow meters
- Bypass pumping valve assembly located downstream of the check valve and an isolation valve on the force main.
- Extension of cable and internet communication wiring and conduit

for SCADA control. SCADA programming shall be completed to operate and control lift station as determined by the District.

- A minimum of two cables (high definition and infrared) for closed caption television (CCTV) security cameras shall be installed to the building on site.
- Add seal leak sensor and relay, motor overtempt sensor and relay.

2. Pumps should be designed to operate on 480 volt, three-phase, 60 Hz, if possible. Pump shall contain an identifying attached tag showing manufacturer's name, model number and rating/capacity. Pumping equipment shall carry a five (5) year warranty as provided in Section 5.11(E) of these Standard Specifications.

3. Supports and Anchors. All pipe and other supports and anchors, lifting chains, excepting the supports integral with the pump and base plate-elbow, shall be stainless steel.

4. Sleeves. Where piping penetrates the wall or ceiling of the wet well or valve vault, the space between the pipe and adjacent surface shall be closed off with a watertight flexible connector. The connector shall be Kor-N-Seal® as manufactured by NPC, Inc., Milford, New Hampshire, or approved equal. No adhesives or lubricants shall be employed in the installation of the connector. The rubber for the connector shall comply with ASTM C443 and ASTM C923 and consist of EPDM and elastomers designed to be resistant to the corrosive atmosphere of a pumped sewage environment.

F. Workmanship

1. Pumps. Pumps shall be installed in strict accordance with the manufacturer's instructions and recommendations. The piping adjacent to the pumps shall be supported such that no weight is carried on the pump casings. The pump shall operate at the specified system fluid temperature without vapor binding and cavitation, is non-overloading in operation and operates within twenty-five (25) percent of the midpoint of the published maximum efficiency curve. The contractor shall align and verify alignment of the pump and piping prior to start up.

2. Supports, Anchors and Sleeves. All work shall be done in a workmanlike manner and in accordance with the approved construction plans.

5.6 ACCESS DOORS

A. Materials

1. Wet Well Access Door and Frame. The frame and door shall be aluminum with mill finish. The frame and door shall support a live load of 300 pounds per square foot with a deflection of the door not to exceed 1/180 of the span. The frame shall include accessories for attachment of the stainless-steel pump removal guide rails. The aluminum cover shall

be equipped with a hasp lock to accept the lock standard to the Wastewater Department. The frame shall have attached anchor rods to secure its placement in the concrete cover. All aluminum frame exterior surfaces shall be coated with bituminous coating where in contact with concrete. The access door shall be equipped with a safety grate.

2. Valve Vault Access Frame & Cover. This frame and cover shall be cast iron as manufactured by Baxter Foundry, or an alternate as approved by the Engineer, as shown by Standard Drawing 7.19(S).

B. Workmanship. The contractor shall:

1. Submit shop drawings showing the exact location of all access units and complete product data.

2. Verify that rough openings for the door and frame are correctly sized and located, if not cast into the concrete cover.

3. Install units in accordance with the manufacturer's instructions.

4. Install frames level and secure rigidly in place.

5. Position frames to provide convenient access to the concealed work requiring access.

5.7 DISCHARGE MANHOLE

Discharge will not be allowed into existing manholes. The force main shall discharge into a new manhole installed upstream of the gravity sewer. The discharge manhole shall be constructed in accordance with Section 4.3. Sewage shall flow from the discharge manhole to the gravity sewer by an appropriately sized sewer pipe. The discharge manhole shall be smoothly coated, prior to discharge of any sewage into the manhole, with Sprayroq liner, Strong Seal Sewper Coat®, T-Loc®, or prior approved equal.

5.8 ELECTRICAL

A. Materials

1. General. All electrical and instrumentation materials shall conform to all applicable local, state and federal codes, standards and requirements. Where the specifications listed herein conflict with any local, state or federal code, standard or requirement, the applicable code, standard or requirement shall take precedence. Electrical equipment in wet well or enclosed spaces must meet National Electrical Code for Class I, Group D, Division 1 locations and be suitable for corrosive conditions.

