

Section 3 Index

Sanitary Sewer

3-1	Sanitary Sewer
3-2	Pipe Bedding
3-3	Trench Excavation and Backfill
3-4	Sewer Service Lines
3-5	Standard Manhole
3-6	Cleanout
3-7	Sanitary Sewer Pipe Plugs
3-8	Connect to Existing Manhole
3-9	Adjust Existing Casting to Grade
3-10	Abandoned Conduits
3-11	Flushing and Testing

SECTION 3

CITY OF SUNNYSIDE

STANDARD SPECIFICATIONS

SANITARY SEWER

3-1 SANITARY SEWER

3-1.01 DESIGN

These specifications cover the furnishing and installation of sanitary sewer pipe, manholes, cleanouts, and other appurtenances as shown on the plans or as directed by the Engineer. Sewer related standard drawings are contained in Standard Drawings Section 3 of these Standard Specifications. All construction shall be in conformance with SWSS Section 7-17, except as modified by these specifications. All extensions of sewer mains will be designed to a depth as required to serve all future areas that will be serviced by the main line. The City shall determine the suitability of any proposed lift station and may require all additional engineering as necessary prior to permitting any lift stations. Where existing sewer depths allow, the minimum sewer main line invert depth will be eight (8) feet. All variations from the above design requirements will be subject to approval of the City Engineer. It is the intent of this specification that a continuous, gasketed sewer pipeline and appropriate side sewer services be constructed between manholes. At no time shall the Contractor make any repair or connection to a newly constructed sewer main using FERNCO Adaptors.

3-1.02 APPROVED PIPE AND JOINT MATERIALS

The sanitary sewer pipe shall be one of the types as indicated below:

- A. ACRYLONITRILE-BUTADIENE-STYRENE (ABS) PIPE shall conform to the requirements of SWSS Section 9-05.14.
- B. POLYVINYL CHLORIDE (PVC) PIPE shall conform to the requirements of ASTM D3034, SDR35. Pipe joint lengths shall be limited to 12.5 feet in length.
- C. DUCTILE IRON PIPE shall conform to the requirements of ASTM A 21.51 or AWWA C-151 and shall be cement mortar lined, push-on joint and shall be Class 50.

- D. POLYVINYL CHLORIDE (PVC) PIPE for FORCE MAINS shall conform to the requirements of ASTM D2241, SDR 21, 200 psi pipe.
- E. Jointing materials and fittings shall conform to the requirements of SWSS Section 9-05 for the type of pipe material installed. All repairs to PVC sewer pipe shall be made using gasketed PVC SDR35, ASTM D3034 couplings only.
- F. Piping material to be installed by the Contractor shall be one of the above unless otherwise specified in the contract Special Provisions.

3-1.03 MEASUREMENT AND PAYMENT

The unit contract price for each size of "Sewer Pipe", per Linear Foot, shall be full compensation for furnishing all labor, materials, 1 ¼"-inch minus crushed rock pipe bedding, pipe zone material, and trench backfill, equipment, testing, connections to existing lines and all other incidentals necessary to perform the work, complete and in-place, in accordance with the plans and specifications or as directed by the Engineer.

3-2 PIPE BEDDING

3-2.01 GENERAL

The Contractor shall place 1 ¼" minus crushed aggregate material per SWSS section 9-03.9(3) for backfill above the pipe zone gravel material unless otherwise indicated on the plans and in the special provisions. When unsuitable native material exists or is encountered during trench excavation, the Contractor shall over excavate the unsuitable material.

3-2.02 1 ¼"-INCH MINUS CRUSHED ROCK BEDDING

All sewer pipe shall be bedded to a depth of six (6) inches below the bottom of the pipe and to a height of six (6) inches above the pipe (this area is the pipe zone) with 1 ¼"-inch minus crushed rock as per section 3-2.01 of the City of Sunnyside Standard Specifications.

3-2.03 OVEREXCAVATION

Where over excavation is required by the plans or as directed by the Engineer, the Contractor shall be required to over excavate a minimum depth of two (2) feet below the pipe, or deeper as directed by the Engineer, and shall place pit run material, as approved by the Engineer, to within six (6) inches of the design invert elevation of the pipe.

