

DIVISION 6 , WASTEWATER

6-00 General Considerations:

6-10 General: Sanitary sewerage refers to wastewater derived from domestic, commercial and industrial pretreated waste to which storm, surface, and ground water are not intentionally admitted. Pretreatment shall follow all the requirements as set forth in the Engineering Design and Construction Standards.

Any extension of the City's wastewater system shall be approved by the Department of Public Works and Utilities and shall conform to the Wastewater Comprehensive System Plan Update, Washington State Department of Ecology Criteria for Sewage Works Design (DOE), Washington State Department of Health (DOH) requirements, WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction and the Engineering Design and Construction Standards. Specific site conditions may require variance from the system plan and require approval from the Director.

All new homes and businesses constructed within the corporate City limits or the City of Bremerton's Assigned Urban Growth Areas shall connect to the wastewater system in accordance with BMC 15.03.050.

Anyone who wishes to extend or connect to the City's wastewater system should contact the Department to determine the appropriate requirements and obtain a sanitary sewer fee estimate for a sanitary sewer main extension or connection.

Prior to the installation of any new or reinstalled water meters, all Department wastewater system improvements must be completed and approved and all applicable fees must be paid. A sanitary sewer main extension project shall be considered complete upon receipt of all easement, record drawing, conveyance and warranty documentation. In the event that a sanitary sewer main project has no new or reinstalled water meters to trigger payment of the connection fees, the sanitary sewer connection fees shall be paid prior to the start of construction.

6-10.1 Each property owner shall be required to secure a permit to connect, cap (which is required for a Demolition Permit) or repair a sanitary side sewer. The sanitary side sewer shall be installed and tested in accordance with the Engineering Design and Construction Standards. All work shall be inspected by the city Inspector.

6-10.2 Permits shall be valid for a period of 180 days from the date of issuance. The property owner or contractor shall give the City 24 hours notice prior to commencing work. No work shall be covered until the city inspector has reviewed and approved the work. Work covered prior to approval shall be uncovered by the property owner or contractor at their own expense.

6-10.3 A separate and independent sanitary sewer lateral connection and sanitary side sewer shall be made for each building structure or duplex unit.

Maintenance of the sanitary sewer lateral from the wastewater system to the property line shall be maintained by and kept within the exclusive control of the City.

The side sewer from the property line to the structure is the responsibility of the property owner.

Final Record Drawings will be provided to the Department on inked Mylar and electronically for as-built and permanent records.

6-15 General Construction Requirements:

6-15.1 Contractors shall be responsible for cleanup of any debris in new or existing manholes and gravity/low pressure sanitary sewer mains associated with the project.

6-15.2 Prior to backfill, all gravity/low pressure sanitary sewer mains and appurtenances shall be inspected and approved by the city inspectors. Approval shall not relieve the contractor for correction of any deficiencies and/or failures as determined by subsequent testing and inspections. It shall be the contractor's responsibility to notify the City for the required inspections.

6-15.3 Prior to backfill, all fittings, valves, thrust blocks and appurtenances shall be inspected and approved by the city inspector. Approval shall not relieve the contractor for correction of any deficiencies and/or failures as determined by subsequent testing and inspections. It shall be the contractor's responsibility to notify the City for the required inspections.

6-15.4 The contractor shall perform compaction testing on all backfill material located within the R-O-W in accordance with the Engineering Design and Construction Standards or an approved R-O-W permit.

6-15.5 Contractor shall obtain 95% of maximum density in all trench backfill located within the R-O-W or any paved traffic area. The contractor shall achieve 90% compaction in areas located outside paved traffic areas.

6-15.6 Alignment Tolerance: The maximum tolerance from true line and grade shall be as follows:

- Maximum deviation from established line and grade shall not be greater than 0.03 inches at the time of backfill.
- No adverse grade in any pipe length shall be permitted.
- The difference in deviation from true line and grade between any two successive joints shall not exceed 1/3 of the amounts specified above.

6-20 Sanitary Sewer/Water Main Crossings/Protection/Cover:

6-20.1 Sanitary sewer main or sanitary sewer laterals will be encased in a steel or ductile iron casing when crossing under rockeries or retaining walls over 4 feet in height. Casing shall extend a minimum of 5 feet on each side of the wall, or the depth of the sanitary sewer whichever is greater. The City may require installation of a casing on an existing sanitary sewer main or sanitary sewer lateral which will be located below a wall or rockery that is less than 4 feet in height if it is determined that the wall may cause damage to the existing sanitary sewer main.

Concrete encasement may be acceptable in lieu of a casing on existing sanitary sewer main, provided that the condition of the sanitary sewer main is acceptable to the Director.

6-20.2 Building and equipment setback requirements from the edge of city's wastewater system:

- 10 feet minimum for building/post foundations.
- 25 foot minimum easement width shall be provided between buildings for sanitary sewer mains 12.5 feet deep or less with the sanitary sewer main centered in the easement. If the sanitary sewer main depth is greater than 12.5 feet, the minimum easement width shall be twice the sanitary sewer main depth with the sanitary sewer main centered on the easement.

6-20.3 Show easements off roadways and identify width. Show easements on developer's property. If easement is defined as a constant width on each side of the sanitary sewer main, then show a segment of the easement and label as typical (TYP).

All easements shall be a minimum of 25 feet in width. For sanitary sewer main depths greater than 12.5 feet the easement width shall be twice the depth of the sanitary sewer main. Easement width shall be increased in 5 foot increments.

Dedication of easements shall be subject to Department Policies and Procedures. All easements shall be provided using the City's Standard Easement Form.

6-20.4 Water mains and sanitary sewer mains shall have at least 10 feet horizontal separation. Where sanitary sewer main crosses below water main, one full length of sanitary sewer main shall be used with the mains centered for maximum joint separation. Any exception shall be reviewed by the appropriate staff and approved by the Director.

Horizontal clearances from sanitary sewer:

Cable TV	5 feet
Gas	5 feet
Power	5 feet
Storm	5 feet
Telephone	5 feet
Water	10 feet

Vertical clearances from sanitary sewer:

Cable TV	1 foot
Gas	1 foot
Power	1 foot
Storm	1 foot
Telephone	1 foot
Water	1.5 feet

6.20.5 The designer shall request as-built information and incorporate that information into the plans. At minimum, the following utilities should be contacted:

Water
Fiber Optics
Cable Television
Natural Gas
Power
Sanitary sewer
Storm drainage
Telephone
Reclaimed Water Lines

6-25 Staking/Trenching/Bedding/ Back Filling/Patching:

The minimum staking of sanitary sewer main shall be as follows:

6-25.1 Stake location of sanitary sewer main and sanitary sewer laterals every 25 feet with cut or fill to invert of main. If a laser is used to lay the sanitary sewer main, staking is not required.

