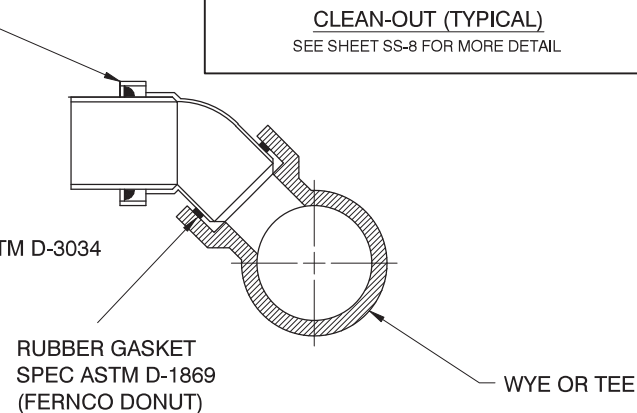
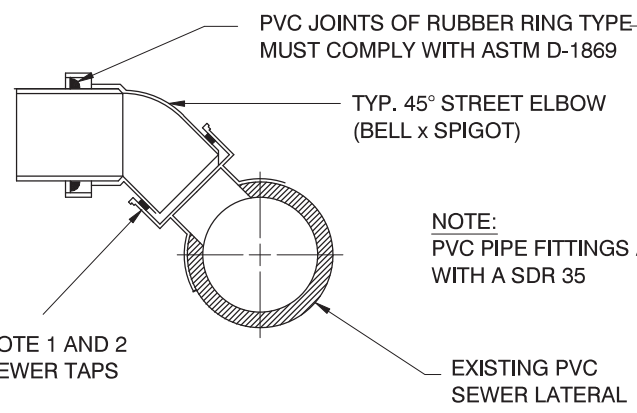
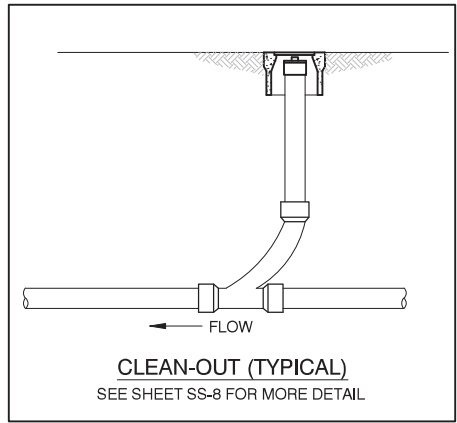
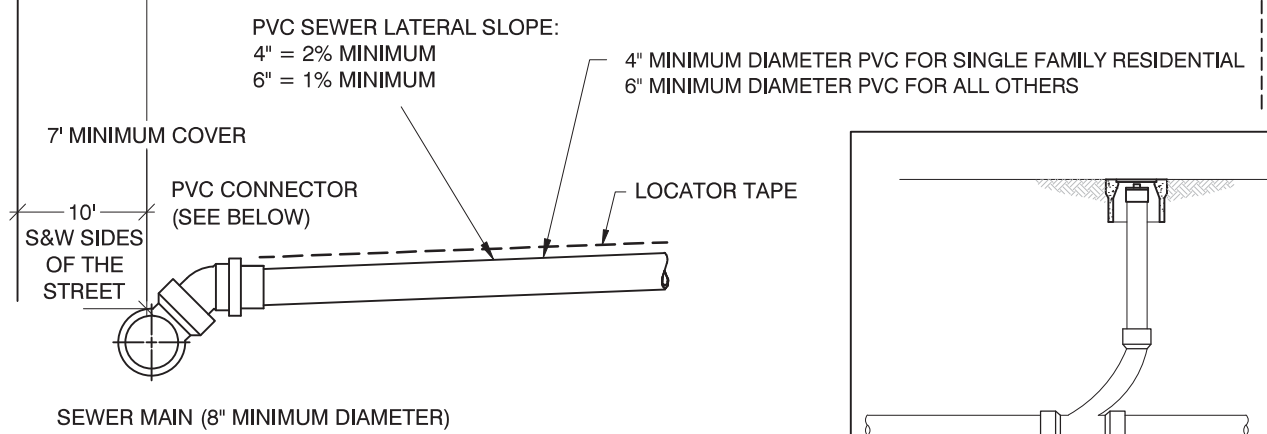
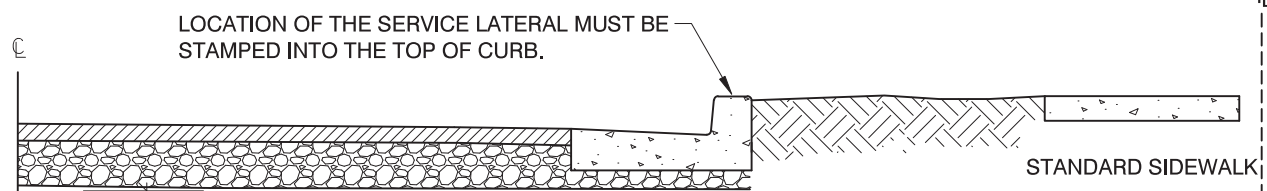




**Engineering Standards and
Drawings for**

Sewer Projects



CONNECTING TO AN EXISTING PIPE

CONNECTING TO A WYE OR TEE

NOTES:

1. CONNECTION FEES WILL BE ASSESSED AT THE TIME A PERMIT IS ISSUED. SEWER TAPS WILL BE PERFORMED BY OGDEN CITY PERSONNEL, WYE CONNECTIONS WILL BE PERFORMED BY THE CONTRACTOR UNDER THE SUPERVISION OF AN OGDEN CITY INSPECTOR.
2. SEWER TAPS INTO EXISTING 8" DIAMETER SANITARY SEWER PIPES SHALL NOT BE GREATER THAN 4".
3. ALLOWABLE SANITARY SEWER LATERAL PIPE MATERIAL:
 - 3.1. PVC SDR-35, GREEN IN COLOR
 - 3.2. HDPE DR-17
4. REQUIREMENTS FOR THE BEDDING OF A LATERAL IS THE SAME AS SHOWN IN SS-4.
5. THE SEWER LATERAL LOCATIONS SHALL BE MARKED WITH AN "S" IN THE TOP OF THE CONCRETE CURB.
6. PVC JOINTS OF RUBBER RING MUST COMPLY WITH ASTM D-1869.
7. FOR NEW PROJECTS: EXTEND SEWER LATERAL 5' BEHIND THE BACK OF THE SIDEWALK OR PROPERTY LINE, WHICHEVER IS FURTHER. THE END OF A LATERAL SHALL BE MARKED WITH A 2x4, SET IN THE GROUND, AND HAVE THE END COLORED GREEN.
8. CLEANOUTS SHALL BE REQUIRED EVERY 100'.
9. SEWER PIPE SHALL BE MARKED WITH A 6" DETECTABLE GREEN COLORED LOCATOR TAPE LABELED "SANITARY SEWER"

OGDEN CITY ENGINEERING - STANDARD DRAWINGS

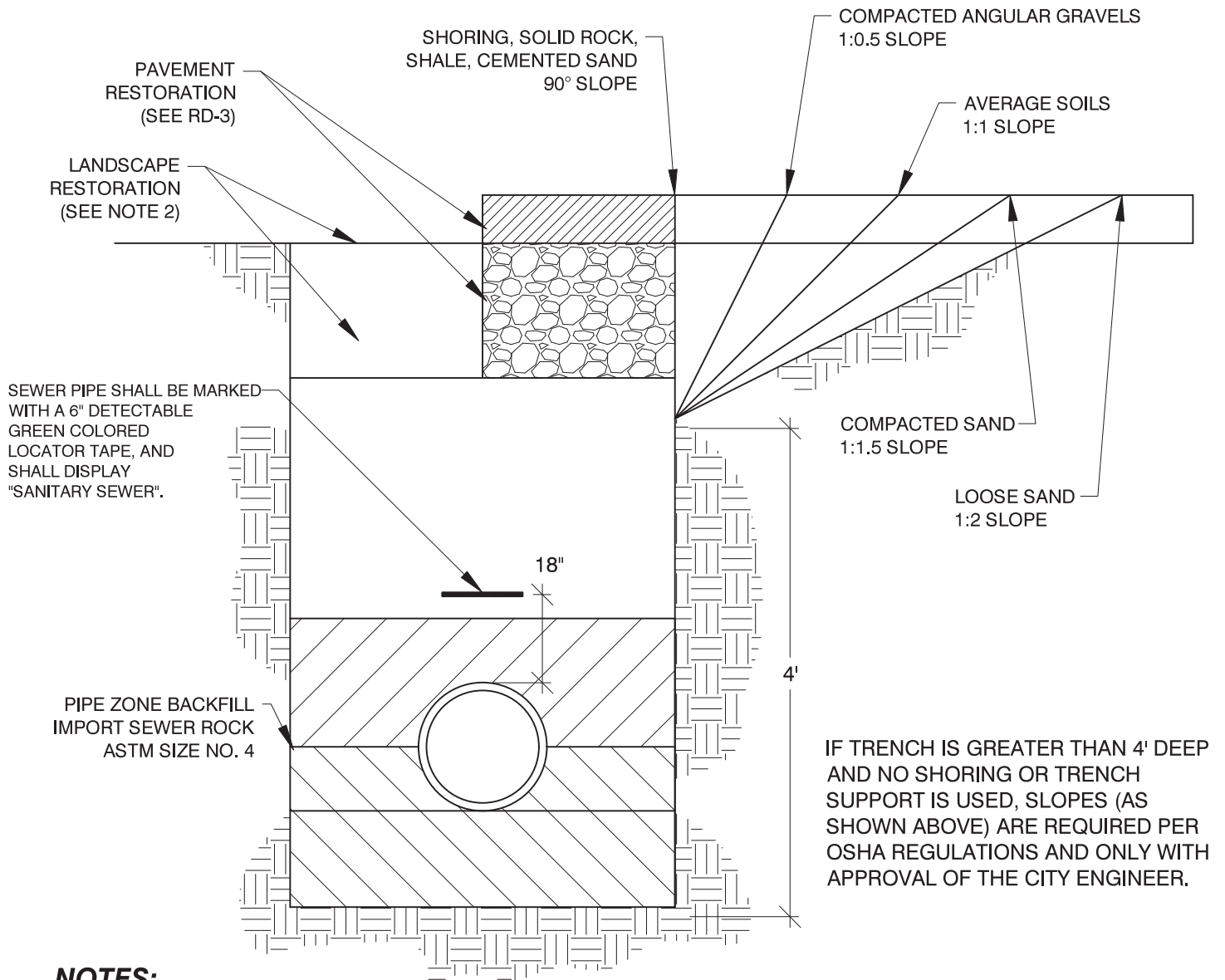


SEWER LATERAL CONNECTION

JUSTIN ANDERSON, CITY ENGINEER

SS-2

SHEET 1 OF 1



NOTES:

1. BACKFILL: ABOVE THE PIPE ZONE.
 - 1.1. GRANULAR FILL: PLACE FILL PER APWA SECTION 33 05 20.
 - 1.2. COMPACT PER APWA SECTION 31 23 26 TO A STANDARD PROCTOR DENSITY OF 95 PERCENT OR GREATER. MAXIMUM LIFT THICKNESS BEFORE COMPACTION IS 8" WHEN USING RIDING AND 6" WHEN USING HAND COMPACTION EQUIPMENT.
2. LANDSCAPE RESTORATION: LANDSCAPE MUST BE RETURNED TO PRE-CONSTRUCTION CONDITIONS OR BETTER.
3. PAVEMENT RESTORATION: DO NOT INSTALL ANY PORTION OF ASPHALT OR CONCRETE SURFACING UNTIL TRENCH COMPACTION IS ACCEPTABLE TO THE ENGINEER.
4. PEA GRAVEL IS NOT ALLOWED IN ANY PART OF THE TRENCH.
5. STANDARD SEWER MAIN ALIGNMENT SHALL BE 10' WEST OR 10' SOUTH OF THE CENTERLINE IN THE PUBLIC RIGHT-OF-WAY (SEE RD-1).
6. HORIZONTAL CLEARANCE TO ANY WATER MAIN SHALL BE AT LEAST 10' (REFER TO UTAH ADMINISTRATIVE CODE # R309-550).
7. COMPACTION TESTS ARE REQUIRED EVERY 200 LINEAR FEET OF A MAIN INSTALLATION PER APWA SECTION 33 05 20. COMPACTION TESTS ARE REQUIRED AT HALF AND FULL DEPTHS.

OGDEN CITY ENGINEERING - STANDARD DRAWINGS

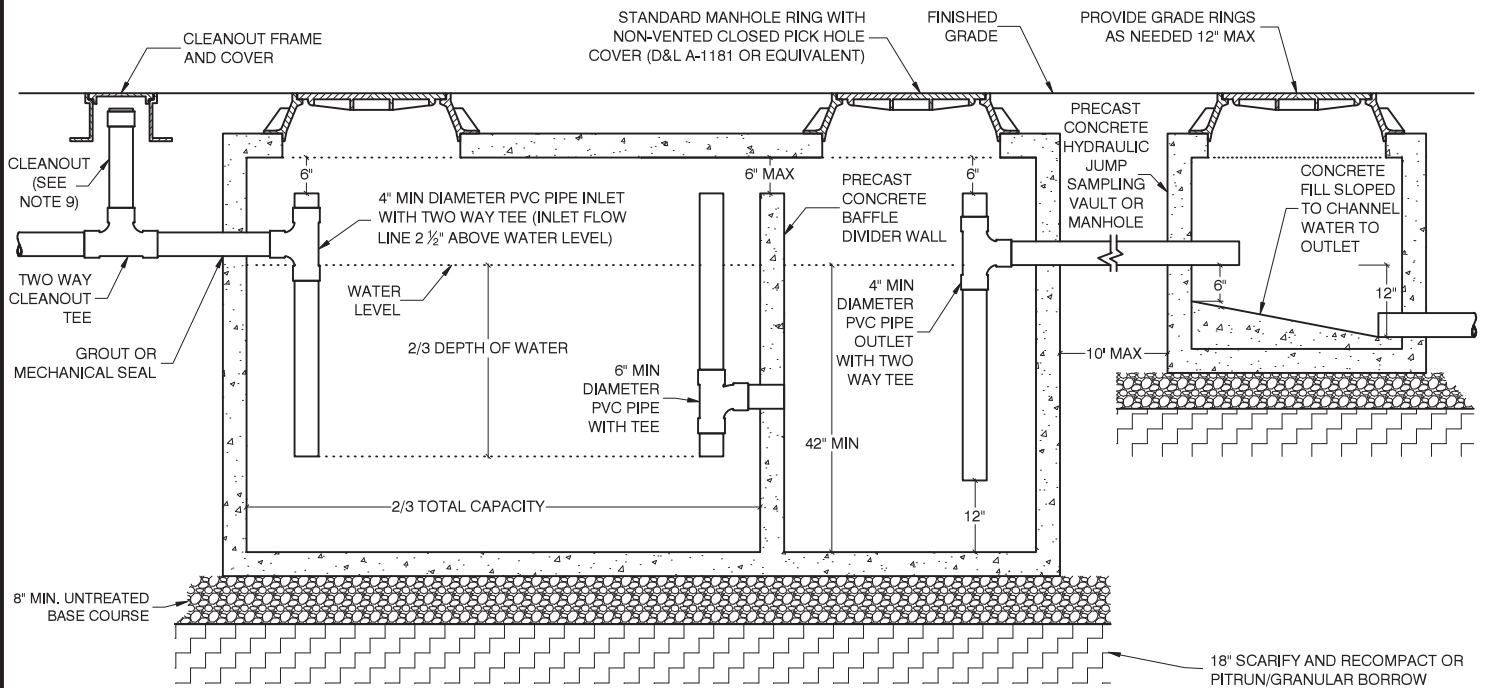


SEWER PIPE TRENCH

JUSTIN ANDERSON, CITY ENGINEER

SS-3

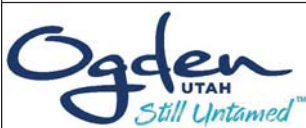
SHEET 1 OF 1



NOTES:

