

CHAPTER 5 CONSTRUCTION REQUIREMENTS

SECTION 501 INSPECTION OF PUBLIC WASTEWATER SYSTEM EXTENSIONS AND MODIFICATIONS

501.1 General

- A. Inspection of Public Wastewater System extensions and modifications by SBWRD will include the following activities.
 - 1. Review and approval of required submittals from Contractor.
 - 2. Preconstruction Meeting.
 - 3. Periodic Inspections.
 - 4. Preliminary Inspection.
 - 5. Final Inspection.
 - 6. Warranty Inspection.
- B. All work and materials shall be subject to inspection by SBWRD until the end of the warranty period.
- C. The SBWRD Inspector shall have access to the work at all times.
- D. Inspections conducted by the SBWRD Inspector will be according to the Approved Construction Drawings and these SBWRD Standards.
- E. Inspections will be conducted as appropriate and as time and scheduling permits, as determined by SBWRD.
- F. The Contractor shall notify the SBWRD Inspector a minimum 24 hours prior to the following.
 - 1. Start of construction.
 - 2. Any change of schedule.
 - 3. Work to be conducted on weekends, or holidays.
- G. SBWRD will notify the Project Manager of any non-conforming work or material as soon as practical after that non-conforming work or material becomes known to SBWRD.
- H. The Contractor shall make necessary corrections. Non-conforming work or material will not be approved by SBWRD and shall be removed.

501.2 Contractor Submittals

- A. Contractor shall deliver required submittals to SBWRD District Engineer for review and approval a minimum 1 week prior to Preconstruction Meeting.
- B. SBWRD District Engineer will advise Contractor of any deficiencies.
- C. Contractor shall make revisions and resubmit, if required.
- D. Product data sheets shall be marked to identify applicable products, models, options, and other data.
- E. Fabrication and/or purchase of any item shall not be commenced before the District Engineer has reviewed and approved the pertinent information.

- F. Required Material Submittals.
 - 1. Pipe, fittings and appurtenances.
 - 2. Manholes and appurtenances.
 - 3. Pipe bedding seive analysis.
 - 4. Tracer wire and connectors.
 - 5. Marking tape.
 - 6. Flowable Fill.
 - 7. Casings and appurtenances.
 - 8. Low pressure sewer system materials and appurtenances.
 - 9. Odor control units.
 - 10. Manhole interior coating.
 - 11. Pump station equipment, materials and appurtenances.
- G. Other Required Submittals.
 - 1. Insurance and licensing documentation.
 - 2. Proposed construction schedule.
 - 3. Proposed acceptance testing companies.
 - 4. By-pass pumping plan, if required.
 - 5. Other submittals as required by SBWRD.

501.3 Preconstruction Meeting

- A. A preconstruction meeting, specifically for wastewater system construction, shall be held for all projects that include extensions and modifications to the Public Wastewater System.
- B. The preconstruction meeting shall be held after final design approval and prior to the start of construction.
- C. The preconstruction meeting shall be scheduled through SBWRD and will generally be held at the SBWRD office.
- D. The preconstruction meeting will be under the direction of SBWRD.
- E. The following individuals shall be present at the preconstruction meeting.
 - 1. Owner, Developer, Project Manager, or designated project representative.
 - 2. Project Engineer.
 - 3. Project Surveyor, if different than the Project Engineer.
 - 4. General Contractor for project.
 - 5. Contractor performing actual wastewater system construction including the Contractor's foreman who will be on-site during construction of the wastewater system.
 - 6. SBWRD District Engineer and SBWRD Inspector.
 - 7. Other individuals requested to attend by the Developer, Contractor or SBWRD .

501.4 Periodic Inspections

- A. The SBWRD Inspector conducts periodic inspections

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of the wastewater system extensions and modifications during the course of construction.

B. The primary areas of interest for the periodic inspections are as follows.

1. Pre-construction Checks.
 - a. Locate and become familiar with existing/proposed public wastewater system tie-ins.
 - b. Verify that necessary plugs are in-place prior to construction.
 - c. Verify that appropriate measures are in place to protect the existing wastewater system.
2. Approved Drawings: Verify that Approved Construction Drawings are on site and being used by the Contractor for construction of the wastewater improvements.
3. Material verification: Verify that all materials used for construction of the wastewater system conform to the approved materials submittals, the Approved Construction Drawings and these Construction Standards.
4. Manholes.
 - a. Verify conformance to manhole details and specifications
 - b. Observe manhole base placement and stacking of sections.
 - c. Verify all joints are sealed according to specifications.
 - d. Verify proper grouting of pipe to manhole interface.
 - e. Verify proper core drilling, if required.
 - f. Verify acceptable conformance to cast-in-place requirements, if required.
 - g. Verify proper final adjustment of manhole frame and cover to final elevation.
 - h. Verify installation of valves, supports and other fittings and features, if Low Pressure Sewer System.
5. Installation of Pipe.
 - a. Review grades and alignments with Approved Construction Drawings.
 - b. Conduct periodic inspection of main line installation.
 - c. Visual inspection of lines prior to stacking manholes.
6. Pipe Bedding.
 - a. Verify conformance to bedding details and specifications.
 - b. Observation of bedding material, backfill and compaction efforts.
7. Lateral Stubs.
 - a. Verify location of wye or other connection to main line.
 - b. Verify length and slope.
 - c. Inspect and verify bedding, pipe and end cap, initial backfill, marking tape and installation of stub marker.

- d. Inspect cleanout construction, if required.
 - e. Inspect installation of curb stop valve, concrete support block and check valve assembly, if Low Pressure Sewer System.
8. Other System Features: Verify conformance to specifications and Approved Construction Drawings.
 9. Utility Encounters: Verify conformance with proper separation and crossing requirements.
 10. Observe required acceptance tests.
 11. Inspection reports for each visit to the site will be prepared by the SBWRD Inspector.

501.5 Preliminary Inspection

- A. After installation of the pipe, manholes and other features and backfilling of trenches and prior to paving and final adjustment of manholes to grade, the Contractor shall request that SBWRD conduct a preliminary inspection.
- B. All low-pressure air tests, vacuum tests, hydraulic pressure tests, initial continuity test of tracer wires, and TV Inspections of the installed system, meeting the requirements of Section 515, shall be performed prior to the preliminary inspection
- C. Testing results and TV inspection videos shall be provided to SBWRD for review prior to the preliminary inspection.
- D. Plywood bottoms shall be placed in the manholes after the TV Inspection in order to protect the system from debris resulting from the paving and manhole adjustment process. The plywood bottoms shall remain in place until after the final inspection. Temporary removal of the plywood bottoms may be necessary during the preliminary inspection and during correction of deficient items on the preliminary "punch list", but shall be immediately replaced to protect the system.
- E. SBWRD will review the test results and TV inspection video and perform the preliminary inspection .
- F. The Contractor shall provide an individual familiar with the newly constructed wastewater system to assist the SBWRD Inspector with the preliminary inspection.
- G. The primary areas of interest for the preliminary inspection are as follows.
 1. Construction of manholes and inverts.
 2. Condition of pipe.
 3. Cleanliness of pipe.
 4. Construction of other system features.
 5. Private Lateral stub markers.
 6. Deficiencies noted during periodic inspections.
- H. SBWRD will prepare a preliminary inspection letter with a "punch list" of deficient items. A copy of the preliminary inspection letter will be sent to the Developer, the Project Engineer and the Contractor.
- I. The Contractor shall correct the deficient items listed

in the preliminary inspection letter and advise the SBWRD Inspector when the items are complete.

- J. The SBWRD Inspector will verify completion of the deficient items.
- K. After the deficient items have been corrected and verified, paving and final adjustment of manholes to grade may occur.

501.6 Final Inspection

- A. After completion of paving and adjustment of manholes to grade, and after submittal of Record Drawings as required by Section 302.9 and results of the final continuity test on the installed tracer wire, as required by Section 515.7, the Contractor shall request that a final construction inspection be performed.
- B. SBWRD will perform the final inspection.
- C. The Contractor shall provide an individual familiar with the newly constructed wastewater system to assist the SBWRD Inspector with the final inspection.
- D. The primary areas of interest for the final inspection are as follow
 - 1. Preliminary inspection “punch list” items.
 - 2. Adjustment of manholes to final grade.
 - 3. Alignment and tolerances of cone, grade rings, and frame and cover.
 - 4. Private Lateral stub markers.
 - 5. Placement of off-road manhole markers.
 - 6. Final grading around off-road manholes.
 - 7. Revegetation.
 - 8. Access roads.
 - 9. All other items required for completion of the project.
- E. SBWRD will prepare a final inspection letter with a “punch list” of deficient items. A copy of the final inspection letter will be sent to the Developer, the Project Engineer and the Contractor.
- F. The Contractor shall correct the deficient items listed in the final inspection letter and advise the SBWRD Inspector when the items are complete.
- G. The SBWRD Inspector will verify completion of the deficient items.
- H. When all deficient items have been completed and upon approval and direction by SBWRD, the Contractor shall remove plywood bottoms and all plugs installed on the system. The SBWRD Inspector shall observe the removal of all plugs.

501.7 Warranty Inspection

- A. SBWRD will conduct a warranty inspection according to Section 202.10.

