900 – Sanitary Sewers
MANHOLE FRAME & LID
(SEE MISC. SANITARY
MANHOLE DETAIL 900-4
FOR CHIMNEY SEAL).

PRECAST ADJUSTING RING 2" MIN. AND 12" MAX. AND
LIMITED TO NO MORE THAN TWO RINGS TO REACH THE
12" MAXIMUM

ECCENTRIC CONE OR
PRECAST FLAT SLAB TOP
WHEN REQUIRED

FLEXIBLE WATER TIGHT
JOINT A.S.T.M. 923-79
E.R. DURA-SEAL OR A-LOK

1' ABOVE LARGEST OR HIGHEST
PIPE ENTERING MH UNLESS
OTHERWISE AUTHORIZED

STONE FOUNDATION
(ODOT #67 OR ODOT #57)

INVERT ELEVATION
SHOWN ON PROFILE

O-RING JOINT DETAIL
(MEETING ASTM SPEC. 443)

JOINTS MUST BE KEPT TO A MINIMUM.

NOTES:

A. SANITARY MANHOLE FRAMES AND COVERS SHALL BE EQUAL TO NEENAH
NO. R-1767 OR EAST JORDAN IRON WORKS NO. 1600. LID SHALL BE
SANITARY LETTERED SOLID NON-VENTED. SELF-SEALING AND NON-BOLTED
LIDS.

B. TO CONNECT INTO EXISTING MANHOLE. THE MANHOLE SHALL BE CORED
AND AN A-LOK XP SERIES FLEXIBLE CONNECTOR OR EQUIVALENT SHALL BE
INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. NON-SHRINK
GROUT ALTERNATIVE MAY BE USED IN SPECIAL CIRCUMSTANCES WHEN
PREVIOUSLY APPROVED BY CITY.

C. MATERIALS FOR BASES, RISERS, AND OTHER PRECAST SECTIONS, INCLUDING
REINFORCEMENTS SHALL COMPLY WITH ASTM C-478.

D. MAXIMUM SANITARY MANHOLE SPACING SHALL BE 350 FEET FOR LESS
THAN 15 INCHES, 400 FEET FOR 15 INCHES, 400 FEET FOR 15 INCHES AND
GREATER.

E. LOCATE THE CENTERLINE OF MANHOLE COVERS AT 90° OVER THE
CENTERLINE OF THE MAIN SEWER WHENEVER POSSIBLE.

F. CUT PIPE SHALL NOT EXTEND BEYOND THE INSIDE FACE OF THE MANHOLE
WALL.

G. CONCRETE PLACED INSIDE THE MANHOLE SHALL NOT BE PLACED BETWEEN
THE PIPE AND THE OPENING SO AS TO INTERFERE IN ANY WAY WITH THE
FLEXIBILITY OF THE JOINT.

H. (4) ¾ INCH DIA. STAINLESS STEEL ANCHOR BOLTS AND NUTS TO FASTEN
MANHOLE FRAME TO MANHOLE CONE OR FLAT LID SECTION WHEN
REQUIRED BY THE ENGINEER.

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H. (4) ¾ INCH DIA. STAINLESS STEEL ANCHOR BOLTS AND NUTS TO FASTEN
MANHOLE FRAME TO MANHOLE CONE OR FLAT LID SECTION WHEN
REQUIRED BY THE ENGINEER.

STANDARD INVERT CHANNEL

ALL INVERTS TO BE CHANNELED FOR
OPTIMUM FLOW.
A. LOCATE THE CENTERLINE OF MANHOLE COVERS AT 90° OVER THE CENTERLINE OF THE MAIN SEWER WHENEVER POSSIBLE.

B. TYPE D MANHOLE SHALL BE USED WHERE THE DIFFERENCE IN INVERT ELEVATIONS IS GREATER THAN 2 FEET.

C. ALL NOTES AND ASTM REFERENCES ON THE TYPE 3 SANITARY MANHOLE SHALL APPLY ON THE TYPE D SANITARY DROP MANHOLE.
A. SANITARY DROP MANHOLE SHALL BE USED WHERE THE DIFFERENCE IN INVERT ELEVATIONS IS GREATER THAN 2 FEET.

B. ALL NOTES AND ASTM REFERENCES ON THE TYPE 3 SANITARY MANHOLE SHALL APPLY ON THE SANITARY DROP ON EXISTING MANHOLE.

C. ALL NOTES AND ASTM REFERENCES ON THE TYPE D SANITARY DROP MANHOLE SHALL APPLY ON THE SANITARY DROP ON EXISTING MANHOLE.

