Raleigh Water

STANDARD SEWER DETAILS

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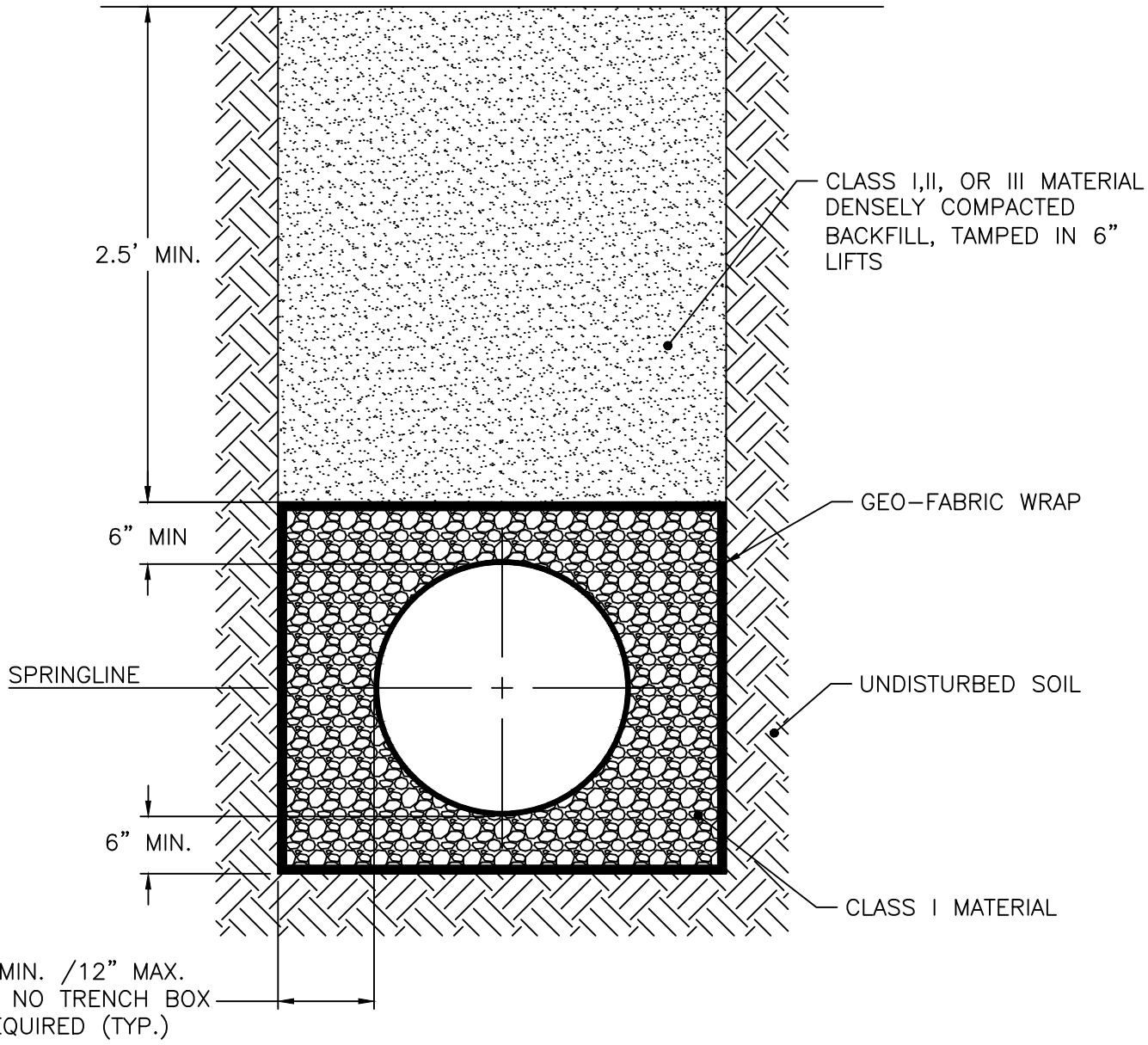
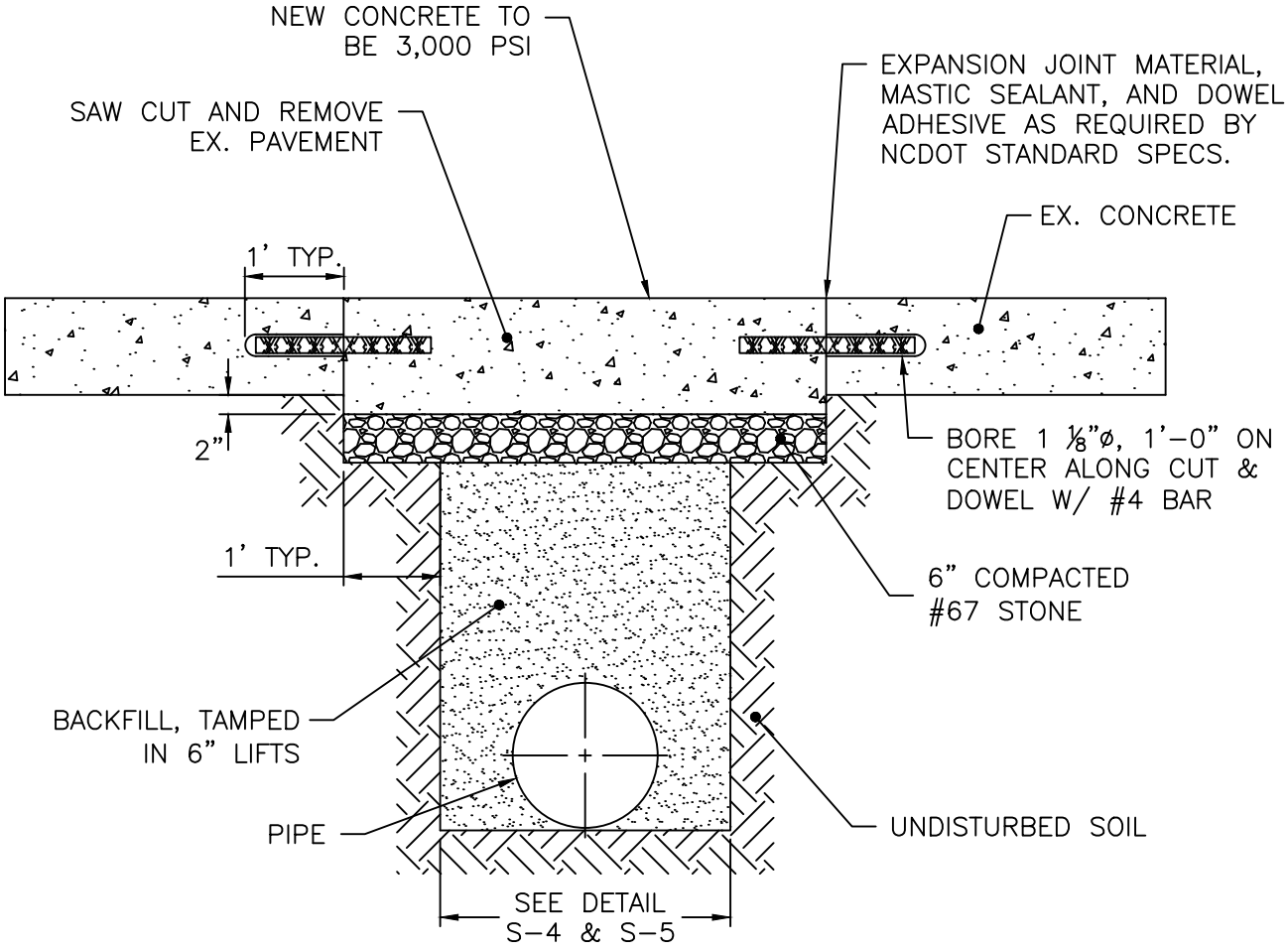


CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD BEDDING DETAIL FOR CCFRPM PIPES	
	S-1	



NOTES:

1. SEE DETAIL S–4 & S–5 FOR ADDITIONAL TRENCH AND PIPE BEDDING DETAILS.
2. PAVEMENT CUTS OVER 5'–0" IN WIDTH SHALL BE REINFORCED TO NCDOT OR MERGER COMMUNITY STANDARDS.
3. PAVEMENT CUTS SHALL BE MADE WITH AN APPROPRIATE SAW CUT MACHINE.
4. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 99 AS MODIFIED BY NCDOT.
5. THE FINAL 6" OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO AT LEAST 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 180 AS MODIFIED BY NCDOT.

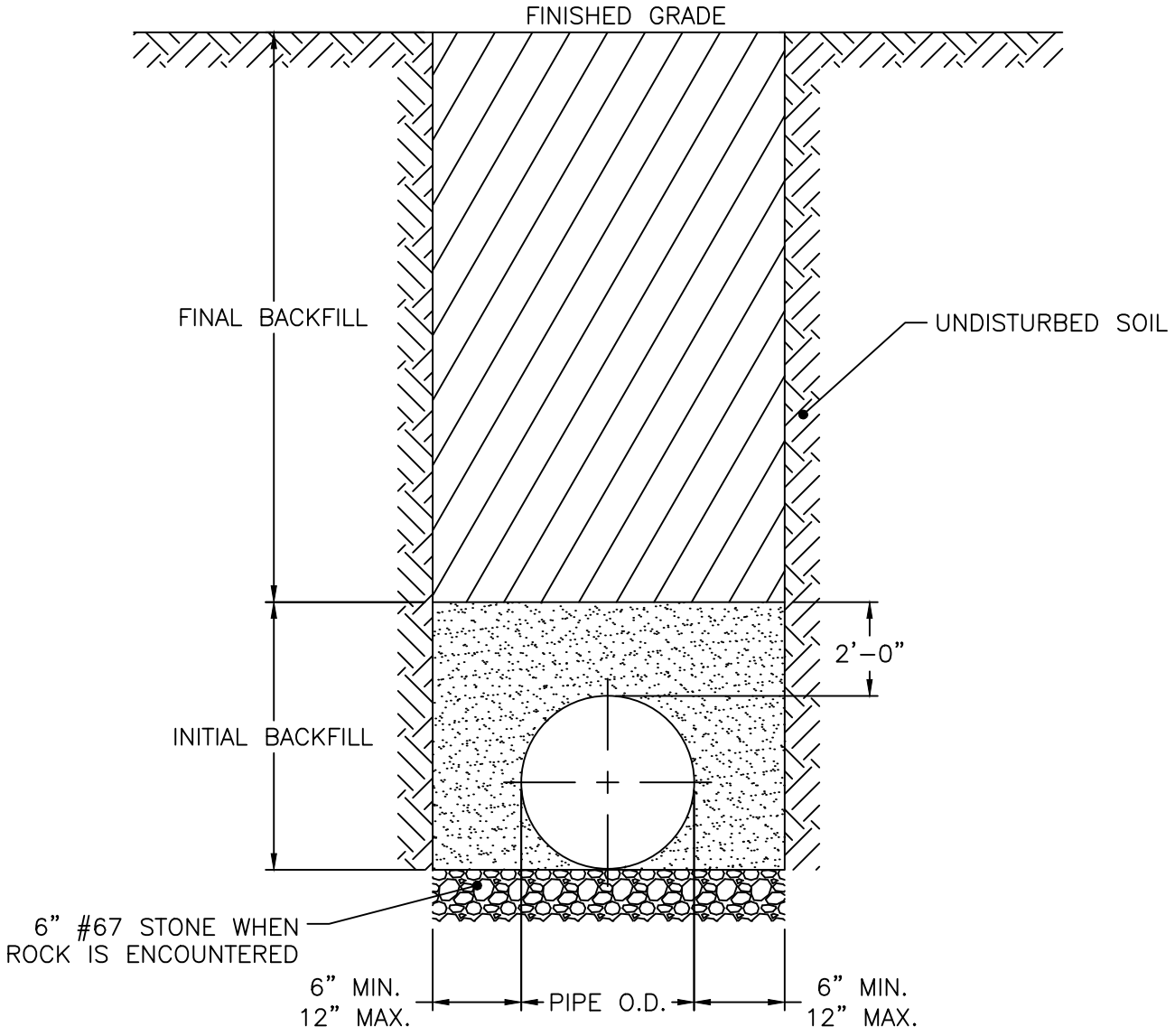
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD CONCRETE PAVEMENT PATCH	
	S-2	

SEE TRANSPORTATION DETAIL
T–10.05.1 FOR ASPHALT REPAIR

SEE TRANSPORTATION DETAIL
T–10.05.2 FOR ASPHALT REPAIR EXTENTS

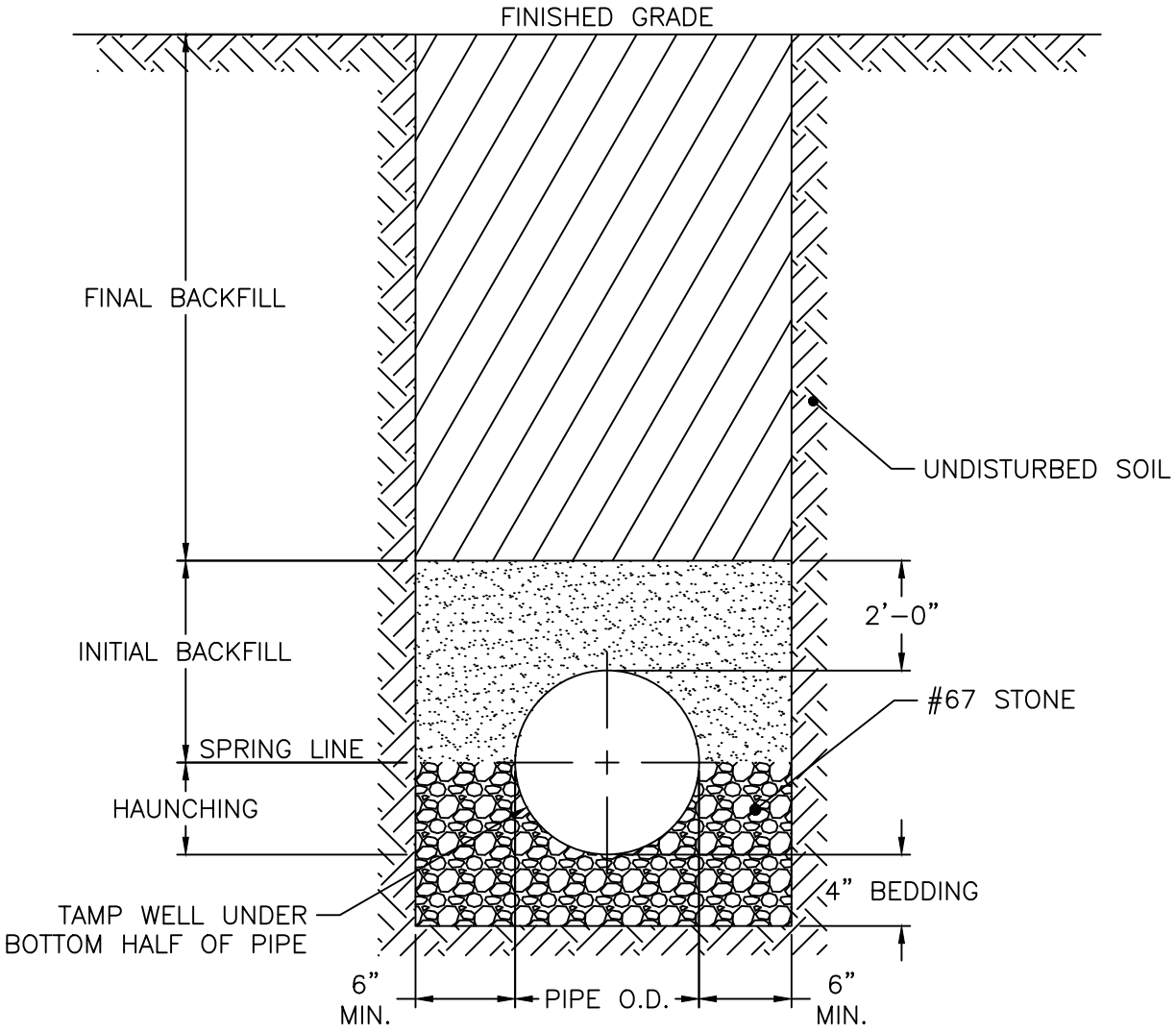
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD ASPHALT PAVEMENT PATCH	
	S-3	



NOTES:

1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON–TRAFFIC AREAS.
5. ACHIEVE 80% COMPACTION IN NON–TRAFFIC AREAS, AND 95% COMPACTION IN TRAFFIC AREAS.
6. IF IN EASEMENT, 4" TOPSOIL AND 12" CLEAN SELECT FILL MAY BE REQUIRED.
7. NO BOULDERS 8" IN DIAMETER OR GREATER ALLOWED IN FINAL BACKFILL.

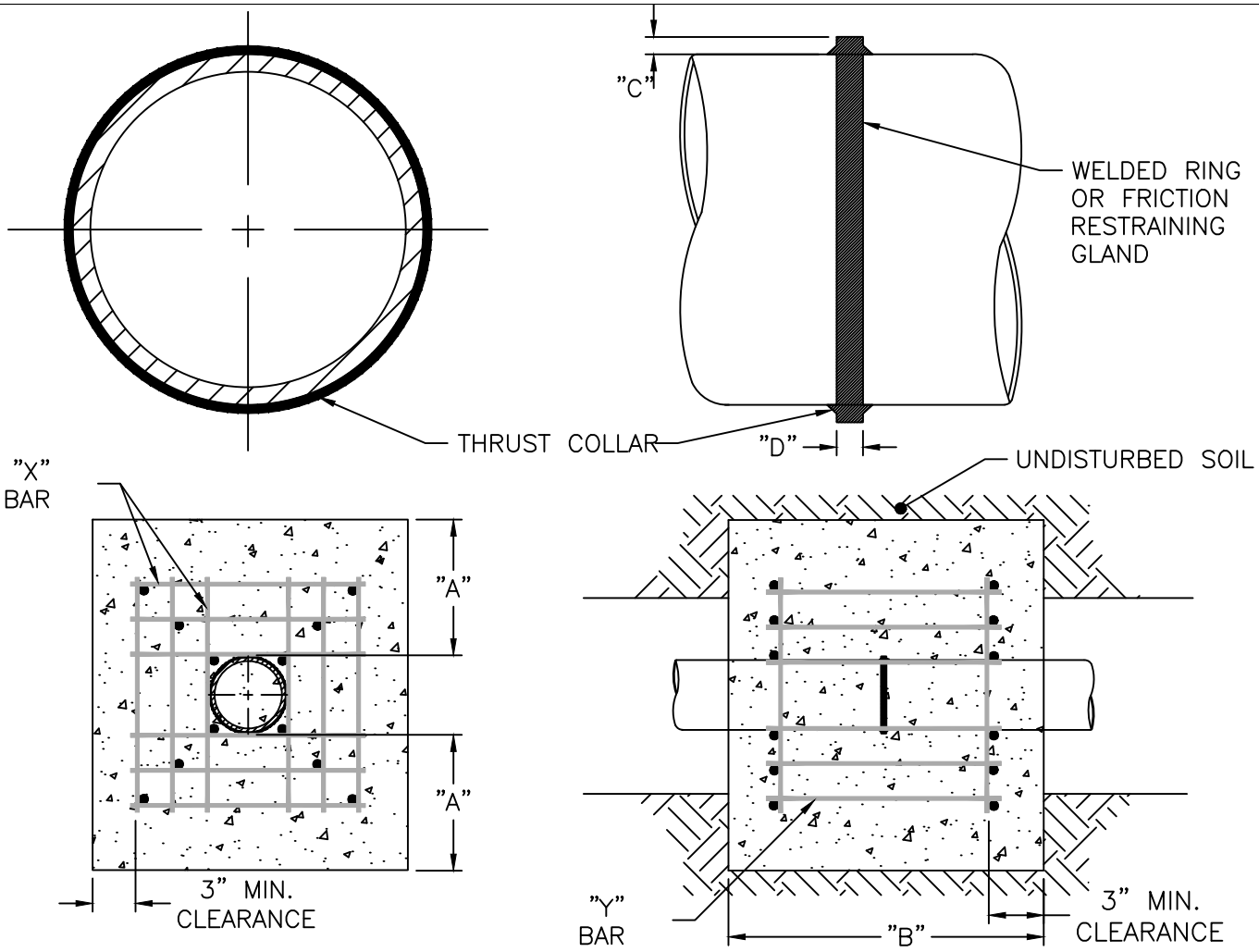
CITY OF RALEIGH **STANDARD DETAIL**	
REVISIONS	*DATE: 01/18/2025* *NOT TO SCALE*
	TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON
	S-4



TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE

NOTES:
1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS, 4" OR LARGER, TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON–TRAFFIC AREAS.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN	
	S-5	



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"–36"	#5	2'–2" + O.D. PIPE	1.043 LBS/FT	1'–1"	1.1 LBS. EACH	X–24 Y–12
≥48"	#6	3'–0" + O.D. PIPE	1.502 LBS/FT	1'–3"	1.9 LBS. EACH	X–24 Y–12

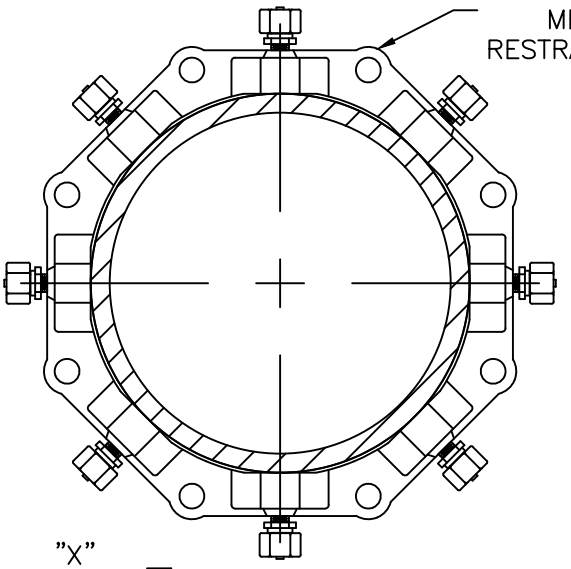
THRUST COLLAR, AND THRUST SCHEDULE

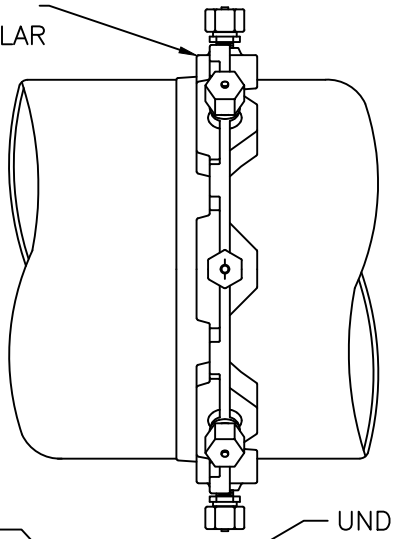
I.D. PIPE	"A"	"B"	"C"	"D"
6"–16"	1'–4"	1'–7"	2"	⅜"
20"–24"	1'–4"	1'–7"	3"	½"
30"–36"	1'–4"	1'–7"	4"	⅝"
≥48	1'–8"	1'–9"	6"	⅞"

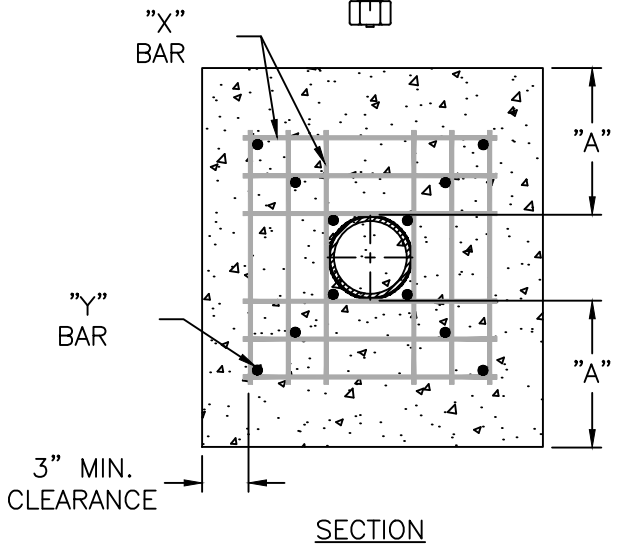
NOTES:
1. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL S–4 & S–5.
4. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL S–4 & S–5.
5. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.
6. IN LIEU OF WELDED RING, FRICTION RESTRAINING GLANDS ARE PERMITTED.

CITY OF RALEIGH
STANDARD DETAIL

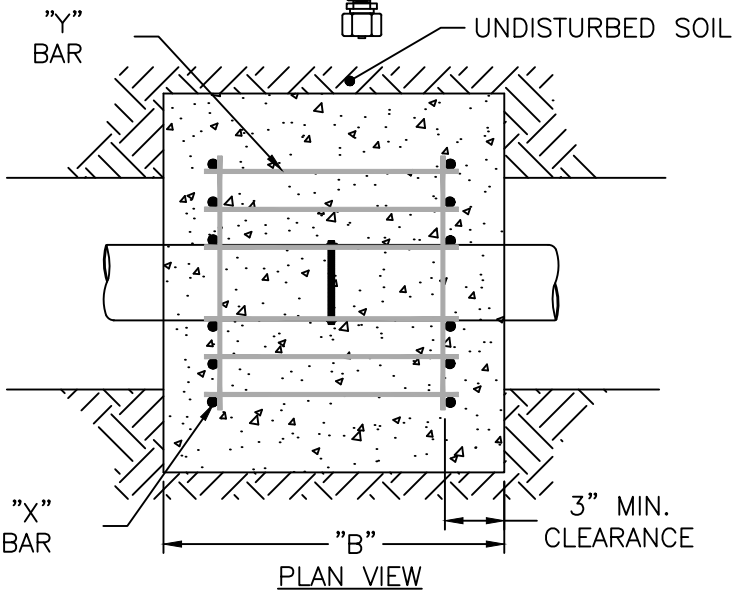
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	RESTRAINING COLLAR DESIGN DATA FOR SEWER FORCE MAIN	
	S-6	







SECTION



PLAN VIEW

REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"–36"	#5	2'–2" + O.D. PIPE	1.043 LBS/FT	1'–1"	1.1 LBS. EACH	X–24 Y–12
≥48"	#6	3'–0" + O.D. PIPE	1.502 LBS/FT	1'–3"	1.9 LBS. EACH	X–24 Y–12

THRUST COLLAR, AND THRUST SCEDULE

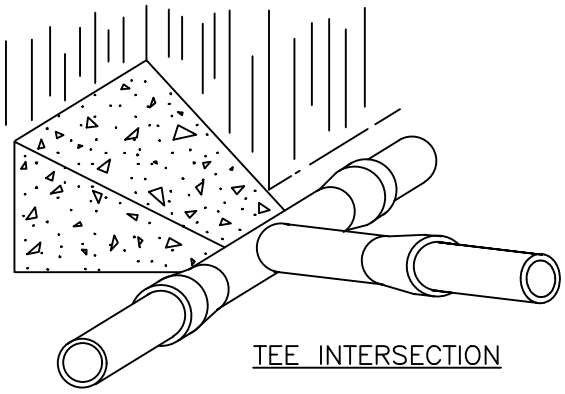
I.D. PIPE	"A"	"B"	"C"	"D"
6"–16"	1'–4"	1'–7"	2"	⅜"
20"–24"	1'–4"	1'–7"	3"	½"
30"–36"	1'–4"	1'–7"	4"	⅝"
≥48"	1'–8"	1'–9"	6"	⅞"

NOTES:
1. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL S–5.
4. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL S–4 & S–5.
5. MECHANICAL RESTRAINING COLLAR SHALL BE AS MANUFACTURED BY MEGA–LUG OR EQUAL.

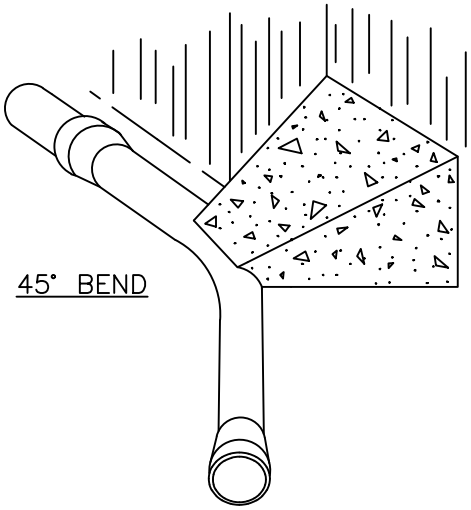
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	RESTRAINING COLLAR DESIGN DATA FOR PVC FORCE MAINS	
	S-6A	

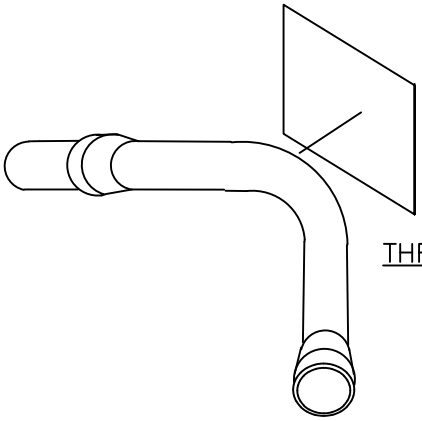
THRUST BLOCKING



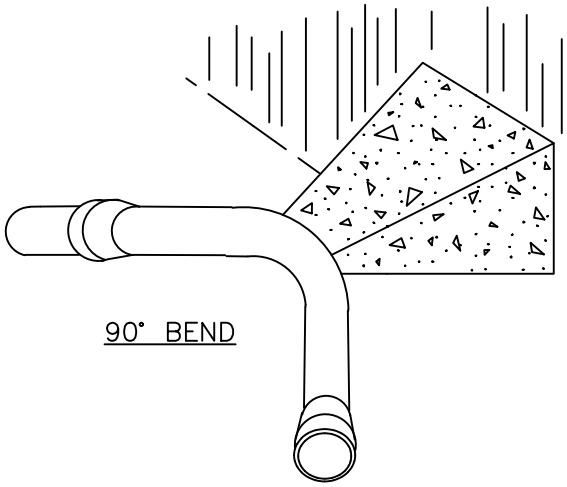
TEE INTERSECTION



45° BEND



THRUST BLOCK AREA

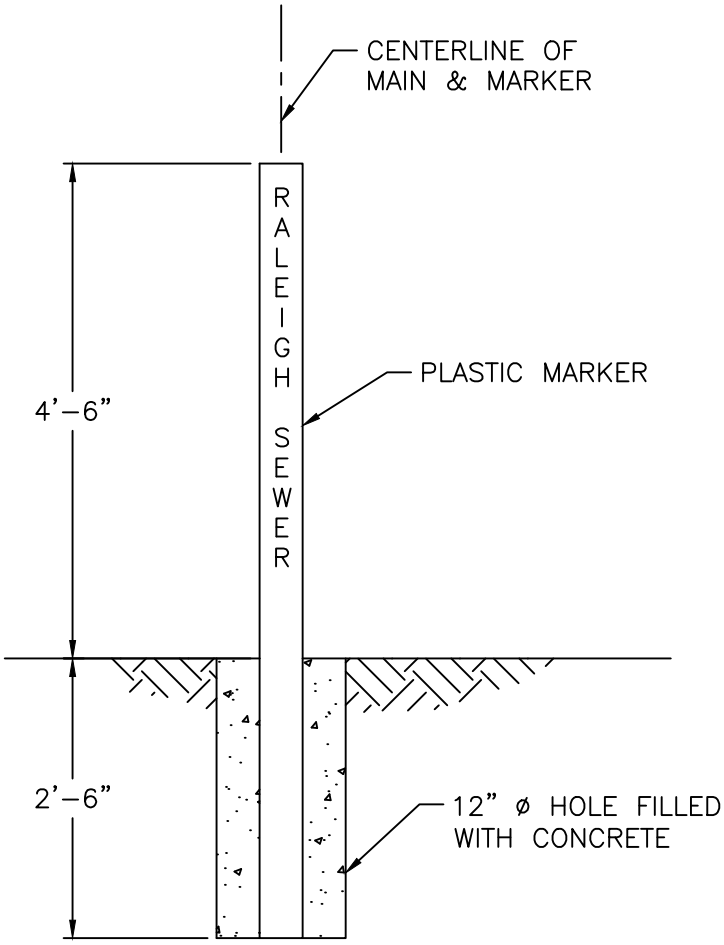


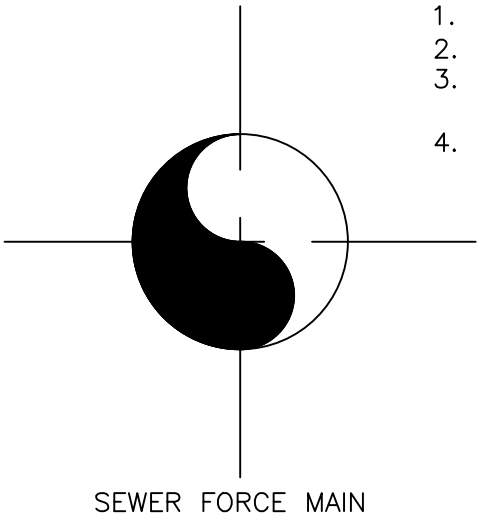
90° BEND

NOTES:
1. CONCRETE SHALL BE 3,000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO DETAIL S–4 & S–5.
4. SEE DETAIL W–10 & W–11 (THRUST BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	THRUST BLOCKING VIEWS	
	S-7	

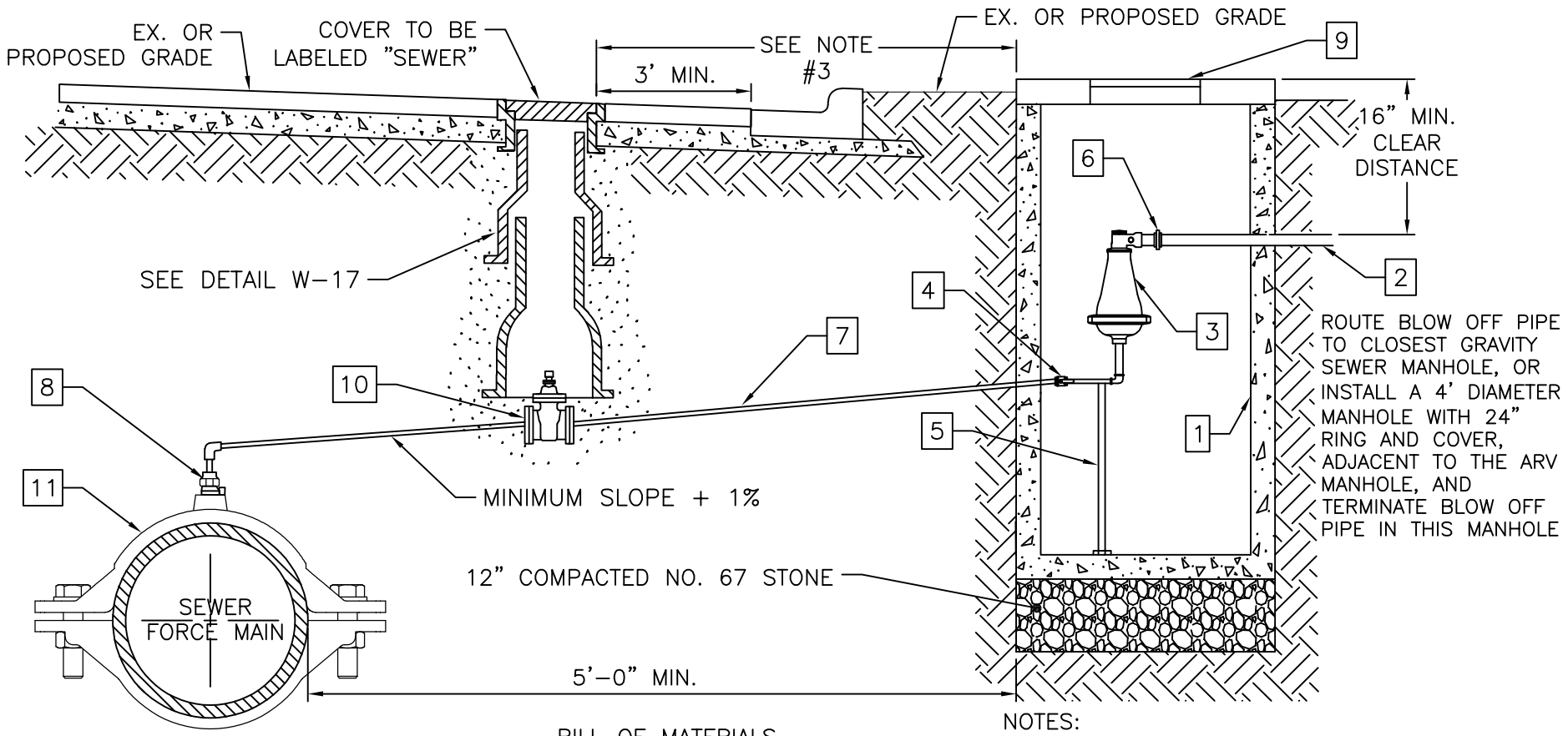




SEWER FORCE MAIN

NOTES:
1. PLASTIC MARKER SHALL BE GREEN IN COLOR.
2. MARKERS SHALL BE LABELED "RALEIGH SEWER".
3. TO BE SPACED EVERY 300 FEET ON EACH SIDE OF ANY ROADWAY OR JUNCTION.
4. MARKERS SHALL BE ROUND, 4" IN DIAMETER.

