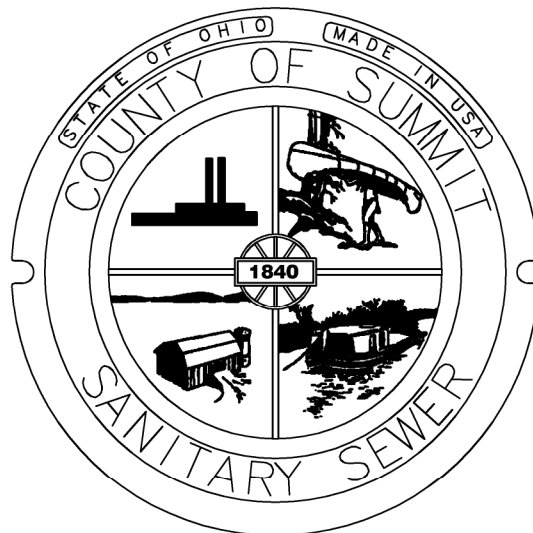


Standard Construction Drawings and Procedures for Sanitary Sewers



**Department of Sanitary Sewer Services
1180 South Main St. Akron, Ohio 44301**

Ross A. Nicholson, P.E.

APPROVED BY

Ross A. Nicholson, PE
DEPUTY DIRECTOR

DATE 09/15/15

**SUMMIT COUNTY
DEPARTMENT OF SANITARY SEWER SERVICES**

**STANDARD CONSTRUCTION DRAWINGS
and PROCEDURES for SANITARY SEWERS**

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10. **DEFLECTION TEST:**

2B

Deflection tests shall be performed on all flexible pipe, and shall be conducted after the final backfill has been in place at least 30 days to permit stabilization of the soil-pipe system, as directed by the Summit County Department of Sanitary Sewer Services (DSSS). Deflection tests shall be performed in the presence of and approved by the DSSS. Deflection tests shall be performed without mechanical pulling devices.

No pipe shall exceed a deflection of 5 percent of the inside diameter. If the deflection exceeds 5 percent the pipe shall be excavated, corrected, and/or replaced as necessary. Replacement and correction of the pipe shall be accomplished in accordance with the County's standard specifications and details at the Contractor's expense.

The rigid ball or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe, depending upon which is specified in the ASTM Specification (including appendices) to which the pipe is manufactured. The device used for the deflection test shall be of material and construction appropriate for use with the pipe being tested.

STANDARD DETAIL DWG. NO. 2B
DEPARTMENT OF SANITARY SEWER SERVICES
GENERAL NOTES
APPROVED BY <i>Ross A. Johnson, PE</i>
DEPUTY DIRECTOR
DATE <u>09/15/15</u>

2B

GENERAL NOTES

PERMISSION TO CONSTRUCT SANITARY SEWERS IS GRANTED BY THE STATE OF OHIO ENVIRONMENTAL PROTECTION AGENCY (O.E.P.A.), THE COUNTY OF SUMMIT DEPARTMENT OF SANITARY SEWER SERVICES (D.S.S.S.) AND THE COUNCIL OF THE COUNTY OF SUMMIT WHEN APPROPRIATE. THE D.S.S.S. HAS AUTHORITY TO STOP ANY SANITARY SEWER CONSTRUCTION NOT IN COMPLIANCE WITH CURRENT REGULATIONS AND STANDARDS.

1. The attached standard construction drawings are derived from “ Recommended Standards for Wastewater Facilities “, latest edition (known as " The Ten States Standards ") as established by the Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (GLUMRB) and as amended by the Summit County Commissioners Resolution No. 294-75. If no applicable standard is attached, the Ten States Standards will apply.
2. All work shall be directed by a competent engineer, licensed by the State of Ohio.
3. All construction shall be inspected by the D.S.S.S. and the cost of that inspection shall be borne by the project.
4. No sewer construction shall occur prior to the project plan and specification approval by the D.S.S.S., the O.E.P.A. and local regulatory agencies as applicable.
5. Any and all plan revisions shall be approved by the D.S.S.S. prior to implementation.
6. All sewers 6 through 12 inches in diameter shall be tested by the low pressure air test method as outlined in the applicable ASTM standards. All sewers 15 inches and greater diameter shall be tested by the most practical method. Acceptable test methods are:
 - a. Low Pressure Air Test
 - b. Infiltration Test
 - c. Exfiltration TestThe test method selection shall be based on the existing ground water conditions and other facts pertinent to the particular project and shall be approved by the Engineer .
7. Sewers shall be inspected in accordance with the standard for " Internal Video Inspection of Sanitary Sewers " and the cost of that inspection shall be borne by the project.
8. No “ Permit To Connect “ to the project shall be issued prior to the approval by D.S.S.S. of all project work, documentation, testing, inspection and measurement.
9. No footer drains, down spouts, sump pumps or other clean water sources shall be connected to the sanitary sewer as prohibited by Summit County Ordinance No. 85-656, as approved October 08, 1985.

ACCEPTABLE MATERIALS AND SUPPLIERS

ASTM and AWWA Specification numbers refer to the latest version thereof. Other standards shall apply by reference although not specifically stated herein.

1. Concrete Pipe - ASTM C-76, C-443, C-507, C-655
 - a. Hanson Pipe and PreCast Company
 - b. Independent Concrete Pipe Company
 - c. Superior Concrete Pipe Company

2. Ductile Iron Pipe and Fittings - AWWA C-110, C-115, C-116, C-151; ASTM A-746
 - a. American Cast Iron Pipe Company
 - b. Clow Corporation
 - c. U.S. Pipe Company

3. PVC Pipe and Fittings - ASTM D-3034, F-679, F-789, F-794, F-949
 - a. Certain-Teed Products Corporation
 - b. Harco Fittings
 - c. Heritage Plastics Pipe
 - d. JM Eagle
 - e. Plastic Trends

4. Truss Pipe - ASTM D-2680
 - a. Contech

5. Vitrified Clay Pipe - ASTM C-301, C-425, C-700
 - a. Logan Clay Pipe
 - b. United Pipe Supply
 - c. Superior Clay Products

6. Precast Concrete Manholes - ASTM C-478, C-497, C-923
 - a. Lindsay Concrete Products
 - b. Mack Industries
 - c. Migchelbrink Precast Concrete

7. Manhole Frames and Covers - ASTM A-48

- a. EJ Company fka
- b. Neenah Foundry

8. Flexible Pipe Entries - ASTM C-923

- a. Kor - N - Seal
- b. A - Lok Corp

9. Internal Video Inspection

- a. DynAmerican
- b. Great Lakes
- c. Lake County Sewer
- d. United Survey, Incorporated

10. Pressure Pipe & Fittings - ASTM D-1785, D-2241, AWWA C-900, C-905, C-909

- a. JM Eagle
- b. National Pipe & Plastic

11. PE Pipe and Fittings - ASTM D-1248, D-3350, F-714, F-2736, AWWA C-906

- a. Advanced Drainage Systems
- b. Isco Industries
- c. National Pipe & Plastic

12. Pumps

- a. Flygt
- b. HydroMatic
- c. Myers
- d. Essco

STANDARD
DETAIL DWG. NO. 3B

DEPARTMENT OF
SANITARY SEWER SERVICES

ACCEPTABLE MATERIALS
AND SUPPLIERS

APPROVED BY

Ross A. Scholten, PE
DEPUTY DIRECTOR

DATE 09/15/15

INTERNAL VISUAL INSPECTION POLICY AND PROCEDURES

I. GENERAL

- A. All gravity sanitary sewer extensions, repairs and replacements, 8 inches and larger in diameter, shall be subject to an internal visual inspection after the completion of construction. The internal visual inspection shall document the sewer condition and consist of an audio-visual recording and written report. The recording and report shall be submitted by the internal inspection contractor directly to the Department of Sanitary Sewer Services for review, approval and permanent record. Submittals from developers, engineers or any other contractor associated with the sewer installation shall be rejected.
- B. The condition of a sewer system shall be proven satisfactory by the internal inspection, as well as other tests required by DSSS as stated in the General Notes, prior to its placement into service.
- C. It is suggested that the entire new sewer system be thoroughly cleaned by jetting or other appropriate method immediately prior to the inspection. Should any amount of mud, water, debris, foreign material, identifiable or otherwise, or other obstructions to or the viewing of the sewer be found, the system must be re-cleaned and re-inspected. The Project Inspector Supervisor shall make the determination of the sewer condition, the necessity of repair or replacement of the sewer and the necessity of additional internal inspections.
- D. Under normal circumstances a DSSS Project Inspector need not be present for sewer cleaning or internal inspection. However, the DSSS Project Inspector Supervisor must be notified of the intent to perform the inspection prior to 9:00 a.m. on the day preceding the anticipated inspection.
- E. All lines, strings, ropes, plugs and paraphernalia necessary for the performance of the internal visual inspection shall be removed from the sewer system. Any damage to the new or existing sewers, any loss suffered by a county sewer customer and any other incidental damages resulting from the internal inspection or its paraphernalia shall be remedied by the internal inspection contractor.
- F. All costs of the internal inspection, re-inspection, repairing, cleaning, etc. shall be paid by the sewer installation contractor prior to the sewer system acceptance for ownership by Summit County, including any damage claims per Section I-E.
- G. All internal inspection shall be done by persons or firms qualified and approved by DSSS. Inferior work will be rejected. Multiple rejections will be cause for the suspension of acceptance by DSSS of the firm's work until the correction of the deficiencies has been proven.

- H. The use of air, whether pressurized or vacuum, to remove residual water or debris from the sewer cleaning operation is not acceptable.

II. VIDEO RECORDING

- A. The visual recording shall be in color showing continuous coverage of the sanitary sewer from one manhole to the next manhole. The color shall be a good rendition of the sewer installed in the opinion of DSSS.
- B. The recording shall be in good focus and have adequate but not excessive lighting. The light intensity shall be adjusted to assure a quality viewing of the pipe surface and observation of changes in color and material of the surface. This section does not represent approval of the use of different color pipe.
- C. The recording shall be free of video "noise" in the form of snow, streaks, migrating color or focus patterns or other electronic interference which may hinder observation of the sanitary sewer.
- D. The recording of any sewer inspection shall be continuous with no breaks in the recording operation.
- E. The recording shall show the actual length of the sewer at the top center of the image. Obstruction of the view of the pipe invert shall result in the rejection of the recording.
- F. The camera drag line shall not obstruct the view of the flow line of the pipe.
- G. The view shall be clear and unobstructed by dirt, water, condensation or vapor on the camera lens or in the sewer. See Section I-C for cleaning and re-inspection requirements.
- H. The visual recording shall be augmented with an audio recording of the inspector's narration calling out the nomenclature of the sewer system, the pipe, manholes, wyes, debris, mud, water, bad joints, crack damage or deformed pipe, joints or fittings or any other observation that may be of use to the assessment of the sewer condition. The narration shall be clear, concise, and loud enough to overcome any background noise from machinery or equipment. The narration shall begin with the identification of the pipe, the distance from the downstream manhole of the sewer then the identification of each and every observation. The camera shall stop at each observation at the discretion of the recording firm as to the significance of the observation and its severity (or the inability to identify) to warrant reversing the camera one or more times to provide a better view.

- I. The camera view shall be looking upstream so that the butt-ends of the pipe spigot will show clearly.
- J. The camera direction of travel shall be upstream.
- K. The video inspection sequence shall be from the lowest manhole to the farthest upstream "terminal" manhole. Each subsequent branch shall be recorded from a manhole already recorded to the terminal manhole of the branch.
- L. At each manhole video annotation and audio narration shall be presented identifying in a uniform manner the following :
- 1) Beginning Manhole Number from the approved construction drawing set
 - 2) Manhole Number to which the camera is about to approach
 - 3) Project Name and Number
 - 4) Street Name
 - 5) Date of recording
 - 6) Size and material of pipe.
- M. Each project or phase shall be recorded separately and supplied to DSSS on separate media. Recordings of the same phase submitted on multiple pieces of media shall be rejected unless the size of the project prevents its submittal on one single piece of media.
- N. Each recording shall be marked with the following :
- 1) Project Name, Phase and Number
 - 2) Township or City in which the Improvement is located
 - 3) Developer's Name
 - 4) Installation Contractor's Name
 - 5) Internal Inspection Company Name, Address and Telephone Number
 - 6) Date of Submittal and Date of Inspection
 - 7) Number of pieces of media being submitted.
- O. Each recording submittal shall be accompanied with a report describing the media and its contents. See Section III REPORT for requirements.

III. REPORT

- A. Each recording of an internal visual inspection shall be submitted to DSSS with an accompanying report on 8-1/2 by 11 inch paper with a cover sheet.
- B. The report cover sheet for a recording submittal shall include the following :
- 1) Project Name, Phase and Number
 - 2) Township or City in which the Improvement is located
 - 3) Developer's Name
 - 4) Installation Contractor's Name
 - 5) Internal Inspection Company Name, Address and Telephone Number
 - 6) Date of Submittal and Date of Inspection
 - 7) Number of pieces of media submitted.
- C. The report shall contain a map of the subdivision, streets or easements showing the general layout of the improvement. The map shall include no less than :
- 1) Project Name, Phase and Number
 - 2) Township or City in which the Improvement is located
 - 3) Developer's Name
 - 4) Street Names and Rights-Of-Way identifications matching the names on the approved construction drawing set.
 - 5) North Arrow
 - 6) Scale
 - 7) Manhole numbers or names from the approved construction drawing set
 - 8) Intended flow directional arrows.
- D. The report shall include a separate sheet for each sewer (manhole to manhole) containing detailed information of that specific sewer. Each sheet shall include no less than :
- 1) Inspection Company Name
 - 2) Project Name, Phase and Number
 - 3) Township or City in which the Improvement is located
 - 4) Internal Inspection Media
 - 5) Date of the internal inspection
 - 6) Size and material of sewer pipe
 - 7) Inspection beginning and ending construction station numbers
 - 9) Inspection beginning and ending manhole names or numbers, from the map and the approved construction drawing set
 - 10) Total length of the sewer pipe, in feet.

E. The specific information to be included for each sewer shall be in a columnar tabular form indicating the distance from the previous manhole and a description of each and every observation. These columns shall be marked to indicate each and every observation of the following conditions at a minimum:

- 1) Beginning manhole identification name or number
- 2) Service connection called as either left or right or by o'clock ONLY
- 3) Abnormal pipe joints such as open or partially open, cracked, excessive glue, gasket exposure, leaking, defects
- 4) Abnormal pipe such as cracked, leaking, damaged, deflected
- 5) Obstructions such as mud, stones, leaves, paper, tools
- 6) Standing water starting point.
- 7) Standing water ending point
- 8) Submergence of camera
- 9) Blocked pipe preventing camera travel
- 10) Change of pipe material or color
- 11) Water vapor (See Section II-G)
- 12) Other events either ordinary or extra-ordinary
- 13) Ending manhole identification name or number.

STANDARD
DETAIL DWG. NO. 4E

DEPARTMENT OF
SANITARY SEWER SERVICES

INTERNAL VISUAL
INSPECTION POLICY
AND PROCEDURES

APPROVED BY

Ross A. Schobert, PE

DEPUTY DIRECTOR

DATE 09/15/15

INFILTRATION/EXFILTRATION TEST PROCEDURE

5A

The Contractor shall conduct tests to determine the water tightness of the gravity sewer when completed. The tests shall be observed by the Engineer, but the Contractor shall furnish all labor, equipment and materials required in connection herewith.

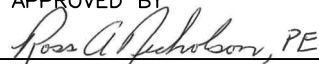
It is agreed that the sewer shall be tested in sections, each section extending between two adjacent manholes or from the end of the sewer to nearest manhole. The Contractor may elect to use either an infiltration test, an exfiltration test, or the low pressure air test (see Sheet 6), with the approval of the Summit County Department of Sanitary Sewer Services.

A. Infiltration Test

Each section under test shall be covered with not less than two (2) feet of water above the top of the pipe at the highest point. The infiltration will be measured by means of weir located in the downstream manhole. The above head of two (2) feet shall be maintained for a period of not less than twenty-four (24) hours before the weir measurements are made.

B. Exfiltration Test

The sewer at the upstream side of the lower manhole and the upstream side of the upper manhole in each section shall be closed with a watertight bulkhead and the sewer filled with water until the water elevation in the upstream manhole is not less than two (2) feet above the top of the sewer pipe or two (2) feet above ground water elevation in the trench, whichever is higher. The exfiltration will be determined by measuring the amount of water required to maintain the above stated water elevation for a period of one (1) hour from the start of the test. The entire length of section to be tested shall be filled and maintained full of water for a period of approximately twenty-four (24) hours prior to the start of the test.

STANDARD DETAIL DWG. NO. 5A
DEPARTMENT OF SANITARY SEWER SERVICES
INFILTRATION EXFILTRATION TEST PROCEDURE
APPROVED BY  DEPUTY DIRECTOR
DATE <u>09/15/15</u>

5A

C. Allowable Infiltration or Exfiltration

The amount of infiltration or exfiltration shall not exceed 100 gallons per inch of pipe diameter per twenty-four (24) hours per mile of sewer in each and every section tested in accordance with the above.

D. Testing Requirements

In the event the allowable leakage rates are not met, the Contractor shall determine the location(s) where excess water is entering the sewer or leaving the sewer. The sewer and/or the manholes shall be repaired in manner satisfactory to the Summit County Department of Sanitary Sewer Services and retested until the leakage in the sewer is within the allowable limits.

The Contractor shall include in the price bid per lineal foot of sewer, the cost of all bulkheads, plugs, pipe stoppers, pumps, water, weirs, accessories, labor, delay and any other items of cost necessary for the performance and the completion of the required leakage tests and for the cost of the any repairs or adjustments which may be necessary to make the sewer conform to the required allowable leakage rates (for public projects only).

All leakage test shall be conducted under the supervision of the Summit County Department of Sanitary Sewer Services.

It is understood that each section, as above described, must be tested under the supervision of the Summit County Department of Sanitary Sewer Services for conformity to these requirements before such section or sections are included in any current or final estimate for payment to the Contractor, (for public projects only). It is further understood that, if the leakage does not come within the limits specified, the Contractor will be required to do such work as may be necessary in order to insure conformance even to the extent of reconstructing the defective section or sections.

STANDARD
DETAIL DWG. NO. 5B

DEPARTMENT OF
SANITARY SEWER SERVICES

INFILTRATION
EXFILTRATION
TEST PROCEDURE

APPROVED BY

Ross A. Schobert, PE
DEPUTY DIRECTOR

DATE 09/15/15

LOW PRESSURE AIR TEST PROCEDURE

In lieu of performing an infiltration or exfiltration test to determine the water tightness of the sewer, the Contractor may elect to perform a low pressure air test by the Ramseier procedure, as recommended by the National Clay Pipe Institute (NCPI).

Ramseier's method of conducting acceptance tests may be separated into two parts, one having to do with field procedure and the other having to do with the determination of pressure holding time.

Field Procedures

1. Clean pipe to be tested by propelling snug fitting inflated rubber ball through the pipe with water, by jetting, or by other method approved by the Summit County Department of Sanitary Sewer Services.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in ground water, insert a pipe probe, by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.

In ground water conditions, the standard air test is not reliable if adjustments are not made. The following standard should be followed where applicable. For every foot of water over the top of the sanitary sewer 0.4333 PSI should be added to our standard 4.0 PSI.

Where heavy ground water conditions prevail, contractor should be notified that he may air test at 4.0 PSI immediately after a run is completed (M.H. to M.H.), while his pumps are still operating, (holding ground water below sanitary sewer), otherwise, 0.4333 PSI per foot of water above sanitary sewer will be added when air test is performed at a later date.

DATE 09/15/15

testing requirements before it is accepted by DSSS and/or, on public projects, is included in any current or final estimate for payment to the Contractor.

SANITARY FORCE MAIN TESTING AND PUMP STATIONS

Sanitary force mains shall be subject to post-construction leakage and pressure tests prior to acceptance by the DSSS. Tests shall conform to appropriate ASTM testing standards based upon system design pressures and operating conditions, and specific force main material type. Necessary repairs and replacements shall be the responsibility of the Contractor.

Site tests for emergency generators, where required, shall include a full rated load test of two (2) hours duration utilizing a resistive load bank furnished by the generator set manufacturer, and conducted by the generator set manufacturer's representative in accordance with the manufacturer's standard procedures and requirements.