6-25.2 Stake location of all manholes for alignment and grade with cut or fill to rim and invert of sanitary sewer main.

6-25.3 Trench Excavation:

See Section 3-20.17 of the Engineering Design and Construction Standards for Trench Excavation requirements.

6-25.4 Pipe Zone Bedding:

Refer to the Engineering Design and Construction Standards (Detail 6061) for Pipe Zone Bedding requirements. In no case shall pea gravel be used for pipe zone bedding.

6-25.5 Back Filling:

See Section 3-20.18 of the Engineering Design and Construction Standards for requirements regarding back filling.

6-25.6 Street Patching And Restoration:

See Chapter 3–20.19 of the Engineering Design and Construction Standards (Detail 3153, 3154).

6-30 Testing:

Prior to acceptance and approval of construction, the sanitary sewer main shall be flushed, video inspected and pressure tested as follows.

6-30.1(1) Sanitary Sewer Mains: Prior to acceptance of the project, the sanitary sewer main shall be subject to a low pressure air test per WSDOT/APWA Standards Referenced in 7-17.3(2)E or 7-17.3(2)F. The contractor shall furnish all equipment and personnel for conducting the test under the observation of the city inspector.

The contractor shall perform an air test for his own purposes prior to notifying the city inspector to witness the test. The acceptance air test shall be performed after the trench is back filled and compacted and the roadway section is completed to sub grade, with no final paving completed prior to final acceptance.

6-30.1(2) Video Inspection: Testing of the sanitary sewer main shall include a video inspection per WSDOT/APWA 7-17.3(2) H by the contractor. The camera must be equipped with a rotating head to allow video of the sanitary sewer laterals and every joint of the sanitary sewer main as inspection is occurring. The camera unit shall be equipped with a measuring device that is in plain view ahead of the camera. The device shall be 1” in diameter and on a flexible shaft. Video inspection shall be done after the WSDOT air test and before the roadway is paved. Immediately prior to the video inspection the new sanitary sewer main shall be thoroughly cleaned to remove all dirt and debris. A copy of the video inspection and current utility Red-line drawing and written report shall be submitted in a format acceptable to the City. Acceptance of the sanitary sewer main will be made after the material submitted has been reviewed and approved by the Director.

6-30.1(3) No visible leakage in a manhole shall be permitted.

6-30.2 Sanitary Sewer Laterals: WSDOT/APWA Standards 7-18 will be used. Testing of sanitary sewer laterals may be by either the low pressure air test referenced in 6-30.1(1) above, or the WSDOT/APWA exfiltration test 7-17.3 (2) B and 7-18.3(3). All new sanitary sewer laterals or repairs to existing sanitary sewer laterals on existing sanitary sewer mains must be video inspected by city forces prior to acceptance. If the sewer lateral is determined not acceptable, the lateral must be abandoned and a new sewer lateral must be installed or reconditioned using trenchless technology if feasible at the owner’s expense. Final paving shall not be completed prior to final acceptance.

All wyes, tees, and ends of sanitary sewer laterals shall be plugged and securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily

removable and their removal shall provide a socket suitable for making a sanitary sewer lateral connection or extension.

6-30.3 Low Pressure Sanitary Sewer Mains: Prior to acceptance of the project, the low pressure sanitary sewer main shall be subjected to a hydrostatic pressure test in accordance with C2-3.7 of the Washington State Department of Ecology Criteria for Sewage Works Design (DOE), "Orange Book," and 7-09.3(23) of the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction .

No final paving shall be placed prior to City acceptance of the pressure test and video inspection of the sanitary sewer main or sanitary sewer laterals.

6-35 Sewage Pretreatment:

Pretreatment of wastewater to restrict the discharge of fats, oils, or grease to the wastewater system shall be required for all food service facilities or other facilities Per City B.M.C. 15.05.

6-35.1 Oil/Water Separation Pretreatment:

6-35.1(1) Oil/Water Separator: Whenever an industrial or commercial business generates mineral/petroleum oils which shows a visible sheen and discharges to the sanitary sewer, pre-treatment is required. An oil/water separation device shall be installed by the property owner as specified in the Engineering Design and Construction Standard details. Selection and sizing of an oil/water separator shall be subject to approval of the Department. Water discharged from any oil/water separator to the wastewater system shall not have a visible sheen of petroleum oil, non-biodegradable cutting oil or mineral products to be in compliance with the City's regulations for discharge to the wastewater system.

Sizing of a separator facility shall be based upon maximum available flow to the separator and provision of a forty-five minute retention time in the separator at the time, with a minimum capacity of at least 450 gallons.

The oil/water separator shall be covered with removable sections. Access and inspection covers, weighing not more than 30 lbs and with suitable hand holds are to be provided directly above inspection "tee" and oil/grit collection compartments.

Only wastewater from floor drains and covered parking garages shall go to the separator. The location and design shall minimize or eliminate the possibility of storm water reaching the separator – areas over two hundred square feet open to rainfall shall not drain to the separator. Sewage from restrooms and shower facilities shall not drain to the separator. See Standard Detail 6080 & 6081.

Allowable materials for construction are as follows:

- Tank – Concrete
- Baffles – Concrete, steel plate

The separator shall be located in an area for easy access by maintenance vehicle and by personnel for sampling.

A sampling tee shall be located on the outlet with a minimum 18-inch drop below the invert. Alternatively, the use of the discharge tee is acceptable. The separator shall be accessible for inspection and compliance determination sampling at all times.

The effluent discharged from any oil/water separator to the wastewater system shall not show a visible sheen.

6-35.1(2) Grease Interceptor: Refer to B.M.C. 15.05 (fats, oils and grease) When pre-treatment is no longer required, the inlet and outlet pipes shall be plugged and the separation chambers pumped out.

6-35.1(3) Fats, Oil, and Grease Pretreatment: All food processing establishments, food sales establishments, food service establishments and any other facility that discharges polar grease to the wastewater system and is located within the boundaries of the City's wastewater system shall be required to comply with BMC Chapter 15.05. This shall include preparation of a Fats, Oils, and Grease Control Program and installation, operation and maintenance of an approved type and adequately sized grease interceptor necessary to maintain compliance with requirements as described in Chapter 15.05.

Any existing facilities that are known to cause grease-related cleaning activities in the wastewater system, a grease-related sanitary sewer overflow, or fail to implement and enforce BMPs will be required to install a properly sized and functioning grease interceptor designed to meet the City's grease control requirements as described in Chapter 15.05.