2. Conduit

a. Rigid Metal Conduit. All conduit exposed to moisture or damage shall be standard weight galvanized steel conduit unless

otherwise indicated on drawings.

b. Intermediate Metallic Conduit (IMC). IMC may be used where rigid is specified or where permitted by code.

c. All systems of conduit must be installed completely before conductors are pulled in.

d. Raceway ends shall be capped during construction. Conduits in which water or foreign matter has accumulated shall be thoroughly cleaned to the satisfaction of the Engineer or be replaced.

e. A tagged #12 AWG galvanized, or nylon, pull wire shall be provided in all empty conduits with at least eighteen (18) inches coiled free at each end. Only tags with a metal rim, made for this purpose, shall be used.

f. Rigid metal conduit shall be installed in accordance with the requirements of the NEC. All conduit joints shall be cut square, threaded, reamed smooth and made up tight. Bends or offsets shall be made with standard conduit ells. Field bends shall be made with approved hickey and conform to NEC limitations.

g. Minimum conduit size for motor feeders is one and one-half inch diameter (1 ½").

3. Conductors

a. Conductors shall be copper unless otherwise specified.

b. The insulation for conductors size #8 and smaller shall be type THWN or THHN.

c. Conductors shall be sized according to the drawings. Wire size #8 and larger shall be stranded. Minimum wire size shall be #12 except where specified otherwise for signal and pilot control conductors.

d. Conductors shall not be pulled into conduit until cabinets and outlet boxes are free of foreign matter and moisture.

e. Conductors shall be continuous from outlet to outlet.

f. All conductors shall be installed in conduit.

g. Motor feeders shall be copper, type RHW or TW for sizes 10 and 12, and THWN for larger sizes, installed in rigid galvanized metal conduit. Motors shall be grounded with a visible green ground wire attached to the nearest know system ground point.

h. Internal panel wiring shall be color-coded and any wiring leaving the panel shall pass through properly numbered or coded terminal strips. Every switch, control relay, circuit breaker, wiring and other component, either inside or outside the control panel shall be visibly identified by permanently attached phenolic plates.

4. Receptacles. Convenience receptacles shall be duplex, ground fault interrupting type, 20 ampere, 125 volts rated.

5. Cover Plates. Cover plates shall be stainless steel or approved equal.

6. Service Entrance and Equipment

   a. Service entrance shall be underground as shown on the drawings.

   b. Service entrance equipment shall be rated and labeled for use as service entrance equipment, and as shown on the One-Line Diagram and Equipment List on the drawings.

   c. Grounding. (1) All electrical panelboards and equipment shall be grounded in accordance with the requirements of the NEC. The neutral bus of panelboards shall be grounded to the system ground and adjoining sections of switchgear bonded together. (2) No portion of the electrical system shall be energized until the service ground has been connected.

7. Disconnect Switches. Furnish and install heavy-duty switches in the Control Panel as shown on the drawings, and horsepower rated where required.

8. Motor Starters. Pumps shall be operated and controlled by Allen-Bradly soft starts. These soft starters shall be installed inside a motor starter panel (MSP), unless otherwise indicated. Soft starts shall be suitable for use with motors, providing adjustable acceleration rate control using voltage or current ramp. Provide adjustable starting torque control with up to 450 percent current limitation for 10 seconds. Provide surge suppressor in solid-state power circuits to provide 3-phase protection against damage form supply voltage surges 10 percent or more above nominal line voltage. Provide snubbers to prevent malfunction due to system voltage transients. Provide overload protection for NEMA Class 10 or better. Provide LEDs to indicate motor and control status including control power available, controller on, overload trip, loss of phase, and shorted SCR. In addition, provide the following.

   a) Provide automatic voltage reduction controls to reduce voltage when motor is running at light load.

   b) Provide a motor running contactor to operate automatically when full voltage is applied to motor. Controller shall operate as a magnetic motor controller except during starting of motor.

   c) H-O-A On-Off buttons, and ETM.

   d) 0-120 second soft start and soft stop time. Adjust acceleration and deceleration time per Engineer's direction.

e) Provide ancillary items required to meet the following control requirements:

1. Accept start/stop signal from SCADA system that will be provided by others.

2. Connectivity via Ethernet/IP

f) Control power transformer shall be supplied for all local power and control requirements.