STANDARD
DETAIL DWG. NO. 6B

DEPARTMENT OF
SANITARY SEWER SERVICES

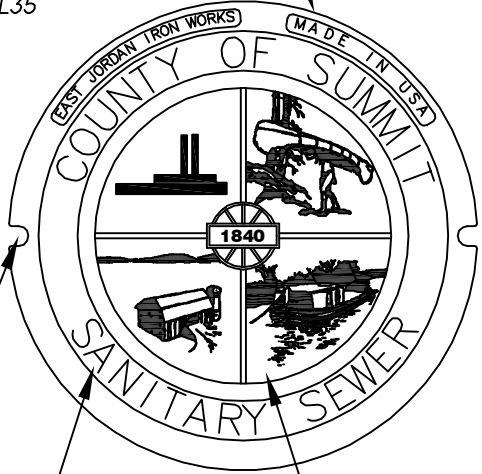
LOW PRESSURE AIR TEST
PROCEDURES AND FORCE
MAIN TESTING

APPROVED BY

Rosa A. Nicholson, PE
DEPUTY DIRECTOR

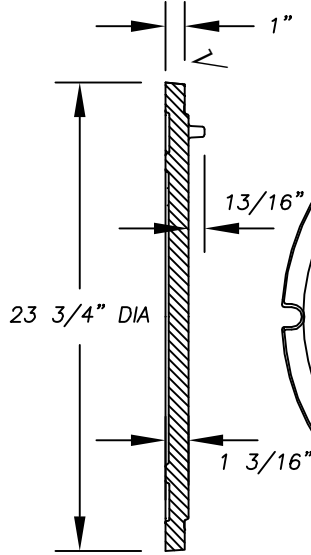
DATE 09/15/15

PRODUCT NO. 00145073
 EST. WT. COVER 120 LBS
 MATERIAL SPEC. COVER - GRAY IRON
 ASTM A48 CL35

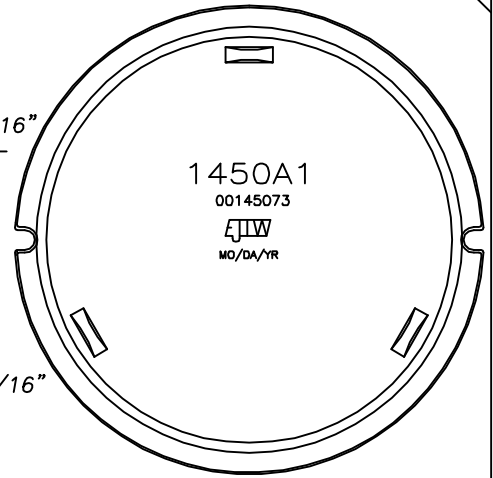


CUSTOM LOGO
 1 1/2" LETTERS (RECESSED FLUSH)

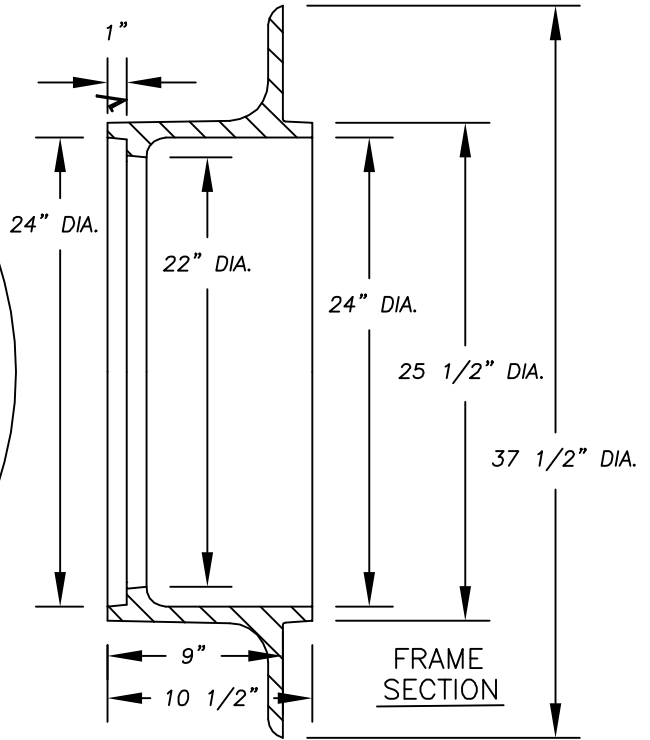
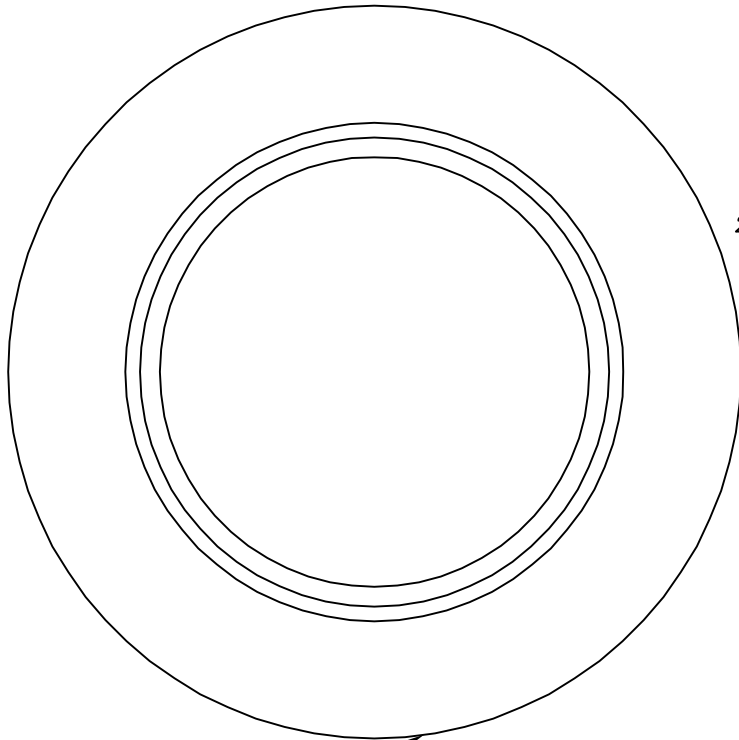
(2) OPEN PICKHOLES (SEE DETAIL)



COVER SECTION



BOTTOM VIEW OF COVER

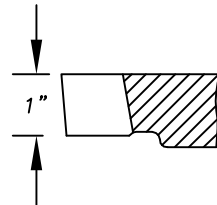


FRAME SECTION

EAST JORDAN IRON WORKS
 PRODUCT NO. 0020210
 EST. WT. FRAME 305 LBS.
 MATERIAL SPEC. FRAME - GRAY IRON
 ASTM A48 CL35

*ACCEPTABLE ALTERNATIVES

M.A. INDUSTRIES, INCORPORATED-
 PLASTIC COATED
 NEENAH FOUNDRY COMPANY-
 CAST IRON
 ALUMINUM



PICKHOLE DETAIL

√ MACHINED SURFACE

STANDARD
 DETAIL DWG. NO. 7

DEPARTMENT OF
 SANITARY SEWER SERVICES

MANHOLE
 FRAME
 AND COVER

APPROVED BY

Ross A. Scholten, PE
 DEPUTY DIRECTOR

DATE

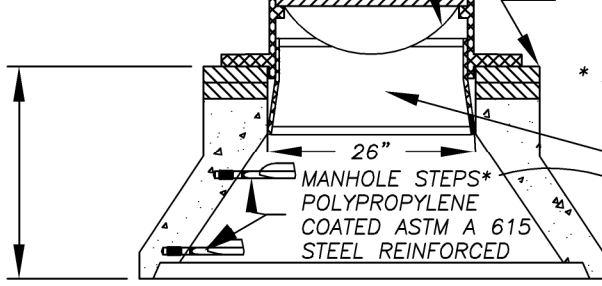
09/15/15

STD. MH. C.I. FRAME & COVER, ASTM A - 48, SET IN 1-1/2" OF BITUMINOUS SEAL UNDER ENTIRE CASTING OR AS REQUIRED

MANHOLE COVER INSERT BY CONTRACTOR SPECIALTY SUPPLY OR APPROVED EQUAL

ADJUST TO GRADE WITH AT LEAST ONE 26" I.D. PRECAST GRADE RING OR RUBBER RISER RING. TWELVE INCH MAXIMUM ADJUSTMENT PERMITTED.
* RUBBER RISER RING REQUIRED IN PAVEMENT AS MANUFACTURED BY EUJW (INFRA-RISER) OR APPROVED EQUAL
* ADJUSTING RING #1450H BY EUJW AS NECESSARY

CONCENTRIC CONE SECTION ASTM C - 478



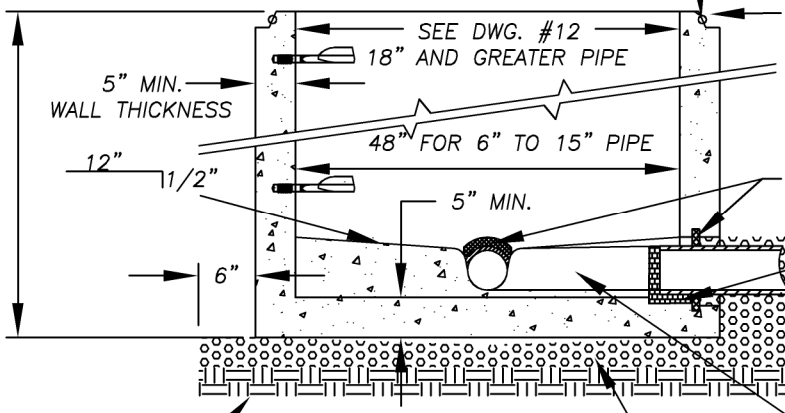
INTERNAL CHIMNEY SEAL BY CRETEX SPECIALTY PRODUCTS OR APPROVED EQUAL

* ACCEPTABLE MANHOLE STEPS: AMERICAN STEP CO. ML - 10 M.A. INDUSTRIES INC. PS1 - PF NEENAH FOUNDRY COMPANY- CAST IRON OR ALUMINUM

JOINTS BETWEEN SECTIONS SHALL BE RUBBER GASKET PER ASTM C-443 (TYP. ALL MANHOLE UNIONS)

ALL MATING AND THE EXTERIOR SURFACES OF THE MANHOLE SECTION SHALL BE SEALED WITH A BITUMASTIC MATERIAL

PRECAST CONCRETE FOUNDATION SLAB & RISER ASTM C - 478



FLEXIBLE PIPE TO MANHOLE CONNECTOR, PER ASTM C - 923 A-LOK X-CEL

NON-SHRINK GROUT

3000 P.S.I CONCRETE BENCH WITH STEEL TROWEL FINISH WITH FORMED CHANNEL (INVERT) TO DIRECT FLOW

COMPACTED SUBGRADE

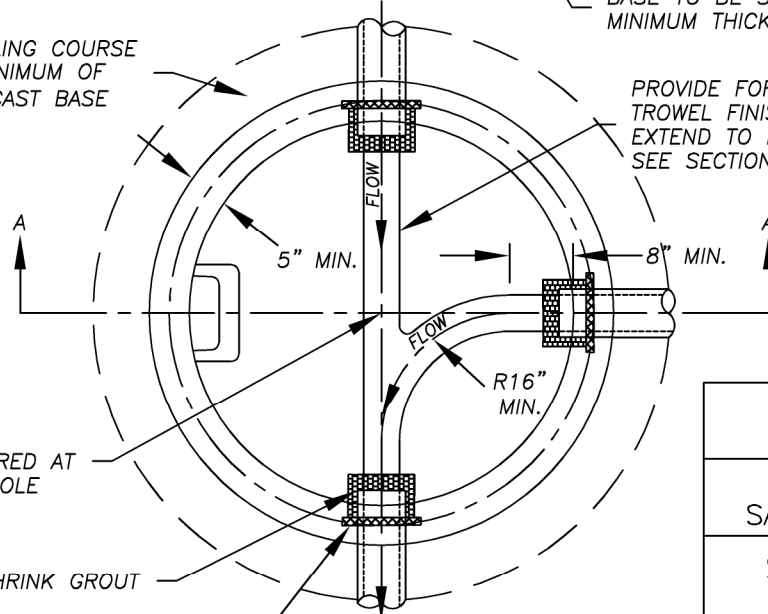
SECTION A - A

BASE TO BE SET ON BED OF #57 LIMESTONE MINIMUM THICKNESS 6 INCHES

LIMESTONE LEVELING COURSE TO EXTEND A MINIMUM OF 6" BEYOND PRECAST BASE

PROVIDE FORMED CHANNEL INVERT WITH STEEL TROWEL FINISH TO DIRECT FLOW. CHANNEL TO EXTEND TO FULL HEIGHT OF PIPES SEE SECTION A-A

SEE DRAWING NO. 10 FOR MANHOLES LESS THAN 6' 3" DEEP



INVERT ELEVATION SHALL BE MEASURED AT CENTER OF MANHOLE

NON-SHRINK GROUT

FLEXIBLE PIPE TO MANHOLE CONNECTOR, PER ASTM C - 923 A-LOK X-CEL.

* RADIUS = 1.5 x DIAMETER FOR PIPE DIAMETERS GREATER THAN 10"

PLAN PRECAST BASE

STANDARD DETAIL DWG. NO. 8
DEPARTMENT OF SANITARY SEWER SERVICES
STANDARD MANHOLE WITH PRECAST CONCRETE BASE
APPROVED BY <i>Ross A. Schubert, PE</i> DEPUTY DIRECTOR
DATE 12/29/16

STD. MH. C.I. FRAME & COVER, ASTM A - 48, SET IN 1-1/2" OF BITUMINOUS SEAL UNDER ENTIRE CASTING OR AS REQUIRED

MANHOLE COVER INSERT BY CONTRACTOR SPECIALTY SUPPLY OR APPROVED EQUAL

ADJUST TO GRADE WITH AT LEAST ONE 26" I.D. PRECAST GRADE RING OR RUBBER RISER RING. TWELVE INCH MAXIMUM ADJUSTMENT PERMITTED.
* RUBBER RISER RING REQUIRED IN PAVEMENT AS MANUFACTURED BY EJIW (INFRA-RISER) OR APPROVED EQUAL
* ADJUSTING RING #1450H BY EJIW AS NECESSARY

CONCENTRIC CONE SECTION ASTM C - 478

16" TYP.

26"

MANHOLE STEPS POLYPROPYLENE COATED ASTM A 615 STEEL REINFORCED

INTERNAL CHIMNEY SEAL BY CRETEX SPECIALTY PRODUCTS OR APPROVED EQUAL

* ACCEPTABLE MANHOLE STEPS: AMERICAN STEP CO. ML - 10 M.A. INDUSTRIES INC. PS1 - PF NEENAH FOUNDRY COMPANY- CAST IRON OR ALUMINUM

JOINTS BETWEEN SECTIONS SHALL BE RUBBER GASKET PER ASTM C-443 (TYP. ALL MANHOLE UNIONS)

ALL MATING AND THE EXTERIOR SURFACES OF THE MANHOLE SECTION JOINTS SHALL BE SEALED WITH A BITUMASTIC MATERIAL

NOTE: ALL CONCRETE FOR BASE AND BENCH SHALL BE PLACED MONOLITHIC WITH STEEL TROWEL FINISH.

FLEXIBLE TYPE ENTRIES SHALL BE USED IN ALL INSTANCES. KOR-N-SEAL, PER ASTM C-923

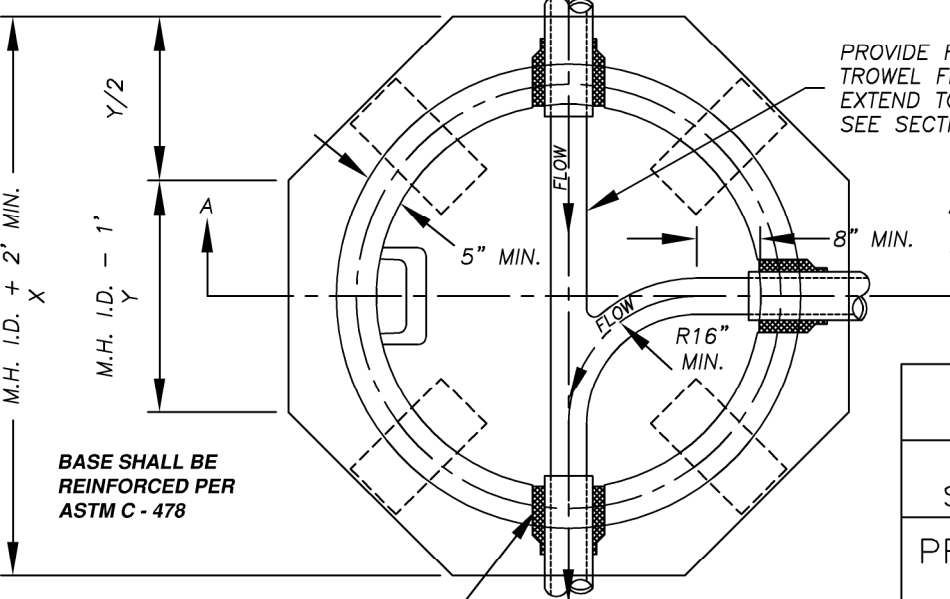
3000 P.S.I CONCRETE BENCH WITH STEEL TROWEL FINISH WITH FORMED CHANNEL (INVERT) TO DIRECT FLOW

FIN. CEMENT COVE, 1:4 MIN. SLOPE

SECTION A - A

6" SOLID CONCRETE BLOCKS

COMPACTED SUBGRADE



PROVIDE FORMED CHANNEL INVERT WITH STEEL TROWEL FINISH TO DIRECT FLOW. CHANNEL TO EXTEND TO FULL HEIGHT OF PIPES SEE SECTION A-A

NOTE: SEE DRAWING NO. 10 FOR MANHOLES LESS THAN 6' 3" DEEP

BASE SHALL BE REINFORCED PER ASTM C - 478

FLEXIBLE PIPE TO MANHOLE CONNECTOR, PER ASTM C - 923 KOR-N-SEAL, A-LOK X-CELL

* RADIUS = 1.5 x DIAMETER FOR PIPE DIAMETERS GREATER THAN 10"

PLAN
POURED BASE SLAB

STANDARD
DETAIL DWG. NO. 9

DEPARTMENT OF
SANITARY SEWER SERVICES

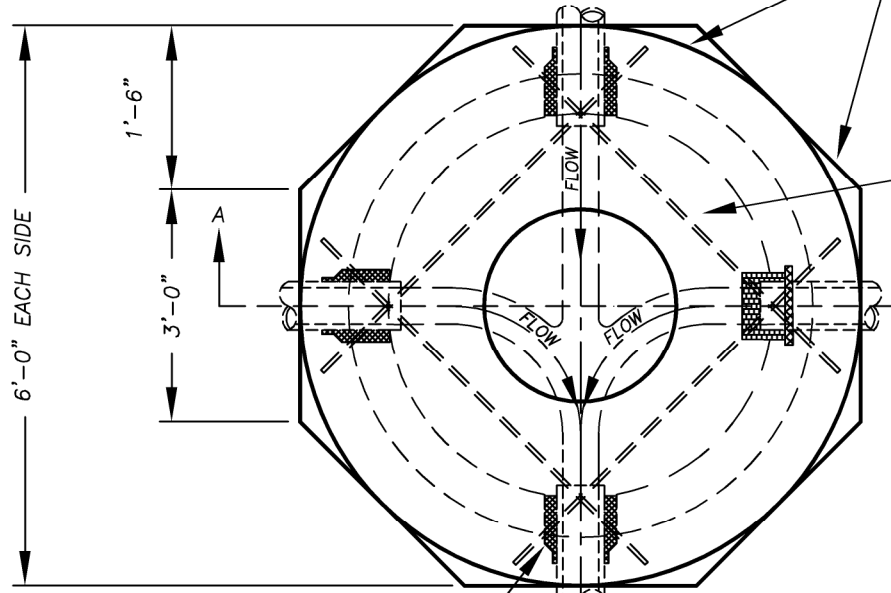
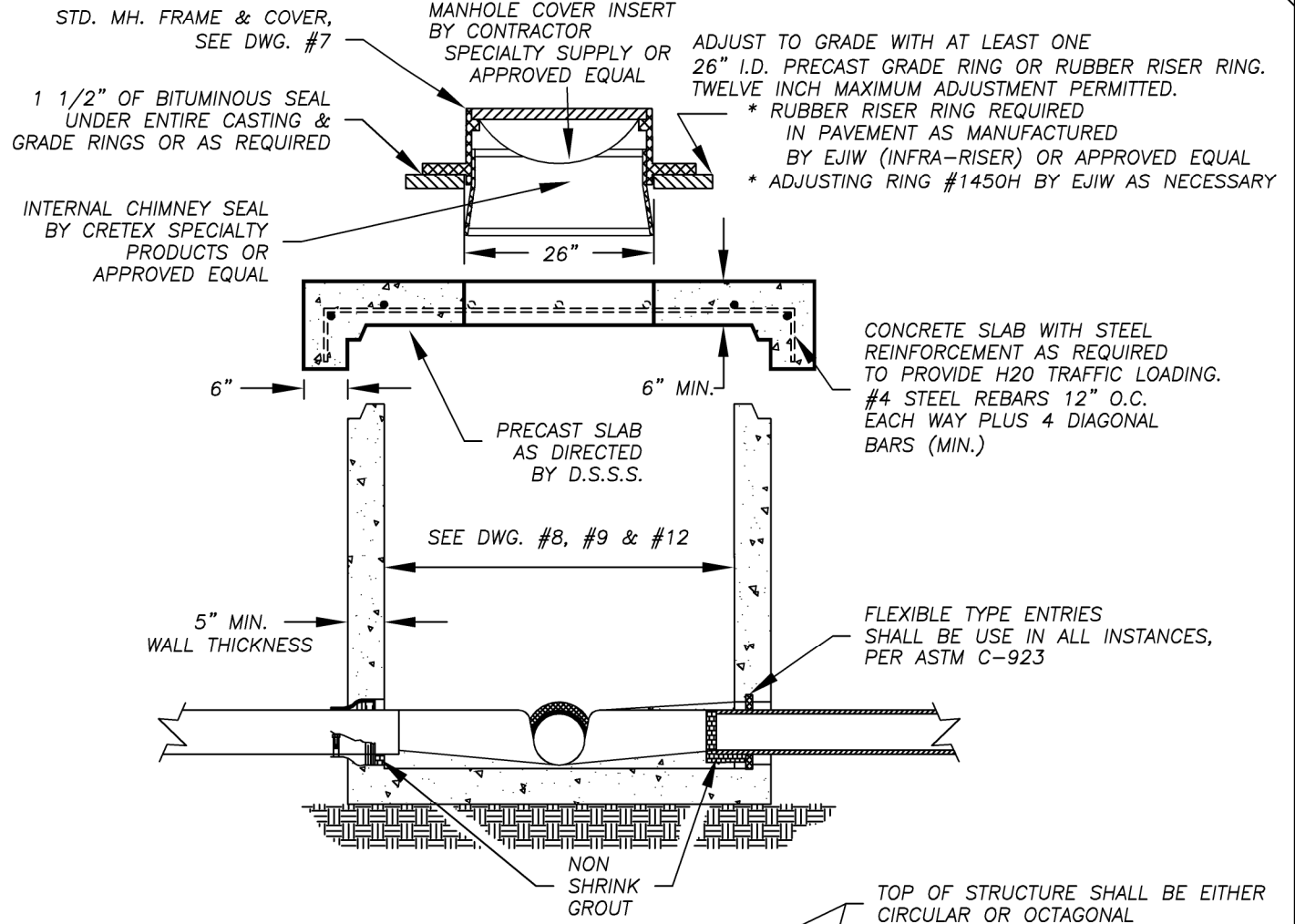
PRECAST MANHOLE WITH
CAST IN PLACE
CONCRETE BASE