Existing establishments that expand their seating capacity for food service by twenty-five (25) percent, or renovate or remodel with a valuation greater than or equal to twenty-five (25) percent of the building's current assessed value, will be required to install a properly sized and functioning grease interceptor designed to meet the City's grease control requirements as described in Chapter 15.05.

Grease Interceptor Requirements

- Grease interceptor sizing and installation shall conform to the requirements contained in the current edition of the Uniform Plumbing Code (UPC) or other criteria as determined on a case-by-case basis based on review of relevant information.
- The minimum capacity of any exterior grease interceptor will be one thousand five hundred (1,500) gallons unless approved by the Director. Supporting sizing calculations shall be submitted to the City.
- The grease interceptor will have a minimum of two (2) compartments with fittings designed for grease retention.
- Grease interceptors shall be installed in accordance with Engineering Design and Construction Standards (Detail 6090, 6092).

- Grease interceptors shall be installed at a location where they are easily accessible for sample collection, inspection, and cleaning and removal of retained grease. The grease interceptor may not be installed in any part of the building, unless approved by the City.
- Grease interceptors shall be located in the food service establishment's lateral line between all fixtures which may introduce grease into the wastewater system and the connection to the wastewater system. Such fixtures shall include but not be limited to sinks, dishwashers, floor drains for food preparation and storage areas, mop sinks, and any other fixture which is determined to be a potential source of grease.
- Grease interceptors must be directly vented. Grease interceptor shall not be connected to building vents.
- Access manholes, with a minimum diameter of twenty-four (24) inches, shall be provided over each chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed to prevent water inflow or infiltration. The manholes shall also have readily removable covers to facilitate inspection, cleaning and removal of retained grease and sample collection. Riser maximum height will not exceed twenty-four (24) inches.
- Sanitary wastes (restroom wastes) cannot be introduced into the grease interceptor.
- Any facility that has a grease interceptor shall maintain a pumping contract with a licensed grease pumping company. The pumping company will pump the interceptor on a regular schedule without notification from the food service. The pumping company will notify the City if the contract is canceled by either party.
- All facilities shall maintain a written record of inspection and maintenance activities and the rendering/disposal company manifest for a minimum of three (3) years. All such records shall be submitted to the City and made available for on-site inspection during all operating hours.

Grease Trap Requirements

- Grease trap sizing and installation shall conform to the requirements contained in the current edition of the Uniform Plumbing Code or other criteria as determined on a case-by-case basis based on review or relevant information.
- Grease traps shall be installed in accordance with Engineering Design and Construction Standards (Detail 6091).
- Grease traps shall be installed at a location where it is easily accessible for sample collection, inspection, and cleaning and removal of retained grease.
- Grease traps shall be located in the food service establishment's lateral line between all fixtures which may introduce grease into the wastewater system and the connection to the wastewater system. Such fixtures shall include sinks, drains and other fixtures for food preparation and storage areas, and any other fixture which is determined to be a potential source of grease.
- Fixtures such as waste disposal units and dishwashers shall not be connected to the grease trap.
- Grease traps shall be equipped with a device to control the rate of flow through the unit. The rate of flow shall not exceed the manufacturer's rated capacity recommended in gallons per minute for the unit.

- Sanitary wastes (restroom wastes) cannot be introduced into the grease trap.
- All facilities shall maintain a written record of inspection and maintenance activities for a minimum of three (3) years. All such records shall be made available for on-site inspection by representatives of the City during all operating hours.

6-40 Sanitary Sewer Main:

6-40.1 General: All sanitary sewers shall be designed as a gravity sanitary sewer system whenever physically and/or economically feasible or as outlined in the City of Bremerton Wastewater Comprehensive System Plan Update.

6-40.2 Design Standards: The design of any sanitary sewer main extension or connection shall conform to City requirements, Engineering Design and Construction Standards and the Washington State Department of Ecology's (DOE) "Criteria for Sewage Works Design".

The layout of extensions shall provide for the future extension of the existing wastewater system as determined by the City.

New wastewater systems shall be designed on the basis of an average daily per capita flow of sewage identified in the City of Bremerton Wastewater Comprehensive System Plan Update. New sanitary sewer mains shall be designed so that under ultimate development, peak flow (including I/I allowance) shall not exceed the maximum flow capacity of the sanitary sewer main without surcharge.

6-40.3 Size: Sanitary sewer mains shall be sized for the ultimate development of the tributary area. Nothing shall preclude the City from requiring the installation of a larger sized sanitary sewer main if the City determines a larger size is needed to meet the requirements for future service.

The minimum size for sanitary sewer mains shall be 8 inch inside diameter.

6-40.4 Material: Sanitary sewer mains shall be PVC, ASTM D 3034, SDR 35 and rubber gaskets conforming to ASTM D 3212 and ASTM F 477.

6-40.5 Depth: Sanitary sewer mains will have a minimum depth of 5 feet to provide gravity sanitary service to adjoining parcels. Actual depth will be determined by slope, flow, velocity and elevation of existing wastewater system. In areas where basements are anticipated, the minimum depth shall be 12 feet.

6-40.6 Connections: All sanitary sewer lateral connections to the sanitary sewer main shall be made with a wye or an insert-a-tee with the use of a drill or coring machine per manufacturer requirements. All new sanitary sewer mains connecting to existing sanitary sewer mains shall require the installation of a new manhole if not extended from an existing manhole.

6-40.7 Direction: At no time shall a sanitary sewer main be installed with a reverse direction of flow. The maximum deflection angle through a manhole shall not exceed 90 degrees.

6-40.8(1) Flow Velocity: All sanitary sewers mains shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second based on Manning's formula using an "n" value of 0.013. The following minimum slopes should be provided; however, slopes greater than these are desirable.

6-40.8(2) Minimum Flow Depths: Slopes which are slightly less than the recommended minimum slopes may be permitted. Such decreased slopes may be considered where the depth of flow will be 0.3 of the diameter or greater for design average flow.

6-40.8(3) Minimize Solids Deposition: The sanitary sewer main diameter and slope shall be selected to obtain the greatest practical velocities to minimize settling problems. Oversize sanitary sewer mains will not be approved to justify using flatter slopes. If the proposed slope is less than the minimum slope of the smallest sanitary sewer main which can accommodate the design peak hourly flow, the actual depths and velocities at minimum, average, and design maximum day and peak hourly flow for each design section of the sanitary sewer main shall be calculated by the design engineer and be included with the plans.

Sanitary sewer mains shall be laid with uniform slope between manholes.

