BIG SKY COUNTY WATER
&
SEWER DISTRICT

STANDARD
SPECIFICATIONS
&
DRAWINGS

Revised: July 2010

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BIG SKY WATER & SEWER DISTRICT NO. 363 MODIFICATIONS TO MONTANA PUBLIC WORKS 6TH EDITION, April 2010 FOR WATER & SEWER MAIN EXTENSIONS

GENERAL INFORMATION

FORWARD

The Big Sky Water & Sewer District No. 363 (BSWSD) has unique requirements which are not addressed in the *"Montana Public Works Standard Specifications"*, Sixth Edition, April, 2010 (MPWSS). As a result, the BSWSD Modifications to Montana Public Works Standard Specifications and Standard Drawings – Sixth Edition, was created. This document addresses those specific requirements which the BSWSD has pertaining to water and sewer utility projects not addressed in the MPWSS. All public water and sewer utility projects for the BSWSD shall be done in accordance with MPWSS and those BSWSD Modifications to MPWSS.

Where a BSWSD modification to MPWSS does not exist for a particular Section of MPWSS, the reader shall assume the work is to be completed in accordance with the appropriate MPWSS Section. When a BSWSD modification to the MPWSS does exist the requirements of that modification supersede the related MPWSS requirement. The same holds true for BSWSD Standard Drawings; however, there are some BSWSD Standard Drawings which do not replace or supersede the MPWSS Standard Drawing, but are additional drawings created specifically for the BSWSD.

Each Section of the MPWSS that has been modified is listed in the Table of Contents of these *"BSWSD Modifications to Montana Public Works Standard Specifications and Drawings."* The entire Section from the MPWSS has not been rewritten for these modifications. Instead, modifications are indicated for a specific subsection, paragraph, sentence or drawing.

Appendixes A of these modifications contain a list of MPWSS Standard Drawings followed by the words "Deleted", "Replaced", or "Active". "Deleted" indicates that the drawing is not to be used. "Replaced" indicates that the drawing has been replaced by a BSWSD Standard Drawing and Active" means that the drawing is useable as shown in MPWSS. Appendix B contains a list of BSWSD Standard Drawings.

The BSWSD intends to revise this document on an as-needed basis. Written comments on the *"BSWSD Modifications to Montana Public Works Standard Specifications and Drawings"* may be submitted to its Operations Manager. A form for submitting suggested changes can be found in Appendix C.

Additional copies of the BSWSD Modifications to Montana Public Works Standard Specifications and Drawings may be obtained from the office of the BSWSD, located at 561 Little Coyote Road, Big Sky, Montana 59716, or by calling the BSWSD office at 406-995-2660, and arranging for a copy by regular mail or electronically mail.

INSTRUCTION TO BIDDERS

Any contract documents for which the Big Sky Water & Sewer District (BSWSD) acts as the contracting agent, (i.e., signatory to the contract), shall include the following additions or changes to the Montana Public Works Standard Specifications.

BID QUANTITIES Bidders must satisfy themselves by personal examination of the locations of the proposed work and by such other means as they may prefer as to the correctness of any quantities.

The estimated unit quantities of the various classes of work to be done under this contract are approximate and are to be used only as a basis for estimating the probable cost of the work and for comparing the proposals offered for the work. The Contractor agrees that, during progress of the work, the Owner may find it advisable to omit portions of the work to increase or decrease the quantities as may be deemed necessary or desirable, that the actual amount of work to be done and materials to be furnished may differ from the estimated quantities, and that the basis for payment under this contract shall be the actual amount of work done and the materials furnished.

The Contractor agrees that he will make no claim for damages, anticipated profits or otherwise on account of any difference which may be found between quantities of work actually done and the estimated quantities.

BID REQUIREMENTS The Bidder is expected to base his bid on materials and equipment complying fully with the plans and specifications and, in the event he names in his bid materials or equipment which do not conform, he will be responsible for furnishing materials and equipment which fully conform at no change in his bid price.

Before submitting a proposal, each Contractor should read the complete Contract Documents (including all addenda), specifications and plans, including all related documents contained herein, all of which contain provisions applicable not only to the successful Bidder, but also to his subcontractors.

EXAMINATION Examine documents and conditions at existing site carefully. No extra payments will be given for conditions which can be determined by examining documents and existing conditions.

QUESTIONS Submit to Engineer. Replies will be issued to Bidders of record as addenda. Engineer and the Owner shall not provide nor be responsible for any oral clarification.

PROPOSAL

1. The Bidder shall submit his proposal on the forms bound in these Contract Documents. Neither the proposal nor any other pages bound herein or attached hereto shall be detached.

2. Proposals shall be in a sealed envelope and addressed to:

Big Sky Water & Sewer District
PO Box 160670
Big Sky, MT 59716

The envelope shall also contain the following information:

a. Name of Project
b. Name of Contractor
c. Montana Certificate of Contractor Registration Number
d. Acknowledge Receipt of Addendum No.(s): ____ , _____
e. In the lower left-hand corner of the envelope print or type: BID DOCUMENTS – DO NOT OPEN UNTIL_____P.M., on 201__.

3. Proposals shall be made in accordance with the following instructions:

a. Submit on copy of the complete bound documents in an opaque sealed envelope. DO NOT REMOVE THE PROPOSAL NOR ANY OTHER PAGES FROM THE BOUND CONTRACT DOCUMENT.

b. Bids shall be made in ink upon the unaltered Bid Proposal Form supplied with these documents.

c. All blank spaces must be properly filled.

d. The total bid price must be stated in both writing and in figures. In case of a discrepancy between unit price and total bid price, the unit prices or lump sum prices shall be used in computing the total bid price.

e. The proposal form shall contain no addition, conditions, stipulations, erasures, or other irregularities.

f. The proposal must acknowledge receipt of all addenda issued.

g. The proposal must be signed in ink and display the Bidder's name, address, and correct Montana Contractor's Registration Number.

SIGNING OF BIDS

a. Bids which are not signed by individuals making them shall be attached thereto a Power of Attorney evidencing authority to sign the bid in the name of the person for whom it is signed.

b. Bids which are signed for a co-partnership shall be signed by all of the co-partners or by any attorney-in-fact. If signed by an attorney-in-fact, there shall be

attached to the bid a Power of Attorney evidencing authority to sign the bid.

c. Bids which are signed for a corporation shall have the correct corporate name thereof signed in handwriting or in typewriting and the signature of the president or other authorized officer of the corporation shall be manually written below the written or typewritten corporate name following the work:

By:

Corporate Seal:

Title:

d. If bids are signed for any other legal entity, the authority of the person signing for such legal entity should be attached to the bid.

TELEGRAPHIC MODIFICATION Any Bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing for receipt for bids. The telegraphic communication shall not reveal the bid price, but shall only provide the addition or subtraction from the original proposal. Telegraphic proposal modifications must be verified by letter. This written confirmation shall be received no later than three (3) working days following the bid opening or no consideration will be given to the telegraphic modification.

LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT The successful Bidder, upon his failure or refusal to execute and deliver the contract and bonds required with then (10) days after he has received notice of the acceptance of his bid, shall forfeit to the Owner as liquidated damages for such failure or refusal, the security deposited with his bid, as provided in Chapter 5, Section 6-501, Revised Codes of Montana, 1947.

GROSS RECEIPTS WITHHOLDING In accordance with Section 15-50-206, Montana Code Annotated, the BSWSD must withhold one percent (1%) of incremental payments due the Contractor for remittance to the department of Revenue for any contract greater the $5,000.00.

SPECIAL PROVISIONS

Any contract documents for which the Big Sky Water & Sewer District (BSWSD) acts as the contracting agent, (i.e., signatory to the contract), shall include the following additions or changes to the Montana Works Standard Specifications.

1. GENERAL

The Big Sky County Water & Sewer District No. 363 (BSWSD) requires that all persons comply with all rules and regulations of the BSWSD's Sewer and Water Use Ordinances 97-1001 and 99-1002 respectively in the planning and construction of any sewer and water main extensions within the District's Boundaries. All work shall be performed in accordance with applicable sections of the Montana Public Works Standard Specifications, Sixth Edition, April, 2010, including all its references, which by this reference are hereby included as part of this specification as modified herein by the BSWSD, and all agendas. The following special provision items are included to complement the specifications and to clarify those items and issues that are unique to Big Sky. Unless specifically addressed in the MPW Standard Specifications, the Special Provisions for Water & Sewer Main Extensions and the BSWSD's Sewer and Water Use Ordinances, all work must comply with the locally applicable laws, codes and regulations. In the event of differing requirements, the most stringent shall apply. For items not specifically addressed by the Special Provisions, the most recent edition of the MPW Standard Specifications will apply.

All correspondence and official authorization concerning the work shall be with the BSWSD or the BSWSD's designated representatives as identified at the preconstruction meeting. Any changes in the work or schedule not authorized by the above shall be deemed as unauthorized and shall be done at Contractor's risk at no cost to the Owner. All damages, reparations and costs thus incurred during the progress of such unauthorized work shall be borne exclusively by the Contractor

2. AWARD OF CONTRACT

The award of the contract, if awarded, will be made within the period specified in the Invitation to Bid to the lowest responsible Bidder whose bid complies with all the requirements prescribed herein. The successful Bidder will be notified by letter, mailed to the address shown on the bid, that his bid has been accepted and that he has been awarded a contract. The bid schedules may be awarded singly as separate contracts, or in any combination of schedules which result in the lowest project cost to the Owner.

3. TIME OF COMMENCEMENT AND COMPLETION DATE

The beginning of the contract time shall be stated in a written NOTICE TO PROCEED written by the BSWSD's Operations Manager (Manager) to the Contractor. In establishing the date when contract time begins, the Manager will consider that the contract time begins following delivery of the NOTICE TO PROCEED. The contract time will expire automatically the number of calendar days stated as contract time, except as the contract time may be extended by change

order. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the seventy-fifth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

4. LIQUIDATED DAMAGES

Subject to the provisions of the contract documents, the Owner shall be entitled to liquidated damages for failure of the Bidder to complete the work within the specified contract time.

The Bidder agrees to pay liquidated damages for compensation to the Owner for expenses incurred by the Owner during the contract time overrun.

As compensation for expenses incurred, the Contractor shall be assessed a liquidated damage of $\$$_____ per calendar day for each day that the work remains uncompleted beyond the contract period. Liquidated damages shall be paid be deduction from monthly progress payments and the final payment.

5. COST LIMITATIONS

The Owner reserves the right to eliminate or reduce certain proposal items from the project following the bid opening to make the project financially feasible with the limitations of the funds allocated for this project. The determination of which items shall be eliminated shall be the responsibility of the Owner.

6. NAMES, PRODUCTS AND SUBSTITUTIONS

Where products or materials are specified by manufacturer, trade name, or brand, such designations are intended to indicate the required quality, type, utility and finish. Requests for proposed substitution shall include complete specifications and descriptive data to prove the equality of proposed substitutions. Substitutions shall not be made without the written approval of the Owner. No substitutions will be considered until after contract award.

7. APPROVAL OF EQUIPMENT AND MATERIAL

The Contractor shall furnish to the Owner or its Engineer for approval the name of the manufacturer of machinery, mechanical and other equipment and materials which he contemplates using in execution of the work, together with the performance capacities and such other information which may be pertinent or required by the Owner.

8. BIDDER'S QUALIFICATIONS

The Contractor shall show evidence that he has the finances, organization and equipment to perform the work with a limited number of subcontractors. The Contractor will be required to have a full-time resident General Superintendent on the job at all times while the work is in progress. He shall be in a position to direct the work and make decisions either directly or

through immediate contact with his superior. Absence or incompetence of the Superintendent shall be reason for the Owner to stop all work on the project.

9. WARRANTY

If, within one year after acceptance of the work by the Owner, any of the work is found to be defective or not in accordance with the Contract Documents, and upon written notice from the Owner, the Contractor shall correct any work beginning within seven (7) calendar days of said written notice. Should the Contractor fail to respond to the written notice within the designated time, the Owner may correct the work at the expense of the Contractor.

10. SCHEDULING

Prior to or at the PRECONSTRUCTION CONFERENCE, the Contractor shall provide the Manager and Project Engineer the following schedules:

A. A practicable CONSTRUCTION PROGRESS SCHEDULE showing the order, timing and progress in which the Contractor proposes to prosecute the work. This schedule shall be in bar graph, CPM or PERT format. The schedule shall be updated and re-submitted as necessary to reflect project changes.

B. A PAYMENT SCHEDULE showing the anticipated amount of each monthly payment that will become due the Contractor in accordance with the Construction Progress Schedule.

11. PRECONSTRUCTION CONFERENCE

After the contract(s) have been awarded, but before the start of construction, a preconstruction conference attended by the Contractor, Engineer, the resident project representative and a BSWSD representative will be held at the BSWD office at 561 Little Coyote Road, Big Sky, Montana, for the purpose of discussing requirements on such matters as project supervision, on-site inspection, progress schedules and reports, payrolls, payment to contractors, contract change orders, insurance, safety and any other items pertinent to the project. The Contractor shall arrange to have all supervisory personnel and a representative from each of the affected utility companies connected with the project to attend the meeting to discuss the project and any problems and issues anticipated.

The Contractor shall also provide for the District's approval a plan showing any flow by-pass plans to be used to continue water & sewer service during construction, or water main shutoffs during construction. If construction has the potential to effect roads and traffic, a traffic control plan must submitted to the District before the pre-construction meeting.