3-2.04 COMPACTION

The bedding material shall be placed and compacted in lifts not to exceed six inches (6"). The pipe bedding shall be compacted to not less than 95 percent of maximum density. Compaction shall be done in such a manner as to preclude future settlement.

3-2.05 MEASUREMENT AND PAYMENT

Where select native materials are acceptable and utilized as bedding, per prior approval of the Engineer, it shall be considered as incidental and included in the "Trench Excavation and Backfill" pay item, and no additional payment will be allowed.

The unit contract price for "Imported Pipe Bedding", per Cubic Yard, shall be full compensation for furnishing all labor, materials, equipment, and all other incidentals required to supply and place imported pipe bedding material in accordance with the plans and specifications, or as directed by the Engineer.

The unit contract price for "Over Excavation and Pit Run Material as approved by the Engineer", shall be per Cubic Yard, calculated by field measurement of the trench or estimated per load based upon the size and number of the bucket loads, and shall be full compensation for furnishing all labor, materials, equipment, and all other incidentals required to supply and place this material in accordance with the plans and specifications, or as directed by the Engineer.

3-3 TRENCH EXCAVATION AND BACKFILL

3-3.01 GENERAL

Trench excavation for sanitary sewer pipe shall be in accordance with SWSS Section 7-17.3(1) A, except as herein modified and shall be to the depth as shown on the plans and as indicated in the proposal for the various depths required. All Bedding, Pipe Zone, and Trench Backfill material shall be per City Standard Drawing 4-7 and Section 3 of these specifications unless otherwise noted or approved.

Trench excavation shall be considered unclassified material and be disposed by the Contractor per the plans and specifications, or as directed by the Engineer. Trench excavation shall include all excavation, disposal of all material, and all other work incidental to the construction of the trenches for gravity sewers and force mains, including manholes or other appurtenances, which are part of the pipeline.

3-3.02 ROCK EXCAVATION

Rock excavation shall include solid rock formations requiring systematic drilling and blasting with explosives and any boulders or broken rock larger than one-half (1/2) cubic yard in volume. Hardpan or cemented gravel, even though it may be advantageous to use explosives in its removal, shall not be classified as solid rock excavation.

The Contractor shall notify the Engineer at least 24 hours prior to any blasting. All blasting shall be done in accordance with local, county, and state regulations governing this class of work. Any damage to persons or property resulting from blasting operations shall be the sole responsibility of the Contractor and his surety.

3-3.03 BACKFILL AND COMPACTION

All sewer trench excavation, including that portion of the side sewer trench, located within the public right of way shall be backfilled with 1 ¼" minus crushed aggregate material per SWSS Section 9-03.9(3), above the pipe zone bedding to within three (3) inches of the finish asphalt grade. The material shall be placed and compacted to achieve a minimum of 95 percent maximum density when tested in accordance with SWSS Section 2-03.3(14)D. Side Sewer trenches located outside and extending beyond the right of way may be backfilled with select native material.

3-3.04 TRENCH SAFETY

All trench excavation shall have adequate safety systems for the trench excavation that meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW. The Contractor shall be fully responsible for providing the necessary back sloping, cribbing, trench boxes, etc., as required to meet the specified safety requirements for the trench, manhole, dry well and related excavation, including providing trench safety for City crews when taps are required to existing sewer mains. Sloping will not be allowed as an option to trench boxes and shoring, when the trench is within paved areas, or when sloping would damage adjoining paved areas.

3-3.05 AC WATER MAIN CROSSING REPAIR

When a sanitary sewer main line or storm sewer main line, will cross under an Asbestos Cement water main, the Contractor, prior to excavating under the water main, shall be required to remove and replace the section of AC water main. The length of water main to be removed shall be no less than three feet each side of the trench. The Contractor shall replace the AC pipe with a section of approved water main materials and couplings per the City of Sunnyside Standard Specifications.

After completion of the excavation and backfill, the repair couplings shall remain firmly on undisturbed ground, or the Contractor will be required to replace the water repair. The Contractor shall be required to install all repairs of this nature per Section 4 of these specifications.