Sanitary Sewer Size (Inches)	Minimum % Slope % (Feet per 100')
8	0.40 (0.0040 Ft/Ft)
10	0.28 (0.0028 Ft/Ft)
12	0.22 (0.0022 Ft/Ft)
14	0.17 (0.0017 Ft/Ft)
15	0.15 (0.0015 Ft/Ft)
16	0.14 (0.0014 Ft/Ft)
18	0.12 (0.0012 Ft/Ft)
21	0.10 (0.0010 Ft/Ft)
24	0.08 (0.0008 Ft/Ft)
27	0.07 (0.0007 Ft/Ft)
30	0.06 (0.0006 Ft/Ft)
36	0.05 (0.0005 Ft/Ft)

6-40.9 Manholes shall be provided where sanitary sewer main size changes occur. Where a smaller sanitary sewer main joins a larger sanitary sewer main, the invert of the larger sanitary sewer main should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sanitary sewer mains at the same elevation.

6-40.10 Where velocities greater than 15 feet per second are expected, special provisions such as thrust blocking and sanitary sewer main materials shall be made to protect against displacement by erosion and shock.

6-40.11 Sanitary sewer mains shall be designed with straight alignment between manholes. Any exceptions will need to be approved by the Director.

6-45 Connection To Existing Wastewater System:

All new sanitary sewer main connections shall be physically plugged until all tests have been completed and the city inspector approves the removal of the plug.

6-45.1 Plugs, screens or other provisions shall be installed to ensure that at no time construction debris is allowed to enter the existing wastewater system.

6-45.2 Connection of new sanitary sewer mains to existing manholes shall be accomplished by using provided knock-outs. Where knock-outs are not available, the manhole shall be core drilled and fitted with a sand collar. Channels shall be installed using a 4,000 PSI concrete mix as approved by the City. Concrete must be obtained from a certified batch plant. No fillers will be allowed all shelves and channels will be solid concrete.

6-45.3 Unless approved otherwise, connection of a sanitary sewer main to the wastewater system where a manhole is not available shall be accomplished by setting a saddle manhole and pouring a concrete base. The existing sanitary sewer main shall not be cut into until approval is received from the city inspector.

6-45.4 All new sanitary sewer lateral connections to existing manholes shall be channeled to meet existing sanitary sewer main flow line.

6-45.5 Sanitary sewer lateral connections shall not be allowed to protrude into the existing wastewater system. The city Inspector shall be notified 48 hours prior to any connection to a City wastewater system .the city Inspector shall be present to witness a tap. The sanitary sewer main at the tap location shall be video inspected by the City from the nearest manhole a minimum of 10 feet beyond the tap, after tapping and prior to final approval. Taps on sanitary sewer mains shall be made by core drilling the sanitary sewer main with the correct sized bit and utilizing an insert-a-tee connection. Alternatively, sanitary sewer lateral connections to existing sanitary sewer mains may be made by cutting out a section of the existing sanitary sewer main and installing a wye fitting.

6-45.6 Cap the end of the existing sanitary sewer main to be abandoned as follows:

- ASBESTOS CEMENT LINES: Use end cap coupling equal to ROMAC EC501.

- CAST OR DUCTILE IRON LINES: Use MJ cap or plug.
- CONCRETE MAINS: Fill end of sanitary sewer main with cement concrete minimum of 12" from end of the sanitary sewer main.
- PLASTIC MAINS: Use cap or plug fitting compatible with plastic sanitary sewer main to be abandoned.

6-50 Manholes:

Precast manholes shall meet the requirements of ASTM C 478 with either a precast base or a cast-in-place base made from 4000 PSI structural concrete. Manholes shall be Type 1, 48 inch diameter minimum. The minimum clear opening in the manhole frame shall be 24 inches. Joints shall be gasket and shall be grouted from the inside and outside. Lift holes shall be grouted from the outside and inside of the manhole. Manholes constructed of other materials may be approved by the Director, provided they meet the requirements of CI-6 of Department of Ecology's "Criteria for Sewage Works Design". Material specifications need to be submitted for review before an alternate material will be considered.

Eccentric manhole cone shall be offset so as not to be located in the tire track of a traveled lane.

Manhole frames and covers shall be ductile iron casting marked "Sewer" conforming to the requirements of ASTM A-30, Class 25, and shall be free of defects or ductile iron ASTM A536 Grade 80.55-06. The use of a composite frame and cover made of fiber reinforced polymers may be used, but will have to meet same specifications as ductile iron.

Concrete perimeter seals shall be provided around all manhole and clean-out lids in unimproved easement areas, these shall be provided with locking lids.

Where lock-type castings are called for, the casting device shall be such that the cover may be readily released from the ring and all movable parts shall be made of non-corrosive materials and otherwise arranged to avoid possible binding. Lock-type covers shall be required in all multi-family complexes, on school grounds, on manholes containing odor control devices and as determined by the Director.

Safety steps shall be fabricated of polypropylene conforming to an ASTM D-4101 specification, injection molded around a 1/2 inch ASTM A-615 grade 60 steel reinforcing bar with anti-slip tread. Steps shall project uniformly from the inside wall of the manhole. Steps shall be installed to form a continuous vertical ladder with rungs equally spaced on 12 inch centers.

Manholes shall be provided at maximum 400 foot intervals for 8 inch to 15 inch sewers, 300 foot intervals for 18 inch to 30 inch sewers, at intersections, and at changes in direction, grade or pipe size. Spacing on larger sanitary sewer mains will be reviewed on a case by case basis.

Minimum slope through the manhole shall be 1/10th of one foot from invert in to invert out.

Terminal manholes are required when the distance from the last manhole exceeds 150 feet. Clean-outs may be used for distances less than 150 feet. Sanitary sewer lateral connections are not allowed at terminal manholes.

Manholes receiving discharge from a sanitary sewer force main or low pressure sanitary sewer main will be lined to prevent deterioration. Lining shall be a spray-on epoxy coating Raven 405 as manufactured by Raven Lining Systems, Inc. or approved equal.

6-50.1 Manhole Drops:

Straight grades between inverts are preferred over drops whenever possible when connecting to an existing manhole. Care must be taken when designing steep grades so as not to create a situation of excessive velocity.

An outside drop connection shall be provided for a sanitary sewer main entering a manhole at an elevation of 36 inches or more above the manhole invert.

An inside drop connection will not be allowed by the City unless otherwise approved by the Director.

6-55 GENERAL NOTES (SANITARY SEWER MAIN INSTALLATION)

General Notes shall be included on all sanitary sewer main design documents.