APPROVED BY

Rosa A. Johnson, PE
DEPUTY DIRECTOR

DATE 12/29/16

SECTION A-A
NOT TO SCALE

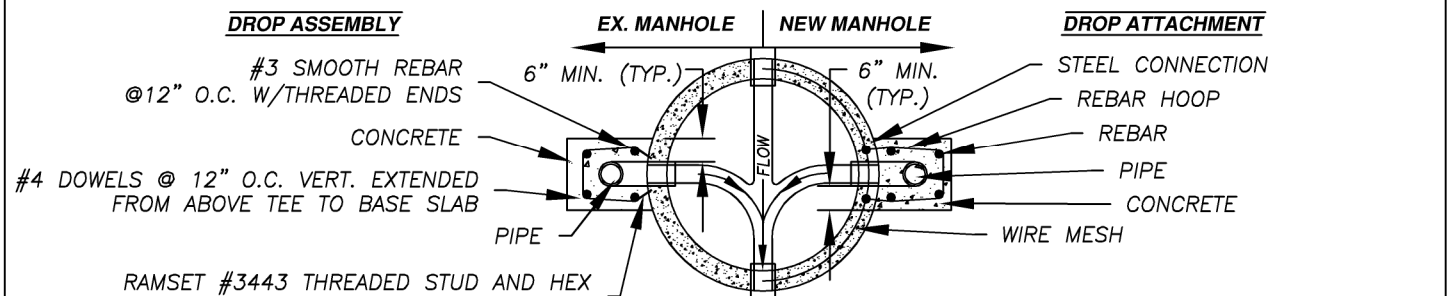
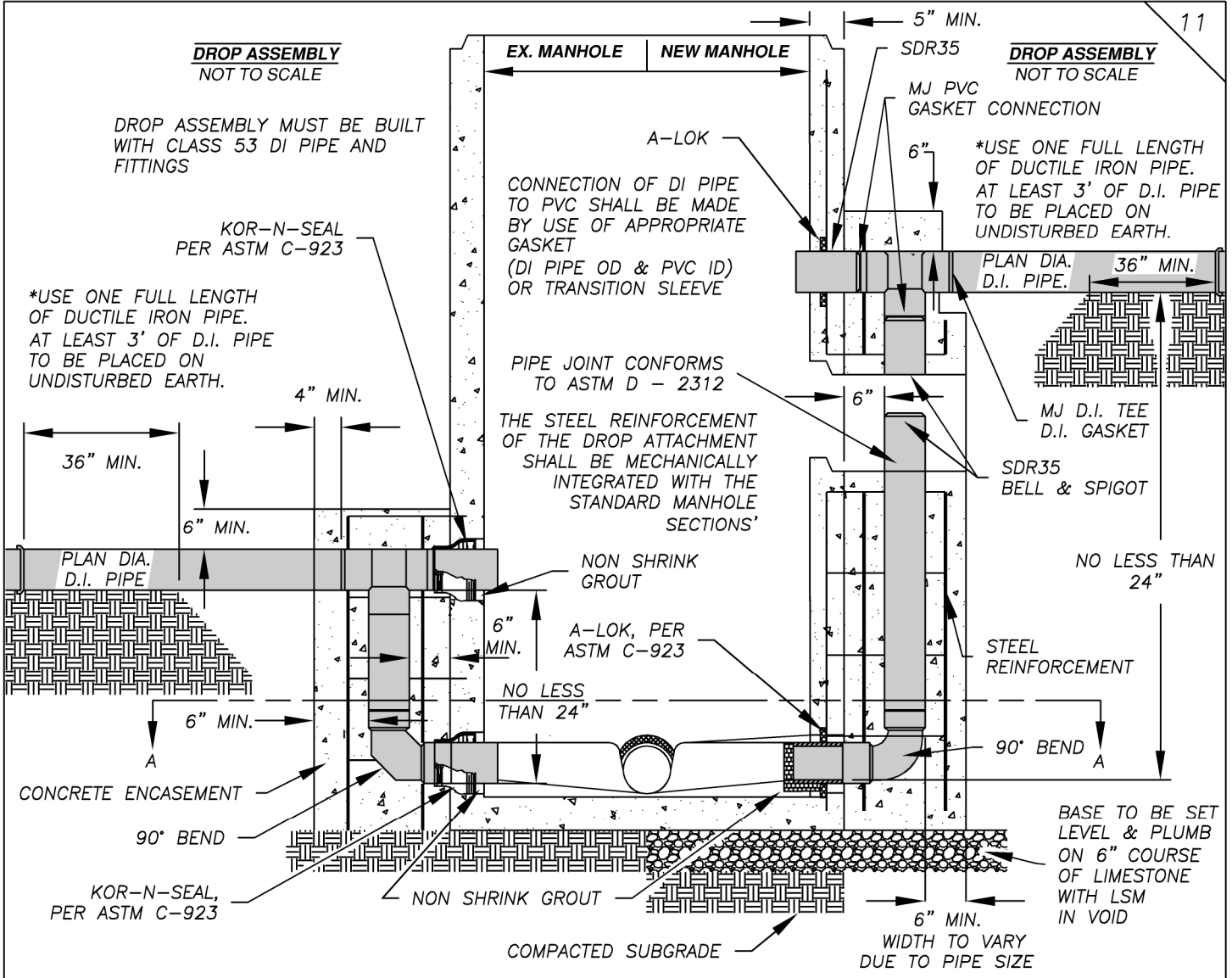


TOP OF STRUCTURE SHALL BE EITHER CIRCULAR OR OCTAGONAL

4-#4 STEEL REBARS (MIN.) DIAGONALLY SPACED

STANDARD DETAIL DWG. NO. 10
DEPARTMENT OF SANITARY SEWER SERVICES
SHALLOW MANHOLE 6'-3" AND UNDER

APPROVED BY <i>Ross A. Johnson, PE</i> DEPUTY DIRECTOR
DATE 12/29/16



SECTION A - A
NOT TO SCALE

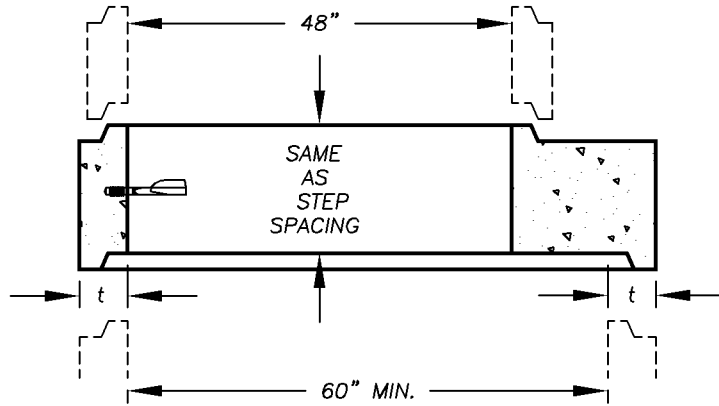
NOTE: SEE DEPARTMENT OF SANITARY SEWER SERVICES STANDARD DETAIL DRAWINGS 7, 8 & 9 FOR CONCENTRIC CONE SECTION, RISER, FRAME, COVER AND STEPS.

CONCRETE BENCH OF NEW MANHOLES SHALL BE PRECAST AS ONE PIECE AND FINISHED WITH A STEEL TROWEL AS SHOWN ON DRAWING 8 & 9. CHANNEL SHALL BE CORED THRU THE BENCH OF EXISTING MANHOLES.

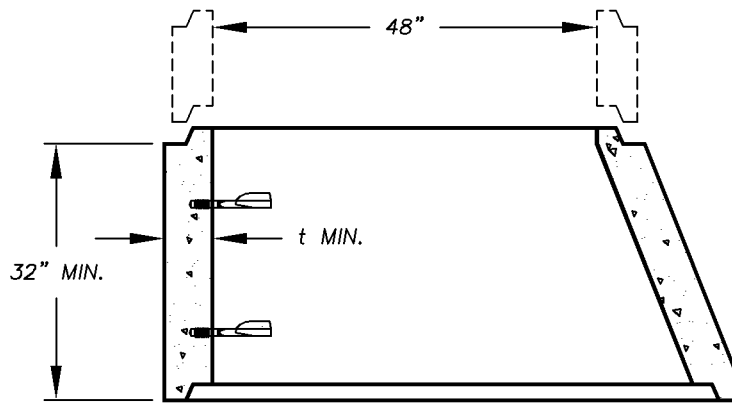
MANHOLE DROP SHALL BE A MINIMUM OF EIGHT INCHES IN DIAMETER UNLESS OTHERWISE SPECIFIED OR DIRECTED BY ENGINEER.

ALL POURED IN PLACE CONCRETE SHALL BE 3000 P.S.I.

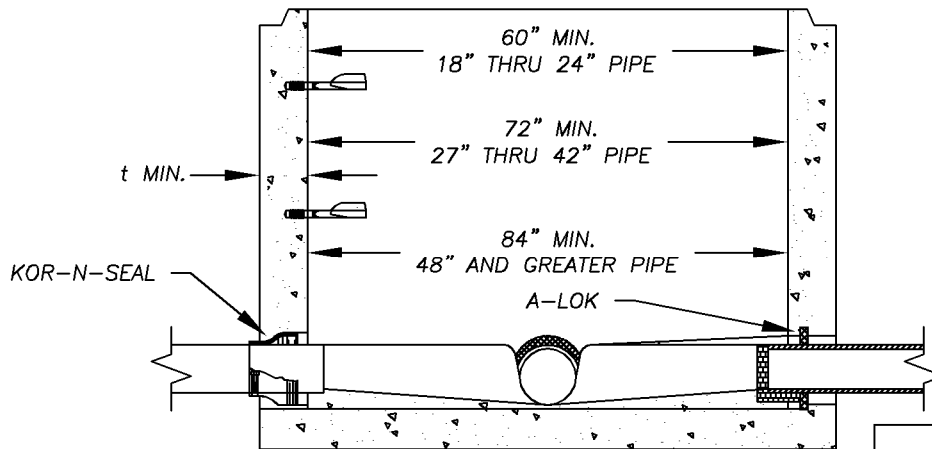
STANDARD DETAIL DWG. NO. 11
DEPARTMENT OF SANITARY SEWER SERVICES
MANHOLE WITH OUTSIDE DROP
APPROVED BY <i>Ross A. Nicholson, PE</i> DEPUTY DIRECTOR
DATE 12/29/16



FLAT TOP TRANSITION
NOT TO SCALE



ECCENTRIC TRANSITION
NOT TO SCALE



60" TO 144"
PRECAST BASE
NOT TO SCALE

BASE I.D.	MIN. "t"	PIPE SIZES
60"	5"	15"-24"
72"	6"	27"-42"
84"+	7"+	48"+

SEE DRAWINGS #8, #9 & #11
FOR PIPE SIZES 6" THRU 15"

STANDARD
DETAIL DWG. NO. 12

DEPARTMENT OF
SANITARY SEWER SERVICES

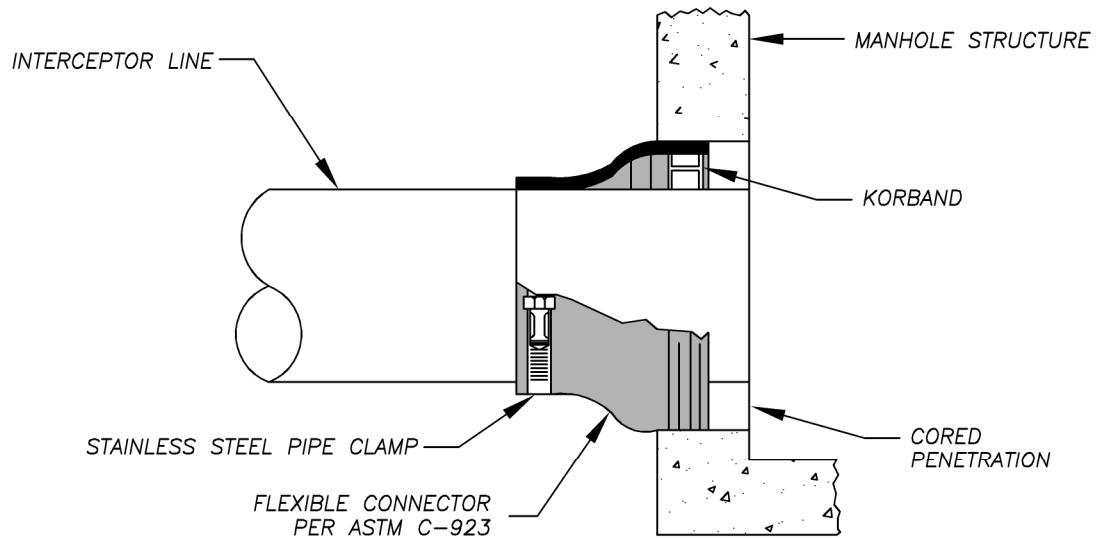
CYLINDRICAL MANHOLE
SECTIONS FOR
LARGE DIAMETER PIPE

APPROVED BY

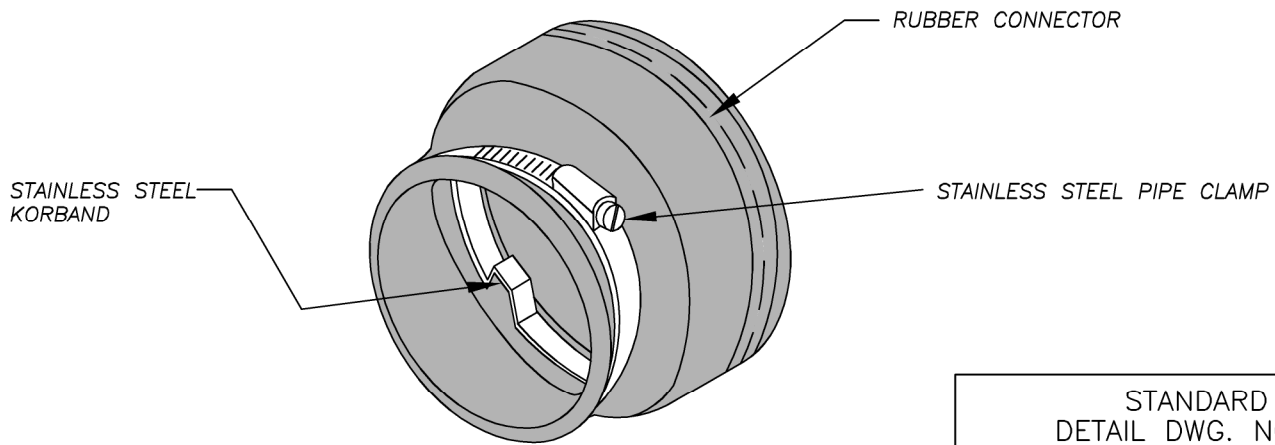
Rosa A. Scholborn, PE

DEPUTY DIRECTOR

DATE 09/15/15



CUT-AWAY VIEW



STANDARD DETAIL DWG. NO. 13
DEPARTMENT OF SANITARY SEWER SERVICES
KOR-N-SEAL FLEXIBLE PIPE TO MANHOLE CONNECTOR
APPROVED BY <i>Rosa A. Nicholson, PE</i> DEPUTY DIRECTOR
DATE 12/29/16

WYE BRANCH APPROPRIATE FOR MAIN DIAMETER & MATERIAL TO 6" DIAMETER ASTM D 3034 (TYP.)

ASTM APPROVED SOLID REPAIR SLEEVE APPROPRIATE FOR MAIN SEWER DIAMETER & MATERIAL WITH FLEXIBLE GASKETS

SPOOL PIECE IN KIND WITH EXISTING MAIN

6"Ø 45° BEND ASTM D 3034 (TYP.)

MAIN WITH SPIGOT END

REMOVE EXISTING BELL IN MAIN SEWER

6" NOMINAL CORED HOLE

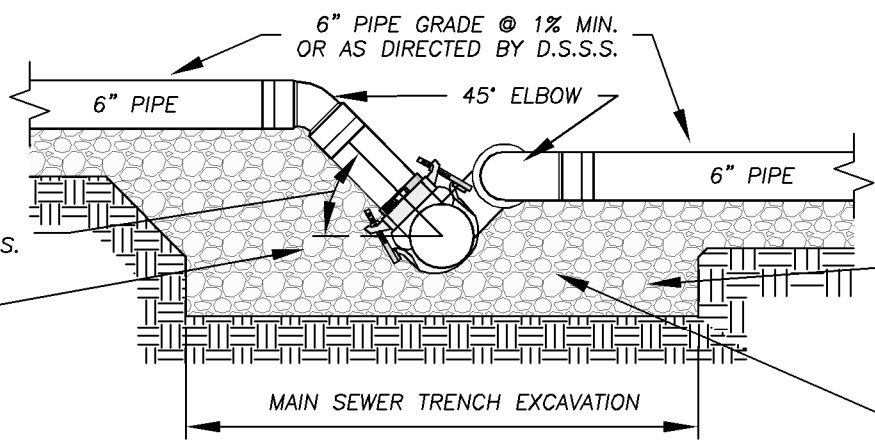
TRENCH WIDTH SHALL BE NO LESS THAN O.D.+18 AND NO MORE THAN O.D.+24 (TYP.)

CORE DRILLED OPTION WYE BRANCH OPTION

PLAN VIEW

NOT TO SCALE

SEE STD. DWG. #15 FOR BRANCHES, SERVICE EXTENSIONS, STACKS AND MARKERS



PROFILE VIEW

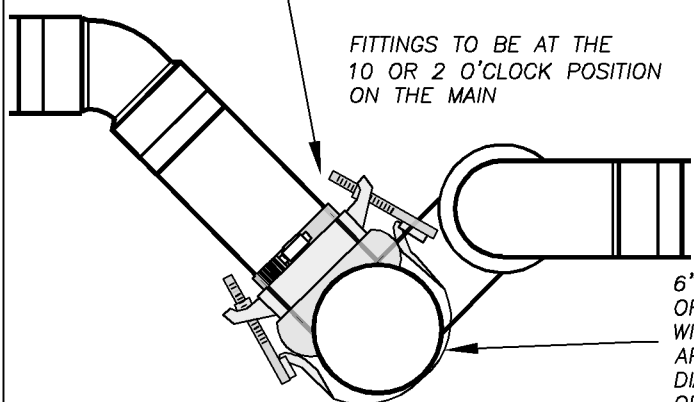
NOT TO SCALE

30" MIN. OR AS DIRECTED BY D.S.S.S.