12. PROJECT REPRESENTATIVE

The Owner/Developer's Engineer will furnish a full time Resident Project Representative to provide inspection of any and all work that will eventually be accepted by the District. This will include, but is not limited to, all trench excavation, pipe bedding, materials, and testing that is required by these specifications and the MPW Standard Specifications. This representative is

required to be on site at all times during construction. Digital video and/or photographs should be taken of all significant connections. Any and all deviations from approved plans need to be measured and recorded so as to have an accurate set of as-constructed drawings. The Engineer shall provide the BSWSD with a resume of the Resident Project Representative qualifications for the BSWSD'S approval at least five working days before the pre-construction meeting is held.

13. SHOP AND FABRICATION DRAWINGS

The Contractor shall prepare and submit fabrication drawings, design mix information, material testing compliance data, and other data in accordance with the General Conditions. Following review, the Contractor shall resubmit copies of any drawings which required revision or correction.

Any review by the Owner will not relieve the Contractor from responsibility for errors or omissions, inadequate design performance requirements, schedule requirements and proper operation of any item required under the Contract. Not withstanding any such review, Contractor shall remain solely responsible for full and complete performance in accordance with the terms, conditions, provisions, drawings and specifications set forth in the Contract Documents.

14. PROTECTION OF EXISTING WATER AND SEWER UTILITIES

The BSWSD shall be notified by the Underground Utility Locate Center (1-800-424-5555) before any work at or near existing sewer and water lines commences. The Contractor shall take all necessary precautions to protect the BSWSD's sewer and water mains and flows when and if they are exposed by work. The Contractor shall be responsible for removing any debris or other material that may inadvertently enter the BSWSD's collection system through manholes or open mains by BSWSD's approved method. In addition the Contractor is prohibited from discharging or causing to be discharged any waste or substance to the public sewer system as specified in the BSWSD's Sewer Use Ordinance. Flushing of water or sewer mains to the BSWSD's sewer collection system is prohibited without prior written approval of the BSWSD.

15. UNDERGROUND UTILITIES

The Contractor shall be responsible for checking with the Owners of the underground utilities such as the County, power and telephone companies, etc., as to the location of their underground installations in the project area. The Contractor shall be solely responsible for any damage done to these installations due to failure to locate them or to properly protect them when their location is known.

It shall be solely the responsibility of the Contractor to fully coordinate his work with the agencies and to keep them informed of his construction activities so that these vital installations are fully protected at all times.

A Montana Once-Call system (1-800-424-5555) has been established to facilitate requests for underground facility location information. The Contractor is cautioned that all utilities may not be on this system.

16. EASEMENTS, RIGHTS-OF-WAY, ADJOINING PROPERTY

The Contractor shall contain all of his construction operations within the easements and rights-of-way unless written approval is secured from the Owner of the adjoining property or written approval is given by the Owner to utilize the adjacent land area.

17. TRAFFIC CONTROL

A. GENERAL The Contractor shall at all times conduct his operations so that there is a minimum interruption in the use of Big Sky affected by the work. Exact procedures in this respect shall be established in advance of construction with the Manager.

Barricade function, design and construction shall conform to the latest edition of the Manual on Uniform Traffic Control Devices and the Standard Specifications for Road and Bridge Construction of the State Highway Commission, latest edition.

Should construction of the project require the closure of any streets, roads or highways or require night-time or long-term traffic control, the Contractor shall be required to prepare a detailed TRAFFIC CONTROL PLAN to address the methods and means of controlling traffic under the specific conditions. In regards to closures, the plan shall include specific details on traffic detours and estimated duration of the closures. Details of signing, barricades, flagging and other traffic control devices shall be included, and the TRAFFIC CONTROL PLAN shall be approved by the operations manager of the BSWSD or his designated representative prior to construction.

B. TRAFFIC ACCESS Construction work shall be programmed by the Contractor so that local traffic will have continuous access within one block of any given property. It shall be the responsibility of the Contractor to notify all residents in the area of programmed work of street closures, parking requirements and restriction, and any other conditions, a minimum of twenty-four (24) hours prior to beginning work within the affected area. All signing, barricades and other traffic control measures shall be provided by the Contractor.

C. WARNING SIGNALS All streets, roads, highways and other public thoroughfares which are closed to traffic shall be protected by means of effective barricades on which shall be placed, mounted or affixed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.

All open trenches and other excavations within the construction area shall be provided with suitable barriers, signs and lights to the extent that adequate public protection is

provided. All abrupt grade changes greater than one inch which traffic is required to pass over, and obstructions, including but not limited to material stockpiles and equipment, shall be similarly protected.

All barricades and obstructions shall be illuminated by means of warning lights at night. All lights used for this purpose shall be kept burning from sundown to sunrise.

18. DISPOSAL, EROSION, WATER POLLUTION AND SILTATION CONTROL

The Contractor is responsible for proper disposal of all waste soils and materials unless otherwise directed herein. Where waste materials are disposed on private property not owned by the Contractor, evidence of property owner's written permission shall be obtained and provided to the Owner. Contractor shall comply with all local, state and federal laws and regulations pertaining to erosion control, fill in wetlands and floodplains. The Contractor shall dispose of all refuse and discarded material in an approved location.

The Contractor shall exercise every reasonable precaution throughout the life of the project to prevent pollution or siltation of rivers, streams or impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful wastes shall not be discharged into or alongside of rivers, streams, impoundments or into natural or manmade channels leading thereto. In addition, the Contractor shall conduct and schedule his operations to avoid muddying or silting of rivers, streams or impoundments. The Contractor shall meet the requirements of the applicable regulations of the Department of Fish, Wildlife and Parks, Department of Environmental Quality, the Department of Natural Resources & Conservation and other State or Federal regulations relating to the prevention or abatement of water pollution and siltation.

The Contractor's specific attention is directed to the Montana Water Pollution Control Act and the Montana Stream Preservation Act. The Contractor shall be responsible for obtaining any required discharge permits associated with erosion control and groundwater dewatering operations. Contractor's responsibility shall include all cleanup, restoration, etc., of any detention or discharge areas.

19. PROTECTION OF EXISTING PAVEMENT

All equipment shall be fitted with pads on the outriggers and other accessories as necessary to prevent damage to existing pavement during the course of the project. Any damages to pavement shall be corrected by the Contractor, at his expense, in a manner directed by the Engineer.

20. OPERATION OF EXISTING AND NEW VALVES

All existing BSWSD water main valves shall be operated by authorized personnel of the BSWSD only. The Contractor shall not operate any existing valves without the written consent of the BSWSD. When new or existing valves are used to take water from the BSWSD water distribution system, they shall be operated by BSWSD personnel only.

21. SALVAGEABLE ITEMS

Any items removed from the existing system under the terms of this contract shall remain the property of the BSWSD and shall be delivered to a site specified by the BSWSD. Should the BSWSD choose not to accept any salvageable items, then the Contactor shall dispose of those items at his expense at a site or landfill acceptable to the Engineer. Any costs for the above work shall be at the Contractor's expense.

22. ACCESS TO RECORDS

The Contractor shall allow access to any books, documents, papers or records which are directly pertinent to this Contract by the Owner, State or Federal agencies, or any of their duly authorized representatives for the purpose of making an audit, examination, excerpts or transcriptions.

23. FINAL INSPECTION, CERTIFICATION, RECORD (AS-CONSTRUCTED) DRAWINGS & FINAL CLOSE OUT DOCUMENTS

After a water or sewer main extension has been installed and tested, it shall be inspected for final acceptance by the Contractor and the Engineer. After the inspection, a punch list will be prepared by the Engineer listing the deficiencies or incomplete portions of the project. The extension will be conditionally accepted by the BSWSD at the BSWSD's sole discretion after the punch list items have been completed and a final walk through is done by a representative from the BSWSD, the Contractor and the Engineer. Final acceptance of the extension will be completed when the engineer has submitted the following:

1. Signed letter certifying that the project inspector was on site full time and can verify the extension has been completed according to the approved plans and specifications unless otherwise noted;

2. Stamped and signed as-constructed drawings consisting of two sets of blue line prints, a set of mylar plans consisting of full size sheets and a set consisting of 11 x 17 (ledger) sheets; Note: as-constructed drawings should only reflect exactly what was constructed and shall not include any items that were included on construction drawings not be constructed.

3. Copy of the as-constructed drawings in electronic form in AutoCAD Civil 3-D Release 2011 format;

4. Copy of all inspection filed notes and construction inspection photographs or video tapes; and

5. Summary spreadsheet listing final construction costs separated for sewer and water improvements

6. Copy of sub-meter accurate gps coordinates of all curb stops, fire hydrants, main line valves, sewer clean out and manholes converted to Universal Transverse Mercator (UTM) coordinates using WGS 84 datum.

24. INSURANCE

Insurance coverages required under this contract shall extend, at a minimum, to the end of the contract time.

SECTION 02660
WATER DISTRIBUTION

SECTION 02660

WATER DISTRIBUTION

PART 1: GENERAL

1.4 STANDARD DRAWINGS

Delete the following:

Delete: Standard Drawing No. 02660-1, Thrust Blocking for Water Main Fittings
Delete: Standard Drawing No. 02660-2, Water and Sewer Separation
Delete: Standard Drawing No. 02660-3, Trust Blocking for Water Main Valves
Delete: Standard Drawing No. 02664-4, Fire Hydrant Setting
Delete: Standard Drawing No. 02660-5, Hydrant Location Detail
Delete: Standard Drawing No. 02660-6, Water Service Line
Delete: Standard Drawing No. 02660-7, Blow-off Valve

Add the following:

BSWSD 21-01	Manhole Adjustment Detail
BSWSD 22-01	Water Valve Adjustment Detail
BSWSD 22-02 A	Typical Big Sky Utility Trench Details-1
BSWSD 22-02 B	Typical Utility Trench Detail with Pavement Surface Restoration 2
BSWSD 22-03	Trench Plug Excavation Detail
BSWSD 26-01	Thrust Blocking for Water Main Fittings
BSWSD 26-02	Water and Sewer Main and Service Separation
BSWSD 26-03	Thrust Blocking for Water Main Valves
BSWSD 26-04	Fire Hydrant Setting
BSWSD 26-05	Fire Hydrant Location Detail with Roadside Pull-out
BSWSD 26-06	Water Service Line
BSWSD 26-07A	Typical 2" Blow-off Hydrant
BSWSD 26-07B	Typical 2" Blow-off Valve
BSWSD 26-08	Bollard Placement at Fire Hydrant
BSWSD 26-09	Typical Steel Casing Pipe
BSWSD 26-10	Typical Valve/Tee Restraint
BSWSD 26-11	Water Main Crossing Below Existing Sewer Line
BSWSD 26-12	Water Service Line for sizes 4" and Larger
BSWSD 26-13	Standard Fire Service Line Installation for Class I, II, & III Systems
BSWSD 26-14	Standard Fire Line Installation Class IV and V Systems
BSWSD 26-15	Gate Valve & Valve Box with Thrust Block
BSWSD 26-16	Water and Sewer Main and Services Location Standards
BSWSD 26-17	Water Services Interior Clearances
BSWSD 26-18	Buried Water Service Line Insulation
BSWSD 26-19	Typical 6" x 2" PRV Station w/ 3" Relief
BSWSD 26-20 A	Mueller/Hunt 1" Single Meter Coil Pit
BSWSD 26-20 B	Ford 1" Single Meter Coil Pit
BSWSD 26-21 A	Mueller 18" Flat Lid with 2" Touch Read Hole
BSWSD 26-21 B	Ford Meter Box Cover – 18" Flat Lid with 2" Touch Read Hole
BSWSD 26-22	Residential Water Service Line with Pit Set Meter Transceiver Unit (MXU)

BSWSD 26-23	Residential Water Service Line with Non-Pit Set Wall Mounted Transceiver Unit (MXU)
BSWSD 26-24	Residential Irrigation System - Outside Installation with Above-Ground Backflow Vault
BSWSD 26-25	Residential Irrigation System – Inside Installation with Meter and Backflow in Basement or Crawlspace
BSWSD 26-26	Pipe to Pipe Connection Detail
BSWSD 26-27	Common Trench Water Services for Multi-Plex Units
BSWSD 26-28	Mueller/Hunt and Ford 1½" and 2" Meter Pit Setters
BSWSD 26-29A	Irrigation Water Vault – Vertical Plumbing Installation
BSWSD 26-29-B	Irrigation Water Vault – Horizontal Plumbing Installation
BSWSD 26-30	Typical Internal Metered Residential and Irrigation Service
BSWSD 26-31	Air Release Valve and Vault 8"-12" Dia. Water Mains

Add the following section:

1.5 SUBMITTALS

Supply the BSWSD with four (4) complete sets of shop drawings from the pipe, fitting and equipment manufacturer for review and approval before any construction starts.

PART 2: PRODUCTS

2.1 GENERAL

Revise this section: Water mains shall be thickness Class 51 or 52 ductile iron pipe, depending on the size of pipe. Pipe sizes 6-inch through 12-inch diameter shall be minimum thickness Class 51. Pipe sizes larger than 12-inch diameter shall be thickness class 52. Minimum main size shall be six (6) inch for hydrant leads and eight (8) inches for all other distribution mains. Mains shall be looped wherever possible. Ductile iron pipe joints shall be fitted with copper conductivity straps for sound conductance. Bronze wedges are not acceptable.

2.2 PIPE MATERIALS

B. Ductile Iron Pipe

1. ***Revise as follows:*** Furnish ductile iron pipe manufactured in accordance with the latest revisions of ANSI/AWWA C151/A21.51, American National Standard for Ductile Iron Pipe (DIP). Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture.