**SECTION 502
INSPECTION OF PRIVATE LATERAL
WASTEWATER LINES**

502.1 Scheduling Inspection Appointments

- A. Prior to starting construction of the Private Lateral Wastewater line, and at various times during the construction process, the Contractor shall contact SBWRD to request a Private Lateral inspection.
- B. Contractors shall call the SBWRD Engineering Department secretary for an inspection a minimum of 1 day (excluding weekends) prior to the time it is needed. Same-day or spot inspections will not be provided. During periods of heavy inspection requests, additional notice may be necessary
- C. Inspections are scheduled on a first-come first-served basis.
- D. If an inspection is scheduled and the construction is not ready for the inspection at the scheduled time, the contractor will be required to schedule another inspection with SBWRD at the next available time slot.
- E. Excessive call-back inspections caused by the contractor not being ready for an inspection at the scheduled time may result in additional Administration Fees being charged to the homeowner, building owner or facility owner.

502.2 Required Inspections

- A. Inspections by the SBWRD Inspector are required at the following times.
 - 1. New Private Lateral Connections.
 - a. If a direct connection of the Private Lateral to an existing Public Wastewater System collection line or manhole is required, inspection of the coring operation and installation of the saddle or manhole connection is required.
 - b. After installation of the Private Lateral pipe, fittings and other appurtenances but prior to backfilling.
 - c. When deficiencies in the installation noted during a prior inspection are corrected and ready for re-inspection.
 - 2. Grease Interceptors and Sampling Manholes.
 - a. After placement of the grease interceptor and sampling manhole but prior to backfilling.
 - b. After backfilling, paving and adjustment of frame and cover to grade.
 - 3. Abandoned Private Laterals: If an existing Private Lateral to the Public Wastewater System is abandoned, the abandonment shall be inspected prior to backfilling.
 - 4. Damaged Private Laterals: If an existing Private Lateral is damaged the repair shall be inspected by the SBWRD Inspector prior to backfilling.

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502.3 Private Lateral Cleanout Locations

- A. 54-8a-10.5 Utah Code Annotated (UCA) requires that:
- “ (a) An operator or person installing or replacing a sewer lateral cleanout beginning August 1, 2009 shall install or replace the sewer lateral cleanout in a manner so that the lateral can be located, including:*
- (i) house sheets; or*
- (ii) electronic markers.*
- (b) An operator or person installing a sewer lateral cleanout shall notify the sewer operator of the sewer lateral cleanout location for record keeping purposes.”*
- B. To assist the Contractor in meeting the requirements of the UCA, and to standardize the cleanout location information provided to SBWRD as the “Sewer Operator”, the SBWRD Inspector will assist the Contractor in taking measurements and preparing the “house sheet” which will document cleanout locations.
- C. The Contractor shall provide personnel and, if necessary, equipment required to take measurements for the location of cleanouts.
- D. In addition to providing the “house sheet” information, the Contractor may choose to place electronic markers at the cleanout location. However, placing electronic markers will not replace the requirement for providing the “house sheet” information.

502.4 Inspection Procedure

- A. The Contractor shall have a copy of the Private Lateral Construction Information on site during inspections.
- B. The primary areas of interest for inspections of Private Lateral Wastewater Lines are as follows.
1. Material verification: Verify that pipe, fittings, couplings, bedding and initial backfill materials, cleanout caps, ring and cover, and other material conform to the specifications.
 2. Installation of Pipe.
 - a. Check slope and alignments.
 - b. Visual inspection of lines prior to backfilling.
 - c. Verify that minimum cover requirements are met.
 3. Couplings: Verify alignment of pipe and couplings and conformance to specifications.
 4. Connections: Verify that connections to manholes, main lines or stubs and to the building stub meet the specifications.
 5. Pipe Bedding: Verify conformance to bedding details and specifications.
 6. Marking tape: Verify that marking tape is on site for installation.
 7. Cleanouts: Document locations and verify that

standpipe is vertical and that fittings, cap, ring and cover, and other materials conform to specifications.

8. Other Features: Verify conformance to specifications.
 9. Utility Encounters: Verify conformance with proper separation and crossing requirements.
- C. The SBWRD Inspector will perform or witness tests on the Private Lateral Wastewater Line as required by Section 516.
- D. The SBWRD inspector will assist the Contractor in documenting the location of the Cleanouts on the Private Lateral Wastewater Line, as required by Section 502.3, and will document other aspects of the Private Lateral Wastewater Line.
- E. The Contractor shall provide an individual familiar with the newly constructed private lateral to assist the SBWRD Inspector with the inspection.
- F. The SBWRD Inspector will advise the Contractor’s on-site representative of any deficient items at the time of the inspection and, if required, will prepare a Partial Inspection letter that documents those deficient items. A copy of the Partial Inspection Letter will be sent to the homeowner, building owner or authorized representative and the Contractor.
- G. The homeowner, building owner or authorized representative and the Contractor shall correct the deficient items listed in the Partial Inspection Letter and schedule another appointment with the SBWRD Inspector according to Section 502.1.
- H. The SBWRD Inspector will verify completion of the incomplete items and repair of deficient items.

SECTION 503 GENERAL CONSTRUCTION REQUIREMENTS

503.1 Protection of the Existing Public Wastewater System

- A. No connection to the existing Public Wastewater System or to existing Private Lateral Wastewater Line stubs shall be made without approval of SBWRD and inspection by the SBWRD Inspector.
- B. No modification of the existing Public Wastewater System or existing Private Lateral Wastewater Lines shall be made without approval of SBWRD and inspection by the SBWRD Inspector.
- C. The Public Wastewater System and Private Lateral Wastewater Lines shall be protected from damage. Any damage to the existing system resulting from the Contractor’s operation shall be corrected by the Contractor at his expense.
- D. All repairs to the Public Wastewater System shall be observed by the SBWRD Inspector.

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503.2 Excluding Construction Debris and Material From the Existing Public Wastewater System

- A. All construction debris and material, including groundwater, native soil, bedding material, backfill material, pipe and other construction material, garbage, etc., shall not be placed in or allowed to enter the existing Public Wastewater System.
- B. The Contractor shall conduct his operations and provide adequate controls to exclude this debris and material from the system.
- C. Any debris or construction material that does enter the existing Public Wastewater System shall be removed by the Contractor at the Contractors expense.
 1. Any costs incurred by SBWRD in removing the debris or construction material will be billed to the Contractor.
 2. A video inspection of the cleaned downstream lines demonstrating that the debris and construction material has been removed shall be provided by the Contractor.

503.3 Maintaining Existing Wastewater Flows

- A. Wastewater flows in the existing wastewater system shall be maintained at all times.
- B. Bypass pumping, temporary bypass piping, or other means required to divert wastewater flow around the construction site shall be provided by the Contractor.
- C. Placing a plug and allowing wastewater to back up in existing wastewater lines will not be allowed.
- D. A bypass plan shall be submitted to SBWRD for review and approval prior to the start of construction.
- E. Bypass plans using pumping equipment shall include continuous (24 hr/day) monitoring of the pumping equipment.

503.4 Isolation Of New Construction

- A. At the start of construction of Public Wastewater System Extensions and Modifications, the Contractor shall install and maintain a plug near the connection of the new construction to the existing Public Wastewater System. The plug shall isolate the new system under construction from the existing system.
- B. The location of the plug shall be determined by SBWRD.
- C. The plug shall be anchored to the apron of the manhole as approved by SBWRD.
- D. The plug shall remain in-place until approval to remove the plug is given by SBWRD.
- E. Removal of the plug shall be the responsibility of the Contractor.
- F. Removal of the plug shall be witnessed by SBWRD.
- G. Failure to install and maintain this plug will subject the Developer and Contractor to additional final "punch-list" items such as cleaning all existing downstream collection lines as determined by SBWRD and repair of damage to the existing

wastewater system.

503.5 Record Drawing Information Collected by Contractor

- A. During construction of Public Wastewater System Extensions and Modifications, the Contractor shall record "As-Built" measurements and information.
- B. Information measured and recorded shall include the following.
 1. Private Laterals:
 - a. Wye location on main line.
 - b. Pipe size, slope and length.
 - c. Cleanout and bend locations and degree of bend.
 - d. Horizontal distance ties from the end of the lateral stub to property corners.
 - e. In the absence of established property corners, finished surface improvements, preferably sewer manholes or fire hydrants, shall be used.
 - f. If no finished surface improvements are near the lateral stub, lateral markers shall be installed on nearby trees or features and horizontal distance ties to the maker provided.
 2. Location of other utilities encountered.
- C. The information recorded shall be incorporated into the Record Drawings as required in Section 302.9
- D. The pipe length and depth shall be noted on the lateral marker according to Section 506.5.
- E. A set of the record information shall be maintained at the construction site.
- F. The SBWRD Inspector may periodically and independently measure and record installed lateral information for the purpose of verifying submitted Record Drawing information.

503.6 Safety

- A. In all cases, the contractor is responsible for safety.
- B. The contractor shall be responsible for full compliance with applicable excavation and trenching regulations set forth by the U.S. Department of Labor Occupational Safety and Health Administration; as administered by the Utah Occupational Safety and Health Division (UOSH) of the Utah Labor Commission.
- C. The contractor shall be responsible for full compliance with applicable confined space regulations set forth by the U.S. Department of Labor Occupational Safety and Health Administration, as administered by the Utah Occupational Safety and Health Division (UOSH) of the Utah Labor Commission.
- D. The contractor shall furnish and maintain all necessary safety equipment, such as barriers, signs, warning lights, and guards to provide adequate protection for persons and property during all phases

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of construction.