3-3.06 MEASUREMENT

A. TRENCH EXCAVATION AND BACKFILL

Measurement for payment for "Trench Excavation and Backfill," shall be by the Cubic Yard for the appropriate depth increment of trench excavation and backfill, including measurement through manholes.

Measurement for trench excavation shall be the depth from the pipe design invert to original grade plus 6-inches for pipe bedding, except that where the sewer is constructed in conjunction with street construction, and unless excavation to subgrade is not allowed by the contract Special Provisions, measurement shall be from the pipe invert to the street design subgrade, regardless of when the Contractor chooses to excavate the street to subgrade. Aggregate backfill shall be measured from the top of the pipe zone bedding material to within three (3) inches of the finished grade of asphalt on all local streets or within six (6) inches of the finished grade of asphalt on all arterial streets.

B. TRENCH SAFETY SYSTEMS

The unit contract price for "Trench Safety Systems", per Linear Foot, shall be measured along the trench length through manholes, dry wells and catch basins.

C. ROCK EXCAVATION

When provided for in the bid proposal, Measurement for Payment for "Rock Excavation" shall include boulders exceeding one-half cubic yard in volume and solid rock, which requires systematic drilling and blasting. Rock Excavation will be measured on a cubic yard basis computed as follows:

a. Length

Length will be the entire horizontal distance where rock is encountered, measured on a linear foot basis along centerline of the trench.

b. Width

The trench width for payment of Rock Trench Excavation shall be as follows:

<u>Size of Pipe</u>	<u>Pay Width of Trench</u>
4" - 15"	2.5 feet
18" - 36"	Outside pipe diameter plus 12"
42" & larger	Outside pipe diameter plus 24"

c. Depth

Measurement for depth will be the vertical distance from six inches (6") below the pipe invert to the top of the solid rock strata. Depth will be measured at intervals of 25 feet along centerline of trench, beginning at the first location that solid rock is encountered, and the average depth between measuring points will be the depth used for computing depth of rock.

D. ROCK EXCAVATION FOR STRUCTURES

Rock excavation quantities for sewer manholes and other sewer structures shall be computed on a cubic yard basis from the actual profile depth as above, multiplied by the area within a line parallel to and one-foot (1') outside of the actual dimensions of the manhole or structure base.

3-3.07 PAYMENT

A. TRENCH EXCAVATION AND BACKFILL

The unit contract price for "Trench Excavation and Backfill", per Cubic Yard, for the various depths indicated in the proposal, shall be full compensation for the cost of excavation, backfill, furnishing all labor, equipment, and all other incidentals necessary to perform the work in accordance with the plans and specifications or as directed by the Engineer. Unless provided for in the contract special provisions, all costs for labor, equipment and materials as required to replace sections of all AC water mains at all main line trench crossings, shall be considered incidental to the "Trench Excavation and Backfill" bid items as provided in the bid proposal.

B. OVER EXCAVATION

The unit contract price for "Over Excavation", per Cubic Yard, for the depths as indicated on the plans or as directed by the Engineer, shall be full compensation for the cost of excavation, backfill, furnishing all labor, equipment, and all other incidentals necessary to perform the work in accordance with the plans and specifications or as directed by the Engineer

B. TRENCH SAFETY

The unit contract price, as provided in the bid proposal, for "Trench Safety Systems", per Linear Foot, or per Lump Sum, shall be full compensation for furnishing all labor, equipment, materials and all other incidentals to meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW, including all requirements at manholes.

C. ROCK EXCAVATION

When provided for in the bid proposal, the unit contract price for "Rock Excavation" will be based on the unit price, per cubic yard, and will be paid in addition to the payment for trench excavation and backfill at the various depths indicated in the proposal in which the rock is encountered. Payment for rock excavation shall be full compensation for all work required to excavate and dispose of the solid rock material. No payment will be made for rock excavated below required grade or outside the widths mentioned above.

3-4 SEWER SERVICE LINES

3-4.01 GENERAL

Side sewer service lines shall be installed and tested in accordance with the requirements of SWSS Section 7-18 as herein modified and City of Sunnyside Standard Drawing 3-6.

