

## SEWER DETAILS

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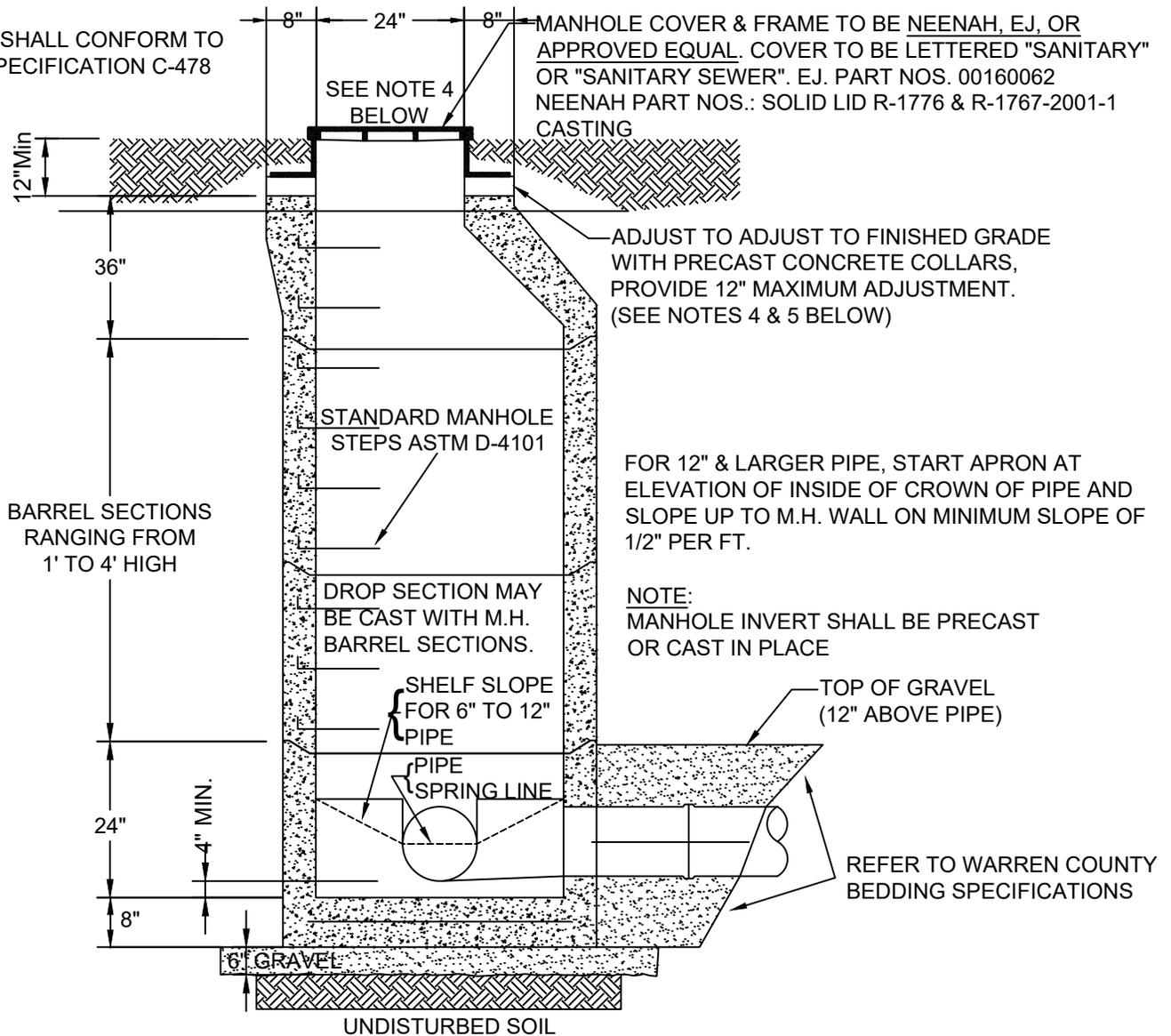
MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**TOC**

MANHOLE SHALL CONFORM TO A.S.T.M. SPECIFICATION C-478



ADJUST TO ADJUST TO FINISHED GRADE WITH PRECAST CONCRETE COLLARS, PROVIDE 12" MAXIMUM ADJUSTMENT. (SEE NOTES 4 & 5 BELOW)

FOR 12" & LARGER PIPE, START APRON AT ELEVATION OF INSIDE OF CROWN OF PIPE AND SLOPE UP TO M.H. WALL ON MINIMUM SLOPE OF 1/2" PER FT.

NOTE: MANHOLE INVERT SHALL BE PRECAST OR CAST IN PLACE

TOP OF GRAVEL (12" ABOVE PIPE)

REFER TO WARREN COUNTY BEDDING SPECIFICATIONS

**NOTES:**

1. MINIMUM WALL THICKNESS AND STEEL REINFORCING TO CONFORM WITH A.S.T.M. DESIGNATION C-478. STEEL SHALL BE COLD DRAWING WIRE IN ACCORDANCE WITH A.S.T.M. DESIGNATION A-82.
2. WATER TIGHT GASKETS ARE REQUIRED AT ALL JOINTS (C-443 FOR RUBBER TYPE JOINTS).
3. EXCEPT AS OTHERWISE NOTED ON THE SEWER STAKING PLAN, WHERE PIPE SIZES CHANGE AT THE MANHOLE, THE INSIDE TOPS OF PIPES ARE TO BE SET AT THE SAME ELEVATION.
4. TOP OF CASTING SHALL BE EVEN WITH FINISHED GRADE AT PAVE LOCATIONS (ROADWAYS AND PARKING LOTS) AND AT DEVELOPED LOTS. IN UNDEVELOPED LOTS, TOP OF CASTING TO BE A MINIMUM OF 12" ABOVE FINISHED GRADE OR AS OTHERWISE SHOWN ON PLAN.
5. WITHIN A NEW SUBDIVISION, TEMPORARY ADJUSTING COLLAR MUST BE PROVIDED 1 FOOT ABOVE ROUGH/FINISHED GRADE. RISERS (12" MAXIMUM) ARE PERMITTED. MANHOLES SHALL BE LOWERED TO FINISHED GRADE WHEN SUBDIVISION IMPROVEMENTS ARE COMPLETED AND THE LOTS IS BUILT ON.
6. NO MANHOLE, OR ANY PORTION OF MANHOLE, SHALL BE LOCATED UNDER A SIDEWALK OR DRIVEWAY. MANHOLES SHALL ONLY BE ALLOWED IN ROADWAY PAVEMENT UPON PERMISSION BY THE COUNTY SANITARY ENGINEER.
7. A MINIMUM DROP OF 0.20' MUST BE MAINTAINED BETWEEN INLET AND OUTLET INVERTS IN MANHOLES.

## PRECAST MANHOLE

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WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

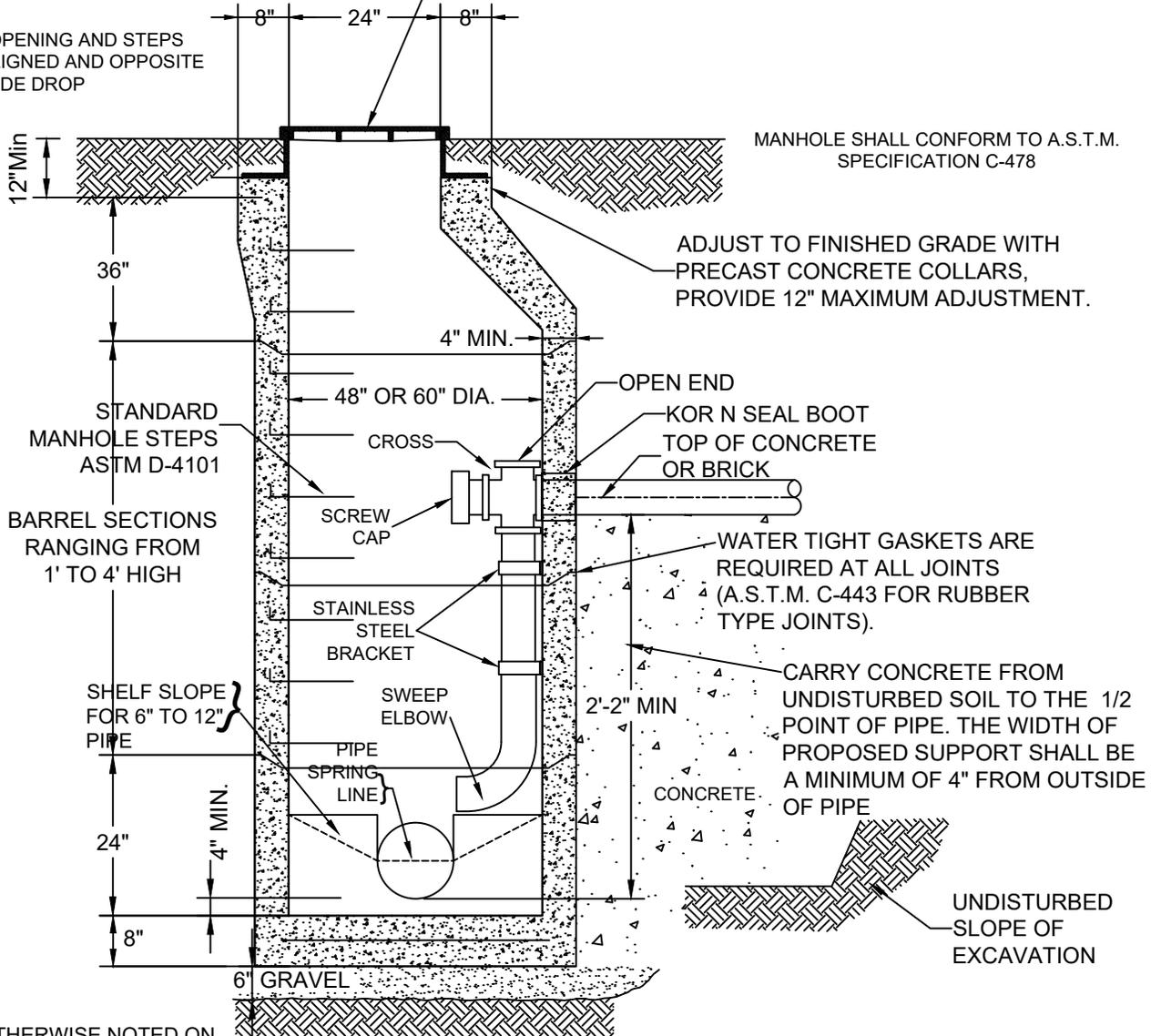
STANDARD NUMBER

**S-1**

**NOTE:** TOP OF CASTING SHALL BE AT FINISHED GRADE AT PAVED LOCATIONS (ROADWAYS AND PARKING LOTS) AND AT DEVELOPED LOTS. IN UNDEVELOPED LOTS, TOP OF CASTING TO BE A MINIMUM OF 12" ABOVE FINISHED GRADE OR AS SHOWN ON PLAN.

MANHOLE COVER & FRAME TO BE NEENAH, EJ, OR APPROVED EQUAL. COVER TO BE LETTERED "SANITARY" OR "SANITARY SEWER". EJ. PART NOS. 00160062 NEENAH PART NOS.: SOLID LID R-1776 & R-1767-2001-1 CASTING

MANHOLE OPENING AND STEPS MUST BE ALIGNED AND OPPOSITE OF THE INSIDE DROP



**NOTE:**

EXCEPT AS OTHERWISE NOTED ON THE SEWER STAKING PLAN, WHERE PIPE SIZES CHANGE AT THE MH, THE INSIDE TOPS OF PIPES ARE TO BE AT THE SAME ELEVATION.

MINIMUM WALL THICKNESS AND STEEL REINFORCING TO CONFORM WITH ASTM DESIGNATION C-478. STEEL SHALL BE COLD DRAWN WIRE IN ACCORDANCE WITH ASTM DESIGNATION A-82.

NO MANHOLE, OR ANY PORTION OF A MANHOLE, SHALL BE LOCATED UNDER A SIDEWALK OR DRIVEWAY. MANHOLE SHALL ONLY BE ALLOWED IN ROADWAY PAVEMENT UPON PERMISSION BY THE COUNTY SANITARY ENGINEER.

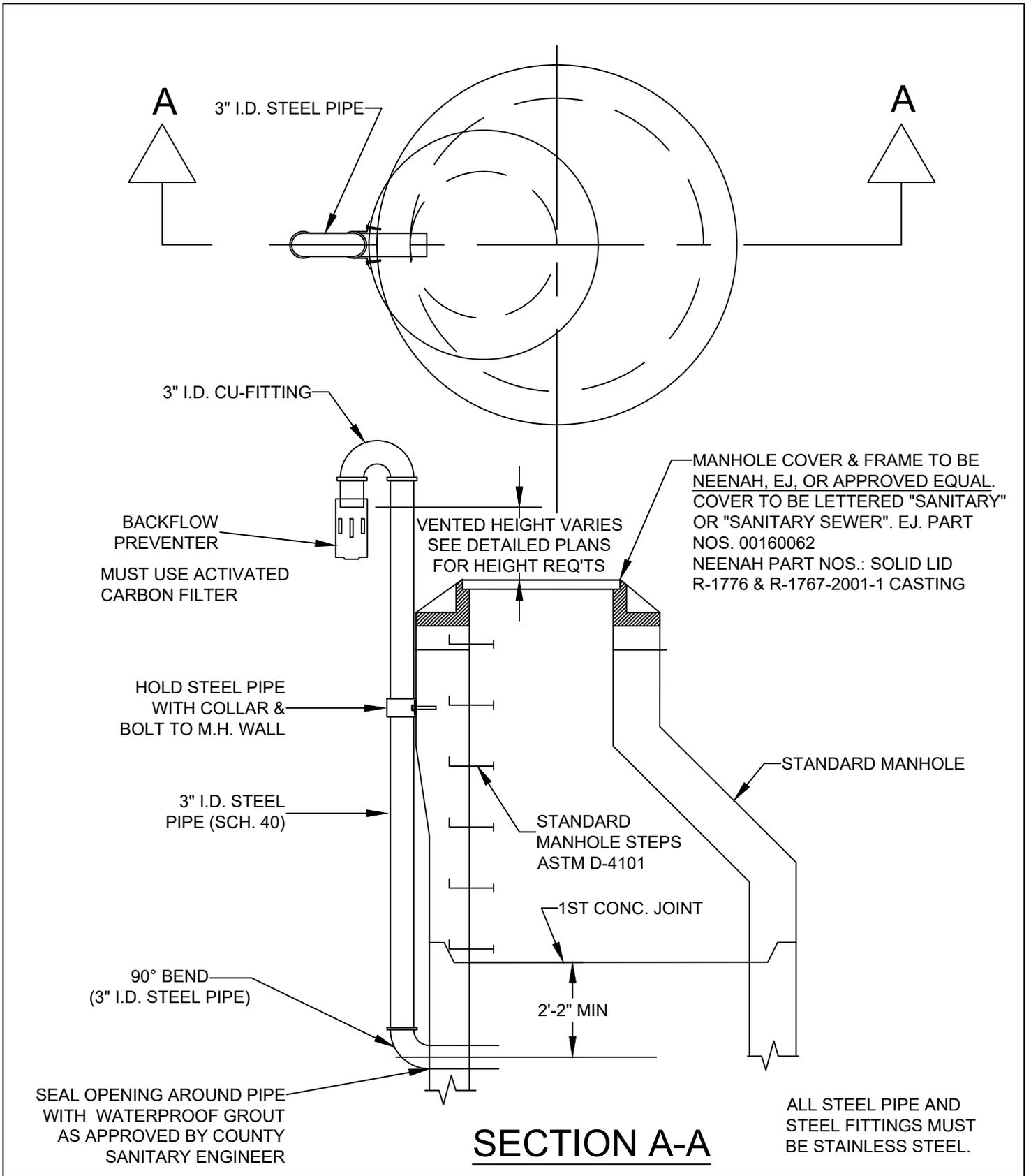
WITHIN A NEW SUBDIVISION, TEMPORARY ADJUSTING COLLAR MUST BE PROVIDED 1 FOOT ABOVE ROUGH/FINISHED GRADE. RISERS (12" MAXIMUM) ARE PERMITTED. MANHOLES SHALL BE LOWERED TO FINISHED GRADE WHEN SUBDIVISION IMPROVEMENTS ARE COMPLETED AND THE LOT IS BUILT ON .