- E. The contractor shall give reasonable notice to the owners of public or private property and utilities when such property and utilities are within the construction area.
- F. The contractor shall at all times observe and comply with all Federal, State, and local laws, ordinances, permits and regulations which will in any manner affect the work.

503.7 Materials Handling

- A. All material to be incorporated into the project shall be transported, handled and stored in a manner which will insure proper installation in an undamaged condition.
- B. The contractor shall replace all material found to be defective or which has been damaged before inclusion in the work.

503.8 Installation of Precast Concrete Products

- A. Precast concrete products shall not be installed within seven days of manufacture date.
- B. The date stamped on the precast concrete product will be used as the starting date in determining this time period.
- C. Any precast concrete product installed prior to completion of this seven-day period will not be approved by SBWRD and shall be removed.

SECTION 504 TRENCH EXCAVATIONS

504.1 General

- A. Trench Excavation shall include every operation necessary for excavation of all materials of whatever nature within the designated limits of the trenches.
- B. Contractor shall support and maintain the excavation with shoring, bracing, trench boxes or other methods.
- C. Contractor shall provide for the uninterrupted flow of surface water.
- D. Contractor shall protect all utilities, pipes, conduits, culverts, bridges and all other public and private improvements and property which may be endangered by the work.
- E. Contractor shall provide temporary support, adequate protection, and maintenance of all underground and surface structures and other obstructions affected by the trench excavation. Any structure that has been disturbed shall be restored or replaced at the Contractor's expense.

504.2 Pavement Removal

- A. All pavement removal shall be in accordance with applicable City, County, or State Standards and permits.

504.3 Trenching

- A. Alignment: Trench excavations shall be performed to the alignment and grade as indicated on the Approved Construction Drawings.
- B. Trench Width
 - 1. Trenches shall be excavated to provide adequate working space for proper pipe installation, jointing, and embedment.
 - 2. Minimum sidewall clearance shall be 8".
- C. Trench Depth: The trench shall be over-excavated to a minimum depth of one-fourth the pipe diameter (6" minimum) below the bottom of the pipe.
- D. Fill Areas.
 - 1. Trench excavations in fill areas shall extend to the level of native, undisturbed soil.
 - 2. The area between the native, undisturbed soil and the normal bottom of trench shall be backfilled with suitable material in maximum 12" lifts and compacted to 95% of the Modified Proctor Density as determined by the compaction control test specified in ASTM D-1557 and verified by ASTM D-1556 or ASTM D-2922.
 - 3. If fill areas were placed with appropriate lifts and compactive effort, evidence of that effort shall be provided to SBWRD prior to excavation.
- E. Trenching Method.
 - 1. The use of mechanical equipment will be permitted except in locations where machines may cause damage to existing structures, in which case, hand methods shall be employed.
 - 2. The trenching method used and the width of the trench excavated shall provide adequate space for proper installation of the pipe, manholes and other appurtenances. This shall include placement and compaction of bedding and backfill materials, jointing of pipe and manholes, and haunching of pipe.

504.4 Dewatering

- A. All excavations shall be dewatered before any construction is undertaken.
- B. Pipe shall be laid only in dry trenches.
- C. Concrete shall be placed only on dry, firm foundation material.
- D. The Contractor shall have adequate dewatering equipment on-site.
- E. Groundwater shall not be allowed to enter the Public Wastewater System.

504.5 Blasting

- A. The Contractor shall comply with all Federal, State, and City laws, rules and regulations governing the keeping, storage, use, manufacture, sale, handling, transportation, or distribution of explosives used for blasting operations.
- B. The Contractor shall be responsible to secure blasting permits from the Park City Building Department,

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Summit County Building Department and Park City Fire District, as required, prior to blasting.

504.6 Borings and Casings

- A. Borings and casings shall meet the requirements of Section 303 and Section 409.
- B. The proposed boring method, qualifications and experience of the boring contractor, and other boring related information, as required by SBWRD, shall be submitted for approval by SBWRD prior to mobilizing the boring operation.

SECTION 505 PIPE EMBEDMENT

505.1 General

- A. Bedding material meeting the requirements of Section 408.1 shall be placed from the bottom of the excavated trench to the bottom of the pipe and compacted to 95% of the Modified Proctor Density prior to placement of the pipe.
- B. Bedding material shall extend a minimum depth of one-fourth the pipe diameter (6" minimum) below the bottom of the pipe.
- C. After placement of the pipe, additional bedding material shall be placed in maximum 6" lifts to the springline of the pipe.
- D. The bedding material shall be shovel sliced and compacted in the pipe haunch areas to insure uniform and continuous bearing along the pipe.
- E. Initial Backfill meeting the requirements of Section 408.1 shall be placed and compacted in the trench simultaneously on each side of the pipe in 6" lifts for the full width of the trench in such a manner as not to damage or disturb the pipe.
- F. Initial backfill shall be placed to a minimum depth of 12" above the top of the pipe.
- G. The initial backfill shall be compacted to 95% of the Modified Proctor Density.
- H. The percent of compaction shall be as determined by the compaction control test specified in ASTM D-1557 and verified by ASTM D-1556 or ASTM D-2922.

SECTION 506 PIPE INSTALLATION

506.1 General

- A. Alignment and Grade: Pipe shall be laid to the alignment and grades indicated on the Approved Construction Drawings within the following limits.
 - 1. Alignment: 2"
 - 2. Grade: $\pm 1/2"$
 - 3. When installed at minimum allowable slopes, as

defined in Section 303.6, the variation in grade listed above shall not be applicable.

- 4. Obvious bellies or low spots in pipe segments shall be corrected.
 - 5. Flat or reverse grade lines or segments of lines are not acceptable.
 - 6. SBWRD reserves the right to require whatever action is necessary to correct (including replacement of all affected sections of line including manholes) any unacceptable items generated as a result of pipe installation at less than minimum allowable slopes or with other deficiencies in alignment or grade.
- B. Except where a curvilinear alignment has been specifically approved by SBWRD, pipe shall be laid in a straight line at a uniform grade between manholes on main lines and between bends on Private Lateral lines. Some minor roping or deflection of Private Lateral lines may be allowed.
 - C. Pipe laying shall begin at the lowest elevation and proceed upstream with the bell end of bell-and-spigot pipe positioned upstream.
 - D. The interior of all pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean during installation and until the work has been accepted.
 - E. Pipe shall not be laid in water nor under unsuitable weather or trench conditions.
 - F. Cold weather wastewater collection line construction requirements in accordance with Section 512 shall be utilized when temperature or weather conditions could affect the final product, or as deemed necessary by SBWRD. Cold weather construction shall be in accordance with the pipe manufacturer's recommendations.
 - G. All field cuts shall be made at right angles to the axis of the pipe. All pipe shall be filed and beveled to remove roughness.
 - H. Pipe material shall be consistent between manholes unless specifically approved by SBWRD.
 - I. If a change of pipe material between manholes is approved by SBWRD the following requirements shall be met.
 - 1. The connection between different pipe materials shall be made with pipe couplings meeting the requirements of Section 407.
 - 2. Clearance between pipes at the coupling shall be a maximum of 1/8".
 - 3. Pipes shall be aligned to provide a smooth transition without any lip or misalignment at the joints.
 - 4. Coupling bolts shall be greased with non-oxidizing grease and the coupling shall be wrapped with polyethylene sheeting and taped.
 - J. Whenever pipe laying is stopped, the open end of the pipe shall be plugged with a watertight plug and the trench shall be properly backfilled to protect the pipe

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from floating.

- K. If adjustment of the position of a pipe length is required after being laid, it shall be removed, relaid and rejoined.
- L. Any pipe that has floated due to water entering the trench shall be removed from the trench and the pipe shall be relaid as directed by SBWRD.

506.2 Pipe Laying

- A. In addition to the above general requirements, all pipe installation shall comply with the specific requirements of the pipe manufacturer as follows.
 - 1. ABS Pipe: ASTM D 2321, "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe." ASTM D 2751 "Standard Specification for ABS Sewer Pipe and Fittings."
 - 2. Ductile Iron Pipe: AWWA C 600 "Installation of Ductile Cast-Iron Water Mains and Appurtenances."
 - 3. PVC Pipe: ASTM D 2321 "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe."
 - 4. High Density Polyethylene (HDPE) Pipe: ASTM D 2321 "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe."

506.3 Tracer Wire Installation

- A. Tracer wire shall be installed directly on top of the pipe, along the entire length of all main gravity lines, low pressure lines and force mains.
- B. The tracer wire shall be attached to the pipe at maximum 5' intervals with duct tape or zip ties.
- C. The tracer wire shall be continuous from manhole to manhole and shall terminate inside the manhole according to Standard Detail MH-01.
- D. Splices in the tracer wire between manholes using approved wire connectors will be allowed but shall be kept to a minimum.
- E. A successful continuity test on the installed tracer wire according to Section 517.7 will be required.