D. STANDARD DIMENSION PIPE (SDR) SHALL BE ANCHORED TO THE OUTSIDE OF THE EXISTING MANHOLE.

3/4 INCH STAINLESS STEEL STRAPPING WITH 24 INCHES ON CENTER WITH STAINLESS ANCHORING.
SANITARY DROP INSIDE DROP

NOTES
1. THE USE OF INSIDE DROP MANHOLES WILL REQUIRE APPROVAL OF THE CITY ENGINEER. THE USE OF INSIDE DROP MANHOLES WILL BE LIMITED TO ONLY SINGLE FAMILY AND MULTI-FAMILY RESIDENCES FOR CONNECTIONS TO EXISTING DEEP SANITARY SEWER SYSTEMS. NOT APPLICABLE TO COMMERCIAL OR INDUSTRIAL APPLICATIONS.
2. ONLY ONE INSIDE DROP CONNECTION ALLOWED PER MANHOLE. PIPE INVERT ELEVATIONS SHALL BE AS SHOWN ON THE PLANS.
3. MINIMUM MANHOLE DIAMETER WITH INSIDE DROP CONNECTION SHALL BE 48 INCHES.
4. MAXIMUM DROP PIPE DIAMETER SHALL BE 6 INCHES.
5. DROP MUST BE OPPOSITE OF THE LADDER STEPS.
MANHOLE STEPS SHALL BE SECURELY INSTALLED INTO EACH MANHOLE SECTION, BY THE MANUFACTURER, PRIOR TO DELIVERY TO THE JOB SITE.

FLAT TOP SLAB

NOTES

1. PRECAST CONCRETE ADJUSTING RINGS-ENCASE WITH CONCRETE 6 INCHES DOWN FROM BARREL TOP AND UP TO THE PAVEMENT SURFACE.
2. SET MANHOLE, PRECAST CONCRETE ADJUSTING RINGS AND CASTING AND PAVE OVER MANHOLE, THEN DIG OUT. ENCASE COLLARS AND CASTING AS PER DETAIL WITH CONCRETE.

TYPICAL OFF STREET MANHOLE GRADING

NOTES

A. MANHOLE STEPS SHALL BE SECURELY INSTALLED INTO EACH MANHOLE SECTION, BY THE MANUFACTURER, PRIOR TO DELIVERY TO THE JOB SITE.
B. MANHOLE STEPS SHALL BE PF-1 STEP BY M.A. INDUSTRIES OR EQUIVALENT.

INTERNAL MANHOLE CHIMNEY SEAL

(REQUIRED BY ALL SANITARY APPLICATIONS)
USE CRETEX SPECIALITY PRODUCTS OR EQUAL.

PROP. GROUND LEVEL GRADED

3'-0" (TYP.)

EX. GROUND LEVEL

3" (TYP.)

PRECAST CONCRETE ADJUSTING RINGS

CHIMNEY HEIGHT

STAINLESS STEEL EXPANSION BANDS

RUBBER SLEEVE

MANHOLE FRAME AND COVER

PRECAST

RUBBER EXTENSION
SANITARY SEWER TRENCH DETAIL

SHOWN AS "OFF ROAD" APPLICATION

TRENCH DETAIL NOTES

A. GRANULAR BEDDING SHALL BE CRUSHED STONE OR GRAVEL, (#57 OR #67), OR OTHER APPROVED EQUIVALENT.

B. ALL TRENCHES OUTSIDE THE RIGHT-OF-WAY FROM PROPOSED OR EXISTING PAVEMENT, CURB, DRIVEWAYS, ALLEYS, STONE AREAS OR WALKS CAN COMPACTED WITH EXISTING NATIVE MATERIAL IN 12 INCH MAXIMUM LIFTS OR AS APPROVED BY THE CITY. NO MATERIAL SHALL BE USED FOR BACK FILLING THAT CONTAINS STONE, ROCKS, ETC., GREATER THAN 4 INCH DIAMETER.

ALL TRENCHES INSIDE THE RIGHT-OF-WAY FROM PROPOSED OR EXISTING PAVEMENT, CURB, DRIVEWAYS, ALLEYS, STONE AREAS OR WALKS SHALL BE COMPACTED WITH GRANULAR BACKFILL MATERIAL TYPE 1 IN 6 INCH MAXIMUM LIFTS.

A DENSITY TEST ON GRANULAR BACKFILL OF 98% OF ASTM D698 STANDARD PROCTOR CURVE MAY BE REQUIRED TO BE PERFORMED BY A COMMERCIAL TESTING LAB SATISFACTORY TO THE CITY.

C. OFF-PAVEMENT AREAS SHALL BE PROVIDED WITH A MINIMUM OF 6 INCHES OF TOPSOIL OVER THE COMPACTED MATERIAL AND THEN SEEDED AND MULCHED PER ODOT ITEM 650. IN PAVEMENT AREAS SHALL FOLLOW MISCELLANEOUS ROADWAY NOTES SHOWN ON PAGE 300-14.