1. All workmanship and materials shall be in accordance with Engineering Design and Construction Standards and the most current copy of the (WSDOT/APWA) *Standard Specifications for Road, Bridge and Municipal Construction*. In cases of conflict, the most stringent standard shall apply.
2. All safety standards and requirements shall be complied with as set forth by OSHA, WISHA and Washington State Department of Labor and Industries.
3. All approvals and permits required by the City shall be obtained by the contractor prior to the start of construction.
4. If construction is to take place in the City or County right-of-way, the contractor shall notify the City or County and obtain all the required approvals and permits.
5. A pre-construction meeting shall be held with the Department prior to the start of construction.
6. The city Inspector shall be notified a minimum of 48 hours in advance of a connection to an existing sanitary sewer main. The city inspector shall be present at the time of the connection.

7. The contractor shall be fully responsible for the location and protection of all existing utilities, which includes keeping the locate marks current. The contractor shall verify all utility locations prior to construction by calling the Underground Locate Line at 1-800-424-5555 a minimum of 48 hours prior to any excavation and after the locates are completed the contractor is responsible to maintain marks through the construction..
8. Gravity sanitary sewer main shall be PVC, ASTM D 3034 SDR 35 with joints and rubber gaskets conforming to ASTM D 3212 and ASTM F 477. All sanitary sewer lateral fittings will be solvent welded, including the wye fitting on the sanitary sewer main.
9. Pre-cast manholes shall meet the requirements of ASTM C 478. Manholes shall be Type 1-48" manhole unless otherwise specified on the plans. Joints shall be gasket and watertight, and shall be grouted from the inside and outside of the manholes. Lift holes shall be grouted from the outside and inside of the manhole.
10. Manhole frames and covers shall be ductile iron casting or composite marked "Sewer" conforming to the requirements of ASTM A-30.
11. Sanitary sewer laterals shall be PVC, ASTM D 3034 SDR 35 and shall be solvent welded. Sanitary sewer lateral connections shall be made by an insert-a-tee tap to an existing sanitary sewer main or a wye branch on a new sanitary sewer main connected above the spring line of the sanitary sewer main.
12. All sanitary sewer mains shall be field staked for grade and alignment.
13. All new plastic low pressure sanitary sewer mains and pressure sanitary sewer force mains shall be installed with continuous 12 gauge green coated solid copper wire and buried locate warning tape. All materials shall be furnished by the contractor.
14. Bedding of the sanitary sewer main shall be placed in accordance with Section 7-08 and Section 9-03 of the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction.
15. Temporary street patching shall be allowed as approved by the Director.
16. Erosion control measures shall be taken by the contractor during construction to prevent infiltration of existing and proposed stormwater facilities and roadways.
17. The contractor shall be responsible for all traffic control in accordance with the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction (all applicable "K" plans in the standard plans) and/or the *Manual on Uniform Traffic Control Devices* (MUTCD). Prior to interruption of any traffic, an approved traffic control plan is required. No work shall commence until all approved traffic control is in place.

18. A copy of the approved plans must be kept on site whenever construction is in progress.

19. Any changes to the design shall be reviewed by the appropriate staff and approved by the Director prior to implementation.

20. All new sanitary sewer mains, sanitary sewer laterals, low pressure sanitary sewer mains and pressure sanitary sewer force mains shall be high velocity cleaned and pressure tested prior to paving in conformance with the above referenced specifications. Testing of the sanitary sewer main shall include video inspection of the sanitary sewer main and sanitary sewer laterals by the contractor. Immediately prior to video inspection, enough water shall be run down the line so it comes out the lower manhole. A copy of the video inspection and a copy of the red-line drawing shall be submitted to the City. Acceptance of the new wastewater system will be made after the tape has been reviewed and approved by the City.

21. The method of cleaning shall be high-velocity water pressure cleaning. Using a vactor truck, all rocks and debris shall be removed and be disposed of at the Developer's/Contractors expense.

PROCESS TO OBTAIN SEWER SERVICE

		Inside Bremerton Sewer Service Area				
		N	Y			
Provide Applicant with info for other Sewer District				Availability Letter Required		
				N	Y	Request Availability Letter
			Subdivision			
	Plans Submitted by Engineer to DCD	Y	or City Bldg. Permit Required	Within City Limits		
			N	Y	N	Execute OUA
	Four sets of plans provided to PW & U Engineering			Main Extension Required		
	Date Stamped			Y	N	Pay Fees and apply for service
	Plan Review Fees Paid					Obtain Right-of- Way Permit
Revise and Re-submit Plans to PW&U Engineering	N	Plans & Easements Approved by City				Install Service Line to Residence
		Y				Call for Inspection
		Pre-Construction Meeting: *Pay Inspection Fee *Submit Bonds/Proof of Insurance *Obtain ROW Permits *Execute PUCA				Call Operations for Video Inspection
		Notify Inspector of Start Date				Record drawings as- built completed
		Construct Main Extension				
		-Pressure Test Approved -Compactor Test Approved -Video Inspection Approved -Punch List Complete				Copy of Inspected/ Signed U.S.A. sent to Utility Operations
		Submit: *Record of Drawing *Deed of Conveyance *Warranty Bond *Easements *Reimbursement Agreement				
		Final Acceptance by the City				

6-60 Sanitary Sewer Lateral And Sanitary Side Sewer Requirements:

Refer to example A

6-60.1 Lots created by plat, re-plats, short plats, or binding site plans shall have a sanitary sewer lateral installed as required below. All sanitary side sewers are private and shall be installed in accordance with the Engineering Design and Construction Standards, WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction and the most current edition of the Uniform Plumbing Code.

In single family subdivisions, (including mobile home and manufactured home subdivisions) a sanitary sewer lateral shall be provided to each lot or pad.

Duplexes on a single lot under single ownership may have a single, shared sanitary sewer lateral provided to each building.

Sanitary sewer laterals for multi-family and commercial complexes shall be as required in the most current edition of the Uniform Plumbing Code. Generally, this requires a minimum of one sanitary sewer lateral to each separate building.

Sanitary sewer lateral connections to beach sanitary sewer mains (along shoreline) will not be allowed, this includes sanitary sewer laterals that are already connected to sanitary sewer beach mains that are requiring repair. The use of a sanitary sewer grinder pump system will be used. The property owner may be allowed to re-connect to the beach sanitary sewer main if no upland sanitary sewer service is available. These will be based on a case-by-case basis. Some of the conditions that will be reviewed are location of the upland sanitary sewer main, physical ability to extend the sanitary sewer main, the need for easements.