# PRECAST MANHOLE INSIDE DROP CONNECTION

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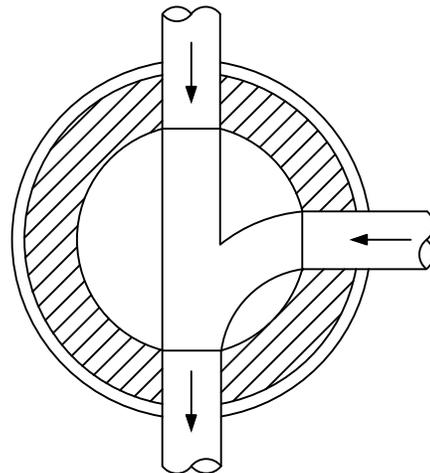
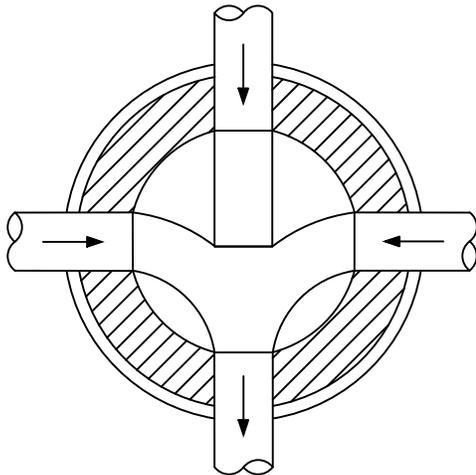
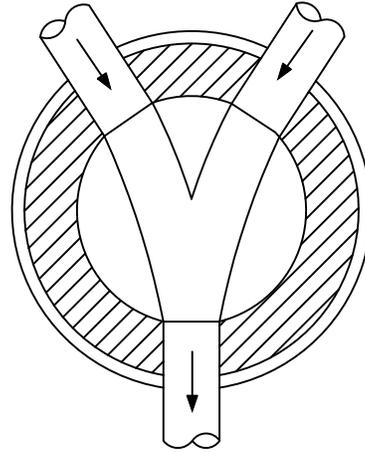
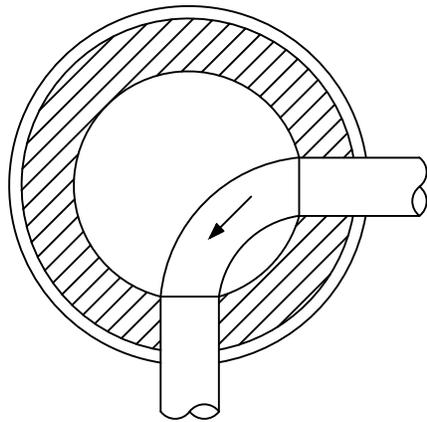
WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER  
**S-2**



## VENTED MANHOLE

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NOTE:

1. MODIFY MANHOLE CHANNEL ENTRANCE CONDITIONS TO SUIT ENTRANCE NEEDS OF INDIVIDUAL CASES, MAINTAINING CHANNEL CONCEPT.
2. CHANNELS MUST BE SUITABLE FOR INSTALLATION & REMOVAL OF EXPANSION PLUG USED FOR FLUSHING.
3. ALL CONSTRUCTION DETAILS & DIMENSION ARE TO CONFORM TO THOSE SHOWN FOR STANDARD MANHOLES.
4. ALL CHANNELS MUST BE SMOOTH AND UNIFORM. TRANSITION MUST NOT CREATE OBSTRUCTION TO FLOW.
5. SLOPE CHANNELS UNIFORMLY TO MAINTAIN A MINIMUM DROP OF 0.20' BETWEEN INLET AND OUTLET INVERTS.

## MANHOLE CHANNELS

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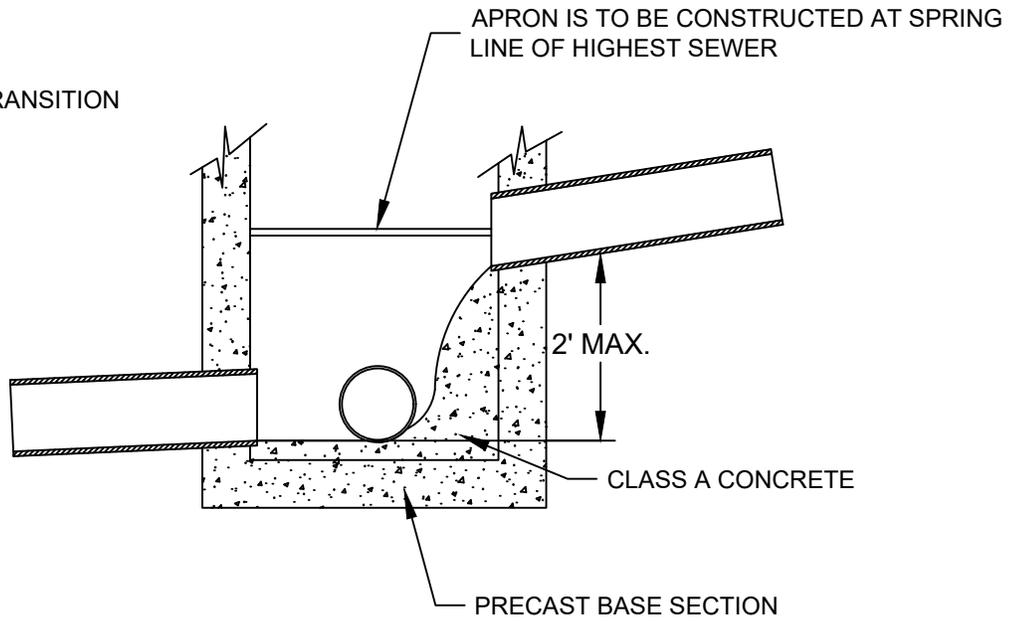
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WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

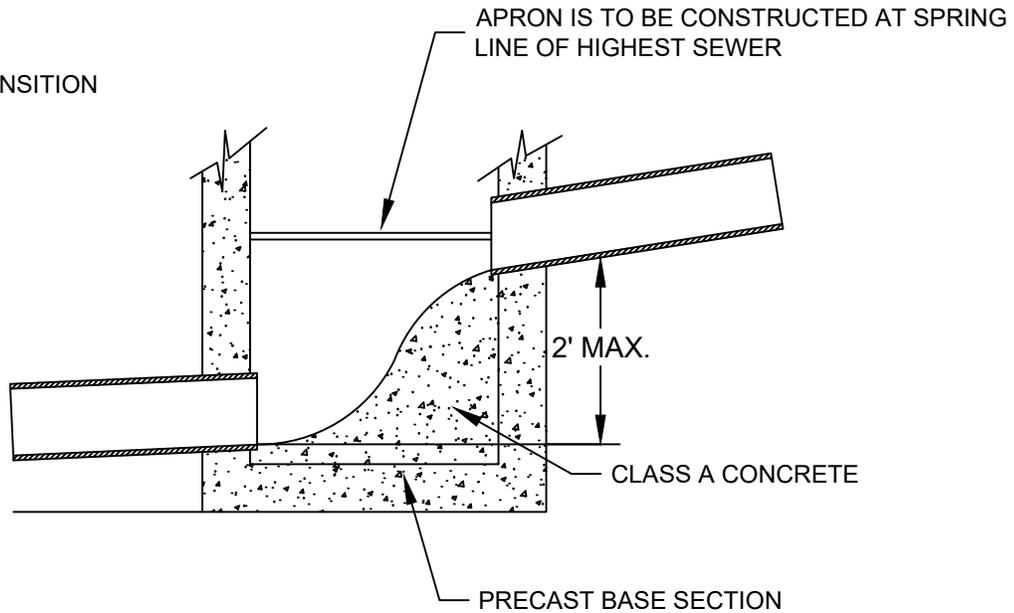
STANDARD NUMBER

# S-4

THREE PIPE TRANSITION



TWO PIPE TRANSITION



NOTE:

DROP MANHOLES ARE TO BE USED WHEN THE SEWER ENTERING THE MANHOLE IS TWO (2) FEET OR GREATER ABOVE THE MANHOLE INVERT.

# SANITARY M.H. INVERT TRANSITION BASE SECTIONS

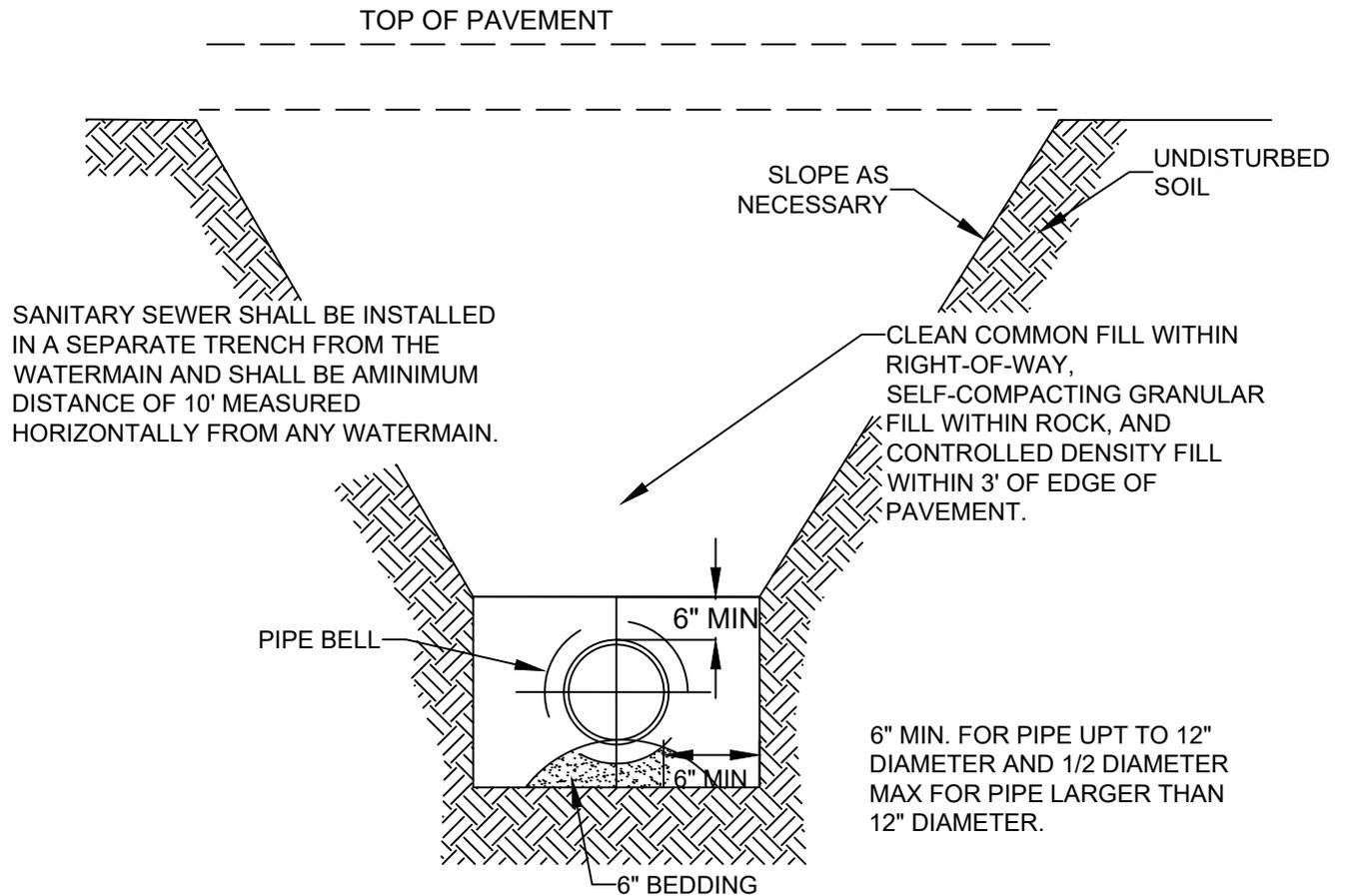
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MARCH, 2018

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-5



REFER TO WARREN COUNTY BEDDING REQUIREMENTS PER STANDARD DETAILS SG-1.

**NOTES:**

1. TRENCH SIDES SHALL MEET OSHA REQUIREMENTS.
2. TRENCH SHALL HAVE FLAT BOTTOM SO THAT PIPE WILL BE SUPPORTED UNIFORMLY ALONG THE BARREL.
3. NO SUPPORT BY BLOCKING IS PERMITTED.

## SANITARY GRAVITY SEWER TRENCH DETIAL

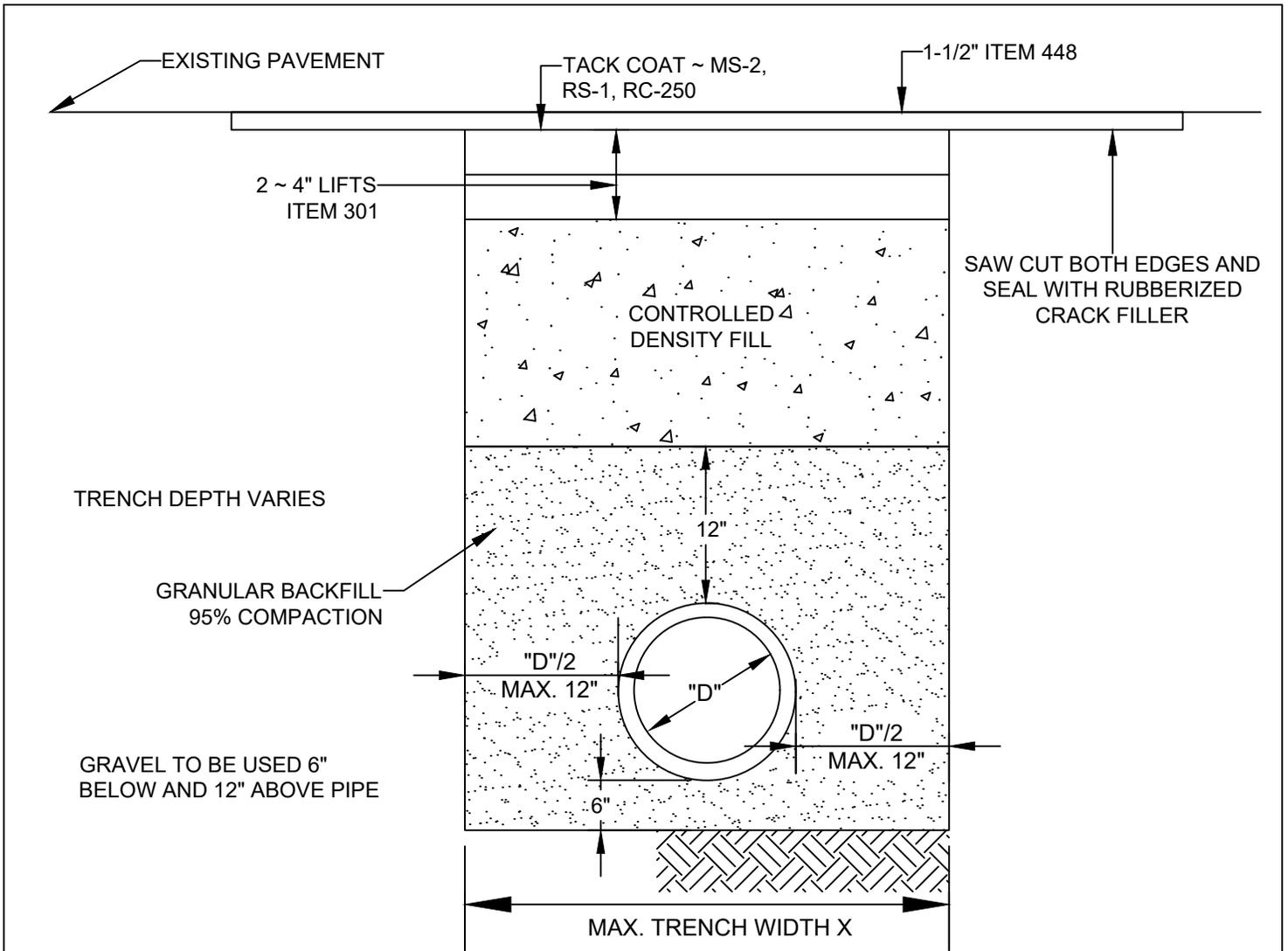
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MARCH, 2018