D. THE OPEN ENDS OF ALL PIPES SHALL BE PLUGGED TO THE APPROVAL OF THE CITY BEFORE LEAVING THE WORK FOR THE NIGHT.
REPAIR OF EXISTING PVC SDR35 SANITARY SEWER

PVC SDR35 REPLACEMENT PIPE OR APPROVED EQUIVALENT

COMPACT AND TAMP GRAVEL FIRMLY UNDER REPAIR PIPE AND REPAIR SLEEVE

GPK PRODUCTS INC., PVC COUPLING ASTM D-3034/F-1336PSM, OR APPROVED EQUIVALENT

EXISTING PVC SDR35 SANITARY SEWER

PROVIDE ADEQUATE STONE BEARING TO SUPPORT REPLACED SECTION OF PIPE. TYPE 3 (#57 OR #67) COMPACTED WASHED GRAVEL

SEE 900-5 TRENCH DETAIL FOR PROPER BACKFILLING

REPAIR OF EXISTING SANITARY SEWER OTHER THAN PVC

6" CONCRETE ENCASEMENT AROUND COUPLINGS EXTENDING 6" ON EACH SIDE OF COUPLING.

FERNCO COUPLINGS WITH STAINLESS STEEL SHEAR BANDS, EACH SIDE, OR APPROVED EQUIVALENT

EXISTING SANITARY SEWER

PROVIDE ADEQUATE STONE BEARING TO SUPPORT REPLACED SECTION OF PIPE. TYPE 3 (#57 OR #67) COMPACTED WASHED GRAVEL

SEE 900-5 TRENCH DETAIL FOR PROPER BACKFILLING

REPAIR OF EXISTING SANITARY SEWER PIPE DETAIL
NOTES
A. RISER PIPE TO BE BEDDED SOLIDLY AGAINST UNDISTURBED GROUND. ALSO, TEE MAY BE SUBSTITUTED FOR WYE BRANCH IF SPECIFIED.
B. RISER PIPE TO BE INSTALLED SO THAT CONNECTING SERVICE SHALL HAVE A MINIMUM DEPTH OF 10 FEET AT THE PROPERTY LINE UNLESS OTHERWISE DIRECTED BY THE CITY.
C. CONCRETE ENCASEMENT AND BLOCKING REQUIRED IF DEPTH OF CONNECTION IS 12 FEET OR GREATER.
D. EACH SANITARY LATERAL MUST BE IN SEPARATE TRENCHES.

SERVICE RISER AND SERVICE LATERAL
FOR NEW CONSTRUCTION ONLY

[Diagram of service riser and service lateral with notes and specifications]
NOTES

A. A WYE MAY BE CUT IN OR SADDLE WITH PRIOR APPROVAL PLACED ONLY IF AN EXISTING LATERAL IS NOT PROVIDED.

B. ALL SADDLES AND CUTTING IN WYES MUST BE INSPECTED PRIOR TO COVERING, AND THE HOLE IN THE EXISTING PIPE SHALL BE INSPECTED AND APPROVED PRIOR TO INSTALLATION.

C. OTHER SADDLE TYPES THAT MAY BE APPROVED ON CASE-BY-CASE BASIS BY ENGINEERING.

D. ON LOW FLOW AND PVC PIPE SDR 35 USE CUT IN WYE ONLY.

HOLE SHALL BE CAREFULLY CORED AND BE SAME DIAMETER AS OUTSIDE DIAMETER OF LATERAL CONNECTOR.

GRANULAR BEDDING

SECTION A-A

SECTION B-B

GRANULAR BEDDING

GRANULAR BEDDING (#57 OR #67) COMPACTED WASHED STONE

SERVICE LATERAL

EXISTING SERVICE LATERAL

EXISTING SERVICE LATERAL PORTION TO BE CONNECTED WITH A COUPLING WITH SHEAR BANDS. (FOR CONNECTIONS DETAILS SEE REPAIR OF EXISTING SANITARY SEWER PIPE DETAIL 900-6).

COUPLING (FOR CONNECTIONS DETAIL SEE REPAIR OF EXISTING SANITARY SEWER PIPE DETAIL 900-6).

GAP IN PIPE NOT TO EXCEED 1/4"

LATERAL

EXISTING PIPE

EXISTING PIPE GAP IN PIPE NOT TO EXCEED 1/4"

A

A

B

B

SEALTITE TYPE "E" MULTI-RANGE WYE SEWER SADDLE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION

SADDLE TYPE CONNECTION MAY BE USED ONLY WITH PRIOR APPROVAL FROM ENGINEER.
CLEANOUT DETAIL
AT SANITARY LATERALS ONLY

SCREW PLUG WITH FLUSH FITTING CAP
FINISHED GRADE

VARIABLE
45° BEND

6" PVC
COMPACTED BACKFILL

PVC PIPE

STANDARD PVC WYE

6" MIN

6" MIN

6"

SANITARY SEWER CLEANOUT DETAIL
NOTES:
A. Septic tanks. When abandoned, shall be dewatered by an accepted sewage hauler and properly filled with granular material. Drain holes shall be broken out on the bottom and sides of the tank when directed by the city.