   Pipe shall have a standard asphaltic coating on the exterior. Pipe shall also have a cement-mortar lining on the interior in accordance with ANSI/AWWA C104/A21.4, of latest revision.

   The class and nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, country where cast, year in which the pipe was produced, and the letters "DI" or "Ductile" shall be cast or stamped in the pipe.

All pipe shall be furnished with Push-on Type Joints, such as Tyton or Fastite. Joints shall be in accordance with ANSI/AWWA C111/A21.11, of latest revision, and be furnished complete with all necessary accessories.

2. ***Revise as follows:*** Use underground pipe having mechanical or push-on joints meeting AWWA C111. Use underground fittings including all bends, tees, end caps, and plugs having mechanical joints meeting AWWA C111. All fitting shall be restrained. If thrust blocks are used, they shall be formed instead of poured loose in the trench. Polyethylene encasement shall be wrapped and taped around and between the fitting and the concrete. Use restrained joint pipe for all stream and road crossings and for DIP pipe installed in encasement sleeves. For restrained joints at fittings, use MEGALUG-Series 1100 mechanical joint restraint for DIP or MEGALUG – Series 1100SD for existing DIP; or Series 2100 MEGAFLANGE restrained flange adapters, manufactured by EBBA Iron Sales; UNIFLANGE mechanical joint retainer gland and adapter flanges, manufactured by Ford Meter Box Company; MJ Field Lok® Series DI, manufactured by US Pipe; One-Lok Series SLD, manufactured by Sigma Corporation; "Romagrip", manufactured by Romac Industries, Inc.; or a BSWSD approved equal.

4. Fittings:

Delete the use of gray-iron fitting and add the follows requirements:

a. 1. Class 250 fittings meeting AWWA C110, latest edition, ductile iron fittings for water mains. Fittings shall be restrained in conformance with Section 2.2 Pipe Materials, Part B – Ductile Iron Pipe, Subpart (2), above.

2. Mechanical joint ductile iron fittings shall be produced in accordance with all applicable terms and provisions of ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11.

3. ***Add the following section:*** All fittings must be Iron Pipe Size (IPS) and manufactured in accordance with applicable AWWA standards at ISO 9001-2000 approved manufacturing facilities. These manufacturing facilities must be covered under periodic audits by third party accreditation bodies for evaluations. These evaluations shall include manufacturing processes, quality control, corrective and preventative actions and document control. In addition, distribution centers must be audited by Third Party Approval Agencies for periodic confirmation tests and surveillance audits. These periodic tests and surveillance audits shall document continuation of product approvals by auditing the entire quality systems including design, infrastructure, system implementation, distribution, training, quality control and assurance and document control. All fittings must be manufactured in accordance with NSF 61.

5. Joints

a. ***Revise as follows:*** Assure the fitting interior is cement mortar lined meeting ANSI/AWWA C104/A21.4, latest revision, or fusion-bonded epoxy lined meeting ANSI/AWWA C116/A21.16. Assure the fitting exterior is bituminous tar coated 1-mil thick or fusion-bonded epoxy lined meeting ANSI/AWWA C116/A21.16. Use compact fittings having a rated working pressure of 350 psi following manufacturer recommended laying lengths.

6. Couplings

Delete the use of cast iron or gray iron sleeves. Add the following requirements:

4. Furnish one of the following IPS pack joint-type polyethylene compression connections couplings: Mueller E-15404 (IPS PE pipe both ends); Ford C66-44 (PEP both ends); or AY McDonald 4758-33 for 1", and 1"x1½" three part union water service products. No connection couplings are permitted from the corporation stop to the curb stop for 1", 1½" or 2" water services. No couplings are permitted from the curb box to the home or building meter assembly unless otherwise approved by the BSWSD.

C. Polyvinyl Chloride (PVC) Pressure Pipe - ***Delete the use of this pipe material for water mains or services.***

D. Concrete Cylinder Pipe - ***Delete the use of this pipe material for water mains***

E. Water Service Pipe

1. ***Revise this section as follows:*** Use polyethylene (PE) pipe for 1", 1½" and 2" size services and ductile iron (DI) pipe in water service lines 4" and larger construction as specified in the contract documents and meeting the following specifications.

a. Furnish service pipe of the size or sizes specified. A water line is designated a service line or water main based on its use, not its size. Generally, a line serving a single building or facility is considered a service line; a line serving more than one building, or intended to serve more than one building or facility is generally designated a water main. The standard sizes of services are 1", 1½", 2", 4", 6" or 8". The minimum size of a domestic service is 1". The minimum size for a fire service is 1".

b. Unless otherwise shown on the plans, furnish and install the water service from the main to the curb stop and box, placing the curb stop and box at a distance of eight (8)-feet past the property line. Install this portion of the water service in accordance with BSWSD Standard Drawing No. 26-06 and where applicable with BSWSD Fire Service Line Standard Drawing Nos. 26-13 and 26-14.

c. Copper Service Pipe: ***Delete the use of this pipe material for water service or fire lines***

d. Polyethylene Service Pipe – External Portion of Service Line

1. ***Revise this section as follows:*** Use pipe meeting AWWA Specification C901, Polyethylene (PE) Pressure Pipe, Tubing and Fittings 1" through 2" diameter water services. Water service piping shall be polyethylene pipe and a minimum of one (1)-inch diameter Class 200 with a DR of 7. Polyethylene water service pipe and tubing shall be IPS Phillips DriscoPlex Ultra-Line 5100 PE 4710 or BSWSD approved equal. This pipe shall not be used inside of residential or commercial buildings.

e. Internal Building Service Pipe

1. Pipe for internal building plumbing through the meter and backflow preventer assemblies shall be Type "L" (hard) copper tubing or a BSWSD approved material.

Add the following section:

f. Ductile Iron Pipe (DIP)

1. Use DIP for water service lines that are 4 inches in diameter and larger. Furnish DIP, which conforms to the requirements of Section 02660 Sub-Part 2.2 – Pipe Materials.

2.3 TAPPING SLEEVES AND VALVES: *Revise this section as follows:*

A. Tapping valves and sleeves are required on all new main extensions when they join any existing main line at right angles. Cutting the existing main or installing a tapping tee will not be permitted unless approved by the BSWSD. The tapping sleeve shall be installed with the outlet set on the horizontal plane. A concrete thrust block shall be installed for the fitting.

1. Tapping sleeves shall be ductile iron (DI) or stainless steel, split-sleeve, mechanical joint type with end and side gaskets. They shall have a Class 125, ANSI B16.1 outlet flange. They shall be rated for a minimum of 200 psi working pressure and shall contain threaded plug for testing purposes on the neck or body of the tapping sleeve. Gaskets shall be manufacturer's standard suitable for use in potable water systems. Bolts and nuts shall be Cor-Ten, Dura-Bolt or stainless steel. The sleeve shall be as manufactured by Mueller Company. Model H-615 or H304, unless otherwise approved by the BSWSD.

2. Tapping valves shall be Mueller with flanges inlets compatible with the flange of the tapping sleeve and mechanical joint outlet. Tapping valves shall be iron body, bronze mounted gate valves with non-rising stem with design, construction and pressure rating conforming to AWWA Specification C509. Stem seals shall be

double "O" ring seals designated so that the seal above the stem collar can be replaced with the valve under pressure in full open position.

3. The tapping sleeve and valve and the wet tap shall be furnished and installed by the Contractor. The Contractor shall excavate the existing main at the location to confirm the appropriate pipe dimensions prior to ordering the fittings. The tapping sleeve shall be installed with the outlet set on the horizontal plane. A concrete thrust block shall be installed behind the tee.

2.4 CORPORATION STOPS *Revise this section as follows:*

1. Furnish 300 psig ball valve brass corporation stops with inlet end to meet AWWA taper "CC" threads and outlet with compression type pack joint coupling for IPS polyethylene service pipe (outlet). Furnish either Mueller E25009 300 or Ford FB10010-x Style ball corporation stops.

2.5 SERVICE CLAMPS *Revise this section as follows:*

1. Water service saddles shall be wide band, stainless steel, full circumference, flat double strap, bronze metal service clamps (service saddles) for use on DIP, as per pipe manufacturer's recommendations. Bands shall be a minimum of five (5)-inch wide for a single stud and 7-1'2 inches wide for double stud saddle. All weldments, including studs, side bars and fingers, shall be construction of premium grade stainless steel. Heavy duty nylon washers shall be provided between nut and keeper bar. Saddle shall be equipped with a heavy duty threaded stainless steel outlet with "CC" treads. A neoprene gasket shall be provided to ensure complete sealing and shall not slip during installations. Saddles shall be Rockwell (Smith Blair), Mueller BR 2B Series, Ford 202B or a BSWSD approved equal.

2.6 CURB STOPS *Revise this section as follows:*

1. Furnish curb stops with pack joint ball-type curb valves with Minneapolis pattern screw box mounts for 1", 1½", and 2" series, with 90° open to close operation. Furnish curb stops that conform to the following:

Service Size	Curb Valve and Curb Stop
1"	Ford Ball Valve Curb Stop B66-444M or Mueller E-25211- 1" 300 Ball Curb Stop
1½"	Ford Ball Valve Curb Stop B66-666-M-IDR 7 or Mueller E-25211- 1½" 300 Ball Curb Valve
2"	Ford Ball Valve Curb Stop B66-777-IDR 7 2" or Mueller E-25211- 2" 300 Ball Curb Valve

2.7 CURB BOXES *Revise this section as follows:*

1. Furnish Minneapolis patter bases, extension-type curb boxes having 7-foot or 8-foot extended lengths with 1-1/4" upper section. Boxes shall be cast iron with cost iron lid and brass pentagon plug. Use the following curb boxes:

   Mueller H10300 for 1" services
   Ford EM2-70-56-60R for 1" services
   Mueller H10300-99002 for 1½" and 2" services
   Ford EM2-70-57-60R for 1½" and 2" services

2. Center and place the top section of a valve box with lid over all curb boxes.

2.8 VALVES *Replace this section as follow:*

A. Valve Spacing and Location

1. Gate valves are required on all legs of mainline tees and 4-way crosses unless otherwise approved by the BSWSD. Main valve spacing shall not exceed 400-feet.

B. Valve Markers

1. A blue Carsonite Brand Model CUM-375 post shall be installed to mark each mainline valve. The BSWSD will assist the Contractor in choosing the correct offset location for valve markers located in roadways.

C. Valve Operation

1. All existing water main valves are to be operated only by the BSWSD personnel. Any existing or new water main valves, which are used for isolation purposes or to take water from the BSWSD's water distribution system for the purposes of filling, testing, chlorinating or flushing, shall be operated by BSWSD personnel only unless otherwise directed by BSWSD personnel. The Contractor requesting operation must make request to the BSWSD office at least 48-hours in advance during the normal business hours of the BSWSD.

D. Gate Valves

1. Gate Valves shall be used for all lines 4" and larger in diameter. Furnish gate valves for underground installation equipped with a 2-inch square operating nut for key operation. All valves are to open counterclockwise. Valves are to be equipped with mechanical joints and joint restraints for pipe connections. Furnish Mueller 2360 valves or American Flow Control Series 2500 Ductile Orin Resilient Wedge gate valves for sizes 12" and smaller and Mueller 2361 valves for sizes 14" through 20".

E. Butterfly Valves

1. Class 250, rubber seated, butterfly valves for water distribution systems sized 24" and larger, meeting AWWA C504 requirements. Valves to be equipped with mechanical joint ends and lubricated screw type operation operators designed for underground service. Furnish butterfly valves by Mueller or Ford.

F. OS & Y Valves

1. For service lines 4" and larger, furnish a UL listed flanged Mueller OS & Y valve as the first fitting inside the building. For fire service lines 2" and smaller, furnish a NIBCO T-104-0 OS & Y Valve as the first fitting inside the building.

2.9 VALVE BOXES *Add the following requirement*

B. Valve boxes shall be East Jordon Iron Works 8560 series or an approved BSWSD approved equal.

2.10 FIRE HYDRANTS *Revise this section as follows:*

B. Hydrants shall be Mueller Super Centurion 250 or BSWSD approved equal with 5¼" valve openings, flanged inlet, 5" and two 2½" hose connections. Storz connections, if required by the Big Sky Rural Fire Department (BSRFD), are to be those manufactured by Harrington Company. Assure hose nozzle threads meet ASA Specification B26 for National Standard Fire Hose Coupling Screw Threads, 7½ threads per inch. Assure hose threads and Storz connection match BSWSD standards. Furnish National Standard operating nut. Furnish hydrant opening counterclockwise and having an arrow on the hydrant top designating the operating direction.

D. Paint the hydrant portion above the ground line red. Furnish hydrants so that there is a minimum of 7'feet of cover over the hydrant lead unless specified otherwise on the approved plans. Hydrant bury and breakaway flange height shall be on the plans. The height of the breakaway flange shall be 6-inches above either the edge of the road if the street does not have curb and gutter, or 3-inches above the top of the curb. If required by the BSWSD, furnish Mueller Defender Securing Devices with locks keyed to the BSWSD standard for each hydrant installed. Hydrants shall be equipped with a 6-foot snow flag marker, as specified on BSWSD Standard Drawing No. 26-04.

PART 3: EXECUTION

3.1 TRENCH EXCAVATION AND BACKFILL FOR WATER MAINS

Revise this section as follows:

B. Perform pipeline excavation and backfill meeting the applicable requirements of MPW (6th Edition) Section 02221: TRENCH EXCAVATION AND BACKFILL FOR UNDERGROUND PIPELINES AND APPURTENANT STRUCTURES and these modifications.