CITY OF RALEIGH STANDARD DETAIL	
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	MAIN MARKER FOR SEWER FORCE MAINS IN EASEMENTS
	S-8



BILL OF MATERIALS

1	4' DIA. PRECAST MANHOLE W/ FLAT TOP
2	SCH. 80 PVC BLOW OFF PIPE W/ TRACER WIRE
3	2" AIR RELEASE/VACUUM VALVE
4	2" SST BALL VALVE
5	SST ADJUSTABLE SADDLE PIPE SUPPORT
6	2" UNION, SCH. 80 PVC
7	2" SCH. 80 PVC W/ TRACER WIRE
8	CITY STANDARD CORPORATION COCK
9	36" x 30" HALLIDAY HATCH, ALUMINUM
10	2" GATE VALVE W/ OPERATING NUT
11	TAPPING SADDLE

NOTES:

1. AIR RELEASE/VACUUM VALVE TO BE A.R.I. FLOW CONTROL MODEL SAAR SHORT VERSION D-025 SS (STAINLESS STEEL).
2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
3. FOR FORCE MAINS LOCATED OUTSIDE OF STREET RIGHT-OF-WAYS, THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE THREE (3) FEET.
4. MAIN SHALL BE DEEP ENOUGH TO ACCOMMODATE INSTALLATION AS SHOWN.
5. SEE DETAIL S-4 & S-5 TO INSURE PROPER BACKFILL.
6. ALL PIPE MATERIALS INSIDE MANHOLE BETWEEN BALL VALVE & ARV SHALL BE SST.
7. TRACER WIRE SHALL BE ACCESSIBLE FROM WITHIN THE ARV MANHOLE.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS 07/2025

DATE: 01/18/2025

NOT TO SCALE

SEWER FORCE MAIN AIR RELEASE VALVE

S-9

AERIAL PIPE CROSSING GENERAL NOTES:

1. ALL MATERIALS UTILIZED ON THESE DETAIL SHEETS SHALL CONFORM TO THE APPROPRIATE SECTIONS OF THE CITY OF RALEIGH PUBLIC UTILITIES HANDBOOK UNLESS NOTED OTHERWISE HEREIN.

2. RESTRAINED JOINT PIPE AND FITTINGS SHALL CONSIST OF BOLTED RETAINER RINGS AND WELDED RETAINER BARS OR BOLTLESS TYPE WHICH INCLUDE DUCTILE IRON LOCKING SEGMENTS AND RUBBER RETAINERS. BOLTS FOR RESTRAINED JOINTS (IF APPLICABLE) SHALL CONFORM TO ANSI B18.2. RESTRAINED PIPE AND FITTINGS SHALL BE FLEX–RING OR LOK–RING TYPE JOINTS AS MANUFACTURED BY AMERICAN CAST IRON PIPE CO.; TR FLEX AS MANUFACTURED BY US PIPE, SUPER–LOCK AS MANUFACTURED BY CLOW, BOLT–LOK OR SNAP–LOK AS MANUFACTURED BY GRIFFIN PIPE PRODUCTS, OR EQUAL.

3. CONCRETE PROPERTIES SHALL BE AS FOLLOWS:
   A. CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
   B. NOMINAL SLUMP = 4 INCHES
   C. WATER/CEMENTITOUS MATERIALS RATIO = 0.45 (MAX)
   D. AIR CONTENT = 6% * 1.5%

CONCRETE SHALL BE COMPOSED OF CEMENT, WATER, COARSE AGGREGATES, FINE AGGREGATES AND AIR. CEMENT SHALL BE TYPE I/II OR II IN ACCORDANCE WITH ASTM C–150. MATERIAL REQUIREMENTS FOR ALL FINE AND COARSE AGGREGATES SHALL CONFORM TO ASTM C–33. COARSE AGGREGATE SHALL BE SIZE No. 57 OR 67. AN APPROVED CLASS 'F' FLYASH MAY BE SUBSTITUTED FOR AN EQUAL AMOUNT OF CEMENT BY WEIGHT UP TO 25%.

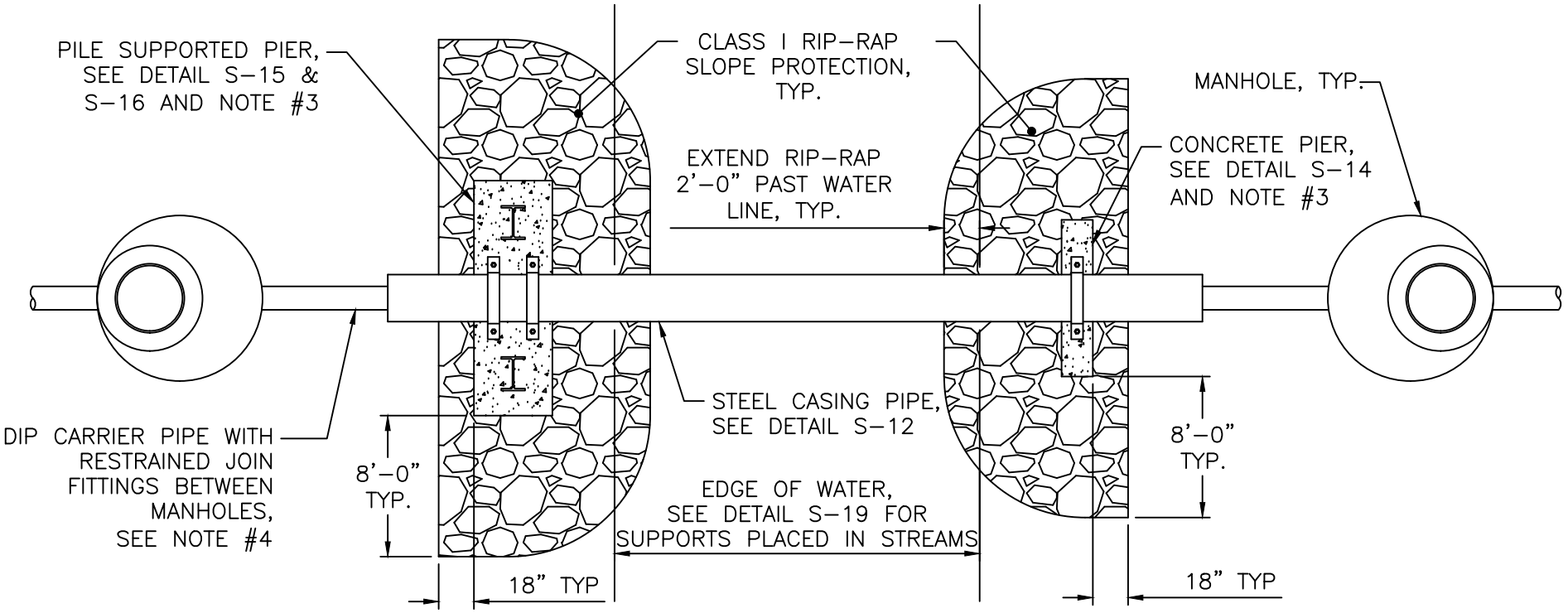
4. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED ¾".

5. CONVENTIONAL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 AND SHALL BE PLACED IN ACCORDANCE WITH "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS" (LATEST EDITION) AS PUBLISHED BY THE CONCRETE REINFORCING INSTITUTE. SPLICES SHALL BE CLASS 'B' CONFORMING TO THE PROVISIONS OF ACI 318 – "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".

6. NEOPRENE BEARING PADS SHALL BE FORMED FROM PREVIOUSLY UNVULCANIZED, 100% VIRGIN NEOPRENE, WITH DUROMETER HARDNESS = 50.

7. PILES SHALL BE STRUCTURAL STEEL HP12x53 PILES AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36. PILES SHALL BE DRIVEN TO DEPTHS REQUIRED TO OBTAIN AN ULTIMATE BEARING CAPACITY OF NOT LESS THAN TWO TIMES THE DESIGN LOADING OF 30 TONS. PILES SHALL PENETRATE A MINIMUM OF FIFTEEN FEET INTO UNDISTURBED SOIL. IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED. IF REQUESTED BY THE ENGINEER, PILES SHALL BE TESTED TO DETERMINE THE ULTIMATE CAPACITY OF THE PILES. THE METHOD OF LOAD TESTING SHALL CONFORM TO ASTM D1143 AND THE NORTH CAROLINA STATE BUILDING CODE. WHERE PILES ARE EXPOSED, PILES SHALL BE PAINTED AND/OR COATED IN ACCORDANCE WITH THE CITY SPECIFICATIONS.

CITY OF RALEIGH **STANDARD DETAIL**	
REVISIONS	*DATE: 01/18/2025* *NOT TO SCALE*
	AERIAL PIPE CROSSING GENERAL NOTES
	S-10



NOTES:

1. RIP–RAP FOR SLOPE PROTECTION SHALL BE CLASS I RIP–RAP IN ACCORDANCE WITH SECTION 876 OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES".
2. RIP–RAP SHALL BE PLACED IN ACCORDANCE WITH DRAWING 876.01 OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S "ROADWAY STANDARD DRAWINGS".
3. SUPPORT TYPE FOR PIERS SHALL BE DETERMINED BY ENGINEER BASED ON SUBGRADE CONDITIONS AT SITE. SEE DETAIL S–14 FOR SUBGRADE PARAMETERS FOR EACH TYPE OF FOUNDATION.
4. WHERE DUCTILE IRON PIPE IS USED FOR CARRIER PIPE, DUCTILE IRON CARRIER PIPE SHALL BE INSTALLED UTILIZING 2 PIPE ALIGNMENT GUIDES PER JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

CITY OF RALEIGH
STANDARD DETAIL

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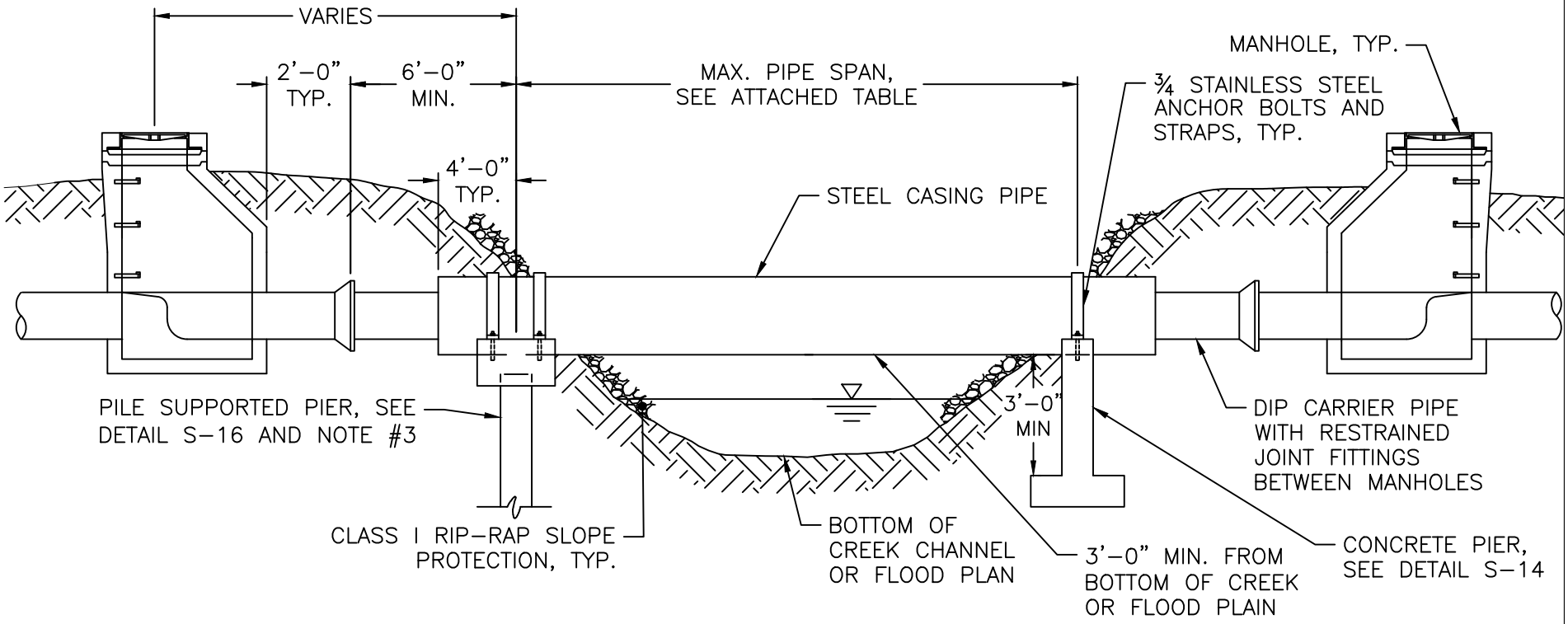
NOT TO SCALE

AERIAL PIPE CROSSING
TYPICAL PLAN

S-11



ALLOWABLE SPANS FOR STEEL CASING PIPE

CARRIER PIPE, DIP DIAMETER (IN.)	CASING PIPE, STEEL DIAMETER (IN.)	MIN. CASING PIPE WALL THICKNESS (IN.)	ALLOWABLE SPAN (FT.)
6	14	0.3750	40
8	16	0.3750	45
10	18	0.3750	50
12	20	0.3750	50
14	24	0.3750	55
16	26	0.3750	55
18	30	0.3750	60
20	32	0.3750	60
24	36	0.4375	65
30	42	0.4375	65
36	48	0.5000	65
42	56	0.5000	65

NOTES:

1. STEEL PIPE SHALL BE EITHER SPIRAL WELDED OR SMOOTH WALL SEAMLESS WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI. PAINTING AND LINING SHALL BE AS REQUIRED BY THE CITY OF RALEIGH PUBLIC UTILITIES HANDBOOK.
2. DUCTILE IRON PIPE SHALL BE SUPPORTED WITH TWO SPIDERS AT EVERY JOINT WITHIN THE CASING PIPE USING APPROVED PIPE ALIGNMENT GUIDE. SEE DETAIL S–39. ALL JOINTS SHALL BE RESTRAINED JOINT. SEE NOTE #2 ON DETAIL S–10.
3. SUPPORT TYPE FOR PIERS SHALL BE DETERMINED BY ENGINEER BASED ON SUBGRADE CONDITIONS AT SITE. SEE DETAIL S–14 FOR SUBGRADE PARAMETERS FOR EACH TYPE OF FOUNDATION. SEE DETAIL S–19 FOR SUPPORTS PLACED WITHIN STREAM.
4. BOTTOM OF PIPE TO BE AT A MINIMUM OF 1' ABOVE THE 25 YEAR FLOOD ELEVATION.

CITY OF RALEIGH
STANDARD DETAIL

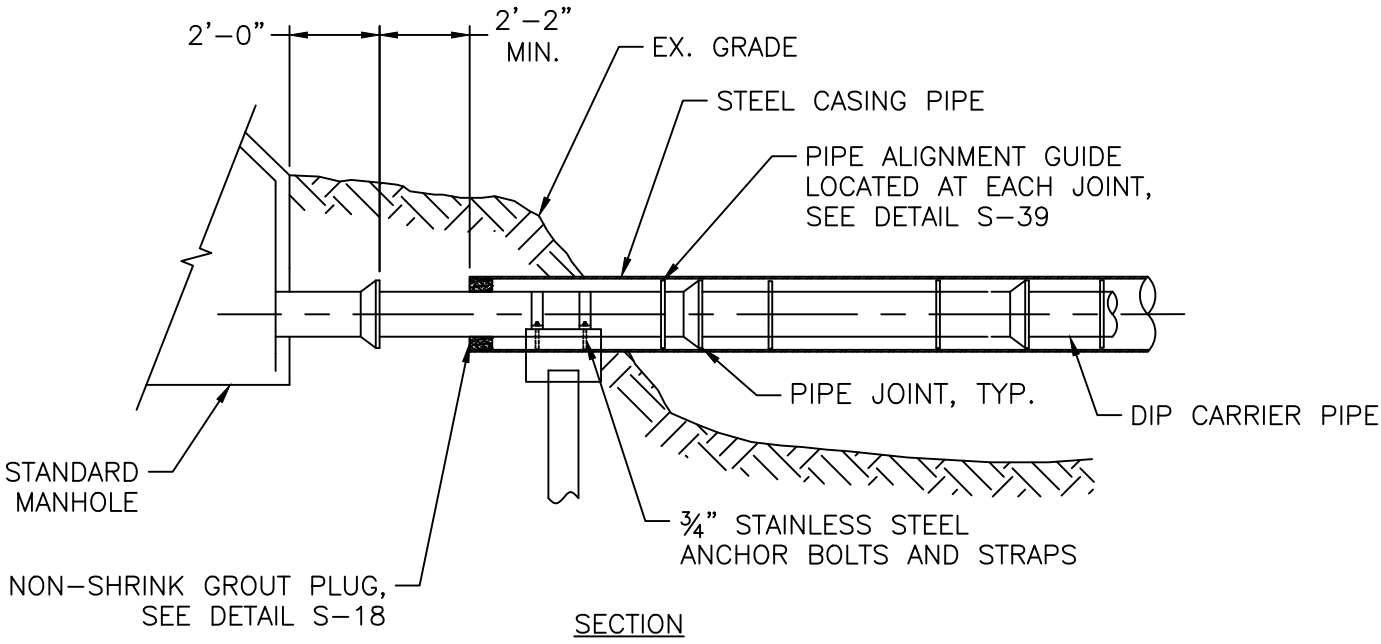
AERIAL PIPE CROSSING STEEL CASING PIPE ELEVATION

REVISIONS

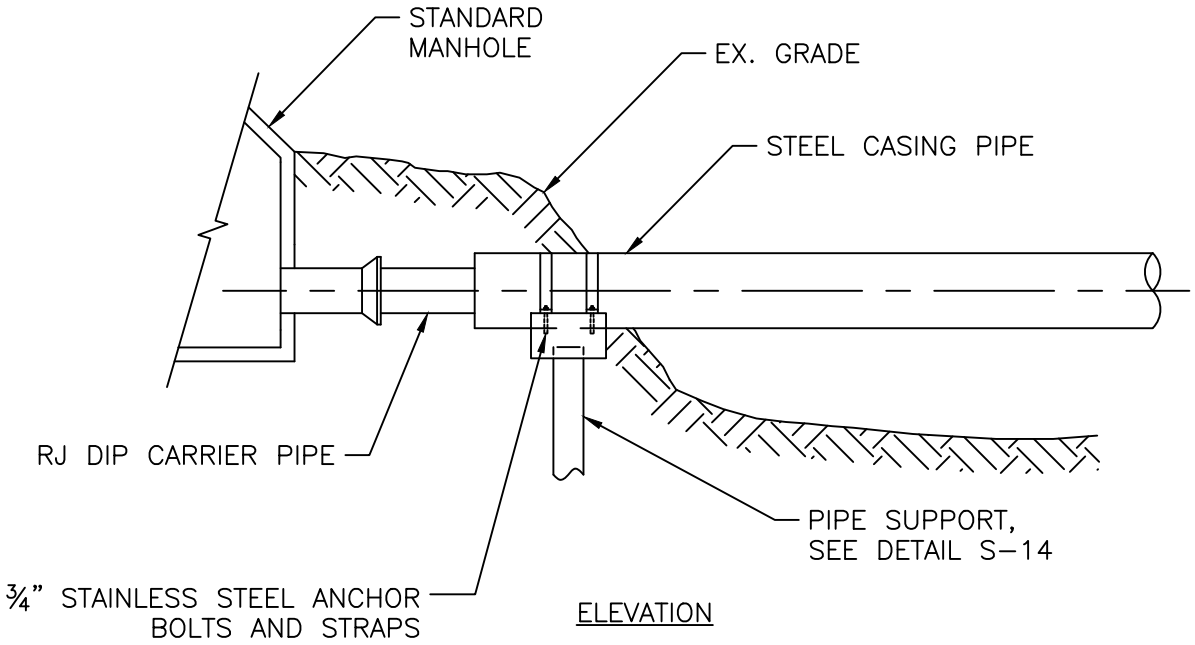
DATE: 01/18/2025

NOT TO SCALE

S-12

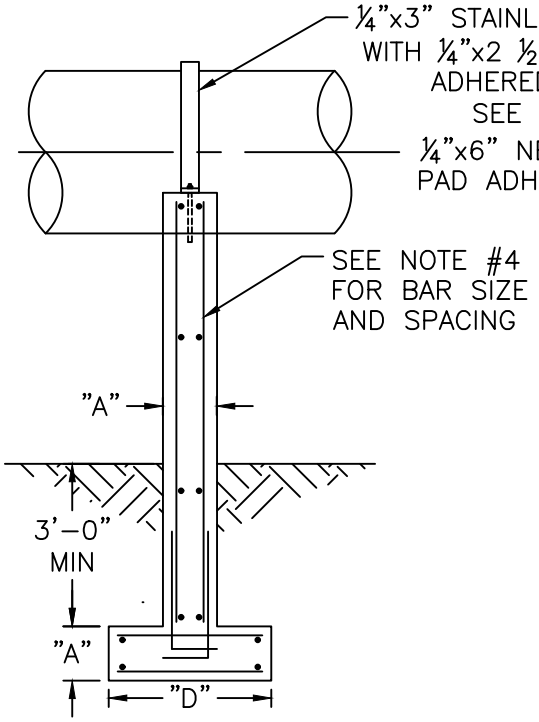


SECTION

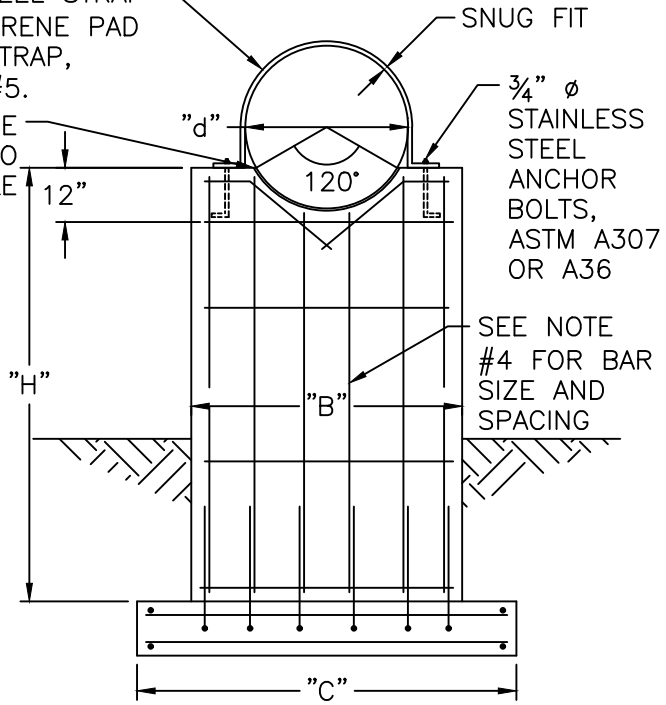


ELEVATION

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	AERIAL PIPE CROSSING TYPICAL PIPE SECTION AND ELEVATION	
	S-13	



PROFILE VIEW



SECTION

CASING PIPE DIA. "d" (IN.)	"H" (FT.)	THICKNESS "A" (IN.)	PIER WIDTH "B"	FOOTING LENGTH "C"	FOOTING WIDTH "D"
6–12	≤6	12	2'–4"	5'–6"	3'–0"
	8	12		6'–3"	
	10	12		6'–8"	
	12	12		7'–2"	
14–20	≤6	12	3'–0"	8'–0"	3'–0"
	8	12		9'–0"	
	10	12		9'–10"	
	12	14		10'–6"	
22–28	≤6	14	3'–8"	8'–9"	4'–0"
	8	14		10'–0"	
	10	14		11'–0"	
	12	14		11'–10"	
30–36	≤6	18	4'–4"	9'–0"	4'–0"
	8	18		10'–6"	
	10	18		11'–6"	
	12	18		12'–4"	
38–48	≤6	18	5'–4"	9'–6"	5'–0"
	8	18		11'–0"	
	10	18		12'–0"	
	12	18		12'–10"	
51–56	≤6	18	6'–4"	9'–10"	5'–0"
	8	18		11'–4"	
	10	18		12'–4"	
	12	18		13'–2"	

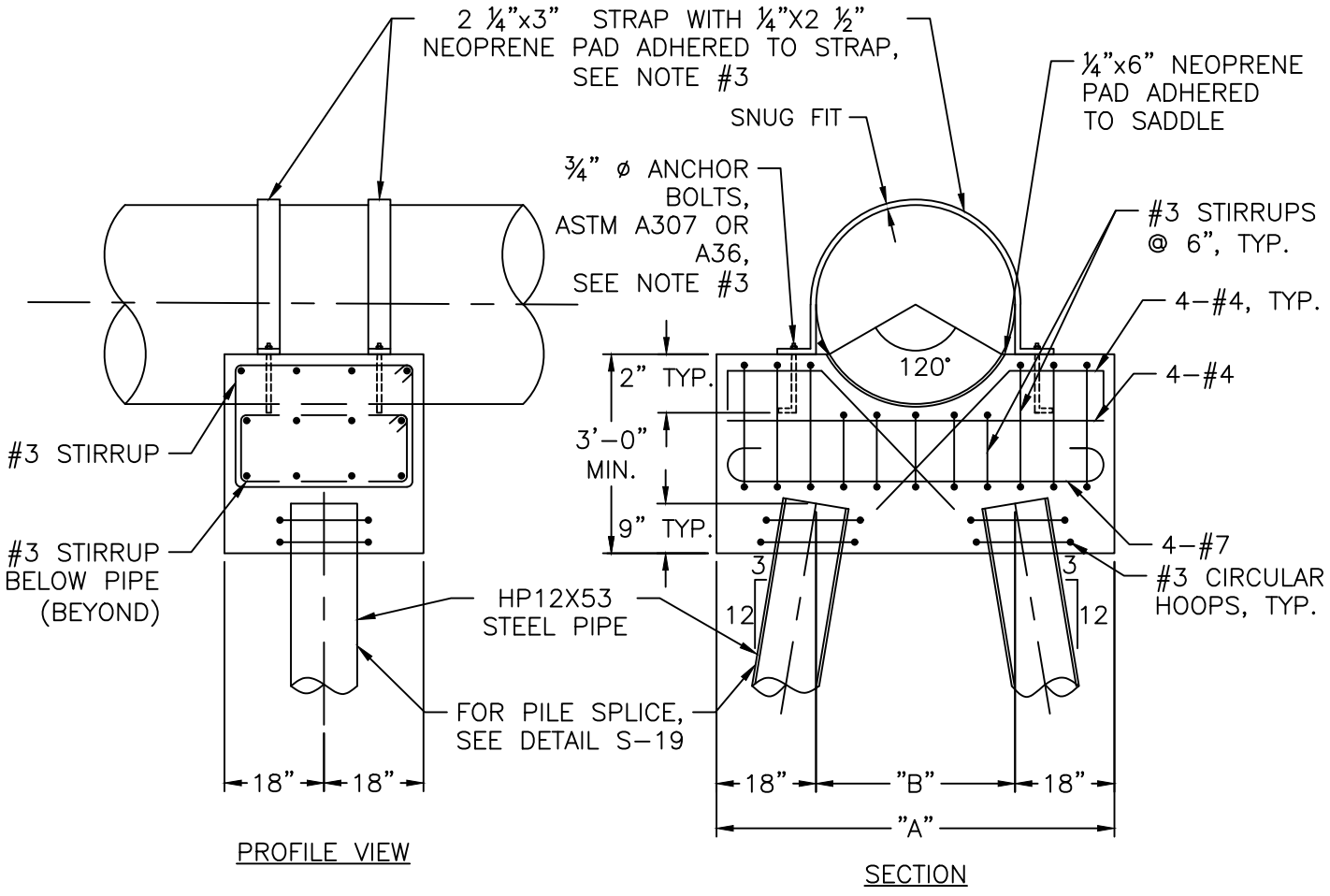
NOTES:

1. SHALLOW FOUNDATION DESIGN SHOWN THIS DETAIL IS BASED ON THE FOLLOWING PARAMETERS:
   A. ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF
   B. CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
   C. GRADE 60 REINFORCING STEEL
   D. MAX. STREAM VELOCITY = 10 FT/SEC
   E. MAX. SUPPORT HEIGHT (H) = 12'–0"

   IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, THE FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.
2. IF SUBGRADE AT LOCATION OF SUPPORTS IS DEEMED UNABLE TO WITHSTAND 2,000 PSF BEARING PRESSURE, A PILE SUPPORTED FOUNDATION SHALL BE UTILIZED AS PER DETAIL S–15.
3. IF BEDROCK IS ENCOUNTERED WHICH WILL PREVENT 3–FEET MIN. COVER OVER FOOTING, DOWELS SHALL BE DRILLED INTO BEDROCK PRIOR TO PLACING FOUNDATION, SEE DETAIL S–17.
4. TWELVE–INCH AND FOURTEEN–INCH THICK PIERS AND FOOTINGS SHALL BE REINFORCED WITH #5 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE. EIGHTEEN–INCH WIDE PIERS AND FOOTINGS SHALL BE REINFORCED WITH #7 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE.
5. EIGHTEEN–INCH THICK PIERS SHALL REQUIRE TWO STRAPS OVER THE PIPE INSTEAD OF ONE (AS SHOWN).
6. WHEN CONCRETE SUPPORTS ARE REQUIRED TO BE LOCATED WITHIN A STREAM AND ARE NOT COVERED WITH BLACKFILL, SEE DETAIL S–19 FOR MODIFICATIONS TO UPSTREAM FACE SUPPORT.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	AERIAL PIPE CROSSING CONCRETE PIER DETAIL	
	S-14	