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-6



**NOTES:**

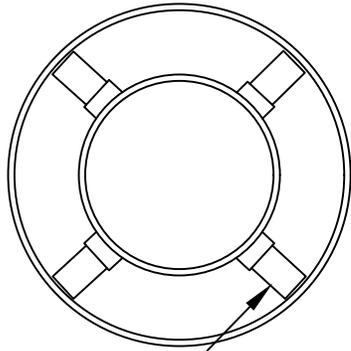
1. ALL DIMENSIONS ARE MINIMUM - ACTUAL TO BE PER COUNTY ENGINEER OR ODOT INSTRUCTIONS & PERMIT.
2. TRAFFIC MUST BE MAINTAINED AT ALL TIMES; LIGHTS, SIGNS, BARRICADES AND IF NECESSARY, FLAGMAN AN WATCHMEN TO BE ON JOB FOR PROTECTION OF THE PUBLIC. STREET PLATES MUST CONFORM TO COUNTY ENGINEER OR ODOT REQUIREMENTS.
3. FLASHFILL OR CONTROLLED DENSITY FILL TO A MINIMUM DISTANCE OF 5 FEET BEYOND THE EDGE OF PAVEMENT. TRENCH BACKFILL AND PAVEMENT RESTORATION MUST CONFORM TO THE APPLICABLE WARREN COUNTY ENGINEER OR ODOT SPECIFICATIONS.
4. EXISTING PAVEMENT AND EDGES SHALL BE NEATLY AND SQUARELY TRIMMED AND/OR MILLED. PAVEMENT MUST MATCH EXISTING ROAD THICKNESS OR AS SPECIFIED BY COUNTY ENGINEER OR ODOT.

**ROAD PAVEMENT CUT AND RESTORATION  
AT ROADWAY CROSSING**

APPROVED/REVISED	WARREN COUNTY STANDARD DETAILS DEPARTMENT OF WATER & SEWER	STANDARD NUMBER
MARCH, 2018		<b>S-7</b>

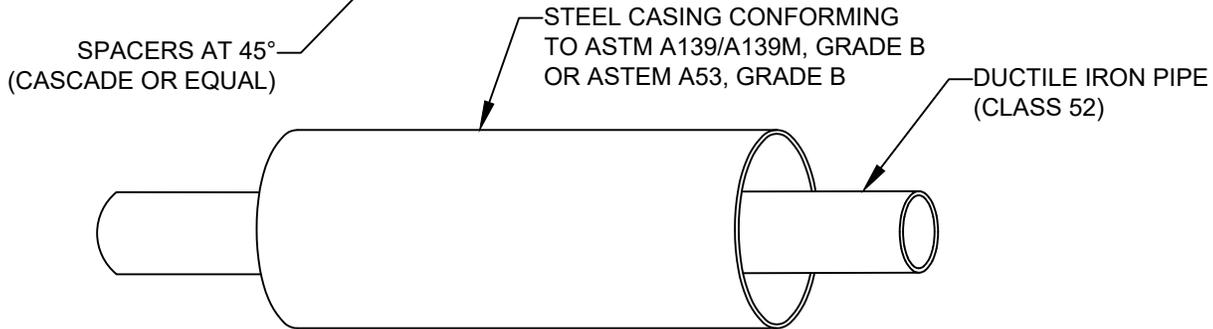
WATER PIPE SIZE - CARRIER PIPE SIZE (O.D.)-THICKNESS

4"	10"	1/4"
6"	12"	3/8"
8"	18"	3/8"
10"	20"	3/8"
12"	24"	1/2"
16"	24"	1/2"
20"	30"	1/2"
24"	36"	1/2"



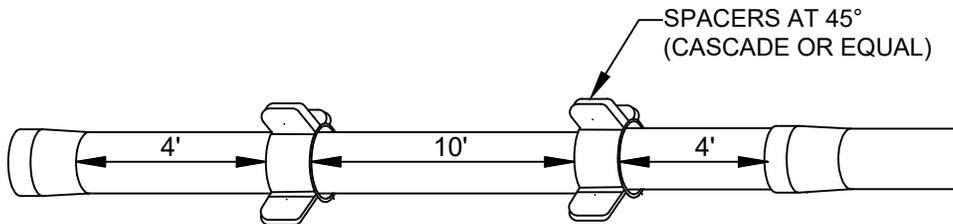
SO THAT PIPE WILL BE CENTERED IN CARRIER PIPE, THE FOLLOWING INFORMATION IS NEEDED:

1. TYPE & O.D. OF PIPE
2. TYPE OF JOINT/RESTRAINT
3. TYPE & I.D. OF CASING
4. 2 SPACER PER LENGTH OF PIPE (18")  
(SEE STANDARD PLACEMENT BELOW)



NOTE:

1. RESTRAINED JOINT TO BE USED WITHIN LIMITS OF CASING
2. PACK END OF CASING WITH CONCRETE OR GRAVEL
3. CASING SPACER TO BE USED THRU CARRIER PIPE



RECOMMENDED STANDARD PLACEMENT

## SEWER IN CASING

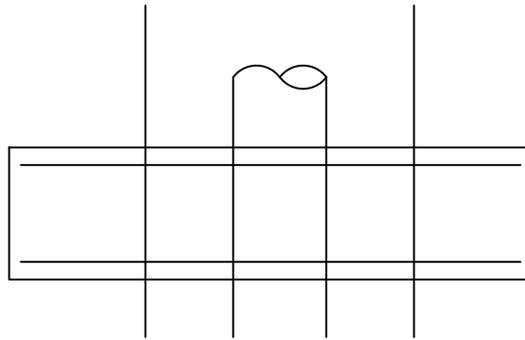
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MARCH, 2018

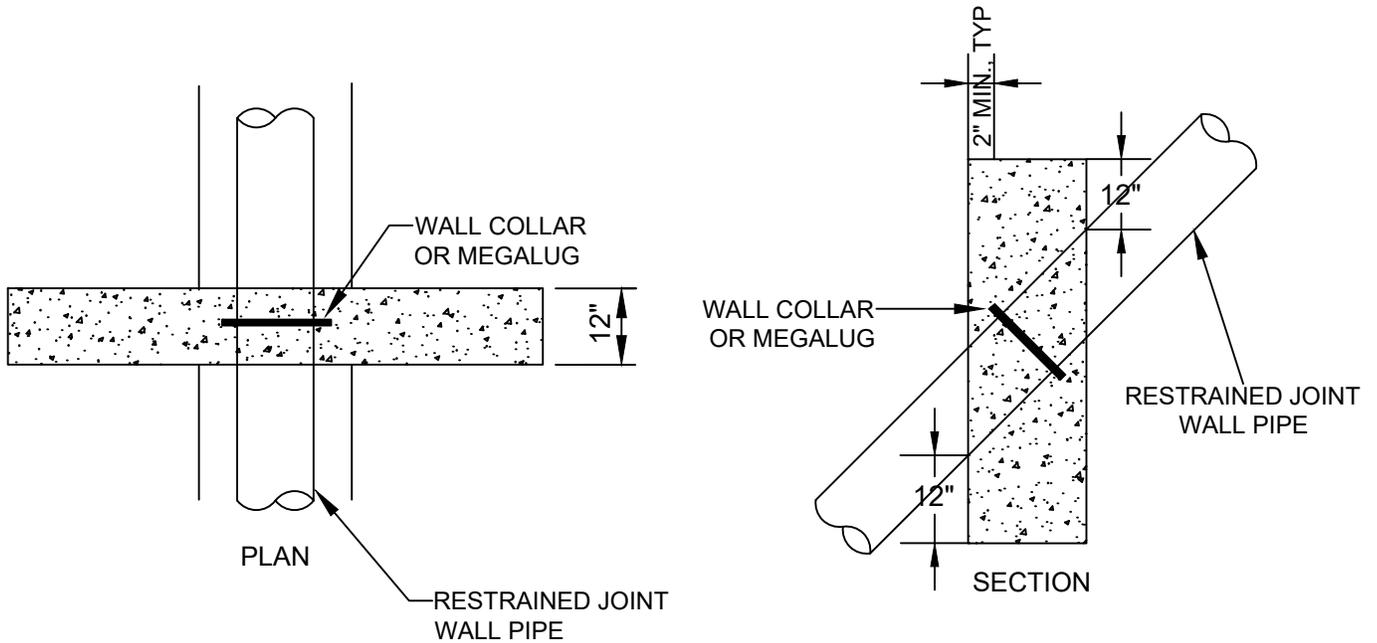
WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**S-8**



4000 PSI CONCRETE



SEWERS ON 20 PERCENT SLOPE OR GREATER SHALL BE CASS 53 RESTRAINED JOINT DUCTILE IRON ANCHORED WITH CONCRETE ANCHORS SPACED AS FOLLOWS:

1. NOT OVER 36 FEET CENTER TO CENTER ON GRADES 20 PERCENT TO 35 PERCENT.
2. NOT OVER 24 FEET CENTER TO CENTER ON GRADES 35 PERCENT TO 50 PERCENT.
3. NOT OVER 16 FEET CENTER TO CENTER ON GRADES 50 PERCENT AND OVER.

## CONCRETE ANCHOR

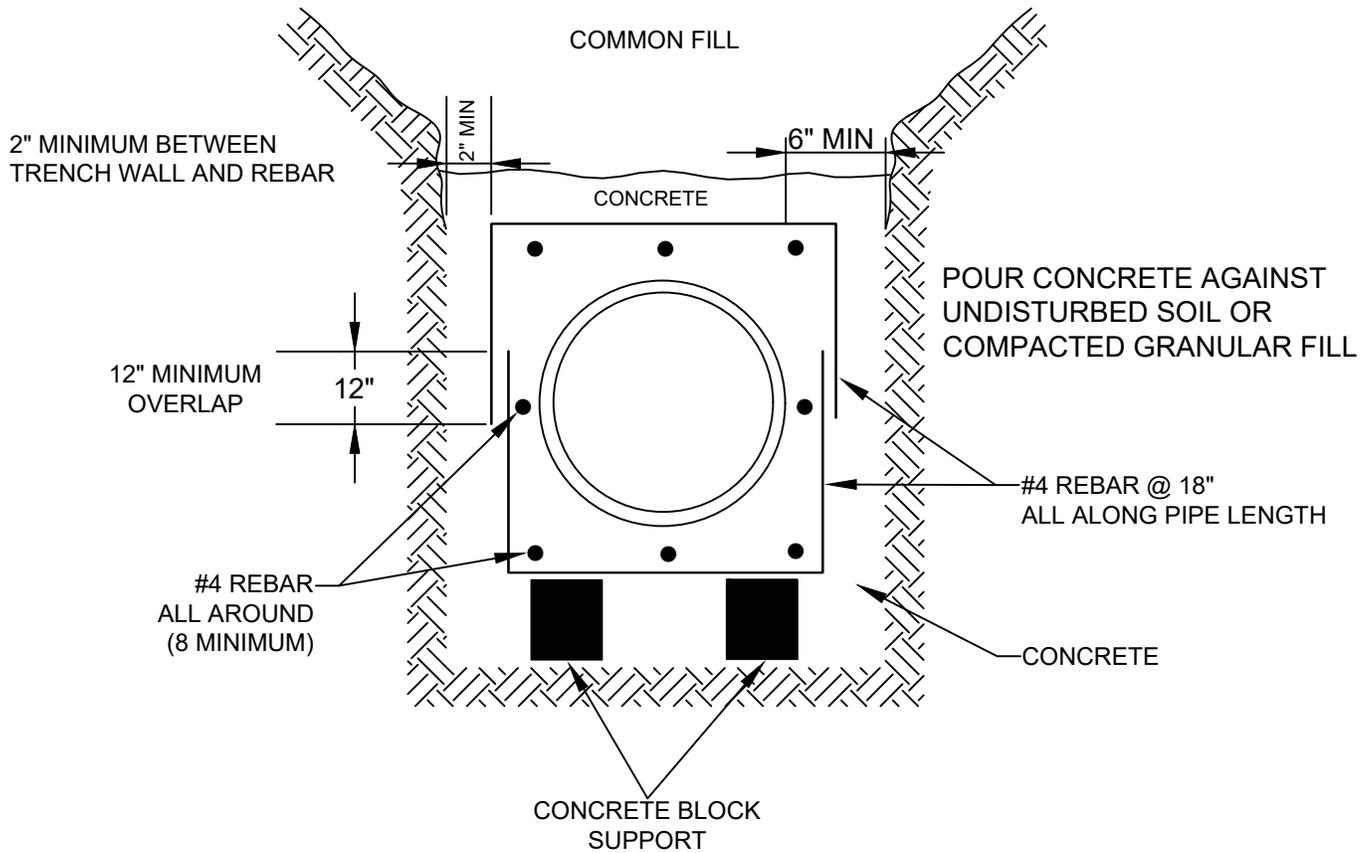
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MARCH, 2018

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**S-9**



NOTES:

- 1) CONCRETE SHALL BE 3000 P.S.I. MINIMUM 28 DAYS STRENGTH (4" SLUMP).
- 2) SUPPORT PIPE AND REBAR CAGE ON CONCRETE BRICKS DURING CONCRETE PLACEMENT.
- 3) CONCRETE ENCASMENT SHALL BE TERMINATED AT PIPE JOINTS ONLY.