BEDDING & BACKFILL PER DETAILS NO. 26-27

FILL VOIDS WITH BEDDING MATERIAL

MAIN SEWER TRENCH EXCAVATION

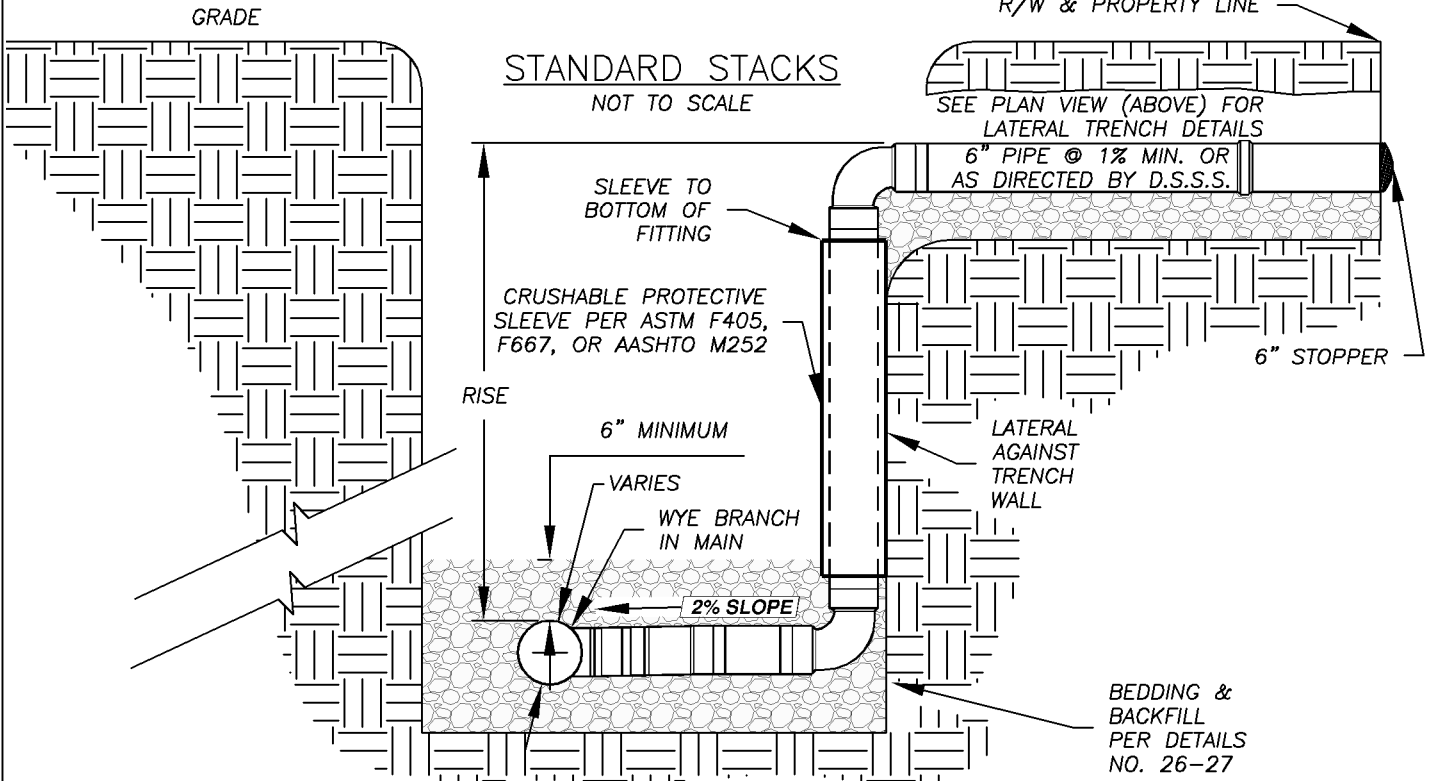
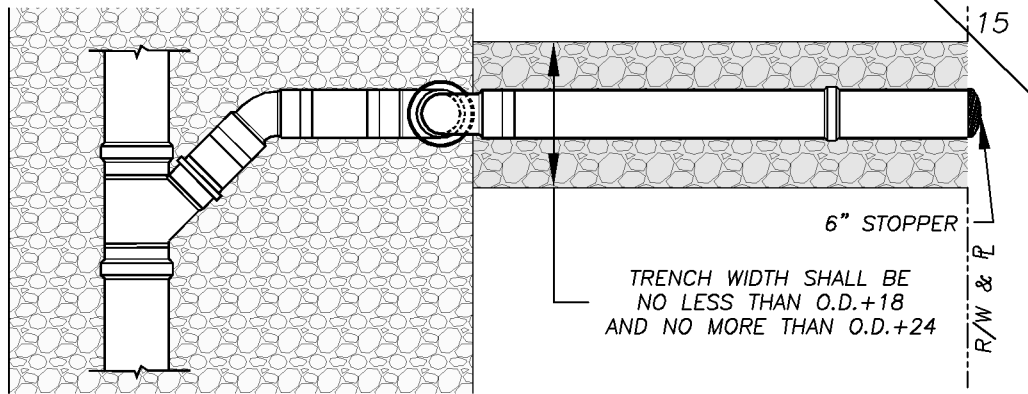


FITTINGS TO BE AT THE 10 OR 2 O'CLOCK POSITION ON THE MAIN

6" NOMINAL ROMAC OR SEALTITE SADDLE WITH FLEXIBLE GASKET APPROPRIATE FOR THE DIAMETER & MATERIAL OF THE MAIN

STANDARD DETAIL DWG. NO. 14
DEPARTMENT OF SANITARY SEWER SERVICES
NEW LATERAL IN EXISTING SEWER
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

PLAN VIEW
OF LATERAL TRENCH
NOT TO SCALE



BRANCHES, SERVICE EXTENSIONS AND STACKS

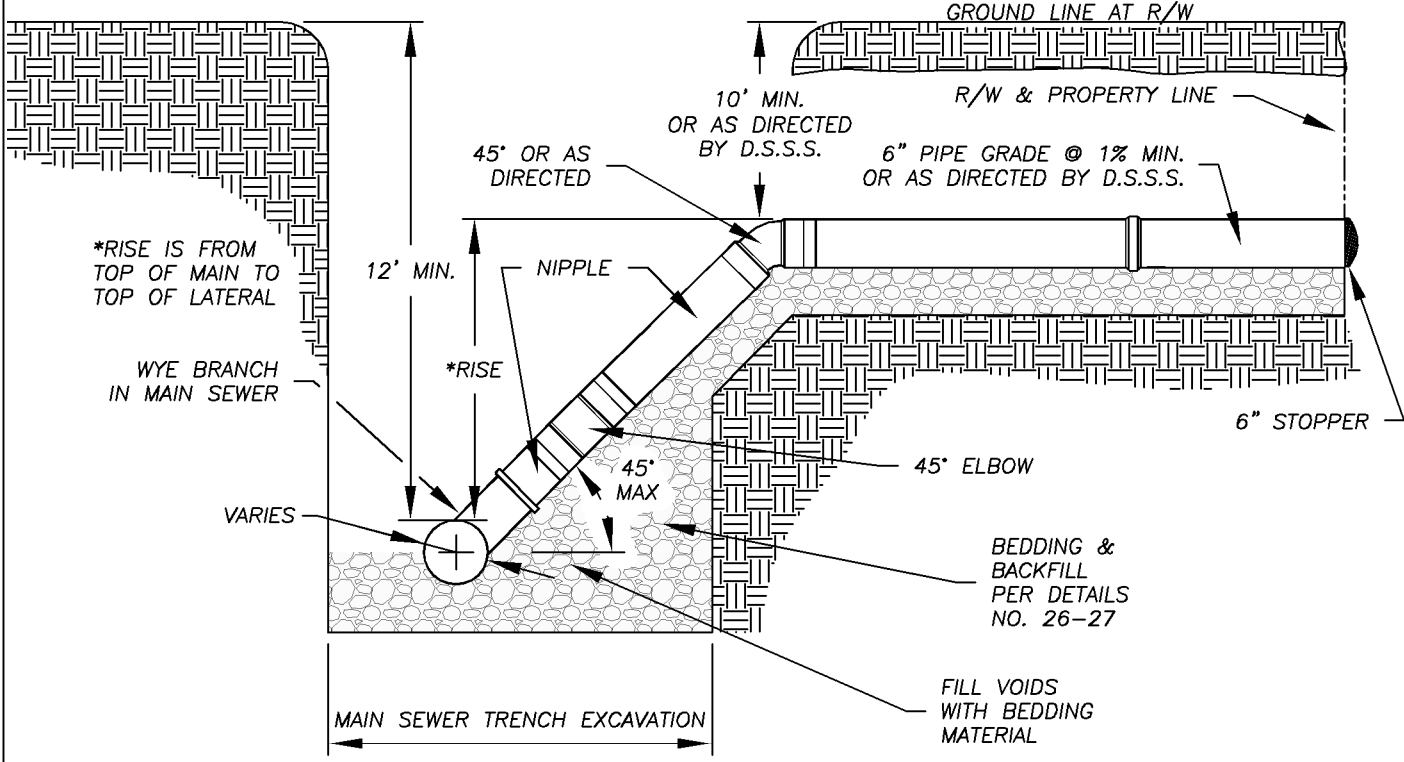
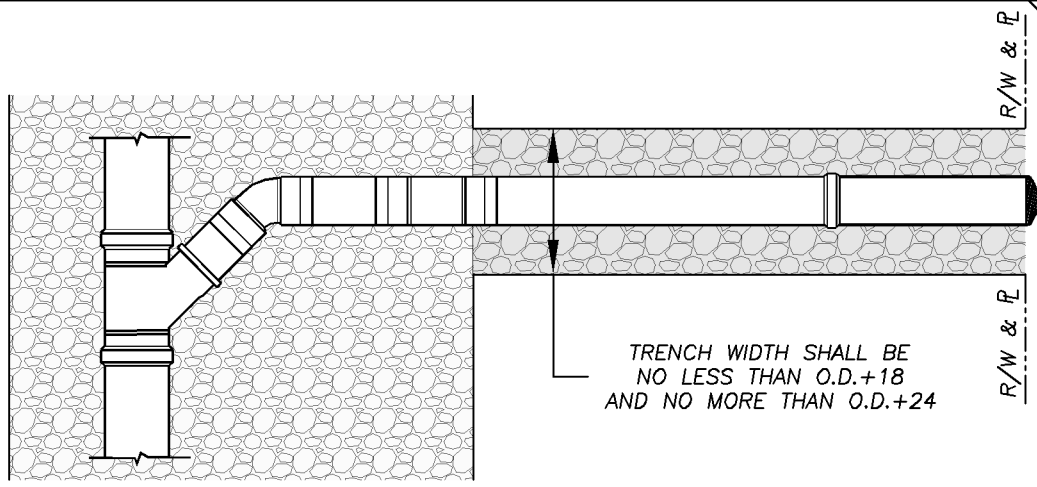
1. INSTALL AT LOCATIONS AND ELEVATIONS SHOWN ON DRAWINGS, OR AS DIRECTED BY ENGINEER.
2. LAY 6" SERVICE CONNECTIONS TO PROPERTY LINE IN DEVELOPED AREAS UNLESS OTHERWISE DIRECTED OR SPECIFIED.
3. GENERALLY PROVIDE STACKS WHERE SEWER IS MORE THAN 12 FEET BELOW GROUND SURFACE AND EXTEND STACK TO WITHIN 10 FEET OF SURFACE.
4. INSTALLER TO USE STACK SLEEVE AND FITTINGS.
5. ALL STACK PIPES AND STACK FITTINGS SHALL CONFORM TO D.S.S.S. STANDARDS.

MARKERS

1. PROVIDE 2"x2" POLES TO MARK END OF BRANCHES, STACKS AND SERVICE CONNECTIONS FOR FUTURE LOCATION.
2. EXTEND POLE FROM BELL TO 12" ABOVE GROUND SURFACE, DURING CONSTRUCTION.
3. REST POLES AGAINST BELL BUT NOT ON IT.
4. SUPPORT POLES IN VERTICAL POSITION DURING BACKFILL.
5. CUT 2"x2" POLES OFF 1'-0" BELOW GROUND LEVEL AFTER CONSTRUCTION. (POLES TO BE OF ROUGH CUT LUMBER.)

STANDARD DETAIL DWG. NO. 15
DEPARTMENT OF SANITARY SEWER SERVICES
STACKS FOR SANITARY SEWERS
APPROVED BY <i>Rosa A. Nicholson, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u> 15

PLAN VIEW
NOT TO SCALE



SEE STD. DWG. #15 FOR BRANCHES, SERVICE EXTENSIONS, STACKS AND MARKERS

STANDARD DETAIL DWG. NO. 16
DEPARTMENT OF SANITARY SEWER SERVICES
SLOPED LATERAL
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

EAST JORDAN IRON WORKS
FRAME AND COVER
NO.1574 OR APPROVED EQUAL

6" THREADED ADAPTER
PLASTIC OR BRASS PLUG

3,000 P.S.I. CLASS
"B" CONCRETE

(4)-1" DIA. HOLES
W/(4)-3/4" DIA. BOLTS

#4 12"
BOTHWAYS

3'-0"
SQ.

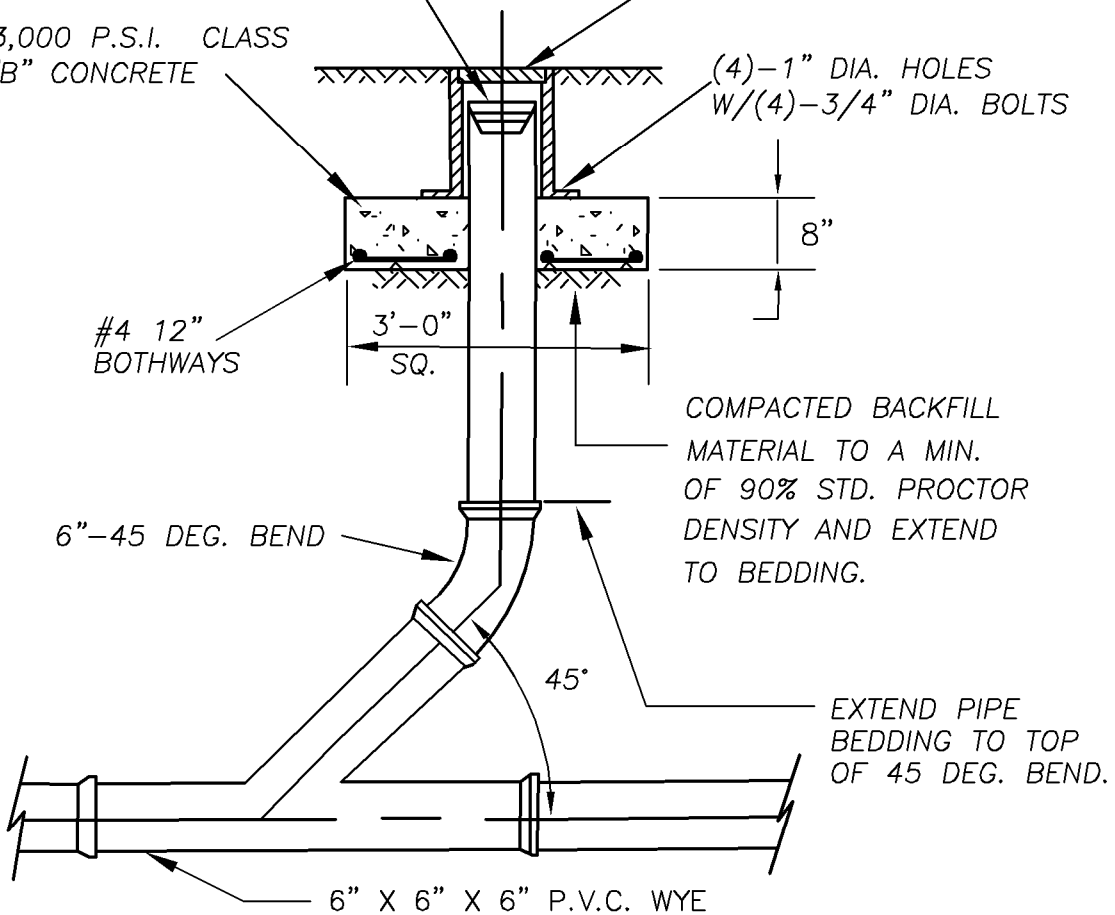
8"

COMPACTED BACKFILL
MATERIAL TO A MIN.
OF 90% STD. PROCTOR
DENSITY AND EXTEND
TO BEDDING.

6"-45 DEG. BEND

45°

EXTEND PIPE
BEDDING TO TOP
OF 45 DEG. BEND.



6" X 6" X 6" P.V.C. WYE

SEE STD. DWG. #15
FOR BRANCHES, SERVICE
EXTENSIONS,
STACKS AND MARKERS

STANDARD
DETAIL DWG. NO. 17

DEPARTMENT OF
SANITARY SEWER SERVICES

CLEAN OUT
FOR LATERALS

APPROVED BY

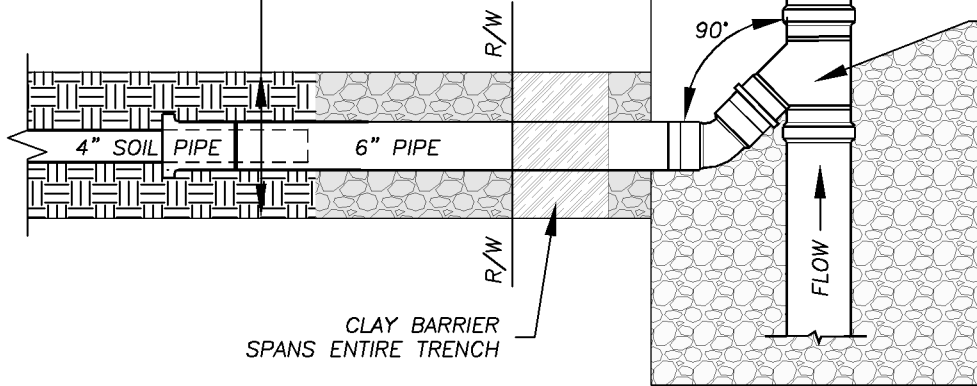
Rosa A. Nicholson, PE

DEPUTY DIRECTOR

DATE 09/15/15

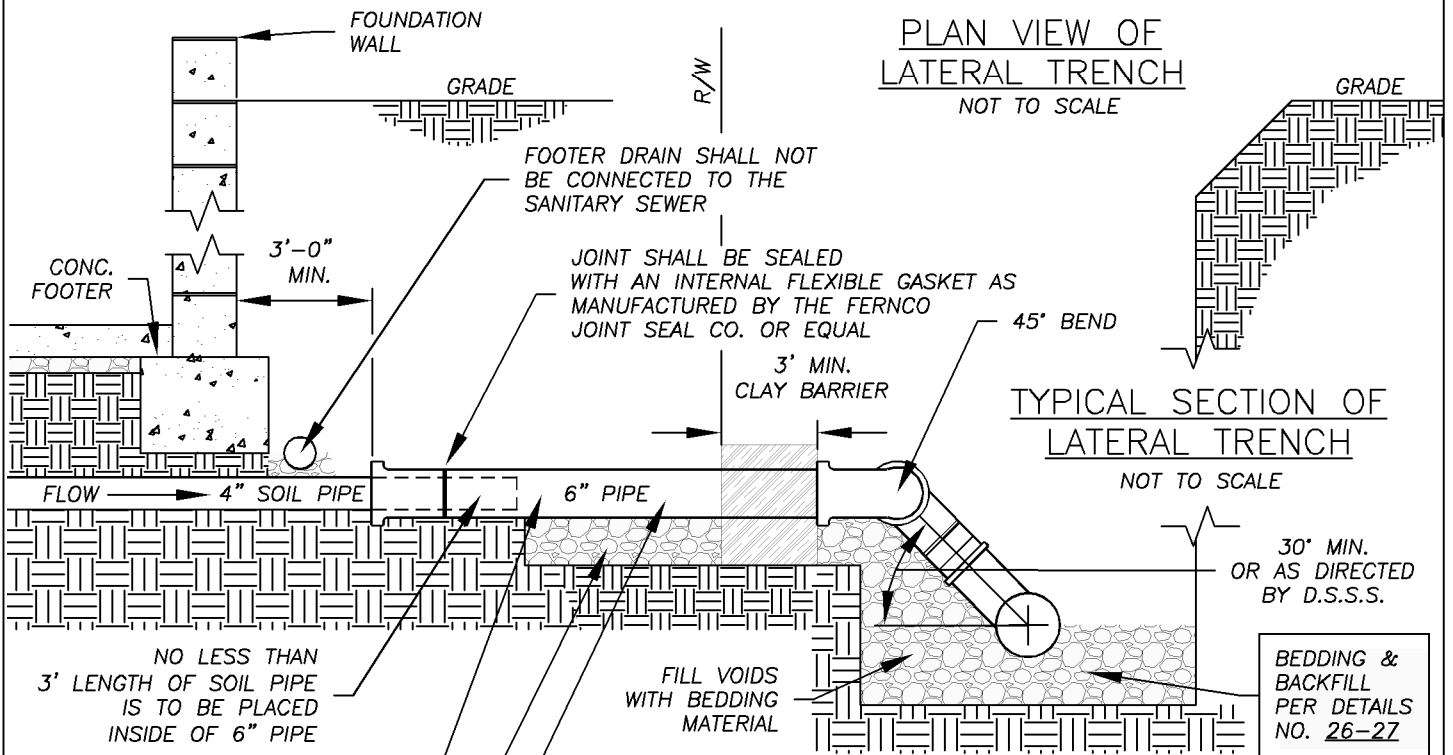
TRENCH WIDTH SHALL BE NO LESS THAN O.D.+18 AND NO MORE THAN O.D.+24

CONSTRUCTION OF LATERAL MUST BEGIN AT MAIN SEWER



WYE BRANCH CONNECTION TO MAIN SEWER

PLAN VIEW OF LATERAL TRENCH NOT TO SCALE



TYPICAL SECTION OF LATERAL TRENCH NOT TO SCALE

NO LESS THAN 3' LENGTH OF SOIL PIPE IS TO BE PLACED INSIDE OF 6" PIPE

LATERAL SHALL BE ASTM D-3034 SDR 26 WHEN WITHIN 50 FEET OF A WATER SUPPLY WELL

LATERAL BEDDING SHALL BE A MIN. OF 10' AWAY FROM FOUNDATION TO AVOID FRENCH DRAIN SITUATION

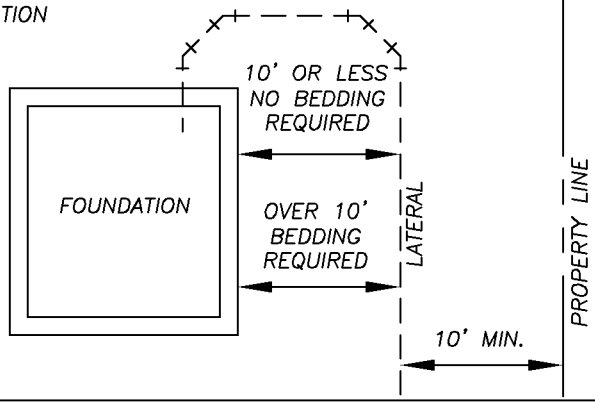
6" DIA. ASTM D-3034 SDR 35 PVC GASKETED PIPE, TYPICALLY. GRADE @ 1% MIN. OR AS DIRECTED BY D.S.S.S.