WIDTH OF PILE CAP

CASING PIPE DIAMETER (IN.)	TOTAL WIDTH "A"	PILE SPACING "B"
≤ 36	6'–0"	3'–0"
38–42	6'–6"	3'–6"
45–51	7'–3"	4'–3"
54–60	8'–0"	5'–0"

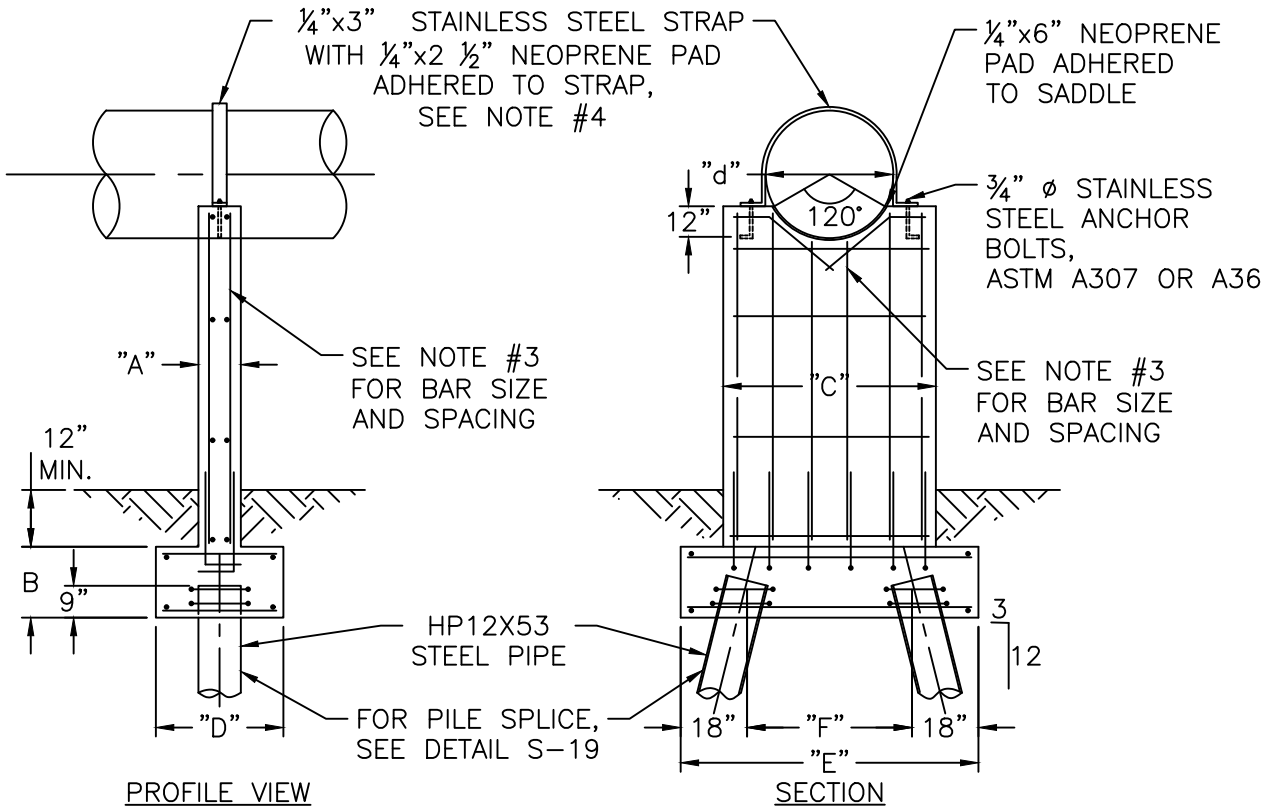
NOTES:

1. PILE SUPPORTED FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED UPON THE FOLLOWING PARAMETERS:
   A. MINIMUM CAPACITY OF HP12x53 PILE = 30 TONS
   B. CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
   C. GRADE 60 REINFORCING STEEL
   D. MAXIMUM STREAM VELOCITY = 10 FT/SEC

   IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, FOUNDATION DESIGN SHALL BE REVIEWED BY THE PROJECT ENGINEER.
2. LENGTH OF PILES SHALL BE AS REQUIRED TO DEVELOP 30 TON CAPACITY BY EITHER END BEARING, FRICTION, OR A COMBINATION OF END BEARING AND FRICTION. AS A MINIMUM, PILES SHALL BE DRIVEN AT LEAST 15 FEET INTO UNDISTURBED SOIL.
3. ANCHOR BOLTS AND STRAPS SHALL BE STAINLESS STEEL.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	AERIAL PIPE CROSSING PIPE CAP DETAIL
	S-15



CASING PIPE DIA. "d" (IN.)	PIER THICKNESS "A" (IN.)	FOOTING THICKNESS "B" (IN.)	PIER WIDTH "C"	FOOTING WIDTH "D"	FOOTING LENGTH "E"	PILE SPACING "F"
6–12	12	20	2'–4"	3'–0"	6'–0"	3'–0"
14–20	12	20	3'–0"	3'–0"	8'–0"	5'–0"
22–28	18	26	3'–8"	4'–0"	8'–9"	5'–9"
30–36	18	26	4'–4"	4'–0"	9'–0"	6'–0"
38–48	18	26	5'–4"	5'–0"	9'–6"	6'–6"
51–60	18	26	6'–4"	5'–0"	9'–10"	6'–10"

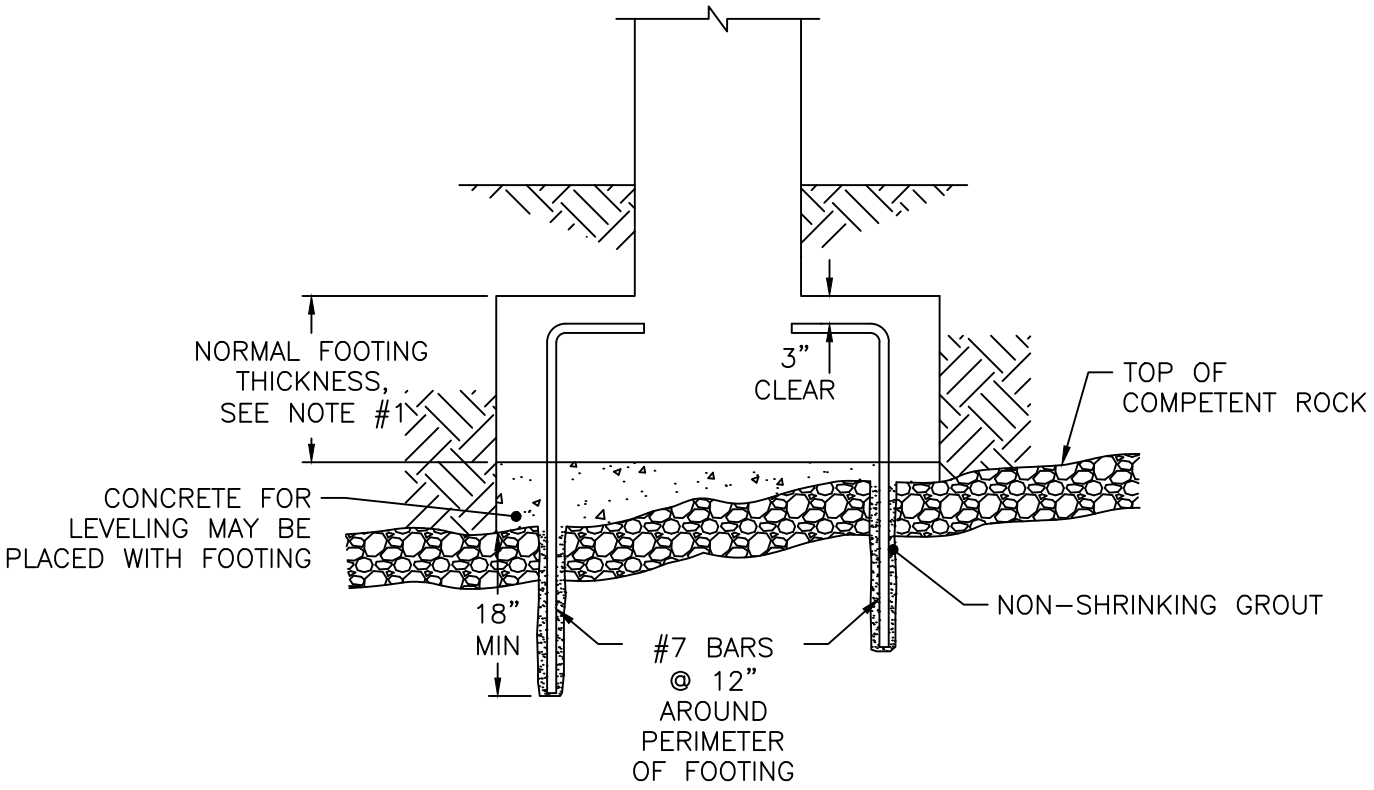
NOTES:

1. PILE SUPPORTED PIER FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED ON THE FOLLOWING PARAMETERS:
   A. MINIMUM CAPACITY OF HP12x53 PILE = 30 TONS
   B. CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
   C. GRADE 60 REINFORCING STEEL
   D. MAXIMUM STREAM VELOCITY = 10 FT/SEC

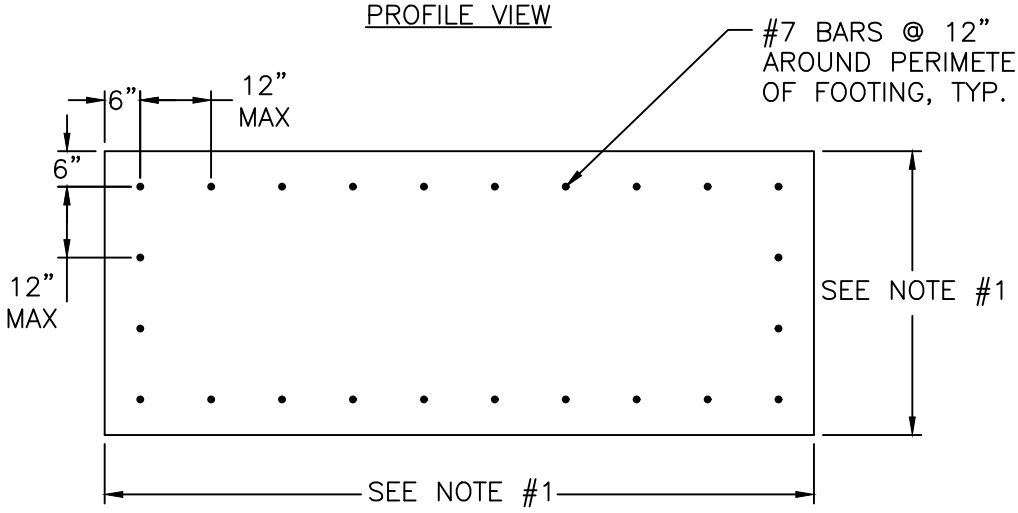
   IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, THE FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.
2. LENGTH OF PILES SHALL BE AS REQUIRED TO DEVELOP 30 TON CAPACITY BY EITHER END BEARING, FRICTION OR A COMBINATION OF END BEARING AND FRICTION. AS A MINIMUM, PILES SHALL BE DRIVEN AT LEAST 15 FEET INTO UNDISTURBED SOIL.
3. TWELVE–INCH AND FOURTEEN–INCH WIDE PIERS SHALL BE REINFORCED WITH #5 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE. EIGHTEEN–INCH WIDE PIERS SHALL BE REINFORCED WITH #7 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE. FOOTINGS SHALL BE REINFORCED TYPICALLY TO PIERS.
4. EIGHTEEN–INCH WIDE PIERS SHALL REQUIRE TWO STRAPS OVER THE PIPE INSTEAD OF ONE (AS SHOWN).
5. WHEN CONCRETE SUPPORTS ARE REQUIRED TO BE LOCATED WITHIN A STREAM AND ARE NOT COVERED WITH BACKFILL, SEE DETAIL S–19 FOR MODIFICATIONS TO UPSTREAM FACE OF SUPPORT.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	AERIAL PIPE CROSSING PILE SUPPORTED PIER DETAIL	
	S-16	



PROFILE VIEW



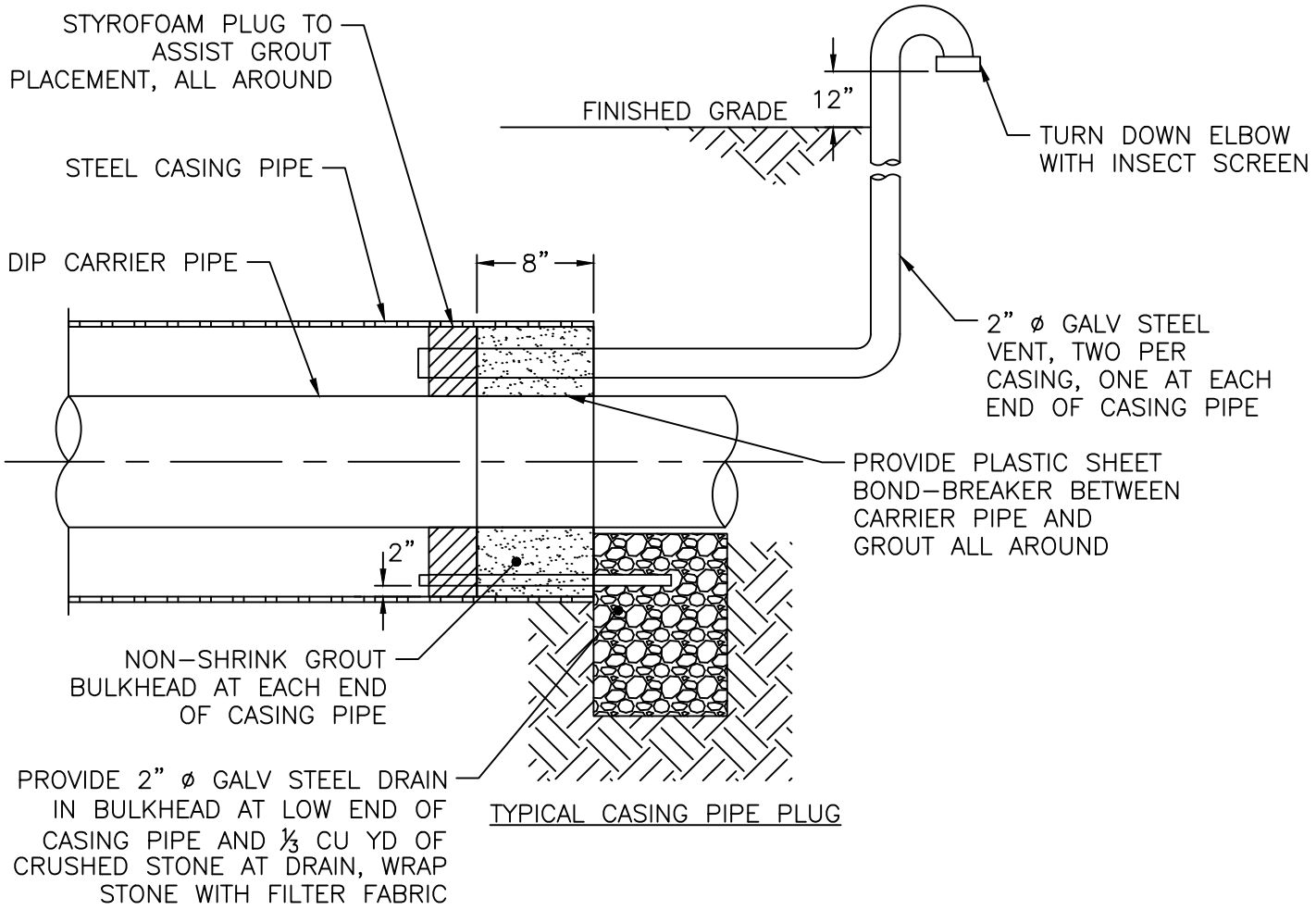
PLAN VIEW

NOTES:

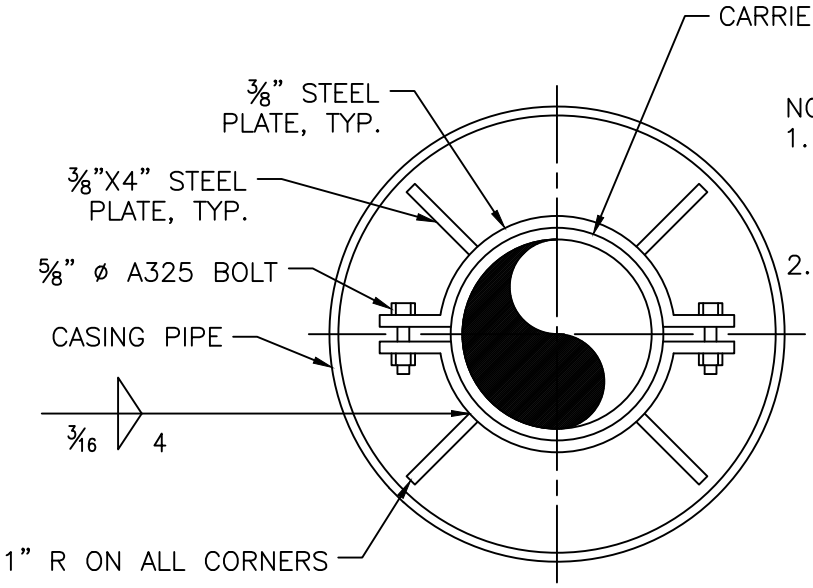
1. GEOMETRY OF FOOTING SHALL MATCH GEOMETRY OF CONCRETE PIERS WITH HEIGHT OF 6 FEET OR LESS AS PER DETAIL S–14.
2. NON–SHRINK GROUT SHALL BE "EUCO–N–S" BY THE EUCLID CHEMICAL COMPANY; "MASTERFLOW 713" BY MASTER BULDERS, OR EQUAL.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	AERIAL PIPE CROSSING CONCRETE PIER ON BEDROCK
	S-17



TYPICAL CASING PIPE PLUG

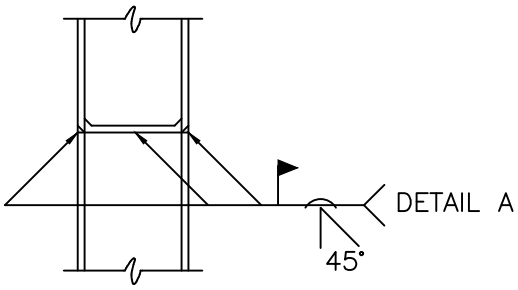


PIPE ALIGNMENT GUIDE

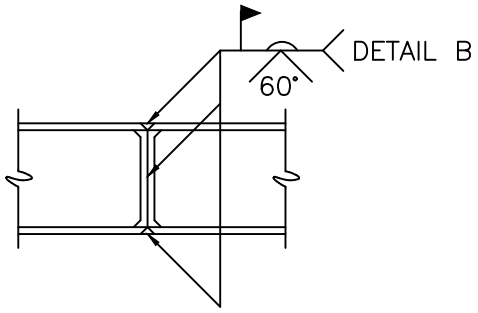
NOTES:
1. NON-SHRINK GROUT SHALL BE "EUCO-N-S" BY THE EUCLID CHEMICAL COMPANY; "MASTERFLOW 713" BY MASTER BUILDERS, OR EQUAL.
2. USE A MINIMUM OF 2 SPIDERS PER JOINT PLACED ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT.

CITY OF RALEIGH
STANDARD DETAIL

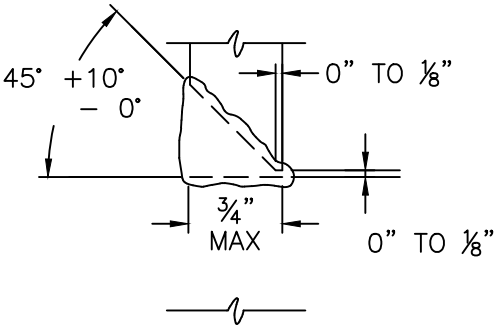
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	AERIAL PIPE CROSSING CASING PIPE DETAILS	
	S-18	



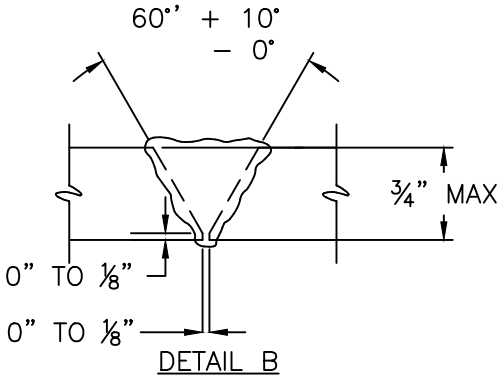
COLUMN VERTICAL



* COLUMN HORIZONTAL OR VERTICAL



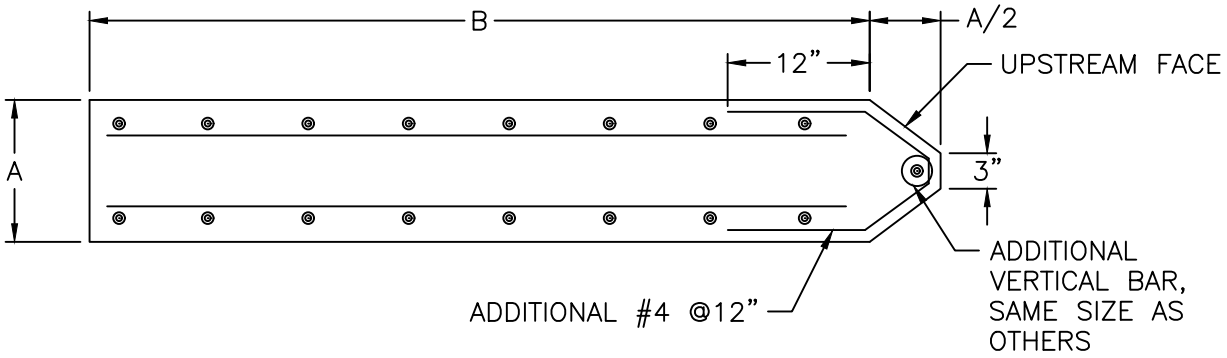
DETAIL A



DETAIL B

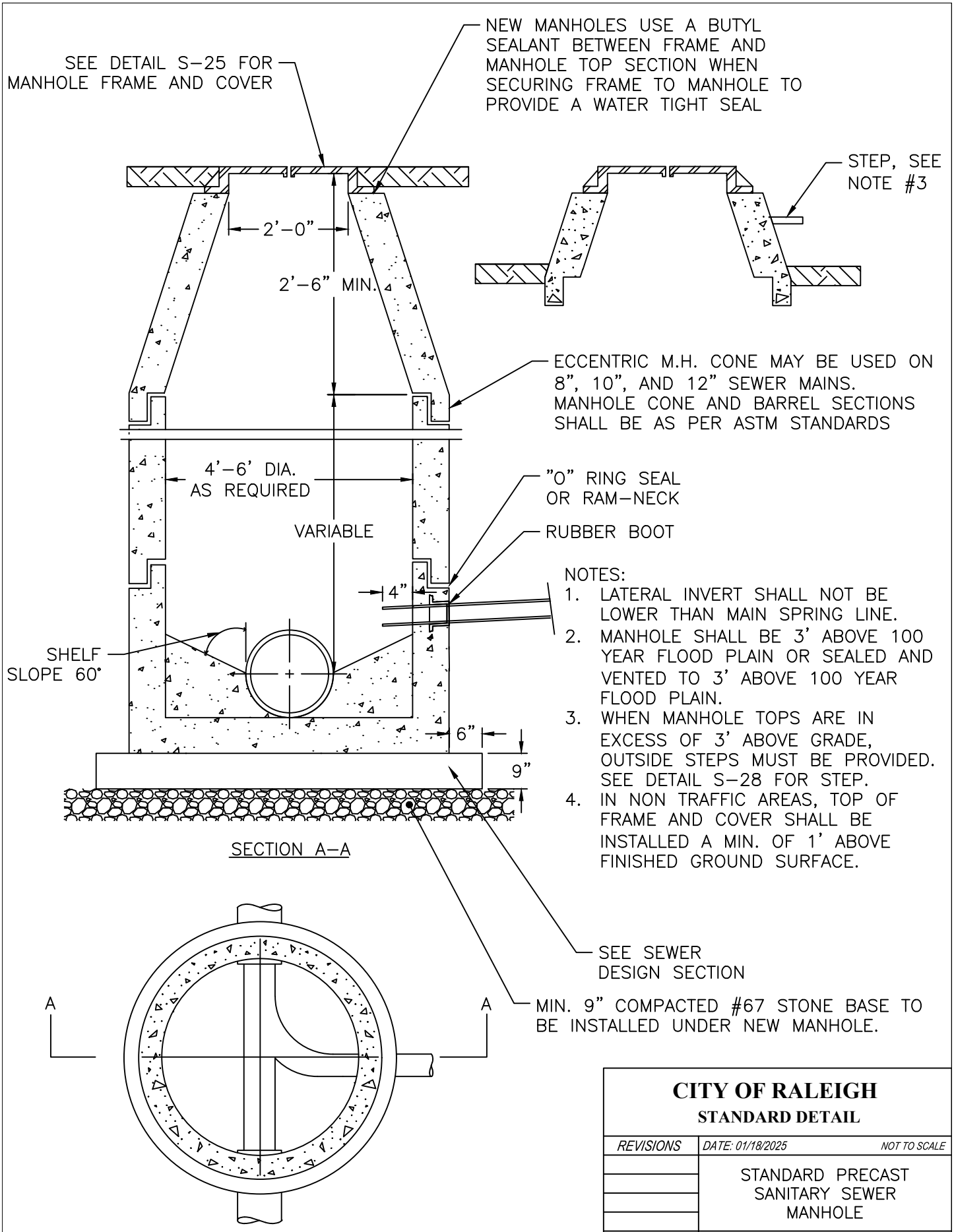
* POSITION OF COLUMN DURING WELDING

STEEL PILE SPLICE



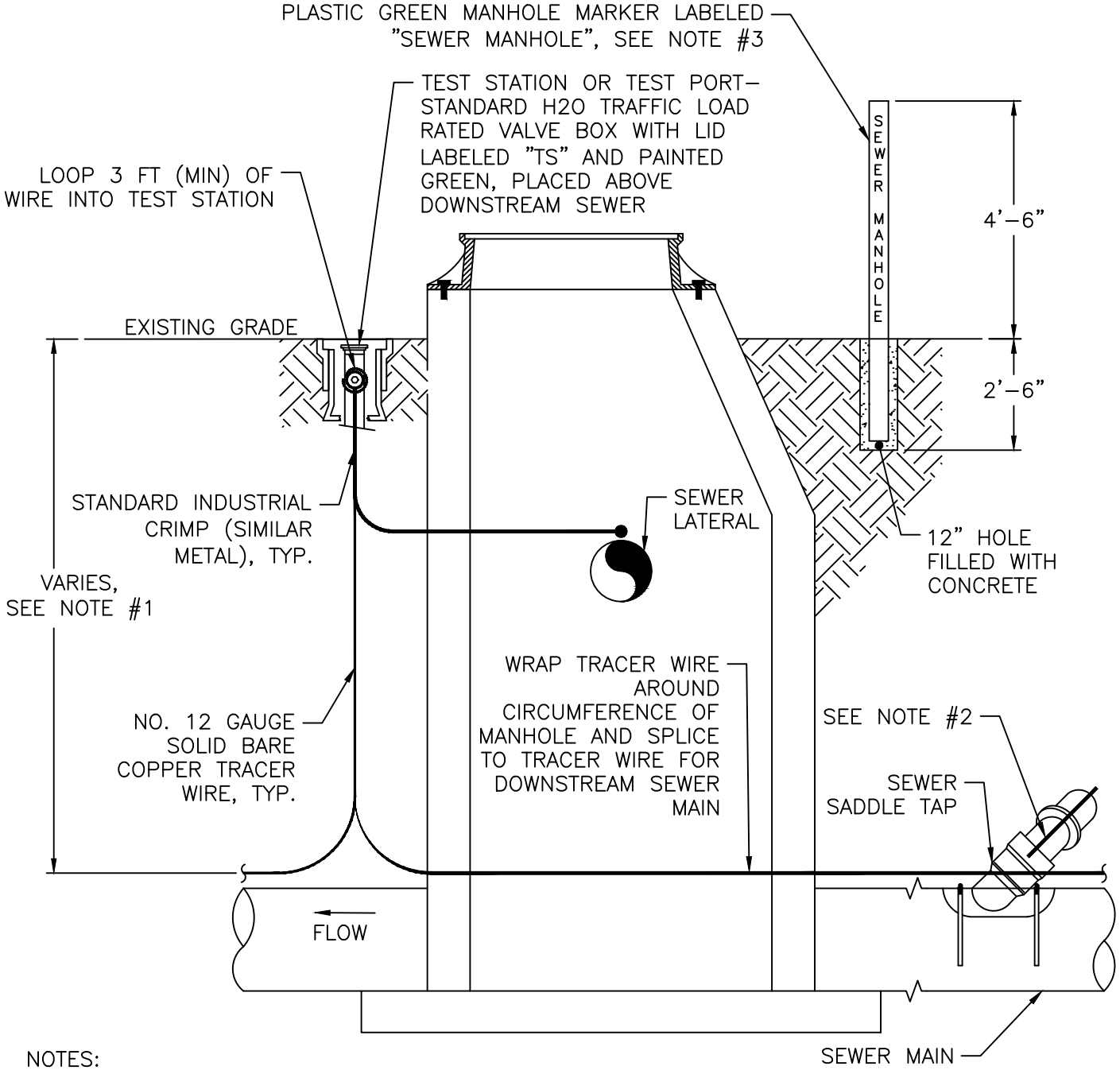
PLAN – CONCRETE SUPPORT NOSING
(WHEN EXPOSED TO STREAM FLOW)

CITY OF RALEIGH STANDARD DETAIL	
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	AERIAL PIPE CROSSING CONCRETE SUPPORT DETAILS
	S-19



CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	STANDARD PRECAST SANITARY SEWER MANHOLE
	S-20

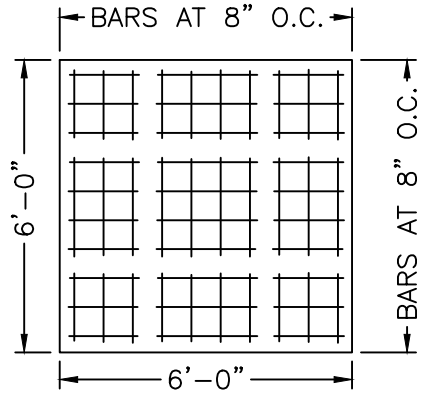


NOTES:

1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL INSTALLATION DEEPER THAN 8 FT, THE TRACING WIRE SHALL BE INSTALLED AT A DEPTH OF 7–8 FT. THE WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OF CUTS IN THE TRACER WIRE SHALL BE PERMITTED.
2. WHERE LATERAL TAPS ARE MADE BY SERVICE SADDLES, THE TRACER WIRE SHALL NOT BE ALLOWED TO TO BE PLACED BETWEEN THE SADDLE AND MAIN.
3. MANHOLE MARKERS SHALL BE PLACED ADJACENT TO MANHOLES AT THE DISCRETION OF OWNER OR OWNER'S REPRESENTATIVE.