3.2 PIPE INSTALLATION FOR WATER MAINS

C. Laying of Pipe ***Revise the following section:***

3. Excavate pipe trenchers to the lines and grades given or to the standard cover depth specified on the approved plans. Water mains shall have a minimum depth of 7-feet and a maximum of 8.5- feet of cover at all points unless otherwise approved by the BSWSD. Lay and maintain all pipe to the specified lines and elevations with fittings, tees, valves and services at the required location shown. Transfer lines and grades to the pipe from pre-set surveyed offset hubs as an incidental part of the work. Establish line and grade using laser equipment or other BSWSD approved methods.

5. Take every precaution to prevent foreign material from entering the pipe while it is being installed. At times when pipe laying is not in progress, the open ends of the pipe shall be plugged with a tight fitting plug. Clean and remove all foreign material, including sand, grave, concrete, and cement grout by a BSWSD approved method. Flushing of the lines with water into the BSWSD's sewage collection system shall not be allowed.

10. If used as the only method of pipe and fitting restraint, construct reaction or thrust blocks at all tees, tapping tees, plugs, valves (except tapping valves and hydrant auxiliary valves that are part of a hydrant assembly), reducers, caps, vertical bends and at horizontal bends deflecting 22½ degrees or more. Limit using metal rods or straps for thrust restraint to those specified on the plans, or where the use of concrete thrust blocks would be impractical. Do not use metal restraining rods or straps unless specifically approved by the BSWSD. Construct reaction blocks from formed concrete having a minimum compressive strength of 3,000 pounds per square inch at 28 days. Place blocking between undisturbed ground and the fitting to be anchored, as shown on BSWSD Standard Drawing No. 26-01. The size of thrust (gravity) blocks for vertical bends will be designed by the Engineer. Place the blocking so that pipe and fitting joints are accessible for repair.

    In lieu of concrete thrust blocks, thrust restraint joints may be provided utilizing Megalug, Uni-Flange, MJ Field Lok Series DI, Romagrip, Sigma One-Lok Series SLD or approved BSWSD approved joint restraint equal for push on joints for all fittings that require thrust restraint, except for cut in or tapping tees (for mains or services) and bends on service and fire lines inside building foundations, unless specifically prohibited by the BSWSD. Install the mechanical restraints in accordance with manufacturer's specifications and at all joints as specified by the Engineer.

Add the following requirements:

12. Water main extension design shall not allow a maximum main line static pressure greater than 120 psi at any fire hydrant or less than 45 psi at the highest floor level of any building being served.

13. Pipe Installation Tolerance: Install the pipe within 1-inch (13mm) of the specified alignment and with ¼ inch of the specified grade.

14. Water Main Pipe Bedding: Type I Pipe Bedding will be used as the material placed from four (4) inches below the bottom of the pipe, around the pipe, and to six (6) inches over the top of the pipe. Type I Pipe Bedding shall be defined by the BSWSD as crushed washed rock having a maximum ¾ inch size. Sand, sandy gravel and road mix will not be allowed or accepted as Type I Pipe Bedding.

15. Locate Wire: Place a #12 THHN blue insulated copper location wire directly on top of and taped to the centerline of the pipe in the Type 1 bedding material over the top of the pipe. Bring this wire to the surface along the outside of each valve box and each curb stop box. Leave or loop at least 12 inches of wire to allow for attaching a meter or locator to the protruding wire at each surfacing location. Wrap the location wire around the base of the top of the curb stop box. The cost for the installation of copper location wire is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

16. Warning Tape: Detectable reinforced underground manufactured by Thortec, Traceline or a BSWSD approved equal shall be buried directly above the water main and service at a depth of three feet below finished ground elevation. Blue warning tape shall be used for all water lines and shall be clearly marked "water". The location tape shall be a minimum of five (5) mil thickness with a minimum 50 gauge solid aluminum core. Location tape shall be three (3) inches wide. The cost for the installation of marking tape is incidental and shall be figured into other unit bid items

D. Pipe Jointing

1. Rubber Gasket, "Push-On" Joints ***Add the following requirements:***

b. All sections of newly installed water main shall provide continuity for electrical current. In order to provide continuity, use copper conductivity straps in the joints of DIP joints in accordance with manufacturer's recommendations. Conduct a continuity test of new mains when required by the BSWSD.

c. Copper Conductivity Straps – In conformance with PART 2: PRODUCTS, Sub-Part 2.1-GENERAL of these specifications DIP joint to joint conductivity shall be provided by copper conductivity (CC) straps, manufactured by Griffin Pipe Company, or BSWSD approved equal. Bronze wedges cannot be used as a substitute for CC straps. Pipe must be pre-ordered with CC straps factory welded to the bell and spigot of each pipe section delivered to the project, so that a bolted factory jumper strap with silicon-bronze bolts and nuts can be field assembled in between the CC straps to provide a continuous connection between the straps, following assembly of each pipe joint. No full sections of DIP will be accepted that do not have welded CC straps. When field cutting pipe, the BSWSD requires field

welded CC straps installed on spigot end in accordance with pipe manufacturer approved materials and methods.

3. Connections to Existing Mains ***Add the following requirements:***

c. All wet and dry taps to water mains in use shall be made by the Contractor must by preauthorized by the BSWSD. A representative from the BSWSD must be on-site during the installation and testing. Any new or existing valve, which controls water in the BSWSD distribution system shall be operated only by BSWSD personnel. The Contractor shall pressure test tapping tees, once in-place prior to live tapping the main. The tapping tees shall be hydrostatically pressurized to a minimum pressure of 200 psi, and the test apparatus shall be in-place for verification by personnel from the BSWSD.

d. The Contractor is responsible for 48 hour advance notification, in writing, to all affected customers of a water main shut-down. The written notification is to include the date, time and estimated duration of interrupted service. The written notification is also to include the name and phone number of the Contractor's representative, who is coordinating the shut-down as well as the phone number of the BSWSD. All commercial customers affected by the water main shut-down must sign a notification sheet acknowledging that they have been informed of the date and time of the shut-down. BSWSD reserves the right to determine the likely duration of the main shut-down based on the proposed work and Contractor experience, and require the installation of temporary water services by the Contractor.

e. Clean and disinfect temporary water systems in accordance with the requirements for cleaning and disinfecting new water mains. Do not connect existing services to the temporary system until bacteriological tests show successful disinfection. Provide backflow protection at the point of connection of the temporary system to the BSWSD water system and at each point of connection of the temporary water system to the individual services.

g. Remove any existing blow-offs or temporary flushing hydrants upon completion of the connection to the existing main and install a brass plug upon removal of the corporation stop.

h. <u>Transition sleeve coupler from PVC – C-900 to Ductile Iron – Class 51 Water Main Pipe and Cut-In Tees</u>: Use Tyler Union (TU) Restrained Mechanical Joint (MJ) pipe sleeve with TU TUF Lock Ductile Iron (DI) TLD restraining gland on the DI side of the connection and TUF Lock PVC TLP on the PVC side or BSWSD approved equal. StarGrip and PVC StarGrip and Sigma PV-Lok and One-Lok are acceptable substitutes for TU pipe restrainers. Cut-in tees shall be both restrained and thrust blocked.

3.4 TESTING, CLEANING & DISINFECTING WATER MAINS, VALVES & FITTINGS

A. Hydrostatic and Leakage Testing:

1. ***Add the following:*** The required minimum hydrostatic pressure for any test on new mains is 200 psi or 1.5 X the normal operating pressure whichever is greater. A test that falls below 200 psi at any point during the test will require a retest. No test will be allowed to fall below 200 psi. Make all tests after backfill has been completed, but before any surface restoration or road surfacing is completed. Notify the BSWSD office at least 48 hours or (2) business days before any of the following tests are done. Contractor shall be responsible for finding and repairing all breaks and leaks revealed by the tests. Perform all tests in the presence of the resident inspector and a representative of the BSWSD at the BSWSD's discretion. The BSWSD will not accept new water lines until all required tests are done, and the results submitted in written form to the BSWSD.

   The BSWSD shall require all water main extensions to be electronically surveyed for leaks using an approved leak detection contractor after a minimum of 12 months and a maximum of 24 months from the date of transfer and final acceptance of the improvements at the expiration of the two (2) year warranty period. Contractor shall be responsible for finding and repairing all breaks leaks revealed by the tests.

2. ***Add the following:*** Assure that the testing gauge is marked in increments no greater than 2 psi increments.

4. ***Revise this section as follows:*** Conduct the leakage test concurrently with the hydrostatic pressure test for a period of two (2) hours. Leakage is defined as: (1) the quantity of water supplied into the pipe, or any valved section thereof, necessary to maintain pressure within 5 PSI of the specified test pressure (after the pipe has been filled with water and purged of air for the duration of the two (2) hour test period, and (2) the quantity of the water supplied into the pipe, or any valved section thereof, required to return the pressure to the specified test pressure at the end of the two (2) hour test period.

Add the following requirements:

11. Chlorination, testing and sampling shall comply with AWWA Standard C651-92. There shall be no allowable leakage for resilient seat gate valves. At least 24 hours prior to beginning water main tests, a testing schedule shall be submitted by the Contractor to BSWSD for approval. The schedule shall specify the proposed sequence of testing and the methods and procedures which will be used to complete the tests. Hydrostatic and leakage testing shall not be conducted concurrently with chlorination of water mains. All heavily chlorinated water must be flushed from the system prior to pressurizing the new mains. The contractor shall be responsible for the proper disposal of chlorinated test water.

12. Any existing or new water main valves, which are used to take water from the BSWSD distribution system for the purpose of filling, testing, chlorination or flushing, shall be operated by the BSWSD personnel only, with the Contractor requesting such operation at least 24 hours in advance. All existing water main valves are to be operated only by BSWSD personnel.

13. Allow five (5) days after placement of concrete for thrust blocks before performing hydrostatic or leakage testing. If high-early strength concrete is used, allow two (2) days after placement of concrete before performing hydrostatic or leakage testing. Provide adequate cold blocking as required for all thrust blocks that will not have the necessary curing time prior to testing.

14. For sections of mains that cannot be hydrostatically tested, assure that all joints are visually inspected for leakage under line working pressure by a BSWSD representative prior to backfilling.

B. Cleaning Water Mains ***Add the following requirements:***

5. Prior to any main flushing the BSWSD shall be notified and provided with a flushing schedule and plan a minimum of 24 hours in advance of any main flushing. The Big Sky Fire Department shall be allowed adequate access to conduct pressure and flow testing of fire hydrants during the flushing process.

6. Any existing or new water main valves, which are used to take water from the BSWSD distribution system for the purpose of filling, testing, chlorination or flushing, shall be operated by the BSWSD personnel only with the Contractor requesting such operation at least 48 hours in advance. All existing water main valves are to be operated only by the BSWSD personnel.

7. Install adequately-sized corporation stop on all main stubs longer than 10 feet to allow for the flushing of the stubs (see Table 1, MPW Section 02660). Following completion of all tests, remove corporation stops, install brass plugs and assure plugs do not leak after main has been charged. A representative from the BSWSD must witness the work.

C. Disinfecting Water Mains

3. Method of Chlorination

(1) Tablet Method ***Revise this section as follow:***

a. This table method consists of placing calcium hypochlorite granules (tablets shall not be used) in the water main as it is being installed and then filling the main with potable water when installation is completed. This method may be used if the pipes and appurtenances are kept clean and dry during construction.

b. Placing of calcium hypochlorite granules. During construction, calcium hypochlorite granules shall be placed at the upstream end of the first

section of pipe, at the upstream end of each branch main, and at 500-foot intervals. The quantity of granules shall be as shown in Table 2.

c. Warning: This procedure must not be used on solvent welded plastic or on screwed joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

d. When installation has been completed, fill the main with water at a velocity not exceeding 1 fps. Take precautions to assure that the air pockets are eliminated. Leave this water in the pipe for at least 24-hours if the water temperature is less than 41°.

TABLE 2
OUNCES OF CALCIUM HYPOCHLORITE GRANULES TO BE PLACED AT BEGINNING OF MAIN AND AT EACH 500-FOOT (150 METER) INTERVAL

Pipe Diameter	Calcium Hypochlorite Granules
in.	oz.
4	1.7
6	3.8
8	6.7
10	10.5
12	15.1
14 and larger	D^2x15.1

D. Bacteriological Tests

Revise this section as follows:

1. After final flushing and before the water main is placed in service, test a sample, or samples, collected from the main(s) for bacteriological (Bac-T) organisms. Collect at least one sample for every 1200 feet of new main and from each branch.

   a. Once the water main has been flushed following the successful completion of chlorination and pressure testing, the water line must be refilled with water and allowed to sit a minimum of 24 hours prior to collection of samples for bacteriological tests. All flushing of mains for cleaning purposes shall only take place through the 5¼-inch hydrant port. A second set of samples is to be taken a minimum of 24 hours after the first set of samples. Samples shall be taken in accordance with AWWA Standard C651-92. New water mains shall be placed in service by BSWSD personnel only.

   b. Collect samples from new water mains out of service lines or temporary taps. Samples may only be taken out of fire hydrants or flushing hydrants approved in advance by BSWSD. If hydrants are approved as sample locations, operate hydrants using the auxiliary valves or cub stops

to prevent groundwater from entering the hydrant. Assure that hydrants are kept from freezing during testing.

c. Following the completion of bacteriological tests, assure that all temporary piping has been removed, and all temporary corporation stops have been removed and replaced with brass plugs.