FITTINGS TO BE AT THE 10 OR 2 O'CLOCK POSITION ON THE MAIN

BEDDING & BACKFILL PER DETAILS NO. 26-27

SEE STD. DWG. #15 FOR BRANCHES, SERVICE EXTENSIONS, STACKS AND MARKERS

PLAN VIEW OF LATERAL PARALLEL TO FOUNDATION NOT TO SCALE



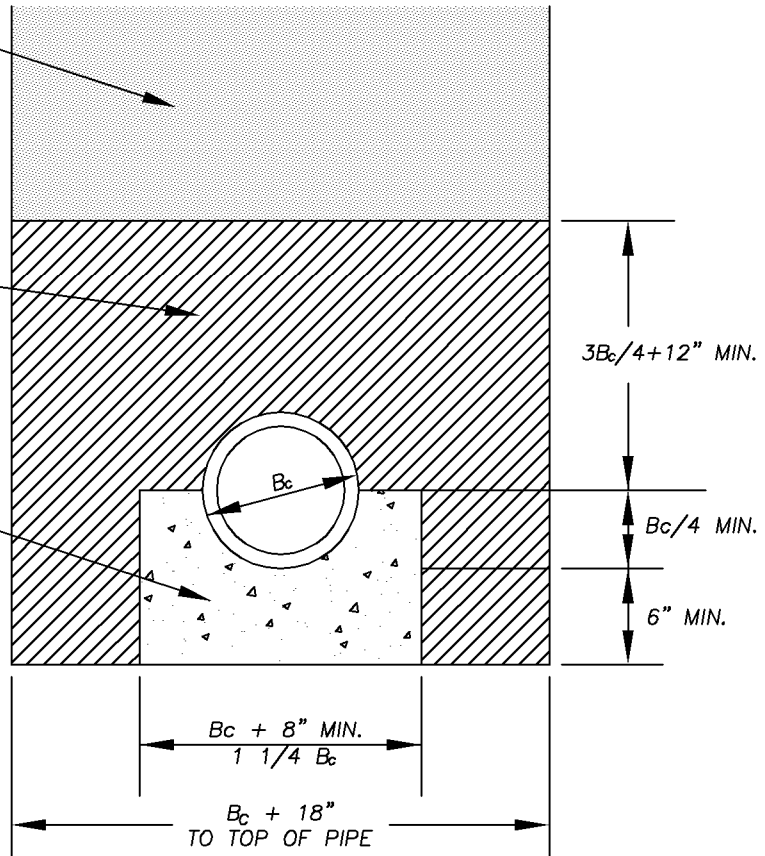
STANDARD DETAIL DWG. NO. 18
DEPARTMENT OF SANITARY SEWER SERVICES
SANITARY SEWER LATERALS
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

CONCRETE CRADLE BEDDING AND BACKFILLING RIDGID PIPE TYPE III

* STANDARD DRAWING NO. 36-37
Δ CLASS II THRU V BACKFILL-
MECHANICALLY PLACED.
AS DIRECTED

* STANDARD DRAWING NO. 36-37
Δ CLASS I THRU III-COMPACTED
INITIAL BACKFILL- HAND PLACED.
TAMPED IF DIRECTED

PLAIN OR REINFORCED
3000 P.S.I. CONCRETE
AS REQUIRED BY DESIGN.



* NOT APPLICABLE UNDER DRIVEWAYS, AND/OR TRAVELED ROADWAYS. SEE STANDARD DRAWING NO. 23

Δ CONTRACTOR HAS THE OPTION OF HAND BACKFILLING AND COMPACTING ADDITIONAL SPACE TO TOP OF CRADLE OR, IN LIEU OF HAND FORMING, MAY FILL ENTIRE TRENCH WITH CONCRETE TO TOP OF CRADLE AT NO COST TO THE COUNTY.

B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

RIGID PIPE:

- 1) A.S.T.M. C-14, PLAIN CONCRETE PIPE
- 2) A.S.T.M. C-76, REINFORCED CONCRETE PIPE
- 3) A.S.T.M. C-428, ASBESTOS CEMENT PIPE
- 4) A.S.T.M. C-700, EXTRA STRENGTH CLAY PIPE
- 5) A.N.S.I. A-2151 DUCTILE IRON PIPE

STANDARD
DETAIL DWG. NO. 19

DEPARTMENT OF
SANITARY SEWER SERVICES

CONCRETE CRADLE
BEDDING AND BACKFILLING
RIDGID PIPE TYPE III

APPROVED BY

Ross A. Scholborn, PE
DEPUTY DIRECTOR

DATE 09/15/15

CONCRETE ARCH BEDDING AND BACKFILLING RIGID PIPE TYPE IV

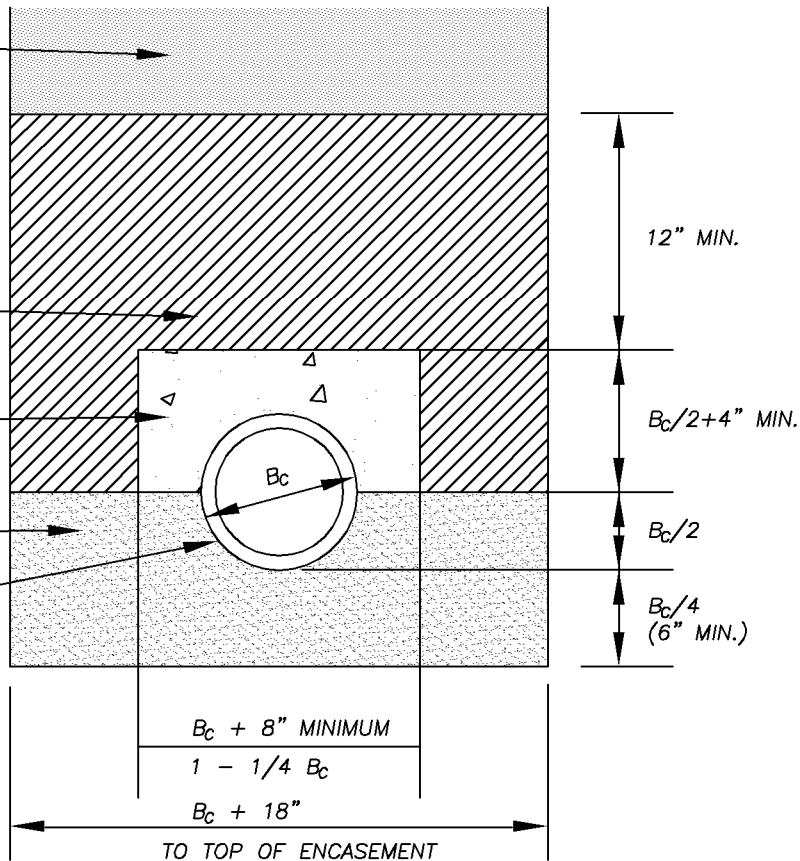
* STANDARD DRAWING NO. 36-37
 Δ CLASS II THRU V
 BACKFILL- MECHANICALLY
 PLACED. AS DIRECTED

* STANDARD DRAWING NO. 36-37
 Δ CLASS I THRU III- COMPACTED
 INITIAL BACKFILL- HAND PLACED.
 TAMPED IF DIRECTED

PLAIN OR REINFORCED
 3000 P.S.I. CONCRETE OR
 AS REQUIRED BY DESIGN

STANDARD DRAWING NO.36-37
 CLASS I, #467 AGGREGATE OR
 AS DIRECTED

CARE MUST BE TAKEN TO
 ENSURE THAT SUFFICIENT
 BEDDING HAS BEEN WORKED
 UNDER THE PIPE TO
 PREVENT VOIDS.



CONTRACTOR HAS THE OPTION OF HAND BACKFILLING AND TAMPING ADDITIONAL SPACE TO TOP OF ARCH OR, IN LIEU OF HAND FORMING, MAY FILL ENTIRE TRENCH WITH CONCRETE TO TOP OF CAP AT NO COST TO THE COUNTY.

NOTE:

* NOT APPLICABLE UNDER DRIVEWAYS, AND/OR TRAVELED ROADWAYS.
 SEE STANDARD DRAWING NO. 23

Δ " AS DIRECTED " SHALL MEAN "AS DIRECTED BY THE D.S.S.S. OR HIS APPOINTED AGENT."

B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

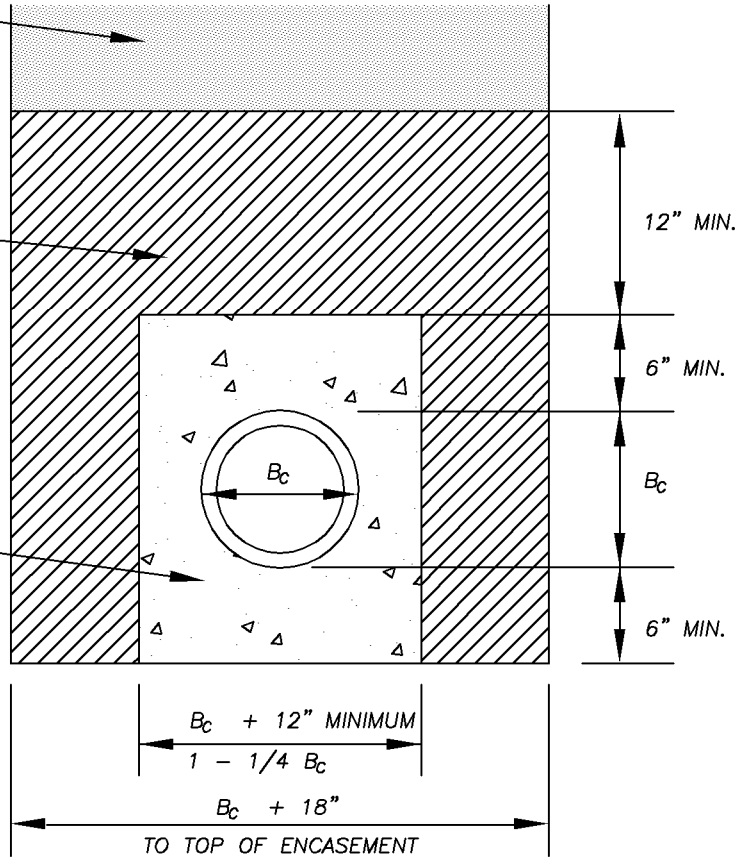
STANDARD DETAIL DWG. NO. 20
DEPARTMENT OF SANITARY SEWER SERVICES
CONCRETE ARCH BEDDING AND BACKFILL RIGID PIPE TYPE IV
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u>

RIGID PIPE CONCRETE ENCASEMENT BEDDING AND BACKFILLING TYPE V

* STANDARD DRAWING NO. 36-37
 Δ CLASS II THRU V
 BACKFILL- MECHANICALLY
 PLACED AS DIRECTED

* STANDARD DRAWING NO. 36-37
 Δ CLASS I THRU III- INITIAL
 BACKFILL- HAND PLACED
 AND TAMPED.

6" MINIMUM ENCASEMENT
 3000 P.S.I. CONCRETE OR
 AS REQUIRED BY DESIGN.



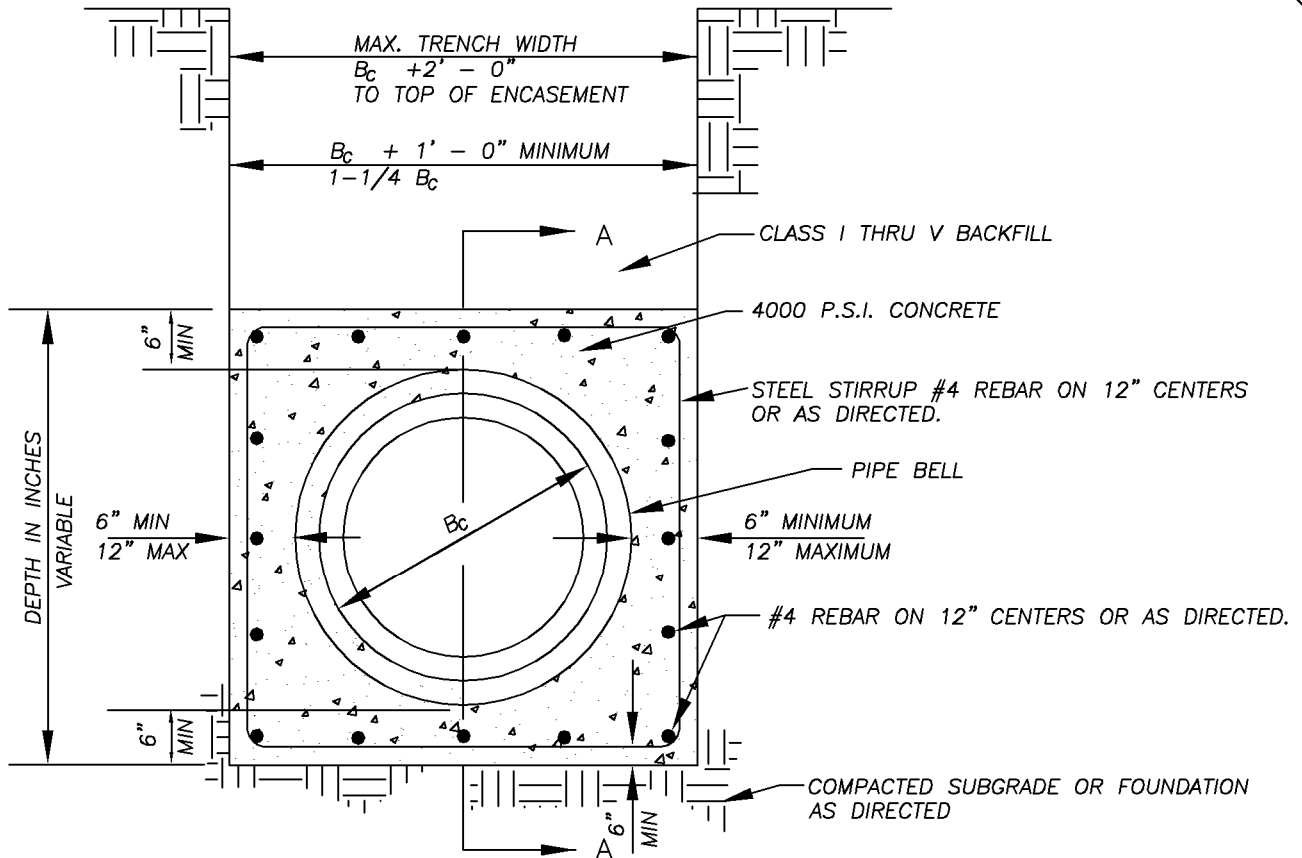
CONTRACTOR HAS THE OPTION OF HAND BACKFILLING AND TAMPING ADDITIONAL SPACE TO TOP OF ENCASEMENT OR, IN LIEU OF HAND FORMING, MAY FILL ENTIRE TRENCH WIDTH WITH CONCRETE TO TOP OF ENCASEMENT AT NO COST TO THE COUNTY.

Δ " AS DIRECTED " SHALL MEAN "AS DIRECTED BY THE D.S.S.S. OR HIS APPOINTED AGENT."
 B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

THIS STANDARD APPLIES TO RIGID PIPE.

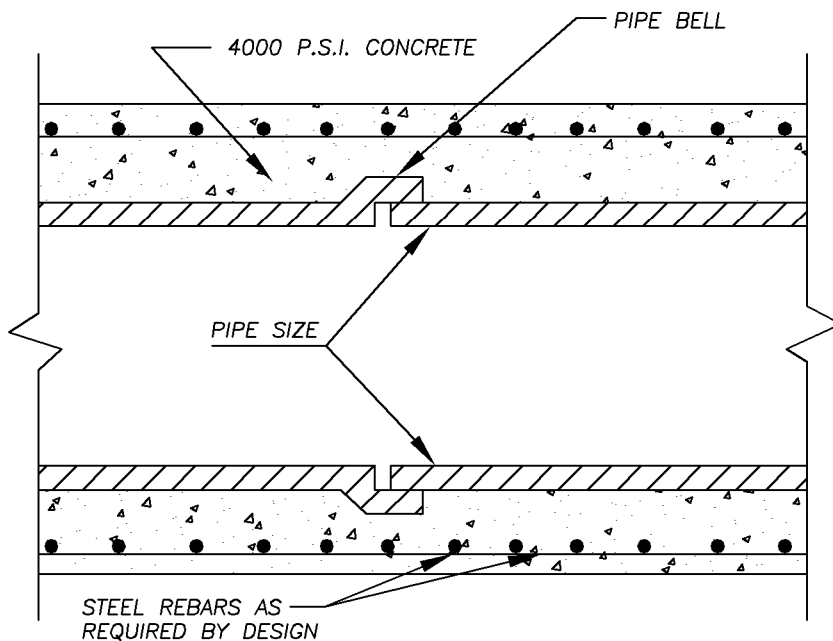
* NOT APPLICABLE UNDER DRIVEWAYS, AND/OR TRAVELED ROADWAYS. SEE STANDARD DRAWING NO. 23

STANDARD DETAIL DWG. NO. 21
DEPARTMENT OF SANITARY SEWER SERVICES
CONCRETE ENCASEMENT BEDDING AND BACKFILLING RIGID PIPE TYPE V
APPROVED BY <i>Ross A. Scholborn, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u>



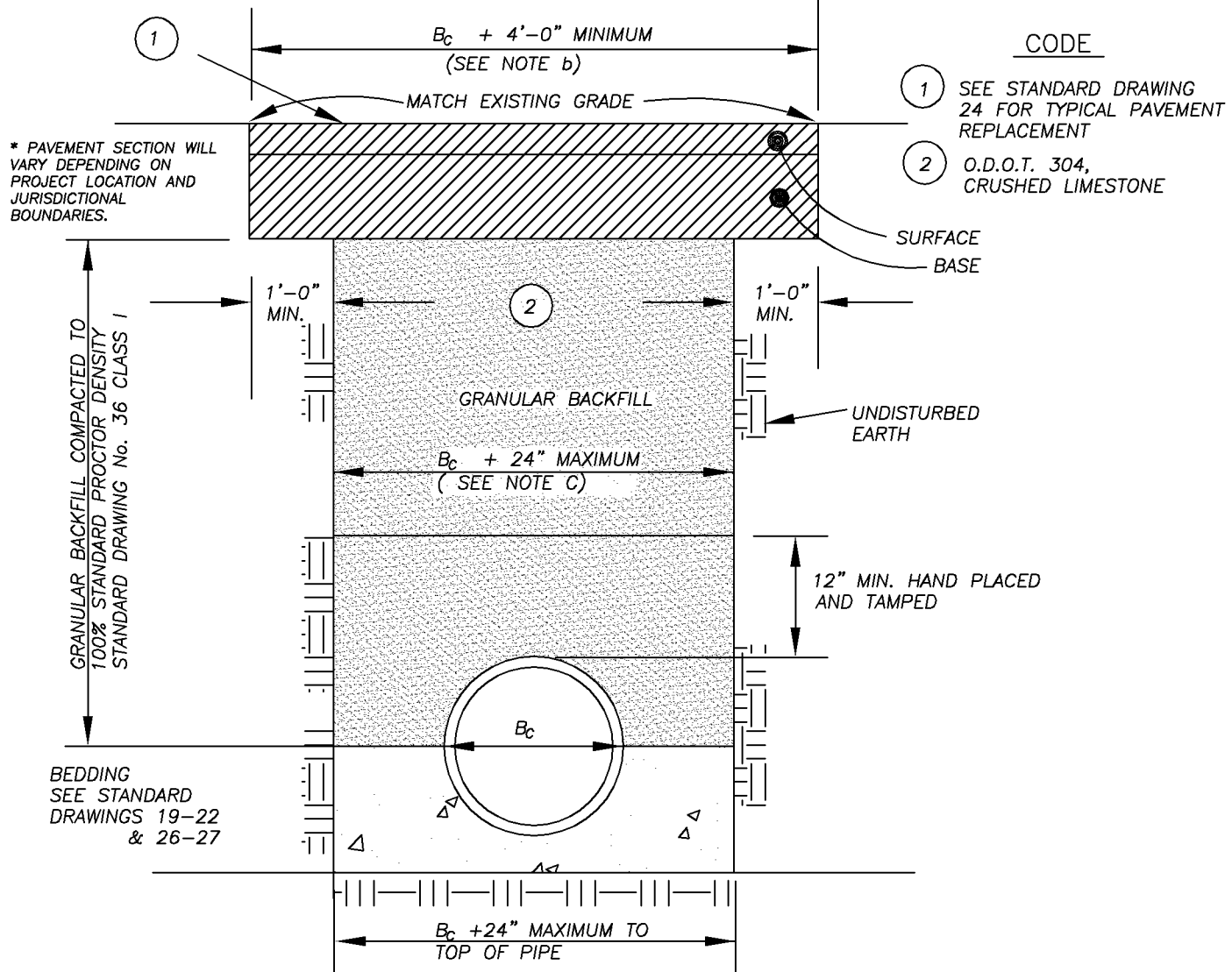
B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

* USE OF THIS DRAWING REQUIRES
 D.S.S.S. APPROVAL



SECTION A - A
 NOT TO SCALE

STANDARD DETAIL DWG. NO. 22
DEPARTMENT OF SANITARY SEWER SERVICES
REINFORCED CONCRETE ENCASEMENT
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15



TYPICAL TRENCH SECTION

B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

NOTE:

a) THIS DETAIL APPLIES WHEN SEWERS INSTALLED BY THE OPEN-CUT METHOD ARE LOCATED UNDER ASPHALT-PAVED STREETS OR DRIVEWAYS. WHERE OTHER TYPES OF STREETS OR DRIVEWAYS ARE CROSSED BY SAID SEWERS, IT SHALL BE UNDERSTOOD THAT THE EXISTING ROADWAY SURFACE SHALL BE REPLACED WITH NEW MATERIAL AS SHOWN ON DRAWING 24, OR AS DIRECTED BY THE DEPARTMENT OF SANITARY SEWER SERVICES. D.S.S.S. MAY DIRECT USE OF LSM IN LIEU OF ODOT 304.

b) ON PUBLIC PROJECTS, THE AMOUNT OF PAVEMENT OR PAVED DRIVEWAY REPLACEMENT TO BE PAID FOR SHALL BE LIMITED TO B_c + 4'-0", UNLESS OTHERWISE APPROVED BY THE D.S.S.S.

c) ON PUBLIC PROJECTS, THE AMOUNT OF GRANULAR BACKFILL TO BE PAID FOR SHALL BE LIMITED TO B_c + 2'-0" UNLESS OTHERWISE APPROVED BY THE D.S.S.S.