## FULL CONCRETE ENCASEMENT

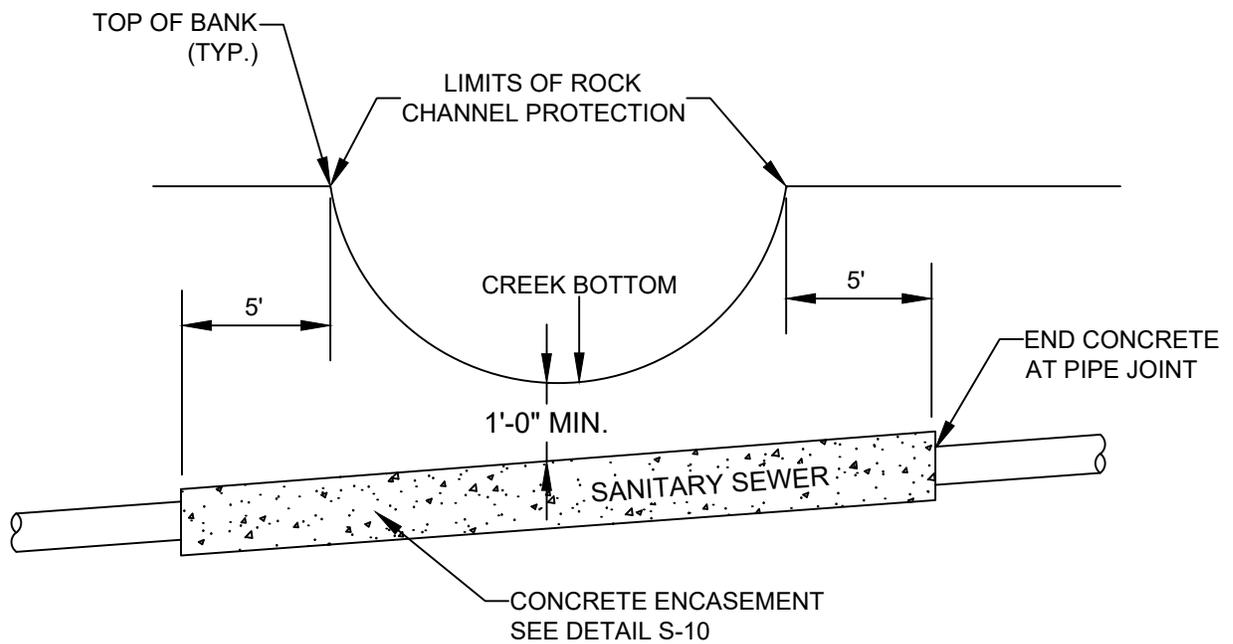
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WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-10



## SANITARY SEWER CREEK CROSSING

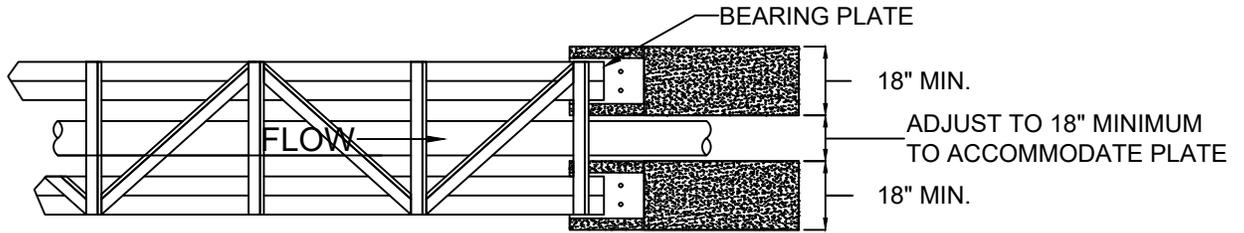
APPROVED/REVISED

MARCH, 2018

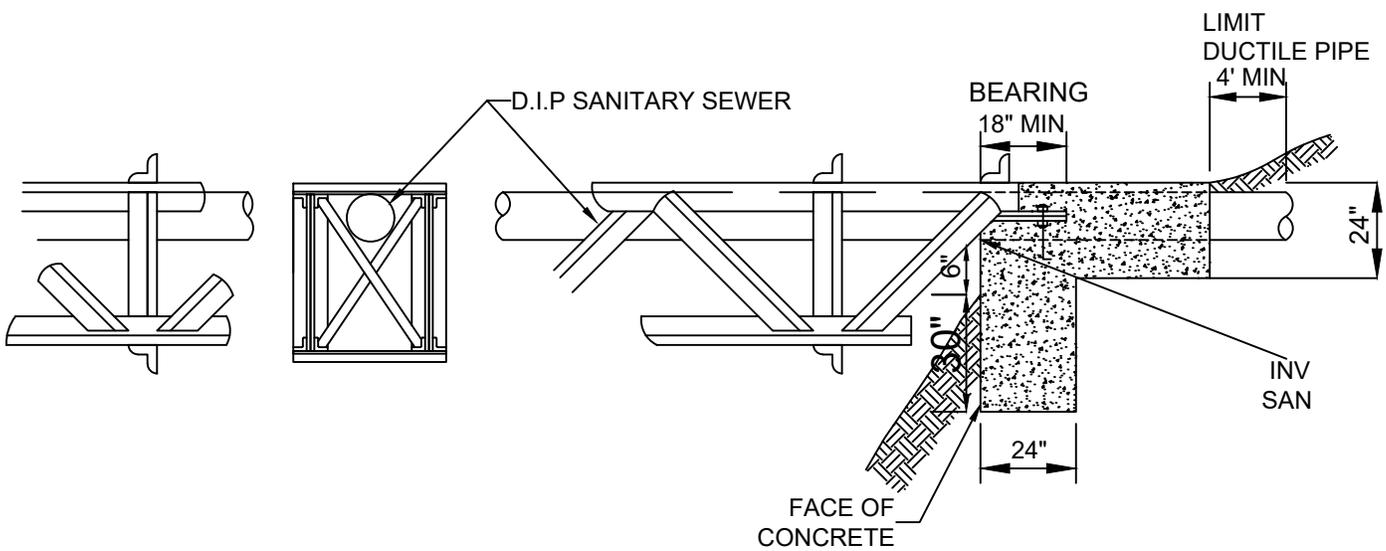
WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**S-11**



## PLAN



## ELEVATION

### NOTES:

1. STRUCTURAL DESIGN, CALCULATIONS, AND DRAWING SHALL BE PREPARED AND STAMPED BY AN OHIO REGISTERED PROFESSIONAL ENGINEER AND SUBMITTED TO THE COUNTY FOR REVIEW.
2. SUBMIT COMPLETE DRAWINGS INCLUDING, BUT NOT LIMITED TO:
  - a. COMPLETE DETAILS WITH STRUCTURAL SELECTION AND MATERIAL PROPERTIES FOR ALL PROPOSED SECTIONS (BEAMS, COLUMNS, DECKING, ETC.)
  - b. STRUCTURAL CALCULATIONS, PREPARED AND STAMPED BY AN OHIO REGISTERED PROFESSIONAL ENGINEER.
  - c. PROTECTIVE COATINGS.

# AERIAL SANITARY SEWER CROSSING

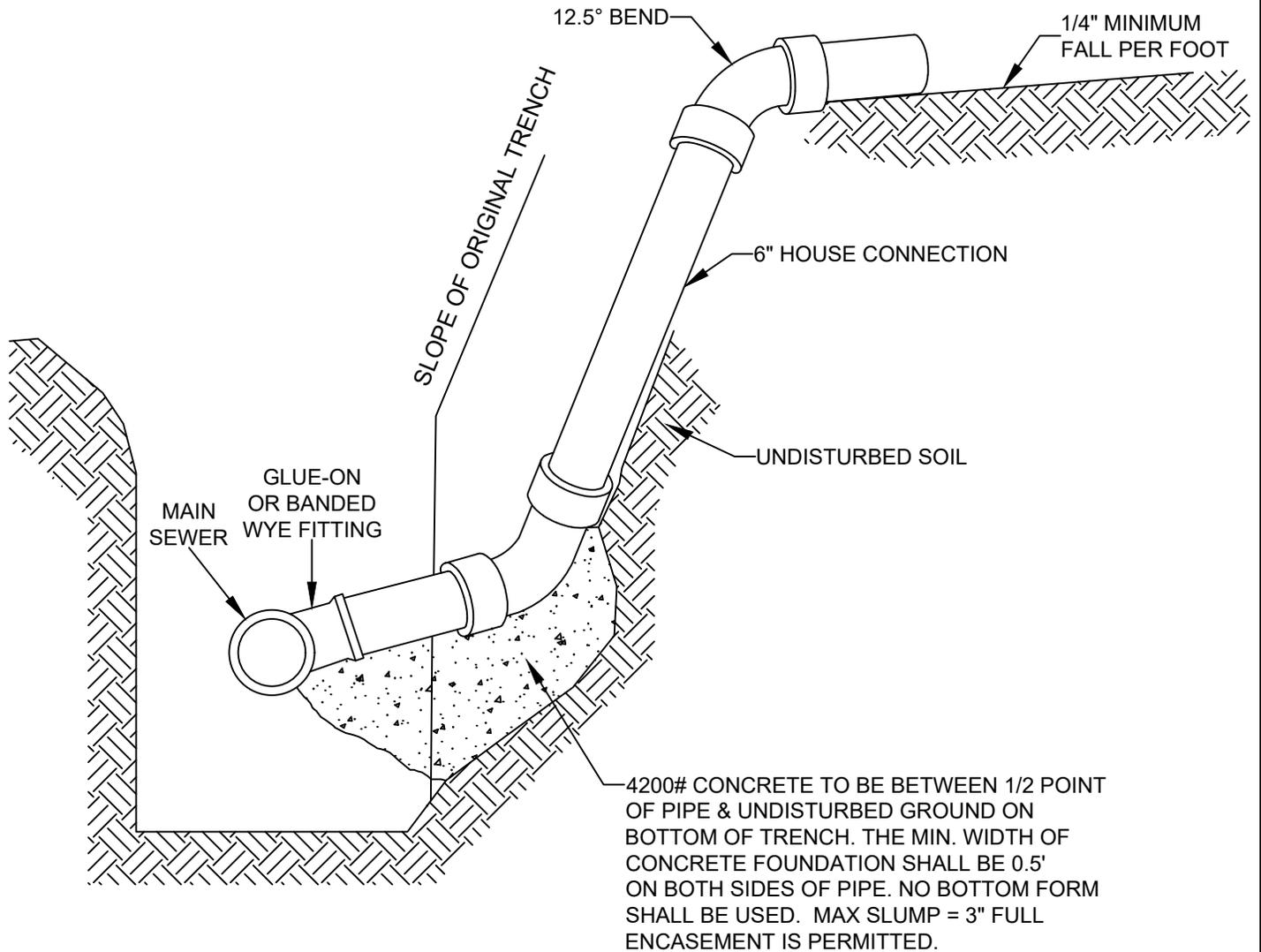
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MARCH, 2018

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-12



**NOTES:**

1. ALL JOINTS SHALL BE WATER TIGHT.
2. PIPE TO BE BEDDED SO THAT PIPE LOADS ARE NOT IMPOSED ON EXISTING WYES OR SADDLES.
3. EXCAVATION CLOSER THAN TWO FEET (2') FROM PIPE, WYES OR SADDLES SHALL BE DONE BY HAND.
4. DEEP HOUSE CONNECTION TO BE USED WHEN HOUSE CONNECTION IS MADE TO A SEWER DEEPER THAN 12'.