506.4 Connecting to Pipe Stubs

- A. The Contractor shall verify that existing pipe stubs are acceptable (i.e., condition, alignment, grade, leakage) prior to connecting to the stub.
- B. The acceptability of the stub shall be approved by SBWRD.
- C. Unacceptable main line stubs shall be removed and replaced with new pipe to the manhole or to a location on the stub where the remaining pipe to the manhole is acceptable.
- D. Unacceptable Private Lateral stubs shall be removed and replaced to the main line or to a location on the stub where the remaining pipe to the main line is

acceptable.

- E. The extension of main line pipe stubs shall be accomplished with pipe having the same type, size, and joint type as the existing stub to the next manhole.
- F. If new pipe material matching the material of the existing stub is no longer available, then a change of pipe material may be approved by SBWRD.
- G. If a change of pipe material is approved by SBWRD, the following requirement shall be met.
 - 1. The connection between different pipe materials shall be made with pipe couplings meeting the requirements of Section 407.
 - 2. Clearance between pipes at the coupling shall be a maximum of 1/8".
 - 3. Pipes shall be aligned to provide a smooth transition without any lip or misalignment at the joints.
 - 4. Coupling bolts shall be covered with non-oxidizing grease and the coupling shall be wrapped with polyethylene sheeting and taped.

506.5 Installing Private Lateral Stubs

- A. Private Lateral Wastewater Line stubs installed as part of the main line construction shall be extended at the slope and to the length or location indicated on the Approved Construction Drawings.
- B. Lateral stub trenches which require either blasting or rock sawing trenching equipment shall be over excavated to a minimum of 5' beyond the installed stub end to allow re-excavation and extension of the lateral without damage to the existing lateral stub
- C. Connection to Main Line.
 - 1. The connection of Private Lateral Wastewater Lines to the main line shall be an in-line "wye" branch made specifically for wastewater lateral connections.
 - 2. The "wye" shall be turned up so that the invert of the "wye" branch at the connection is at or above the spring line of the main line.
- D. Caps: All stubs shall be plugged at the end of the pipe with a glued, fused or approved gasketed cap. Expansion type (Brandt™) plugs shall not be used.
- E. Private Lateral Stub Marker.
 - 1. Immediately following installation of the Private Lateral stub, a Private Lateral stub marker shall be installed by the Contractor at the end of each lateral stub.
 - 2. The marker shall be placed straight and erect at the end of the capped lateral and extended upward to at least 2' above grade.
 - 3. The exposed portion of the marker shall be painted green.
 - 4. Record Drawing information required by Section 503.5 shall be collected.
 - 5. The length of the lateral pipe from the main line and the length of the marker shall be clearly

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- labeled with permanent ink at the top of the marker.
6. Private Lateral markers disturbed or lost prior to Final Approval shall be reset using accepted survey practices and procedures.
 7. Lateral markers shall be in-place and visible at the Final Inspection.

SECTION 507 TRENCH BACKFILL AND PAVING

507.1 Trench Backfill in Roads

- A. Trench backfill in public or private roads, streets and rights-of-way shall be in accordance with the applicable City, County, or State standards, permits, and/or as designated on Approved Construction Drawings.

507.2 Trench Backfill For Off-Road Lines

- A. Trench Backfill for Off-Road Lines, as defined in Section 101.6, shall meet the following requirements.
 1. Backfill material shall meet the requirements of Section 408.2.
 2. Suitable backfill material shall be placed in maximum 12" lifts and compacted to 90% of the Modified Proctor Density as determined by the compaction control test specified in ASTM D-1557 and verified by ASTM D-1556 or ASTM D-2922.
 3. If existing material cannot meet compaction requirements, acceptable import material will be required.

507.3 Marking Tape Installation

- A. Marking tape shall be installed directly above the pipe, along the entire length of all wastewater lines.
- B. The tape shall be located at a depth of 2' to 3' above the top of the pipe.
- C. The warning tape depth shall be consistent along the entire length of the line.

507.4 Pavement Replacement

- A. All pavement replacement shall be in accordance with the applicable City, County, or State standards, permits, and/or as designated on Approved Construction Drawings.

SECTION 508 TRENCH DIKES

508.1 General

- A. Trench dikes shall be constructed at the locations indicated and in accordance with details as shown on the Approved Construction Drawings and standard

detail drawings.

- B. Additional trench dikes may be required at other locations to prevent migration of ground water along the sewer trench as determined and directed by SBWRD.

508.2 Construction Method

- A. Trench dikes shall be constructed of cement treated fill material.
- B. Placement of the cement treated fill material shall occur after pipe installation and placement of bedding and initial backfill material.
- C. The bedding, initial backfill and native soil shall be removed for the width and length of the trench dike.
- D. The trench dike shall be keyed into undisturbed soil a minimum 12" below the bottom of the pipe embedment material (18" below bottom of pipe) and a minimum 12" beyond each side of the excavated trench.
- E. The trench dike shall extend a minimum 12" above the top of the pipe embedment (24" above the top of pipe).
- F. Pipe to Manhole Adapters (2 per trench dike) shall be placed on the pipe.
- G. Cement treated fill material shall be placed in one continuous pour for the full depth of the trench dike.
- H. Care shall be taken while placing the cement treated fill material to assure that displacement or distortion of the pipe does not occur.
- I. The area around the trench dike shall remain dewatered for a period of 24 hours after placement of the cement treated backfill material and until the backfill is brought to approximate final grade.

SECTION 509 MANHOLES

509.1 General

- A. Manholes shall be constructed at the locations indicated and in accordance with details as shown on the Approved Construction Drawings and standard detail drawings.

509.2 Subgrade

- A. Manholes shall be constructed on a stable foundation capable of supporting the imposed loads.
- B. A minimum 6" depth of bedding material shall be placed, leveled and compacted to 95% of the Modified Proctor Density as determined by the compaction control test specified in ASTM D-1557 and verified by ASTM D-1556 or ASTM D-2922. prior to placing the manhole bases.

509.3 Manhole Bases

- A. Precast Concrete Bases:
 1. Shall meet the requirements of Section 404.2.

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2. Shall be placed so as to be fully and uniformly supported in proper horizontal and vertical alignment.
- B. Cast-in-Place Bases on Existing Lines: (prior approval required)
1. Shall meet the requirements of Section 404.3.
 2. Shall be constructed so as to be fully and uniformly supported in proper horizontal and vertical alignment.
- C. Installation of pipe in manhole bases with flexible pipe connectors shall be per manufacturer's recommendation.
- D. Installation of pipe in manhole bases where use of a flexible pipe connector is not possible, as approved by SBWRD, shall include a pipe to manhole adapter placed around the pipe and centered on the manhole wall and grouted with non-shrink grout to form a watertight seal.
- E. In all cases, a watertight manhole to pipe connection is required.

509.4 Wall and Cone Sections

- A. Precast wall and cone sections shall be placed and aligned to provide vertical sides.
- B. Steps:
1. Uniform vertical spacing for entire depth of manhole with a maximum 16" vertical spacing between steps.
 2. Vertically aligned with less than 1" deviation.
 3. 4" maximum vertical distance from top of cone to center of top step.
 4. 22" maximum vertical distance from top of frame and cover to center of top step.
 5. 24" maximum, 12" minimum vertical distance from center of bottom step to manhole apron.
 6. Located over the largest apron of the manhole base.
- C. Joints:
1. Mastic installed according to manufacturer's recommendations. Grouted joints shall not be used.
 2. Mastic shall be installed when the temperature of the material is above 70 degrees to assure a water tight seal. Heating of the material may be required to achieve a proper seal.

509.5 Backfilling Manholes

- A. All backfilling shall be in accordance with the applicable City, County, or State standards, permits, and/or as designated on Approved Construction Drawings.
- B. Backfilling shall be accomplished in a manner to prevent damage or disturbance to the installed manholes.
- C. Manhole sections disturbed during backfilling shall be removed, rejointed and restacked.
- D. Manhole sections damaged during construction shall

be replaced with new sections.

509.6 Installation of Temporary Plywood Bottoms

- A. Plywood bottoms shall be placed in the manholes after the TV Inspection in order to protect the system from debris resulting from the paving and manhole adjustment process.
- B. The plywood bottoms shall remain in place until after the final inspection and removal is authorized by SBWRD.
- C. Temporary removal of the plywood bottoms may be necessary during the preliminary inspection and during correction of deficient items on the preliminary "punch list", but shall be immediately replaced to protect the system.
- D. Plywood bottoms shall be constructed of minimum 3/4" CDX plywood with adequate bracing to prevent sagging.
- E. The plywood bottom shall be constructed in two or three pieces with a 1/8" maximum clearance at the joints.
- F. The plywood shall be placed in the manhole bottom such that the joint is perpendicular to the flow channel.
- G. 2x4's shall be placed across the plywood sections and screws attached to hold the plywood in place.
- H. The plywood bottom shall be placed above the crown of all pipes entering the manhole.
- I. Removal of the plywood bottoms shall be the responsibility of the Contractor.
- J. All debris collected on the plywood bottoms shall be removed from the manhole prior to removal of the plywood bottoms.