On existing sewer mains, the Contractor shall cut the main supply and install the sewer service insert a banded tee or wye, or gasketed repair couplings and gasketed tee or wye, as directed by the Engineer. The Contractor shall provide the required trench safety systems during installation of all side sewers at all times.

3-4.02 CONSTRUCTION

Construction of sewer service lines shall conform to SWSS Section 7-18.3 and as herein modified. Wyes shall be gasket fitted and shall be installed at the 2:00 o'clock or 10:00 o'clock position. Other bends and fittings on all sewer services shall be gasketed within the public right of way. No bends greater than 45° shall be used within the City right-of-way. All fittings shall be SDR 35 rated for use with SDR 35 sewer pipe. Written approval shall be obtained from the Engineer for all wye taps into the main sewer line. All services six (6)-inches or larger shall connect into a sewer manhole at the mainline connection. Where an existing service is being replaced, the alignment and grade of the replacement sewer may be revised from the old position as conditions require, provided that the existing abandoned wye is removed and mainline repaired and that the new service alignment and grade otherwise meet the approval of the Engineer and the requirements of these specifications.

The minimum pipe grade for all services within the public right-of-way shall be two (2) percent. (One-quarter inch (1/4") per linear foot or two feet (2') of drop per 100 feet of pipe.) With the approval of the Engineer and the Building Official, the grade may be flattened to 1%, if gravity sewer service could not otherwise be provided.

3-4.03 CLEANOUTS

Cleanouts are required on service laterals as required to meet the following requirements.

- A: At each 90° elbow (not required if two 45° elbows are used.)
- B: When a total of 135° bends have been made in the installation (after 3-45° bends.)
- C: Not more than 100 feet of line can be run without a cleanout being installed.
- D: A cleanout will be required where the connection is made near the building, unless an existing cleanout already exists just outside or just inside the foundation or basement.
- E: A cleanout is required immediately downstream of the sewer backflow device if a backflow device is required.
- F: A cleanout is required at the City right-of-way.

3-4.04 STUB MARKERS AND CAP

At all new sewer service locations, the Contractor shall install a tracer wire from the wye at the main along the entire length of the service line and terminate the wire at the top of the locating marker post. Tracer wire shall be 12 gauge copper wire with blue coded UF insulation. The ends of new sewer service line stubs shall be capped to provide a watertight seal and shall be referenced with a two-inch by four-inch (2" x 4") eight (8) foot long steel stud reinforced with a ground contact pressure treated wood 2 x 4, inserted in the steel stud. The post is to be painted green and left protruding two (2) foot above finished grade at the property line.

3-4.05 MEASUREMENT AND PAYMENT FOR SEWER SERVICE LINE

Measurement shall be per each for each size of sewer service. Wye taps shall be measured per each for each size of wye, cleanouts will be measured per each.

The unit contract price for "Sewer Service Lines," per Each, for "Service Wye Tap," per Each, and for "Sanitary Sewer cleanout" per Each, shall be full compensation for furnishing all trench excavation and backfill, materials including wyes and wye taps, labor, equipment, pipe bedding, end plugs, tracer wire and marker posts, cleanouts, testing, and all other incidentals required to construct side services in accordance with the plans and specifications or as directed by the Engineer. A separate measurement and payment will be made for pavement and concrete curb and sidewalk restorations and for "Trench Safety Systems".

3-5 STANDARD MANHOLE

3-5.01 GENERAL

Manholes are to be furnished and installed in accordance with the City of Sunnyside Standard Drawings 3-2, 3-3 and 3-5 and may have either a poured-in-place base or a precast base. Prior to construction, or placing excavated material in the street, impacted storm drain catch basins shall be protected with the City Standard Catch Basin Fabric Sock Protection. When in conjunction with street construction, sewer manhole channels shall be protected as required by Section 2-26 of these specifications.

Construction of manholes shall conform to SWSS Section 7-05, except as herein modified. The following provisions shall apply to the construction of all manholes:

- A. The City of Sunnyside will not accept any manhole constructed with manhole steps.
- B. Precast concrete cones shall be eccentric.
- C. All manhole joints shall be made with flexible gaskets or positive self-sealing mastic.
- D. Where installed in conjunction with street construction, the channelization and manhole bases shall be covered by a rigid material such as 3/4-inch plywood or better. This cover shall remain in place until street construction is complete and the manhole castings are grouted and then shall be removed along with all the debris prior to acceptance of construction.