B. Roof downspouts exterior foundation drains, area way drains or other surface runoff or groundwater shall not be connect to the sanitary sewer main.

C. Basement floor drains and sump pumps, that carry gray water, shall be connected to the sanitary sewer. Foundation drains and all other sump pumps, except as noted above are to be connected to the storm sewer or discharged onto the ground.

D. Any individual or firm installing sewer connections shall be approved by the city.

E. Before beginning work, a sewer tap permit must be obtained from the engineering department and applicable fees must be paid. Also obtain a plumbing permit for building sewer or lateral from the health department.

F. When the building connection must enter into a paved portion of the street sidewalk or alley, a right-of-way opening permit must be obtained from the city street department before beginning work.

G. A permit to block way or street and alley closing permit shall also be obtained from the engineering department.

H. Water services shall be a minimum of 10 feet measured horizontally from the sewer service and shall be a minimum of 18 inches above the crown (whenever possible) of the sanitary sewer main where the water service crosses the sewer main.

Pipe:
A. The pipe material shall be PVC SDR 35 or Schedule 40 utilizing purple primer, or an approved equivalent.

B. Pipe sizes for building connections shall be 4 inch minimum for single residence and 6 inch minimum for all other uses. The laterals shall be run to within 3’ of the outside of the building.

Inspection:
A. A tap inspection shall be required on all new building connections and also on the replacement of existing building connections.

B. When the building sewer is ready for inspection, the plumbing inspector shall be given 24 hours advance notice. The pipe shall be left uncovered until an inspection has been made and approved. The engineering department inspector shall inspect all taps to property line. The plumbing department inspector shall inspect from the property line to 3 feet outside of building.

C. Any new building connection installed without an inspection shall result in no issuance of a water meter for the building. If this occurs, the entire lateral shall be uncovered so that a proper inspection can be made.

D. No tap fee is required if an old building sewer is to be reused. An inspection will be required. The plumbing inspector shall inspect the entire building connection from the cleanout to the property line connection. The lateral shall be inspected from the property line to the sewer main by the wastewater department.

E. If a saddle has been approved, the inspector shall be present while the sanitary sewer main is being cut into a saddle may be used where a tee or wye is not present for lateral connection.

Testing:
A. The onsite licensed plumber shall be responsible for the testing from the connection to the existing service lateral to the cleanout.

B. All new building connections shall be by air with 4 PSA pressure.

C. The sewer test shall be from the cleanout to the property line connection or to the main sewer, whichever is applicable.

D. When a substantial amount of an existing lateral is replaced, the new portion of the lateral shall require a test unless otherwise approved.

Pipe Laying:
A. The open ends of all pipes shall be plugged or otherwise closed with a watertight plug to the approval of the city before leaving the work site for the night.

B. The joining of pipe with concrete shall not be accepted.

C. Before making a connection to an existing sewer or service lateral, the contractor shall check the existing pipe by utilizing a dye test to see that the existing pipe is connected to the sanitary sewer main.

D. In the case where a 90° corner is required in the building connection line, two 45° bends shall be used in lieu of a 90° bend.

E. The building connection line shall be laid in as straight a line, form the building to the existing lateral as possible.

F. All new construction shall have sanitary laterals installed.

G. Minimum slope of sanitary lateral shall be 1% grade (1/8 inch per foot) maximum slope (see 900-7).
LOW PRESSURE AIR TEST

A. AFTER BACKFILLING, THE AIR TEST SHALL BE CONDUCTED BETWEEN TWO CONSECUTIVE MANHOLES. ALL PIPE OUTLETS MUST BE PLUGGED IN THE SECTION BEING TESTED WITH A SUITABLE TEST PLUGS. ONE OF THE PLUGS USED AT A MANHOLE MUST BE TAPPED AND EQUIPPED FOR AN AIR INLET CONNECTION FOR FILLING THE LINE FROM THE AIR COMPRESSOR. AIR SHALL BE SUPPLIED SLOWLY TO THE TEST UNTIL THE INTERNAL PRESSURE REACHES APPROXIMATELY 4 PSI. IF THE PIPE IS BELOW EXISTING GROUNDWATER LEVEL, THE INTERNAL PRESSURE SHALL BE INCREASED BY THE AVERAGE BACK PRESSURE OF ANY GROUNDWATER THAT MAY BE OVER THE PIPE, BUT IN NO CASE SHOULD THE INTERNAL PRESSURE EVER EXCEED 5 PSI.