6-60.2 A sanitary side sewer refers to the extension from a building sanitary sewer line beginning two feet outside the outer foundation wall of the structure to the property line or easement. Sanitary side sewers shall be minimum 4-inch diameter. Clean-outs are required at the property line or easement line and within 5 feet of the building. Maintenance of the sanitary side sewer is the responsibility of the property owner. Prior to connection of a sanitary side sewer to the sanitary sewer lateral a connection permit must be obtained.

6-60.3 Each parcel under separate ownership shall have its own separate sanitary side sewer connection to the wastewater system.

6-60.4 A backwater valve assembly shall be installed where there is a possibility that reverse flow could occur on to private property. Per the most current edition of the Uniform Plumbing Code backwater valves shall be located where they will be accessible for inspection and repair at all times. Refer to the Engineering Design and Construction Standards details for Installation of the valve. Details (6070, 6071, 6072).

6-60.5 6-inch pipe shall be used for the sanitary sewer lateral from sanitary sewer main to the clean-out at the property line. Wrap #12 green coated tracing wire from the wye to the cleanout with two wraps minimum around the sewer pipe. Maintenance of the sanitary sewer lateral is the responsibility of the property owner. Maintenance of the sanitary sewer lateral from the wastewater system to the property line is the responsibility of the City.

6-60.6 Where an existing (capped or inactive) sanitary sewer lateral is requested to be re-used, a video inspection and prior approval will be required. The city will video the sanitary sewer lateral at no cost to the customer. If the existing sanitary sewer lateral is determined to be inadequate, then it must be abandoned and a new 6" sanitary sewer lateral installed or reconditioned using trenchless technology if feasible at the owner's expense. After installation of the new sanitary sewer lateral is completed, the city will video at no cost the new sanitary sewer lateral for approval.

6-60.7 4-inch minimum pipe shall be used for residential sanitary side sewers from the end of 6-inch sanitary side sewer lateral cleanout to the building. Commercial sanitary side sewers shall be a minimum 6-inch pipe.

6-60.8 Sanitary sewer laterals shall be a minimum of 5 feet deep at the property line unless otherwise approved by the Director.

6-60.9 Sanitary sewer laterals shall connect to the sanitary sewer main with a wye rather than a tee or insert a tee, unless a tap is required. On the plan, indicate the station of the sanitary sewer lateral connection from nearest downstream manhole. Also indicate length of the sanitary sewer lateral from the sanitary sewer main to the plug at the end of the 6-inch sanitary sewer lateral. Sanitary sewers laterals for single family residential properties shall not be connected to the wastewater system at a manhole.

6-60.10 Sanitary sewer lateral locations as shown on the plan are approximate only. Damage caused to existing sanitary sewer laterals or problems/failure locating existing sanitary sewer laterals is the responsibility of the contractor and the City shall not be held liable.

6-60.11 All existing services shall be maintained during construction.

6-60.12 If an existing sanitary sewer main is being replaced, all existing sanitary sewer laterals shall be reconnected or replaced immediately after the sanitary sewer main is tested and approved.

6-60.13 The ends of the sanitary sewer laterals shall be marked with an 8 foot long vertical 2 x 4 board. Boards shall have 12 inches minimum painted green above ground.

6-60.14 Slope of sanitary sewer laterals shall not be less than two percent (2%).

6-61 Sewer Beach Main Connection

6-61-1 New sewer lateral connections or sewer lateral repair that in the past would have been connected to a sewer beach main will not be allowed. The sewer lateral connection will need to be connected to an upland sewer main.

6-61-2 Any exceptions to this requirement will be evaluated on a case-by-case basis by the Director.

6-65 Clean-Outs:

Clean-outs may be used in lieu of manholes at the end of the 8 inch diameter sanitary sewer main if not more than 150 feet in length.

All clean-outs in the City right-of-way or easements shall be extended to grade. A 2 foot square by 8 inch thick concrete pad with #4 rebar shall be installed around all sanitary sewer main clean-outs that are not in a pavement area.

Where possible, beach or lake sanitary sewer lateral clean-out shall be located above hydraulic gradient of the sanitary sewer main. Clean-out location shall provide easy access for inspection and maintenance. P.V.C. clean-outs located above hydraulic gradient shall be capped with a P.V.C cap. Clean-outs located below the hydraulic gradient shall be capped with restrained mechanical sanitary sewer plug designed to withstand uplift pressure from sanitary sewer force main.

A 6"x8" clean-out will have an 11" x 4" cast iron frame and a 12 1/4" cover; for smaller clean-outs such as an 8" x 4" cast iron frame and a 8 3/4" cover will be used.

6-70 Sanitary Sewer Lift Stations/Sanitary Sewer Force Mains:

Design criteria for sanitary sewer lift stations and sanitary sewer force mains will be identified on a case by case basis and are outside of the scope of the Engineering Design and Construction Standards.

6-75 Minimum Requirements And Installation Of Low-Pressure Sanitary Sewer Mains:

All grinder pump lift station installations must meet all building, plumbing, and electrical codes, and shall have the City's approval prior to installation. Please refer to the Engineering Design and Construction Standards for Low Pressure Sanitary Sewer Details for minimum requirements. Installation of pressure sanitary side sewers, sanitary service laterals, and taps on the low pressure sanitary sewer main shall be at the cost and responsibility of the property owner. All construction shall be in accordance with the City's specifications and the Engineering Design and Construction Standards. Installation of said services shall be made by a contractor licensed in the state of Washington.

Licensed contractors installing or connecting a new sanitary sewer lateral to a low pressure sanitary sewer main shall guarantee the workmanship and materials of said sanitary sewer lateral connection and appurtenances for a period of one (1) year from

the date of final inspection. In the event a problem occurs within one (1) year warranty period, the installer shall make the necessary repairs as soon as reasonably possible.

6-75.1 Pipe:

Unless otherwise called for, sanitary sewer lateral pipe shall be iron pipe size high-density polyethylene plastic pipe (HDPE SDR 11, 160PSI) and meet the following specifications.

1. Base Resin: Conform to all requirements of ASTM D 48, Type III, Class C, Category 5, Grade P34, with a PPI rating of PE 3408.
2. Melt Index: Less than 0.25 grams/10 min. as determined by ASTM D 1238, Condition E.
3. Environmental Stress Check Resistance: No cracks after 192 hours at 100 C as determined by ASTM D 1693, Condition C.
4. Rating: Long-term hydrostatic strength of 1450 psi and hydrostatic design stress of 730 psi as determined by ASTM D 2837.
5. Working Pressure Rating: 160 psi.
6. Laboratory Test Requirements: Withstand without failure a minimum burst pressure of 560 psi when applied in 60 to 70 seconds with water at 730 F. Test in accordance with ASTM D 1599. Test one percent but not more than three lengths.