- E. Piping to new and existing manhole connections shall be made in accordance with the requirements of SWSS Section 7-05.3 and 7-05.3(3).
- F. Manhole sections installed below the high static groundwater level shall be infiltration tested. A water infiltration allowance of 0.20 gallons per hour, per foot of static head above the lowest manhole invert, shall be considered as a satisfactory manhole test.
- G. All tapping of existing manholes shall be done using concrete core drilling equipment and all cores will be sized and fitted with a Kor-N-Seal boot for the size of pipe to be installed. The Contractor shall not be allowed to chip, break or jack hammer any openings into the existing manhole. The Contractor shall use all appropriate means to re-channel all existing manholes to accept the new sewer flows. All channels will be at a depth of not less than 2/3 the pipe diameter of the new pipe.
- H. All internal joints, picking holes, and step holes shall be completely grouted prior to acceptance.

3-5.02 MEASUREMENT AND PAYMENT

3-5.02.01 MANHOLES

The unit contract price for "Manholes, (to 10' deep)" per Each, shall be full compensation for furnishing all labor, materials, equipment, frames, covers, internal grouting, including adjusting the manhole ring and cover to finished grade, and all incidental work required to construct a standard manhole up to a depth of ten (10) feet, complete and in place in accordance with the plans and specifications. When constructed in conjunction with a paving project, a separate payment will be made for adjusting to grade, after completion of paving, as per Standard Drawing 3-4.

3-5.02.02 ADDITIONAL MANHOLE DEPTH

The unit contract price for "Additional Manhole Depth," per Vertical Foot, shall be full compensation for all labor, equipment and materials as required to construct the additional depth manhole section, which exceeds ten feet in depth. Measurement for "Extra Depth Manhole" will be from the sewer invert to the cover finish grade, less ten feet (10') and all other items as listed in Section 3-5.0202.

3-5.02.03 DROP CONNECTIONS

Payment for drop connections shall be in accordance with the unit contract price for "___ inch Drop Connection", per Vertical Foot, as measured from the cleanout rim to the invert in near the manhole base , and shall be full compensation for furnishing all labor, materials, and equipment required to construct the drop connection in accordance with the plans and specifications or as directed by the Engineer.

3-6 SEWER MAIN LINE REPAIR

3-6.01 GENERAL

Where shown on the plans, the Contractor shall make all appropriate repairs to the sewer main line. The Contractor shall notify the City of Sunnyside Sewer Division 48 hours in advance of all repairs so that the line may be jetted and cleaned prior to any repair work. As stated previously within this section, the Contractor shall use only gasketed repair couplings on all PVC pipe and new pipe spool pieces for all main repairs. On all non-PVC main lines, the Contractor shall submit the type of repair device to the Engineer for approval prior to installation. The Contractor shall use all appropriate trench safety systems during all repairs.

3-6.02 MEASUREMENT AND PAYMENT

Measurement and payment for each size of "Sewer Main Line Repair," per Each, shall be full compensation for furnishing all labor, materials, equipment, and all other incidentals required to install the cleanout, complete and in place, in accordance with the plans and specifications including adjusting the cleanout cover to the finished grade or as directed by the Engineer. Use of trench safety systems during repairs shall be paid per section 3-3.06B

3-7 SANITARY SEWER PIPE PLUGS

3-7.01 GENERAL

All stubbed out sewer main lines shall be closed with a watertight stopper or plug fastened in place. The end of the plug shall be referenced as specified for sewer services, Section 3-4.04.

3-7.02 MEASUREMENT AND PAYMENT

The unit contract price per each, for each size of end cap, shall be full compensation for all labor, equipment and materials to complete the end cap and marker, as required to supply, install and mark the mainline sewer stub as specified.