B. AT LEAST 2 MINUTES SHALL BE ALLOWED FOR THE AIR PRESSURE TO STABILIZE, WHEN THE PRESSURE HAS STABILIZED AND IS AT OR ABOVE 3.5 PSI, THE AIR SUPPLY SHALL BE DISCONNECTED AND TIMING SHALL BEGIN WITH A STOP WATCH. THE STOP WATCH SHALL BE ALLOWED TO RUN UNTIL THE PRESSURE HAS DROPPED 1.0 PSI, IF THE TIME SHOWN ON THE STOP WATCH IS GREATER THAN THE SPECIFIED MINIMUM TIME, THE SECTION SHALL BE CONSIDERED TO HAVE PASSED THE TEST. THE TIME MAY INTERPOLATED FROM THE FIGURES LISTED BELOW.

<table>
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<tr>
<th>PIPE DIA (IN.)</th>
<th>100FT.</th>
<th>150FT.</th>
<th>200FT</th>
<th>250FT</th>
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DEFLECTION TEST

A. DEFLECTION TEST SHALL BE PERFORMED BY THE CONTRACTOR ON ALL FLEXIBLE PIPE. THE TEST SHALL CONDUCT AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS TO PERMIT STABILIZATION OF THE SOIL-PIPE SYSTEM.

B. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. IF DEFLECTION EXCEEDS 5% REPLACEMENT OR CORRECTION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS OF APPROVING AGENCY.

C. THE RIGID BALL OR MANDREL USED FOR THE DEFLECTION TEST SHALL HAVE A DIAMETER NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER OR AVERAGE INSIDE DIAMETER OF THE PIPE DEPENDING ON WHICH IS MANUFACTURED. THE PIPE SHALL BE MEASURED IN COMPLIANCE WITH ASTM D-2122 STANDARD TEST METHOD OF DETERMINING DIMENSIONS OF THERMOPLASTIC PIPE AND FITTINGS. THE TEST SHALL BE PERFORMED WITH MECHANICAL PULLING DEVICES.

MANHOLE VACUUM TEST

ALL SANITARY SEWER MANHOLES SHALL BE VACUUM TESTED BY THE CONTRACTOR USING THE FOLLOWING PROCEDURES FROM ASTM C-1244.

A. PREPARATION OF THE MANHOLE
1. ALL LIFT HOLES SHALL BE PLUGGED.
2. ALL PIPES ENTERING THE MANHOLE SHALL BE TEMPORARILY PLUGGED TAKING CARE TO SECURELY BRACE THE PIPES AND PLUGS TO PREVENT FROM BEING DRAWN INTO THE MANHOLE.

B. PROCEDURE
1. THE FIRST HEAD SHALL BE PLACED AT THE TOP OF THE MANHOLE IN THE CASTING IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS.
3. THE MANHOLE SHALL PASS IN THE TIME FOR THE VACUUM READING TO DROP FROM 10 INCHES OF MERCURY (4.9 PSI) MEETES OR EXCEEDS THE VALUES INDICATED ON THE TABLE.
4. IF THE MANHOLE FAILS THE INITIAL TEST, NECESSARY REPAIRS SHALL BE MADE BY AN APPROVED METHOD. THE MANHOLE SHALL BE RETESTED UNTIL A SATISFACTORY TEST IS OBTAINED.

<table>
<thead>
<tr>
<th>DEPTH (FT)</th>
<th>48 TIME</th>
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ALL TESTS SHALL BE WITNESS BY A CITY OF PIQUA ENGINEERING DEPARTMENT REPRESENTATIVE.
SEWER TELEVISION STANDARDS

A. ALL SEWER TELEVISION CONTRACTORS SHALL BE CERTIFIED BY NASSCO FOR PIPELINE ASSESSMENT AND CERTIFICATION.
B. SANITARY TELEVISION WORK SHALL COMPLY WITH NASSCO STANDARDS.
C. ALL TELEVISION WORK SHALL BE COMPLETED IN COLOR WITH THE PROPER AMOUNT OF ILLUMINATION TO CLEARLY SHOW THE ENTIRE PIPE DIAMETER.
D. THE CAMERA SHALL BE OF THE PAN AND TILT TYPE WITH THE PROPER AMOUNT OF ILLUMINATION TO CLEARLY SHOW THE ENTIRE PIPE DIAMETER.
E. THE DIRECTION OF FLOW SHALL BE CLEARLY SHOWN ON THE MAIN SCREEN.
F. AT THE START OF THE TELEVISION PROCESS, THE DVD SHALL SHOW THE CLOCK POSITION AND DISTANCE FROM MANHOLE FOR EACH LATERAL CONNECTION.
G. THE DIRECTION OF TELEVISION SHALL BE SHOWN ON THE MAIN SCREEN.
H. THE CONTRACTOR SHALL TELEVISION THE SEWER MAIN TO FILL ANY POTENTIAL DIPS/BELLIES.
I. THE CONTRACTOR SHALL MAKE SURE THAT THERE IS NO FLOW EMANATING UPSTREAM. IF SO THE CONTRACTOR SHALL STOP THIS FLOW DURING THE TELEVISION PROCESS.
J. THE OPERATOR SHALL PAN EACH SEWER JOINT AND M. THE OPERATOR SHALL KEEP AN ACCURATE LOG OF THE ADDRESSES OR INTERSECTIONS OF MANHOLE WORKING ON. FOR NEW SEWER CONSTRUCTION.
K. AT NO TIME SHALL THE OPERATOR ALLOW THE CAMERA HEAD TO BE SUBMERGED.
L. THE OPERATOR SHALL NOTE ANY DEFICIENCIES ON THE MAIN SCREEN.
M. THE OPERATOR SHALL KEEP AN ACCURATE LOG CONSISTING OF THE FOLLOWING:
   1. DIAGRAM OF SEWER FROM MANHOLE TO MANHOLE SHOWING DIRECTION OF FLOW.
   2. SHALL NOTATE ALL SEWER LATERALS WITH CLOCK POSITIONS AND DISTANCE FROM MANHOLES.
   3. DEFICIENCIES IN THE SEWER PIPE INCLUDING BELLIES.
   4. SPECIAL NOTES DESCRIBING AREAS OF CONCERN.
   5. ANY DEFICIENCIES NOTED SHALL ACCOMPANY A DIGITAL PHOTO ATTACHED OR INCLUDED IN THE REPORT.