509.7 Adjustment of Manhole Frame and Cover To Final Grade

- A. Manholes In Asphalt Paved Areas.
1. Manholes located in asphalt paved areas shall be raised to final grade after final paving is completed.
 2. Shall conform to standard details in Appendix C.
 3. The top of the manhole frame shall be 1/2" below and parallel to the plane of the asphalt paving at the outside edge of the collar.
 4. The distance from the top of the cone to the top of the frame shall generally not exceed 18". Distances greater than 18" require specific approval by SBWRD. In no case shall the distance exceed 24". Distances greater than approved will require the addition of a manhole wall section and retesting.
 5. The distance from the top of the cone to the lowest point on the bottom of the frame shall not be less than 4".
 6. Prior to paving, a manhole frame and cover or a circular metal plate shall be placed on top of the cone temporarily to prevent material from

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- entering the manhole.
7. After the final lift of asphalt is placed, the asphalt and base course material shall be removed to a diameter a minimum 32" greater than the diameter of the top of the manhole frame and to a level 6" below the top of the cone and 6" outside the cone. The edge of the asphalt shall be smooth and uniform.
 8. Manhole Adjustment with Whirlygig® or Approved Equal.
 - a. Install per manufacturer's recommendations and standard details.
 - b. Set thermoplastic riser form in a bead of sealant meeting requirements of Section 404.17 to achieve a watertight seal between form and top of manhole cone.
 - c. The thermoplastic form shall be anchored to the manhole cone with a minimum of 4 anchors.
 - d. After the frame has been set to final grade, Class 4000 concrete shall be placed and consolidated in the excavated area around the cone, riser form and frame.
 - e. The concrete shall be allowed to cure for a minimum of three days prior to allowing traffic over the manhole.
 9. Metal adapter rings (risers) shall not be used for final adjustment of the frame on new development projects.
- B. Manholes in Concrete Paved Areas.
1. Manholes located in concrete paved areas shall be raised to final grade after placement of concrete paving.
 2. Shall conform to standard details in Appendix C.
 3. When installation is complete, the top of the manhole frame shall be 1/4" below and parallel to the plane of the surrounding concrete paving.
 4. The distance from the top of the cone to the top of the frame shall generally not exceed 18". Distances greater than 18" require specific approval by SBWRD. In no case shall the distance exceed 24". Distances greater than approved will require the addition of a manhole wall section and retesting.
 5. The distance from the top of the cone to the lowest point on the bottom of the frame shall not be less than 4".
 6. Prior to paving, a manhole frame and cover or a circular metal plate shall be placed on top of the cone temporarily to prevent material from entering the manhole.
 7. Block out area around the manhole adequate for manhole adjustment.
 8. After concrete pavement is placed, the base course material shall be removed to a diameter a minimum 32" greater than the diameter of the top of the manhole frame and to a level 6" below the top of the cone and 6" outside the cone.
9. Manhole Adjustment with Whirlygig® or Approved Equal.
 - a. Install per manufacturer's recommendations and standard details.
 - b. Set thermoplastic riser form in a bead of sealant meeting requirements of Section 404.17 to achieve a watertight seal between form and top of manhole cone.
 - c. The thermoplastic form shall be anchored to the manhole cone with a minimum of 4 anchors.
 - d. After the frame has been set to final grade, Class 4000 concrete shall be placed and consolidated in the excavated area around the cone, riser form and frame.
 - e. The concrete shall be allowed to cure for a minimum of three days prior to allowing traffic over the manhole.
 10. Metal adapter rings (risers) shall not be used for final adjustment of the frame on new development projects.
- C. Manholes in Roadway Shoulders.
1. Shall conform to standard details in Appendix C.
 2. Roadway shoulders without curb.
 - a. Adjustment to final grade shall occur after placement of pavement around manhole.
 - b. Adjustment shall meet the requirements of Section 509.7.A or B.
 3. Roadway shoulders with curb.
 - a. The top of manhole frames shall be set horizontal and flush with the finished grade.
 - b. The distance from the top of the cone to the top of the frame shall generally not exceed 18". Distances greater than 18" require specific approval by SBWRD. In no case shall the distance exceed 24". Distances greater than approved will require the addition of a manhole wall section and retesting.
 - c. The distance from the top of the cone to the lowest point on the bottom of the frame shall not be less than 4".
 - d. Grade rings shall be placed on the cone as required to raise the frame and cover to the proper elevation. Bricks set in non-shrink grout are not allowed for adjusting the final elevation of manholes in roadway shoulders with curbs.
 - e. The joints between the cone and bottom grade ring, between grade rings, and between the top grade ring and the manhole frame shall be made by placing mastic around the midpoint of the cone or grade ring, placing the next grade ring or frame and applying pressure to distribute the mastic material and form a watertight seal.

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- f. Mastic shall be installed when the temperature of the material is above 70 degrees to assure a water tight seal. Heating of the material may be required to achieve a proper seal.
- D. Manholes in Off-Road Areas.
1. Shall conform to standard details in Appendix C.
 2. When installation is complete, the top of the manhole frame shall be horizontal and flush with the surrounding roadway platform
 3. Grading around the manhole shall not result in a depressed area around the manhole.
 4. The manhole frame shall be placed directly on the manhole cone. Grade rings and bricks shall not be used to adjust the final frame elevation on manholes in off-road areas.
 5. The joint between the cone and frame shall be made by placing mastic around the cone, placing the frame, and applying pressure to distribute the mastic material and form a watertight seal.
 6. Mastic shall be installed when the temperature of the material is above 70 degrees to assure a water tight seal. Heating of the material may be required to achieve a proper seal.
 7. An Off-road Manhole Collar shall be installed around the frame and cone.
- E. Manholes in Concrete or Asphalt Walkways.
1. When installation is complete, the top of the manhole frame shall be flush with the surrounding walkway.
 2. Adjustment shall meet requirements of Section 509.7, A or B.
- 509.8 Drop Manholes**
- A. Drop manholes shall only be installed where indicated on the Approved Construction Drawings.
 - B. Drop manholes shall meet the requirements of Section 303.8.E. and the Standard Detail Drawings.
- 509.9 Connection to Existing Manhole**
- A. Prior to the start of construction, the condition of the existing manhole shall be assessed by SBWRD.
 - B. If the existing manhole is determined by SBWRD to be suitable for core drilling the following procedure shall be followed.
 1. The existing manhole wall and apron shall be core drilled to allow for placement of the new pipe and flexible pipe to manhole connector (boot) in the manhole at the design elevation and provide a channel in the apron for the new line.
 2. The SBWRD Inspector shall witness all core drilling of manholes.
 3. A flexible pipe to manhole connector (boot) shall be installed in the core drilled wall to provide a watertight seal.
 4. The existing apron shall be built up with epoxy grout anchored to the existing concrete with stainless steel anchors or as otherwise directed by the SBWRD Inspector to provide a full depth channel from the new pipe to the existing channel as directed by the SBWRD Inspector.
5. Chipping, cutting and grinding of the existing apron and channel and finishing with epoxy grout may be required.
 6. The transition from the new invert to the existing invert shall be smooth and uniform and shall provide a long radius sweep to redirect flow to the existing downstream pipe.
- C. If the existing manhole is determined by SBWRD to not be suitable for core drilling, the existing manhole shall be removed and replaced with a new manhole with precast base.
- D. During the connection of new sewer lines to existing manholes, the alignment of the existing precast sections, grade rings, and castings shall be maintained and the joints between sections, grade rings, and casting, lift holes and connections of existing inflow and outflow pipes shall be watertight.
- E. The Contractor shall provide for continuous wastewater flow and shall prevent entrance of any ground water, storm water, debris or dirt into the existing facilities during this construction process.
- F. Any damage to the existing manhole or the existing wastewater system shall be repaired by the Contractor at the Contractor's expense.

SECTION 510 WASTEWATER PUMP STATIONS

510.1 General

- A. Wastewater pump stations shall be constructed in accordance with the requirements of the Approved Drawings.

510.2 Startup Services

- A. Prior to acceptance of the wastewater pump station the manufacturer of all major equipment installed in the pump station shall provide Start-up services for the equipment.
- B. A report by the manufacturer confirming that the installation complies with the manufacturer's requirements shall be submitted.
- C. All changes recommended by the manufacturer shall be completed
- D. A one-year warranty of the equipment shall be included in the report. The one-year warranty will begin on the date the pump station receives Final Project Approval by SBWRD

510.3 Training

- A. A minimum of 4 hours of training shall be provided by the manufacturer of all major equipment for SBWRD operation and maintenance personnel.
- B. A proposed training outline and schedule shall be

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submitted by the Project Engineer for approval by SBWRD.

SECTION 511 REPAIR OF EXISTING WASTEWATER SYSTEM

511.1 General

- A. Existing wastewater lines, manholes and other appurtenances damaged or disturbed during construction shall be repaired or replaced by the Contractor at the Contractor's expense.
- B. Notify the SBWRD Inspector 24 hours prior to making repairs. The inspector must be present during the repair.
- C. Provide for pumping or diversion of wastewater around the damaged section as required.