CITY OF RALEIGH
STANDARD DETAIL

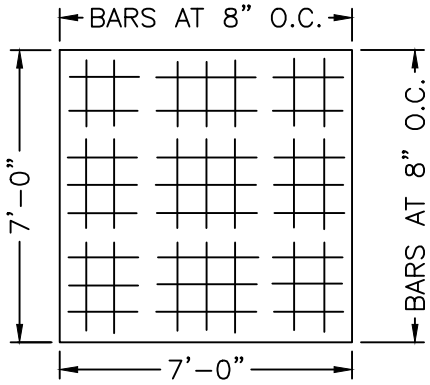
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	GRAVITY SEWER MAIN TRACER WIRE AND MANHOLE MARKER	
	S-20A	



REINFORCED CONC. FOOTING
FOR 4' PRECAST MANHOLE

BILL OF MATERIAL FOR 4' MANHOLE BASE

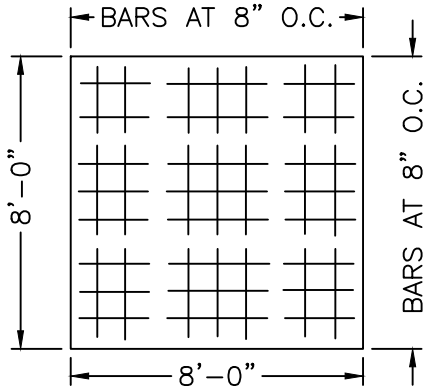
BAR SIZE	BAR LENGTH	NO. OF BARS	BAR WT. (LBS.)
#5	5'-6"	18	103
CL. "A" CONCRETE TOTAL CU. YDS.			1.0



REINFORCED CONC. FOOTING
FOR 5' PRECAST MANHOLE

BILL OF MATERIAL FOR 5' MANHOLE BASE

BAR SIZE	BAR LENGTH	NO. OF BARS	BAR WT. (LBS.)
#5	6'-6"	20	136
CL. "A" CONCRETE TOTAL CU. YDS.			1.4



REINFORCED CONC. FOOTING
FOR 6' PRECAST MANHOLE

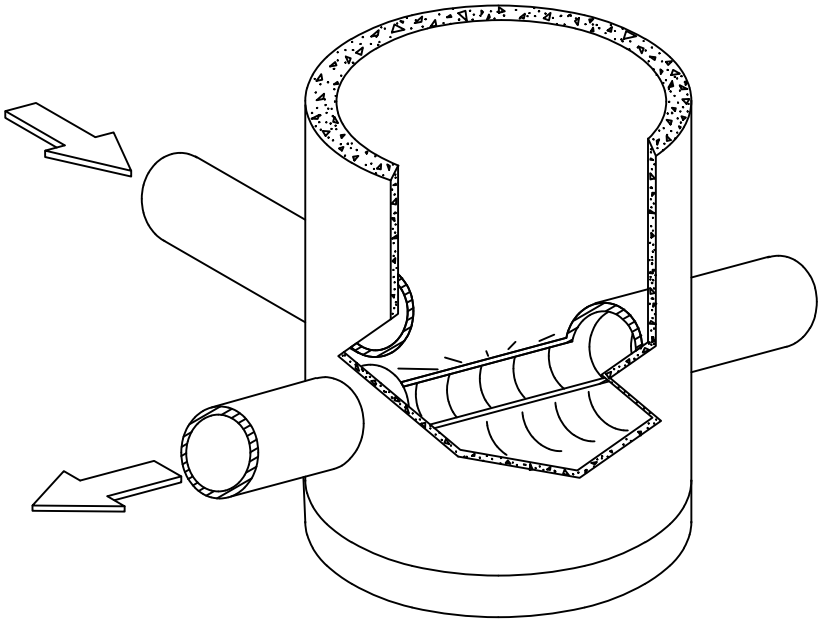
BILL OF MATERIAL FOR 6' MANHOLE BASE

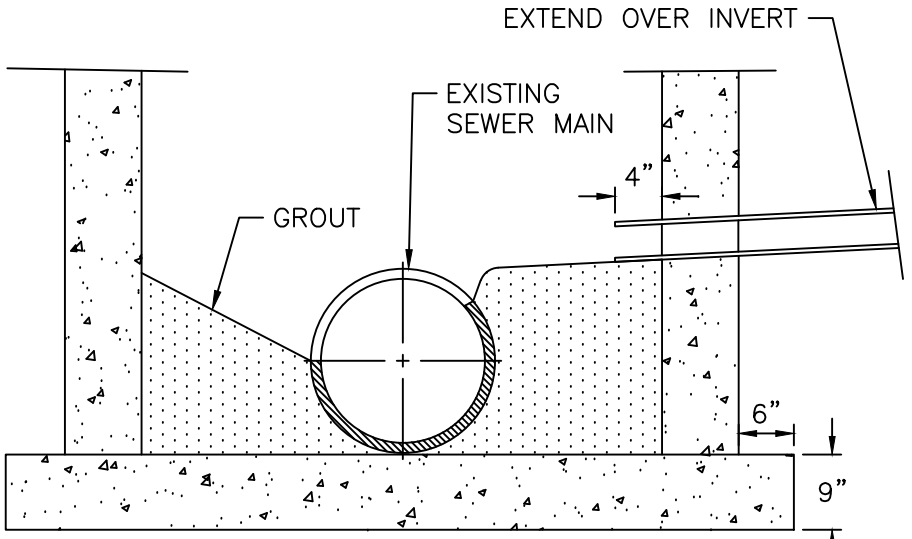
BAR SIZE	BAR LENGTH	NO. OF BARS	BAR WT. (LBS.)
#5	7'-6"	24	165
CL. "A" CONCRETE TOTAL CU. YDS.			1.8

* ALL BASES ARE MINIMUM 9" THICK

CITY OF RALEIGH
STANDARD DETAIL

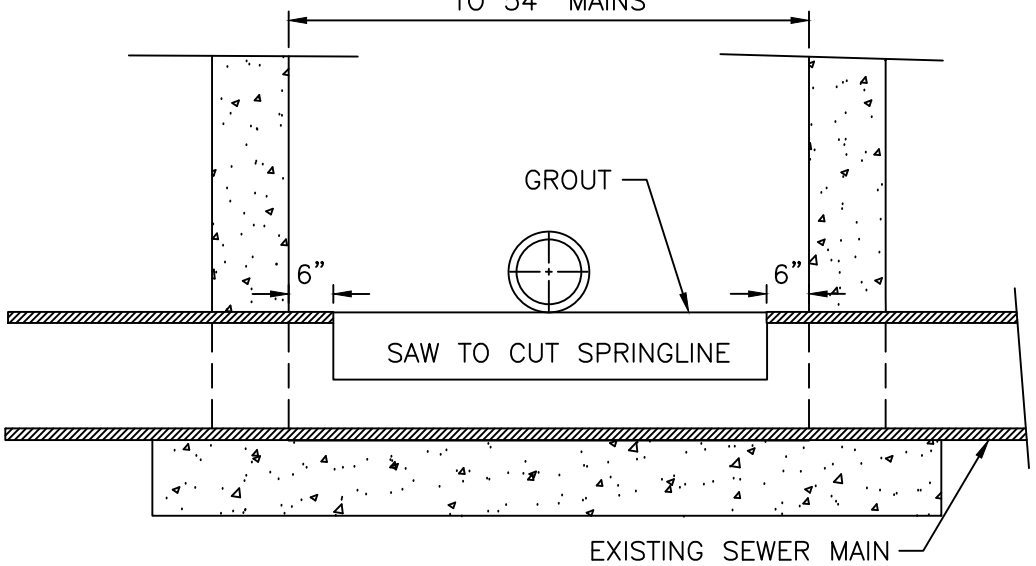
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	EXTENDED BASE OR CAST-IN-PLACE REINFORCED CONCRETE BASE
	S-21





SECTION AT RIGHT ANGLE TO EXISTING MAIN

4'–0" FOR 8" TO 12" MAINS 5'–0" FOR 15" TO 30" MAINS 6'–0" FOR 36" TO 54" MAINS



SECTION ALONG CENTERLINE OF EXISTING MAIN

NOTES:
1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION.
2. THIS DETAIL TO BE USED WHEN A 6" OR LARGER LATERAL NECESSITATES CONSTRUCTION OF A NEW MANHOLE.
3. SEE DETAIL S–20 FOR PRECAST MANHOLES.
4. THE CONTRACTOR SHALL PROVIDE A MINIMUM 9" COMPACTED #67 STONE BASE.
5. FOR USE ON DIP, CONCRETE, AND PVC ONLY. (NOT ALLOWED ON VCP)
6. SEE DETAIL S–21 FOR REINFORCING OF POURED IN–PLACE BASE.

CITY OF RALEIGH
STANDARD DETAIL

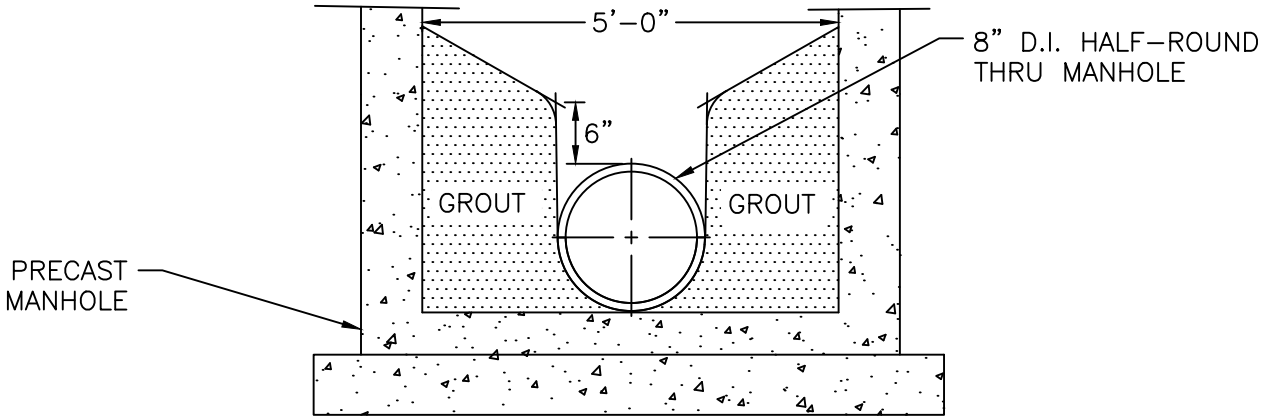
REVISIONS

DATE: 01/18/2025

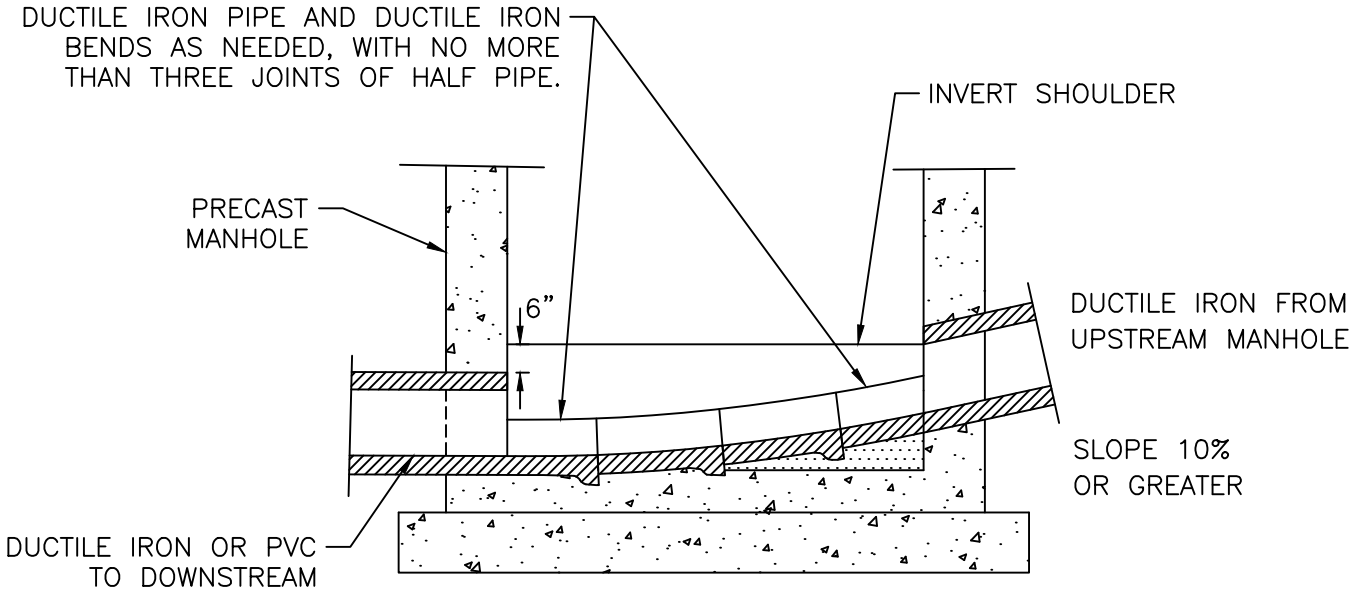
NOT TO SCALE

STANDARD MANHOLE INSTALLATION OVER EXISTING SEWER MAIN

S-22



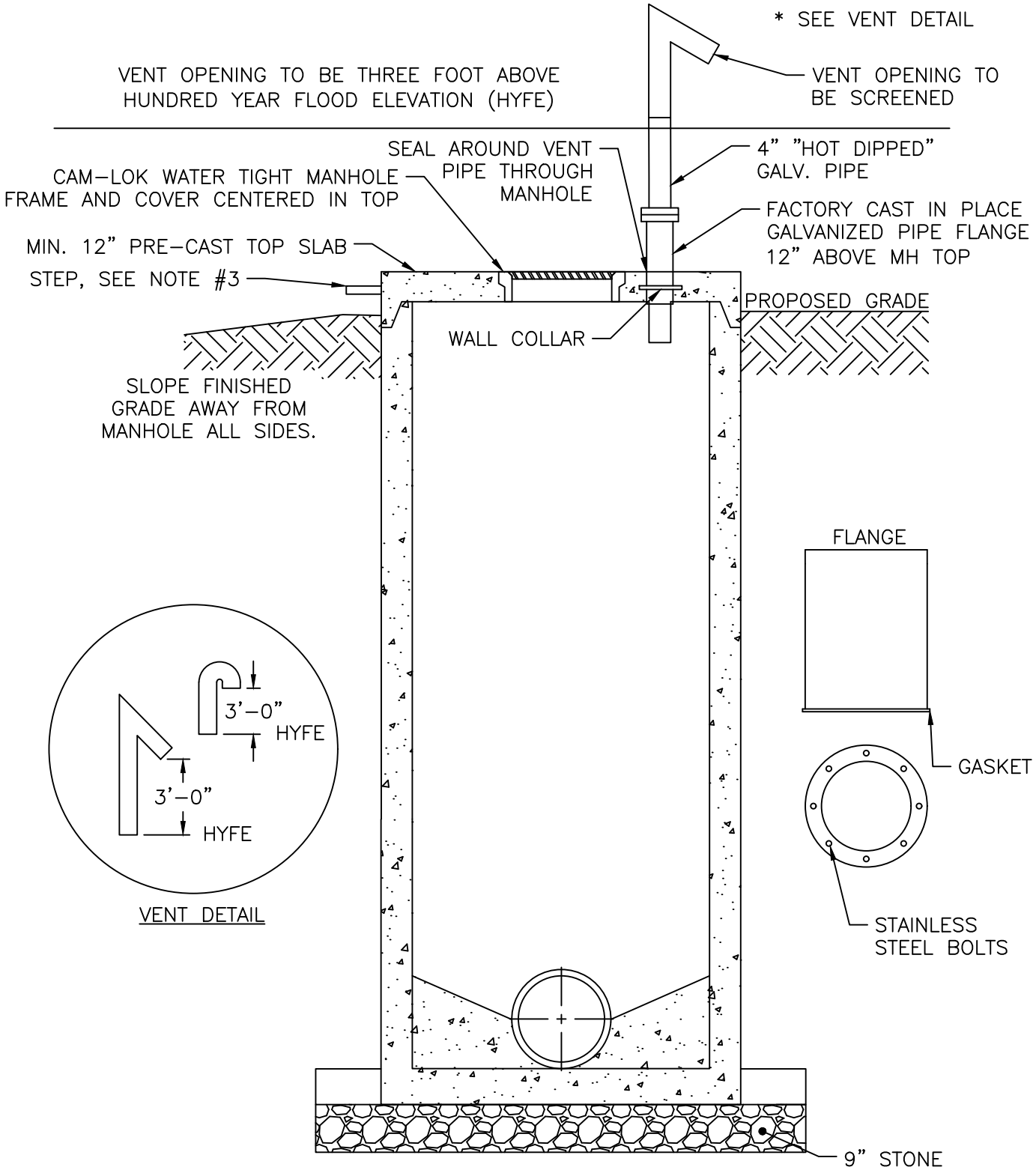
SECTION AT RIGHT ANGLE TO CENTER LINE OF PIPE



SECTION ALONG CENTER LINE OF PIPE

NOTE:
NO HORIZONTAL ALIGNMENT CHANGE
CAN BE MADE WITHIN THIS MANHOLE
TYPE. USE ON GRADES 10% OR GREATER.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD HIGH VELOCITY MANHOLE INVERT	
	S-23	



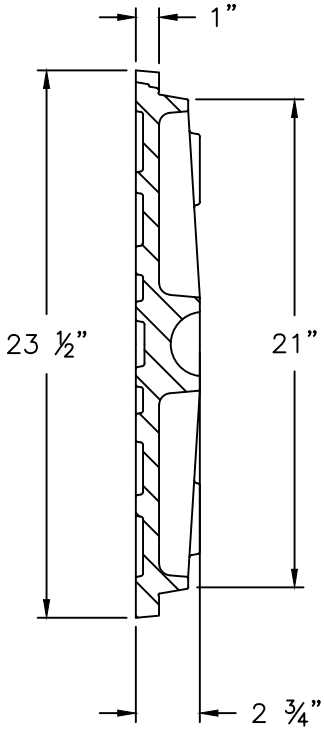
NOTES:

1. VENT MUST BE FACTORY WELDED, FABRICATED, AND "HOT DIPPED" GALVANIZED.
2. HYFE- HUNDRED YEAR FLOOD ELEVATION.
3. WHEN MANHOLE TOPS ARE IN EXCESS OF 3' ABOVE GRADE, OUTSIDE STEPS MUST BE PROVIDED. SEE DETAIL S-28 FOR STEP.

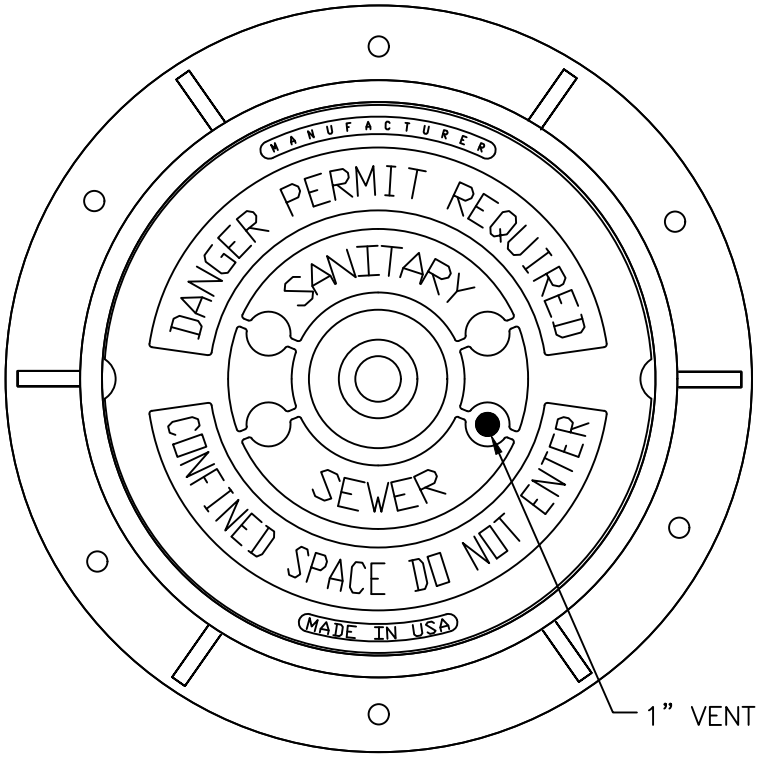
CITY OF RALEIGH
STANDARD DETAIL

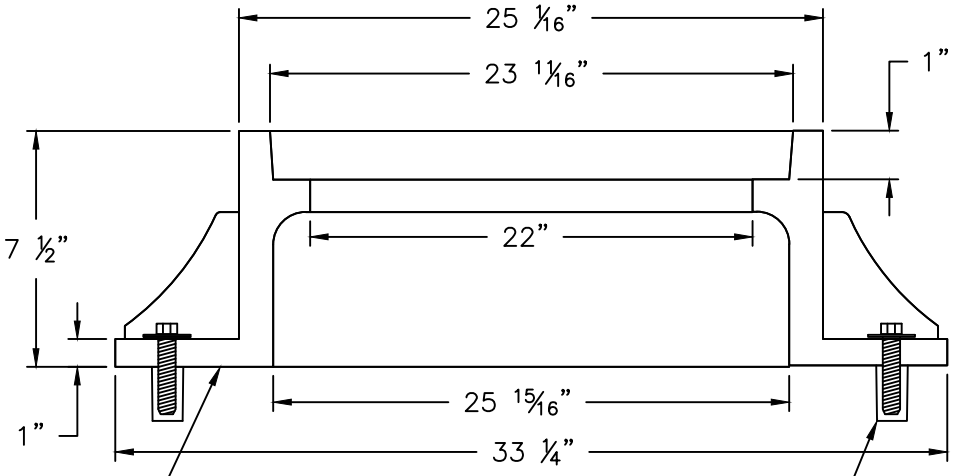
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD SEAL TIGHT MANHOLE WITH VENTED STACK	
	S-24	

MANHOLE FRAME AND COVER



COVER 120 LBS. MINIMUM





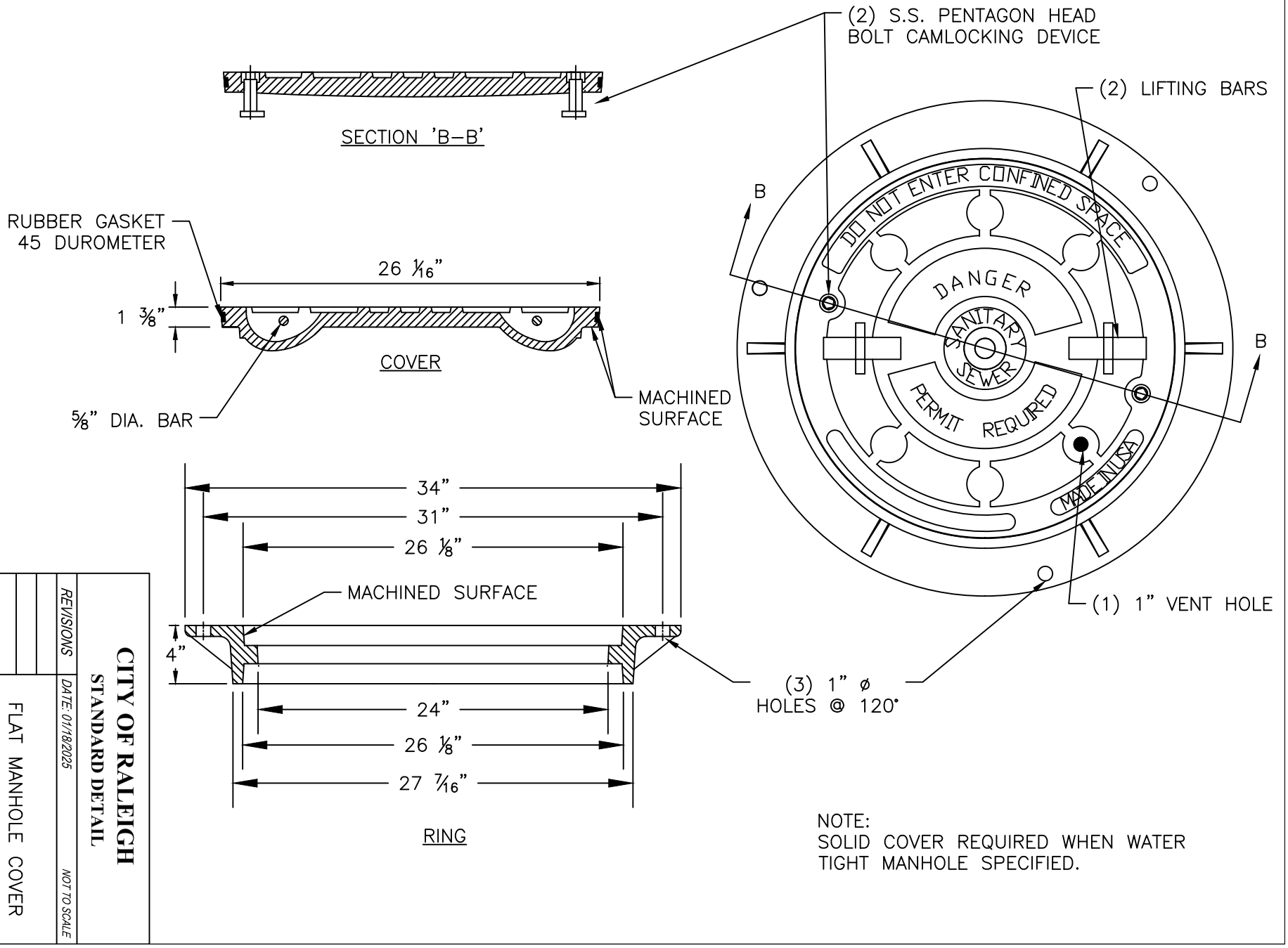
BUTYL–NEK OR APPROVED SEALANT BETWEEN FRAME AND COVER

⅝"x3" LAGSHIELD IN HOLE DRILLED INTO CONE OR RING WITH ANCHOR SUNK TO DESIGN DEPTH, AND ⅜"X3" HOT DIPPED GALVANIZED LAG BOLT AND WASHER

NOTES:
1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2. FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS. WITHIN PUBLIC ROW AND 160 LBS. WITHIN EASEMENTS.
3. COVER SHALL WEIGH A MIN. OF 120 LBS.
4. ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD MANHOLE COVER	
	S-25	



CITY OF RALEIGH
STANDARD DETAIL

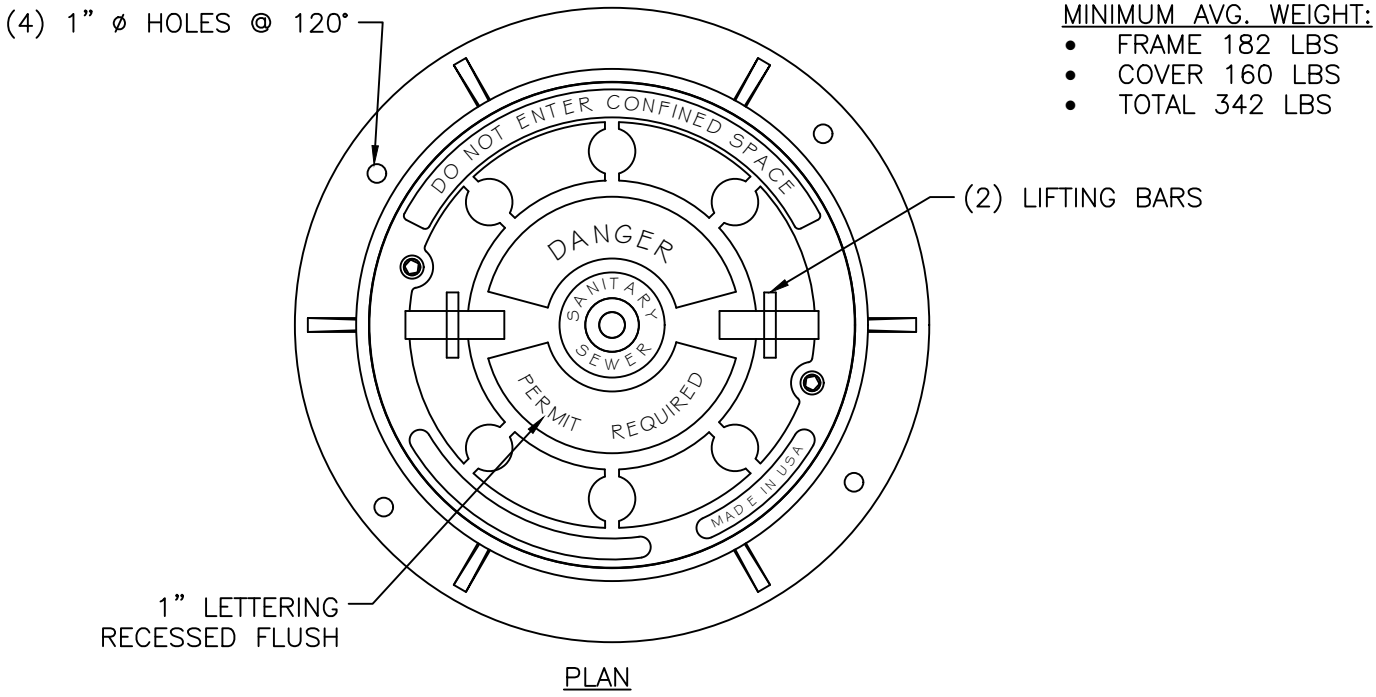
REVISIONS

DATE: 01/18/2025

NOT TO SCALE

FLAT MANHOLE COVER

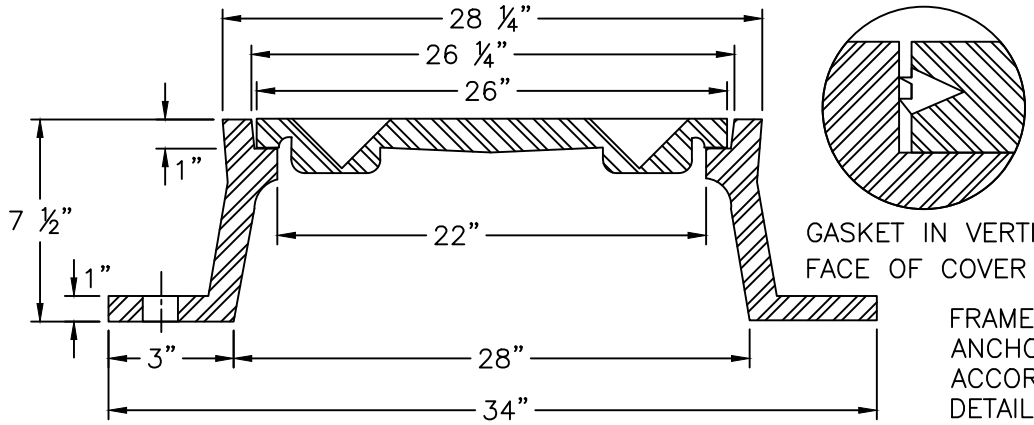
S-25A



MINIMUM AVG. WEIGHT:

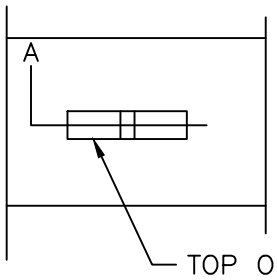
- FRAME 182 LBS
- COVER 160 LBS
- TOTAL 342 LBS

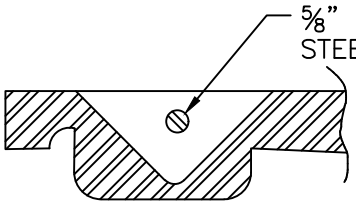
PLAN



GASKET IN VERTICAL FACE OF COVER

FRAME MUST BE ANCHORED IN ACCORDANCE WITH DETAIL S-25

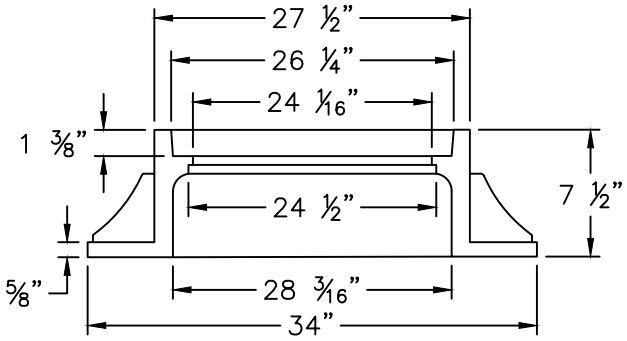




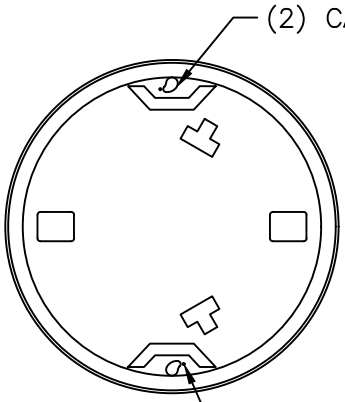
SECTION A

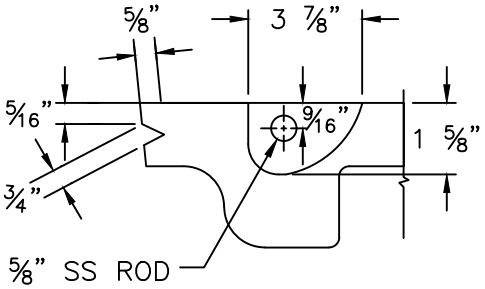
TYPICAL LIFTING DEVICE

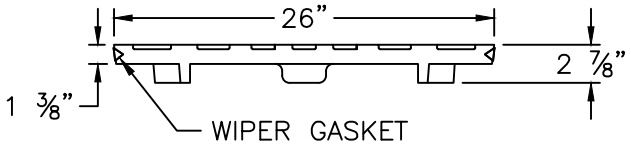
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	MANHOLE FRAME AND WATERTIGHT COVER	
	S-26	



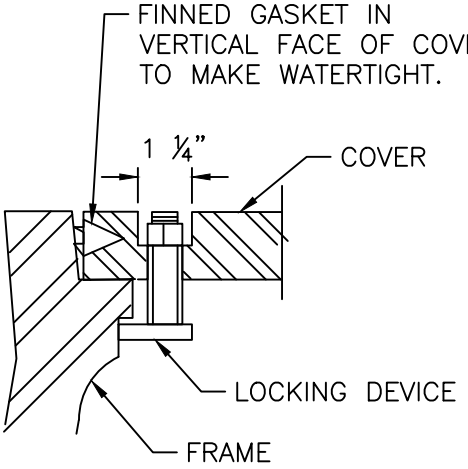
FRAME SECTION

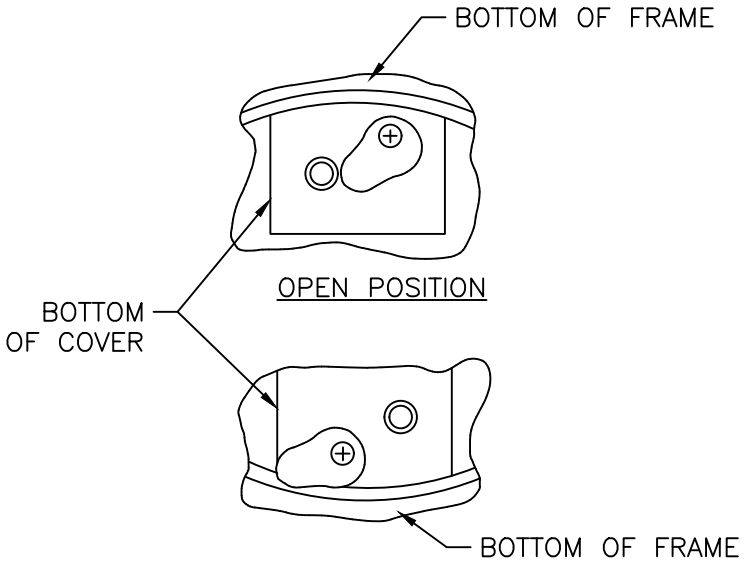






TYPICAL CAM LOCK MANHOLE



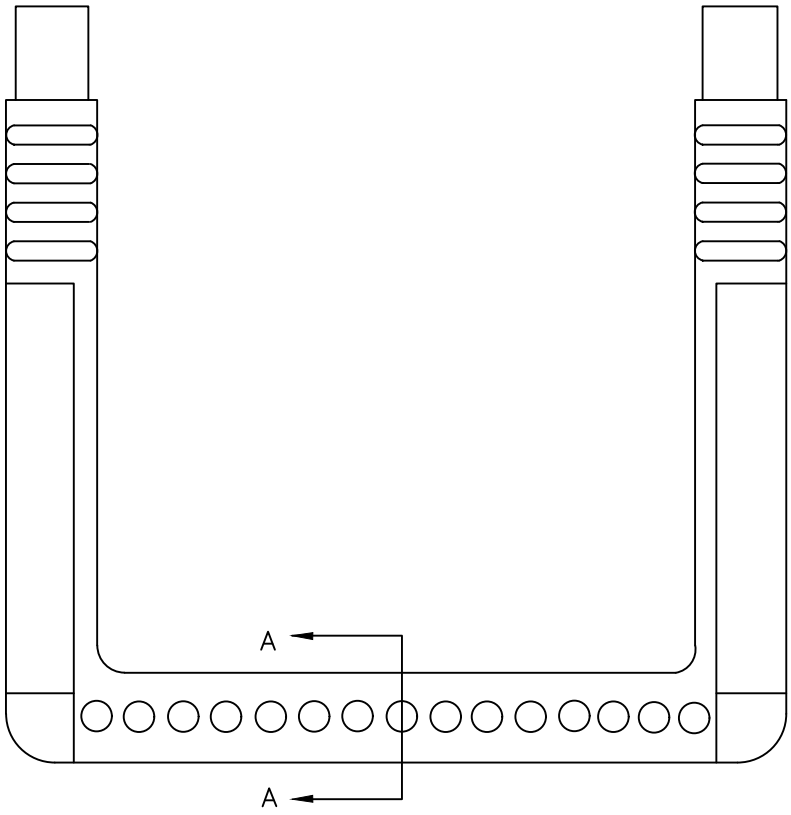


TYPICAL LOCKING DEVICE

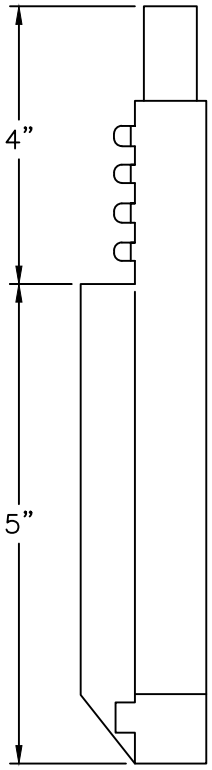
NOTE:
1. WHEN WATERTIGHT NOT SPECIFIED, TOP SHALL HAVE ONE 1" VENT HOLE.
2. STANDARD: PENTAGON HEAD S.S. OPTIONAL: S.S. HEX HEAD BOLT.
3. RING MUST BE ANCHORED IN ACCORDANCE WITH DETAIL S-25.