STANDARDS FOR BELLIES/DIPS IN SEWER MAINS

SANITARY SEwers SHALL BE DECLARED AS "NOT APPROVED" IF DIPS/BELLIES IN THE MAIN LINE EXCEEDS THE FOLLOWING CRITERIA:

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>0%</th>
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<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
<th>6%</th>
<th>7%</th>
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SEWER TELEVISION PROCEDURES FOR NEW SEWER CONSTRUCTION

A. THE SANITARY SEWER SHALL BE COMPLETELY CLEAN AND FREE OF DEBRIS USING A HIGH PRESSURE JET RODDER CAPABLE OF SCOURING THE PIPE WALLS.
B. ALL DEBRIS SHALL BE VACUUMED OUT OF THE SEWER MAIN.
C. ONCE CLEANING HAS BEEN COMPLETED, THE CONTRACTOR SHALL TELEVISE THE SEWER MAIN.
D. ONCE CLEANING HAS BEEN COMPLETED, THE CONTRACTOR SHALL TELEVISION THE SEWER MAIN TO FILL ANY POTENTIAL DIPS/BELLIES.
E. ONCE CLEANING HAS BEEN COMPLETED, THE CONTRACTOR SHALL TELEVISION THE SEWER MAIN TO FILL ANY POTENTIAL DIPS/BELLIES.
F. THE CONTRACTOR MAY RENT A WATER HYDRANT METER FROM THE CITY TO PERFORM THIS TASK.
G. THE CONTRACTOR SHALL TELEVISION THE SEWER FOLLOWING THE TELEVISION STANDARDS.

PASSING SANITARY SEWER

A. THE CITY WILL NOT PASS OR ACCEPT THE SANITARY SEWER FOR FINAL PAYMENT WITHOUT HAVING A PASSING DVD AND LOG OF THE SANITARY SEWER TELEVISION FOLLOWING THE STANDARDS PREVIOUSLY DESCRIBED.
B. ALL TELEVISION WORK SHALL BE AT THE CONTRACTORS EXPENSE.
C. THE CITY RESERVES THE RIGHT TO FINAL RE-TELEVISING AT THE CONTRACTORS EXPENSE IF DEFICIENCIES ARE NOTED ON THE INITIAL TELEVISION WORK AND AFTER THE CONTRACTOR MAKES THE NECESSARY REPAIRS.
NOTES

A. NO WORK SHALL BE APPROVED OR ACCEPTED BY THE CITY UNLESS 2 WORKING DAYS NOTICE OF COMMENCING WORK IS GIVEN TO THE CITY.

B. ALL TEMPORARY PAVEMENT AND SIDEWALK SHALL BE MAINTAINED BY THE CONTRACTOR OR DEVELOPER AT HIS OWN EXPENSE IN A SUITABLE AND SAFE CONDITION FOR TRAFFIC UNTIL PERMANENT PLACEMENT IS MADE OR THE PROJECT IS FINALLY ACCEPTED BY THE CITY.

C. ROOF DRAINS, FOUNDATION DRAINS, SUMP PUMPS, AND ALL OTHER CLEAR WATER CONNECTIONS TO THE SANITARY SEWER SYSTEM ARE PROHIBITED.

D. WHEN A SEWER IS TO BE EXTENDED AT THE DOWNSTREAM MANHOLE OR FIRST MANHOLE IS THE NEW LINE, IT SHALL BE PLUGGED BEFORE CONSTRUCTION BEGINS. NO PLUGS SHALL BE REMOVED UNTIL CONSTRUCTION IS COMPLETED AND SOIL IS STABILIZED AND THEN ONLY AS DIRECTED BY THE CITY.