6-75.2 Fittings And Joints:

If a sanitary sewer lateral connection is not available, the property owner or licensed contractor shall make a new tap on the low pressure sanitary sewer main. This will be done by electro fusion, side wall fusion saddles or a stainless steel service saddle. All materials and methods used for tapping the sanitary sewer main shall be as specified or as approved by the Director. A minimum of 1-1/4 inch diameter pipe shall be used for low pressure sanitary sewer connections.

6-75.3 Pressure Pipe Specifications:

Pressure pipe for sanitary sewer laterals:
Polyethylene AWWA C901, PE 3408, SDR 11
1 1/4" to 2" (OD-I.P.S)

Pressure pipe for low pressure sanitary sewer mains:
Polyethylene pressure pipe AWWA 906, PE 3408, DR 11, ASTM D3035, F 714,
NSF 61, C3
2" and larger (OD-I.P.S.)

6-75.4 Pressure Pipe Fitting/Joints: Joints shall be flanged, thermal fusion butt-welded. Joints, in pipes with a diameter of 2-inch or less, shall be made only at pump basins, valves, fittings and changes in pipe diameter. For pipes larger than 2-inch in diameter, joints between pipe sections shall be thermal fusion butt-welded. All flanges and fittings shall be thermal fusion butt-welded to the pipe. Internal beads from welding at flanges and fittings of 2-inch and larger diameter pipes shall be removed. Operators of fusion welding equipment shall be trained by the pipe manufacturer, who shall certify that operators are qualified. All fittings will be HDPE DR11 unless approved otherwise by the Director.

6-75.5 Sanitary Sewer Internal Pressure Fittings: PVC 1120 Schedule 80 ASTM D1785 schedule 80 treaded fittings ASTMD2464.

6-75.6 Laying Of Sanitary Side Sewer Between Grinder Tank And Street Connection Box:

A pressure sanitary side sewer from the grinder valve box to the collector valve box shall have a minimum cover of 24-inches and shall be HDPE SDR 11. Pipe shall be equipped with tracer wire for locating purposes. Tracer wire shall be insulated 12-gauge green coated wire (solid core) wrapped around the pipe and looped through the valve box from the collection valve to the grinder cleanout. Refer to Engineering Design and Construction Standards detail (6120) for current details. Unless otherwise indicated, it is unnecessary to bed the sanitary sewer lateral.

6-75.7 Cut-In Connection:

Where a collector valve box is not available at the property line an HDPE SDR 11 tee shall be cut in to the existing low pressure sanitary sewer main. A collector valve box assembly shall be placed at the property line.

6-75.8 Connection Into Sanitary Sewer Main:

Where an HDPE SDR11 pressure sanitary side sewer is connecting into a PVC sanitary sewer lateral, the contractor shall install the sanitary sewer lateral according to Engineering Design and Construction Standards detail (6040, 6021).

6-75.8 Connection into Sanitary Manhole:

Manholes receiving discharge from a sanitary sewer force main or low pressure sanitary sewer main will be lined to prevent deterioration. Lining shall be a spray-on epoxy coating as manufactured by Raven Lining or equal.

6-75.9 Backfilling Around Vaults And Valve Boxes:

Vaults and Valve Boxes shall be placed on backfill that has been compacted to a minimum of 95% of maximum theoretical density. Backfilling shall be performed carefully so that no damage is done to sanitary sewer main entering or exiting the vault

or to the vault or valve box. The City may direct the contractor to use special backfill techniques when it deems necessary.

6-80 Grinder Pump Lift Station Installation:

The grinder pump shall be an Environment One Model as supplied by Correct Equipment, Inc.

Contact the City for a pre-construction meeting to review pump tank and control panel locations before any installation. Contractor shall determine the depth of the existing building sanitary side sewer discharge before any installation.

The grinder pump lift station package shall include the following items:

6-80.1 Sewage grinder pumps, semi-positive displacement type, equal to Environment One progressive cavity with a 1 HP, 1800 RPM motor.

6-80.2 Corrugated HDPE tank with single complete pump unit, ready for installation. The tank will have a 1-1/4 NPT discharge connection and a 4-inch inlet grommet for DWV (Drain Waste and Vent) pipe.

6-80.3 The tank shall include an internal check valve assembly.

6-80.4 A breaker panel as supplied by Environment One, with two 15 amp breakers for pump operations, one 15 amp breaker for the alarm system, a Push to Run button, an audible alarm with Silence Button and a red light alarm. All wires and connectors are to be color coded and labeled for ease of installation.

6-80.5 A minimum of 25-feet of direct bury cable (Supply Cable) between the tank and breaker panel.

6-80.6 The grinder pump system operates on two pressure switches. One switch operates the pump on/off and the second operates the alarm.

6-80.7 The package system shall meet the requirements of the Washington State Department of Labor & Industries, Division for Residential, grinder pump systems.

6-80.8 The electrical supply to the breaker panel shall be 240-volt single-phase power.

6-80.9 The tank location shall be accessible for maintenance and repair. The tank cover shall be approximately 3 inches above finished grade. Finish grade shall slope away from the station and the station shall not be installed within a "pot hole". No plants or other obstructions are to be located within 5 feet of the tank and the property owner shall maintain a 3 foot clear zone around the tank.

6-80.10 The location of the breaker panel shall be:

- Accessible for maintenance and repair;
- In sight of the tank;
- The bottom of the Panel must be 5 feet from finished grade; and
- The Alarm light shall be visible from 50 feet and must be visible in a 180-degree radius.

6-80.11 The maximum distance between the Breaker Panel and the grinder tank shall be 25 feet, with a clear line of sight and easy access.

6-80.12 The Breaker Panel shall be equipped with a knife-type lock out switch. The lockout switch shall be visible from the tank.

6-80.13 Fences, bushes, or any other object shall not hide the alarm light or hinder in the maintenance and/or repair of the system.

6-80.14 There shall be no additional junction boxes or splices made once the system has been installed and inspected by the city inspector. Anyone tampering with the approved system shall be liable to the City for any expense, loss, damage, cost of inspection or cost of correction incurred by the City.

Residential grinder pumps shall be as manufactured by Environment One Corporation (E-1). Grinder pumps shall be installed by the property owner or licensed contractor in accordance with these specifications and under the recommendations of the manufacturer. Upon successful installation, approval by the City, approval by the manufacturer, start-up, and the securing of a recorded agreement for access to the grinder pump, the City shall assume ownership, operations, and maintenance of said grinder pump. The buried electrical wires controlling the pump station shall remain the ownership and responsibility of the property owner.