STANDARD DETAIL DWG. NO. 23
DEPARTMENT OF SANITARY SEWER SERVICES
DRIVE OR STREET CROSSING DETAIL
APPROVED BY <i>Ross A. Schoborn, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

TYPICAL PAVEMENT REPLACEMENT

1. EXISTING AGGREGATE BASE—CHIP AND SEAL SURFACE
 - a. REPLACE BASE IN KIND OR O.D.O.T. 304 (NO SLAG) AS DIRECTED BY THE ENGINEER.
 - b. SURFACE WITH 2-1/2" O.D.O.T. 448.
2. EXISTING AGGREGATE BASE—ASPHALT SURFACE
 - a. REPLACE BASE IN KIND OR O.D.O.T. 304 (NO SLAG) AS DIRECTED BY THE ENGINEER.
 - b. SURFACE WITH 2-1/2" O.D.O.T. 448.
3. EXISTING ASPHALT BASE—ASPHALT SURFACE
 - a. REPLACE BASE IN KIND OR O.D.O.T. 448 AS DIRECTED BY THE ENGINEER.
 - b. SURFACE WITH 2-1/2" O.D.O.T. 448.
4. EXISTING CONCRETE BASE—ASPHALT SURFACE
 - a. REPLACE BASE WITH 9"—4,000 POUND CONCRETE AS DIRECTED BY THE ENGINEER.
 - b. SURFACE WITH 2-1/2" O.D.O.T. 448.
5. EXISTING CONCRETE PAVEMENT
 - a. REPLACE WITH 9"—4,000 P.S.I. CONCRETE AS DIRECTED BY THE ENGINEER.

NOTE:

- a. ANY EXISTING PAVEMENT NOT LISTED ABOVE WILL BE REPLACED AS DIRECTED BY THE ENGINEER OR AS REQUIRED BY THE LOCAL AUTHORITY.
- b. THE REPLACEMENTS LISTED ABOVE MAY VARY AS DIRECTED BY THE ENGINEER OR AS REQUIRED BY THE LOCAL AUTHORITY.
- c. DRIVEWAY REPLACEMENT WILL BE IN KIND OR AS DIRECTED BY THE ENGINEER.
- d. THE CONTRACTOR MUST FAMILIARIZE HIMSELF WITH LOCAL REQUIREMENTS NOT LISTED ABOVE.

STANDARD
DETAIL DWG. NO. 24

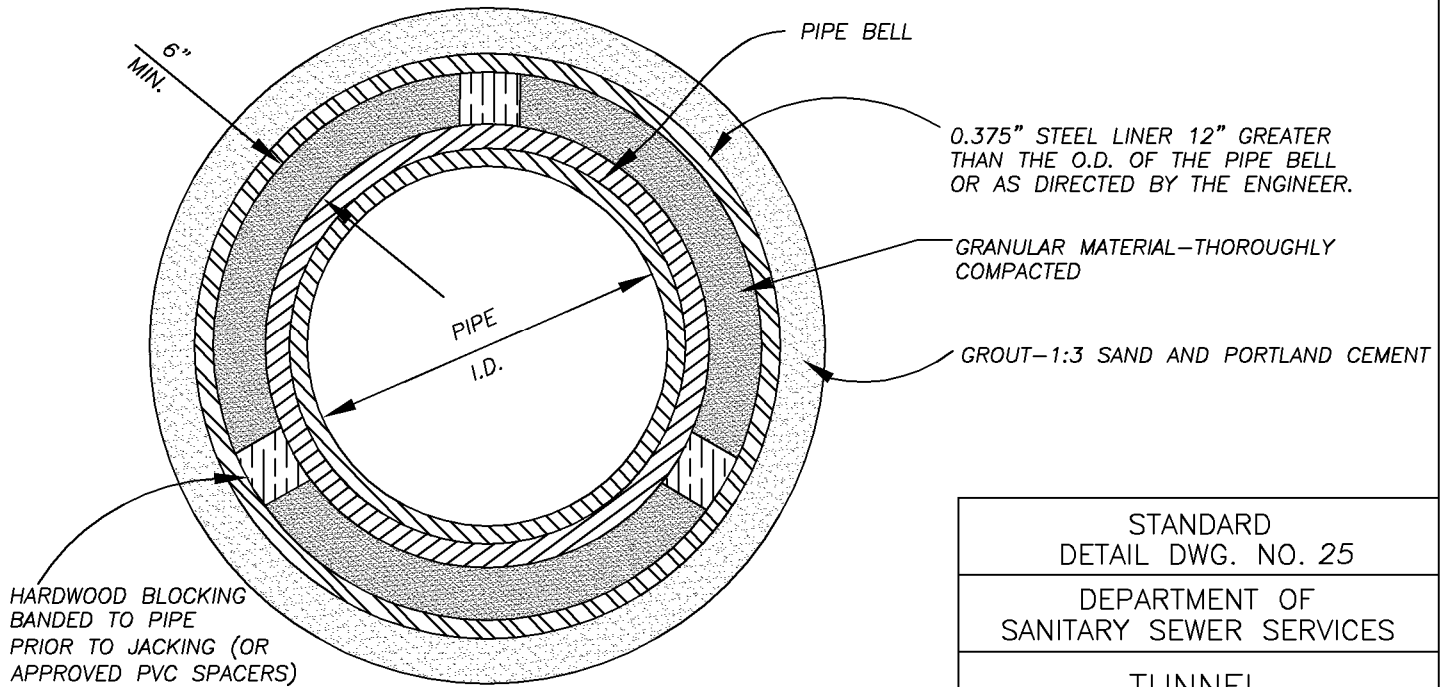
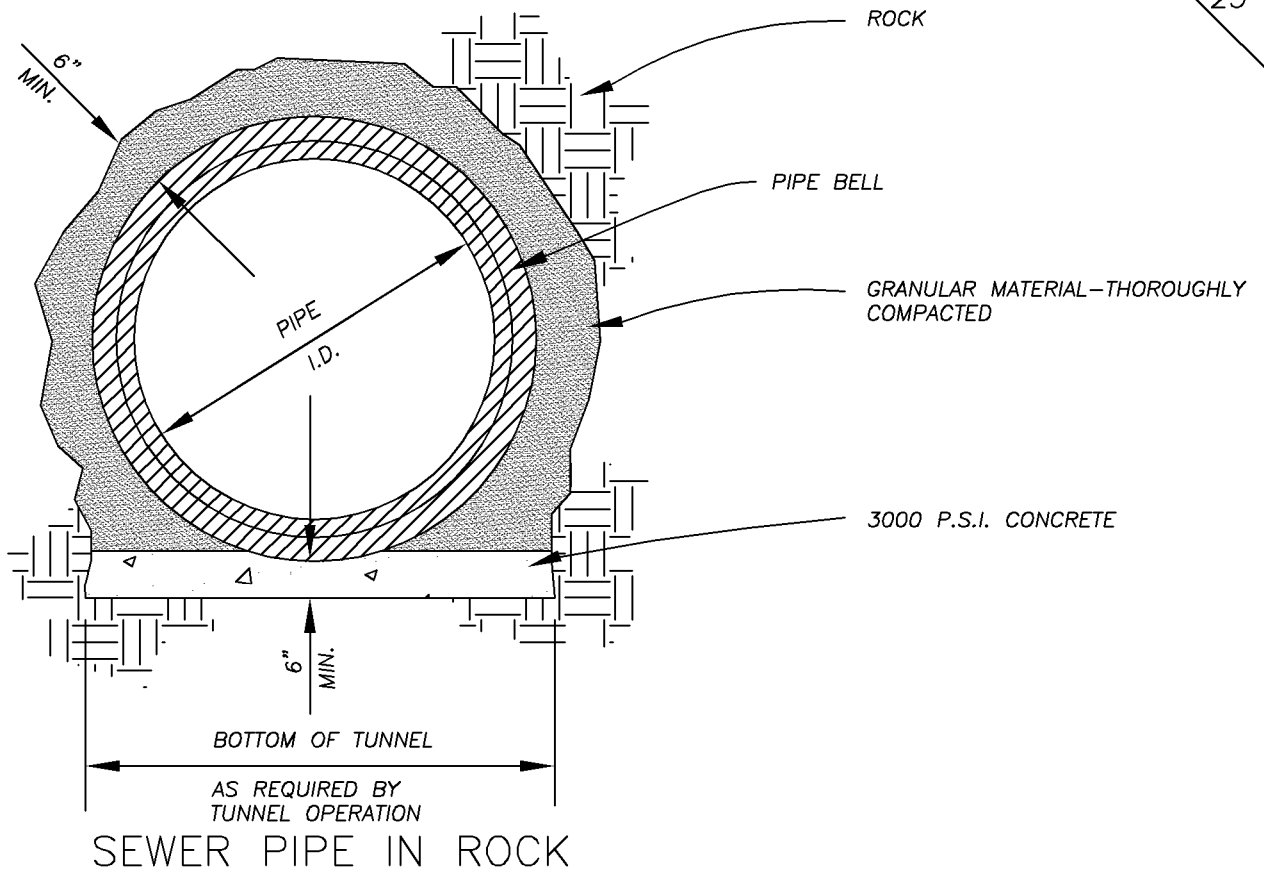
DEPARTMENT OF
SANITARY SEWER SERVICES

TYPICAL
PAVEMENT
REPLACEMENT

APPROVED BY

Ross A. Scholten, PE
DEPUTY DIRECTOR

DATE 09/15/15



SEWER PIPE IN TUNNEL LINER

NOT TO SCALE

NOTE:

CONCRETE SHALL BE PLACED AT BOTH ENDS OF THE STEEL LINER TO KEEP GRANULAR MATERIAL FIRMLY IN PLACE.

STANDARD DETAIL DWG. NO. 25
DEPARTMENT OF SANITARY SEWER SERVICES
TUNNEL EXCAVATION
APPROVED BY <i>Ross A. Scholborn, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

FLEXIBLE PIPE BEDDING AND BACKFILLING TYPE I

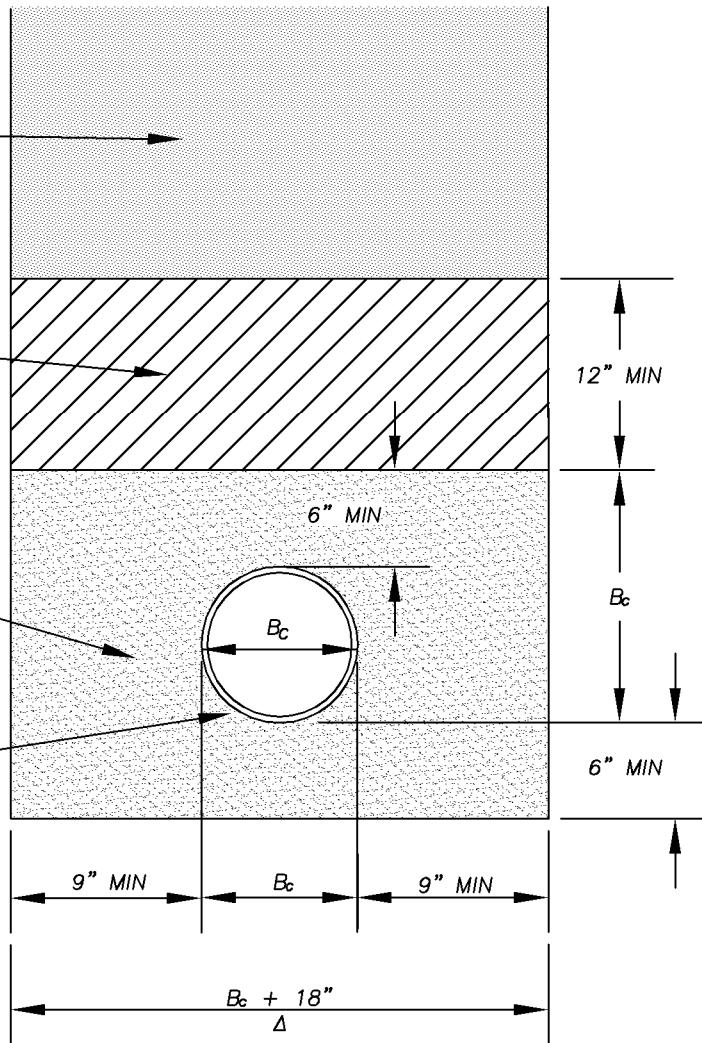
* STANDARD DRAWING NO. 36-37
 Δ CLASS I THRU V BACKFILL AS DIRECTED

MECHANICALLY PLACED
 SEE TECHNICAL SPECS.

* STANDARD DRAWING NO. 36-37
 Δ CLASS I THRU III- COMPACTED
 INITIAL BACKFILL- HAND PLACED.
 TAMPED IF DIRECTED

STANDARD DRAWING NO.36-37 CLASS I.

CARE MUST BE TAKEN TO
 ENSURE THAT SUFFICIENT
 BEDDING HAS BEEN WORKED
 UNDER THE HAUNCH OF THE
 PIPE TO PROVIDE ADEQUATE
 SIDE SUPPORT.



NOT TO SCALE

NOTE:

Δ ALL BEDDING AND BACKFILLING SHALL BE IN ACCORDANCE WITH A.S.T.M. D-2321 UNLESS OTHERWISE DIRECTED HEREIN OR BY THE ENGINEER.

* NOT APPLICABLE UNDER DRIVEWAYS, AND/OR TRAVELED ROADWAYS. SEE STANDARD DRAWING NO. 23

Δ " AS DIRECTED " SHALL MEAN AS DIRECTED BY THE PROJECT OR DESIGN ENGINEER.

B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

NOTE:

AGGREGATE SIZING STANDARD WILL BE PER ODOT LATEST CONSTRUCTION AND MATERIAL SPECIFICATIONS.

STANDARD DETAIL DWG. NO. 26
DEPARTMENT OF SANITARY SEWER SERVICES
FLEXIBLE PIPE BEDDING AND BACKFILLING RIGID PIPE TYPE I
APPROVED BY <i>Ross A. Scholborn, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

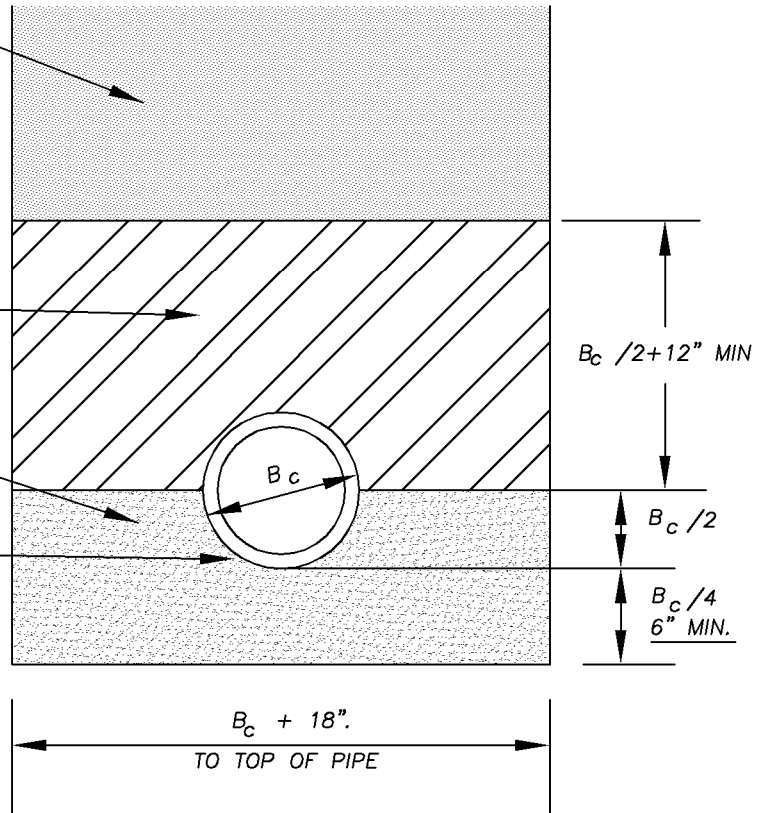
BEDDING AND BACKFILLING RIGID PIPE TYPE II

* STANDARD DRAWING NO. 36-37
CLASS II THRU V
BACKFILL—MECHANICALLY PLACED.
AS DIRECTED

* STANDARD DRAWING NO. 36-37
CLASS I THRU III—COMPACTED
INITIAL BACKFILL—HAND PLACED.
TAMPED IF DIRECTED

STANDARD DRAWING NO. 36-37
CLASS I.

CARE MUST BE TAKEN TO
ENSURE THAT SUFFICIENT
BEDDING HAS BEEN WORKED
UNDER THE PIPE TO PREVENT
VOIDS.



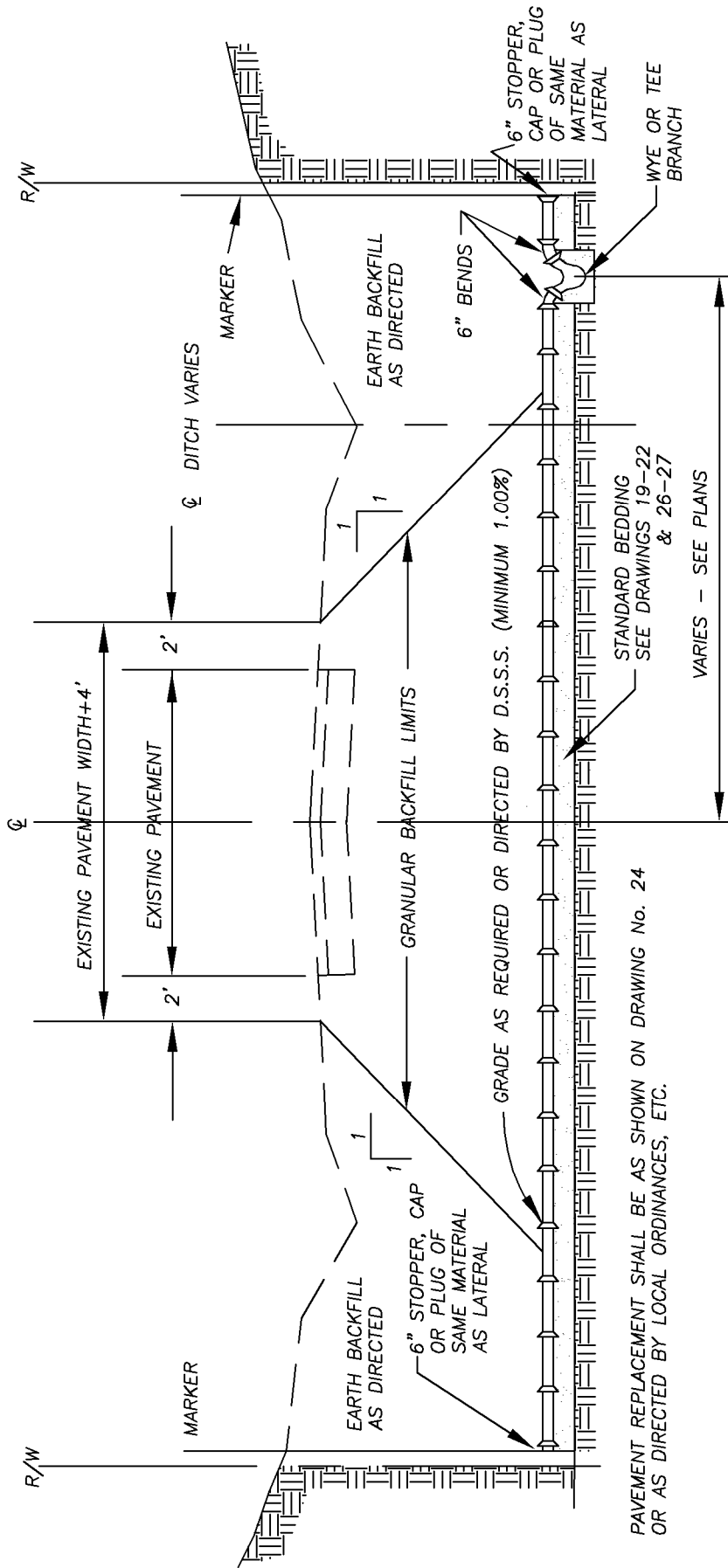
NOTE:

"AS DIRECTED" SHALL MEAN "AS DIRECTED BY THE PROJECT OR DESIGN ENGINEER."
 B_c DENOTES THE OUTSIDE DIAMETER OF THE BARREL OF THE PIPE.