9. SCADA Equipment. Provide SCADA system components that are compatible with the District's existing SCADA system. Components shall include DSL gateway connected to Sparklight internet service provider, PLC, and RTU panel. The developer shall compensate the District $5,000 for third party programming and start-up services associated with the SCADA system and CCTV.

10. Intrinsically Safe Relays. Furnish and install intrinsically safe relays in the Control Panel as shown on the drawings.

11. Control Panel

a. Furnish and install a duplex pump station control panel manufactured by Flygt Pumps as shown on the drawings. The panel shall be UL listed, NEMA 4 steel and shall house the manual transfer switch, motor disconnect switches, starters, circuit breakers, elapsed time meters, alternator, automatic dialer, intrinsically safe relays, service receptacle, heater, generator receptacle and electronic control. The panel, all its components and wiring shall be in accordance with the latest NEC Code. The panel shall be divided into two compartments housing the control and power sections separately. The power circuits shall not interfere with the proper operation of the control circuits.

b. The control panel shall contain a hand-off-auto control switch, pump running light (green), automatic mode indicator light (amber), manual mode indicator light (blue), pump fail indicator light (red), high water level indicator light (red), elapsed time meter (non-resettable), circuit breaker disconnect, and starter overload reset push button for each pump. The indicating lights, push buttons and selector switches shall be rated heavy duty, oil tight.

The PLC installed as part of the SCADA system shall be used in pump control when in the "auto" mode.

c. Control panel shall conform to "Typical Lift Station Control Panel" drawings, Sheets E-01 through E-09.

12. Standby Power Generator. Standby power generator will be provided capable of powering all electrical gear for ultimate flow conditions of the

lift station. Manufacturer shall be Cummins, CAT, Kohler, Bluestar, or approved equal. Manufacturer shall have an authorized service shop within 50 miles of Star, Idaho. Preferred fuel source is diesel, but other fuel sources will be considered. Generator fuel tank shall be full prior to acceptance of the District. The sound enclosure and baffling shall reduce sound level from the generator at full load to 69 dBA or lower at a distance of 23 feet from the generator. Generator package shall include the ability to bring the following into the lift station Program Logic Controller, (PLC); battery volts, motor rpm, oil pressure, motor temperature, fuel level, runtime hours, generator Hz, generator amps, volts for L1-L2-L3. A separate conduit path shall be provided to bring this information from the generator to the PLC. Any special cable, wire, or communication equipment to communicate between the generator and the PLC shall be provided.

13. Automatic Transfer Switch. The transfer switch shall be automatic type with positive mechanical interlock to prohibit simultaneous connection to utility and standby power. ATS shall be manufactured by the same supplier as the generator.

14. Transducers. A submersible pressure transducer manufactured Blue Ribbon (or approved equal) shall be installed in the wet well for monitoring of the wet well liquid levels.

15. Identification. Nameplates shall be provided and installed for identification of main service disconnects, switchboards, lighting control equipment, panelboards, motor starters, contactors, relays, safety switches and system junction boxes. Identification nameplates shall be made of laminated phenolic plastic, engraved to show white lettering on black background. The lettering shall be 3/16-inch minimum letter height. Nameplates shall be located on equipment exteriors, visible from working spaces and attached to the equipment with adhesive bond.

16. Circuit Index Cards. Typewritten index cards shall be provided for branch circuit panelboards to identify areas and equipment served by individual circuits. Each panelboard circuit index card shall be installed under transparent protective cover and set in metal frame on inside of panel door.

17. Conductor Disconnect Junction. All conductors from the wet well (pump conductors) to the control panel shall pass through an explosion-proof junction box. The conductors shall be connected within the junction box with proper connections per electrical code. The conductors from the junction box to the control panel must pass through a seal-off. All conductors must be contained in rigid conduit from the wet well to the junction box to the control panel.

B. Workmanship

1. Standards. All electrical work shall be executed in strict accordance with the following:

- National Electrical Code.

- State of Idaho and local rules and regulations.

If there is any conflict between these drawings and specifications and the applicable codes, rules and regulations, the codes, rules and regulations apply.

2. Permits and Inspections. The contractor shall obtain and pay for all required permits and inspections in connection with this work.

3. Tests. The contractor shall completely test the electrical system to assure that circuits are wired as called for on the drawings and shall test the system for grounds and short circuits.