2. Redisinfection

a. If the initial disinfection fails to produce approved bacteriological samples, re-flush and resample the main. If check samples show bacterial contamination, re-chlorinate the main until approved results are obtained.

3.6 VALVES

A. ***Add the following requirements:*** For butterfly valves, set the operating nut on the west side of mains that run north-south and on the north sides of mains that run east-west.

C. Valve Thrust Blocks

1. ***Revise this section as follows:***
Install valves with thrust blocks and anchor rods meeting BSWSD Standard Drawing No. 26-03 requirements. Main line isolation (gate) valves with poured-in-place thrust blocks, if used in lieu of approved pipe-joint restraint, are required on all valve sizes 4" and larger, except for tapping valves and hydrant auxiliary valves attached to the hydrant shoe flange. In lieu of concrete thrust blocks, thrust restraint may be provided utilizing Megalug Uni-Flange, MJ Field Lok Series DI or BSWSD approve equal joint restraints.

3.7 FIRE HYDRANTS

B. ***Revise this section as follows:*** Provide drainage at the hydrant base by placing clean gravel under and around it. Place gravel at least 1-foot on all sides from the base of the hydrant to at least 6-inches above the drain opening. Brace the hydrant against undisturbed earth at the trench end with concrete backing as detailed on the plans. In lieu of concrete thrust blocks, thrust restraint may be provided utilizing Megalug, Uni-Flange, or other BSWSD approved equal joint restraints. Furnish hydrants with the specified integral gate valves. Install hydrants meeting BSWSD Standard Drawing Nos. 26-04 and 26-05. Where no curb exists or the minimum distance of five (5) feet behind the hydrant cannot be met or there is no other adequate protection, install protective barrier posts in accordance with BSWSD Standard Drawing No. 26-08. The placement of the back or 3rd bollard shall be subject to BSWSD approval. Protect the hydrant from damage during installation and backfilling operations. Hydrants may be subject to replacement by the Contractor if any of the protective paint coating is damaged during installation.

3.8 RESIDENTIAL & COMMERCIAL WATER SERVICE INSTALLATION

Replace this section with the following:

A. General: Provide all work and materials for a complete water service line installation(s), including trench excavation; pipe installation, pipe bedding, backfill; compaction, making the water main tap; furnishing and installing the corporation stop; curb stop, box, top; service clamp, where necessary, and service line pipeline placement with fittings, as required, to make the connection: 1) from the main and to and through the curb stop and 2) from the curb stop into the house or building being served. Contractors and plumbers installing their respective segments of the service are required to:

- Install only minimum sized 1-inch diameter service lines that use only SDR-7, PE-3408 polyethylene (PE) pressure pipe with a minimum 200-psi pressure rating.

- For the buried or external portion of the water service use only Phillips Driscopipe Ultra line 5100 or a BSWSD approved equal.

- Use Type "L" Copper Pipe for the portion of the service on the interior side of the home or business through the meter, PRV and backflow preventer assembly and appurtenant plumbing fittings and components.

- Use IPS (Iron Pipe Size) compression (Pack Joint-type) fittings for all water service line connections and fittings from the corporation stop at the main through both segments of the service. Once the connection from IPS PE pipe to copper pipe (CTS) has been made on the inside of the building, use copper (sweat joints) nipples, copper (sweat joint-type) fittings and copper (wrot) fittings when connecting internal service line components.

- Provide a minimum 7.0-feet and a maximum of 8.5-feet of cover, as specified in the BSWSD Standard Drawing Nos. 26-06, 26-22 and 26-23.

- Not backfill any portion of the service installation until it has been inspected or approved by the BSWSD, no exceptions.

- Terminate all IPS-PE water service piping, when entering the building being served, within 5 feet inside the point of entry into the building.

- Mount internal set water meters in a level, readable position no higher than 4-feet or less than 2-feet from the floor.

- Install a Category 5-wire from the meter location to the remote read-out (Radio Read) box on the outside of the building being served before water service will be initiated.

- Make all water service installations continuous with no joints from the corporation stop to curb stop and from curb stop into building being served.

- Place rigid insulation board on top of all service lines (entire length) from main to the building foundation being served, no exceptions. Insulation shall be 2" inches thick by 24 inches wide rigid foam board centered on the service line.

- Use a cast iron "D" (Ductile Iron) box for the water service curb stops placed in a concrete or pavement traffic area.

- Use a continuous length of pipe with no couplings between each of the two segments of the service line unless otherwise approved by the BSWSD.

- Mechanically restrain back to the main line tee all service lines larger than 2" inch, so as to allow for a safe connection to that service line without de-pressurizing the main.

- Bed both segments of the service with six (6)-inches under and over the pipe with ¾-inch washed (not screened) gravel or as approved by the BSWSD.

B. Water Service Line Segment No. 1 - Installation from the Mainline to and through the Curb Stop: This segment of the water service installation shall conform to all requirements of the BSWSD, these specification modifications and BSWSD Standard Drawing No. 26-06. Assure this portion of the service line installation meets the minimum requirements, listed in Item 3.8- RESIDENTIAL AND COMMERCIAL WATER SERVICE INSTALLATION, Sub-Part A, General, above.

C. Water Service Line Segment No. 2 - Installation from the Curb Stop into the Building: Water service lines from the curb stop to and through the wall or foundation of the building being served shall meet to the same requirements as Segment No. 1, above, and the requirement of Sub-Part A – General, above. This second segment, however, shall be installed by a licensed plumber. The BSWSD requires that the water meter assembly on this portion of the service to include the pressure reducing valve, water meter, backflow preventer and other plumbing appurtenances shall be installed inside the building being served. Under certain circumstances and property conditions the BSWSD will allow the use of pit-set meter assemblies. The decision to use an external pit set meter assembly for a service shall be at the sole discretion of the BSWSD. If the water meter for either a residential or business service is placed in an external meter pit, the building service line involved shall be installed in general compliance with BSWSD Standard Drawing No. 26-22.

The service line for this segment shall be installed as required on BSWSD Standard Drawing Nos. 26-23. This segment of the service line, however, shall not be installed until the main line has been accepted by BSWSD and placed into service. The pipe diameter for this segment may be reduced in size. The size reduction must be made

within 18" of the curb stop and approved in advance by the BSWSD. Connections to existing curb stops, either for domestic or fire service, that have remained dormant or unused longer than six (6) months will require re-flushing or disinfection prior to being placed into service. The BSWSD will require bacteriological testing to assure that the dormant line has not become contaminated.

D. Water Services for Multi-Unit Residential and Commercial Buildings: All multi-family multi-unit residential and multi-user commercial buildings shall require a separate domestic water service line with curb stop to each individual dwelling unit whether owned by the same owner or by separate owners with the following exception. Shared water services will be allowed on multi-family or multi-unit commercial buildings only if a properly sized shared water service line terminates immediately inside a designated and adequately sized mechanical room. Shared services shall be subject to the advanced review and approval of the BSWSD. Once inside the mechanical room, a properly installed manifold will be required with a separate meter and appropriate shutoffs for each individual unit. No "daisy chaining" of meters will be allowed. Two (2), three (3) or four (4) water service lines can be placed in a common trench, as shown on BSWSD Standard Drawing No. 26-27. To place more than four (4) individual water service lines in a common trench will require approval of the BSWSD.

E. Marking and Flushing Water Service Connections to the Curb Stop: Mark the water service line stub end at the curb stop using a steel fence post (T-posts type) painted blue, 6.0 feet long, buried 2.0 feet in the ground with 4-feet extended above the ground as shown on BSWSD Standard Drawing No. 26-06. Set post 1" from the curb box. After bacteriological tests have passed and test results have been submitted to BSWSD, open all curb stops in the presence of the BSWSD to assure the service lines are flushed and all corporation stops are fully opened. All main line valves are to be operated by BSWSD personnel only.

F. Water Meter Installations:

1. Internal Building-Set Water Meter Assembly Installations – The pressure reducing valves (PRVs), water meter, backflow preventer, isolation valve(s) and other plumbing appurtenances, installed inside the building shall be installed in general accordance with BSWSD Standard Drawing No. 26-23 unless otherwise approved by the BSWSD. The proper order and placement of water service components shall include an angle or straight stop, meter, backflow preventer/device, pressure regulator valve (PRV) followed by an isolation valve.

2. Water Meter Types and Remote Radio Readouts

a. 1- Inch Diameter Residential and Commercial Meters - Meter must be a bronze bodied, Sensus SR II (positive displacement-type) or Sensus PMM (multi-jet type), with ICE register ECR/WR for Sensus Radio Read systems. Either of these positive displacement-type Sensus meters shall be used in all minimum sized 1-inch residential and commercial water service lines.

b. 1-1/2 and 2-inch Meters – Meter must be a Sensus OMNI C^2 turbine FTB meter with built-in strainer assembly and test plug with an electronic register with an electronic data output port for a Sensus Radio Readout.

c. Remote Readouts: All individual residential and commercial meters must be equipped with a Sensus Meter Transceiver Unit (MXU) for Radio Readout. The MXU must be attached to the exterior of the building being served, immediately adjacent to the radio-read pad. The placement and location of all MXU units must be approved in advance by the BSWSD prior to installation. The MXU provides for automatic meter reading capability by the BSWSD. When a meter, MXU transceiver unit and mounting bracket are purchased for a residential or commercial service line, the plumbing contractor will perform the installation by placing the meter in a horizontal position in conformance with 3.8 – RESIDENTIAL AND COMMERCIAL WATER SERVICE INSTALLATION, Sub-Part A-General, above, and BSWSD Standard Drawing Nos. 26-23.

3. Service Line Plumbing Components: Water service line meter assemblies shall be equipped with the following plumbing components:

a. Straight Stops:

Brand	Size	Type	Factory Number
Mueller	1"	Pack Joint	P-25146
Ford	1"	Pack Joint	B43-444W
Mueller	1-1/2"	Pack Joint	P-25146
Ford	1-1/2"	Pack Joint	BF43-666W
Mueller	2"	Pack Joint	P-25146
Ford	2"	Pack Joint	BF43-676W

b. Angle Stops:

Brand	Size	Type	Factory Number
Mueller	1"	Pack Joint	E-24258
Ford	1"	Pack Joint	BA43-444W
Mueller	1-1/2"	Pack Joint	P24276
Mueller	1-1/2	Flanged	P24276
Ford	1-1/2"	Pack Joint	BA43-666W
Ford	1-1/2"	Flanged	BF53-666W
Mueller	2"	Pack Joint	P-24276
Mueller	2"	Flanged	P-24276
Ford	2"	Pack Joint	BFA43-777W
Ford	2"	Flanged	BF53-777W

4. Internal Building Meter Assembly Components: The meter assembly to include the angle or straight stop, meter, backflow prevention valve, pressure reducing valve, isolation valve and other appurtenant plumbing improvements shall be installed by a licensed plumber in general compliance with BSWSD Standard Drawing No. 26-23 and the Uniform Plumbing Code (UPC) (latest edition). Where there is a discrepancy between these specifications and BSWSD Standard Drawing No. 26-23 and the UPC (latest edition), the UPC (latest edition) shall take precedence. The internally building service line and meter assembly must transition through the foundation from PE pipe through the floor or wall of the building being served with a

   - IPS Mueller E-15429 Coupling Connection (Pack Joint-type) for IPS PE x MIP Thread
   - Mueller E-15454 Coupling Connection Pack Joint-type for IPS PE x FIP Thread
   - Ford C86-44 (1-inch MIP)
   - Ford C16-44(1-inch FIP)
   - or BSWSD approved equal

   The water meter must be isolated on either side with standard Series WBV-3 Brass Ball isolation valves and unions for removal of the meter for periodic testing or replacement, as shown in BSWSD Standard Drawing No. 26-23. The plumber shall install no less than 12-inches of straight 1-inch copper (Type K) pipe leading into the inlet end of the meter. The next valve downstream from the water meter shall be a Watts L7 Dual Check backflow prevention valve, followed by a Watts Model Series U5B pressure reducing valve (PRV). The PRV needs to be placed downstream of the meter and backflow preventer and before the service isolation valve, placed at the end of the service assembly. Internal building isolation valves on the meter-backflow preventer-PRV assembly (a/k/a meter assembly) shall be Watts Series WBV-3 (FIP ends) or WBVS-3 (solder ends) 2-Piece Standard Part Brass Ball Valves.

5. Pit Set Meter for 1-inch Meters Installations – New residential and commercial water service installations, requiring a Pit-Set Meter by the BSWSD, shall install either a Mueller/Hunt Therma-Coil Meter Box or Ford single meter coil pit. Pit set meters shall be installed in accordance with BSWSD Standard Drawing Nos. 26-20A, 26-20B and 26-22. Provide 84" deep meter pits, 18-inches in diameter for 1" meters. Provide meter pit with a Ford or Mueller pack joint-type angle ball inlet valve and a Mueller P-14462-A or Ford HA34-444 dual check outlet valve, 4-inch insulation pad, flat non-locking metal lid, and a second flat internal non-locking metal lid (w/Ford Meter Pits) as the base (Wabash type). See standard details for Mueller/Hunt Thermal Coil pit-set meter assembly in BSWSD Standard Drawing No. 26-20A or Ford single meter coil pit set meter assembly in BSWSD Standard Drawing No. 26-20B.