* NOT APPLICABLE UNDER DRIVEWAYS, AND/OR TRAVELED
ROADWAYS. SEE STANDARD DRAWING NO. 23

NOTE:
AGGREGATE SIZING STANDARD WILL BE PER ODOT LATEST
CONSTRUCTION AND MATERIAL SPECIFICATIONS.

STANDARD DETAIL DWG. NO. 27
DEPARTMENT OF SANITARY SEWER SERVICES
BEDDING AND BACKFILLING RIGID PIPE TYPE II
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u> / 27



PAVEMENT REPLACEMENT SHALL BE AS SHOWN ON DRAWING No. 24 OR AS DIRECTED BY LOCAL ORDINANCES, ETC.

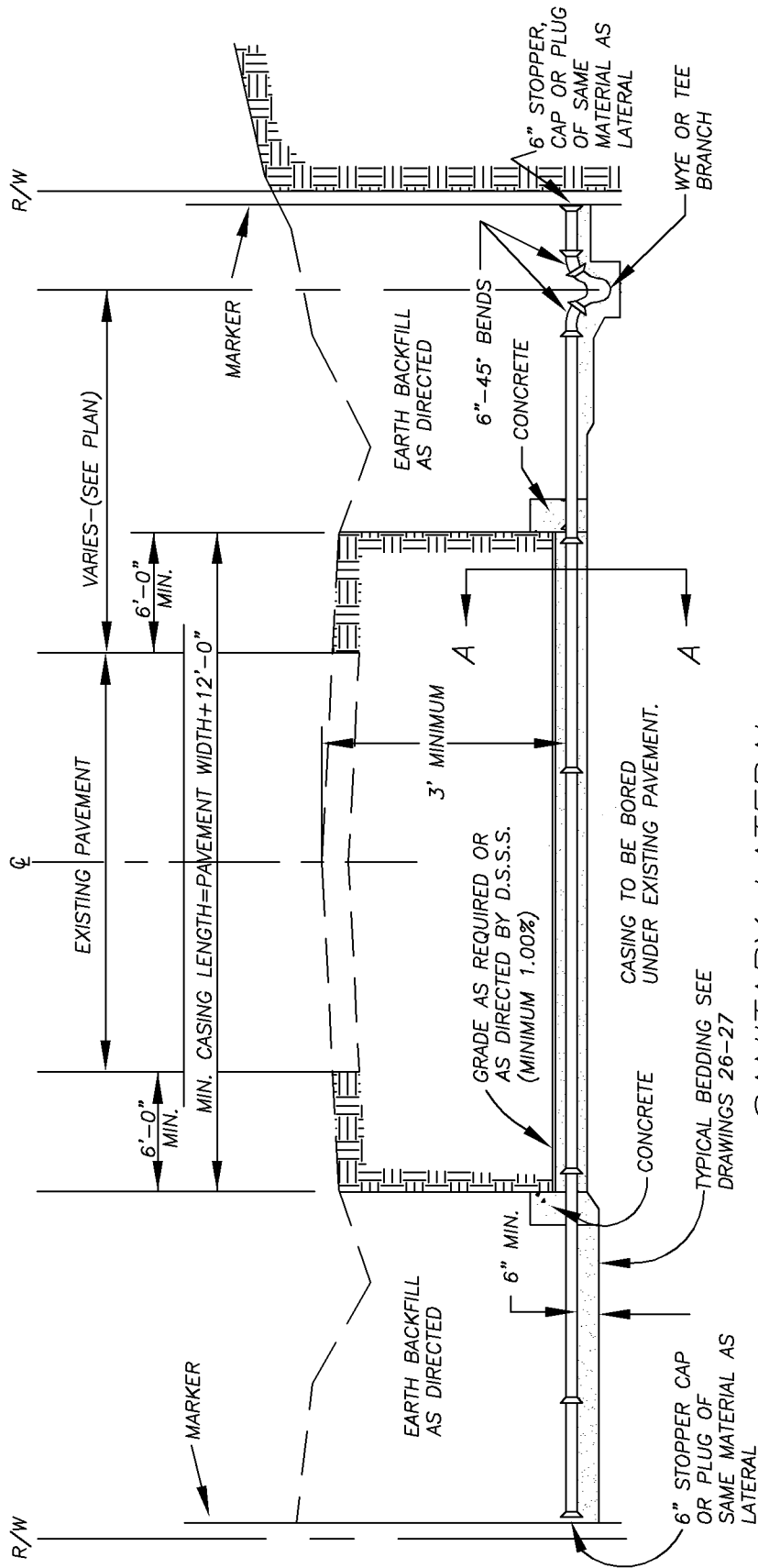
DETAIL OF SANITARY LATERAL OPEN CUT THROUGH EXISTING PAVEMENTS

MARKERS

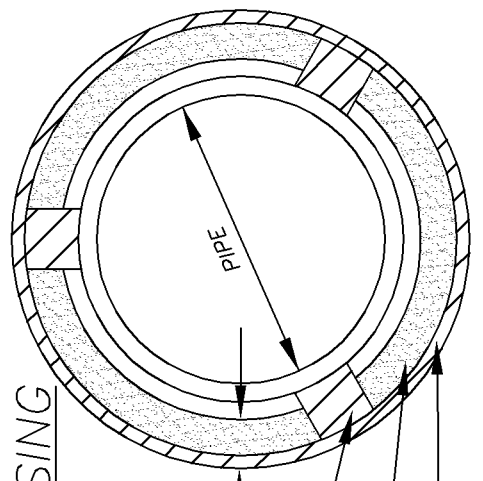
GRANULAR BACKFILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 12" IN DEPTH AND COMPACTED BY MECHANICAL DEVICES TO A DENSITY OF NOT LESS THAN 100% STANDARD PROCTOR DENSITY.

- 1) PROVIDE 2"x2" POLES TO MARK END OF BRANCHES, RISERS AND SERVICE CONNECTIONS FOR FUTURE LOCATION.
- 2) EXTEND POLE TO 12" ABOVE GROUND.
- 3) REST POLE AGAINST BELL BUT NOT ON IT.
- 4) SUPPORT POLES IN A VERTICAL POSITION DURING BACKFILL.
- 5) CUT 2"x2" POLES OFF 1'-0" BELOW GROUND AFTER CONSTRUCTION. (POLES TO BE OF ROUGH CUT LUMBER.)

STANDARD DETAIL DWG. NO. 28
DEPARTMENT OF SANITARY SEWER SERVICES
SANITARY LATERAL OPEN CUT THROUGH EXISTING PAVEMENT
APPROVED BY <i>Ross A. Schoborn, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u>



**SANITARY LATERAL -
BORED ROAD CROSSING WITH STEEL CASING**



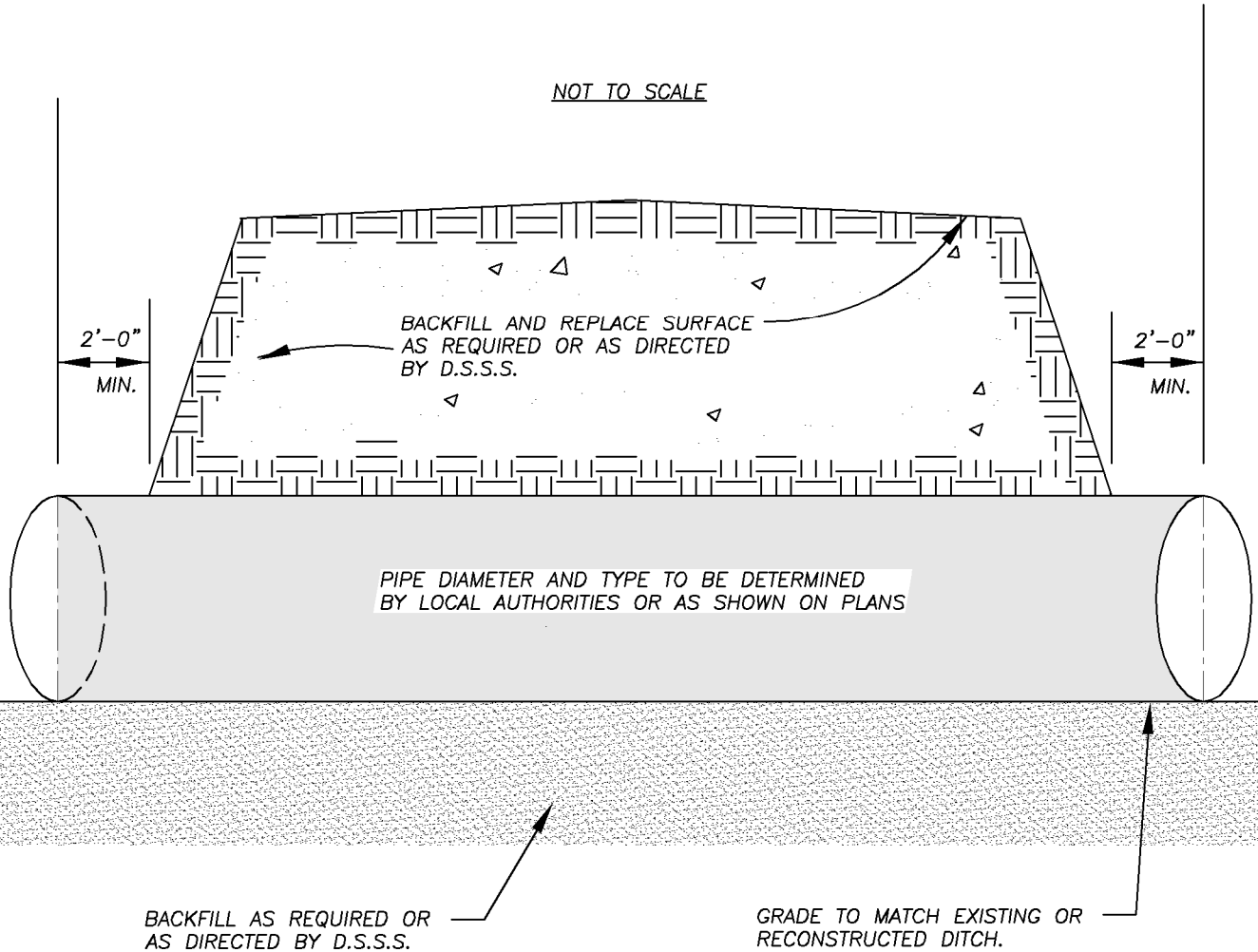
SECTION A-A

- 1) FLUSH VOID BETWEEN CASING AND PIPE WITH SAND OR OTHER APPROVED MATERIAL.
- 2) SEE SHEET THREE FOR ACCEPTABLE PIPE AND MATERIALS TO BE USED.
- 3) ALTERNATE METHODS MAY BE USED, IF FIRST APPROVED BY D.S.S.S.
- 4) CONCRETE SHALL BE PLACED AT BOTH ENDS OF STEEL CASING TO KEEP GRANULAR MATERIAL FIRMLY IN PLACE.

STANDARD DETAIL DWG. NO. 29
DEPARTMENT OF SANITARY SEWER SERVICES
SANITARY LATERAL BORED ROAD CROSSING WITH STEEL CASING
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u>

TYPICAL SECTION FOR CULVERT PIPE REPLACEMENT OR NEW INSTALLATION

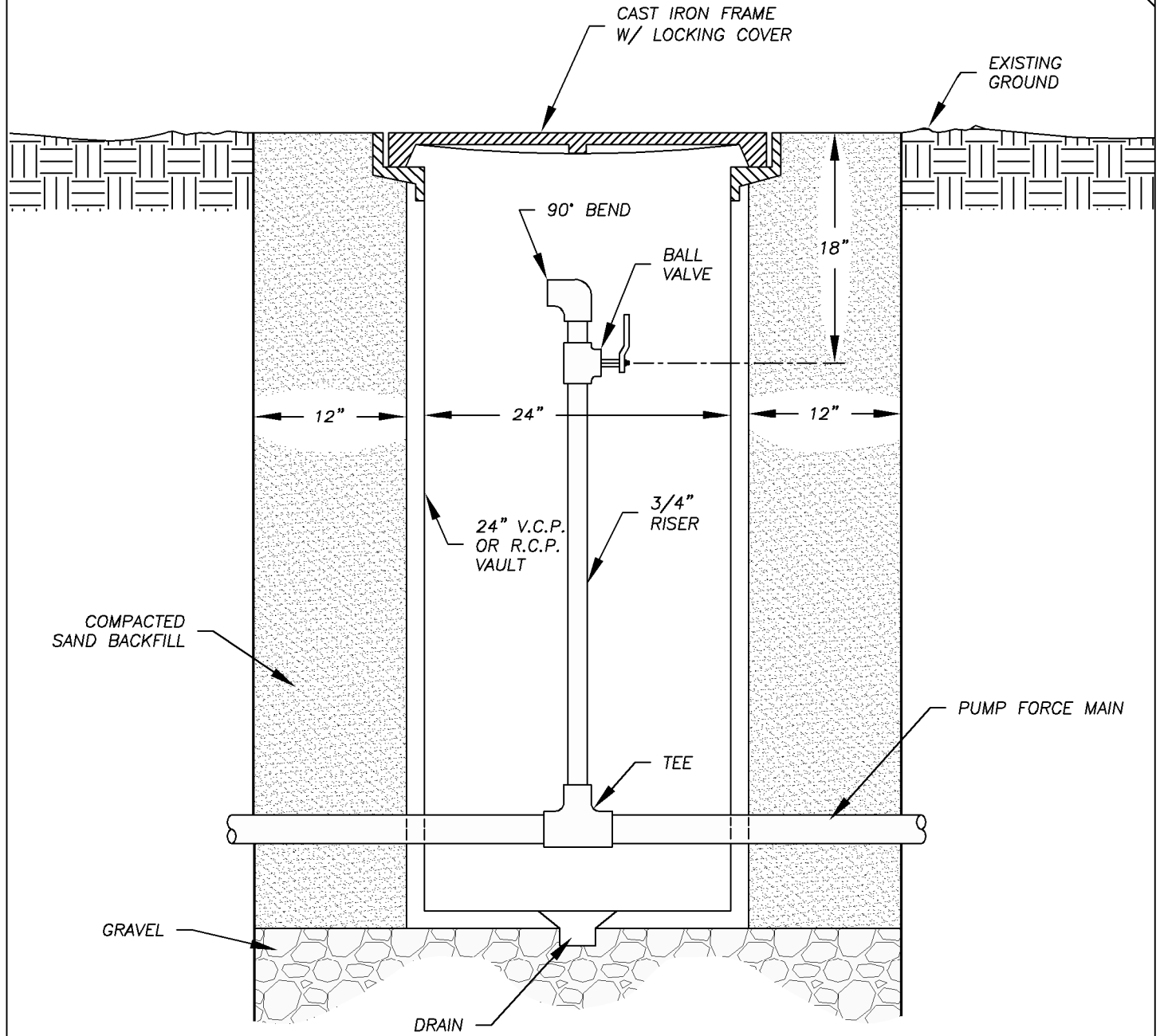
NOT TO SCALE



NOTE:

PIPE SHALL EXTEND A MINIMUM OF 2'-0" BEYOND TOE OF SLOPE BUT IN NO CASE SHALL BE LESS THAN 12'-0" IN LENGTH.

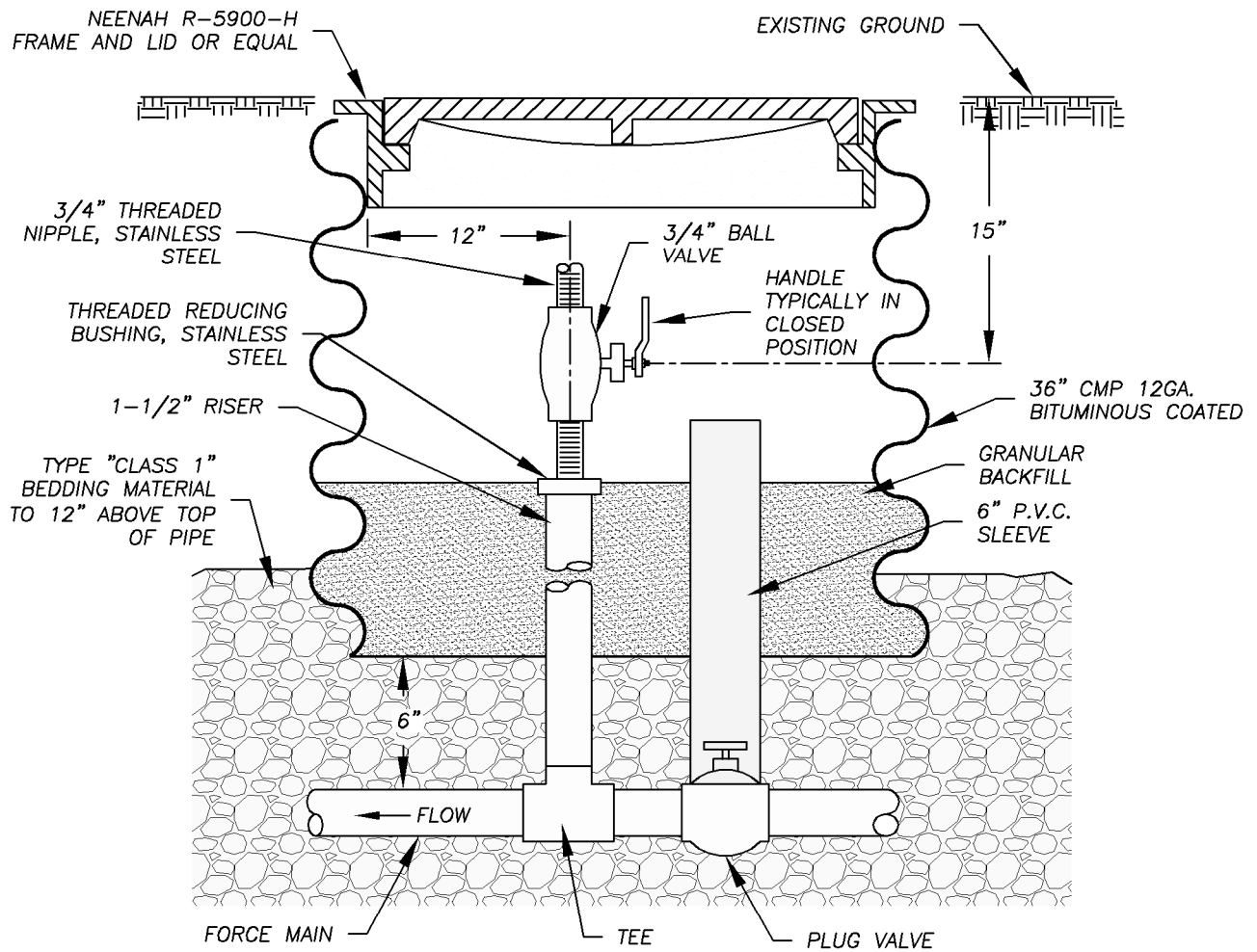
STANDARD DETAIL DWG. NO. 30
DEPARTMENT OF SANITARY SEWER SERVICES
TYPICAL SECTION CULVERT PIPE
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15



FOR USE WITHIN R/W AND ONLY WHEN APPROVED BY THE D.S.S.S.