511.2 Repair Of Wastewater Lines

- A. Cut and remove the broken pipe section. Locate the repair to reduce the number of repair couplings required (removal to the spigot end of the adjacent pipe is preferred).
- B. Check remaining pipe for splits and cracks.
- C. Remove the existing material below the pipe in the area of the broken pipe section to 6" below the bottom of the pipe.
- D. Bedding material meeting the requirements of Section 408.1 shall be placed from the bottom of the excavated trench to the bottom of the pipe and compacted prior to placement of the pipe. Assure that the bedding material is worked under the existing pipe.
- E. Insert new pipe section of the same pipe material, inside diameter and outside diameter.
- F. The Contractor shall notify SBWRD if the same pipe material is not available and a suitable replacement pipe material will be determined.
- G. Clearance between pipes at the coupling shall be a maximum of 1/8".
- H. Pipes shall be aligned to provide a smooth transition through the repaired section without any lip or misalignment at the joints.
- I. Install pipe couplings meeting the requirements of Section 407.
- J. Coupling bolts shall be covered with non-oxidizing grease and the coupling shall be wrapped with polyethylene sheeting and taped.
- K. Additional bedding material shall be placed in maximum 6" lifts to the springline of the pipe.
- L. The bedding material shall be shovel sliced and compacted in the pipe haunch areas to insure uniform and continuous bearing along the pipe.
- M. Prior to placing initial backfill above the springline of the pipe, the alignment of the repaired pipe section

with the existing pipe and the coupling installation shall be inspected to assure proper alignment and installation. If the repair is not properly aligned or installed, remove the couplings and reinstall the repaired section.

- N. Initial Backfill meeting the requirements of Section 408.1 shall be placed and compacted in the trench simultaneously on each side of the pipe in 6" lifts for the full width of the trench in such a manner as not to damage or disturb the pipe.
- O. Final backfill above the pipe zone, including replacement or installation of marking tape and pavement replacement, shall meet the requirements of Section 507.

511.3 Repair Of Manholes and Other Appurtenances

- A. Remove damaged frame and covers, grade rings, wall sections or other features and replace with new materials. Reinstall new materials according to requirements of Section 509.
- B. Remove disturbed frame and covers, grade rings, wall sections or other features and reinstall according to requirements of Section 509.
- C. Some existing manholes may have joints that do not match new manhole construction material. SBWRD shall review and approve the proposed method of connecting the new manhole material to the existing manhole.

SECTION 512 COLD WEATHER CONSTRUCTION

512.1 General

- A. During cold weather conditions, special precautions shall be used to insure that proper construction is maintained.
- B. A cold weather condition is defined as periods where sustained temperatures are 40 degrees and lower.

512.2 Trenching

- A. Trench excavation shall be limited to the amount of material that the Contractor can install in one day.
- B. Trenches shall be completely backfilled at the end of each day.
- C. When frost is encountered, it shall be moved off to the side and not placed in the trench as pipe backfill material.
- D. All snow must be removed from the immediate construction area to prevent it from becoming mixed with the pipe zone and pipe backfill material.
- E. Dewatering of the trench during cold weather construction shall be designed to discharge all water well away from the project site to prevent any possibility of increasing frost depths.

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512.3 Pipe Installation

- A. All pipe and fittings shall be protected and installed according to manufacturer's recommendations for cold weather construction.
- B. Special consideration shall be given to thermal expansion and contraction.
- C. Stresses resulting from extreme temperature variations shall be considered in the design.
- D. Additional or supplemental acceptance tests may be required for pipe installed during weather conditions when warmer temperature conditions return.

512.4 Manhole Construction

- A. Concrete bases, sections and grade rings shall be adequately cured prior to transporting to the site to insure that deterioration of the concrete, due to freeze-thaw action, does not occur.
- B. Mastic used in manhole joints and between grade rings and frames shall be installed when the temperature of the material is above 70 degree to assure a watertight seal. Heating of the material may be required to achieve a proper seal.
- C. Grout must be protected from freezing prior to installation and during the cure period.
- D. Appropriate equipment shall be available for heating, or protecting the construction materials and for maintaining favorable temperatures after grout is placed.
- E. Concrete placed during cold weather conditions shall be in accordance with the American Concrete Institutes requirements for cold weather concreting.

512.5 Manhole Collar Construction

- A. Asphalt collars shall be placed only when the surface temperature of the road and manhole materials is at least 50 degrees F. and/or the wind chill factor has not fallen below 30 degrees F, unless otherwise authorized by SBWRD.
- B. Asphalt collars installed under unacceptable weather conditions will be noted by the SBWRD Inspector and may be required to be replaced when weather and site conditions permit.

SECTION 513 PRIVATE LATERAL WASTEWATER LINES

513.1 General

- A. Private Lateral Wastewater Lines shall meet or exceed the minimum submittal and design requirements contained in Section 304.
- B. It shall be the responsibility of the Property Owner and his Contractor to verify and/or determine the bury depths of the existing private lateral stubs and new private lateral extension. Bury depths greater than SBWRD minimum standards may be necessary to protect the private lateral from freezing. Factors such

as elevation and surface features over the lateral (driveways vs. landscaping) should be considered.

- C. The SBWRD Inspector shall witness all Private Lateral Wastewater Line installations before backfilling.
- D. Buried Private Laterals not inspected, witnessed or verified shall be re-excavated at the Contractor's expense. As approved by SBWRD, a video inspection of the installed private lateral meeting the requirements of Section 515.6 may be allowed in place of re-excavation of the buried pipe.
- E. Existing Public Wastewater System lines shall remain in service while connecting Private Laterals.
- F. Any damage to Public Wastewater System lines resulting from the connection of Private Laterals shall be corrected by the Contractor as directed by SBWRD at the Contractor's expense.
- G. The cost to remove any debris that enters the Public Wastewater System as a result of the connection of the Private Lateral shall be the responsibility of the Contractor.

513.2 Connection to Existing Private Lateral Stubs

- A. Prior to connecting to or extending existing gravity or Low Pressure Private Lateral stubs, it shall be the responsibility of the Contractor to verify acceptability of the existing stubs (condition, alignment, grade, elevations, depths, leakage, etc.). Non-functional stubs shall not be used. SBWRD shall be notified immediately and prior to making a connection to any stub found to be unacceptable.
- B. The extension of Private Lateral stubs shall be accomplished with pipe of the same material, size, and joint type as the existing stub.
- C. If new pipe material matching the material of the existing stub is no longer available, then a change of pipe material may be approved by SBWRD.
- D. Requirements for approved changes of pipe material.
 - 1. The connection between the different pipe materials shall be made with couplings meeting the requirements of Section 407.
 - 2. Clearance between pipes at the coupling shall be a maximum of 1/8".
 - 3. Pipes shall be aligned to provide a smooth transition without any lip or misalignment at the joints.
 - 4. Coupling bolts shall be covered with non-oxidizing grease and the coupling shall be wrapped with polyethylene sheeting and taped.
- E. Test Tee.
 - 1. A test tee shall be installed at the connection to the existing stub to allow for testing of the new construction.
 - 2. The tee shall remain exposed until all testing has been completed, after which the tee shall be plugged and properly backfilled.
 - 3. The test tee plug shall match the type of "wee"

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fitting used (gasketed, solvent weld, or threaded). Brandt™ type expansion plugs shall not be used. If a threaded fitting is used, a thread sealant or glue shall be used on the joint to provide a watertight fit.

513.3 Connection to Existing Gravity Public Wastewater System Main Lines

- A. The connection of Private Lateral Wastewater Lines to existing gravity main lines shall be made by installing a Private Lateral saddle fitting meeting the requirements of Section 410.7.
- B. A circular hole saw shall be used to core the existing main line. The edges of the cored hole shall be filed to remove burrs from the coring operation. Rough or jagged edges on the cored hole shall not be allowed.
- C. The cored hole shall be large enough to prevent the formation of a lip between the saddle fitting and the main line.
- D. The SBWRD Inspector shall witness the coring operation.
- E. The invert of the saddle fitting shall be at or above the spring line of the main line.
- F. Silicon sealant shall be used between the gravity saddle gasket and the existing pipe to insure a watertight seal.
- G. Test Tee.
 - 1. A test tee shall be installed on the Private Lateral Wastewater Line, near the saddle connection to the main line to allow for testing of the new construction.
 - 2. The tee shall remain exposed until all testing has been completed, after which the tee shall be plugged and properly backfilled.
 - 3. The test tee plug shall match the type of “wye” fitting used (gasketed, solvent weld, or threaded). Brandt™ type expansion plugs shall not be used. If a threaded fitting is used, a thread sealant or glue shall be used on the joint to provide a watertight fit.

513.4 Connection to Existing Public Low Pressure Main Lines

- A. The connection of Low Pressure Private Lateral Wastewater Lines to existing Low Pressure Main Lines shall be made by installing a Private Lateral saddle fitting meeting the requirements of Section 410.7.
- B. The installation of the tapping tee shall be according to the manufacturer’s recommendation.
- C. The SBWRD Inspector shall witness the tapping operation.
- D. Test Tee.
 - 1. A test tee shall be installed on the Low Pressure Private Lateral Wastewater Line, near the saddle connection to the main line to allow for testing of the new construction.

- 2. The tee shall remain exposed until all testing has been completed, after which the tee shall be plugged and properly backfilled.
- 3. The test tee plug shall be fused or threaded. If a threaded fitting is used, a thread sealant or glue shall be used on the joint to provide a watertight fit.

- E. A curb stop valve, valve box and check valve assembly with concrete support block shall be installed on the Private Lateral Wastewater Line at the right-of-way line or easement line.