## DEEP HOUSE CONNECTIONS

APPROVED/REVISED

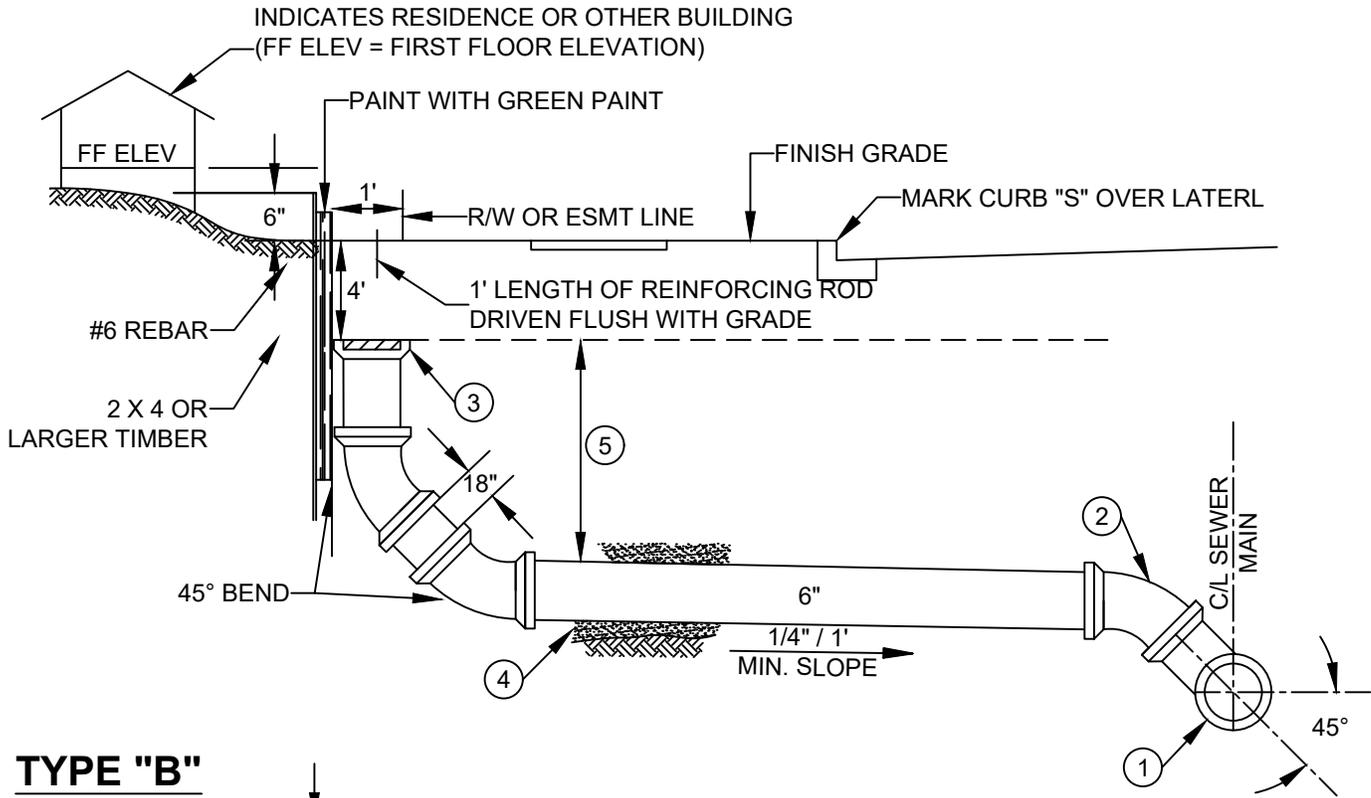
MARCH, 2018

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

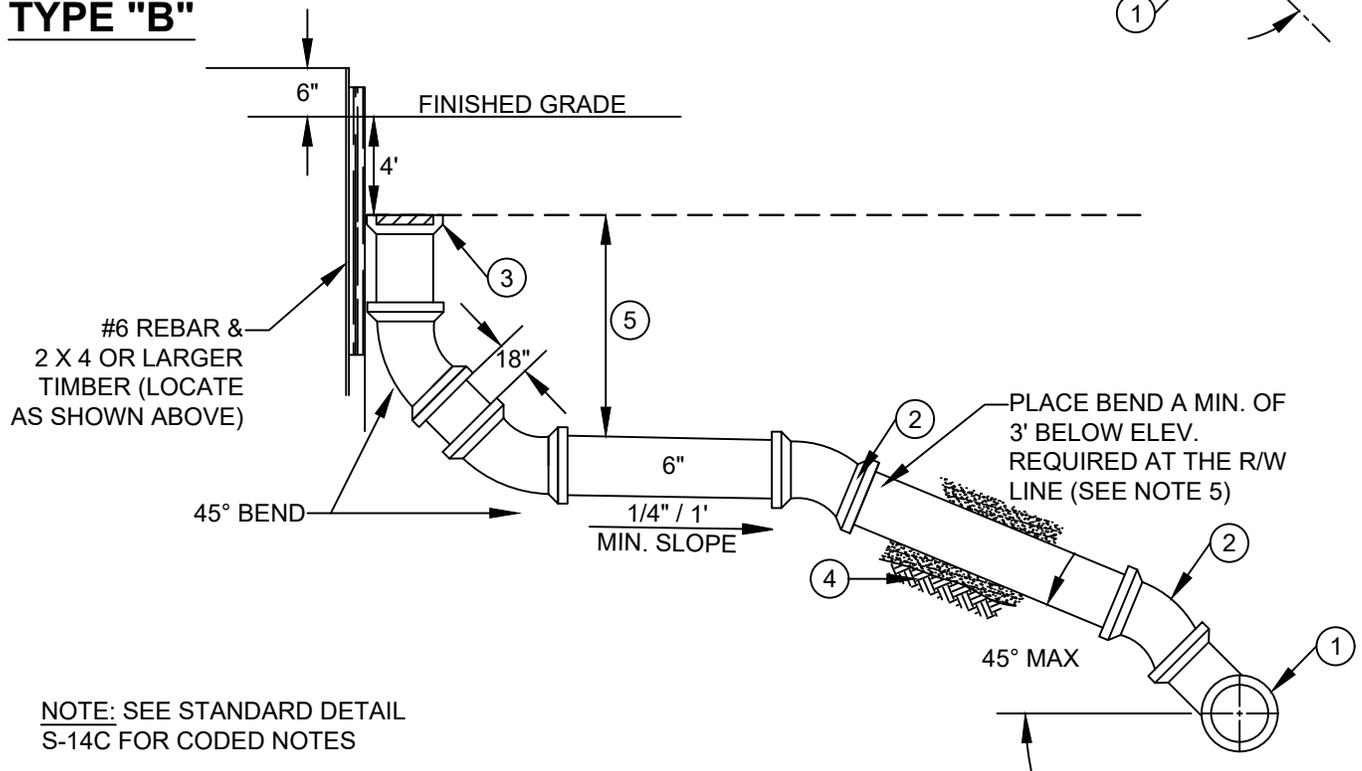
STANDARD NUMBER

# S-13

# TYPE "A"



# TYPE "B"



NOTE: SEE STANDARD DETAIL  
S-14C FOR CODED NOTES

## HOUSE CONNECTIONS

SHT 1 OF 3

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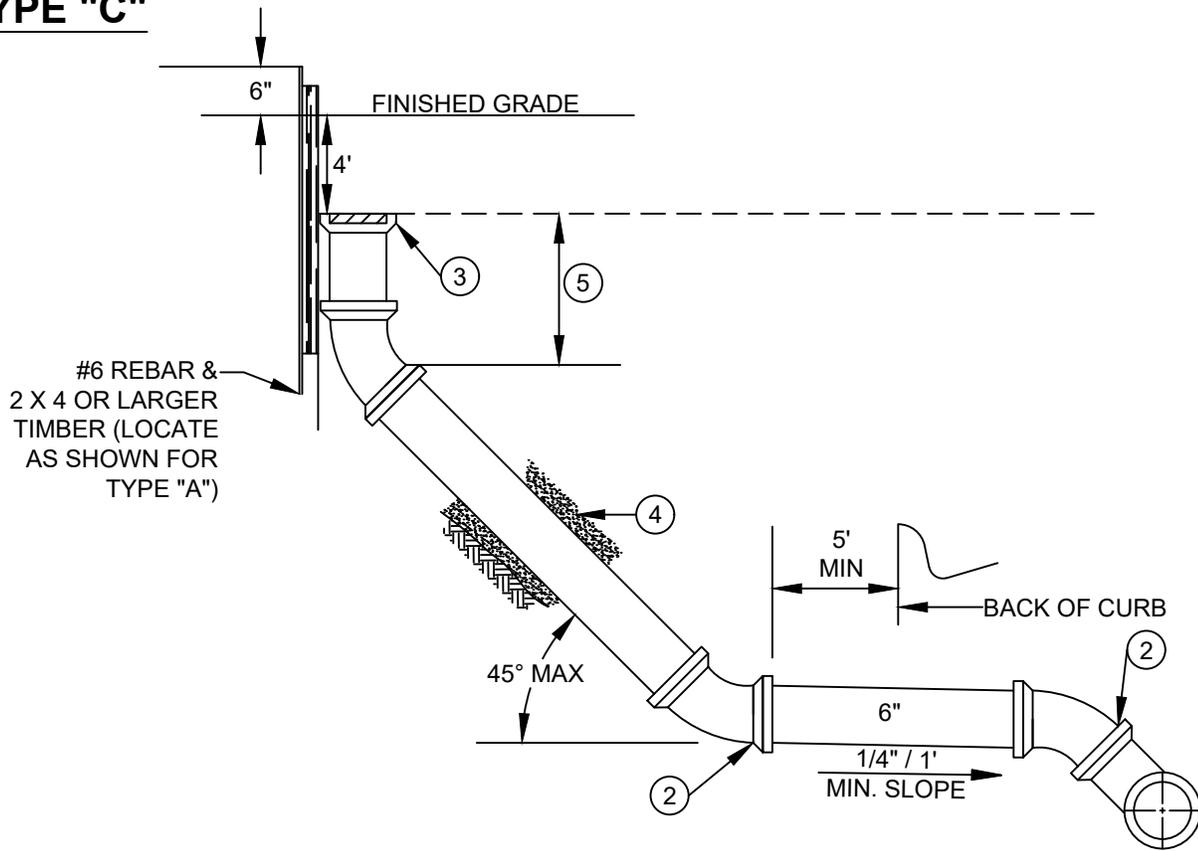
MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-14A

# TYPE "C"



NOTE: SEE STANDARD DETAIL  
S-14C FOR CODED NOTES

## HOUSE CONNECTIONS

SHT 2 OF 3

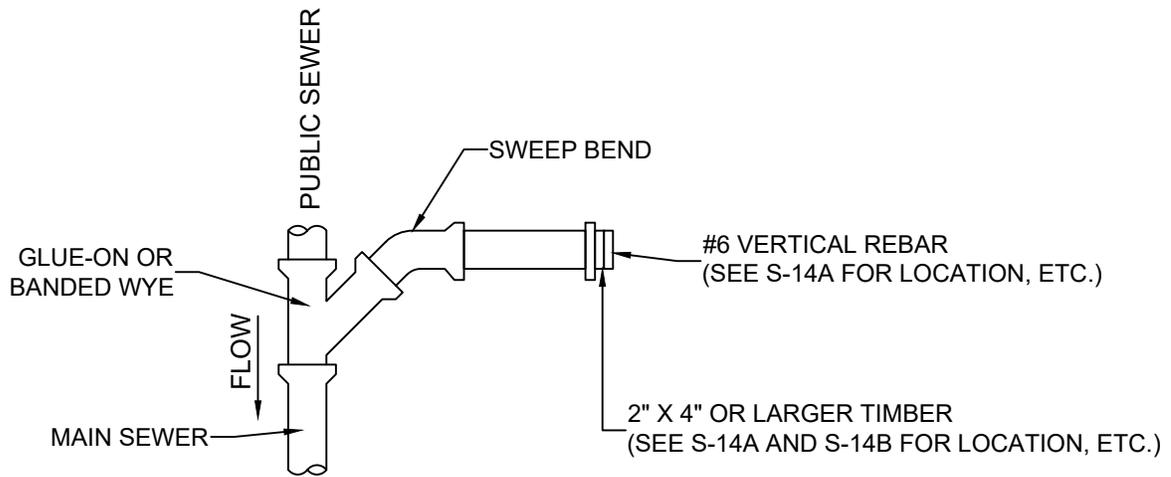
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WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-14B



- ① 6" TEE OR WY - ROTATE 45° FROM HORIZONTAL WHEN ⑤ DIMENSION IS ATTAINABLE.
- ② 6" 1/8 BEND OR 1/16 BEND AS NEEDED.
- ③ CAP UNLESS JOINING EXISTING HOUSE LOCATION.
- ④ BED WITH 4" GRANULAR MATERIAL AND BACKFILL WITH GRANULAR MATERIAL TO 4" ABOVE PIPE.
- ⑤ 6' FOR HOUSES ON SLAB.  
8' FOR HOUSES WITH CRAWL SPACE.  
10' FOR HOUSES WITH BASEMENT.

**NOTE:**

- A. USE TYPE "B" WHEN SEWER INVERT ELEVATION IS 5' TO 10' BELOW THE ELEVATION REQUIRED AT R/W LINE.
- B. USE DEEP HOUSE CONNECTION (S-13) WHEN SEWER INVERT ELEVATION IS 10' OR MORE BELOW THE ELEVATION REQUIRED AT R/W LINE.
- C. IN ALL OTHER CASES USE TYPE "A" OR TYPE "C".

## HOUSE CONNECTIONS

SHT 3 OF 3

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WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

# S-14C

NOTE: TOP OF CASTING SHALL BE AT FINISHED GRADE AT PAVED LOCATIONS (ROADWAYS AND PARKING LOTS) AND AT DEVELOPED LOTS. IN UNDEVELOPED LOTS, TOP OF CASTING TO BE A MINIMUM OF 12" ABOVE FINISHED GRADE OR AS SHOWN ON PLAN.

MANHOLE COVER & FRAME TO BE NEENAH, E.J. OR APPROVED EQUAL. COVER TO BE LETTERED "SANITARY" OR "SANITARY SEWER". E.J. PART NOS. 00160041B01 SOLID LID R-1776 & R-1767-2001-1 CASTING

FINISHED GRADE

MANHOLE COVER & FRAME TO BE NEENAH, E.J. OR APPROVED EQUAL. COVER TO BE LETTERED "SANITARY" OR "SANITARY SEWER". E.J. PART NOS. 00160041B01 SOLID LID R-1776 & R-1767-2001-1 CASTING

ADJUST TO FINISHED GRADE WITH PRECAST CONCRETE COLLARS, PROVIDE 12" MAXIMUM ADJUSTMENT.

MANHOLE SHALL CONFORM TO ASTM SPECIFICATION C-478

STANDARD MANHOLE STEPS ASTM D-4101

WATERTIGHT GASKETS ARE REQUIRED AT ALL JOINTS (ASTM C-443 FOR RUBBER TYPE GASKET JOINTS.)

5' DIA.

CAULK WITH EXPANDING GROUT (TYP.)

2" HOSE CONNECTOR  
2" PLUG VALVE  
2" NIPPLE  
PLUG VALVES

FORCE MAIN

STRAIGHT COUPLING

FLANGED CROSS - RUN TO MATCH FORCEMAIN DIAMETER BRANCHES TO BE 4"

2'-6"

COMPANION FLANGE WITH 4" PLUG

SLOPE

1'

CLASS "A" CONCRETE

## FORCEMAIN CLEANOUT

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DEPARTMENT OF WATER & SEWER

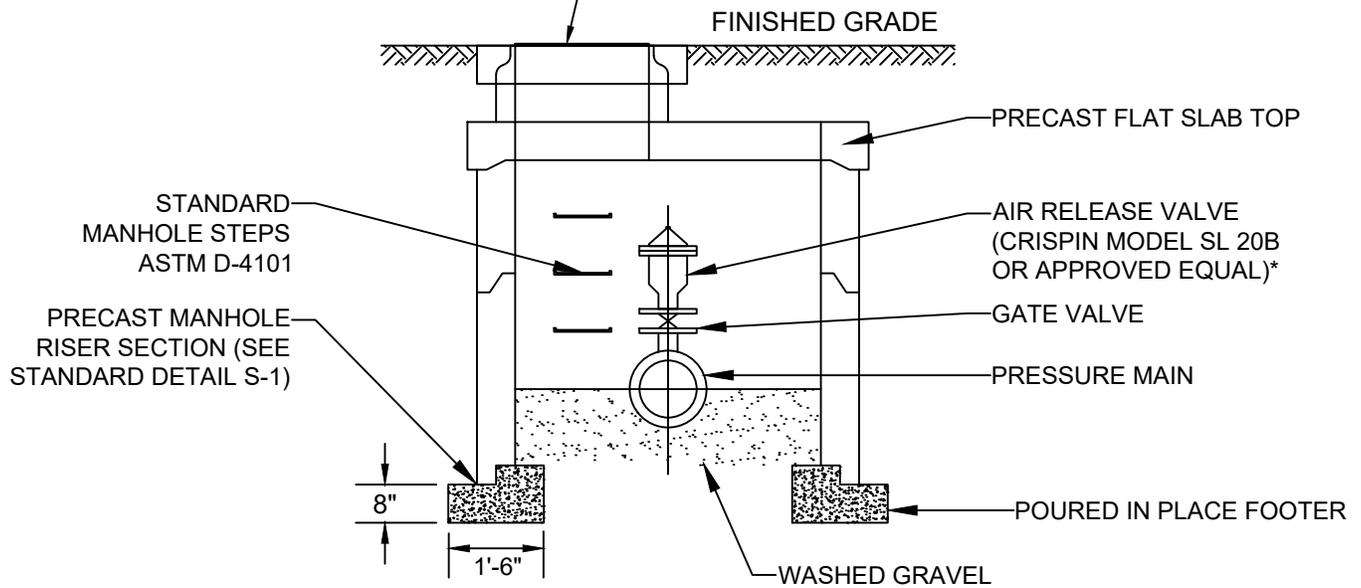
STANDARD NUMBER

**S-15**

**NOTE:** TOP OF CASTING SHALL BE AT FINISHED GRADE AT PAVED LOCATIONS (ROADWAYS AND PARKING LOTS) AND AT DEVELOPED LOTS. IN UNDEVELOPED LOTS, TOP OF CASTING TO BE A MINIMUM OF 12" ABOVE FINISHED GRADE OR AS SHOWN ON PLAN.

MANHOLE SHALL CONFORM TO ASTM SPECIFICATION C-478

MANHOLE COVER & FRAME TO BE NEENAH, EJ, OR APPROVED EQUAL. COVER TO BE LETTERED "SANITARY" OR "SANITARY SEWER". EJ. PART NOS. 00160041B01 SOLID LID R-1776 & R-1767-2001-1 CASTING



**NOTE:** IN WET AREAS SEAL BOTTOM WITH POURED CONCRETE BASE OR PRECAST MANHOLE BASE.

ADJUST TO FINISH GRADE WITH PRECAST CONCRETE COLLARS - 12" MAX ADJUSTMENT.

\* MODEL NUMBER MAY VARY DEPENDING ON APPLICATION

WATERTIGHT GASKETS ARE REQUIRED AT ALL JOINTS (ASTM C-443 FOR RUBBER TYPE GASKET JOINTS).

## AIR RELEASE VALVE ASSEMBLY

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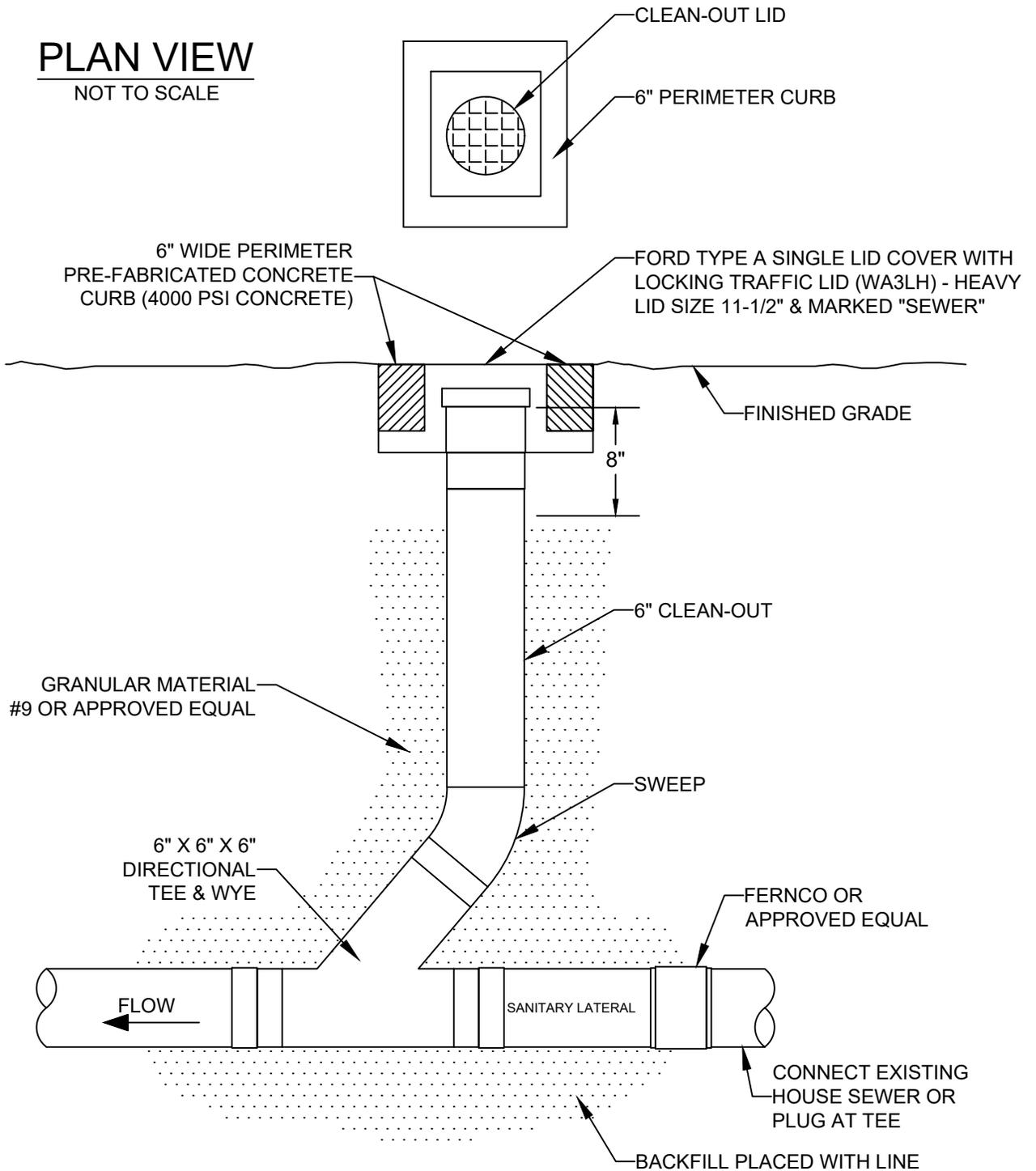
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STANDARD NUMBER

**S-16**

# PLAN VIEW

NOT TO SCALE



**NOTES:**

CLEANOUTS SHALL BE INSTALLED AT ALL 45° BENDS.