1. BACKFILL: PROVIDE AND PLACE PER APWA SECTION 31 23 23.
 - 1.1. COMPACT PER APWA SECTION 31 23 26 TO A DENSITY OF 95 PERCENT OR GREATER. MAXIMUM LIFT THICKNESS BEFORE COMPACTION IS 8" WHEN USING RIDING AND 6" WHEN USING HAND COMPACTION EQUIPMENT.
2. GRAVITY GREASE INTERCEPTOR (GGI) SHALL BE PRECAST REINFORCED CONCRETE WITH A MINIMUM OF 4" THICK WALLS.
 - 2.1. CONCRETE CLASS 4000 PER APWA SECTION 03 30 04.
 - 2.2. THE GGI SHALL HAVE A MINIMUM OF TWO COMPARTMENTS.
 - 2.2.1. THE INLET COMPARTMENT SHALL BE 2/3 OF THE TOTAL LIQUID CAPACITY AND THE OUTLET COMPARTMENT SHALL BE 1/3 OF THE TOTAL LIQUID CAPACITY OF THE GGI.
 - 2.2.2. GGI COMPARTMENTS SHALL BE SEPARATED BY A SEALED BAFFLE WALL 3" MINIMUM THICK.
3. THE GGI SHALL BE SIZED ACCORDING TO THE CURRENT MANUAL OF THE UNIFORM PLUMBING CODE (UPC).
 - 3.1. RESTROOM WASTE SHALL NOT BE ROUTED THROUGH THE GGI.
 - 3.2. THE GGI CAPACITY IS DEFINED AS THE STORAGE VOLUME OF THE VAULT BELOW THE ELEVATION OF THE OUTLET FLOW LINE.
4. ACCESS TO GGI SHALL BE PROVIDED BY A MINIMUM OF ONE MANHOLE RING AND COVER PER INTERCEPTOR DIVISION (BAFFLE CHAMBER) AND OF 24-INCH DIAMETER MINIMUM DIMENSIONS.
 - 4.1. ONE MANHOLE RING AND COVER SHALL BE LOCATED DIRECTLY ABOVE THE INLET TEE AND ONE MANHOLE RING AND COVER SHALL BE LOCATED DIRECTLY ABOVE THE OUTLET TEE.
 - 4.2. MANHOLE COVER SHALL HAVE A CLOSED PICK HOLE OR APPROVED GAS TIGHT EQUIVALENT AND SHALL BE MARKED "SEWER".
5. GGI SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE SOURCE OF THE WASTE WATER.
 - 5.1. GGI LOCATION SHALL BE EASILY ACCESSIBLE FOR INSPECTION AND CLEANING AND SHALL AVOID AREAS THAT COULD BE PERIODICALLY BLOCKED BY A VEHICLE, DUMPSTER, OR OTHER SIMILAR OBSTRUCTIONS.
6. WHEN LOCATED IN PAVED AREAS THE GRAVITY GREASE INTERCEPTOR SHALL HAVE MANHOLE RING AND COVERS RATED FOR TRAFFIC.
 - 6.1. LOW PROFILE MANHOLE RING AND COVERS SHALL NOT BE ALLOWED.
7. GRAVITY GREASE INTERCEPTOR SHALL BE WATER TIGHT AND GAS TIGHT.
 - 7.1. ALL PIPE OPENINGS SHALL BE MECHANICALLY SEALED OR GROUTED WITH 2:1 SAND/CEMENT MORTAR.
 - 7.2. DIRECT VENTING OF THE GRAVITY GREASE INTERCEPTOR SHALL NOT BE ALLOWED.
8. OUTLET PIPE FLOW LINE TO BE A MINIMUM OF 2.5' BELOW INLET PIPE FLOW LINE. THE INLET AND OUTLET PIPING SHALL HAVE 4" MIN PVC TWO WAY CLEANOUT TEES INSTALLED VERTICALLY INSIDE THE GGI.
9. THE BAFFLE WALL SHALL HAVE A 6" MIN PVC TWO WAY CLEANOUT TEE INSTALLED VERTICALLY. ALL PIPING SHALL MATCH THE SIZE OF THE INLET PIPE WHEN THE SIZE OF THE INLET PIPE EXCEEDS 4" DIAMETER.
10. THE CLEANOUT UPSTREAM OF THE GGI MAY BE ELIMINATED IF THE CLEANOUT AT THE BUILDING IS WITHIN 15 FEET OF THE GGI AND THE LINE BETWEEN THE GGI AND THE CLEANOUT IS A STRAIGHT SEGMENT.
11. A 3'X3' MINIMUM PRECAST VAULT OR 4' DIAMETER MINIMUM PRECAST MANHOLE SHALL BE INSTALLED NO MORE THAN 10' DOWNSTREAM FROM ANY GGI.
 - 11.1. THE SAMPLING VAULT OR MANHOLE SHALL HAVE A 12" MINIMUM HYDRAULIC JUMP BETWEEN THE INLET PIPE AND THE OUTLET PIPE WITH A MINIMUM OF A 6" CLEARANCE UNDER THE END OF THE INLET PIPE FOR PROPER SAMPLING OF GGI OUTFLOW.
 - 11.2. THE BOTTOM OF THE SAMPLING VAULT OR MANHOLE SHALL HAVE A WATER TIGHT CONCRETE FILL SLOPED TO CHANNEL THE WATER TO THE OUTLET PIPE.