513.5 Connection to Existing Manhole

- A. Connection to existing manholes shall be made in accordance with Section 509.9.

513.6 Cleanout Requirements

- A. Cleanouts shall meet the requirements of Section 304.8.
- B. A concrete support block shall be poured under the wye for the cleanout.
- C. Cleanout risers shall be the same size and material as the lateral.
- D. Cleanout risers shall be located directly above the private lateral line. Offsetting or laying the cleanout riser over to avoid surfacing in a paved area or other obstruction shall not be allowed.
- E. Cleanout risers shall be capped with a cleanout cap.
- F. The top of the cleanout cap shall be located 4" to 6" below the finished paved or landscaped surface
- G. Cleanouts within paved surfaces and traffic areas shall be provided with a traffic rated cleanout frame and cover.
- H. Cleanouts in unpaved and non-traffic areas shall be provided with a sprinkler irrigation box or other similar structure.

513.7 Connection to Building Sewer

- A. Connection of the Private lateral to the building sewer exiting the building shall be made with couplings meeting the requirements of Section 407.
- B. Clearance between pipes at the coupling shall be a maximum of 1/8"
- C. Pipes shall be aligned to provide a smooth transition without any lip or misalignment at the joints.

SECTION 514 GREASE INTERCEPTORS, OIL SEPARATORS, SAND INTERCEPTORS AND SAMPLING MANHOLES

514.1 General

- A. Grease interceptors, oil separators, sand interceptors and sampling manholes shall be constructed in accordance with the Standard Details in Appendix C.

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- B. Grease interceptors, oil separators, sand interceptors and sampling manholes shall meet the submittal and design requirements contained in Section 304.12 and the material requirements contained in Section 410.8.
 - C. The frame and cover shall be adjusted according to the requirements of Section 509.7.
 - D. The distance from the top of the interceptor or separator concrete lid to the top of the frame shall not exceed 18". If this distance exceeds 18", a vault riser section shall be added to the interceptor, the concrete lid replaced and the manhole retested.
 - E. Sampling manholes shall meet the requirements of Section 509 except that the line coming from the grease interceptor or oil separator shall enter the manhole 6" above the channel and protrude 3" from the manhole wall to allow for sampling of the wastewater.
 - F. The interior of the sampling manhole shall have Manhole Interior Coating meeting the requirements of Section 404.17 applied to all interior concrete surfaces to minimize hydrogen sulfide attack.
- G. All testing and TV inspection, with the exception of compaction testing, shall occur after backfilling of all pipe and manholes is completed but prior to paving.
 - H. Test Results Form.
 - 1. Each item tested shall be noted on a "Public Wastewater System Main Line Test Result" form as contained in Appendix A.
 - 2. Acceptances, failures, reasons for failure, and retests shall be shown on the form.
 - 3. The completed form shall be submitted to SBWRD.
 - I. A passing test is required on each item tested.
 - J. Items failing any test or TV inspection shall be repaired or replaced according to the requirements of Section 515.10, and the test or inspection repeated until successful performance of all tests and inspections is achieved.
 - K. Any testing nullified by repairs or replacements of any component shall be re-done and passing tests achieved.

SECTION 515 ACCEPTANCE TESTING FOR PUBLIC WASTEWATER SYSTEM EXTENSIONS AND MODIFICATIONS

515.1 General

- A. One or more of the following acceptance tests and inspections are required for Public Wastewater System Extensions and Modifications depending on the type of component being tested.
 - 1. Visual Inspection by the SBWRD Inspector.
 - 2. Low-Pressure Air Test.
 - 3. Hydrostatic test.
 - 4. Manhole Vacuum Test.
 - 5. Preliminary and Final Continuity Test of Tracer Wires.
 - 6. TV Inspection.
 - 7. Pump Station and Force Main Testing.
 - 8. Compaction Testing.
- B. All costs associated with testing and TV Inspections, including retesting and reinspection, shall be the responsibility of the Developer or Contractor.
- C. All tests and TV Inspections shall be witnessed by the SBWRD Inspector.
- D. The contractor shall give the SBWRD Inspector 24 hours notice of any test or inspection to be performed.
- E. Testing firms and TV Inspection firms shall be approved by SBWRD prior to the testing or inspection. The Contractor shall confirm the status of the testing and TV Inspection firms with SBWRD prior to the Contractor authorizing testing or inspection.
- F. Contractor, testing firm or TV Inspection firm shall

515.2 Visual Inspection

- A. A visual inspection by the SBWRD Inspector of all installed pipe, manholes, laterals, and other features on the Public Wastewater System Extension or Modification is required.
- B. The visual inspection shall include all items discussed in Section 501 and shall verify that the system has been installed according to these SBWRD Standards.

515.3 Low-Pressure Air Test

- A. A Low-Pressure Air Test shall be performed on the following installed pipes.
 - 1. The full length of each installed section (manhole to manhole) of gravity flow Public Wastewater main line.
 - 2. Private Lateral stubs installed in conjunction with the gravity flow main line.
 - 3. Gravity flow main line stubs.
 - 4. Gravity flow private lateral stubs connecting directly to a manhole.
- B. Method of Testing.
 - 1. PVC and HDPE Pipe: UniBell UNI-B-6, Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe.
 - 2. Other Pipe Material: As recommended by the pipe manufacturer and approved by SBWRD.

515.4 Hydrostatic Test

- A. A hydrostatic test shall be performed on the following installed pipes.
 - 1. Force Mains.
 - 2. Low Pressure Sewer System main lines.

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3. Low Pressure Sewer System main line stubs.
 4. Private Lateral stubs installed in conjunction with the Low Pressure Sewer System main lines.
- B. Prior to the hydrostatic test the line shall be flushed with an adequate flow volume and rate to remove any debris, silt, gravel, or other material in the line. The SBWRD Inspector shall witness the flushing operation.
- C. Method of Test.
1. The lines to be tested shall be filled with clean water.
 2. Air release taps shall be provided at the pipeline's highest elevations and all air in the system shall be expelled before the test. Insert approved permanent plugs after test has been completed.
 3. The test pressure shall be the greater of 150% of the maximum design pressure or 100 psi.
 4. The test pressure shall be maintained for 2 hours.
 5. Leakage rate shall be less than determined by the formula:
$$Q = \frac{LD \times \text{square root of } P}{133,200}$$
Where:
Q = allowable leakage rate, in gallons per hour
L = length of pipe, in feet
D = nominal diameter of pipe in inches
P = average test pressure, in psi (gauge)
 6. Locate and repair defective joints and retest until leakage rate is less than allowable.
 7. Repair any noticeable leakage even if total leakage is less than allowable.

515.5 Manhole Vacuum Test

- A. A vacuum test shall be performed on each manhole installed.
- B. Each manhole shall be tested to the top of the cone/flat slab section. Final manhole adjustment to grade does not have to be included in the test.
- C. Method of Testing: ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test, excluding the provision of Paragraph 7.5.

515.6 TV Inspection

- A. A TV Inspection shall be performed on the following installed system.
1. The full length of each installed section (manhole to manhole) of gravity flow Public Wastewater main line.
 2. Gravity flow main line stubs.
 3. Manholes.
 4. Where new manholes are installed on existing public wastewater lines, the connections to the new manhole and the existing wastewater lines

50 feet each side of the new manhole shall be TV Inspected.

- B. The TV Inspection shall be performed after all other acceptance testing has been completed and passing tests are achieved.
- C. The TV Inspection shall be performed after the lines have been thoroughly cleaned and all dirt, debris, and obstructions have been removed.
- D. The TV Inspection shall be performed while water is running in the pipes.
- E. The video equipment shall provide adequate illumination of the interior of the pipe to produce a clear and viewable image.
- F. The TV Inspection shall not be performed while steam or mist in the pipe obscures visibility. Venting of the line to remove the steam or mist will be required prior to proceeding.
- G. Any debris on the camera lens that obscures the video shall be removed prior to proceeding with the TV Inspection.
- H. TV Inspection video recordings shall be of an acceptable quality subject to the discretion of SBWRD. Inadequate results will require re-inspection.
- I. The TV Inspection video shall consist of a color digital video in DVD format.
- J. The TV Inspection video and supporting data for each section of line inspected shall include the following information.
1. Project name.
 2. Date and time of inspection.
 3. Beginning manhole SBWRD identifying number (e.g., 2-4-07-135).
 4. Ending manhole SBWRD identifying number (e.g., 2-4-07-136).
 5. Camera direction (with flow or against flow).
 6. Starting distance (0' at end of pipe at manhole wall).
 7. Ending distance (to end of pipe a manhole wall).
 8. Type of pipe.
 9. Diameter of pipe.
 10. Lateral connections; location (distance from manhole), orientation (12 o'clock to 11 o'clock), diameter.
 11. Pipe and joint defects identified (type of defect and location).
 12. Low spots or bellies identified (location of beginning and end).
- K. All TV Inspection videos and supporting data shall be turned over to and become the property of SBWRD.
- L. Evaluation Criteria.
1. Straight Alignments: Each section shall be straight and uniformly graded.
 2. Curvilinear Alignments: Each section shall have uniform horizontal and vertical curves with no signs of distorted or irregular pipe.
 3. Lines with debris, silt or other construction

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material will not be approved.