4. UL Listings. All equipment and material supplied shall be UL listed where UL is applicable.

5. Storage and Protection of Materials. Provide storage for materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare. Protect completed work, work underway and materials against loss or damage. Close circuit openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt or damage caused by water, chemicals or mechanical accident.

6. Field Measurements. Verify all measurements at the site and become fully acquainted with the existing conditions before beginning work.

7. Coordination. The contractor shall coordinate the work under this section with the work being done under other sections. The contractor shall promptly notify the Engineer of any conflicts within the Plans and Specifications. All changes required in the work of the contractor as a result of his failure to notify Engineer shall be made by the contractor at his own expense.

8. Shop Drawings. The design engineer shall be responsible for review of shop drawings and equipment submittals. Two complete sets of the shop drawings and other submittals shall be submitted to the District prior to installation of the lift station and equipment.

9. Telephone Company. The developer and/or contractor shall coordinate with the telephone company as to the termination point at the property line of a black one (1) inch PVC, with pull wire, for their service.

10. Power Company. The developer and/or contractor shall coordinate with the power company for permanent power service and, if necessary, temporary power. The developer and/or contractor shall be solely responsible for any and all costs associated with providing temporary and permanent power to the lift station.

11. Cable Company. The developer and/or contractor shall coordinate with the cable company to install a permanent cable service.

12. Gas Company. The developer and/or contractor shall coordinate with the

gas company to install a permanent gas service.

13. Should the Contractor fail to comply with the requirements of this section concerning Record Drawings, final approval and acceptance shall be delayed.

5.9 SITE IMPROVEMENTS

A. Fencing. The lift station site shall be enclosed with an six feet high chain link fence with 3 strands of barbed wire above the chain link fence. Minimum dimensions of the fence shall be 16' x 24' but may be larger depending on location, orientation and configuration of lift station site. One double leaf 12' gate and one man gate shall be provided. Component materials and dimensions are as follows:

Component	Material	Dimension
Line Posts	Type 1 round	1.875 inch
Corner/Terminal Posts	Type 1 round	2.875 inch
Man Gate Posts	Type 1 round	3.5 inch
Vehicle Gate Posts	Type 1 round	6.875 inch
Top/Brace Rail	Type 1 round	1.66 inch
Gate Frame	Type 1 round	1.66 inch
Fabric		9 gage, 2 inch mesh
Tension Wire	Steel	6 gage
Tie Wire	Galvanized steel wire	

Line post spacing shall not exceed ten feet. Caps shall be cast steel galvanized with set screw retainer. Fittings (i.e. sleeves, bands, clips, rail ends, tension bars and fasteners) shall be steel. Gates shall be equipped with center gate stop and drop rod, three 180 degree hinges per leaf and hardware for padlock. Components and fabric shall be galvanized per ASTM A123, 2.0 oz/sq. ft. coating. Hardware shall be galvanized per ASTM A153, 2.0 oz./sq. ft. coating. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Lighting. A minimum of one LED overhead light with motion detector shall be installed within the fenced lift station area. The light shall be mounted on a 15-foot pole adjacent to the control panel. The light shall be operated by a weather-proof manual one-way switch and by motion detector.

C. Access Road. An all-weather gravel access road shall be constructed from the street to the lift station. The entire area within the fenced lift station area shall consist of 6" of 3/4" minus road-mix. Landscaping on the lift station lot shall not be installed without review approval of the District Engineer.

D. Yard Hydrant. A water service, including meter (see Drawing 7.05(W)), shall be installed to the lift station lot capable of delivering not less than 80 GPM of

potable water. A non-freeze, 2 1/2" yard hydrant shall be installed at the lift station for clean up purposes at a location to be determined during plan review and approval. A reduced pressure backflow assembly approved and inspected by the Water Department shall be installed. The developer shall be responsible for any and all permits and fees associated with installation of the water service, water meter and backflow assembly.

E. Lift Station Building. For permanent lift stations, the electrical, communication, generator, and other gear determined by the District shall be enclosed inside a CMU block building. For temporary (as determined by the District) lift stations, aforementioned gear shall be enclosed in a wood building.