6. Pit Set Meter Assembly for 1½ and 2-inch Meter Installations – Residential or commercial pit-set meter installations for 1½ and 2-inch meters assemblies shall be either Mueller/Hunt EZ Vault Meter Box Setter or Ford Double Lid Plastic Pit Setter with Wabash Cover and compatible extension rings, if required, in

conformance with BSWSD Standard Drawing No. 26-28. Use Mueller-Hunt 500-VB-24-84-F-F-B Vault for 1½" meters and Mueller-Hunt 550-VB-27-84-F-F-B vault for 2" meter. Install either vault with 4-inch insulation pads with 18-inch lid frame and flat lid with side mounted key lock and radio readout register lid. Ford meter vaults shall be Ford Double Lid Plastic Pit Setter with Wabash cover. Ford meter vaults for 1-1/2 inch meters shall be a PD-B-HH-6-8-36HB-84. Ford Vaults for 2-inch meters shall be a PD-B-HH-7-8-36HB-84 with W3-T Wabash cover with locking electronic meter reading cover. All vaults shall be ordered for flanged meter setting with dual check valve in by-pass, inlet angle ball valve and outlet angle dual check valve (pack joint-type).

7. Responsibility for Portion of Water Service from Curb Box at the Property Line through Meter and Meter Assembly: The property owner is fully responsible to maintain, repair and replace this portion of the domestic water service. This includes external pit-set residential meters or internal installed meter assemblies. After completion of the construction and acceptance of the installation by the BSWSD and the customer, the customer/owner is responsible for protecting either the pit set meter assembly or the internally installed meter assemblies from freezing, damage due to high water pressure or other physical damage during and after construction.

3.9 TAPPING

A. Tap the newly installed water mains unless specified otherwise. Provide a minimum distance of 18" between service taps. The BSWSD requires advanced review and approval of all taps to any existing water main. For taps on existing mains, the Contractor is responsible for making the tap and scheduling and coordinating the work with the BSWSD. The Contractor will be charged a fee for each tap made by the BSWSD. All taps on existing mains require tapping saddles and corporation stops to be supplied and installed by the Contractor prior to tapping of the main.

B. Perform tapping using an approved tapping machine using clean, sharp drill taps and/or shell cutters. ¾ inch and 1-inch taps may be made directly into the barrel of ductile iron pipe without using service saddles. Direct tap into the pipe barrel to the depth exposing a maximum three threads of the corporation stop. Taps greater than 1" on a 6" line require the use of saddle clamps. Taps 4" and larger to existing water mains which are 4" and larger require the use of a tapping sleeve and valve.

3.10 END PIPE MARKER *Add this sections as follows*

A. Mark the water service end at property line with a five foot long metal fence post painted blue installed directly behind the curb stop to *permanently* mark the end of the water service.

3.11 FIRE LINE SERVICE LINE

A. When a separate fire suppression line is required in addition to a domestic water line, a shut-off valve must be installed on the outside of the building and marked permanently "FIRE".

3.12 IRRIGATION SERVICE LINES - *Add the following section:*

A. Individual Residential Commercial Irrigation Services: Each new individual residential and commercial irrigation water service installation shall be installed in general accordance with BSWSD Standard Drawing Nos. 26-24 for an externally installed service and BSWSD Standard Drawing No. 26-25 for an internally installed service. The buried portion of all irrigation services shall generally be constructed of the same pipe material as individual water services, depending upon the diameter of the service being installed. Irrigation services shall conform to all the material and installation requirements of Specification Section 3.8 - Residential and Commercial Water Service Installations, Sub-Part A-General, above. Like meter assemblies for individual residential and commercial water service installations, individual residential and commercial irrigation meter assemblies shall be installed internally within the residential or commercial building being served as shown in BSWSD Standard Drawing No. 26-30 unless approved by the BSWSD for external installation, whereby the meter shall be installed in an external meter pit, like BSWSD Standard Drawing No. 26-22 or a meter water vault, like BSWSD Standard Drawing No. 26-29A (vertical set) and 26-29B (horizontal set). Just like residential and commercial water services, externally installed irrigation services shall be installed and located on private property in the same manner and location shown on BSWSD Standard Drawing No. 26-22. The meter pit for an externally installed irrigation service shall similarly be sited five (5) feet into private property. Meter pits, if used, shall be coiled Mueller/Hunt Therma-Coil Meter Box or Ford Single Meter Coil Pit suitable for 1-inch services. Coiled meter pits shall be 84-inches in depth. The width of a 1-inch pit-set meter vault is minimum size 18-inches. Provide meter pit with lock-wing angle ball inlet valve and dual check outlet valve, as noted on BSWSD Standard Drawing Nos. 26-20A and 26-20B, as noted or BSWSD approved equals, 4-inch insulation pad, flat non-locking metal lid, a second flat non-locking metal lid as the base. Options for irrigation service installations include:

1. Inside Building Set Irrigation Assemblies: Meter assemblies installed inside buildings or within building basements or crawl spaces shall be installed in accordance with BSWSD Standard Drawing No. 26-25.

2. Outside Building Set Irrigation Assemblies: Irrigation assemblies installed outside buildings shall be installed in accordance with BSWSD Standard Drawing No. 26-24 or individual residential or commercial irrigation system and BSWSD Standard Drawing Nos. 26-29A and 26-29B for a large irrigation system serving a large common area, park or open space.

3. Taps to Individual Water Service Lines for Irrigation Service Connections: All connections to new or existing water service lines for separate irrigation services shall be made before the internal meter assembly or building meter pit assembly, if the residence or business utilizes a external meter pit and above ground sited PRV and backflow prevention device, as shown on BSWSD Standard Drawing No. 26-24. Internally installed irrigation services that connect directly to the individual residence or business water service shall be plumbed in general conformance with BSWSD Standard Drawing No. 26-25 and the UPC (latest

edition). If there is a discrepancy between these specifications and standard drawing and the UPC, the UPC shall apply.

4. Above-Ground PRV-Backflow Prevention Assemblies for Remote Irrigation Services Not Internally Connected to a Residential or Commercial Water Service: A pressure-reducing valve (PRV), Watts Series U5B, shall be installed in all remotely located irrigation service lines downstream of the irrigation water meter and backflow prevention device in general conformance with BSWSD Standard Drawing No. 26-24, ensuring that the irrigation meter, the irrigation plumbing and service components are protected from fluctuating water main pressures. Irrigation service components for remotely installed services shall be placed a minimum of 12-inches above finished ground grade and protected from freezing with a weatherproof enclosure. The weatherproof/vandalproof enclosures shall be WattsRock enclosure by Watts, Inc. or an approved BSWSD equal. Variances to remove the PRV from a remote irrigation service system, not directly connected to an individual residential or commercial service, may be allowed with written authorization from the BSWSD to achieve higher system pressure. The pressure setting for the PRV shall not exceed 100 psi without written permission from the BSWSD. The backflow prevention device for all irrigation services shall be a Watts 009-Backflow Prevention Device. The backflow prevention assembly shall be equipped with unions for easy disassemble/disconnect the backflow valve for winterization or maintenance of the device. All externally installed irrigation services shall be equipped with curb stop and drain valves on either side of the above ground backflow prevention assembly to drain down the riser pipes. The property owner shall take responsibility for the winter storage and care of the above-ground backflow prevention assembly. All backflow prevention assemblies for externally installed irrigation components shall be installed with disconnect unions, as shown on BSWSD Standard Drawing No. 26-24. The backflow preventer valve will be re-tested each year when the assembly is reinstalled and placed back into service.

5. Backflow Prevention Assemblies for Irrigation Services Directly Connected to Residential or Commercial Water Services: Like the irrigation service for a external installation, the backflow prevention device for an internally installed irrigation service shall be installed in general conformance with BSWSD Standard Drawing No. 26-25. All irrigation services will be inspected and certified as working properly after initial installation and in the spring of every year when the sprinkler system is reactivated and placed into service.

6. Irrigation Shut-Off Valve for Internal Irrigation Installations: The irrigation system contractor shall install a hose bid-type shutoff valve on the internal irrigation service to drain down the service for winterization. The hose bid shall be placed just downstream for the "T" connection of the irrigation service line to the water service line and upstream of the irrigation meter to be able to isolate and dewater the meter and remove it and the backflow prevention assembly to facilitate winterization, replacement, testing and repair.

7. Irrigation Meters and Radio Readouts: All irrigation water usage within the BSWSD service area is invoiced separately, so each irrigation meter assembly shall be equipped with a Sensus MXU Radio Readout device, as specified in BSWSD Standard Drawing Nos. 26-20A, 26-20B and 26-25, equipped with a Sensus Electronic Communication Register (ECR) and radio-read pad or externally mounted MXU device. Irrigation meters and radio readout devices shall be the same as those specified in Section 3.8-Residential and Commercial Water Meter Installation, Part F-Water Meter Installations, Subpart 2 (a), (b) and (c), above.

The BSWSD shall inspect the installation of all irrigation meter assemblies before placed into service. The radio-read pad or MXU for an irrigation meter is generally required to be located within 24-inches (24") from the electrical meter, five (5) feet above ground in an accessible location to be able to provide year-round access for the meter reader. The maximum remote distance from the irrigation meter shall be three (300) hundred feet from the property line.

When a meter, transceiver unit and mounting bracket are purchased for the irrigation service line installation, the Contractor will perform an installation in a horizontal position. All irrigation meter installations must be freeze-proof, convenient, and installed in an easily accessible area. Internal meter installation shall be no higher than three (4) feet above and no lower than 2-foot, above the floor level of the residence or commercial building and placed in a horizontal position. If the irrigation meter and assembly are to be located in a crawl space, the meter shall be located within three (3) feet above the access entry. Variations will be considered by the BSWSD on a case-by-case basis prior to the installation of the irrigation meter and meter assembly.

8. Responsibility for the Irrigation Service: The property, owner, again, is responsible to protect the irrigation service from freezing or other physical damage during and after construction. After completion of the construction and acceptance of the installation by the BSWSD and the customer, the customer/owner is responsible to protect the irrigation meter and meter assembly from freezing, from damage due to high water pressure and other physical damage.

Irrigation water will be turned off at the irrigation curb stop or on the main water service until the irrigation meter is installed, inspected and approved by the BSWSD, and all tap fees are paid in full.

9. Irrigation Water Vault for Large Irrigation Systems for Parks, Common Areas and Large Open Spaces: A separate irrigation service for a park, common area or opens space requires a six (6) foot diameter manhole-type water vault to house the irrigation meter assembly and plumbing appurtenance, in general conformance with BSWSD Standard Drawing Nos. 26-29A and 26-29B. The plumbing contractor installing the improvements shall provide the BSWSD with an "as-built" plan of the vault plumbing following completion of the installations.

END OF SECTION

SECTION 02221
TRENCH EXCAVATION

SECTION 02221

TRENCH EXCAVATION AND BACKFILL
FOR PIPELINES & APPURTENANT STRUCTURES

PART 2 - PRODUCTS

2.1 PIPE BEDDING MATERIALS

A. TYPE 1 PIPE BEDDING

1. **Delete this section and replace with:** Type 1 Pipe Bedding includes the material placed from 4 inches below the bottom of the pipe, around the pipe, and to 6 inches over the top of the pipe. Type I Bedding shall be defined by the BSWSD as crushed washed rock having a maximum ¾ inch size. Sand, sandy gravel, and road mix will not be allowed or accepted as Type I Pipe Bedding.

2. **Modify this section as follows:** Provide Type 1 Bedding consisting of imported sand, sandy gravel, or fine gravel having a maximum 3/4 inch size and a maximum plasticity index of 6, determined by AASHTO T89 and T90 or by ASTM D4318.

B. SELECT TYPE 1 BEDDING

1. **Delete this section and replace with:** Select Type I Bedding shall consist of soil, sand or fine gravel, free from clods, lumps of frozen material, or rock exceeding 1-1/2 inches in its greatest dimension. Select Type I Pipe Bedding will not be accepted by the BSWSD for use as pipe bedding.

PART 3 - EXECUTION

3.1 PROTECTION OF EXISTING PROPERTIES

A. General.

1. **Add the following:** Take precautions to protect all adjoining private and public property and facilities, including underground and overhead utilities, curbs, sidewalks, driveways, structures, and fences. Restore or replace all disturbed or damaged facilities to its original condition at Contractor's expense. Replace any tree, bush, hedge, planter or similar vegetation or landscaping damaged during the course of the work with a planting equal to that damaged in kind, size and location. The contract warranty period for performance applies also to the instances described herein.

4. **Modify this section as follows:** Do not cut and replace existing services from the mains to private property which interfere with trenching operations unless

the work has been specifically approved by the BSWSD. If approved, the cost for this work will be the responsibility of the CONTRACTOR. Do not interrupt water service for more than 4 hours. Install a temporary service connection approved by the BSWSD if service is interrupted for a longer period. Protect temporary services from freezing or interruptions of use during the construction period. Protect existing water and sewer mains and water and sewer services from freezing at all times during construction.

3.6 TRENCH FILLING AND BACKFILLING

B. Pipe Bedding Placement

1. Type 1 Bedding

Delete this section and replace with: Place Type 1 Pipe Bedding material 4 inches under the pipe, around the pipe, and six inches over the pipe as specified in Section 2.2.1. Place in maximum lifts of 6 inches, using hand or other compaction methods without damaging or disturbing the pipe. Thoroughly compact each layer. Use special care to assure compaction under the pipe haunches. Place backfill material in equal lifts on both sides of the pipe for the full trench width. Take care to prevent migration of Type 1 Bedding into surrounding soils during placement and compaction.