4. Lines that are flat or reverse grade or with a belly or low spot will not be approved.
5. Lines with damaged pipe, misaligned or displaced joints, or other defects will not be approved.
6. Lines with improperly installed Private Lateral wyes will not be approved.
7. Lines with improper connections to manholes will not be approved.
8. Lines with evidence of infiltration will not be approved.
9. Other defects, as determined by SBWRD, will not be approved.

515.7 Tracer Wire Continuity Testing

- A. A Preliminary and Final Continuity test shall be performed on all tracer wire segments installed on sewer main lines.
- B. The Preliminary Continuity Test shall be performed after installation and backfilling of the sewer lines and prior to paving and adjustment of manholes.
- C. The Final Continuity Test shall be performed after all construction work that will affect the integrity of the tracer wire has been completed, including installation of all other utilities, final paving and adjustment of manholes and structures to grade.
- D. The Continuity Tests shall be performed by a qualified testing company with acceptable testing equipment as approved by SBWRD.
- E. Submittal of a successful Final Continuity Test is required prior to Final Project approval.

515.8 Wastewater Pump Station Testing

- A. 72 Hour Test.
 1. The pump station shall be operated continuously for a period of 72 hours without any failure.
 2. The test shall be conducted with clear water provided by the Contractor. Recycling of the test water shall be provided to minimize the impact on the wastewater system.
 3. All equipment, valves, controls, etc. shall be successfully operated during the 72 hour test.

515.9 Compaction Testing

- A. Compaction testing shall be performed on the following installed material.
 1. Trench backfill material for Off-Road Lines, as defined in Section 507.2.
 2. If directed by the SBWRD Inspector, bedding and initial backfill.
- B. Frequency of testing.
 1. Off-road Lines: 1 test per lift for every 200' of Off-Road Line.
 2. Bedding and initial backfill: 1 test for every 200' of sewer line.
 3. Frequency of testing may be increased if

consistent compaction effort and testing results are not achieved.

515.10 Failed Test Correction

- A. Procedure.
 1. Notify SBWRD Inspector of test failure.
 2. Locate leak or defect location, expose, and identify defect.
 3. Contact SBWRD for approval of the proposed correction procedures.
 4. Evaluation is on a case-by-case basis.
- B. General evaluation considerations for corrections are as follows.
 1. Damaged main line, damaged wye, or defective joints.
 - a. Within 3 pipe lengths or 30' of a manhole or other structure: remove and replace main line to the manhole or structure.
 - b. Beyond 3 pipe lengths or 30' of a manhole or other structure: remove and replace the defective area or section. Make pipe coupling repair in accordance with Section 511.2.
 2. Damaged Private Lateral stubs - remove and replace entire length of lateral stub from wye to end cap.
 3. Damaged or defective manholes.
 - a. Remove and replace the defective section(s), joint sealant material or other defective feature and re-stack the manhole.
 - b. Joint repairs using supplemental sealants or surface grouting of wall sections without removing the sections are not acceptable repair methods and shall not be approved.

SECTION 516 ACCEPTANCE TESTING FOR PRIVATE LATERAL WASTEWATER LINES

516.1 General

- A. One or more of the following acceptance test are required for Private Lateral Wastewater Lines depending on the component being tested.
 1. Visual inspection by the SBWRD Inspector.
 2. Exfiltration test or low-pressure air test of all gravity flow private laterals.
 3. Hydrostatic test of all Low Pressure Sewer System private laterals and ejector pump pressure lines.
 4. Exfiltration test or vacuum Test of grease interceptors and sampling manholes.
 5. Dye test.
- B. All tests shall be performed or witnessed by the SBWRD Inspector.
- C. The Contractor shall provide all plugs, compressors,

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pumps, gauges, water, etc., required to perform tests.

- D. Additional tests may be required by SBWRD.
- E. Defects identified by acceptance testing shall be repaired prior to backfilling, prior to the wastewater lines being approved, or prior to issuance of an Authorization to Use by SBWRD.

516.2 Visual Inspection

- A. A visual inspection of the entire length of Private Lateral Wastewater Line, from the connection to the Public Wastewater System or Private Lateral Stub installed as part of the Public Wastewater System, to the connection to the building drain line, including clean-outs and other appurtenances, is required.
- B. The visual inspection will include items contained in Section 502.

516.3 Exfiltration Test or Low Pressure Air Test of Gravity Flow Private Laterals

- A. An Exfiltration Test or Low-Pressure Air Test shall be performed on the following installed pipes.
 - 1. The full length of each gravity flow Private Lateral Wastewater Line from the Test Tee installed at the connection to the Public Wastewater System or Private Lateral Stub installed as part of the Public Wastewater System, to the connection to the building sewer.
 - 2. Cleanouts installed as part of the Private Lateral Wastewater Line.
- B. Method of Testing:
 - 1. Exfiltration Test. The Test shall be underway prior to the inspector arriving on-site.
 - a. Install plugs in Test Tee and end of lateral line at connection to building drain line to isolate newly installed line.
 - b. Install cleanout standpipe to a height 3' above finished grade.
 - c. Fill lateral line with water to top of installed cleanout standpipe.
 - d. Test shall be maintained as long as necessary to locate all leaks but not less than 15 minutes.
 - e. Leakage shall not exceed 0.16 gallons/diameter inch/100 feet/hour.
 - f. Pipe shall be dewatered upon completion of testing.
 - 2. Low Pressure Air Test: According to the requirements of Section 515.3.
- C. Installation of additional test tees and performing tests in sections may be required for long private lateral lines or private lateral lines with a large elevation difference between each end.

516.4 Hydrostatic Test

- A. A Hydrostatic test shall be performed on the following installed pipes.
 - 1. Low Pressure Sewer System private laterals

2. Ejector pump pressure lines.

- B. The full length of each Low Pressure Private Lateral Wastewater Line or ejector pump pressure line from the Test Tee installed at the connection to the Public Wastewater System or Private Lateral Stub installed as part of the Public Wastewater System, to the connection to the building sewer or pump station shall be tested.
- C. Method of Testing: According to the requirements of Section 515.4.

516.5 Exfiltration Test or Vacuum Test of Grease Interceptors and Sampling Manholes

- A. An exfiltration test or vacuum test shall be performed on the following items.
 - 1. Grease interceptor.
 - 2. Sampling manhole.
 - 3. All connecting piping and cleanouts.
- B. Method of Testing:
 - 1. Exfiltration Test. The Test shall be underway prior to the inspector arriving on-site.
 - a. Install plugs in Test Tee and end of lateral line at connection to building drain line or as otherwise required to isolate newly installed line, grease interceptor and sampling manhole.
 - b. Fill grease interceptor with water to minimum 2" above bottom of precast concrete lid. Fill sampling manhole with water to top of casting.
 - c. After water level has stabilized additional water shall be added to bring water level back to fill level.
 - d. Test shall be maintained as long as necessary to locate all leaks but not less than 30 minutes.
 - e. No drop in water level shall occur during the 30 minute test period.
 - 2. Vacuum Test: According to the requirements of Section 515.5.

516.6 Dye Test

- A. A dye test shall be performed on the following installed pipes.
 - 1. Gravity flow Private Lateral Wastewater Lines.
 - 2. Ejector pump pressure line connected to a gravity flow Public Wastewater line.
- B. Method of testing for gravity flow lines.
 - 1. The SBWRD Inspector will add dye to the water placed in the private lateral for the exfiltration test through the cleanout standpipe.
 - 2. At the direction of the SBWRD Inspector, the plug in the test tee will be removed to release the dyed test water.
 - 3. The SBWRD Inspector will observe the dyed test water as it passes the nearest manhole

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downstream to the connection of the private lateral to the Public Wastewater System.

4. If dyed test water is not observed at the nearest downstream manhole or if the flow characteristics of the dyed test water as it passes the nearest downstream manhole are unusual, the SBWRD Inspector will require a second dye test.
 5. If the second dye test is also unsuccessful, the cause of the failed test shall be investigated by the Contractor, the problem causing the failed test shall be identified and corrected by the Contractor as approved by the SBWRD Inspector, and another dye test shall be performed.
 6. A TV inspection of the lateral, performed at the cost of the Contractor, may be required to verify acceptability of the Private Lateral connection to the Public Wastewater System.
- C. Method of testing for ejector pump pressure lines shall be similar to the method for testing gravity flow lines except that the dye is placed in the ejector pump wet well and the ejector pump is operated until the dyed test water is observed at the nearest downstream manhole.

516.7 Failed Test Correction

- A. Procedure.
1. Locate leak or defect location, expose, and identify defect.
 2. Receive approval of the proposed correction procedures from SBWRD Inspector.
 3. Evaluation of the proposed correction procedures is on a case-by-case basis.

SECTION 517 CLEANUP

517.1 General

- A. All surplus materials, tools, and any temporary structures shall be removed from the construction site by the contractor.
- B. All rubbish, dirt or excess earth from the excavation shall be removed by the contractor at the earliest possible date and the construction site left clean and acceptable to SBWRD.
- C. All components of the Public Wastewater System and Private Lateral Wastewater Lines shall be clean and free of any foreign material and will be subject to a high pressure, high volume water wash or a high pressure jet wash.