* ALL PIPE SHALL BE ASTM D1785 SCHEDULE 80

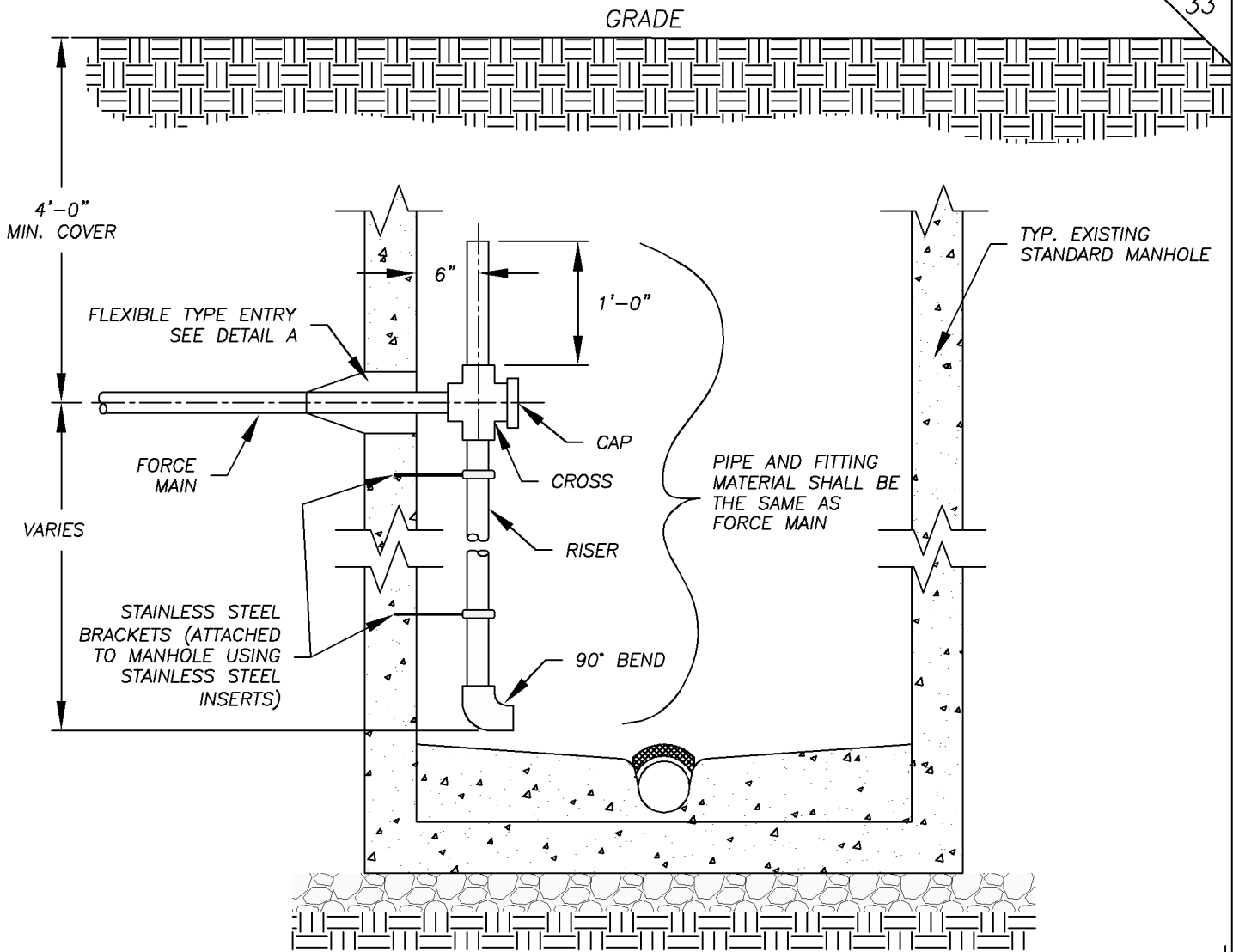
STANDARD DETAIL DWG. NO. 31
DEPARTMENT OF SANITARY SEWER SERVICES
SMALL DIAMETER FORCE MAIN AIR RELEASE ASSEMBLY
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15



FOR USE OUTSIDE OF R/W
AND ONLY WHEN APPROVED
BY THE D.S.S.S.

* ALL PIPE SHALL BE
ASTM D1785
SCHEDULE 80.

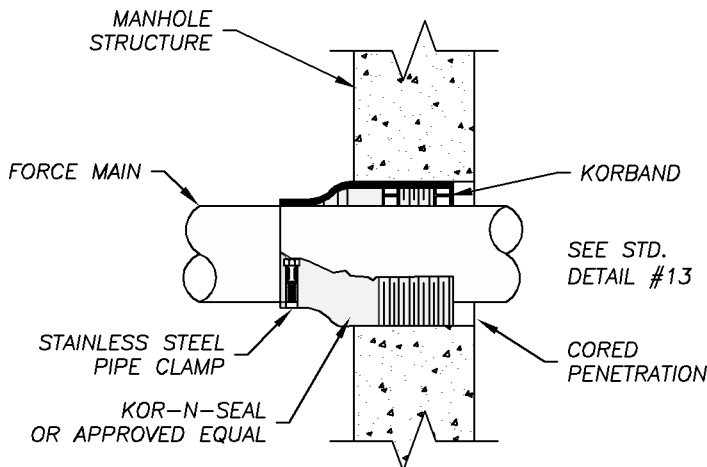
STANDARD DETAIL DWG. NO. 32	
DEPARTMENT OF SANITARY SEWER SERVICES	
SMALL DIAMETER FORCE MAIN CLEANOUT DETAIL	
APPROVED BY	<i>Ross A. Scholten, PE</i>
DEPUTY DIRECTOR	
DATE	09/15/15



**SMALL DIAMETER FORCE MAIN
TO EXISTING MANHOLE CONNECTION**

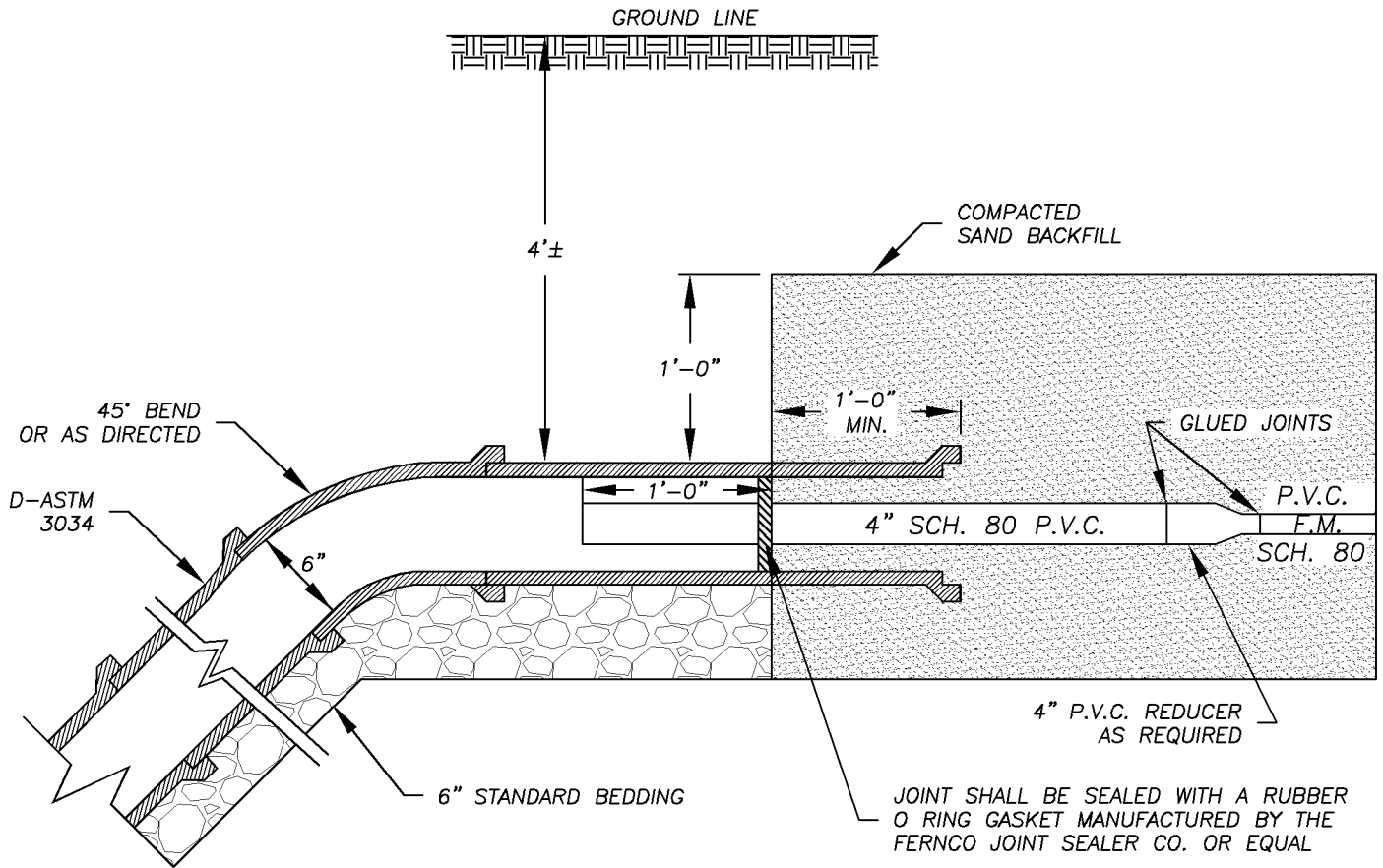
(FOR FORCE MAINS LESS THAN 4" DIAMETER)

NOT TO SCALE



DETAIL A

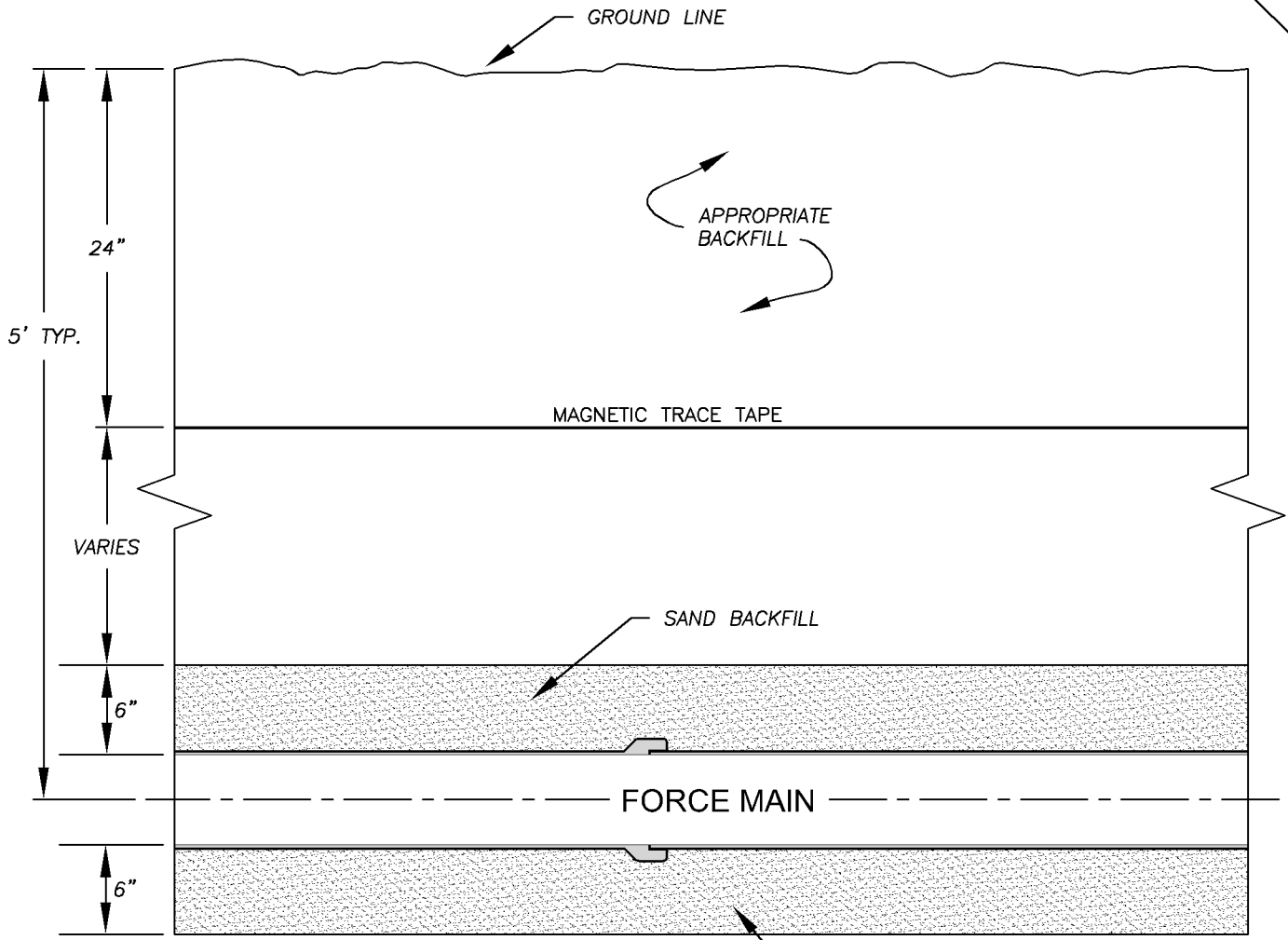
STANDARD DETAIL DWG. NO. 33
DEPARTMENT OF SANITARY SEWER SERVICES
SMALL DIAMETER FORCE MAIN TO EXISTING MANHOLE CONNECTION
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15



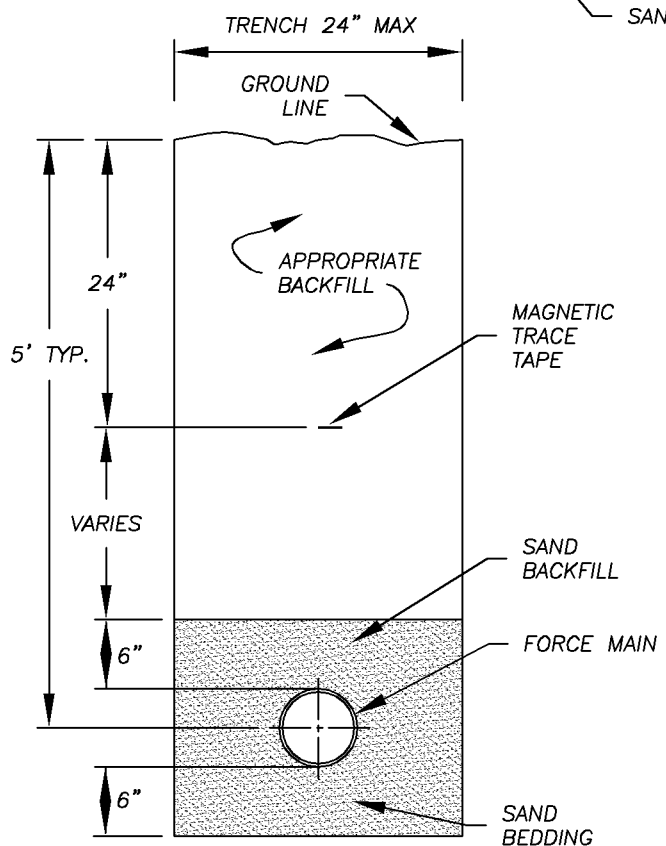
SMALL DIAMETER FORCE MAIN
TO LATERAL CONNECTION

NOT TO SCALE

STANDARD DETAIL DWG. NO. 34
DEPARTMENT OF SANITARY SEWER SERVICES
SMALL DIAMETER FORCE MAIN TO LATERAL CONNECTION
APPROVED BY <i>Ross A. Scholborn, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u>



PROFILE
VIEW
NOT TO SCALE



SECTION
VIEW
NOT TO SCALE

STANDARD DETAIL DWG. NO. 35
DEPARTMENT OF SANITARY SEWER SERVICES
FORCE MAIN TRENCH DETAIL
APPROVED BY <i>Ross A. Scholten, PE</i> DEPUTY DIRECTOR
DATE 09/15/15

DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATION

SOIL CLASS	SOIL TYPE	DESCRIPTION OF MATERIAL CLASSIFICATION
CLASS I SOILS *		Manufactured angular, granular material, 1/4 to 1 1/2 inches (6 to 40 mm) size, including materials having regional significance such as crushed stone or rock, broken coral, cinders, or crushed shells.
CLASS II SOILS**	GW	Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. more than 95% retained on No. 200 sieve. clean.
	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	SW	Well-graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No.200 sieve. Clean.
	SP	Poorly graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
CLASS III SOILS***	GM	Silty gravels, gravel-sand mixtures. 50% or more re- tained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	GC	Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	SW	Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
	SC	Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No.200 sieve.
CLASS IV SOILS	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
CLASS V SOILS	OL	Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	OH	Organic clays of medium to high plasticity. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	PT	Peat, muck and other highly organic soils.

* Soils defined as Class I materials are not defined in ASTM D2487.
 ** In accordance with ASTM D2487, less than 5% pass No. 200 sieve.
 *** In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g., GP-GC.

Note:

Aggregate sizing standard will be per ODOT latest construction and material specifications.

STANDARD
DETAIL DWG. NO. 36

DEPARTMENT OF
SANITARY SEWER SERVICES

STANDARD
SOIL
CLASSIFICATIONS

APPROVED BY

Ross A. Scholborn, PE
DEPUTY DIRECTOR

DATE 09/15/15

Amounts finer than each laboratory sieve (square openings), percentage by weight.

No.	Nominal size square openings (1)	Amounts finer than each laboratory sieve (square openings), percentage by weight.														
		4	3-1/2	3	2-1/2	2	1-1/2	1	3/4	1/2	3/8	No.4	No.8	No.16	No.50	No.100
1	3-1/2 to 1-1/2	100	90 to 100	---	25 to 60	---	0 to 15	---	0 to 5	---	---	---	---	---	---	---
2	2-1/2 to 1-1/2	---	---	100	90 to 100	35 to 70	0 to 15	---	0 to 5	---	---	---	---	---	---	---
24	2-1/2 to 3/4	---	---	100	90 to 100	---	25 to 60	---	0 to 10	0 to 5	---	---	---	---	---	---
3	2 to 1	---	---	---	100	95 to 100	35 to 70	0 to 15	---	0 to 5	---	---	---	---	---	---
357	2 to No.4	---	---	---	100	95 to 100	---	35 to 70	---	10 to 30	---	0 to 5	---	---	---	---
4	1-1/2 to 3/4	---	---	---	---	100	90 to 100	20 to 55	0 to 15	---	0 to 5	---	---	---	---	---
467	1-1/2 to No.4	---	---	---	---	100	95 to 100	---	35 to 70	---	10 to 30	0 to 5	---	---	---	---
5	1 to 1/2	---	---	---	---	---	100	90 to 100	20 to 55	0 to 10	0 to 5	---	---	---	---	---
56	1 to 3/8	---	---	---	---	---	100	90 to 100	40 to 75	15 to 35	0 to 15	0 to 5	---	---	---	---
57	1 to No.4	---	---	---	---	---	100	95 to 100	---	25 to 60	---	0 to 10	0 to 5	---	---	---
6	3/4 to 3/8	---	---	---	---	---	---	100	90 to 100	20 to 55	0 to 15	0 to 5	---	---	---	---
67	3/4 to No.4	---	---	---	---	---	---	100	90 to 100	---	20 to 55	0 to 10	0 to 5	---	---	---
68	3/4 to No.8	---	---	---	---	---	---	100	90 to 100	---	30 to 65	5 to 25	0 to 10	0 to 5	---	---
7	1/2 to No.4	---	---	---	---	---	---	---	100	90 to 100	40 to 70	0 to 15	0 to 5	---	---	---
78	1/2 to No.8	---	---	---	---	---	---	---	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	---	---
8	3/8 to No.8	---	---	---	---	---	---	---	---	100	85 to 100	10 to 30	0 to 10	0 to 5	---	---
89	3/8 to No.16	---	---	---	---	---	---	---	---	---	90 to 100	20 to 55	5 to 30	0 to 10	0 to 5	---
9	No.4 to No.16	---	---	---	---	---	---	---	---	---	---	100	85 to 100	10 to 40	0 to 5	---
10	No.4 to 0(2)	---	---	---	---	---	---	---	---	---	---	---	100	85 to 100	---	10 to 30

IN INCHES, EXCEPT WHERE OTHERWISE INDICATED. NUMBERED SIEVES ARE THOSE OF THE UNITED STATES STANDARD SIEVE SERIES SCREENINGS. WHERE STANDARD SIZES OF COARSE AGGREGATE DESIGNATED BY TWO OR THREE DIGIT NUMBERS ARE SPECIFIED, THE SPECIFIED GRADATION MAY BE OBTAINED BY COMBINING THE APPROPRIATE SINGLE STANDARD SIZE AGGREGATES BY A SUITABLE PROPORTIONING DEVICE WHICH HAS A SEPARATE COMPARTMENT FOR EACH COARSE AGGREGATE COMBINED. THE BLENDING SHALL BE DONE AS DIRECTED BY THE LABORATORY.

SIZES OF COARSE AGGREGATE (AASHO M 43)

STANDARD DETAIL DWG. NO. 37
DEPARTMENT OF SANITARY SEWER SERVICES
AGGREGATE SIZING STANDARD
APPROVED BY <i>Rosa A. Schobert, PE</i> DEPUTY DIRECTOR
DATE <u>09/15/15</u>