CITY OF RALEIGH
STANDARD DETAIL

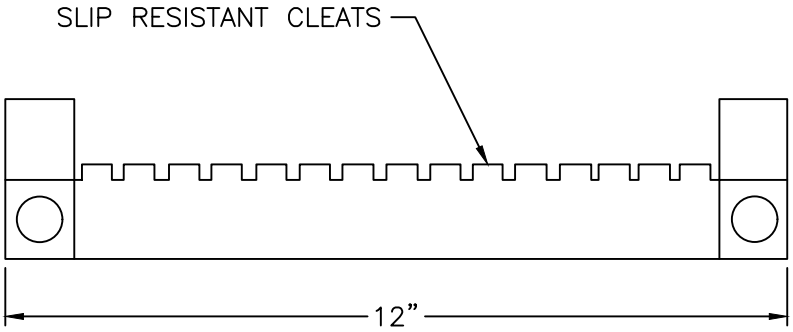
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	WATERTIGHT MANHOLE FRAME WITH CAM LOCK COVER
	S-27



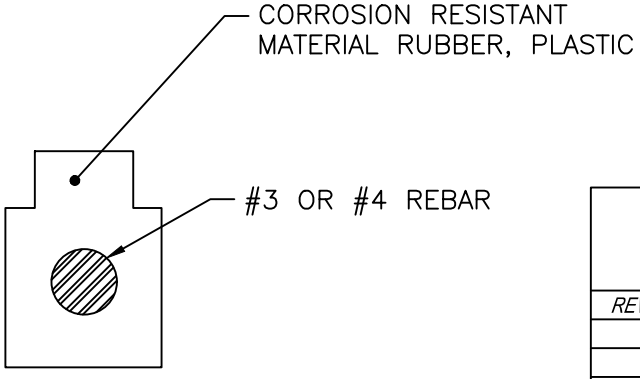
PLAN



SIDE ELEVATION



ELEVATION

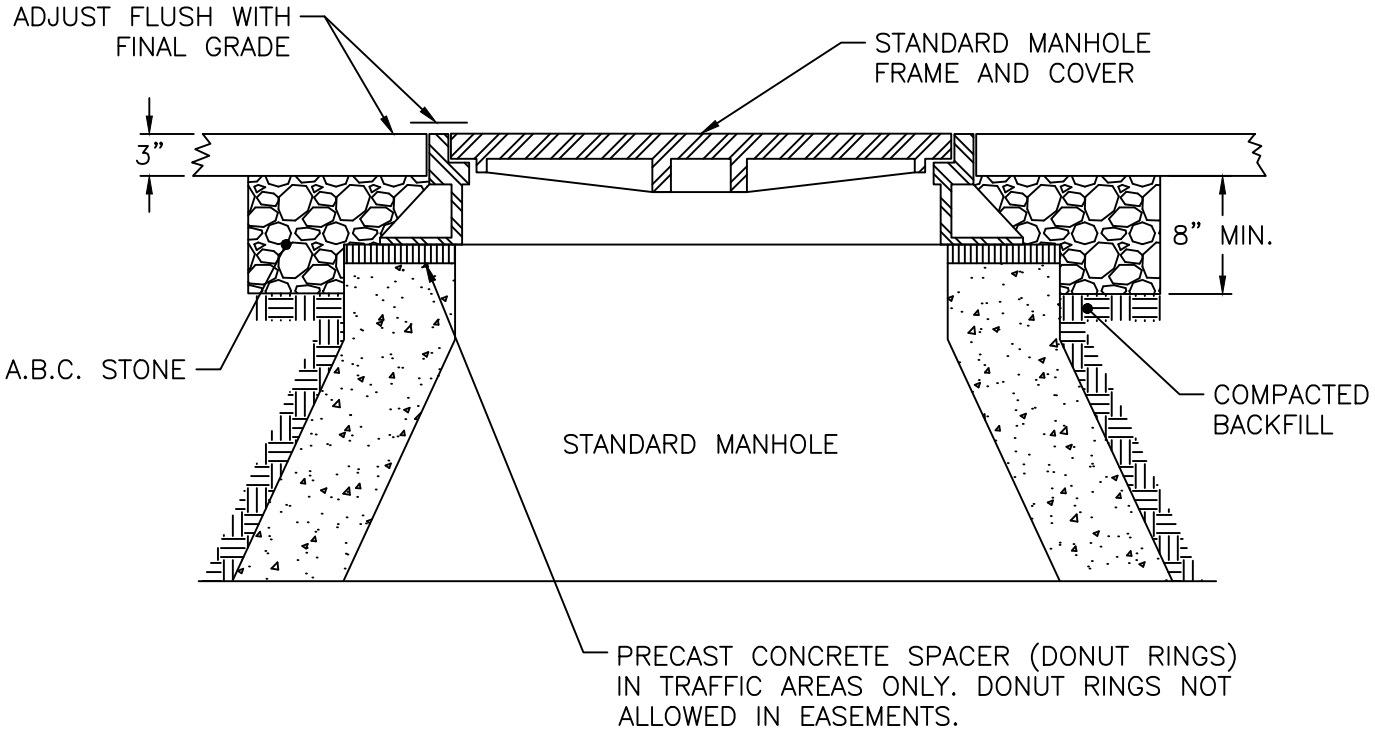


SECTION A – A

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	STANDARD SLIP RESISTANT MANHOLE STEP DETAIL
	S-28

PLAN



SECTION

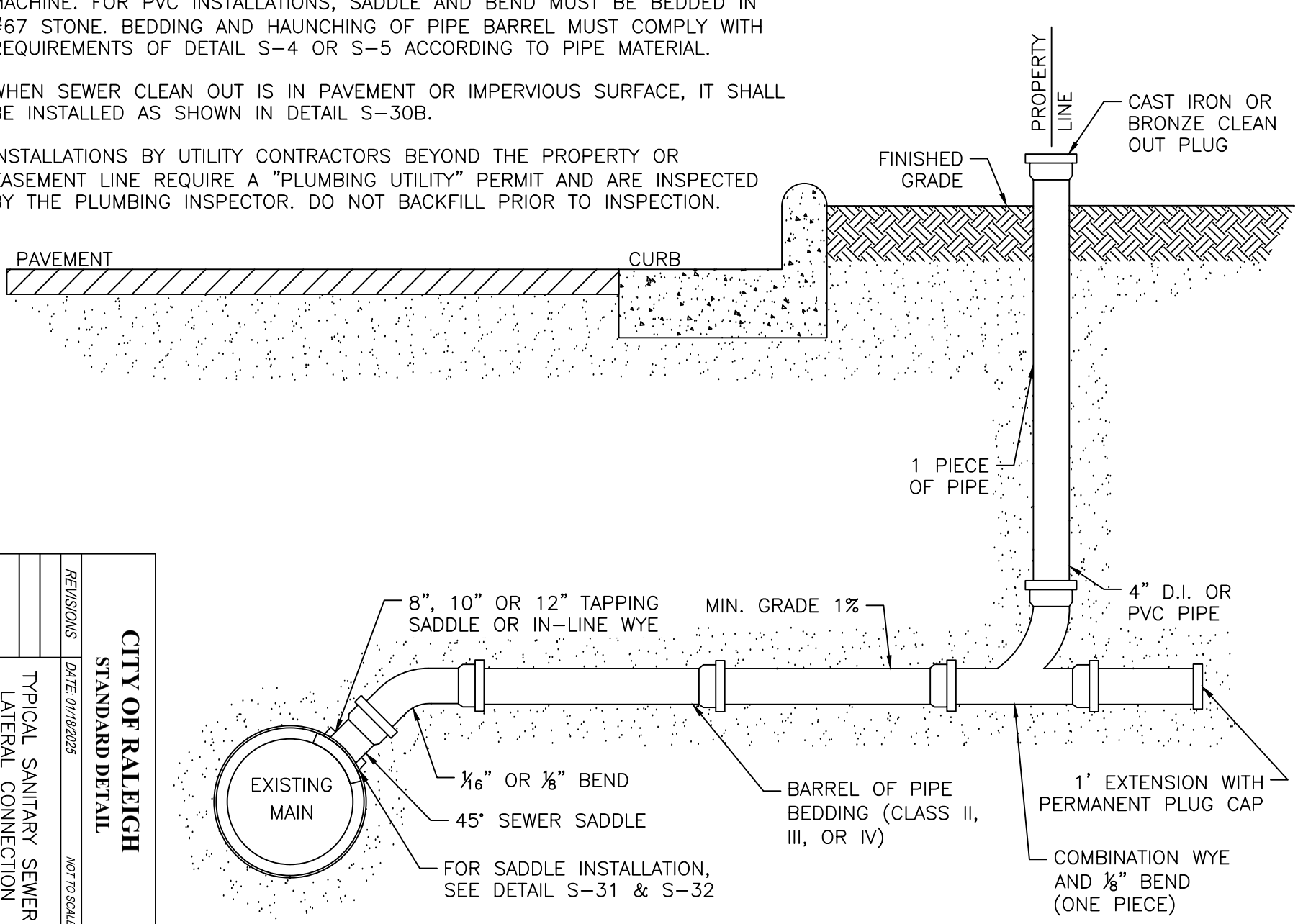
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN FRAME SURFACE	
	S-29	

NOTES:

1. THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6" LIFTS WITH MECHANICAL TAMP. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING MACHINE. FOR PVC INSTALLATIONS, SADDLE AND BEND MUST BE BEDDED IN #67 STONE. BEDDING AND HAUNCHING OF PIPE BARREL MUST COMPLY WITH REQUIREMENTS OF DETAIL S–4 OR S–5 ACCORDING TO PIPE MATERIAL.

2. WHEN SEWER CLEAN OUT IS IN PAVEMENT OR IMPERVIOUS SURFACE, IT SHALL BE INSTALLED AS SHOWN IN DETAIL S–30B.

3. INSTALLATIONS BY UTILITY CONTRACTORS BEYOND THE PROPERTY OR EASEMENT LINE REQUIRE A "PLUMBING UTILITY" PERMIT AND ARE INSPECTED BY THE PLUMBING INSPECTOR. DO NOT BACKFILL PRIOR TO INSPECTION.



CITY OF RALEIGH
STANDARD DETAIL

REVISIONS

TYPICAL SANITARY SEWER LATERAL CONNECTION

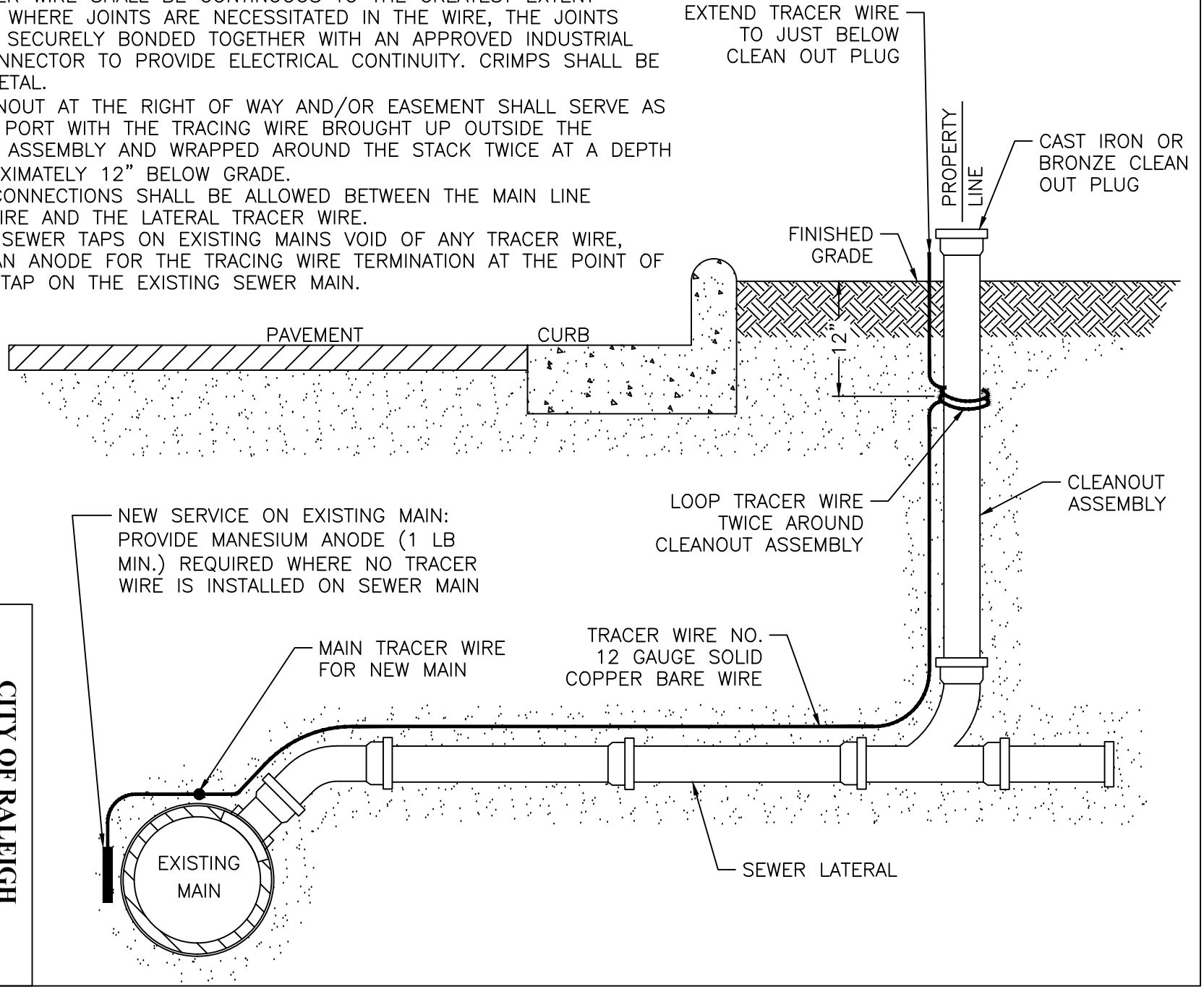
DATE: 01/18/2025

NOT TO SCALE

S-30

NOTES:

1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. WHERE JOINTS ARE NECESSITATED IN THE WIRE, THE JOINTS SHALL BE SECURELY BONDED TOGETHER WITH AN APPROVED INDUSTRIAL CRIMP CONNECTOR TO PROVIDE ELECTRICAL CONTINUITY. CRIMPS SHALL BE SIMILAR METAL.
2. THE CLEANOUT AT THE RIGHT OF WAY AND/OR EASEMENT SHALL SERVE AS THE TEST PORT WITH THE TRACING WIRE BROUGHT UP OUTSIDE THE CLEANOUT ASSEMBLY AND WRAPPED AROUND THE STACK TWICE AT A DEPTH OF APPROXIMATELY 12" BELOW GRADE.
3. SPLICED CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN LINE TRACER WIRE AND THE LATERAL TRACER WIRE.
4. FOR NEW SEWER TAPS ON EXISTING MAINS VOID OF ANY TRACER WIRE, PROVIDE AN ANODE FOR THE TRACING WIRE TERMINATION AT THE POINT OF THE NEW TAP ON THE EXISTING SEWER MAIN.



CITY OF RALEIGH
STANDARD DETAIL

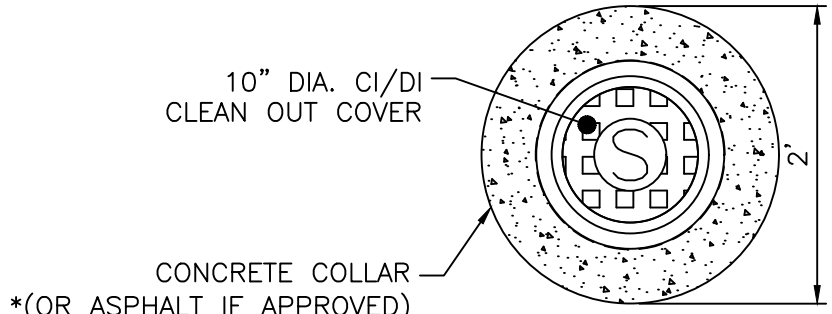
REVISIONS

DATE: 01/18/2025

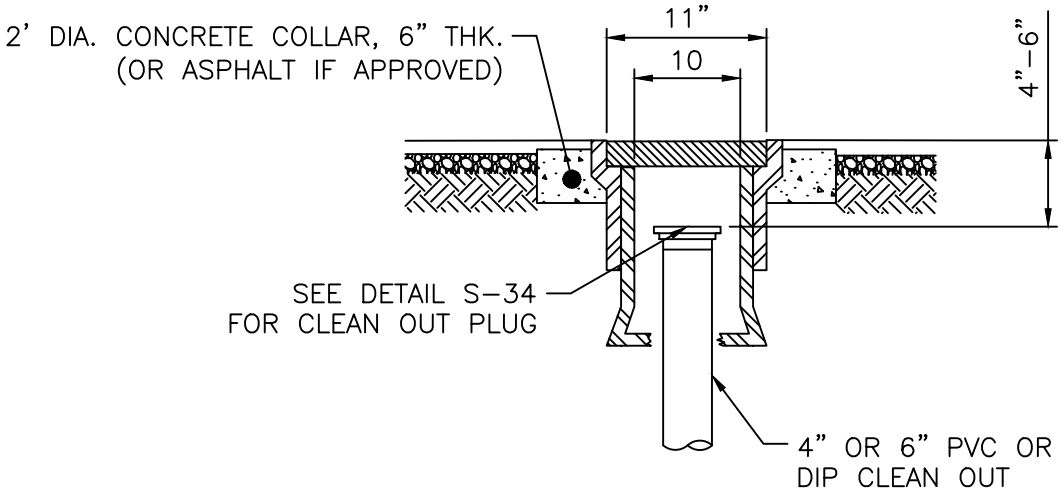
NOT TO SCALE

TYPICAL SANITARY SEWER LATERAL TRACER WIRE

S-30A

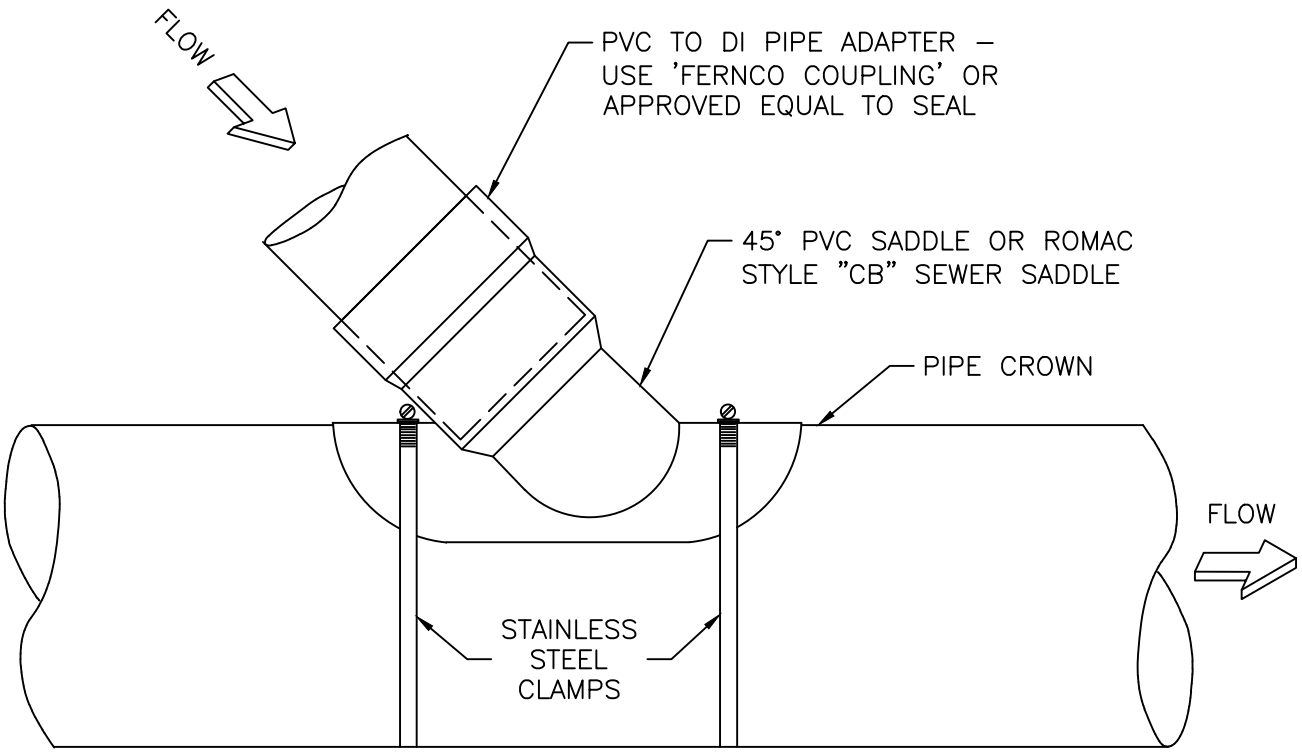


PLAN VIEW

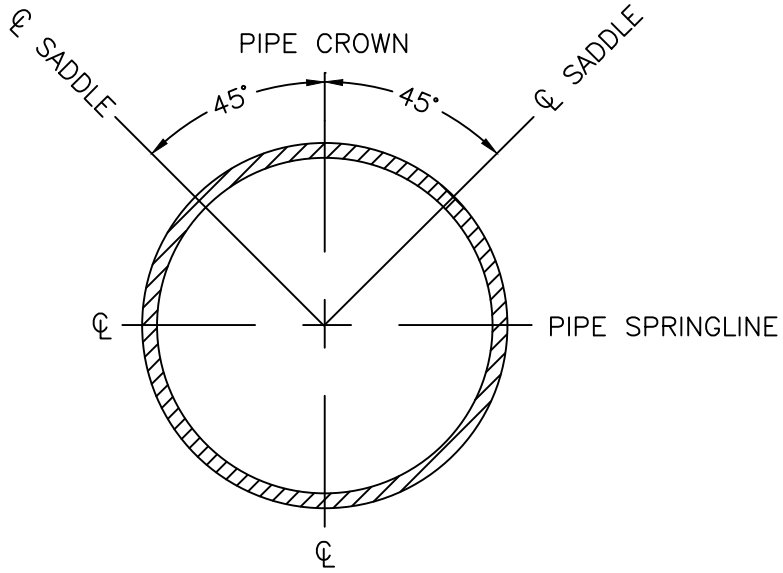


SECTION VIEW

CITY OF RALEIGH STANDARD DETAIL	
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	TRAFFIC RATED CLEAN OUT STRUCTURE
	S-30B

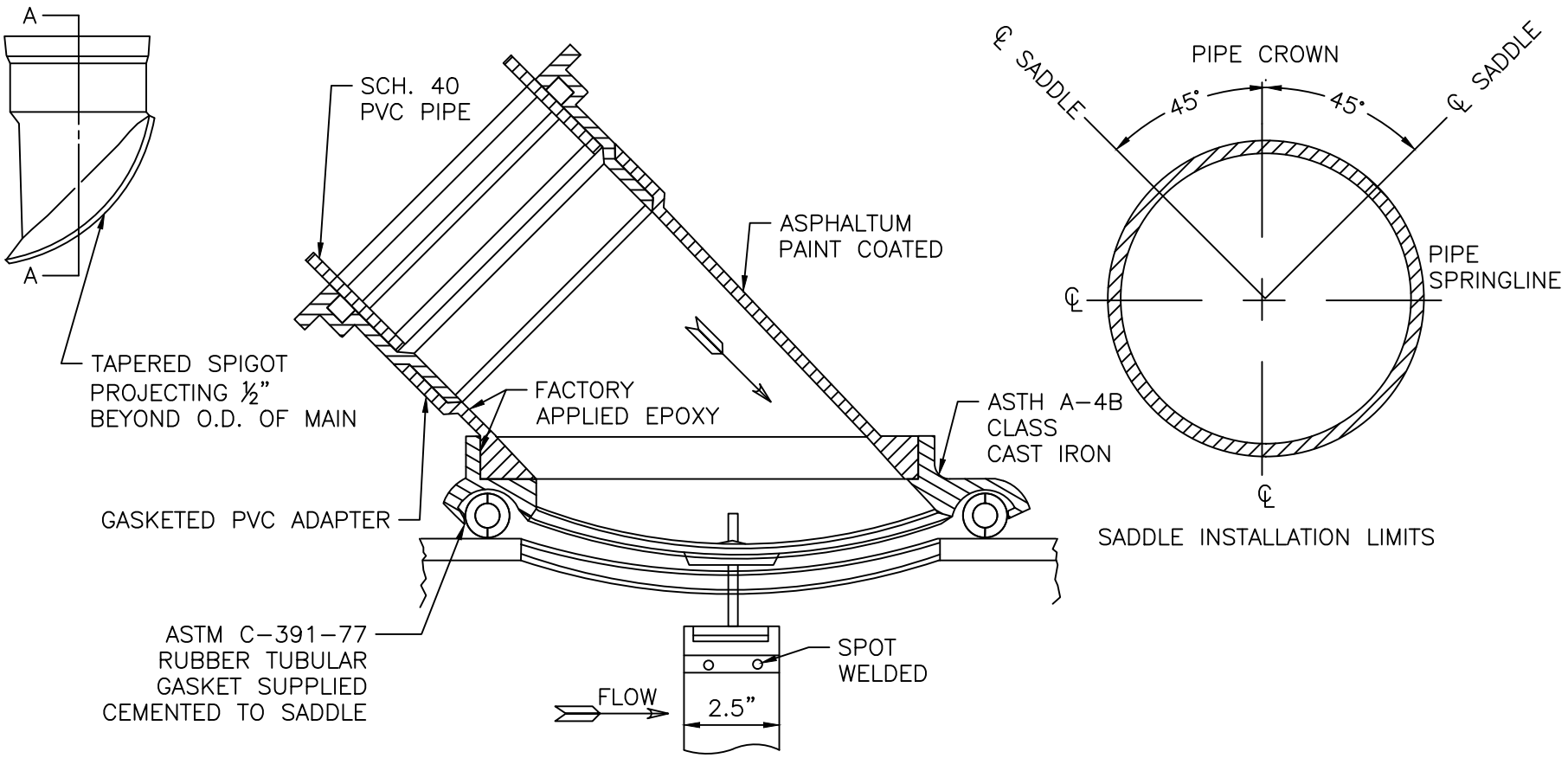


BACKFILL UNDER PVC SADDLE, ADAPTOR, AND CAST IRON BEND WITH #67 STONE AS SHOWN ON DETAIL S–4.



SADDLE INSTALLATION LIMITS

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	LATERAL SADDLE INSTALLATION DETAIL FOR PVC PIPE	
	S-31	



NOTE:
SADDLE TO BE GENECO
E40 OR EQUAL.