OGDEN CITY ENGINEERING - STANDARD DRAWINGS

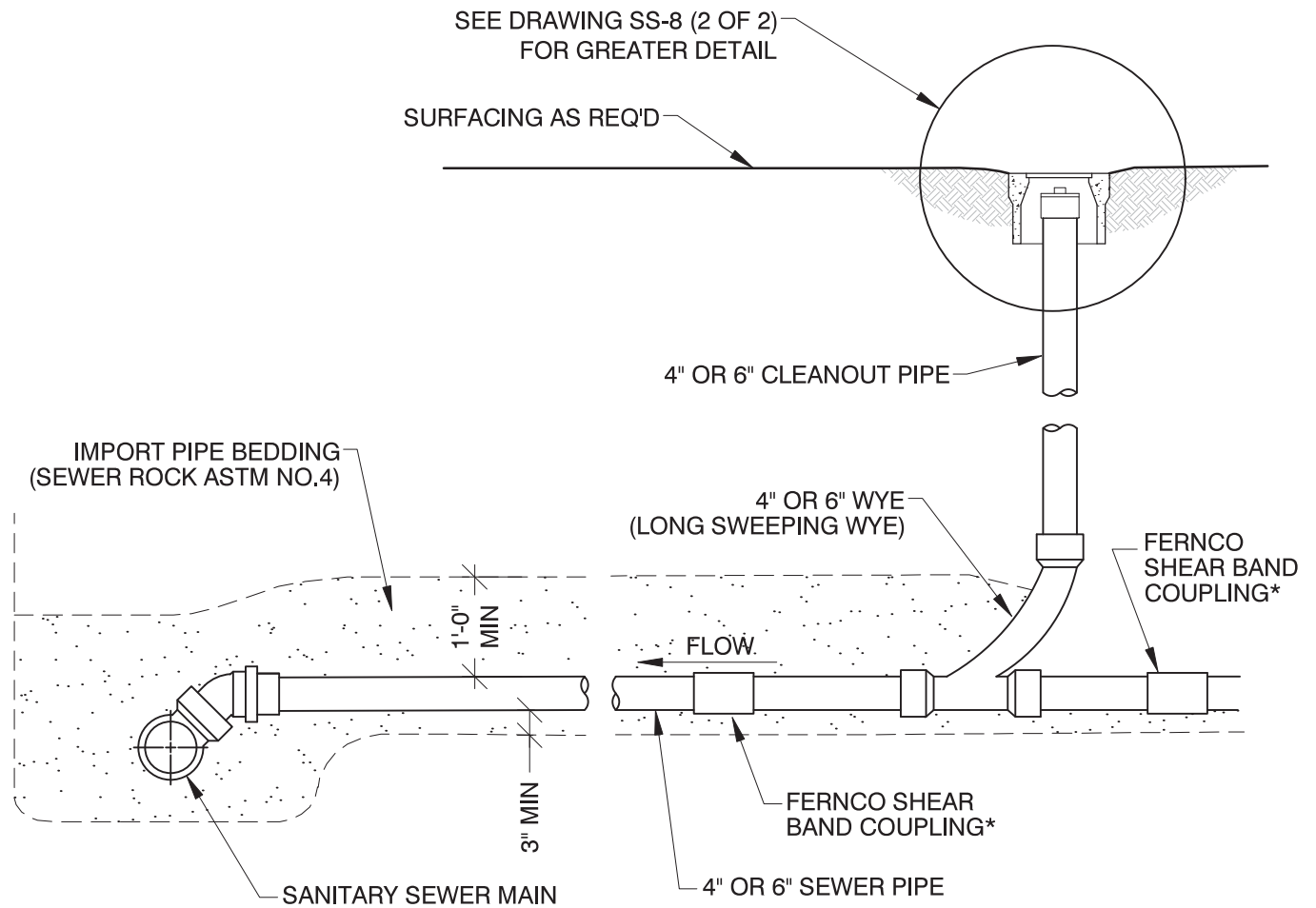


GRAVITY GREASE INTERCEPTOR

JUSTIN ANDERSON, CITY ENGINEER

SS-7

SHEET 1 OF 1



***NOTE:** FERNCO SHEAR BAND COUPLINGS USED FOR LATERAL REPAIRS ONLY.

NOTES:

1. OBTAIN PERMIT
2. OGDEN CITY IS NOT RESPONSIBLE FOR FLUSHING LATERALS. OWNER IS RESPONSIBLE FOR LATERAL FROM CONNECTION AT THE MAIN TO THE HOME.
3. CLEANOUTS SHALL BE PLACED EVERY 100 FEET.
4. IF LATERAL IS IN EXISTING CONCRETE, SEE PAGE 2.
5. ALL FITTINGS EXCLUDING THE CAP NEED TO BE RUBBER GASKETED.
6. NO CLEANOUT SHALL BE INSTALLED IN ANY ROADWAY.
7. ALLOWABLE PIPE MATERIALS ARE ABS (ACRYLONITRILE BUTADIENE STYRENE), GREEN IN COLOR OR PVC (POLYVINYL CHLORIDE) SDR-35