E. CONSTRUCTION OF SANITARY SEWERS SHALL INCLUDE THE CITY DYE TESTING AS DETERMINED BY THE CITY OF ALL PIPES TO BE CONNECTED TO THE NEW SEWER PRIOR TO BACKFILLING.

F. WHEN A CASTING OR OTHER PUBLIC PROPERTY IS ABANDONED IT REMAINS CITY PROPERTY, UNLESS OTHERWISE DIRECTED.

G. SANITARY SEWERS MUST HAVE EPA PLAN APPROVAL OR ANY SANITARY SEWER THAT IS RELOCATED OR RESIZED.

EXCAVATION AND PIPE LAYING

A. THE LAYING OF THE PIPE SHALL COMMENCE AT THE LOWEST POINT, THE THE BELL END LAID UPGRADE. THE PIPE SHALL BE CENTERED IN THE TRENCH AND ALL PIPE SHALL BE LAID WITH ENDS ABUTTING AND TRUE TO LINE AND GRADE.

B. LASER SHALL BE USED INSIDE THE PIPE.

UTILITY STAKING

A. LASER METHOD- OFFSET AND GRADE AT EACH MANHOLE, OFFSET AND GRADE 50 FEET AND 100 FEET OUT FROM EACH MANHOLE UNLESS OTHERWISE APPROVED.

TESTING- ALL PHASES PERFORMED BY CONTRACTOR OR DEVELOPER

A. BEFORE ANY SEWER LINE IS PLACED INTO SERVICE OR ACCEPTED BY THE CITY, IT SHALL BE SUBJECTED TO AND PASS LOW PRESSURE AIR TEST. EACH RUN BETWEEN MANHOLES, WITH SERVICE LATERALS STUBBED INTO PROPERTY LINES, SHALL BE TESTED BEFORE BEING ACCEPTED. THE CONTRACTOR OR DEVELOPER SHALL FURNISH ALL EQUIPMENT AND MATERIAL NECESSARY TO CONDUCT THIS TEST. THE TRENCH SHALL BE COMPLETELY BACKFILLED BEFORE TESTING.

B. SEE SANITARY SEWER TESTING NOTES (PAGE 900-11)

C. BEFORE FINAL ACCEPTANCE BY THE CITY AND BEFORE ANY SERVICE LINE IS PUT INTO USE, ALL SANITARY SEWER AND MANHOLES SHALL BE THOROUGHLY CLEANED OF ALL FOREIGN MATTER BY USE OF A SEWER-JET OR EQUAL. TYPE OF EQUIPMENT BY THE CONTRACTOR. SEWER JET PROCEDURE MUST BE PERFORMED BEFORE CONTRACTOR T.V. TESTS THE PIPE.

D. SEE SANITARY SEWER TESTING NOTES ( PAGE 900-12)

HOUSE CONNECTIONS

A. NO SERVICE LINE SHALL BE ALLOWED TO CONNECT DIRECTLY INTO A MANHOLE. SUBJECT TO APPROVAL BY THE CITY IN SPECIFIC CASES.

B. THE ENDS OF ALL SERVICES LINES OR TEES SHALL BE ACCURATELY LOCATED, MAPPED AND GIVEN TO THE CITY WITHIN 15 DAYS AFTER INSTALLATION.

C. BEFORE MAKING A CONNECTION TO AN EXISTING SEWER TAP OR SEWER LATERAL, THE CONTRACTOR SHALL CHECK THE EXISTING PIPE BY UTILIZING A SEWER EEL, STRAP, OR A ROD TO SEE THAT THE EXISTING PIPE IS CONNECTED TO THE MAIN SEWER. IF NEEDED, THE CONTRACTOR MAY NEED TO USE A HYDRAULIC SEWER CLEANER.

D. LATERALS FROM THE MAIN TO THE PROPERTY LINE SHALL BE 6 INCHES MINIMUM WITH CLEANOUT AT THE PROPERTY LINE.

E. A RIGHT-OF-WAY PERMIT TO OPEN INTO, ALTER, OR DISTURB ANY PUBLIC SEWER MUST BE OBTAINED.

F. IN THE DEMOLITION OF EXISTING BUILDING, ALL ABANDONED SEWER LATERALS SHALL BE CAPPED AT THE OWNER’S EXPENSE.

PIPE

A. ALL MAINLINE PIPE AND SPECIALS SHALL BE PVC SDR-35 UNLESS OTHERWISE APPROVED BY THE CITY. MINIMUM DIAMETER OF PIPE SHALL BE 8 INCHES.

B. DUCTILE IRON PIPE WILL BE USED IN STREAM CROSSINGS AND WHERE MAXIMUM SEPARATION CANNOT BE MAINTAINED OR WHEN THE DEPTH OF SEWER EXCEEDS 25 FEET.