C. Trench Backfill

4. Watering

c. **Add the following requirements:** Water from the BSWSD's municipal system may only be obtained from the metered service located at the BSWSD. The Contractor shall reimburse the BSWSD for the cost of the water used at a rate determined by the BSWSD.

D. Replacement of Unsuitable Backfill Materials

1. **Modify this section as follows:** Remove and dispose of excavated soils that are saturated and cannot be readily conditioned or dried to be made suitable, contain deleterious materials or have characteristics that, in the opinion of the Engineer, render the soils unsuitable as backfill.

END OF SECTION

SECTION 02730
SANITARY SEWER

SECTION 02730

SANITARY SEWER COLLECTION SYSTEM

1.4 STANDARD DRAWINGS

A. Standard drawings in Appendix A applicable to this section are as follows:

Delete Standard Drawing No. 02720-3	Sanitary Sewer and Storm Drain Manhole
Delete Standard Drawing No. 02720-4	Standard Straight Manhole
Delete Standard Drawing No. 02720-8	Standard Cast Iron Cover
Delete Standard Drawing No. 02720-9	Standard 24" Cast Iron Ring
Delete Standard Drawing No. 02730-2	Sanitary Sewer Service Line
Delete Standard Drawing No. 02730-3	Deep Sanitary Sewer Service Line

Add the following:

BSWSD 27-01	Sanitary Sewer Service Line
BSWSD 27-02	Sanitary Sewer Cleanout
BSWSD 27-03	Sanitary Sewer Manhole
BSWSD 27-04	Flat-Top Sanitary and Storm Sewer Manhole
BSWSD 27-05	Nomographic for Air Testing Gravity Sewer Mains
BSWSD 27-06	Typical Residential Sewage Lift Station
BSWSD 27-07	Typical Manhole Channel Details (Solids Handling Type)
BSWSD 27-08	Standard Manhole Cast Iron Cover
BSWSD 27-09	Standard 24" Cast Iron Manhole Ring
BSWSD 27-10	Typical Grease Interceptor
BSWSD 27-11	Typical Force Main Connection to Gravity Sewer
BSWSD 27-12	Buried Sewer Service Line Insulation
BSWSD 27-13	Protective Barrier Sleeve & Cover for Sanitary Sewer Cleanout
BSWSD 27-14	Spanish Peaks Sanitary Sewer Service Index Map
BSWSD 27-15	Spanish Peaks Grinder Pump Sewer Service
BSWSD 27-16	Spanish Peaks "STEP" Installation Plan-Phase 1B & 1C
BSWSD 27-17	Spanish Peaks "STEP" Installation Plan-Phase 2

PART 2: PRODUCTS

2.1 GENERAL

A. ***Revise this section as follows:*** Furnish new sewer pipe and fittings as specified in the Contract Documents and meeting the material and testing requirements of this section. Furnish in-line wye branches of the same material and design as the sewer pipe unless specified otherwise. Pipe strength classifications are as shown on the plans, as listed in the Contract Documents or as specified in Section 2.2 – PIPE MATERIALS, Subpart A – Polyvinyl Chloride Pipe (PVC), Section 2, Gravity Sewer Pipe (a), below. Saddle-type fittings are allowed only upon approval of the BSWSD. Pipe strength classifications are shown on the plans and/or are listed in the Contract Documents. Do not use tee branches

unless specifically approved by the BSWSD. Sewer service lines shall be minimum four (4)-inch schedule 40 PVC pipe. All sewer services shall be marked according to BSWSD Standard Drawing No. 27-01. Ends of all service lines and service fittings shall be provided with approved watertight plugs, caps, or stoppers, suitably braced to prevent blow-off during internal testing. Such plugs or caps shall be removable without damage to the pipe or fitting.

2.2 PIPE MATERIALS ***Delete the use of Concrete Pipe and High Density Polyethylene (HDPE) Pipe***

A. Polyvinyl Chloride (PVC) Pipe

2. Gravity Sewer Pipe

a. ***Revise this section as follows:*** Furnish gravity sewer pipe meeting one of the following requirements:

(1) ASTM D-3034, "Standard Specifications for Polyvinyl Chloride Sewer Pipe and Fittings", with an SDR of 35 8"-15".

(2) ASTM F679, T-1 wall thickness (SDR35), "Standard Specifications for PVC Large Diameter Plastic Gravity Sewer Pipe and Fittings" 18"-27".

(3) Schedule 40 PVC pipe for 4" and 6" service lines.

5. Fittings ***Revise this section as follows:***

a. Tee fittings for connection service lines will not be allowed by the BSWSD. In-line wyes shall be used for connecting service lines and shall be of the same material, construction, and joint design as the sewer main, unless specified otherwise. Assure wye fittings for connecting service lines are of the same material, construction and going design as the main sewer pipe. In the event that a service line is being connected to the existing sewer main, the BSWSD requires that in-place of an in-line wye, a ROMAC Style "CB" sewer saddle or BSWSD approved equal be used.

2.3 MANHOLES

A. General

1. ***Add the following requirement:*** Do not use flat-top (straight) manholes unless specifically called out on the plans or in the Contract Documents. Unless noted otherwise, flat-top manholes are only to be used when the distance from the rim to the invert is less than 6-feet.

2. ***Add the following section.*** Supply the BSWSD with shop drawings from the manhole manufacturer for approval before construction starts. Construct

manholes from precast concrete sections having frames, covers and steps meeting BSWSD and MPW Standard Specifications and Standard Drawings. At the locations where the manhole(s) will be in an existing or planned road, the Engineer will design for future paving requirements. If the manhole(s) location is within an undeveloped area (e.g. a yard or field) the final elevation of the frame(s) will be at least 12 inches above grade. Manholes deeper than ten feet, measured from the rim elevation to the flow line of the center of the manhole, may use a four-foot eccentric cone as the top barrel section. Any manhole shallower than six-feet shall be "flat topped" and will not use a cone as the top barrel section.

3. All connections of new sewer main to BSWSD's existing manholes will, at the BSWSD's sole discretion, require the replacement of the manhole. The replacement will be done at no cost to the BSWSD and will be done in accordance with Big Sky Special Provisions for sanitary sewer extensions. All other tie-ins will be done by the use of concrete coring where feasible. All work on existing manholes will require the prior approval of the BSWSD. The Contractor shall take all necessary precautions to protect the BSWSD's existing sewer mains and flows when and if they are exposed by work. Care shall be taken by the Contractor to prevent construction debris from entering the BSWSD's sanitary sewer collection system. The Contractor and/or owner/developer shall be held responsible for removing any and all debris or other material that may inadvertently enter the BSWSD's collection system through manholes or open mains by a BSWSD's pre-approved method.

D. Frames and Covers

1. ***Revise this section as follows:*** Furnish frames and covers meeting BSWSD Standard Drawing Nos. 27-08 and 27-09, manufactured by Neenah Foundry R1733; East Jordon Iron Works 3771/3772 series ring and cover; D & L Foundry & Supply A-1178 ring and cover, or a BSWSD approved equal. The lid shall be marked "WSD 363" and "Sanitary Sewer". There shall be no through lift holes.

E. Concrete Base

1. ***Revise this section as follows:*** Furnish precast concrete bases that are extended and monolithic with the channel(s) being pre-formed into the base. Channels will have a minimum depth of 7/8th of the pipe diameter. All pre-formed channels shall meet BSWSD Standard Drawing No. 27-07.

PART 3: EXECUTION

3.1 PIPE AND SERVICE LINE INSTALLATION

A. Excavation and Backfill

1. ***Delete this section and replace with***: Perform pipeline excavation and backfill meeting the applicable requirements of MPW Section 02221; TRENCH EXCAVATION AND BACKFILL FOR UNDERGROUND PIPELINES AND APPURTENANT STRUCTURES, and these modifications.

D. Laying Pipe ***Delete references to tee fittings.***

1. ***Delete this section and replace with***: Lay and maintain all pipe to the specified lines and grades with fittings and manholes at the required locations. Establish line and grade using laser equipment or other approved methods. Batter boards and string line will not be allowed to set grade and alignment.

E. Tolerances

1. ***Delete this section and replace with:*** Install the pipe within ½-inch (13 mm) of the specified alignment and within 1/8-inch (3 mm) of the specified grade, provided that such variation does not result in a level or reverse sloping invert.

F. Locate Wire ***Add the following requirement:***

1. Place a #10 AWG insulated copper location wire directly above and taped to the centerline of the pipe in the Type 1 bedding material over the top of the pipe. Bring this wire to the surface along the outside of each manhole and to the end of each service. Bring the wire through the manhole barrel or cone wall immediately below the first step. The penetration through the manhole will be by one inch PVC pipe. The pipe shall have a threaded coupling at the inside wall of the manhole. A one inch by ¼ inch bushing will be installed that will allow the pipe to be bushed down to ¼ inch. A Hubbell Junior 5D520 Corrosion Resistant Nylon Strain Relief Cord Connector shall be installed in the ¼ bushing, effectively making the connection between the wire and the pipe penetration waterproof. Enough wire should be left to leave a loop at least 24 inches to allow for attaching a meter or locator above ground to the protruding wire at each surfacing location. At the end of the sewer service line, wrap the location wire around the end of service pipe with electrical tape. The cost for the installation of copper location wire and appurtenances is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

G. Marking/Warning Tape ***Add the following requirement:***

1. Detectable reinforced underground utility marking tape, as manufactured by Thortec, Traceline or approved BSWSD equal shall be buried directly above the sewer main and service at a depth of three feet below finished ground elevation. Safety green warning tape shall be used for all sewer lines and shall be clearly marked "sanitary sewer". The location tape shall be a minimum of five-mil thickness with a minimum 50-gauge solid aluminum core. Location tape shall be three inches wide. The cost for the installation of marking tape is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

3.2 MANHOLES

A. Construction

1. ***Revise this section as follows:*** Construct manholes to the specified dimensions according to BSWSD Section 02730.2.3; MANHOLES, of these specifications. Make changes in flow direction through a smooth curve with as large a radius as the manhole size will permit. Make changes in channel grade and size gradually and evenly. Channel depth shall be $7/8^{th}$ of the diameter of the pipe. Channel shall be sloped at a five percent grade from inlet to outlet. Make the floor of the manhole outside the channel is smooth and slopes toward the channel at one inch per foot (8 cm per meter).

2. ***Revise this section as follows:*** Joint all connections between manhole walls and base, between wall sections, between adjusting rings and beneath the manhole lid frame using "Ram-Nek", manufactured by K.T. Snyder Company, or CS-202, Butyl Resin ConSeal, or a BSWSD approved equal, making the manhole watertight. Make sure the manhole manufacturer's low to high temperature workability specifications are followed. For all horizontal joints located below the established high groundwater elevation, install a performed, resilient, O-ring type, neoprene gasket in the joint. For all sewer pipes to manhole joints, use gasketed, flexible, watertight Z-LOK cast in pipe to manhole connectors, by A-LOK Products, Inc., or a BSWSD approved equal that will accommodate differential settlement. All inlet and outlet pipes on the interior of manholes will be grouted around the full circumference of the pipe so that in part there is a continuous flow line from the invert of the pipe to the manhole channel. Any grout that enters the pipe will be removed so that the interior of the pipe is clean and smooth.

3. ***Revise this section as follows:*** Install adjusting rings on each manhole to bring the manhole rim elevation to match the existing or specified ground elevations (See Section 2.3-Manholes, Subpart A (2), above). The Engineer will design manholes to meet future paving requirements. A maximum of 12" of adjusting rings are permitted. Furnish concrete adjustment rings reinforced with the same percentage of steel as the riser and top, or use HDPE adjusting rings. To adjust

the rim to match the slope of a street, use tapered adjusting rings. All joints between grade rings will be sealed with "Ram-Nek", manufactured by K.T. Snyder Company, CS-202 Butyl Resin ConSeal or a BSWSD approved equal joint sealant compound between the first adjusting ring and the top of the manhole, between each adjusting ring, and between the last adjusting ring and the manhole frame.

4. ***Add this section:*** The exterior of all manholes shall be coated with a damp-proof coating of ConSeal CS–55 water based concrete coating, or approved equal. All exterior surfaces of the manhole including base, barrel sections and cones shall be coated.

5. ***Add this section:*** Construct New Manholes over Existing (Live) Sanitary Sewer Mains. Manholes installed over existing (live) sewer mains shall be cut-in sanitary sewer manholes meeting the requirements of this Section 3.2 – Manholes. Bases shall be precast concrete, extended and monolithic with the channel(s) being pre-formed into the base. The BSWSD through special exceptions and pre-approval may allow poured-in-place concrete bases where the BSWSD determines the existing sewage flow stream is excessive to bypass for installation of pre-cast monolithic bases and cut-in sewer connections. Flexible pipe couplers on the manhole inlet and outlet pipe stubs shall be Calder, Fernco, Mission, Romac or other approved sanitary sewer couplers with stainless steel tightening bands.

3.3 SANITARY SEWER SERVICE LINES

A. ***Revise this section as follows:*** Construct service lines in accordance with BSWSD Standard Drawing No. 27-01. Install the new sanitary service line to point 5-feet past the property line unless shown or specified otherwise on the plans. Plug the end of the sewer service line with a stopper and gasket, using a gasket of the same type used for pipe joining. Do not grout the plugs. For multiple service lines installed in the same trench, maintain a minimum of 2-feet clear between each service line and service tap. For sewer service lines connected to existing mains, use Schedule 40, PVC pipe with solvent weld joints or SDR 26 PVC pipe with gasketed joints, and provide all equipment, materials, labor and incidentals necessary to install the service line from the main to the building. The Contractor shall make all main taps for new sewer services connected to existing mains, at the Contractor's expense, and under the direct supervision by BSWSD personnel.