3-8 CONNECT TO EXISTING CONCRETE MANHOLE

3-8.01 GENERAL

Where shown on the plans, the Contractor shall connect the new sewer line into the existing concrete manholes and the existing base shall be chipped out and new channels formed. The new channel shall provide a smooth uniform transition for the new sewer pipe into the existing channel flows. The connection shall be completed in accordance with the requirements of Section 3-5 of these specifications. If the existing manhole is constructed from brick, the Contractor shall completely remove the existing manhole and construct a new concrete manhole per these specifications.

3-8.02 MEASUREMENT AND PAYMENT

The unit contract price for "Connect to Existing Manhole," per Each, shall be full compensation for furnishing all labor, equipment, materials, and all other incidentals as required to connect to and re-channel the existing manhole in accordance with the specifications or as directed by the Engineer.

The unit contract price for "Removing Existing Brick Manhole," per Each, shall be full compensation for furnishing all labor, equipment, materials, and all other incidentals as required to remove the existing brick manhole in accordance with the specifications or as directed by the Engineer.

3-9 ADJUST EXISTING CASTING TO GRADE

3-9.01 GENERAL

When the sewer construction is proceeding as a separate project, all manholes in pavement restoration areas shall be set to finish grade prior to patching the trench. Adjustment rings shall be grouted between each ring and finished smooth in and out. All manholes located outside of the pavement area shall be adjusted in accordance to the requirements of Standard Drawing 3-4. Unless otherwise provided for in the contract bid proposal, a separate measurement and payment will not be made for adjustments and all costs shall be incorporated into the unit price per each for all newly constructed sewer manholes and clean outs.

When the sewer system has not been constructed in conjunction with a street construction project, all existing manholes, cleanouts, and all other such sewer structure castings, which are required to be adjusted to finished grade, shall be adjusted, measured and paid in accordance with the requirements of Section 2 of the City of Sunnyside's Standard Specifications for Roadway, to which the Contractor's attention is hereby directed.

3-10 ABANDONED CONDUITS

All pipes, conduits, and other openings determined to be abandoned, which are cut or opened during the sewer installation, shall be capped or concrete plugged prior to backfilling of the trench. And shall be considered incidental to the cost of constructing the new sewer main, side service, and installation of the manhole and no additional compensation will be granted.

3-11 FLUSHING, TESTING, & ACCEPTANCE

Sewer lines shall be tested for acceptance in accordance with SWSS Section 7-17.3(4). The Contractor shall place and compact all backfill from the bottom of the excavated trenches to a depth not to exceed one half (1/2) of the total trench depth and shall flush all sewer mains prior to initiating the test. Following flushing, the Contractor shall visually inspect the sewer by "lamping" to assure that the sewer main is clean and ready for testing.

The Contractor shall air test the completed sewer main and side services between the manholes. The Engineer shall be notified prior to testing and be present during testing. Upon completion of the air test, the Contractor shall arrange to have the City crew perform a television inspection prior to acceptance of the main. The City crew requires a minimum two-work days notice in order to schedule televising. The Contractor shall note that any deviations in the pipe grade greater than 1/2" shall be repaired and no additional compensation shall be given.

The Sewer main shall be considered accepted upon completion of all testing and verification that all depths and grades are within the design parameters. On City of Sunnyside funded projects City crews shall perform all verification of grades and depths. Verification for acceptance on all Developer funded projects shall be considered only after the City receives the as-built, record drawings, as certified by a Professional Engineer or Land Surveyor.

The Contractor shall bear all costs incurred by the City to perform the initial television inspection of new sewer lines. If City crews are scheduled and are unable to complete the inspection, due to debris in the pipe, buried or inaccessible manholes or other causes attributable to lack of

preparation by the Contractor, the cost of all subsequent television inspections will be billed to the Contractor.

All sewer lines will be re-inspected by television, by the City within one (1) year after acceptance, and any line found to be defective through pipe foundation settlement, material defects, or workmanship shall be removed, replaced, or repaired by the Contractor at the option of the Engineer. The costs for such removal, replacement, or repair will be borne by the Contractor.

3-11.01 MEASUREMENT

All costs for labor, equipment and materials as required to complete the flushing, testing, and acceptance verification as specified, shall be considered to be incidental to the cost to construct the sewer and no additional compensation will be offered.