5.10 SYSTEM START UP

A. General. The contractor shall:

1. Coordinate a schedule for start-up of various equipment and systems.
2. Notify the Design Engineer, the District engineer and Wastewater Superintendent seven (7) days prior to start-up of each item.
3. Clean wet well of all construction debris and grit prior to starting pumps to prevent damage.
4. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
5. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
6. Verify wiring and support components for equipment are complete and tested.
7. Execute start-up under supervision of responsible manufacturer's representative and Contractor's personnel in accordance with manufacturer's instructions.
8. Conduct a minimum of two drawdown test and provide results of test on pump curves. Test results shall confirm that pumps operate within there design curves and are consistent with the design flows. Pumps that do not meet these requirements will need to be adjusted or replaced.
9. Submit a written report that equipment or system has been properly installed and is functioning correctly.

B. Demonstration and Instruction. In addition to the requirements of Section A above, the contractor shall:

1. Demonstrate operation and maintenance of the system to SSWD personnel prior to final acceptance. The contractor shall provide the equipment manufacturer's representative for a minimum of one (1) day of training SSWD personnel. The contractor shall coordinate and schedule

demonstration of the system with the District.

2. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with SSWD personnel in detail to explain all aspects of operation and maintenance.

3. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.

4. Prepare and insert additional data in operations and maintenance manuals

5.11 STATION COMPLETION REQUIREMENTS

The contractor shall complete the following for station approval and acceptance:

A. Final Cleaning.

1. Execute final cleaning prior to final inspection.

2. Clean site; sweep paved areas, rake clean landscaped surfaces.

3. Remove waste, surplus materials and construction debris from the site.

B. Adjustments. Adjust equipment to ensure smooth and unhindered operation.

C. Project Record Documents

1. Maintain on site, one (1) set of the following record documents:

   a. Contract Drawings.

   b. Specifications.

   c. O&M Manuals.

   d. Addenda.

   e. Change Orders and other Modifications to the Contract.

   f. Reviewed shop drawings, product date, and samples.

2. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

   a. Measured depths of foundations in relation to finish floor datum.

   b. Measured horizontal and vertical locations of underground utilities and appurtenances referred to permanent surface improvements.

   c. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.

d. Field changes of dimension and detail.

e. Details not on original, approved Contract Drawings.

f. Submit documents to design engineer and District Engineer with written request for final approval and acceptance.

g. Product substitutions or alternates utilized.

D. Operation and Maintenance Data

1. Three (3) Operation and Maintenance manuals, bound in 8-1/2 x 11 inch pages, D-size three ring binders with durable plastic white covers, are ultimately required prior to final acceptance. Operation and Maintenance Manuals shall be prepared in accordance with Secti0n 425 of the "Wastewater Rules" (IDAPA 58.01.16) and shall be reviewed and approved by the Department of Environmental Quality prior to final acceptance of the lift station.

2. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of project.

3. Internally subdivide the binder contents with permanent page dividers, logically organized as described below with tab titling clearly printed under reinforced laminated plastic tabs.

4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, type on thirty (30) pound white paper in the following general organizational layout:

Part 1: Directory listing names, addresses, and telephone numbers of design engineering, contractor, subcontractors, and major equipment suppliers.

Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by specification section. For each category, identify names, address and telephone numbers of subcontractors and suppliers. Identify the following:

a. Significant design criteria.

b. List of equipment.

c. Parts list for each component.

d. Operating instructions.

e. Maintenance instructions for equipment and systems

f. Electrical

Electrical to include switchgear, manufacturer's recommended maintenance and operation instructions, parts list with name, address and phone number of local source of replacement parts.

Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.

b. Certificates.

c. Photocopies of warranties.

5. Submit one (1) copy of completed volumes in final form fifteen (15) days prior to final inspection. This copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final submittal.

6. Submit final four (4) revised volumes prior to final acceptance.

E. Warranties

1. Provide duplicate notarized copies.

2. Submit prior to request for final approval and acceptance.

3. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

F. Spare Parts and Maintenance Materials

Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections. Deliver spare parts, extra materials and other required products to Wastewater Department; obtain receipt prior to final approval and acceptance. At a minimum, spare parts shall include:

a. (1) spare pump and motor

b. (5) spare fusses of each size

c. (1) spare relay of each size

d. (1) spare transducer with cable

●● END OF SECTION ●●