ALL STRUCTURES MUST HAVE A CLEANOUT THAT IS ACCESSIBLE WITHIN TWO FEET (2') FROM THE POINT OF ENTRY INTO THE STRUCTURES.

## SANITARY CLEANOUT

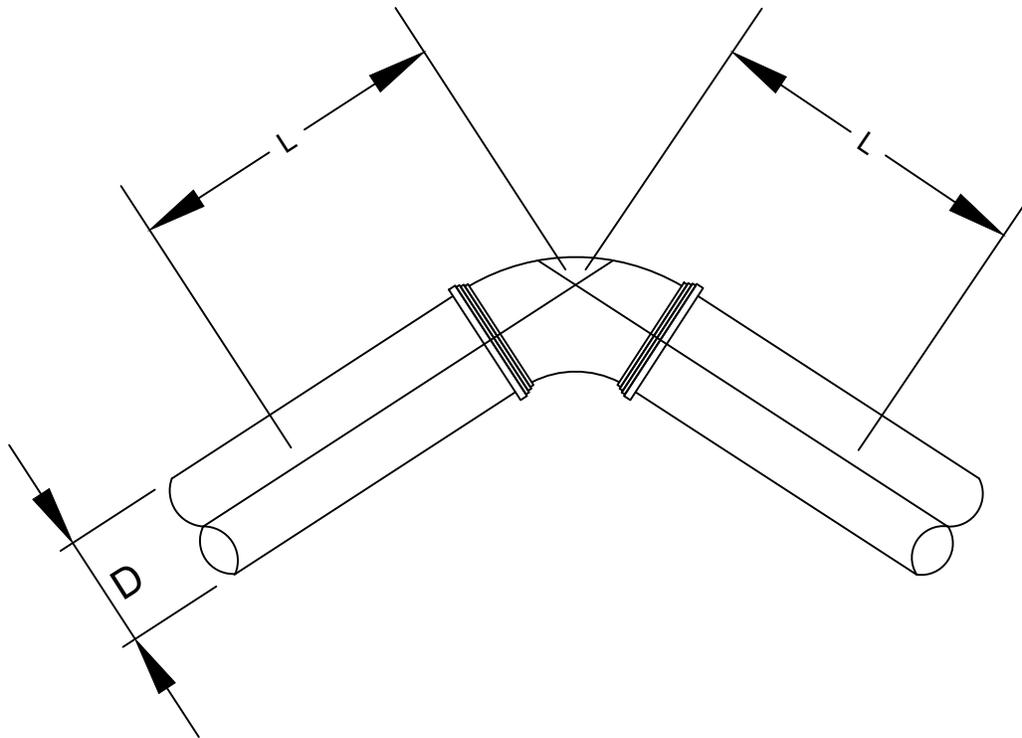
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STANDARD NUMBER

**S-17**



MINIMUM 60' OF RESTRAINED JOINT PIPE (RJP) IS REQUIRED BEFORE AND AFTER ALL HORIZONTAL AND VERTICAL BENDS. REFER TO TABLE BELOW.

RESTRAINT OPTIONS:  
 MECHANICAL JOINT W/MEGALUGS ~ ALL SIZES OF PIPE  
 MJ FIELD LOCKS ~ < 24" PIPE

TABLE  
 REQUIRED LENGTH OF RESTRAINED JOINTS  
 D - DIAMETER OF PIPE  
 L - LENGTH OF PIPE

D	4"	6"	8"	10"	12"	16"	20"	24"
L	60'	60'	60'	60'	66'	98'	125'	145'

**NOTES:**

1. ALL HORIZONTAL AND VERTICAL BENDS SHALL BE LABELED WITH STATIONING.
2. LABEL LIMITS OF REQUIRED RESTRAINED JOINTS WITH STATIONING.

**REQUIRED RESTRAINED JOINTS FOR FORCEMAIN BENDS**

APPROVED/REVISED

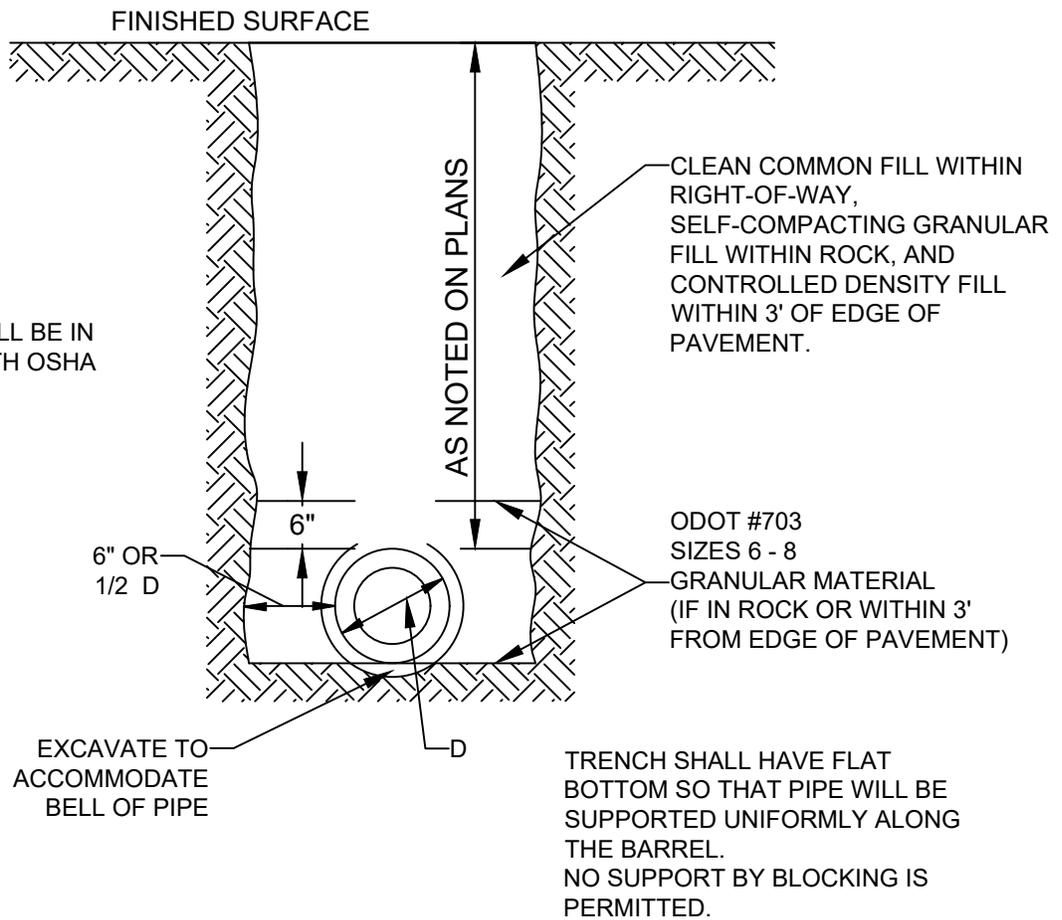
MAY, 2023

WARREN COUNTY STANDARD DETAILS  
 DEPARTMENT OF WATER & SEWER

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**S-18**

TRENCH SIDES SHALL BE IN CONFORMANCE WITH OSHA REQUIREMENTS.



## FORCEMAIN TRENCH DETAIL

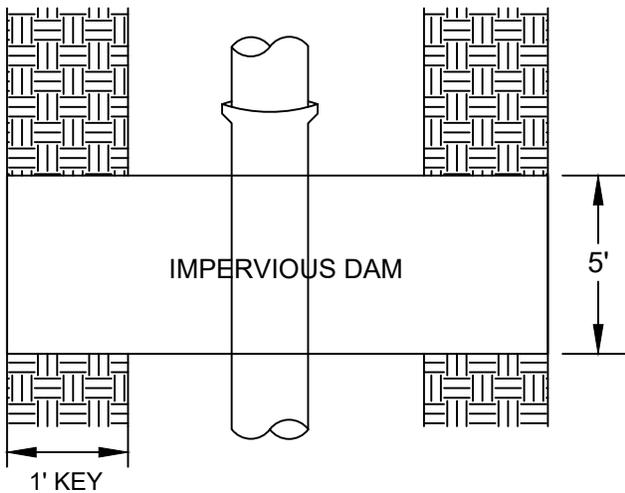
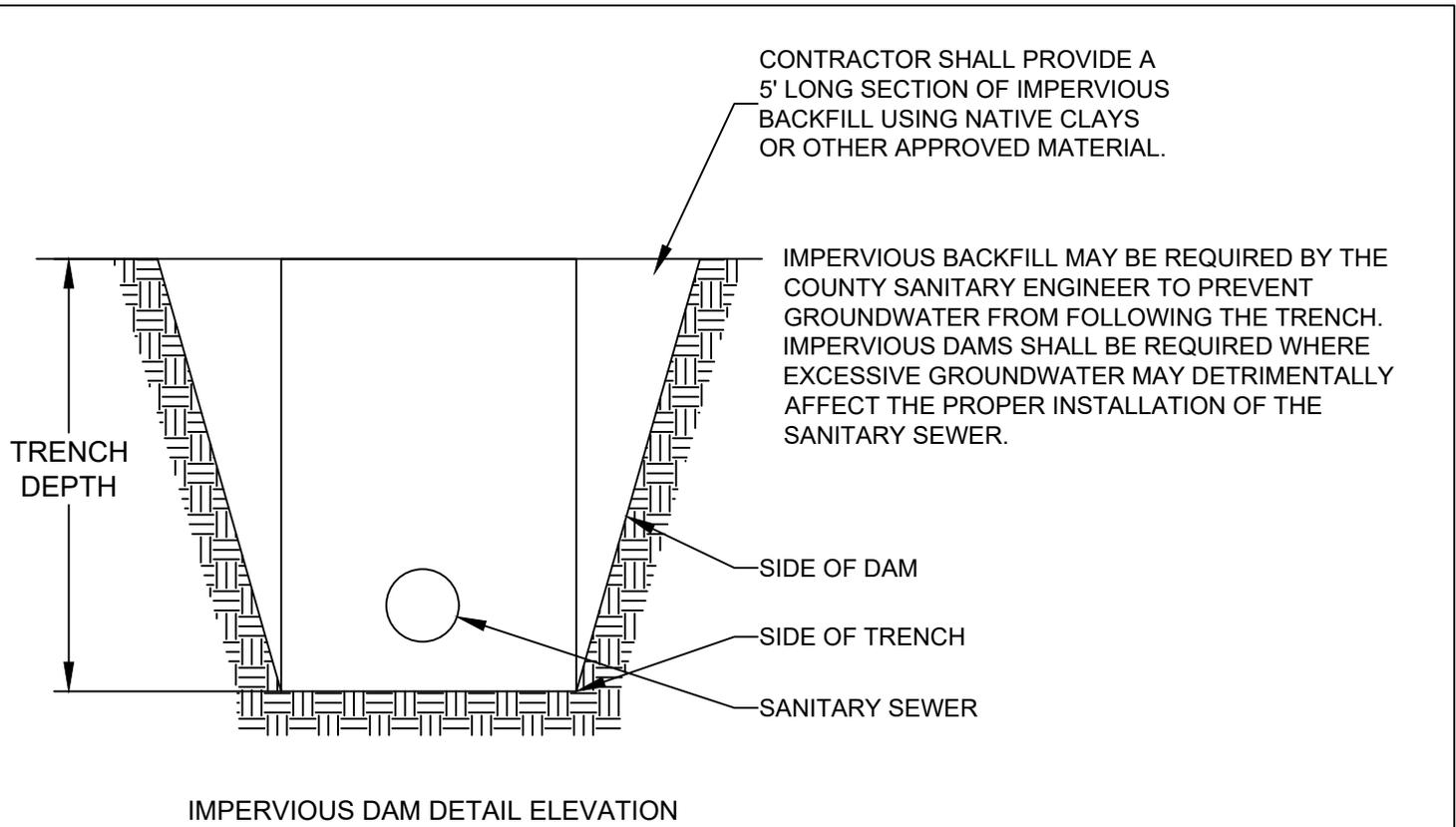
APPROVED/REVISED

MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

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**S-19**



DAM PLAN

THE CONTRACTOR SHALL PLACE CUTOFF TRENCH DAMS OF NATIVE CLAY OR IMPERVIOUS SOIL ACROSS AND ALONG THE TRENCH AS SPECIFIED BY THE COUNTY SANITARY ENGINEER.

THE TRENCH DAMS SHALL BE CAREFULLY COMPACTED AND SHALL BE 5 FEET IN LENGTH (MEASURED ALONG THE TRENCH CENTERLINE) AND SHALL BE BENCHED INTO THE UNDISTURBED TRENCH SIDES.