OGDEN CITY ENGINEERING - STANDARD DRAWINGS

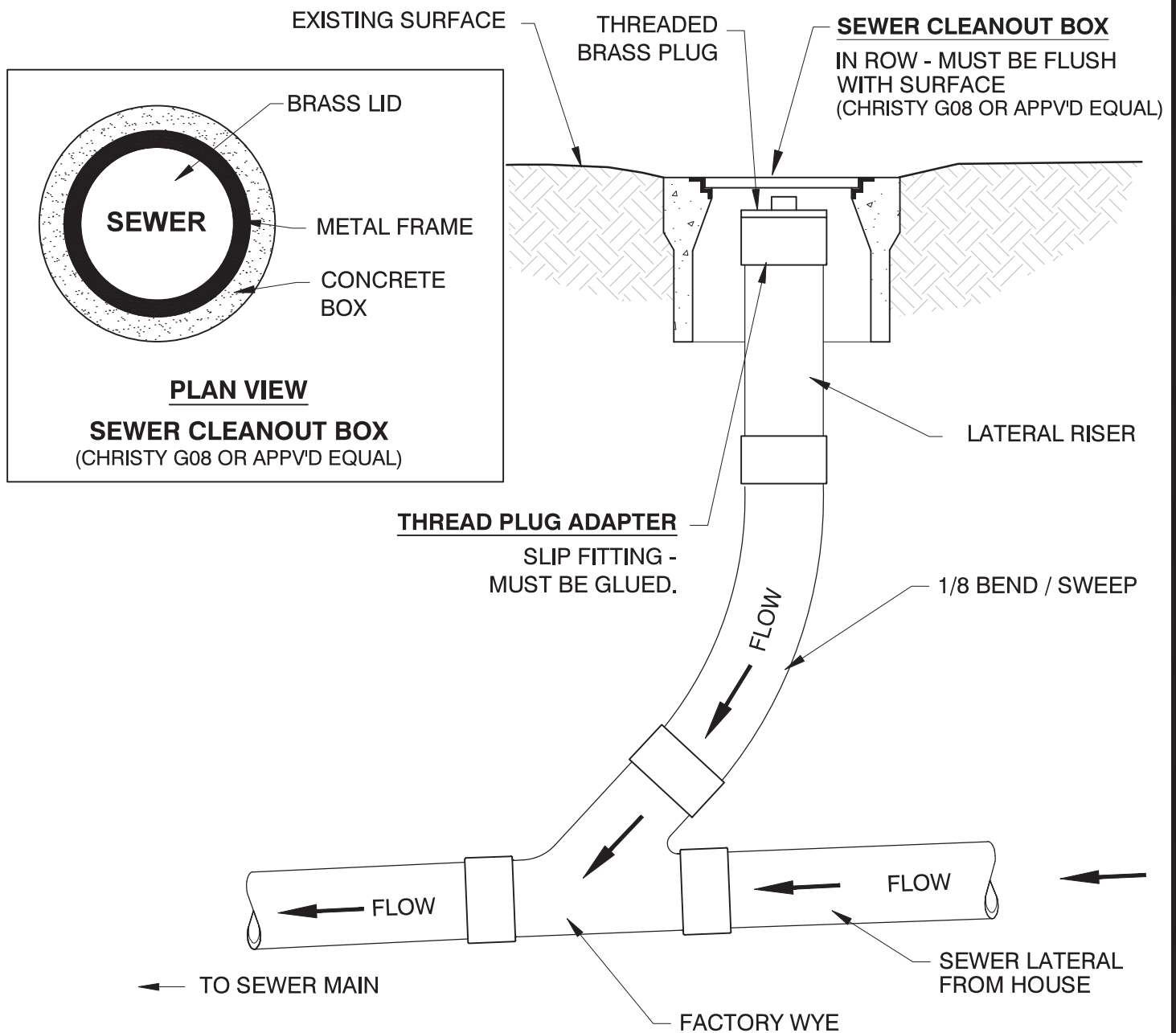


SEWER LATERAL CLEANOUT

JUSTIN ANDERSON, CITY ENGINEER

SS-8

SHEET 1 OF 2



NOTES:

1. OBTAIN PERMIT
2. OGDEN CITY IS NOT RESPONSIBLE FOR FLUSHING LATERALS. OWNER IS RESPONSIBLE FOR LATERAL FROM CONNECTION AT THE MAIN TO THE HOME.
3. CLEANOUTS SHALL BE PLACED EVERY 100 FEET.
4. ALL FITTINGS EXCLUDING THE CAP NEED TO BE RUBBER GASKETED.
5. NO CLEANOUT SHALL BE INSTALLED IN ANY ROADWAY.
6. ALLOWABLE PIPE MATERIALS ARE ABS (ACRYLONITRILE BUTADIENE STYRENE), GREEN IN COLOR OR PVC (POLYVINYL CHLORIDE) SDR-35
7. SEE SHEET SS-8 (PAGE 1 OF 2) FOR FURTHER DETAIL.