CITY OF RALEIGH
STANDARD DETAIL

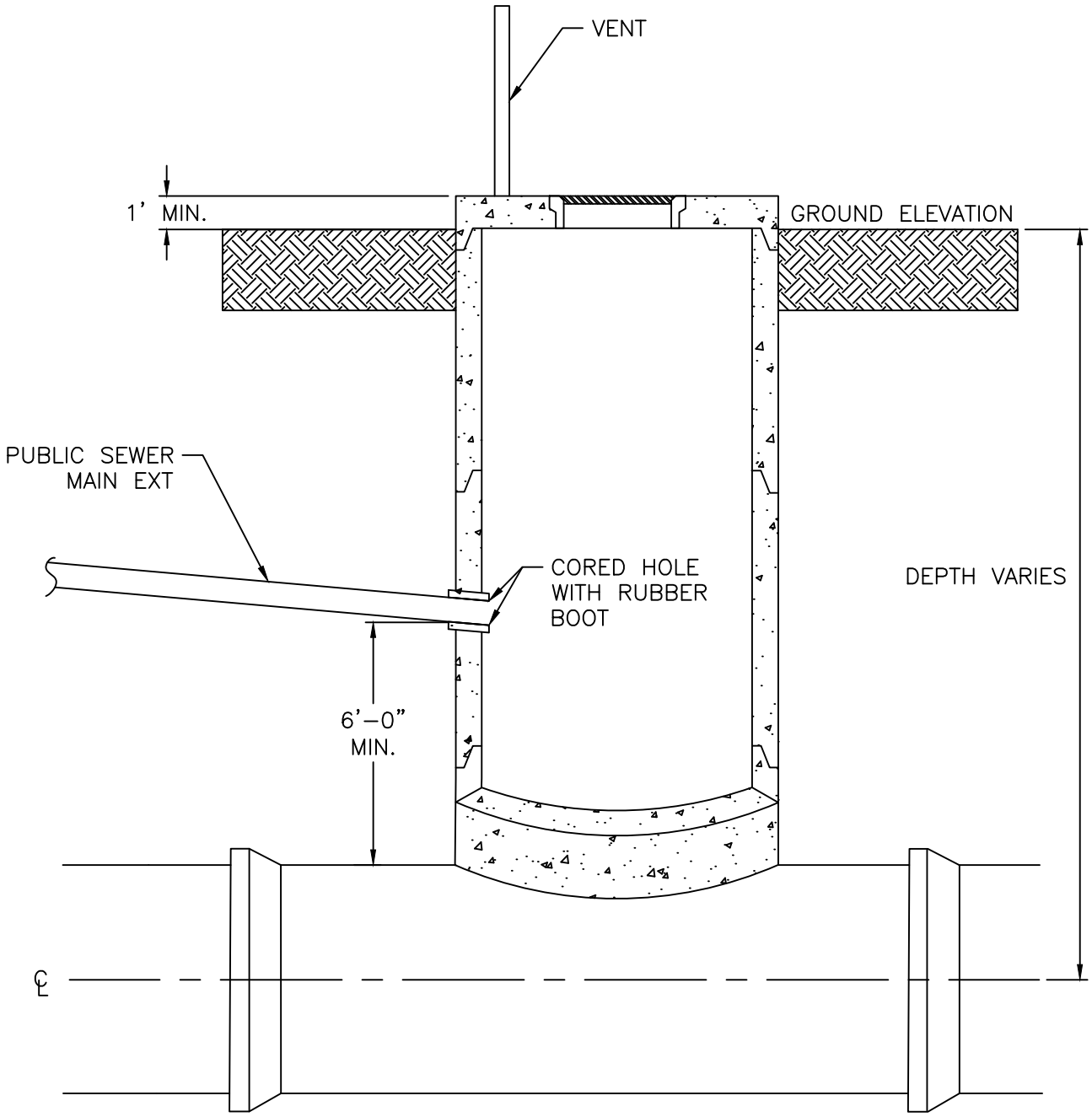
REVISIONS

DATE: 01/18/2025

NOT TO SCALE

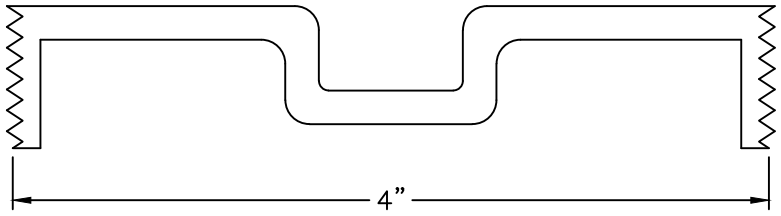
LATERAL SADDLE INSTALLATION
FOR VCP AND
DUCTILE IRON PIPE

S-32

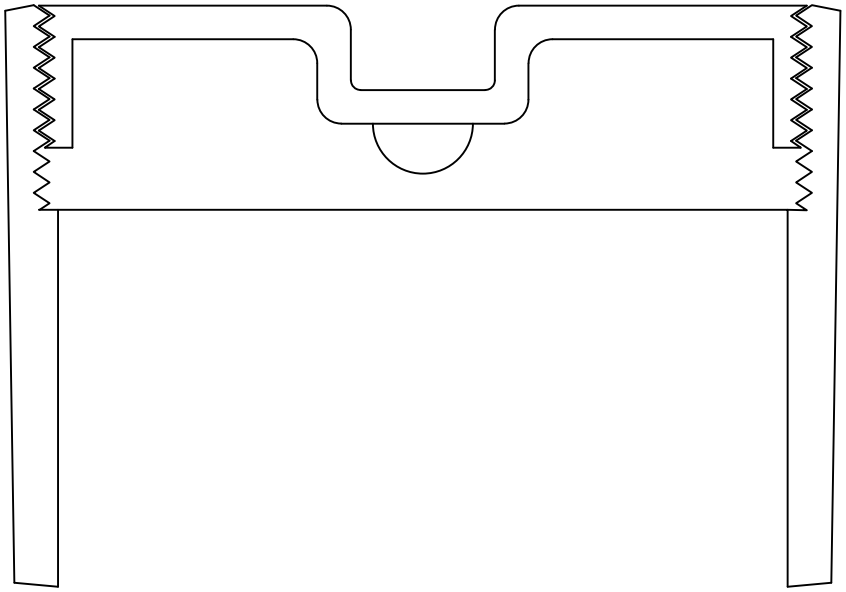


NOTES:
1. HOLE SHALL BE CORED IN RISER SECTION FOR PUBLIC SERVICE MAIN EXTENSION.
2. RUBBER BOOT SHALL BE UTILIZED ON ALL CORES.
3. CORES SHALL BE IN CENTER OF RISER SECTION.
4. CONNECTION TO TEE MANHOLE MUST BE MADE BY CONTRACTOR APPROVED BY CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	MAIN EXTENSION TO TIE INTO TEE MANHOLE	
	S-33	



STANDARD 4” BRONZE CLEANOUT PLUG



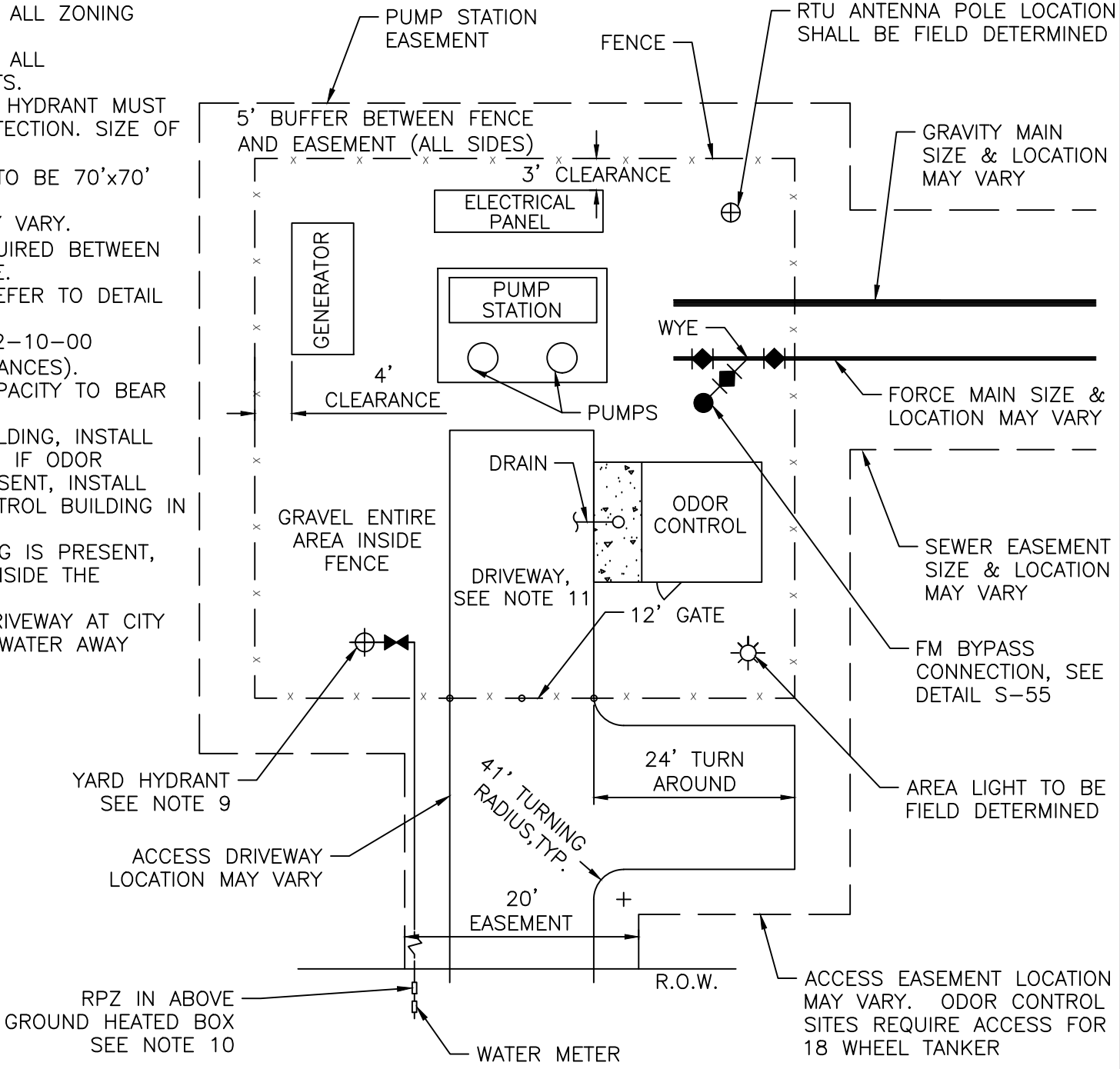
CLEANOUT FERRULE WITH PLUG

STYLES ACCEPTED:
INVERTED NUT
RAISED NUT

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	4” CLEANOUT PLUG	
	S-34	

NOTES:

1. PUMP STATION MUST MEET ALL ZONING SET–BACK REQUIREMENTS.
2. PUMP STATION MUST MEET ALL LANDSCAPING REQUIREMENTS.
3. WATER SERVICE FOR YARD HYDRANT MUST HAVE RPZ BACKFLOW PROTECTION. SIZE OF SERVICE MAY VARY.
4. PUMP STATION EASEMENT TO BE 70'x70' MINIMUM.
5. EQUIPMENT LOCATIONS MAY VARY.
6. 5' BUFFER SHALL BE REQUIRED BETWEEN FENCE AND EASEMENT LINE.
7. FOR ELECTRICAL PANEL, REFER TO DETAIL S–36 & S–37.
8. SEE CITY SPECIFICATION 32–10–00 (PAVEMENT AND APPURTENANCES). PAVEMENT SHALL HAVE CAPACITY TO BEAR 88K G.V.W.
9. IF NO ODOR CONTROL BUILDING, INSTALL YARD HYDRANT AS SHOWN. IF ODOR CONTROL BUILDING IS PRESENT, INSTALL HOSE BIBB ON ODOR CONTROL BUILDING IN LIEU OF YARD HYDRANT.
10. IF ODOR CONTROL BUILDING IS PRESENT, RPZ SHALL BE LOCATED INSIDE THE BUILDING.
11. ASPHALT OR CONCRETE DRIVEWAY AT CITY DISCRETION. DIVERT STORMWATER AWAY FROM PUMP STATION



CITY OF RALEIGH
STANDARD DETAIL

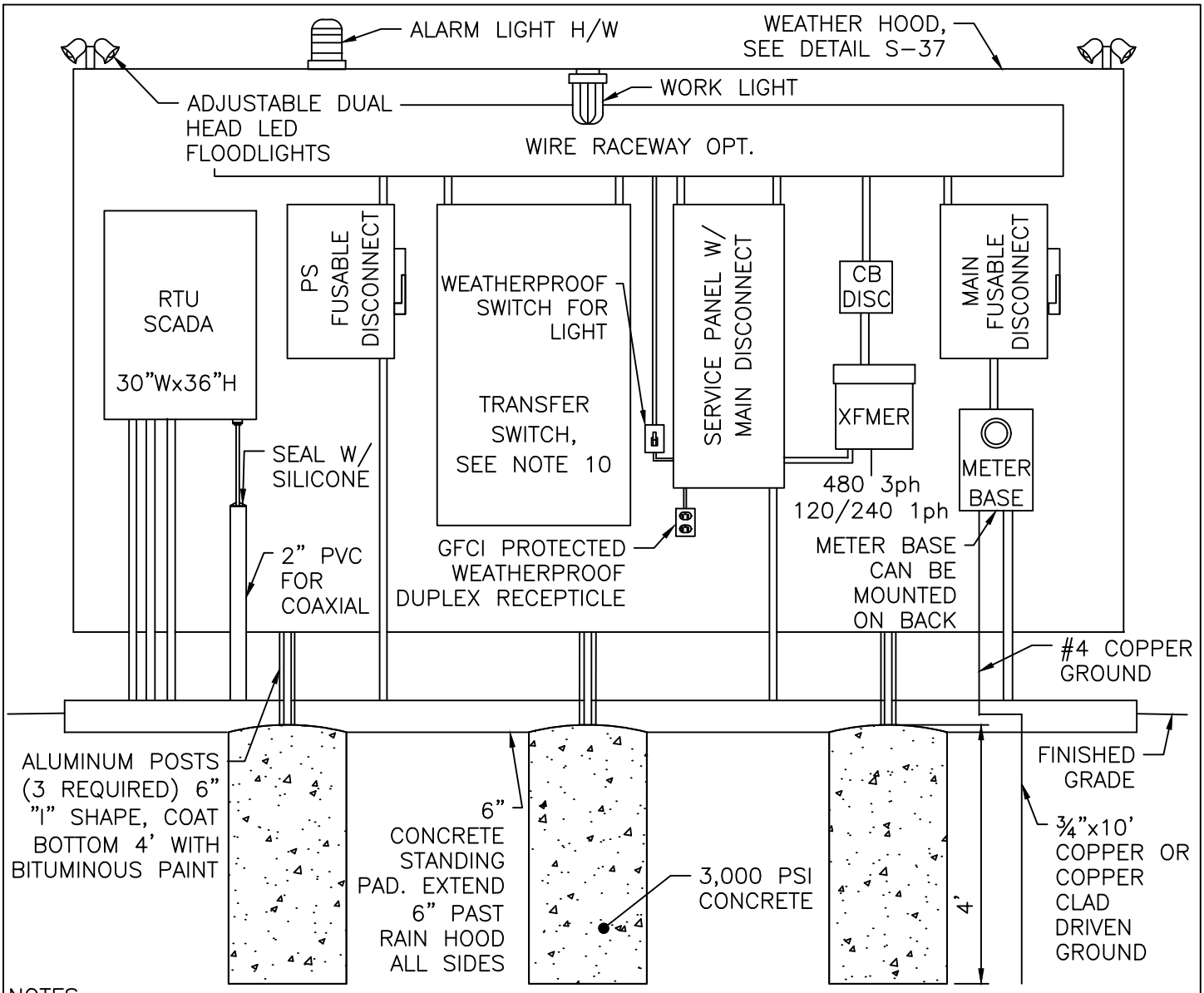
REVISIONS

DATE: 01/18/2025

NOT TO SCALE

MINIMUM REQUIREMENTS FOR PUMP STATIONS

S-35

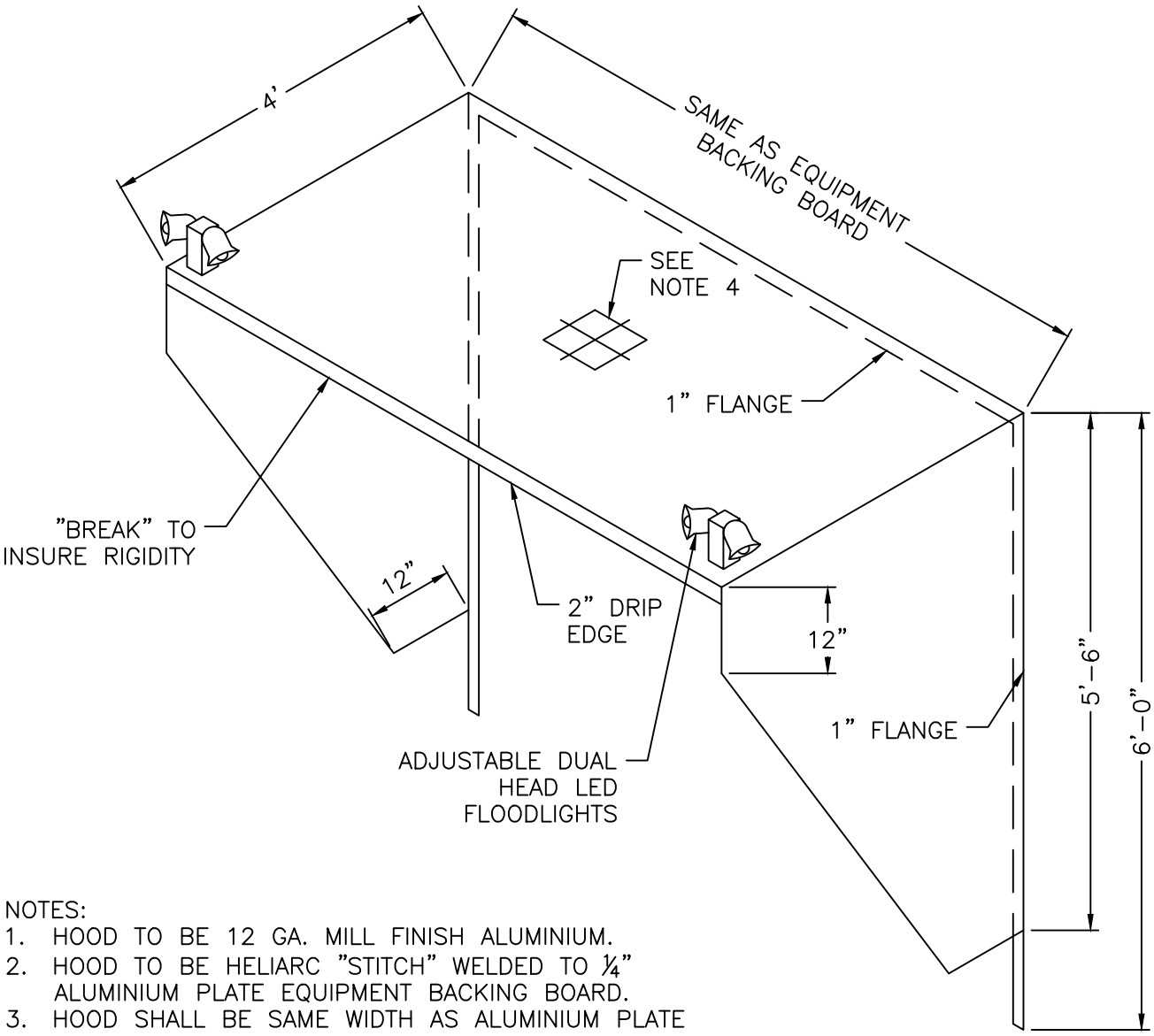


NOTES:

1. BACKING PLATE TO BE ¼" ALUMINUM. MOUNT TO "I" BEAM POSTS WITH STAINLESS STEEL NUTS, BOLTS, AND WASHERS.
2. ALL ELECTRICAL WORK SHALL CONFORM TO LATEST NATIONAL, STATE AND LOCAL CODES AND REQUIREMENTS.
3. SHOW CONDUIT SIZE AND RUNS WITH WIRE SIZE AND NUMBER ON PUMP STATION PLANS.
4. PANEL LAYOUT IS SCHEMATIC ONLY. ADJUST AS NEEDED TO ACCOMMODATE EQUIPMENT. MAINTAIN 4" MIN. CLEARANCE BETWEEN PANELS AND SIDE SHIELDS.
5. ALL ENCLOSURES SHALL BE NEMA 4X RATED AND LOCKABLE.
6. ENCLOSURES SHALL BE MOUNTED TO ALUMINUM BACKING PLATE WITH NYLON SPACERS & STAINLESS STEEL NUTS, BOLTS & WASHERS.
7. CONDUIT SHALL BE RIDGID ALUMINUM OR GALVANIZED. MEYERS HUBS SHALL BE USED AT ALL PANEL CONNECTIONS.
8. NO EQUIPMENT SHALL BE MOUNTED LESS THAN 36" ABOVE FINISHED GRADE. MIN. CLEARANCE FROM WORK LIGHT TO STANDING PAD SHALL BE 6'-6".
9. CONDUITS FROM WET WELL SHALL HAVE AN AIR GAP FROM TERMINATING CABINET.
10. INSTALL AN AUTOMATIC TRANSFER SWITCH IF A GENERATOR IS INSTALLED. INSTALL A MANUAL TRANSFER SWITCH IF A PERMANENT DRY PRIME BYPASS BACK UP PUMPING SYSTEM IS INSTALLED. ADD A MELTRIC PLUG OR EQUAL TO THE MANUAL TRANSFER SWITCH FOR CONNECTION TO A PORTABLE GENERATOR.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	PUMP STATION ELECTRICAL PANEL	
	S-36	

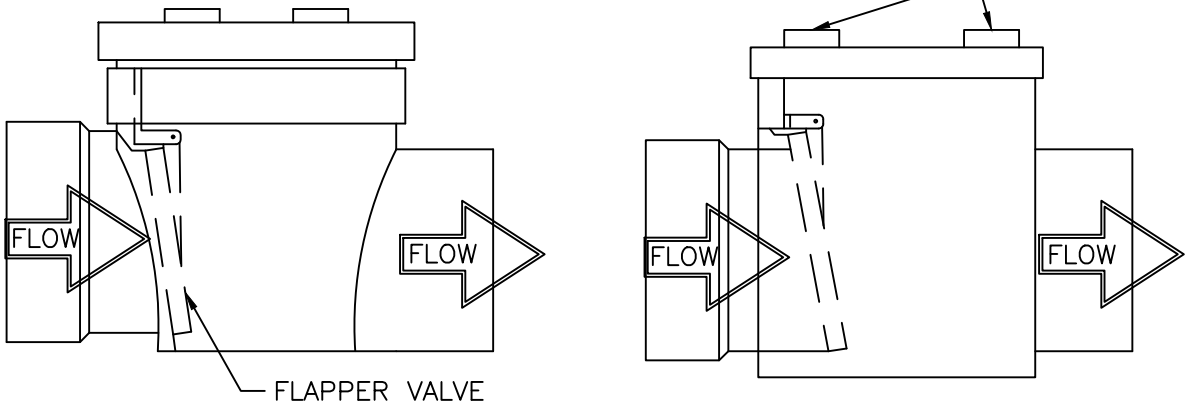


NOTES:
1. HOOD TO BE 12 GA. MILL FINISH ALUMINIUM.
2. HOOD TO BE HELIARC "STITCH" WELDED TO ¼" ALUMINIUM PLATE EQUIPMENT BACKING BOARD.
3. HOOD SHALL BE SAME WIDTH AS ALUMINIUM PLATE EQUIPMENT BACKING BOARD.
4. PROVIDE MOUNTING TABS FOR WORK LIGHT BOX.

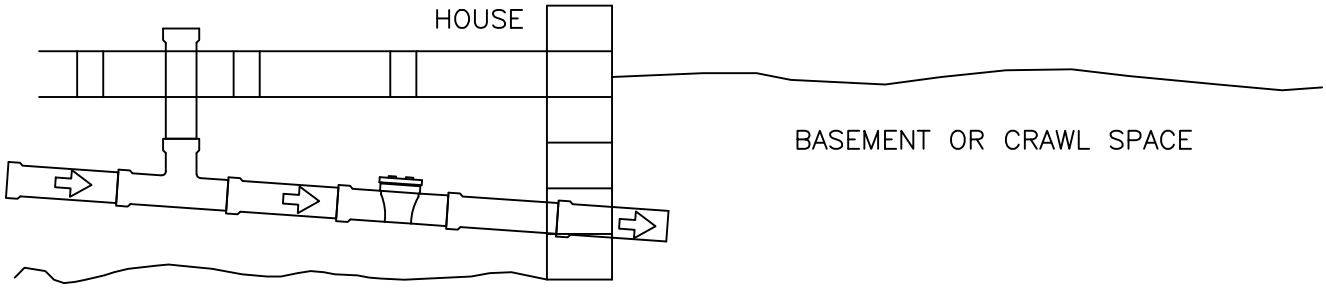
CITY OF RALEIGH
STANDARD DETAIL

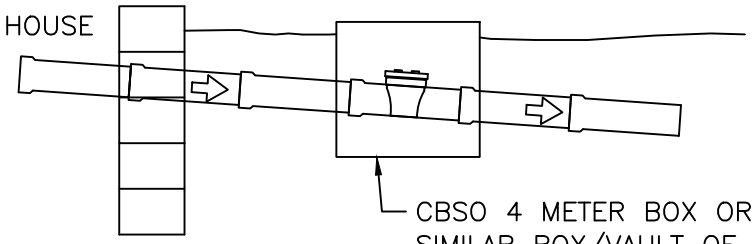
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	WEATHER HOOD FOR ELECTRICAL EQUIPMENT
	S-37

TYPICAL SANITARY SEWER SERVICE BACKWATER VALVE STYLES:



TYPICAL BACKWATER VALVE INSTALLATIONS:





YARD/VAULT INSTALLATION FOR BUILDINGS BUILT ON SLAB AND OTHER LOCATIONS WHERE VALVE CANNOT BE INSTALLED IN BASEMENT OR CRAWL SPACE.

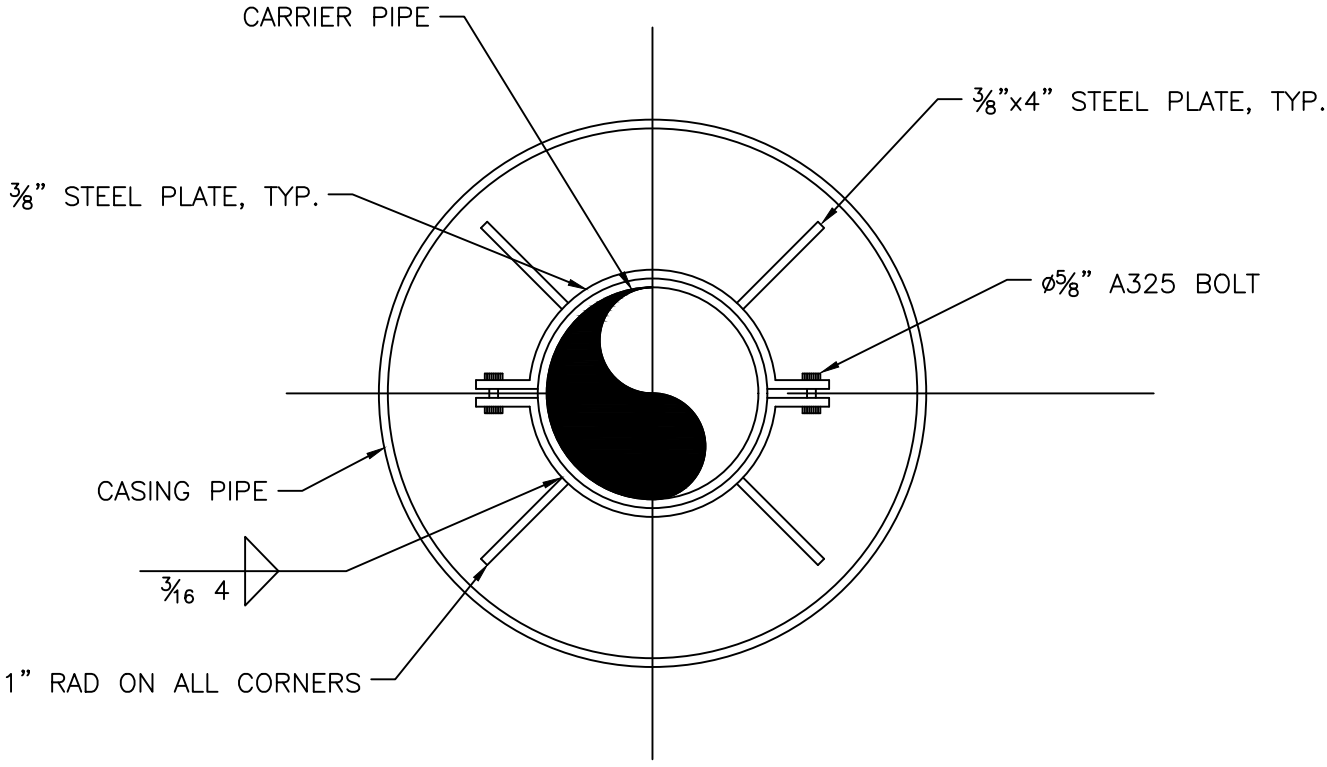
CBSO 4 METER BOX OR SIMILAR BOX/VAULT OF APPROPRIATE SIZE TO ALLOW REGULAR MAINTENANCE

NOTES:

1. INSTALLATIONS OF GREATER THAN 4' IN DEPTH MAY REQUIRE MANHOLE.
2. VALVES MUST BE INSTALLED IN A LOCATION AT WHICH THEY CAN BE CLEANED AND SERVICED REGULARLY.

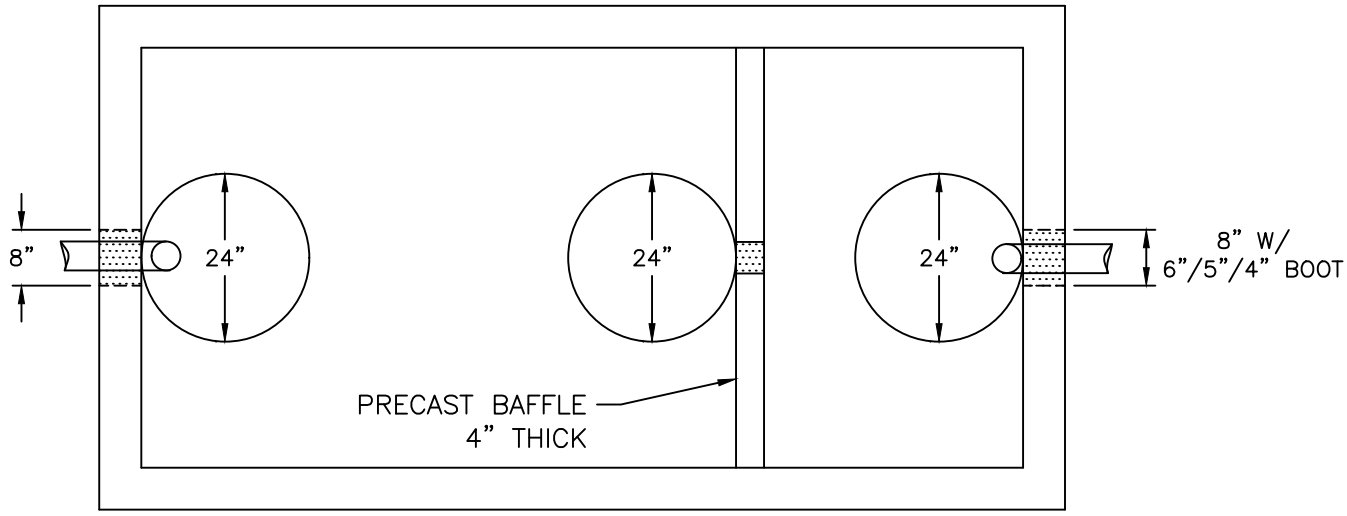
CITY OF RALEIGH
STANDARD DETAIL

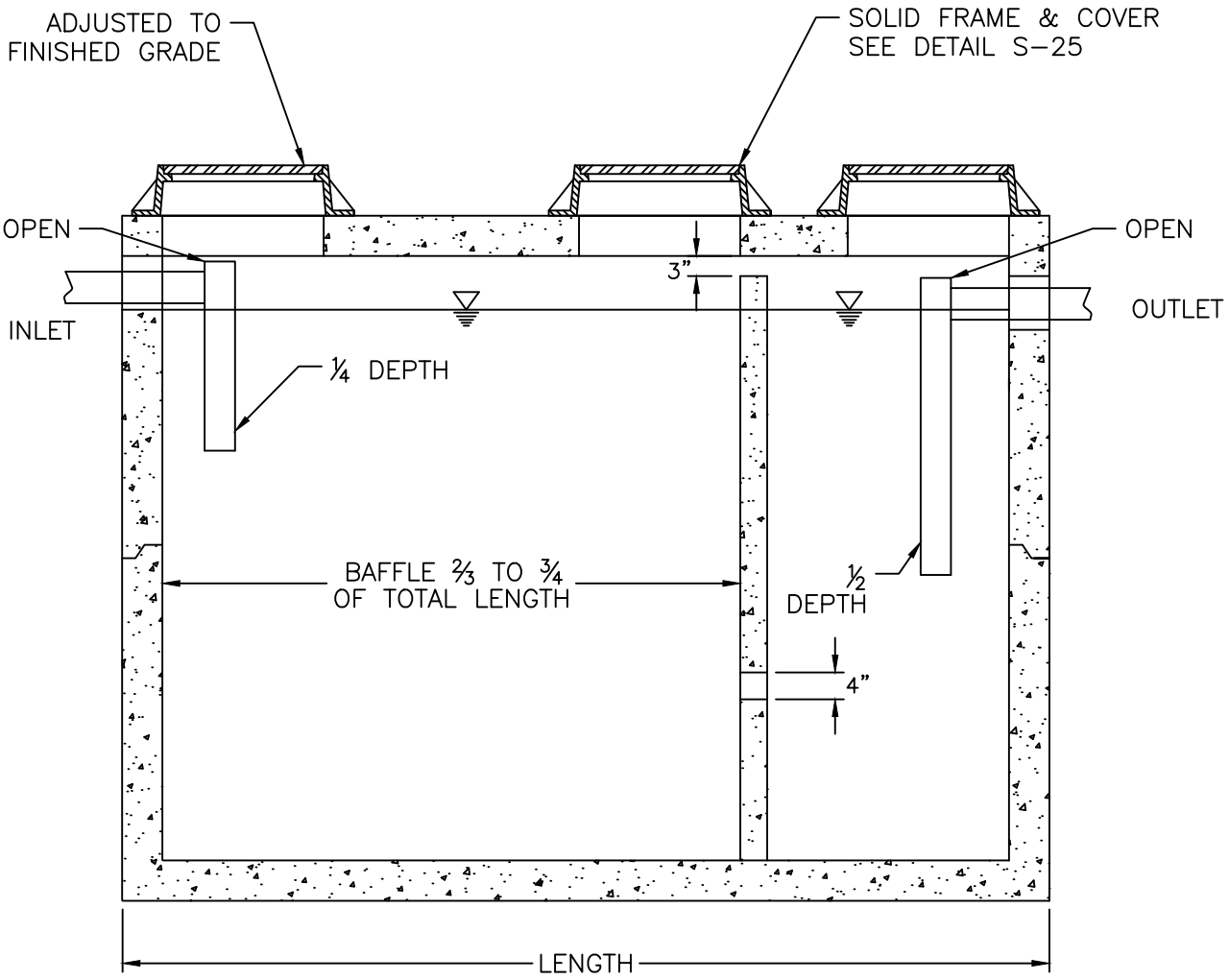
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	TYPICAL SANITARY SEWER SERVICE BACKWATER VALVE INSTALLATION
	S-38



NOTE:
USE A MINIMUM OF TWO SPIDERS PER PIPE JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