## IMPERVIOUS DAM DETAIL

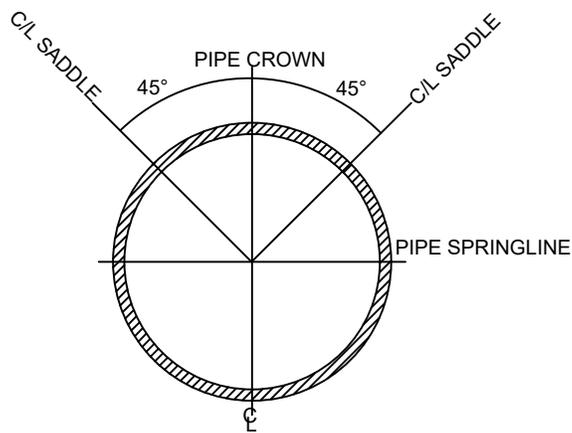
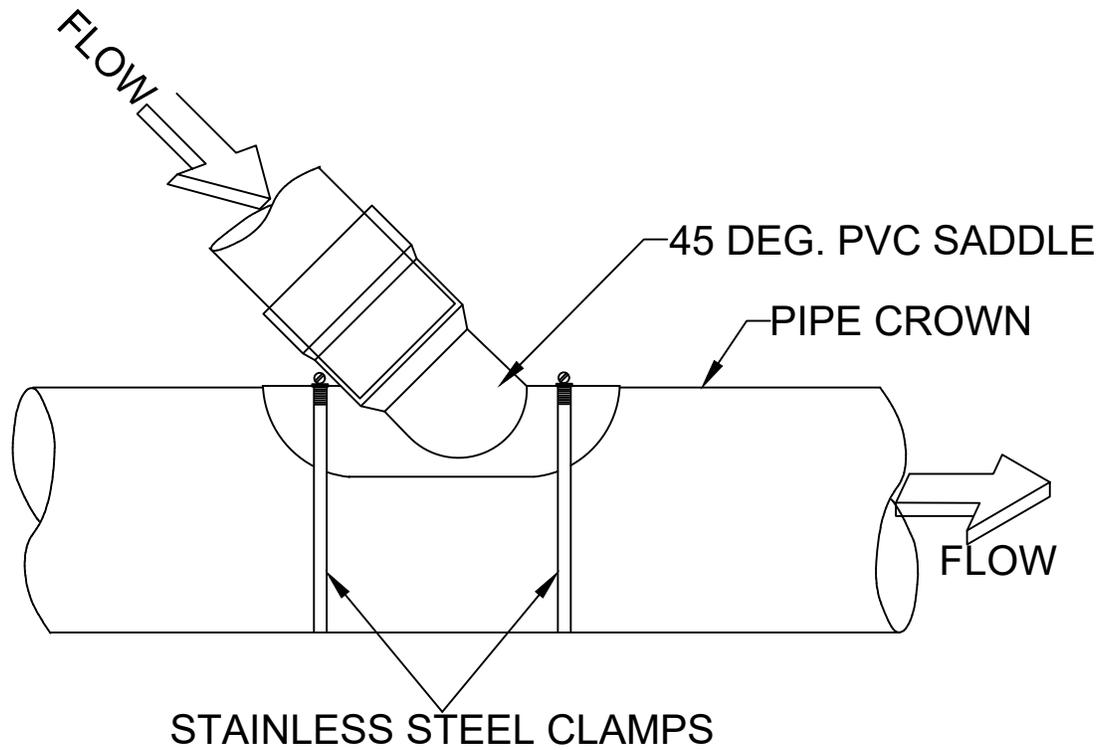
APPROVED/REVISED

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WARREN COUNTY STANDARD DETAILS  
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**S-20**



## LATERAL SADDLE INSTALLATION DETAIL FOR PVC PIPE

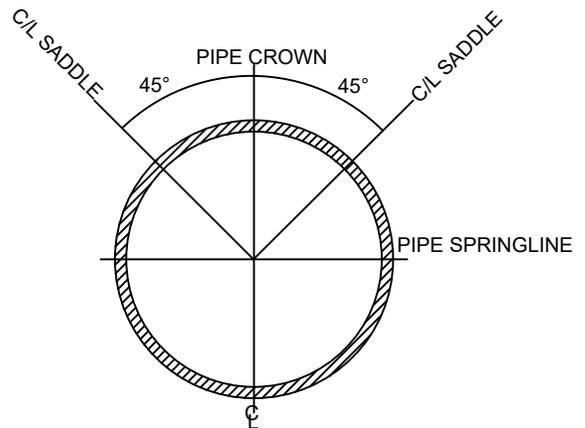
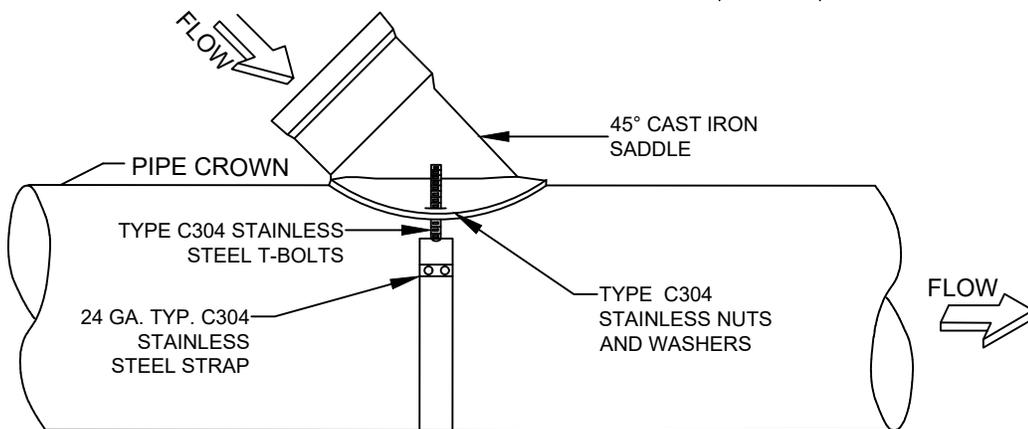
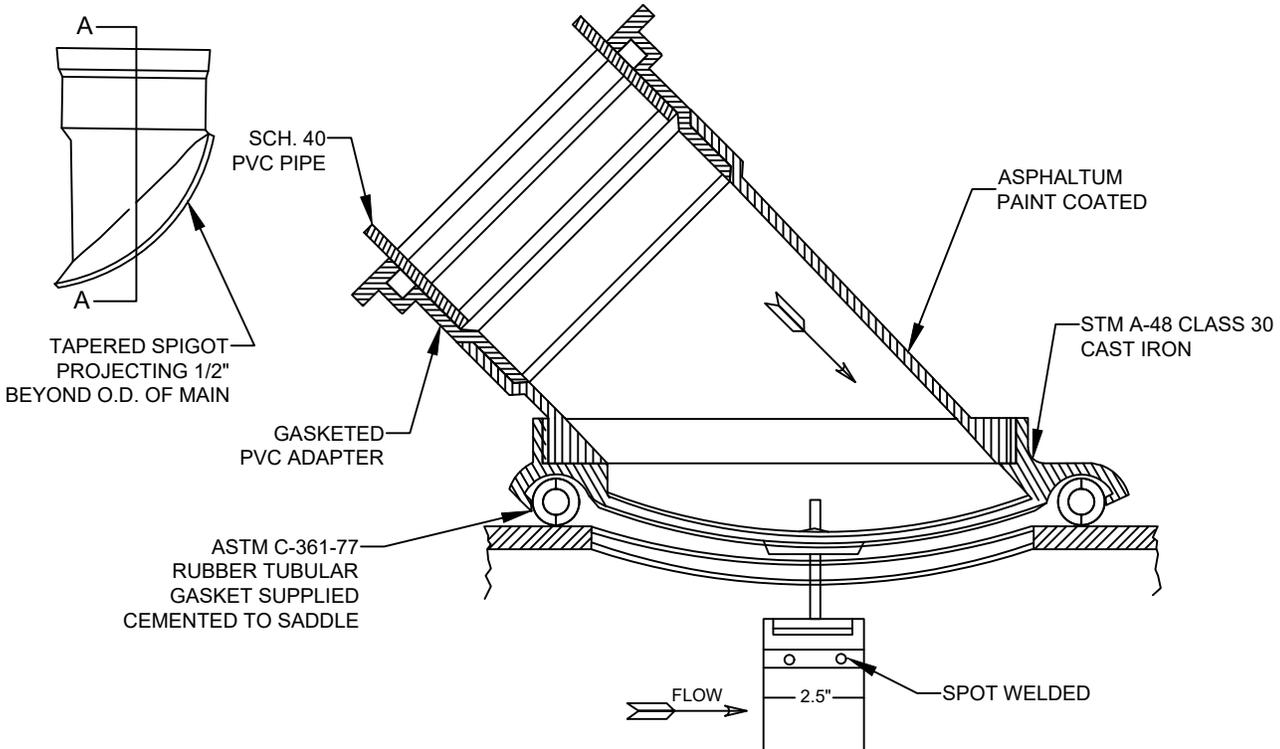
APPROVED/REVISED

MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**S-21**



## LATERAL SADDLE INSTALLATION FOR VCP & DUCTILE IRON PIPE

APPROVED/REVISED

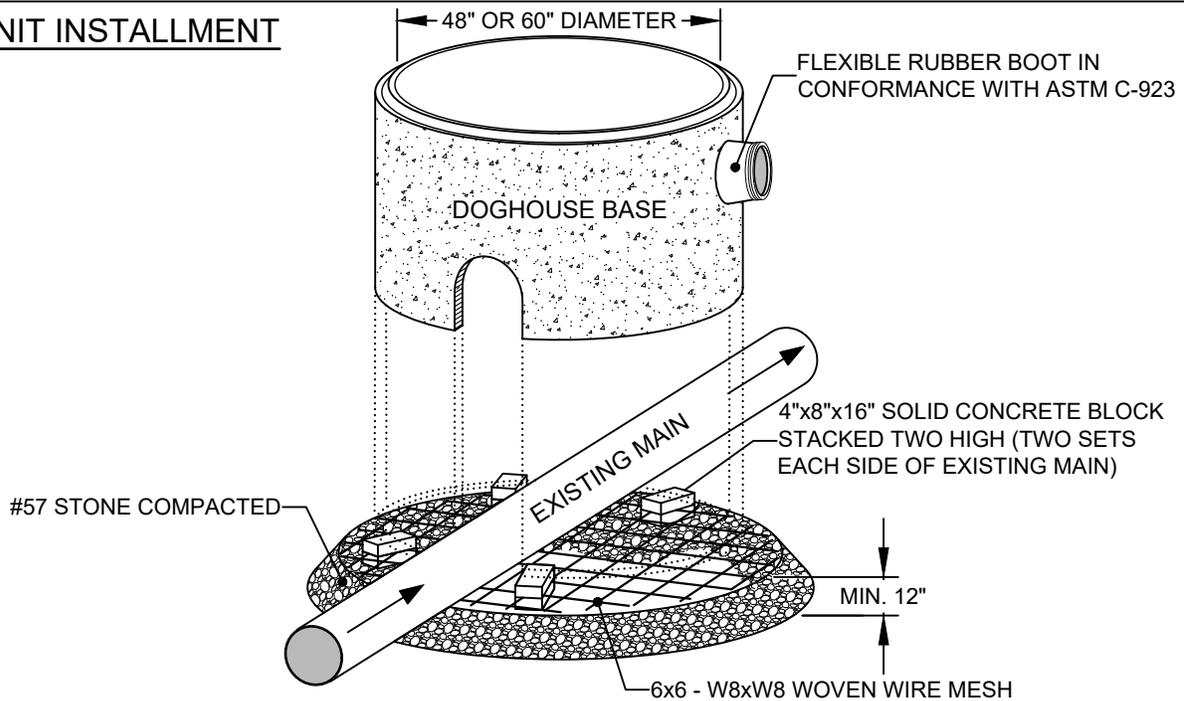
MAY, 2023

WARREN COUNTY STANDARD DETAILS  
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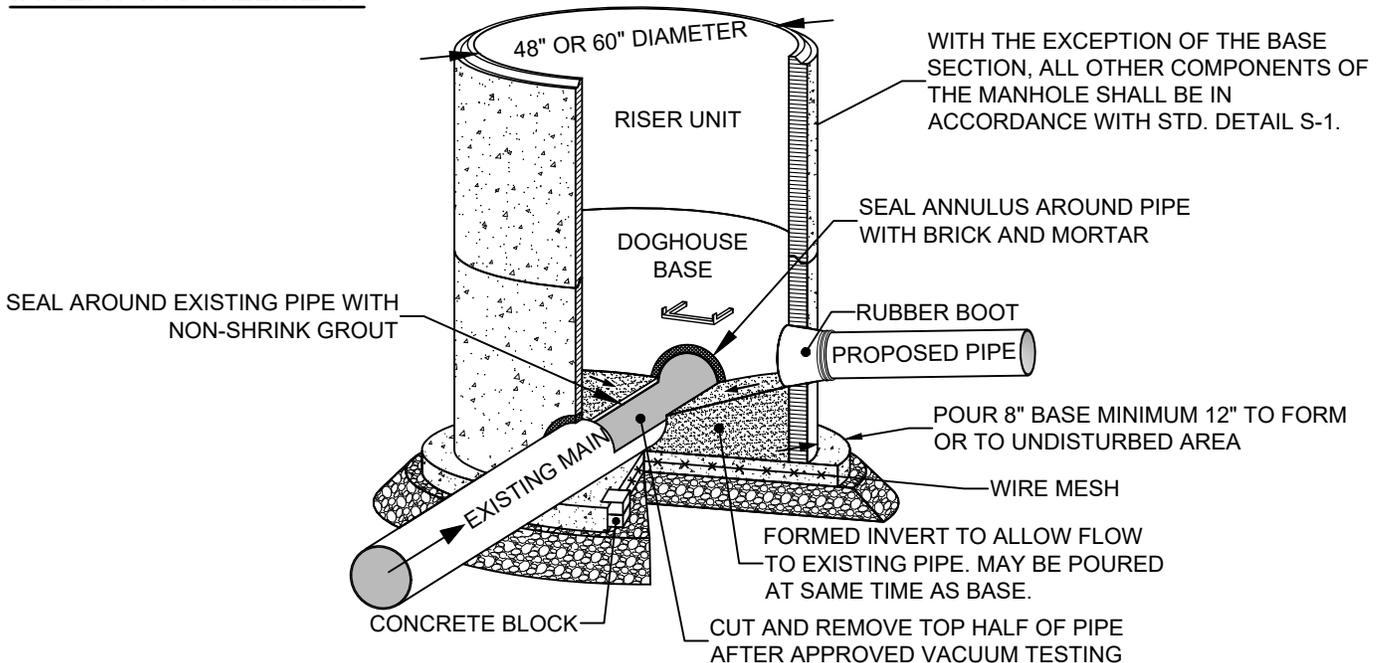
STANDARD NUMBER

**S-22**

## BASE UNIT INSTALLMENT



## INVERT INSTALLMENT



### NOTES:

1. DOGHOUSE OPENINGS IN PRECAST UNITS SHALL HAVE A RADIUS OF 4 TO 8 INCHES LARGER THAN THE EXISTING PIPE DIAMETER.
2. CAST-IN-PLACE CONCRETE SHALL BE 4000 PSI, PER ASTM C-94.
3. ALL PRECAST MANHOLE COMPONENTS SHALL MEET ASTM C-478.
4. BENCH SHALL SLOPE UPWARD FROM THE SPRINGLINE TO THE PROJECTED LEVEL OF THE PIPE CROWN OR 8 INCHES ABOVE THE SPRINGLINE, WHICHEVER IS LESS.

# STANDARD PRECAST CONCRETE DOGHOUSE MANHOLE

APPROVED/REVISED

MAY, 2023

WARREN COUNTY STANDARD DETAILS  
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**S-23**

## DETAILED PROCEDURES FOR SANITARY SEWER

### PROCEDURES FOR MAKING SEWER LATERAL CONNECTIONS TO EXISTING SEWER:

- A. IF ABS COMPOSITE
  1. EXCAVATE TO POINT OF LATERAL ON MAIN.
  2. CLEAN EXISTING PIPE.
  3. ALIGN SADDLE TO PROPER POSITION AND MARK AREA TO BE CUT.
  4. CUT HOLE IN PIPE AS REQUIRED MAKING SURE THE CUT OUT DOESN'T ENTER THE MAIN.
  5. ATTACH AND SEAL SADDLE WITH STAINLESS STEEL STRAPS AND MASTIC SEALER BETWEEN SADDLE AND PIPE. INSERTA TEES ARE NOT PERMITTED.
- B. IF CLAY OR CONCRETE
  1. EXCAVATE TO POINT OF LATERAL ON MAIN.
  2. PLUG OUTLET PIPE AT UPSTREAM MANHOLE - PUMP TO DOWNSTREAM MANHOLE IF NECESSARY. REMOVE CLOSEST LENGTH OF PIPE AND REPLACE WITH TEE LATERAL SECTION OF PIPE OR CORE EXISTING MAIN.