B. ***Modify the following section.*** Mark the location of the sanitary sewer service line ends at the property line or the terminal end of the service using a standard steel fence post 6-feet long, buried at least 2-feet into the ground with a minimum 4-feet protruding above finished grade.

C. ***Add the following section.*** Place a #10 AWG Green insulated copper location wire directly above and taped to the centerline of the sanitary sewer service pipe in the Type 1 bedding material and over the top of the pipe. Securely attach service line locate wire

to mainline pipe's locate wire with a water-tight connection. Bring this wire to the surface along the outside of each terminal end service clean-out. Leave or loop at least 12-inches of wire to allow for attaching a meter or locator to the protruding wire at each surfacing location. Wrap the location wire around the base of the top of the clean-out. The cost of the installation of copper location wire is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

D. ***Add the following section:*** All sanitary sewer service laterals shall be equipped with cleanouts as shown on BSWSD Standard Detail No. 27-02. Service lateral cleanouts shall be of the same size, pipe and material as the service lateral. The top of all property line service lateral cleanouts shall be set at finish grade. The cleanout shall be marked in compliance with 3.3 – Sanitary Sewer Service Lines, Subpart B, above. In the event that a cleanout is in a paved or concreted area, the cleanout shall be protected with a Model No. 3675 cast iron cleanout frame and cover as manufactured by East Jordon Iron Works with the cover marked "cleanout", or an approved equal.

E. ***Add the following section.*** Detectable reinforced underground utility making tape, as manufactured by Thortec, Traceline or a BSWSD approved equal shall be buried directly above the sewer or storm service at a depth of three (3) feet below finished grade elevation. Green warning tape shall be used for all sewer or storm service lines and shall be clearly marked "sewer". The location tape shall be a minimum of five (5) mil thickness with a minimum 50 gauge solid aluminum core. Location tape shall be three (3) inches wide. The cost for the installation of marking tape is incidental and shall b figured into other unit bid items.

3.4 TESTS

A. ***Add the following requirement:*** At least 24-hours prior to beginning sewer main and manhole tests, the Contractor shall provide a testing schedule to the Engineer and the BSWSD for approval. Specify the proposed sequence of testing and the methods and procedures which will be used to complete the tests. Make all tests after backfill has been completed, but before any surface restoration or street surfacing. Notify the BSWSD office at least two (2) working days before any of the following tests are done. The Contractor shall be responsible for finding and repairing all breaks and leaks revealed by the tests. Additionally, the Contractor shall perform all tests in the presence of the resident inspector and the BSWSD Operator(s). The BSWSD will not accept new sewer lines or services until all required tests are done, and the results submitted in written form to the BSWSD office.

B. Light Test

1. ***Revise this section as follows:*** After the trench has been backfilled and compacted as specified in BSWSD & MPW Sections 02221, perform a light test between manholes to check alignment and grade for pipe displacement. The light test will be performed by the engineer or resident inspector. The completed pipeline is to permit a true circle of light to be visible from one manhole to the

next. If alignment or grade is not that specified and displacement of pipe is found, the Contractor will remedy all defects.

C. Leakage Test

1. ***Revise this section as follows:*** The leakage test is a requirement for final acceptance of the sewer extension by the BSWSD. Testing is to be performed in the presence of the resident inspector and a BSWSD representative. Testing will be performed after all the trenches have been backfilled and compacted between manholes.

D. Water Test

1. ***Add the following requirements.*** If the water test method is used, verify groundwater levels at the time of testing by installing piezometers or test pits in the immediate area of the sere line that is being tested.

E. Air Test (Alternate)

1. ***Revise this section as follows:*** Air testing will be allowed for mainline and service laterals only. Manholes shall be water tested. At the discretion of the BSWSD, the mainline and service laterals may be water tested.

9. ***Revise this section as follows:*** For test sections exceeding the maximum lengths, either shorten the test section to the allowable length; test according to Uni-Bell Standard Uni-B-6-98; or use the water test.

10. ***Add the following requirement:*** If the air test method is used to test the sewer main, test manholes for leakage by filling each manhole with water to the top of the manhole. Measure the leakage by checking the water level drop in the man-hole over a four (4) hour period. Allow time to soak the manhole in advance of performing tests. The allowable leakage for manholes is 0.10 gal/hour/foot-diameter/foot-head (gal/hr/ft-dia./ft-head).

G. T.V. Inspection

1. ***Revise this section as follows:*** The BSWSD requires any and all new sewer main extensions and service laterals be inspected using a video camera by an impartial contractor qualified in this type of work before final acceptance. Inspections shall be scheduled with the BSWSD a minimum of one (1) week in advance. Dewatering equipment must be shut down a minimum of 24-hours prior to the television inspection to allow groundwater to return to typical levels. Adequately flush the sewer lines prior to each television inspection. Television inspection of dry sewer lines is not acceptable. <u>All video inspections must be done after the manholes have been grouted</u>. A sewer line will be considered deficient and unacceptable if:

a. The alignment is outside the specified limits.

b. Water ponds in any section of the line equal to or greater than the grade tolerance specified in Section 3.1 – PIPE AND SERVICE LINE INSTALLATION, Subpart E – Tolerance.

c. The pipe has visible defects such as open joints, pinched gaskets, cracked barrels or bell, or similar defects.

d. There is construction debris or foreign material in the line.

3. Record all closed-circuit television inspections of the new sewer lines and services on videotape in DVD format. The DVD or copy shall be delivered to the BSWSD by the TV inspection service contractor for viewing. The DVD shall be appropriately labeled for the sewer project with the name, address and phone number of the company performing the testing. Pull or, in the case of a tracked unit, drive the camera through the sewer at 30 feet per minute. If the camera is pulled by attaching to the hose of a hydraulic cleaner, assure the hose is not active during the pulling process.

Within ten feet of the manhole in which the camera unit is run from, the operator will turn on the camera lights to look for a full circle from the next manhole. All footage shall be continuously shown on the screen with a commentary by the camera operator. The finished tape will be reviewed by the BSWSD before final acceptance of the extension. A copy of the tape and inspection report will be supplied to the BSWSD for their records. The costs incurred in any television inspection are considered incidental work for which no separate payment will be made.

Add the following section

J. Manhole Vacuum Testing

1. Vacuum testing of manholes may be performed in lieu of water testing. Testing shall be done in accordance with "ASTM C1244-05a, Standard Test Method for Concrete Sewer Manholes by a Negative Air Pressure (Vacuum) Test Prior to Backfill".

3.6 GREASE INTERCEPTOR/TRAP STANDARDS

A. Minimum Requirements. The minimum requirement for commercial restaurant grease interceptor/trap construction, materials and other features shall be those required by the Uniform Plumbing Code (UPC), latest edition, and any modifications, revisions or amendments made by the BSWSD. The grease interceptor trap shall be designed to generally comply with BSWSD Standard Drawing No. 27-10. A minimum size grease interceptor of one thousand gallons with at least two compartments (effective liquid

volume of seven hundred fifty gallons in the first compartment and two hundred fifty gallons in the second compartment) is required. The grease trap shall be designed and certified by a registered engineer. If a wastewater discharge flow rate from a restaurant is such that a larger grease trap is required, based on UPC criteria and the detailed engineering analysis, then a larger sized tank shall be installed.

B. Special Requirements: The size and type of grease interceptor shall be subject to the approval of the BSWSD Sewer Department. The grease interceptor shall be installed in a service line separate from other sanitary plumbing facilities and building sewer. In general, all grease trap interceptors shall be designed for exterior installation, of capacity sufficient to service those grease, oils and fat (FOG) generating fixtures connected to it. If the grease interceptor is going to be installed in a traffic area, the project engineer shall provide the BSWD with detailed structural design calculations, computations and details for traffic rated drive over tank and be sufficiently reinforced to withstand appropriate traffic loads. Building wastewater flows other than those requiring separation shall not be discharged into the grease interceptor/trap. Grease interceptor/traps shall be designed, located and constructed in a manner that will permit easy access and maintain by a certified operator, retained by the business requiring the installation, and inspected by the BSWSD, prior to being placed into service. The operator shall regularly provide annual maintenance reports to the BSWD insuring the grease interceptor/trap is regularly being inspected and receiving regular maintenance. FOG build-up in the flow channel of the discharge inspection pipe is evidence the tank is not functioning properly. BSWSD personnel shall be authorized to periodically inspect and monitor performance of grease interceptors.

3.7 SPANISH PEAKS RESORT – SPECIAL SANITARY SEWER SERVICE REQUIREMENTS

1. GENERAL

A. Through an agreement with Spanish Peaks Resort (SPR) at Big Sky, the BSWSD maintains the water and gravity sewer mains within the SPR. The BSWSD has incorporated only the sanitary sewer improvements (gravity mains and manholes) at SPR into its public sewer grid system, but not the water improvements. The BSWSD only administers under contract with SPR the on-going maintenance and operation of the water improvements and has not incorporated any of the water system at SPR into its public water grid.

B. The water mains and services at SPR generally conform to Montana Public Works Standards (MPW-6) and these BSWSD Modifications to MPW-6.

C. Similarly, the gravity sanitary sewer mains (including manholes), within the public right-of-ways at SPR also conform to the general requirement of MWP-6 and the BSWSD Modifications to MPW-6 with the exception of a number of lots that are lower than the gravity sanitary sewer main within the street right-of-way, requiring special pumping units. The individual sanitary sewer (force main) services that connect these low lying properties are pressurized lines connected to either solids-handling raw sewage pumps, called grinder pumps, or Septic Tank Effluent Pumps

(STEP) units in order to lift wastewater from the residence to the up-gradient gravity sewer main in the public street right-of-way.

1. SPR Sanitary Sewer Service Index Map: SPR Sanitary Sewer Service Index Map- BSWSD Standard Drawing No. 27-14 shows the platted lots at SPR with a requirement for a: 1) Conventional Gravity Service, 2) STEP Service or 3) Grinder Pump Service. The lots with conventional gravity sewers are designated on this map and highlighted in green. Gravity sewer services within the SPR shall conform to BSWSD Standard Drawing Nos. 27-01 and 27-02. The gravity services at SPR are highlighted in yellow on BSWSD Standard Drawing No. 27-14.

2. The STEP services at SPR involve three (3) clusters of lots. Each lot with the cluster of properties involves the same STEP installation with the same tank requirement and pump assembly. Each cluster is referred to as a Low-Pressure Sewer System (LPSS), because the receiving main in the street right-of-way is also a small diameter (1-1/2") force main.

    a. Where a STEP system is installed, serving a cluster of properties, the connecting force main service from each residence is in turn connected to a collector force main in the public right-of-way. This small diameter collector force main in turn connects to a conventional manhole and gravity sewer main at the terminal end of the LPSS node.

3. SPR has obtained advanced approval from the State of Montana Department of Environmental Quality (MDEQ) for the gravity designated services and those services requiring either a Grinder and STEP pump installation services. The installation of gravity service at SPR requires no additional approvals before installation. Both the Grinder Pump Services and STEP Services, however, do require a subsequent septic permit from the Madison County Sanitarian's Office prior to installation. SPR will assist the property owners with their permitting and service installation requirements.

4. The responsibility to install, operate, maintain and replace or renew grinder pump and STEP installations is exclusively the homeowners at SPR. The SPHOA only operates and maintains the small diameter force mains within the public road right-of-way associated with STEP installations and takes no responsibility for the tanks, pumps and force main service lines associated with these installations.

5. The BSWSD only operates and maintains the SPR gravity sewer mains and interconnecting gravity manholes.

2. LOTS REQUIRING PUMPING UNITS AND FORCE MAIN SERVICES

A. Grinder Pump & Force Main Service Installations: The lots at SPR requiring a Grinder Pump (noted on SPR Sanitary Sewer Service Index Map Designation as

"GP" highlighted in green) with force main service are shown on BSWSD Standard Drawing No. 27-14. The standard plan sheet with specific details for SPR Grinder Pump assemblies is shown on BSWSD Standard Drawing No. 27-15, Spanish Peaks Grinder Pump Sewer Service.

B. Individual STEP LPSS System Installations: SPR has three (3) separate clusters of lots that require the installation and use of a STEP-LPSS system. The lots involved are shown on BSWSD Standard Drawing No. 27-14 and highlighted in red. These installations differs from the E-One Grinders, as they involve a conventional septic tank (dual compartment type) proceeded by a wet-well dose tank that houses an effluent (non-solids handling) pump. Sewage solids with the STEP installations are collected in the primary septic tank. The effluent pump(s) with the STEP system is placed in a second tank in series, called the dose tank. From the dose tank effluent (non-solids containing wastewater) is pumped to the main in the street.

1. The STEP installations for each of the three LPSS nodes have been pre-designed by SPR to meet the specific head (total dynamic head) conditions of each property in the node or cluster of lots. The first two clusters of properties requiring STEP installations shall comply with "STEP Installations for SPR Subdivision, Phase 1B & 1C (Re-Write for Lots 23-26, and 53-59) – BSWSD Standard Drawing No. 27-16. The third cluster of properties requiring STEP installations shall comply with "Step Installations for SPR Subdivision, Phase 2 (Re-Write for Lots 37, and 45-47, inclusive) – BSWSD Standard Drawing No. 27-17.

END OF SECTION