The licensed contractor shall be responsible for burying the two (2) direct burial electrical cables in accordance with the Engineering Design and Construction Standards, codes and regulations for the control and alarms of the grinder pump. The wires shall be buried at a minimum depth of twenty-four (24) inches. Wires placed in a rigid, non-metallic conduit shall be at a minimum depth of eighteen (18) inches. If the wires are placed in a rigid, metal conduit, the minimum depth shall be six (6) inches. The property owner or licensed contractor shall leave at least two (2) feet of wires exposed and coiled at the outside of the grinder pump near the inlet "eyes" into the grinder pump. At the structure, the property owner or licensed contractor shall run the wires in a rigid conduit from under-ground into the grinder pump control panel on the structure with at least one (1) foot of extra wire coiled in the control panel.

The grinder pump electrical control panel shall be installed by the licensed contractor on the main structure located on the same property as the grinder pump. The power for the grinder pump and alarm system shall come from the property owner's structure. A licensed contractor shall connect the power supply of the structure to the control panel in accordance with State and local codes and in accordance with the electric utility's regulations.

Sanitary side sewer shall remain on the property of the permit holder only, unless an easement has been signed and recorded by the adjoining property owners granting permission to construct and maintain a sanitary side sewer through the adjoining property. A copy of the recorded easement shall be given to the City to keep on file prior to installation of the grinder pump.

6-80.15 Call For Inspection:

Arrangements for inspection of a Grinder Pump installation shall be made with the City 24 hours in advance. The City reserves the right to set the time for inspections. Sanitary side sewer and sanitary sewer lateral permits must be obtained from the City prior to scheduling an inspection. All inspections will be performed during normal working hours. Cancellations must be made a minimum of one hour before the scheduled appointment. Additional inspection may result in additional fees.

6-80.16 Testing Of Final Installation - Grinder Pump:

Sanitary side sewers using pump systems shall be tested at 120 psig (twice the pressure rating of the pump system). Following is the procedure used for testing the discharge line:

- a) Close the in-line ball valve in the grinder pump clean-out valve box.
- b) Open the riser ball valve in the grinder pump clean-out valve box.
- c) Close the ball valve at the collection valve box for the street connection.
- d) Using hand pump, pressurize with air.
- e) Hold the required pressure for ten minutes. Allowable leakage = 0

6-85 As-Built Drawings:

As-built drawings shall be prepared by the Contractor and checked by the city inspector in conjunction with the Permit and shall show the as-built location of the sanitary side sewer and sanitary sewer lateral installation.

Low pressure sanitary sewer main as built drawing shall be prepared and certified by the design engineer.

6-90 Low Pressure Sanitary Sewer Main.

6-90.1 General:

The design of any low pressure sanitary sewer main extension/connection shall conform to Engineering Design and Construction Standards, the E/One Extreme Series (Environment One) Pressure Sewer Systems design manual, and the Washington State Department of Ecology's (DOE) "Criteria of Sewage Works Design".

The layout of extensions shall provide for the future continuation of the existing wastewater system as determined by the City. In addition, low pressure sanitary sewer main extensions shall be extended to and through the site of the affected property fronting the low pressure sanitary sewer main.

The system shall be designed at full depth of flow on the basis of an average daily per capita flow as shown in the City of Bremerton Wastewater Comprehensive System Plan Update. A friction factor of 0.013 shall be used for Manning's "n" value.

New low pressure sanitary sewer systems shall be designed by methods in conjunction with the basis of per capita flow rates. Methods shall include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas and modification of per capita flow rates based on specific data. Documentation of the alternative method used shall be provided along with plans.

Grinder pump lift stations systems shall connect to sanitary sewer mains. Low pressure sanitary sewer mains may be allowed to connect to sanitary sewer force mains.

Minimum low pressure sanitary sewer main size for grinder systems shall be iron pipe size HDPE 11/4"

Minimum pressure sanitary sewer (low pressure sanitary sewer main) main size shall be determined by manufacturer designs but in no case shall the main be less than 2" diameter.

6-95 Low Pressure Sanitary Sewer Design Standards.

6-95.1 Minimum depth of cover is 42 inches: Consideration shall be given for additional cover depth at locations when the new low pressure sanitary sewer main crosses below future water mains to provide 18 inches of separation from the bottom of the water pipe to the top of the low pressure sanitary sewer main.

6-95.2 Low Pressure Sanitary Sewer Main Velocity: The minimum velocity allowed is 2 feet per second (fps) at average Dry Weather Flow. 2 fps is required to maintain solids in suspension although 3 fps is desired to scour settled solids. Maximum velocity allowed shall be 8 fps.

6-95.3 Connections to Low Pressure Sanitary Sewer Mains:

Connection to existing low pressure sanitary sewer main shall be done by using approved saddle threaded for a corporation stop and approved compression fittings. For large connections a tapping sleeve shall be used with a flanged outlet and an epoxy coated resilient wedge gate valve. When connecting a grinder system sanitary sewer lateral to a sanitary sewer force main, a check valve and isolation valve at the property line shall be installed per Engineering Design and Construction Standards detail 6042, 6120.

6-95.4 Low Pressure Sanitary Sewer Cleanouts:

Low pressure sanitary sewer clean-outs shall be spaced no greater than 500 feet. Low pressure sanitary sewer cleanouts shall also be placed at intersecting low pressure

sanitary sewer mains and at any change in vertical or horizontal alignment as determined by the Director.

6-95.5 Valves:

All valves on low pressure sanitary sewer laterals up to 2" shall be PVC Schedule 80 threaded ball valves.

All valves greater than 2-inches on low pressure sanitary sewer mains shall be resilient seat wedge gate valves.

6-95.6 Air Release Valves: Piping and fittings will be brass. Air release valves shall be Crispin model PVC US10S or equal with 1/4" operating orifice and operating range of 10 to 100 psi. Air release valves and air/vacuum valves shall be located at the high points of the line. Air release valves shall be fitted with an activated carbon canister to absorb compounds with disagreeable odors prior to releasing the air to the surrounding area. Grades shall be designed to minimize the need for air/vacuum valves when practical. Vehicular access to valve is required for maintenance. See detail.

6-95.7 Thrust Blocking:

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be poured against undisturbed earth. A barrier shall be placed between all thrust blocks and fittings.

6-95.8 Low Pressure Sanitary Sewer Main Termination:

Sewer odors and gases, hydrogen sulfide odors (H₂S), and the buildup of sulfuric acid (H₂SO₄) occur in the operation of a low pressure sanitary sewer main.

Odor and corrosion control measures shall be addressed on low pressure sanitary sewer mains connecting to a wastewater system.