OGDEN CITY ENGINEERING - STANDARD DRAWINGS

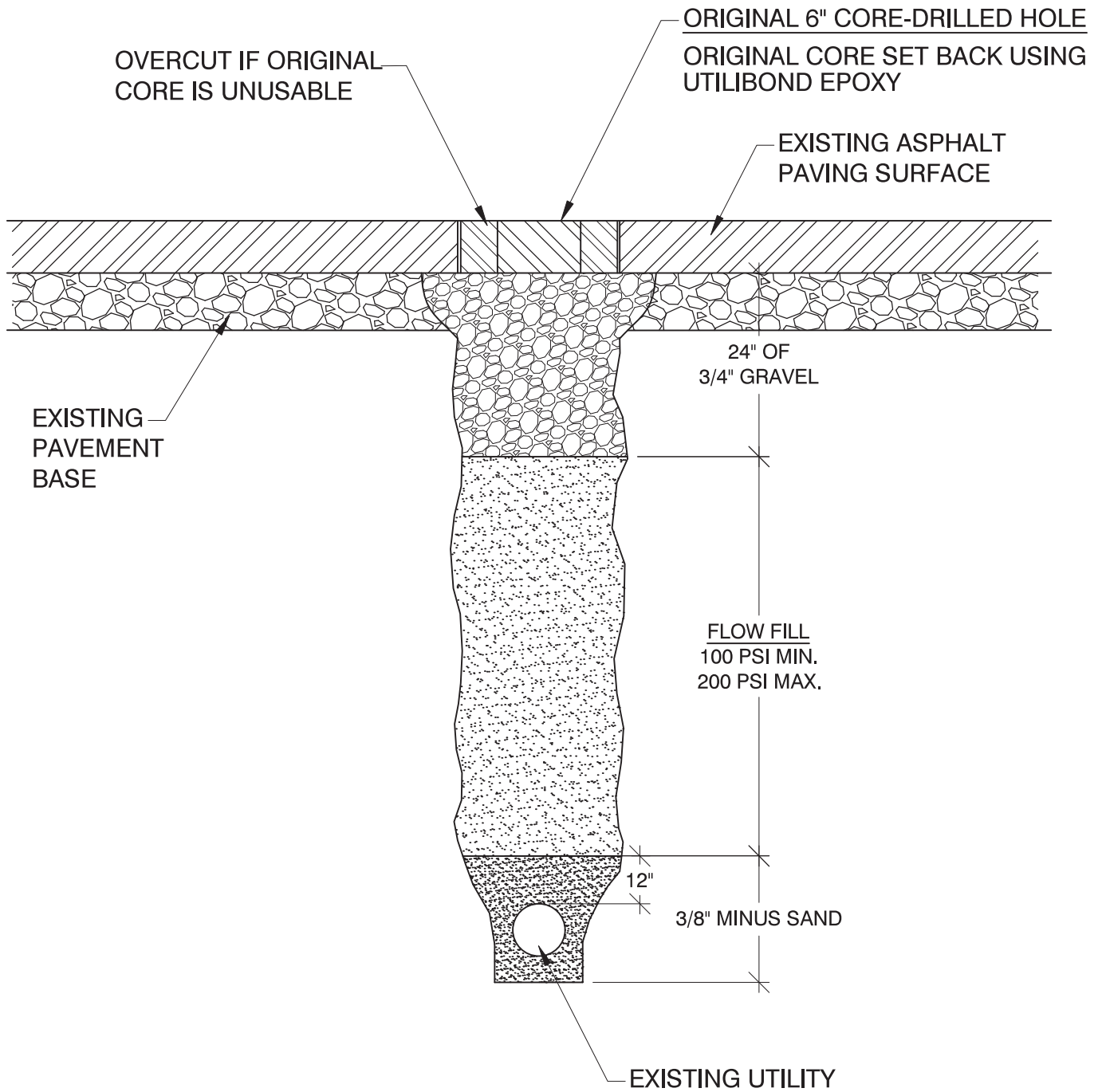


SEWER LATERAL CLEANOUT

JUSTIN ANDERSON, CITY ENGINEER

SS-8

SHEET 2 OF 2



NOTES:

1. IF ORIGINAL CORE CANNOT BE USED, THEN 12" DIAMETER CORE MUST BE CUT AND THEN FILLED WITH HOT MIX ASPHALT.

OGDEN CITY ENGINEERING - STANDARD DRAWINGS



SEWER UTILITY POTHOLING

JUSTIN ANDERSON, CITY ENGINEER

SS-9

SHEET 1 OF 1

D. Sewer Lateral Design Standards

1. Connection fees for a sewer lateral will be assessed at the time a permit is issued.
 - a. A Sewer tap will be performed by Ogden City Personnel, if the applicable fees have been paid.
 - b. Wye connections will be installed by the contractor under the supervision of Ogden City.
 - 1) Sewer taps into an existing eight inch (8") main shall not be greater than four inches (4"). If a six inch (6") connection is required, a portion of the sewer main must be removed, and a wye installed.
 - 2) A wye shall not be installed within 24" inches of bell or other connections.
 - 3) Inserta Tees, or an approved equal, can be used when the connection is smaller than two-thirds of the main line and when approved by the City Engineer.
 - c. No lateral shall be allowed to enter a manhole directly unless the lateral is over six inches (6") in diameter, ties in near the flow line, and is approved by the City Engineer.
 - 1) Connections larger than six inches (6") require a manhole to be installed.
2. Allowable sanitary sewer lateral pipe material is as follows:
 - a. ABS (Acrylonitrile-Butadiene-Styrene) schedule 40, green in color.
 - b. PVC (Polyvinyl Chloride) SDR 35, green in color.
 - c. HDPE (High Density Polyethylene) SDR 19 or SDR 17, green in color.
 - d. CIPP Lining (Cure In Place Pipe) can be used for repair of old laterals with the approval of the City Engineer. The repair must not decrease the volume of the lateral.
 - 1) Installation and material tests of cured-in-place-pipe (CIPP) must meet the minimum requirements demonstrated in the following ASTM standards:
 - 2) ASTM F-1216 Standard Practice for the Installation of C.I.P.P. Pipe by Inversion Lining
 - 3) ASTM D-638 Test Method for Tensile Properties of Plastics Tensile Strength 3,000 psi
 - 4) ASTM D-790 Test Method of Flexural Properties of Plastic Flexural Strength 4,500 psi Flexural Modulus 250,000 psi
 - 5) National Association of Sewer Service Companies (NASSCO) Wastewater Collection Systems Maintenance and Rehabilitation- 10th Edition: Chapters titled "TV Inspection" and "Sewer Line Cleaning."
 - 6) 4" and 5" MaxLiner or approved equivalent. Minimum thickness – 3mm
 - 7) 6" and 8" MaxLiner or approved equivalent. Minimum thickness – 4.5mm
3. Sewer lateral location shall be marked in the curb face by a stamped 'S' in the concrete.
4. Minimum lateral size shall be as follows:
 - a. Four inches (4") in diameter for a single family residential use with a minimum slope of 2%.
 - b. Six inches (6") in diameter for all other uses with a minimum slope of 1%.
 - 1) The sewer lateral shall be based on actual project flows, but in no case shall the lateral be less than six inches (6") in diameter. All project flows and sizing calculations shall be in accordance with the most current manual of the International Plumbing Code (IPC), the State of Utah, and as designed by a licensed engineer and approved by the City.
 - c. Laterals on private property must conform to the current adopted edition of the International Building Code.

5. No common use laterals shall be allowed.
 - a. Such practice of common use laterals shall be eliminated as redevelopment of the site occurs, or if repair or replacement is needed. The repair or replacement cost will be the responsibility of the Owner.
6. Sewage Collection: The developer shall connect to the sanitary sewer and provide adequate individual lateral lines to each property being developed. All proposed sewer connections must provide the future use of the property along with the necessary sized pipe with associated calculations.
 - a. Sewer laterals shall not be allowed to connect into any private sewer system.
 - b. Any new developments shall be subject to the following sewer lateral requirements:
 - 1) Developer will stub into each lot a minimum of one lateral with a factory wye, or tap, from the sewer main. Lateral size will depend on usage and current and future anticipated zoning for the lot.
 - 2) The lateral shall be extended to the back of the existing sidewalk, or beyond the property line, whichever is further.
 - 3) The end of the lateral must be marked with a 2x4, set in the ground, and have the end colored green.
7. Joint trench with a sewer and water lateral is not allowed. All sewer laterals shall maintain a 10 foot separation from all water lines.
8. Cleanouts shall be required every 100 feet (100').
9. Location of the cleanout can be in the City's Right-of-Way so long as it is a landscaped area and maintains a minimum distance of one foot from sidewalk, curb and gutter, etc.
10. Cleanout shall be placed in an Oldcastle precast G08, G05, or approved equal type box.
11. Cleanout needs to have a glue on thread adapter and a plastic screw on cap.

E. Grease Traps and Grease Interceptors

1. All Gravity and Hydromechanical Grease Interceptors shall be sized according to the current manual of the Uniform Plumbing Code (UPC).
 - a. All Drainage Fixtures (DFU) in any food and beverage preparation area or an area which can be contaminated with organic fats, oils, or greases (FOG) shall be routed through the Interceptor.
 - b. Restroom waste shall not be routed through the Interceptor.
 - c. The Interceptor capacity is defined as the storage volume of the vault below the elevation of the outlet flow line or as defined by the manufacture.
2. The Gravity Interceptor shall have manhole rings and covers rated for traffic loading when in areas which experience vehicular traffic.
3. The Interceptor shall be water and airtight.
 - a. All pipe openings shall be mechanically sealed or grouted to prevent infiltration and exfiltration.

- b. Direct venting of the gravity grease interceptor shall not be allowed unless it follows the requirements of the International Building Code.
 - c. All access manholes must be sealed to prevent air and fumes from escaping the containment unit.
4. Outlet pipe flowline shall be a minimum of 2.5 inches (2.5") below the inlet pipe flowline.
 5. The inlet and outlet piping shall have a two-way cleanout. The cleanout must be a minimum of four inch (4") PVC tee installed vertically inside the interceptor.
 6. The baffle wall shall have a six inch (6") minimum PVC cleanout tee installed vertically.
 7. If the inlet is greater than six inches (6") a plan will need to be submitted and approved by the City.
 8. A sampling manhole shall be installed no more than 10 feet (10') downstream from any interceptor.
 - a. The required vault shall be a five foot (5') diameter manhole.
 9. The sampling vault or manhole shall have a 12 inch (12") minimum hydraulic jump between the inlet and outlet pipe.
 - a. A six inch (6") minimum clearance is required from the end of the inlet pipe to the bottom of the sampling manhole flowline.
 10. The bottom of the sampling manhole shall be formed to slope the water towards the outlet pipe.

F. Pipe Bursting

1. The minimum allowable slope from the building to the main is 1% for a 6" service and 2% for a 4" service.
2. A video (CCTV) internal inspection of the cleaned existing piping shall be performed to assure that the piping conditions are acceptable to pipe bursting (e.g. no sags or obstructions in the pipe).
3. All sewer pipe must be green in color.