### PROCEDURE FOR MAKING SEWER EXTENSIONS FROM EXISTING MANHOLES:

- A. CONSTRUCT LINE TO WITHIN ONE JOINT OF EXISTING MANHOLE.
- B. AFTER LINE PASSES LEAKAGE TEST AND WARREN COUNTY SANITARY ENGINEER GIVES GO AHEAD - CONNECTION IS TO BE MADE.
- C. PLUG OUTLET PIPE AT UPSTREAM MANHOLE - PUMP TO DOWNSTREAM MANHOLE IF NECESSARY.
- D. A HOLE IS CUT AT THE PROPOSED INLET POINT AND THE LAST JOINT IS LAID.
- E. EXISTING BENCH AND CHANNEL OF MANHOLE IS REBUILT AND SHAPED AS REQUIRED.
- F. NEW CONNECTION IS TO BE SEALED AS REQUIRED.

### PROCEDURE FOR MAKING NEW MANHOLES ON EXISTING SEWER MAINS:

- A. EXCAVATE AND EXPOSE EXISTING SEWER AT POINT OF NEW MANHOLE.
- B. BUILD MANHOLE OVER EXISTING LINE WILL NOT DISTURBING EXISTING LINE.
- C. BUILD NEW LINE(S) FROM NEW MANHOLE.
- D. AFTER NEW LINE(S) PASS(ES) LEAKAGE TEST AND WARREN COUNTY SANITARY ENGINEER GIVE GO AHEAD - PLUG OUTLET PIPE AT EXISTING UPSTREAM MANHOLE (PUMP TO EXISTING DOWNSTREAM MANHOLE IF NECESSARY).
- E. BREAKOUT TOP OF EXISTING SEWER AS REQUIRED AND FORM A BENCH AND CHANNEL AS REQUIRED.

### STORM WATER AND EXTRANEIOUS FLOWS:

- A. STORM WATER AND EXTRANEIOUS FLOWS ARE PROHIBITED FROM ENTERING THE EXISTING SYSTEM DURING CONSTRUCTION.
- B. NO OPEN CUT TRENCHES WILL BE ALLOWED TO REMAIN OPEN OVERNIGHT.
- C. STORM DRAINS, DIVERSION DITCHES, PUMPS, ETC., SHALL BE USED AS REQUIRED TO MAINTAIN THE INTEGRITY OF THE SYSTEM AT ALL TIMES.

### SANITARY SEWER BEDDING:

- A. ALL SANITARY SEWER PIPE MUST BE BEDDED WITH NUMBER 57 STONE EXTENDING FROM A POINT NOT LESS THAN 6" BELOW THE BOTTOM OF THE PIPE TO THE SPRINGLINE OF THE PIPE.
- B. BACKFILL WITH NUMBER 9 GRITS FROM THE SPRINGLINE TO A POINT NOT LESS THAN 12" ABOVE THE CROWN OF THE PIPE.
- C. BEDDING SHALL PROVIDE A UNIFORM SUPPORT ALONG THE ENTIRE PIPE BARREL, WITHOUT LOAD CONCENTRATION AT JOINT COLLARS OR BELLS.
- D. BEDDING DISTURBED BY PIPE MOVEMENT OR BY REMOVAL OF SHORING OR MOVEMENT OF THE TRENCH SHIELD OR BOXY SHALL BE RECONSOLIDATED PRIOR TO BACKFILL.
- E. BEDDING TO BE COMPACTED TO 95% PROCTOR.

APPROVED/REVISED  MAY, 2023	WARREN COUNTY STANDARD DETAILS DEPARTMENT OF WATER & SEWER	STANDARD NUMBER  <b>SG-1</b>
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## GENERAL NOTES - SANITARY SEWER

1. ALL SANITARY PIPE SHALL CONFORM TO THE FOLLOWING:
  - A. ASTM D-2680 FOR ABS/PVC GASKETED COMPOSITE PIPE (TRUSS)
  - B. ASTM D-3034 FOR SDR 26 GASKETED 4" - 15" DIAMETER
  - C. ASTM F-679 FOR SDR 26 GASKETED 18" - 30" DIAMETER
  - D. PIPE LARGER THAN 15" SHALL CONFORM TO ASTM F-9494 (A2000) OR ASTM F-1803.
2. CERAMIC COATED CLASS 53 DUCTILE IRON PIPE OR EQUAL MUST BE USED WHERE SPECIFIED BY THE COUNTY SANITARY ENGINEER.
3. JOINTS FOR PVC GRAVITY SEWER SHALL BE PUSH-ON TYPES WITH RUBBER GASKETS. PIPE ENDS SHALL NOT BE BEVELED. PIPE ENDS MUST BE SEALED.
4. ROOF DRAINS, FOUNDATION DRAINS, AND OTHER STORM WATER CONNECTIONS TO THE SANITARY SYSTEM ARE PROHIBITED.
5. NO MANHOLE OR ANY PORTION OF THE MANHOLE, SHALL BE LOCATED UNDER A SIDEWALK OR DRIVEWAY.
6. SANITARY SEWER LATERALS SHALL BE CONSTRUCTED OF THE FOLLOWING MATERIALS.
  - A. ABS PIPE - ASTM d-2751 WITH SDR 23.5 (6" GLUE JOINT)
  - B. PVC PIPE - ASTM D-3034 WITH 23.5 (6" GLUE OR GASKET JOINT)  
ASTM D-2665 SCHEDULE 40  
ASTM D-3034 WITH SDR 35 (6" ONLY)
  - C. DUCTILE IRON - CLASS 53 (6")
7. SEWER LATERAL LOCATION :
  - A. SEWER LATERALS MUST BE EXTENDED TO THE HOUSE SIDE OF UTILITY EASEMENTS.
  - B. SEWER LATERALS SHALL BE MARKED BY TWO INCHES BY FOUR INCHES (2" X 4") OR LARGER POSTS. POSTS SHALL BE PAINTED GREEN.
  - C. A SIX FOOT (6') LENGTH OF #6 REINFORCED BAR SHALL BE INSTALLED AGAINST THE POST.
  - D. END OF SEWER LATERAL SHALL NOT EXCEED 4' IN DEPTH UNLESS APPROVED BY THE COUNTY SANITARY ENGINEER.
  - E. SEE DETAILS S-14A , S-14B, AND S-14C.
8. ONLY SANITARY WYES WITH 45° BENDS SHALL BE USED FOR SANITARY LATERAL INSTALLATION. ALL WYES TO BE GLUE JOINTS ON TRUSS AND COMPOSITE PIPE. ALL SANITARY LATERALS MUST BE SIX INCHES (6") IN DIAMETER WITHIN THE RIGHT-OF-WAY. NO CONNECTION SHALL BE MADE TO THE CROWN OF THE SEWER MAIN.
9. ALL LATERALS TO BE NOT LESS THAN SIX INCHES (6") INSIDE DIAMETER.
10. THE LOCATION OF SEWER LATERALS MUST BE STAMPED IN THE CURB AT THE TIME THE CURB IS PLACED TO PERMANENTLY INDICATE THE LOCATION OF SAID LATERALS.
11. THE LOCATION OF ALL SEWER LATERALS MUST BE PROVIDED ON THE AS-BUILT PLANS.
12. MANHOLE LATERALS SHALL HAVE AN INVERT TWO INCHES (2") ABOVE MAIN-LINE INVERTS.
13. EXISTING MANHOLE CASTING ARE TO BE RAISED BY EITHER A MANHOLE ADJUSTING RING OR A BARREL SECTION ADDED. IF THE HEIGHT OF NECESSARY ADJUSTMENT IS OVER ONE FOOT (1') OR THERE IS ALREADY AN EXISTING ADJUSTMENT RING BEING USED, THE CONTRACTOR IS TO USE A NEW BARREL SECTION ONLY. EXTRA CARE IS TO BE TAKEN TO INSURE A PROPER AND TIGHT SEAL AT ALL NEW JOINTS.

APPROVED/REVISED

MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

SG-2A

## GENERAL NOTES - SANITARY SEWER (CONTINUED)

14. THE CONTRACTOR MUST INSTALL MECHANICAL PLUG(S) AT THE POINT(S) OF CONNECTION TO EXISTING SEWER PRIOR TO INITIATING ANY CONSTRUCTION. THE MECHANICAL PLUG(S) SHALL REMAIN IN PLACE UNTIL THE NEW MAINS HAVE BEEN FLUSHED, CLEANED, TESTED, TELEVISED, AND APPROVED FOR USE BY WARREN COUNTY SANITARY ENGINEER. THE MECHANICAL PLUG(S) CAN ONLY BE REMOVED IN THE PRESENCE OF A WARREN COUNTY SEWER INSPECTOR.
15. TRENCH SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR MUST INSURE THAT ALL APPLICABLE OSHA OPEN TRENCH SAFETY REQUIREMENTS ARE FOLLOWED. IT IS NOT WARREN COUNTY'S RESPONSIBILITY TO INSPECT EACH SITE FOR COMPLIANCE.
16. HDPE PIPE MAY ONLY BE USED FOR DIRECTIONAL BORING OF FORCE MAINS WITH APPROVAL FROM THE COUNTY SANITARY ENGINEER. ALL DIRECTIONAL BORING SHOULD BE ACCOMPANIED BY DRILLING LOGS AT 25' STATION INCREMENTS, PVC PIPE SHALL BE PERMITTED FOR FORCE MAINS SIX INCHES (6") OR SMALLER IN DIAMETER. FORCE MAINS EIGHT INCHES (8") OR LARGER MUST BE CLASS 53 DUCTILE IRON WITH AN INTERIOR LINING OF EPOXY OR CERAMIC. PVC SHALL CONFORM TO AWWA C900 REQUIREMENTS AND HAVE AN EQUIVALENT OUTSIDE DIAMETER OF DR 14.
17. MINIMUM SLOPE SHALL BE AS FOLLOWS:

<u>PIPE SIZE</u>	<u>MINIMUM SLOPE (%)</u>
6"	2.00
8"	.50
10"	.35
12"	.28
15"	.19
18"	.15

18. ALL MATERIALS USED SHALL BE DOMESTIC, MADE IN THE UNITED STATES OF AMERICA.

APPROVED/REVISED

MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**SG-2B**

## PIPE CONNECTIONS INTO MANHOLES

SEWER PIPE TO MANHOLE CONNECTIONS ON ALL SANITARY SEWERS SHALL BE FLEXIBLE AND WATERTIGHT. SEWER PIPE SHALL BE SEALED IN THE MANHOLE SECTION PIPE OPENINGS WITH A RESILIENT CONNECTOR MEETING THE REQUIREMENTS OF ASTM C923. THE CONNECTION MAY BE ANY OF THE FOLLOWING TYPES:

1. RUBBER SLEEVE WITH STAINLESS STEEL BANDING
  - A. KOR-N-SEAL AS MANUFACTURED BY POLLUTION CONTROL SYSTEMS, INC.
  - B. LOCK JOINT FLEXIBLE MANHOLE SLEEVE AS MANUFACTURED BY INTERSPACE CORPORATION.
  - C. OR EQUAL.
  
2. RUBBER GASKET COMPRESSION
  - A. PRESS WEDGE II AS MANUFACTURED BY PRESS-SEAL GASKET CORPORATION.
  - B. DURA-SEAL AS MANUFACTURED BY DURA TECH, INC.
  - C. OR EQUAL.

RESILIENT CONNECTOR SHALL BE CAST INTEGRALLY INTO THE WALL OF THE MANHOLE SECTION AT TIME OF MANUFACTURE OR SHALL BE INSTALLED BY MECHANICAL MEANS IN OPENING CUT INTO MAHOLE WALL PER ASTM C923.

ANY CONNECTION TO AN EXISTING MANHOLE MUST BE MADE BY CORING THE MANHOLE. ANY CORE TO A MANHOLE MUST BE CENTERED IN THE BARREL SECTION. NO CORE SHALL BE MADE ALONG THE SEAM OF THE BARREL SECTION(S).

APPROVED/REVISED  MARCH, 2018	WARREN COUNTY STANDARD DETAILS DEPARTMENT OF WATER & SEWER	STANDARD NUMBER  <b>SG-3</b>
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## SEWER TESTING

1. THE CONTRACTOR MUST INSTALL MECHANICAL PLUG(S) AT THE POINT(S) OF CONNECTION TO THE EXISTING SEWER PRIOR TO INITIATING ANY CONSTRUCTION. THE MECHANICAL PLUG(S) SHALL REMAIN IN PLACE UNTIL THE NEW MAINS HAVE BEEN FLUSHED, CLEANED, TESTED, TELEVISED, AND APPROVED FOR USE BY THE WARREN COUNTY SANITARY ENGINEER. THE MECHANICAL PLUG(S) CAN ONLY BE REMOVED IN THE PRESENCE OF A WARREN COUNTY SEWER INSPECTOR.
2. ALL NEW MANHOLES SHALL BE VACUUM TESTED. A VACUUM OF 10" OF MERCURY SHALL BE DRAWN ON THE MANHOLE. FOR A 4' MANHOLE LESS THAN 20' DEEP, MANHOLE SHALL HOLD 9" OF MERCURY FOR AT LEAST ONE (1) MINUTE.
3. ALL SANITARY SEWER MAINS MUST BE AIR TESTED. THE STANDARD TEST IS AN AIR PRESSURE TEST OF 5.0 PSI FOR A FIVE (5) MINUTE PERIOD WITH A MAXIMUM OF 1.0 PSI LOSS.
4. ALL NON-TRUSS PIPE SHALL BE TESTED FOR DEFLECTION AFTER BACKFILLING IS COMPLETED (30 DAY MINIMUM REQUIRED). A DEFLECTION TEST WITH A NINE POINT MANDREL WILL BE REQUIRED. NO MECHANICAL PULLING DEVICE SHALL BE USED. A VERTICAL RING DEFLECTION GREATER THAN FIVE PERCENT (5%) WILL NOT BE ALLOWED. THIS DEFLECTION IS DEFINED AS A FIVE PERCENT REDUCTION IN THE VERTICAL BASE OR AVERAGE INSIDE DIAMETER.
5. AT THE TIME THE SANITARY SEWER IS TESTED, THE SEWER MUST BE CLEANED AND TELEVISED WITH VIDEO DOCUMENTATION PROVIDED TO WARREN COUNTY ON A FLASH DRIVE OR THROUGH A FILE TRANSFER PROTOCOL (FTP) SITE. THE VIDEO MUST INCLUDE AUDIO IDENTIFICATION OF THE PIPE SPANS FROM MANHOLE TO MANHOLE, FLOW DIRECTION, TILT AND PAN OF ALL LATERALS AND CALL OUT ANY SUSPECT PROBLEMS IN THE SYSTEM. ALL PROBLEMS MUST BE IDENTIFIED BY THE CONTRACTOR. THE NECESSARY REPAIRS MUST BE MADE AND THE SEWER MUST THEN BE RE-CLEANED, RE-TESTED, AND RE-TELEVISED.
6. A SECOND VIDEO INSPECTION IS REQUIRED ONE YEAR AFTER INSTALLATION AND/OR PRIOR TO THE RELEASE OF THE MAINTENANCE BOND. IF A DEFICIENCY IS IDENTIFIED DURING THIS TELEVISED INSPECTION, THE FAILED SEWER PIPE MUST BE TESTED AND REPAIRED TO THE SATISFACTION OF THE COUNTY SANITARY ENGINEER.
7. THE DEVELOPER SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE TELEVISING, TESTING, AND REPAIRS OF THE SANITARY SEWER.

APPROVED/REVISED

MAY, 2023

WARREN COUNTY STANDARD DETAILS  
DEPARTMENT OF WATER & SEWER

STANDARD NUMBER

**SG-4**