C. ALL JOINTS SHALL BE OF THE BELL AND SPIGOT TYPE, THE BELLS BEING FORMED INTEGRALLY WITH THE PIPE. THE BELL SHALL CONTAIN A FACTORY INSTALLED ELECTROMETRIC GASKET WHICH IS POSITIVELY RETAINED. NO SOLVENT CEMENT JOINTS WILL BE PERMITTED IN FIELD CONSTRUCTION EXCEPT AS SPECIFICALLY AUTHORIZED BY THE CITY.

FLEXIBLE PIPES

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<th>FLEXIBLE PIPES</th>
<th>MATERIAL SPECIFICATIONS</th>
<th>JOINT SPECIFICATIONS</th>
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<tr>
<td>POLYVINYL CHLORIDE</td>
<td>ASTM D-3034 ( SDR-35) PIPE STIFFNESS= 46 PSI</td>
<td>ELASTOMERIC GASKET ASTM D-3212</td>
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<tr>
<td>DUCTILE IRON</td>
<td>ANSI A-21.51 &amp; AWWA C-151</td>
<td>ANSI A-21.11 AWWA C-111</td>
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1. SDR= OUTSIDE DIAMETER DIVIDED BY WALL THICKNESS.

2. THE SPECIFICATIONS ABOVE SHALL BE THOSE MOST RECENTLY ADOPTED BY THE APPROPRIATE STANDARDS SETTING ORGANIZATION.
THE CONTRACTOR SHALL SUPPLY THE FOLLOWING INFO TO THE SATISFACTION OF THE CITY

1. HORIZONTAL DISTANCE OF TEE TO DOWNSTREAM MANHOLE.
2. HORIZONTAL DISTANCE OF SERVICE CONNECTION END TO DOWNSTREAM MANHOLE ALONG SEWER.
3. PERPENDICULAR DISTANCE FROM SEWER TO SERVICE CONNECTION END.
4. DEPTH OF SERVICE CONNECTION END FLOW LINE TO ORIGINAL GROUND.
5. ELEVATION OF SERVICE CONNECTION END FLOW LINE.
6. ELEVATION OF BACK OF CURB OR SOME OTHER REFERENCE POINT ABOVE LATERAL.

EXAMPLE
1. 275'
2. 290'
3. 35'
4. 8.9'
5. 942.9
TO BE COMPLETED BY THE CONTRACTOR FOR EACH BUILDING SEWER

SAMPLE SITE SKETCH. GIVE DIMENSIONS FOR ALL UNDERGROUND PIPES. MAKE A DIFFERENT SKETCH FOR EACH UTILITY, IF NEEDED. FOR EXAMPLE, IF THIS HOUSE HAD DOWN SPOUT LEADERS, A SEPARATE STORM SHEET WOULD BE NEEDED.
MAINTENANCE OF FLOW IN EXISTING SEWERS AND DRAINS

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to maintain wastewater and/or storm drainage flow in all public and private pipes, including individual service connections, during construction.

B. Construct and maintain all temporary bypass sewers and drains and be responsible for all bypass pumping of sewage and drainage that may be required to prevent backing up of sewage and allow for proper inspection, rehabilitation, testing, or drainage during pipe replacement, installation of new pipe lining, or related rehabilitation work. The contractor shall immediately remove and dispose of all offensive matter spilled during the bypass pumping at his own expense.

1.02 SUMITTLALS

A. The contractor shall submit to the engineer a schedule to complete the work. It will include the sequencing and coordination of pipeline cleaning, inspection, rehabilitation, construction, testing, mainhole rehabilitation, and the handling of wastewater flow and drainage during these activities.

B. The contractor shall submit to the engineer, for approval, a detailed written plan of all methods of flow maintenance ten (10) days in advance of flow interruption. All procedures for maintaining flows, including weekend operations and other extended periods of time, must meet the approval of the engineer.

1.03 EXECUTION

When the bypass pumping is required the contractor shall supply all necessary pumps, piping, connections, and temporary power required to divert the flow of sewage or drainage around the area in which work is being performed. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during a rain event.

A. The contractor shall supply completely redundant bypass pumping for capacity in the event of pump failure.

B. Inflatable plugs or temporary dams may be installed in the sanitary or storm drainage system to temporarily block the flow on the suction side of the bypass pumping setup.

C. The suction or discharge piping or tubing from a bypass pumping setup shall not adversely interfere with pedestrian or vehicular traffic.

D. Discharge from the bypass pumping setup shall be below ground and preferably into the normal flow path of the receiving sanitary sewer to deduce odors.

E. All flows from all public, private, commercial, and industrial users shall be handled without interruption by the contractor during rehabilitation of the sanitary or storm drainage system.

F. The contractor shall be required to repair at his own expense any damage to public property, private property, or the sanitary and storm drainage system caused by his operations.

G. The contractor shall not be permitted to overflow, bypass, pump or by any other means convey drainage to any land, street, storm drain or water course.