CITY OF RALEIGH STANDARD DETAIL	
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	PIPE ALIGNMENT GUIDE
	S-39

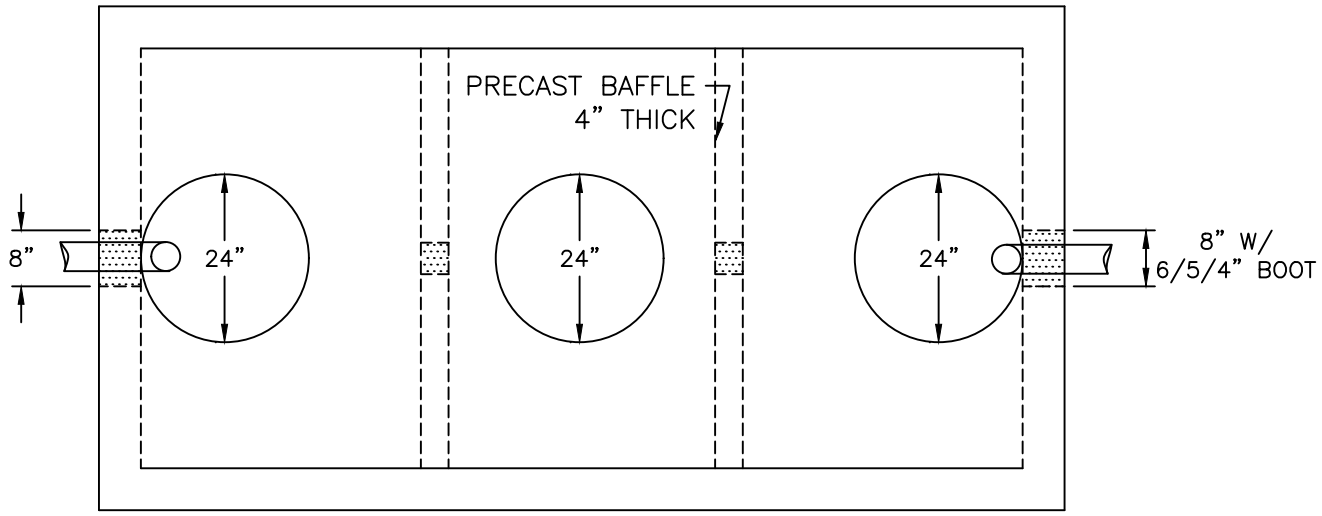


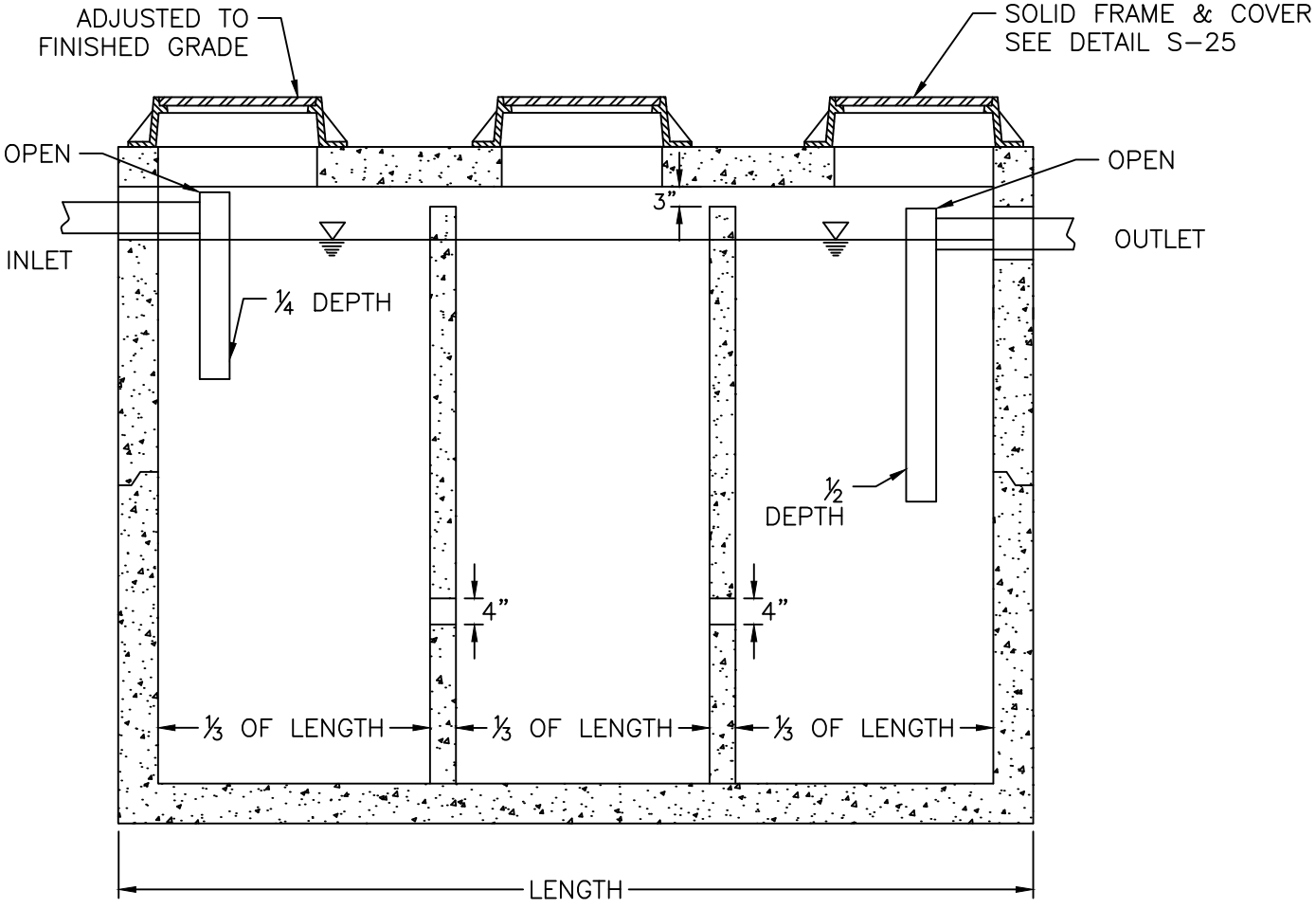


NOTES:
1. REINFORCEMENT: H-20 BRIDGE LOADING (TRAFFIC RATED).
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. EARTHCOVER: 0' TO 5' MAX.
4. HDPE ALLOWED IN LIEU OF CONCRETE. MEET SAME LOADING REQUIREMENTS.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	1,000 GALLON GREASE INTERCEPTOR	
	S-40	





NOTES:

1. REINFORCEMENT: H-20 BRIDGE LOADING (TRAFFIC RATED).
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. EARTHCOVER: 0' TO 5' MAX.
4. HDPE ALLOWED IN LIEU OF CONCRETE. MEET SAME LOADING REQUIREMENTS.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	1,000 GALLON OIL-WATER-SAND SEPARATOR
	S-40A

LOCALLY AVAILABLE SIZES	
INTERCEPTORS CAPACITY (GAL.)	SEPARATORS CAPACITY (GAL.)
300	1,000
550	1,200
750	1,600
1,000	
1,200	
1,500	
2,000	
2,500	
3,000	
4,000	
5,000	
6,000	
8,000	

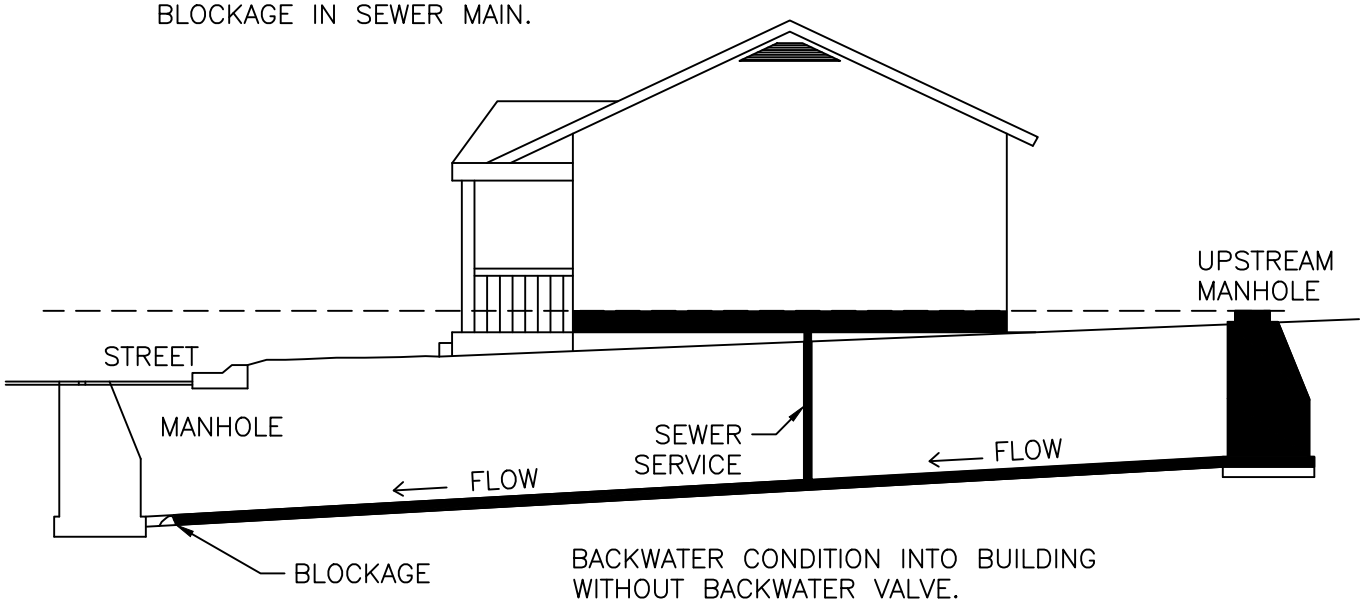
NOTES:

1. BAFFLE WALLS LOCATED AT A DISTANCE FROM INLET WALL ⅔ TO ¾ OF THE TOTAL LENGTH OF THE INTERCEPTOR OR SEPARATOR AS SHOWN ON DETAIL S–40. BAFFLE WALLS LOCATED AT A DISTANCE APPROXIMATELY OF ⅓ OF THE TOTAL LENGTH OF THE SEPARATOR AS SHOWN ON DETAIL S–40A.
2. EACH INTERCEPTOR OR SEPARATOR SHALL HAVE INLET AND OUTLET TEES. THE OUTLET TEE SHALL EXTEND 50% INTO THE LIQUID DEPTH. THE INLET TEE SHALL EXTEND 25% INTO THE LIQUID DEPTH. INLET AND OUTLET TEES MUST BE OPEN TO ALLOW THE COLLECTION OF F.O.G. SAMPLE.
3. ACCESS OPENINGS OVER EACH COMPARTMENT WITHIN THE INTERCEPTOR OR SEPARATOR SHALL BE 24 INCHES IN DIAMETER AND CONTAIN PICK HOLES. ALL COVERS SHALL BE CONSTRUCTED OF CAST IRON OR EQUIVALENT TRAFFIC BEARING MATERIAL. MANHOLE COVERS MUST EXTEND TO FINISH GRADE AND BE INSTALLED TO EXCLUDE THE ENTRANCE OF STORMWATER INTO THE INTERCEPTOR OR SEPARATOR.
4. FULL SIZE DUAL SWEEP CLEANOUTS SHALL BE INSTALLED ON THE INLET AND OUTLET SIDES OF THE INTERCEPTOR OR SEPARATOR.
5. INTERCEPTORS AND SEPARATORS MUST BE VENTED IN ACCORDANCE WITH THE NC STATE PLUMBING CODE.
6. CONCRETE: 4,000 PSI @ 28 DAYS.
7. DESIGN: ACI 318 BUILDING CODE
   ASTM C1613–06 FOR GREASE INTERCEPTORS
   ASTM C913–02 FOR WATER AND WASTEWATER STRUCTURES
   ASTM C890–06 FOR MINIMAL STRUCTURAL DESIGN LOADING
8. INTERCEPTORS AND SEPARATORS SHALL BE DESIGNED TO WITHSTAND AN H–20 WHEEL LOAD.
9. INTERCEPTORS OR SEPARATORS MADE OF POLYETHYLENE OR FIBERGLASS SHALL INCLUDE A MINIMUM 12,000 PSI TENSILE STRENGTH, 19,000 PSI FLEXURAL STRENGTH, AND 800,000 PSI FLEXURAL MODULUS.
10. ALL INTERCEPTORS AND SEPARATORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.

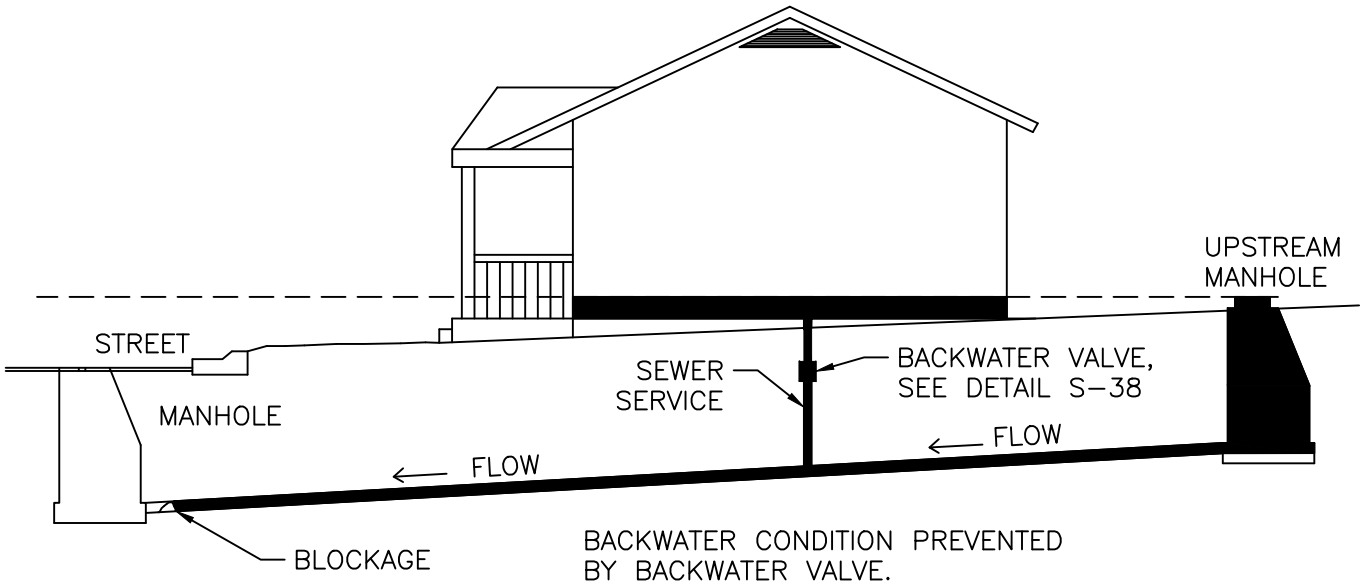
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	DIMENSIONS: GREASE INTERCEPTORS & OIL–WATER SAND SEPARATORS
	S-41

BUILDING WITH NEXT UPSTREAM MANHOLE HIGHER THAN THE LOWEST DRAIN AND BLOCKAGE IN SEWER MAIN.



BACKWATER CONDITION INTO BUILDING WITHOUT BACKWATER VALVE.



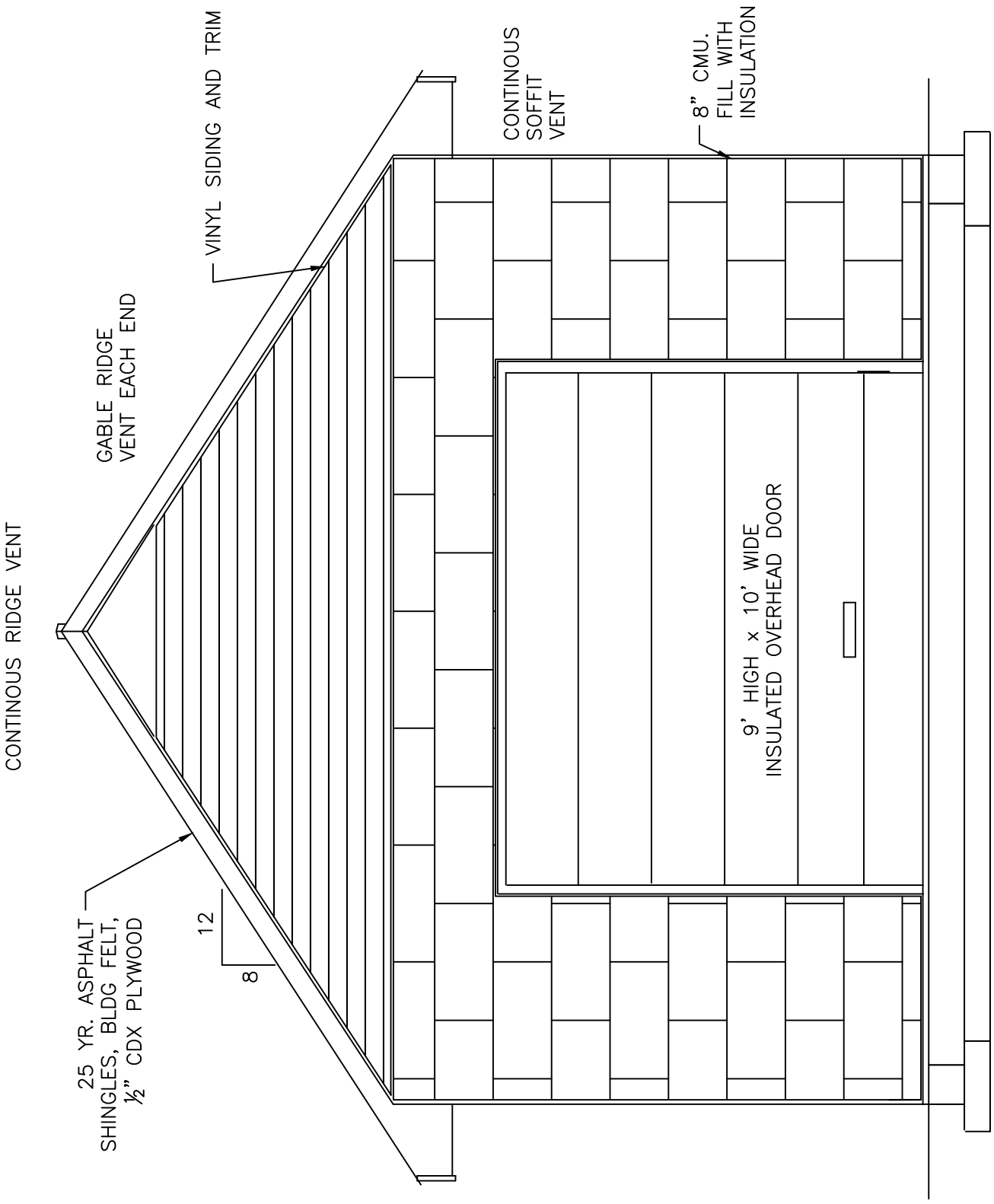
BACKWATER CONDITION PREVENTED BY BACKWATER VALVE.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	TYPICAL SEWER SERVICE REQUIRING BACKWATER VALVE
	S-42

NOT USED

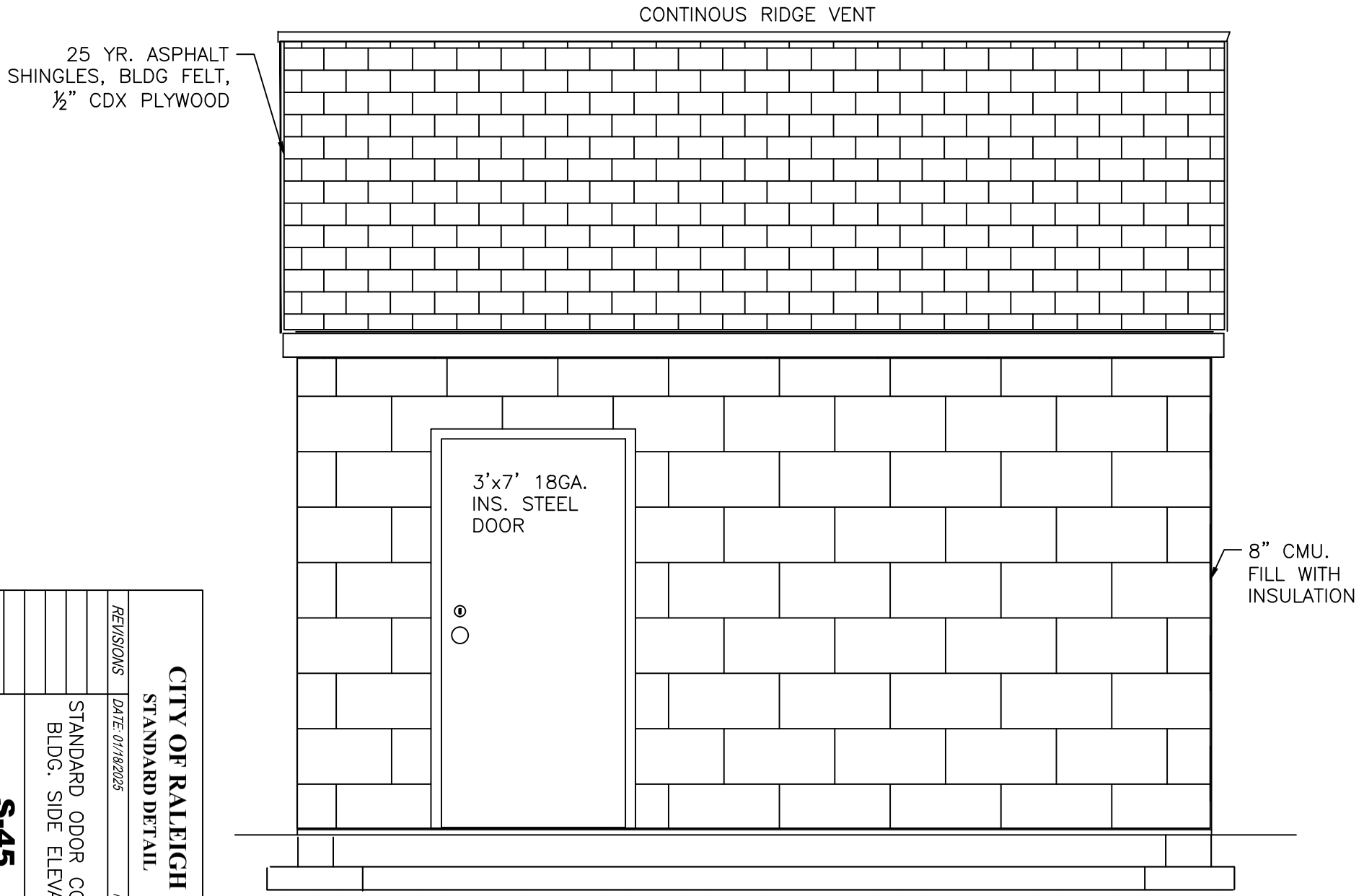
CITY OF RALEIGH STANDARD DETAIL	
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	NOT USED
	S-43



NOTES:
1. NOT TO SCALE.
2. THIS IS A RENDERING ONLY. BUILDING PLANS MUST BE APPROVED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	STANDARD ODOR CONTROL BLDG. FRONT ELEVATION
	S-44



CITY OF RALEIGH
STANDARD DETAIL

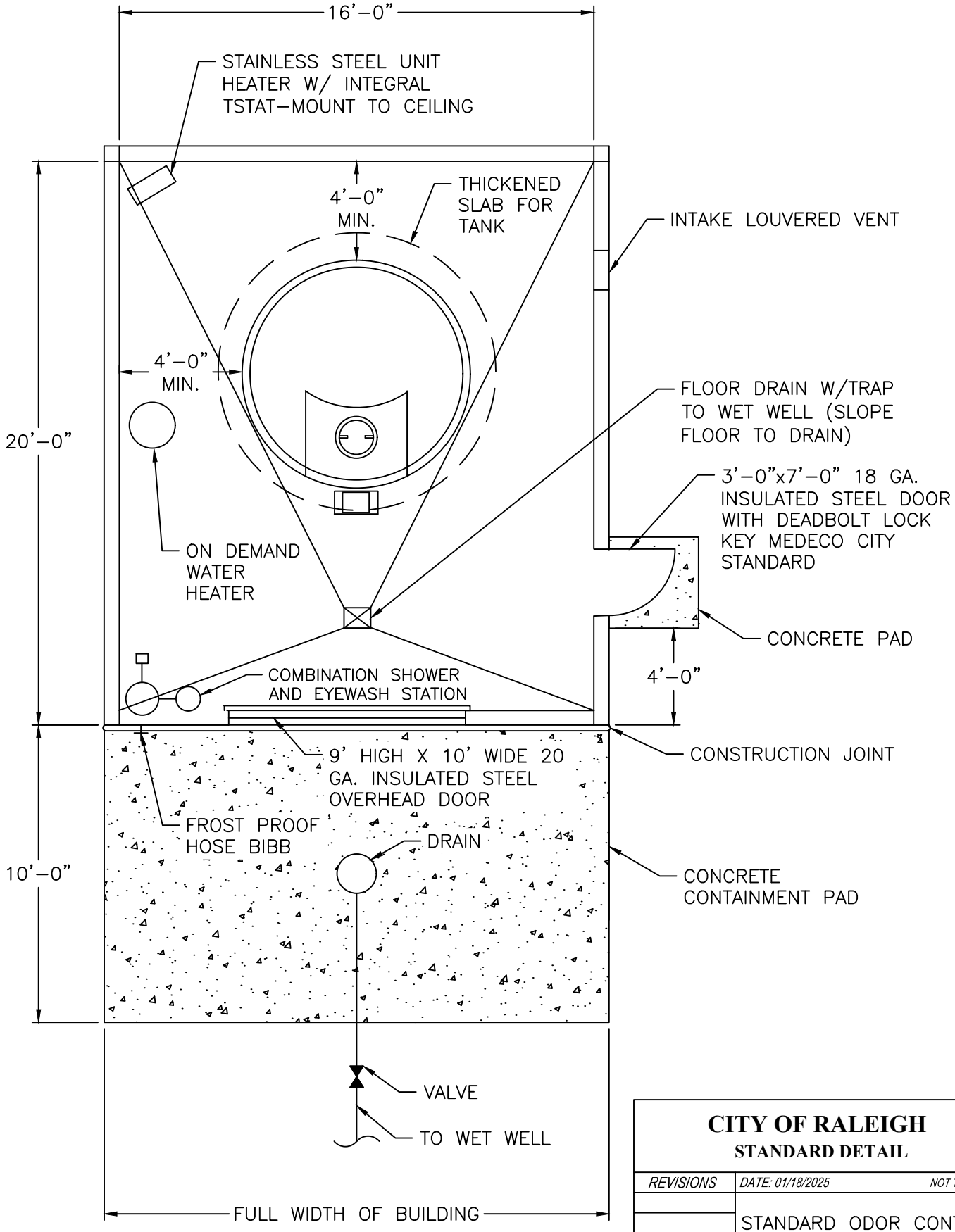
REVISIONS

DATE: 01/18/2025

NOT TO SCALE

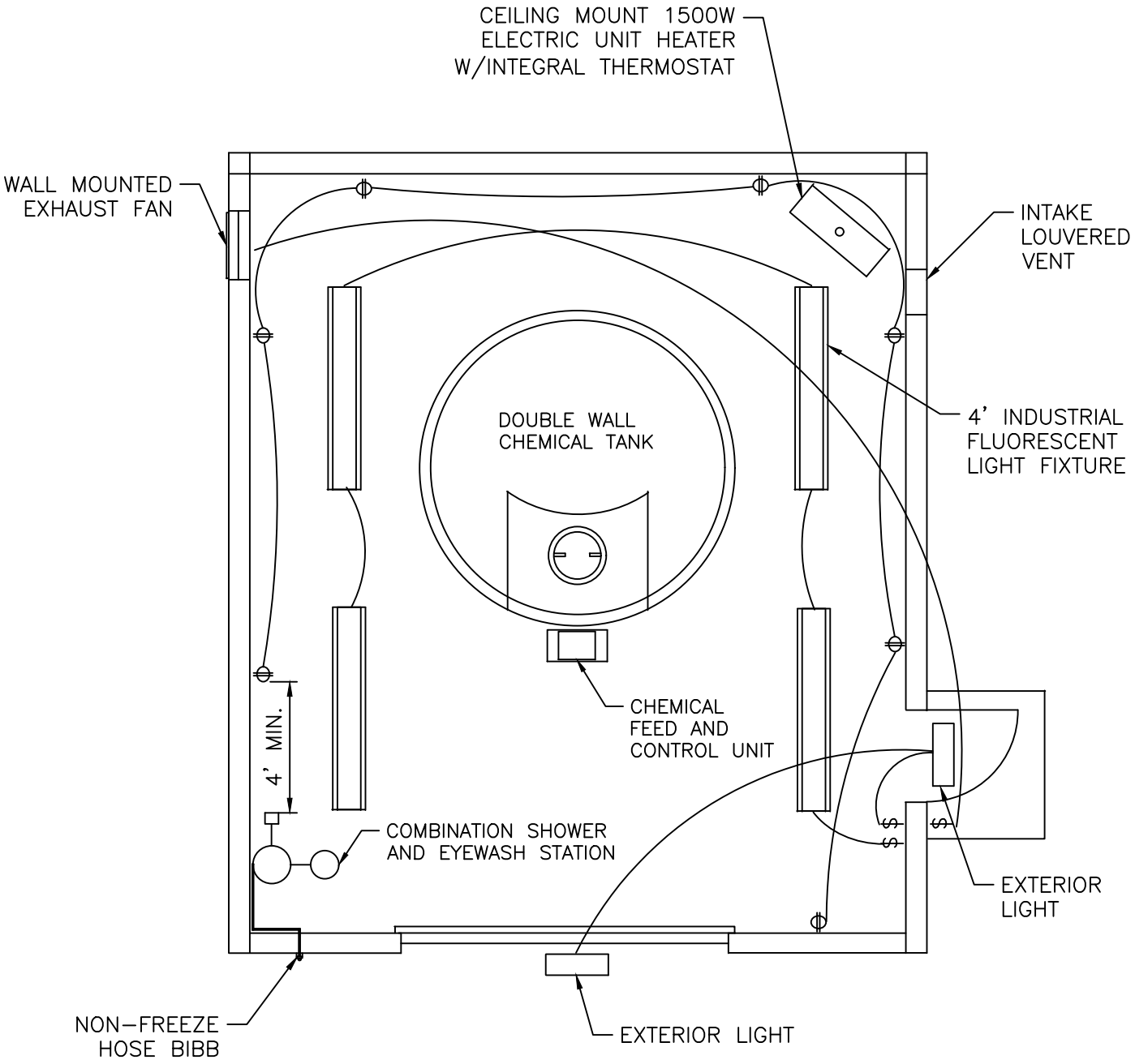
STANDARD ODOR CONTROL BLDG. SIDE ELEVATION

S-45



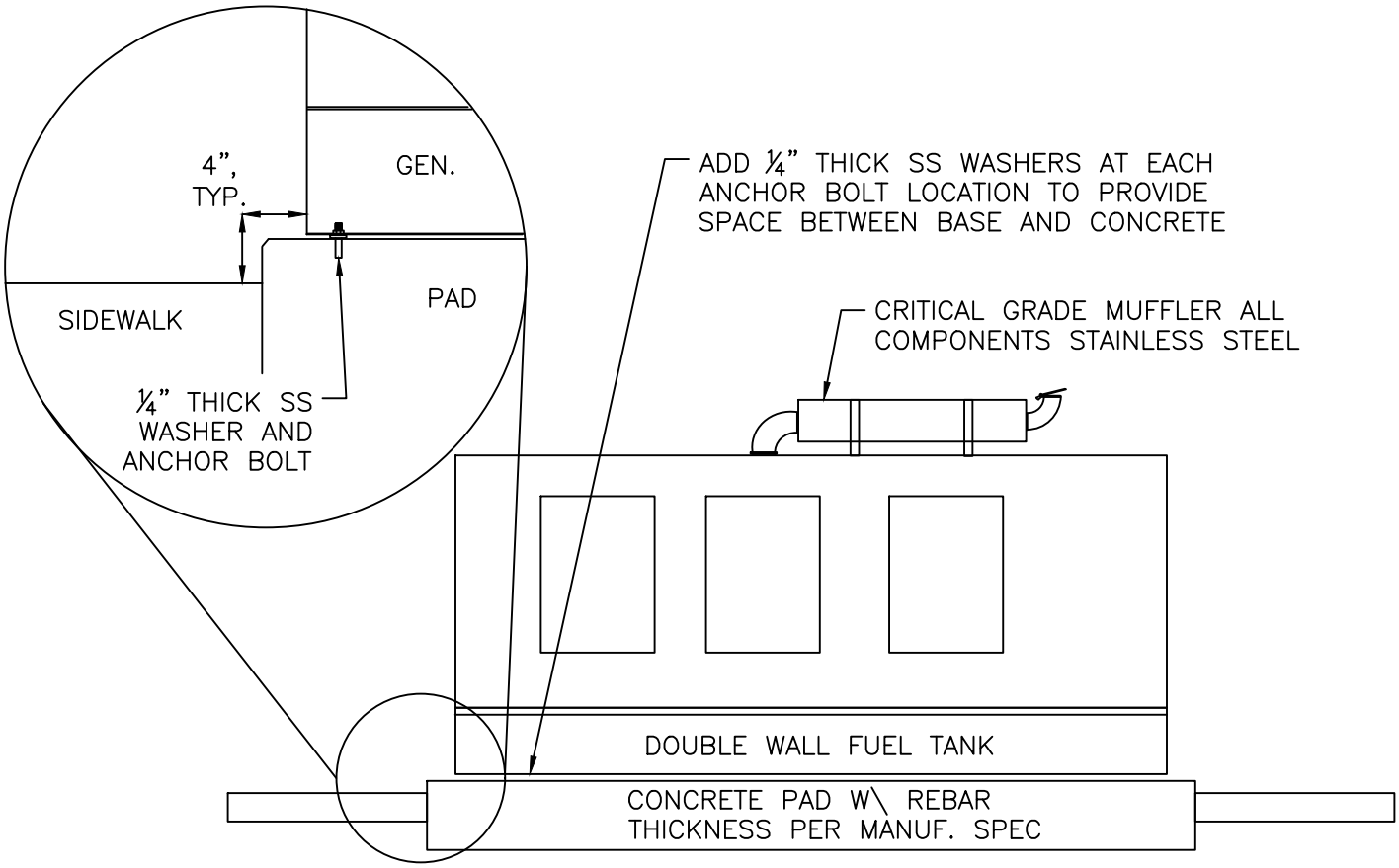
CITY OF RALEIGH
STANDARD DETAIL

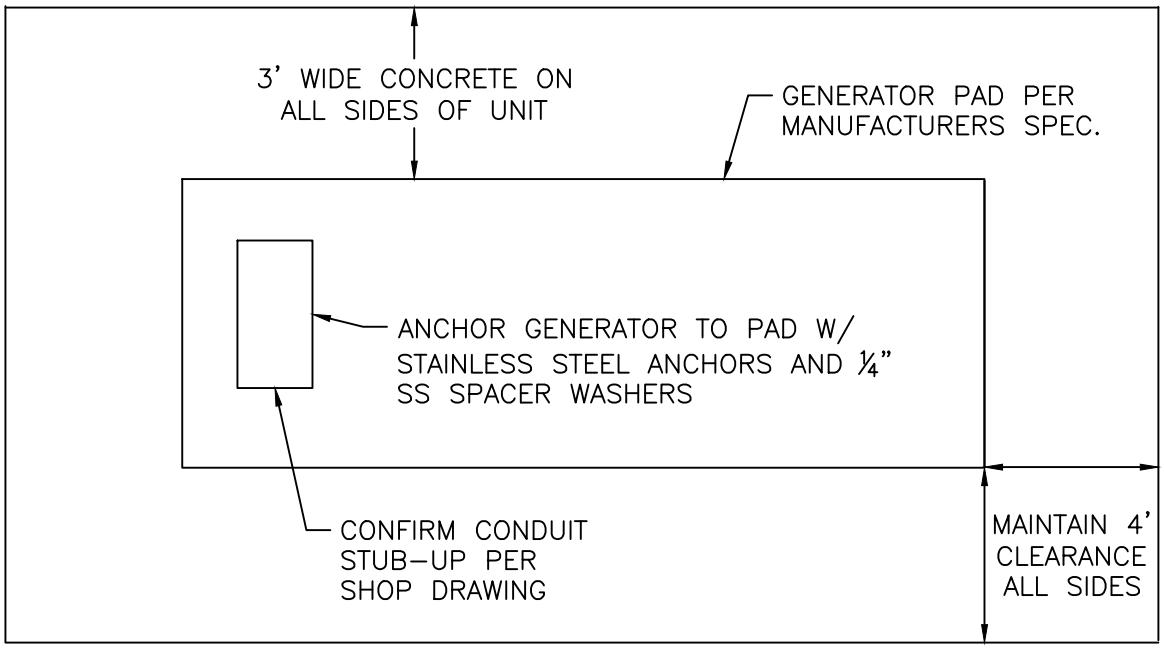
REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	STANDARD ODOR CONTROL BLDG. FLOOR ELEVATION
	S-46



CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	STANDARD ODOR CONTROL BLDG. MECHANICAL & ELECTRICAL
	S-47

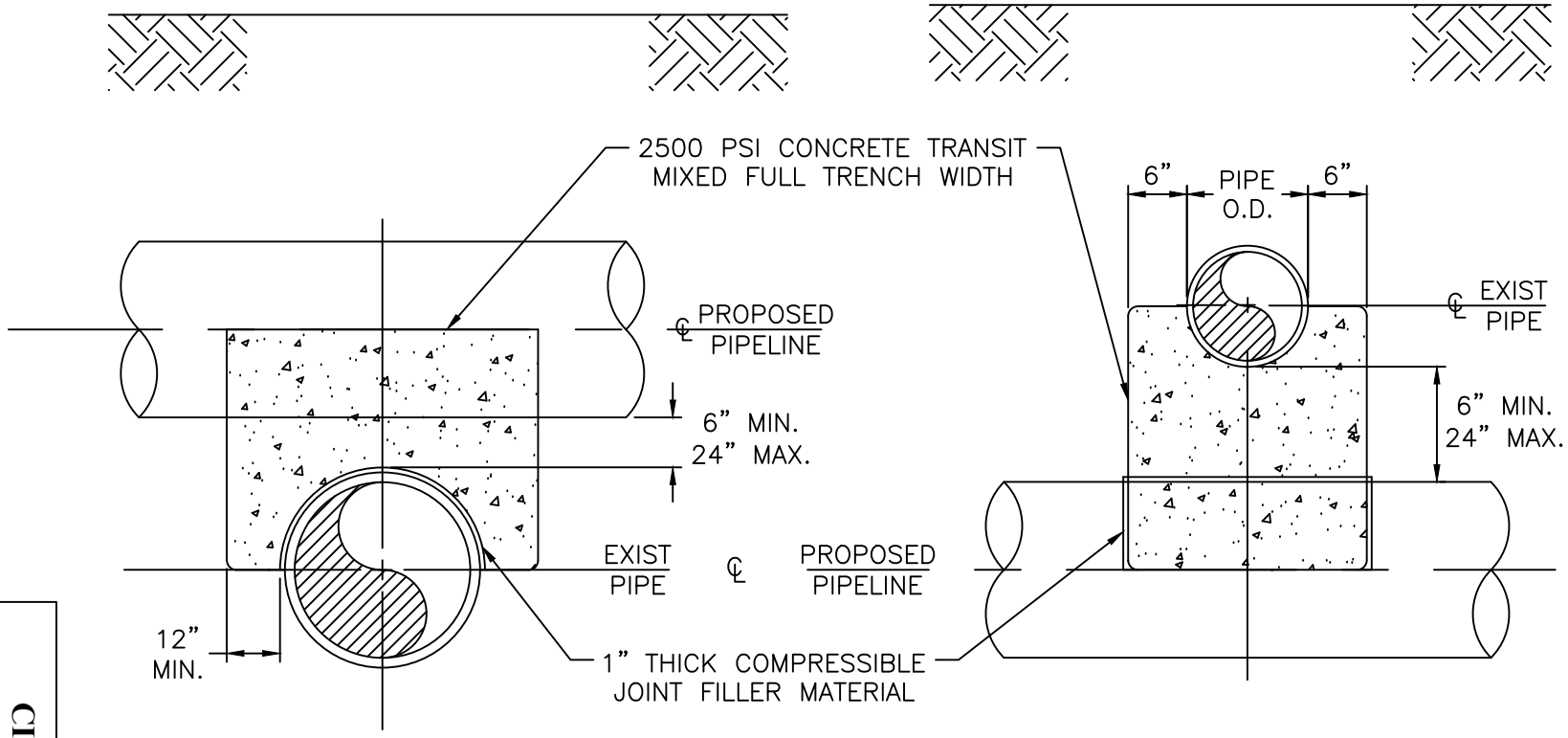




CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	GENERATOR PAD
	S-48

NOTE:
NO ENCASEMENT REQUIRED FOR SPACE
GREATER THAN 24" FOR SEWER LINES.



PROPOSED PIPELINE OVER
EXISTING PIPE

PROPOSED PIPELINE
UNDER EXISTING PIPE

CITY OF RALEIGH
STANDARD DETAIL

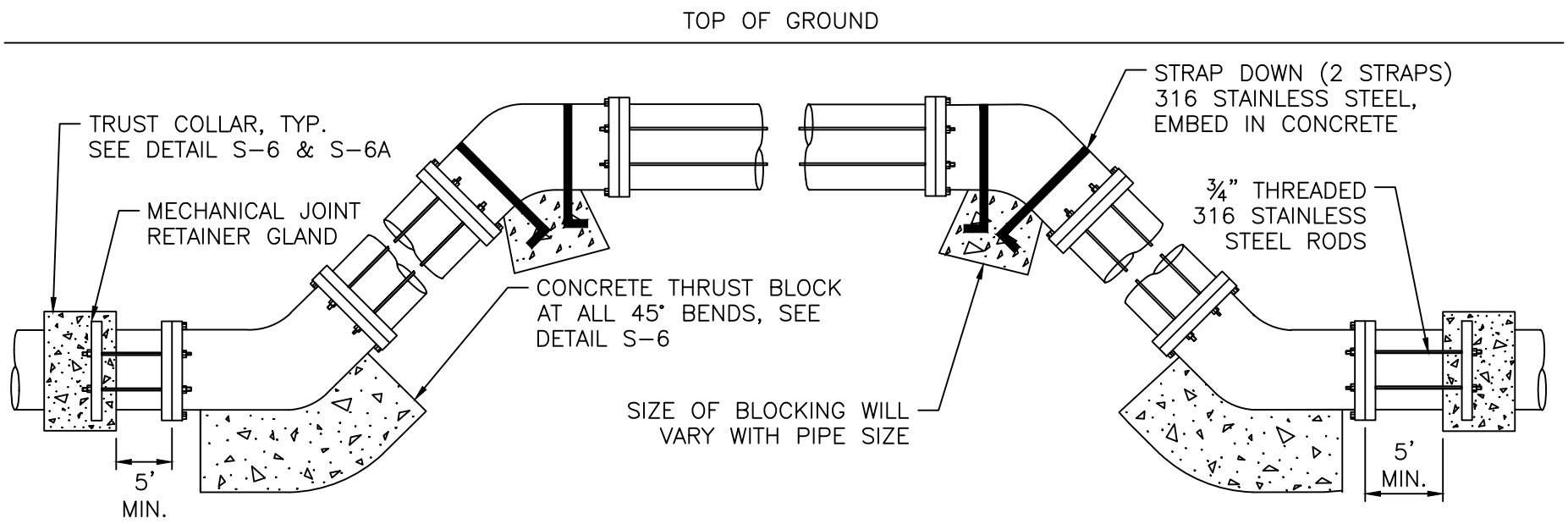
CONCRETE CRADLE
PROTECTION FOR SEWER
LINE CROSSINGS

REVISIONS

DATE: 01/18/2025

NOT TO SCALE

S-49



ROD REQUIREMENTS

SIZE OF 45° BEND	STATIC TRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

STRAP REQUIREMENTS

STRAP WIDTH	STRAP THICKNESS
1"	3/16"
1.5"	3/16"
2"	¼"
2"	½"
4"	½"

RESTRAINT REQUIREMENTS

PIPE DIA	RODDING	RJ GLANDS	THRUST COLLAR	THRUST BLOCKING
<12"	X	X	X	
≥12"	X	X	X	X

"X" DENOTES REQUIRED RESTRAINT.

NOTES:
1. STEEL RODS AND BOLTS SHALL BE ¾" 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED.
6. EXTERNAL RESTRAINT REQUIRED. INTEGRAL BELL RESTRAINT REQUIRES DIRECTOR'S APPROVAL.

CITY OF RALEIGH
STANDARD DETAIL

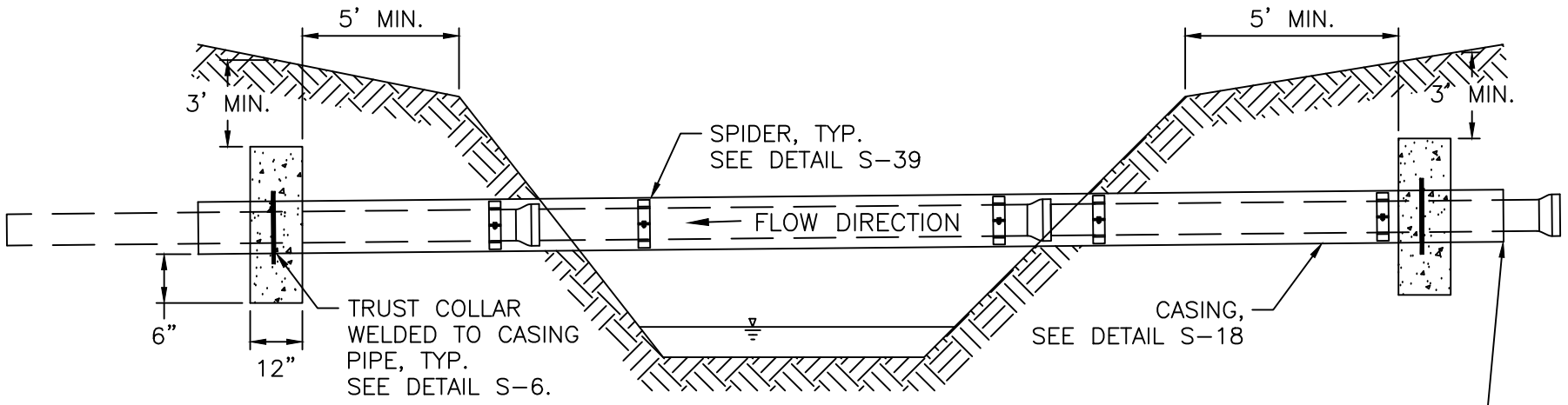
REVISIONS

DATE: 01/10/2025

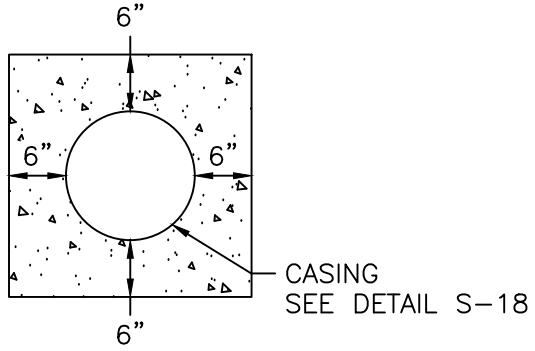
NOT TO SCALE

STANDARD VERTICAL BEND

S-50



PROFILE VIEW



CONCRETE COLLAR

NOTES:

1. FOR CROSSINGS OF LESS THAN 10' NO CASING IS REQUIRED IF THE JOINT OF PIPE IS CENTERED ON THE CROSSING.
2. THRUST COLLAR MAY BE FIELD WELDED ON STEEL CASING PIPE. IF NO CASING IS REQUIRED THE THRUST COLLAR MUST BE FACTORY WELDED ON DIP CARRIER PIPE.

CITY OF RALEIGH
STANDARD DETAIL

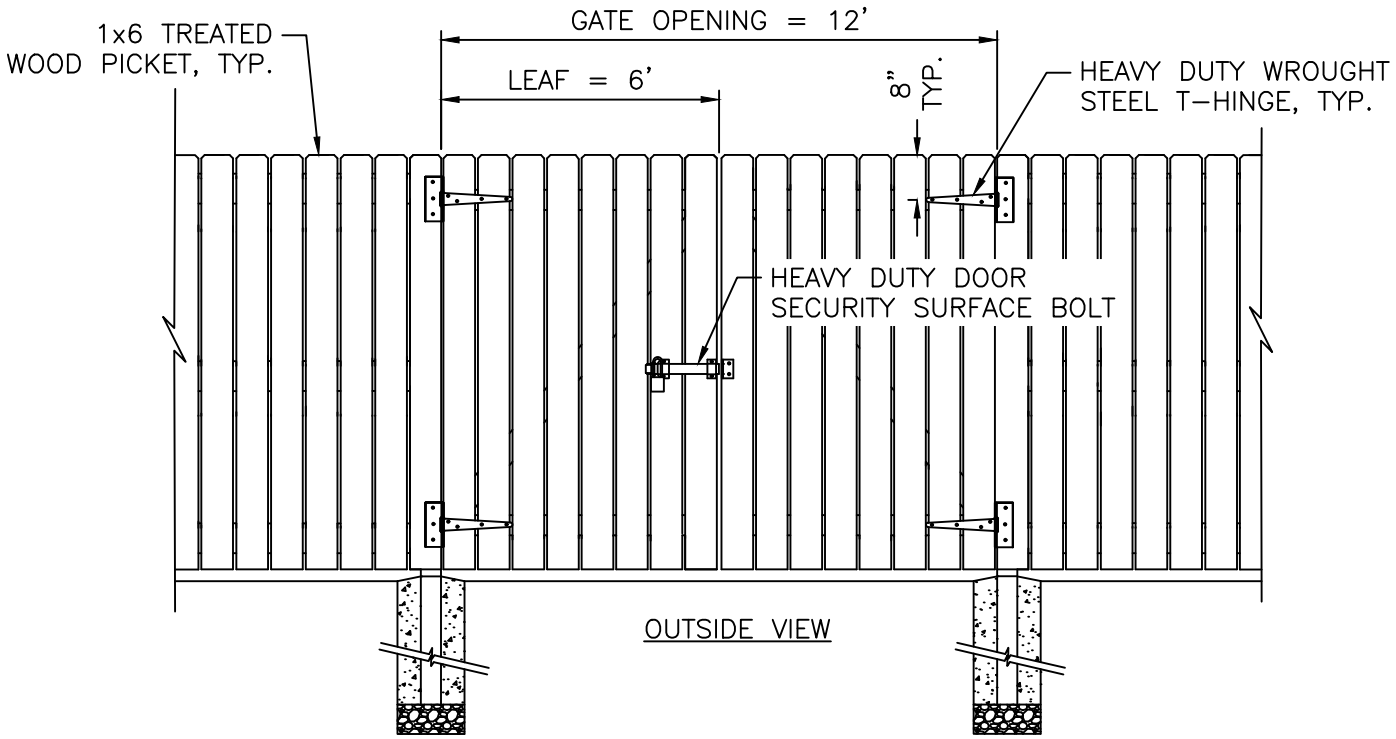
REVISIONS

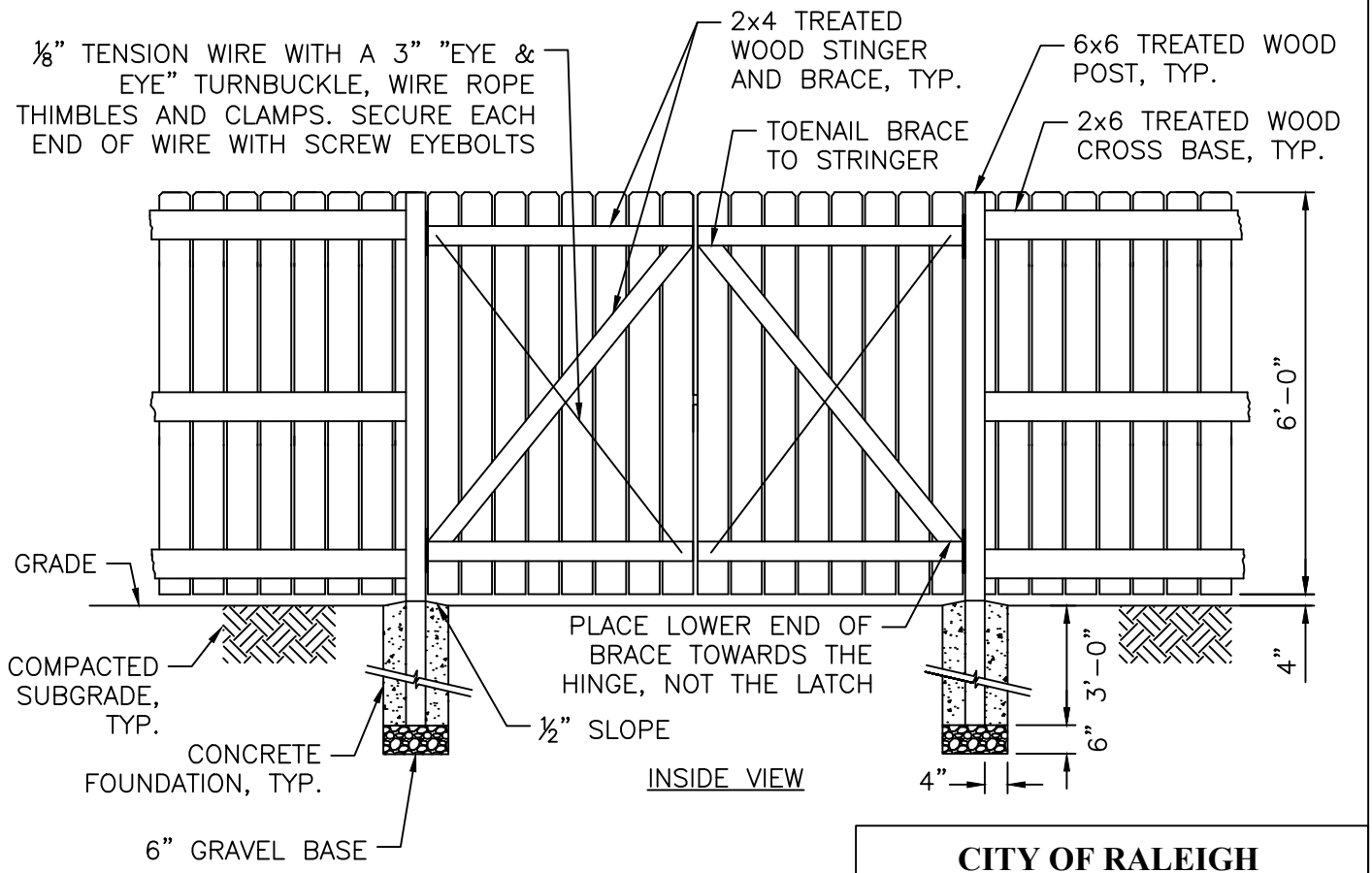
DATE: 01/18/2025

NOT TO SCALE

AERIAL SEWER SERVICE

S-51

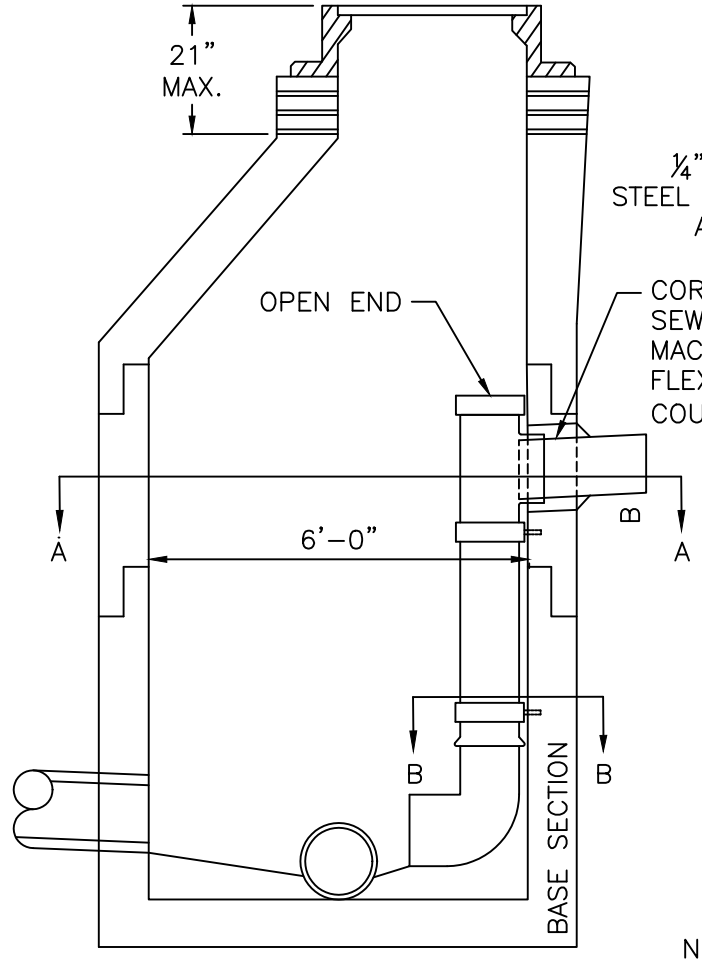


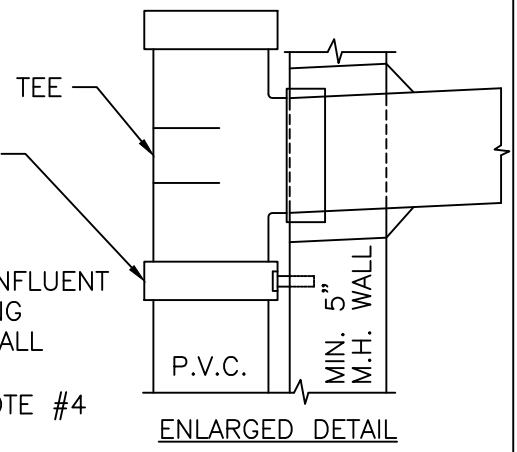


NOTES:
1. INSTALL 1x6 BOARDS VERTICALLY.
2. 2x6'S MAY SLOPE OR BE HORIZONTAL TO ACCOUNT FOR GRADE CHANGES.
3. SPACE 1x6 BOARDS EQUALLY (⅜" MAX).

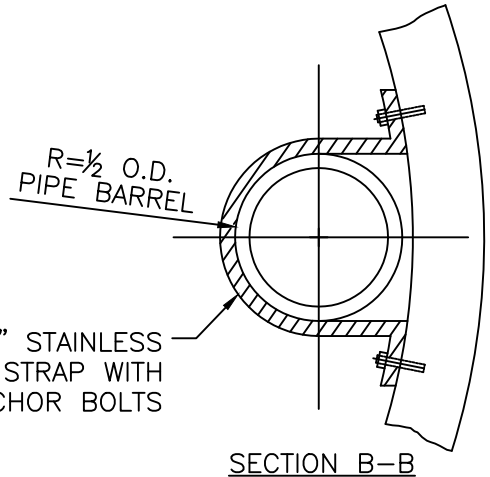
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	WOODEN FENCE GATE
	S-52





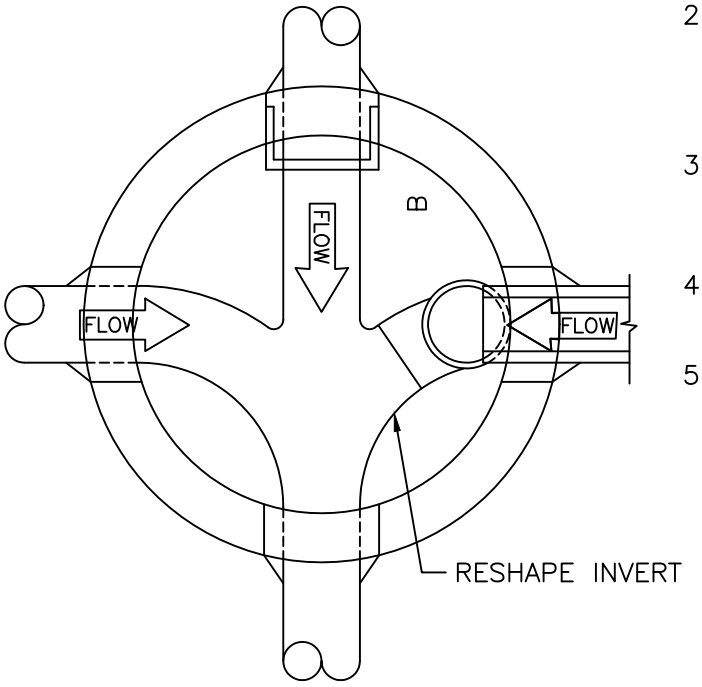
ENLARGED DETAIL



SECTION B–B

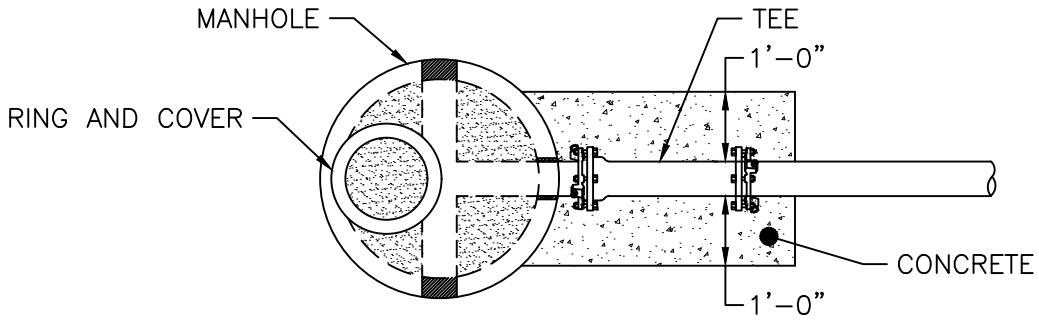
NOTES:

1. PIPE FOR INSIDE DROP SHALL BE SDR 35 PVC CONFORMING TO ASTM SPECIFICATION D3034.
2. BOTTOM BEND TO BE 90° SHORT BEND, BELL SPIGOT, OF SDR 35 PVC. SPIGOT OF BEND TO REST DIRECTLY ON EXISTING SHELF. CONSTRUCT MASONRY TROUGH FROM DROP EFFLUENT TO MAIN CHANNEL.
3. LOCATE STRAPS AT TEE AND ABOVE BELL OF 90° BEND AS SHOWN. ADD EXTRA STRAPS AS NECESSARY TO MAINTAIN MAXIMUM SPACING OF TEN FEET.
4. HOLE IN MANHOLE WALL TO BE MADE WITH A CORING MACHINE. INSTALL FLEXIBLE RUBBER COUPLING.
5. CORE HOLE SHALL NOT ENTER CONE SECTION.

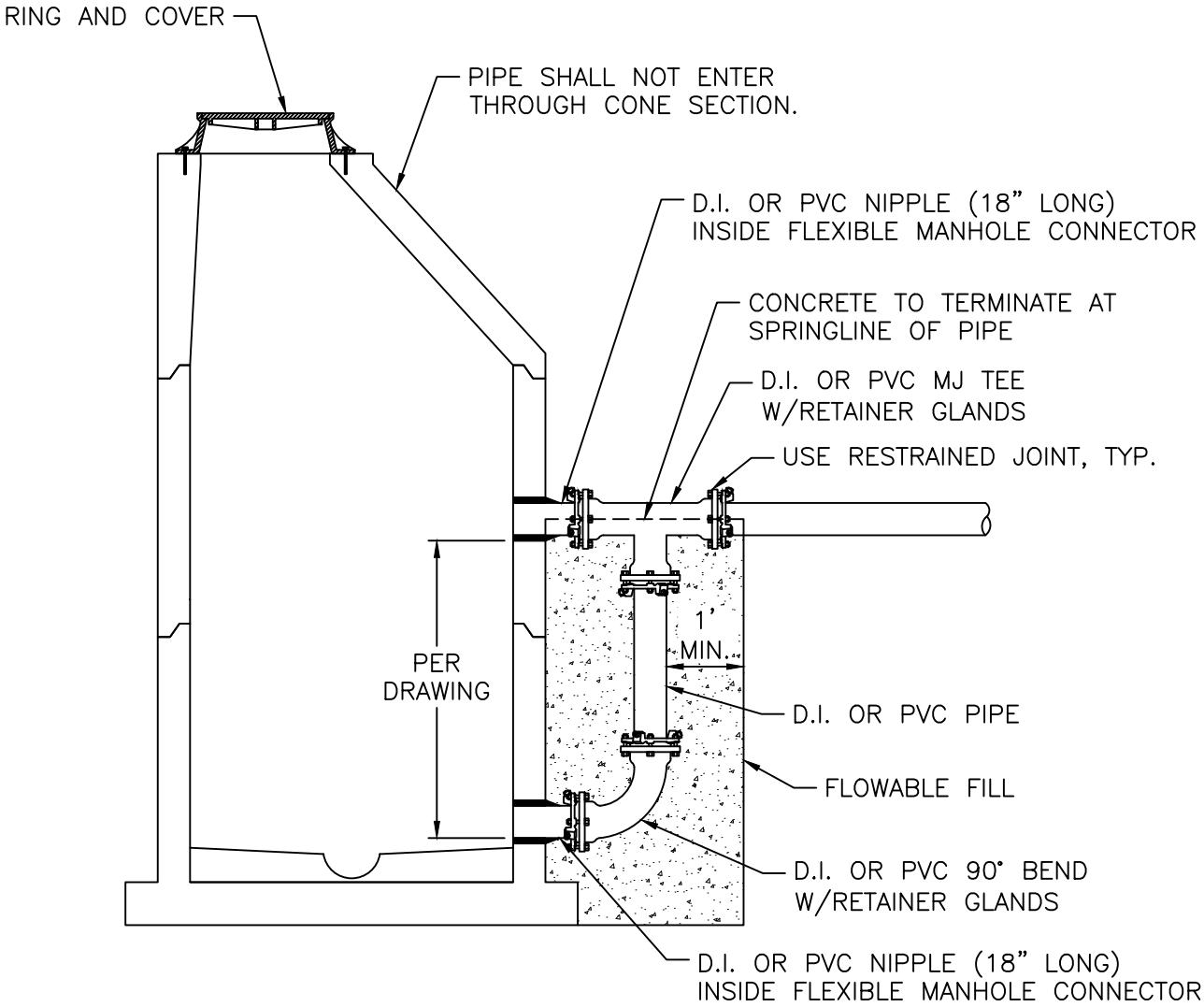


SECTION A–A

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	INSIDE DROP MANHOLE	
	S-53	



PLAN VIEW



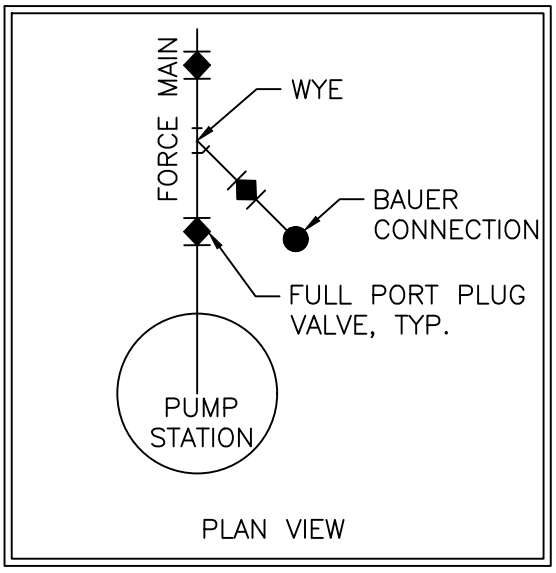
SECTION VIEW

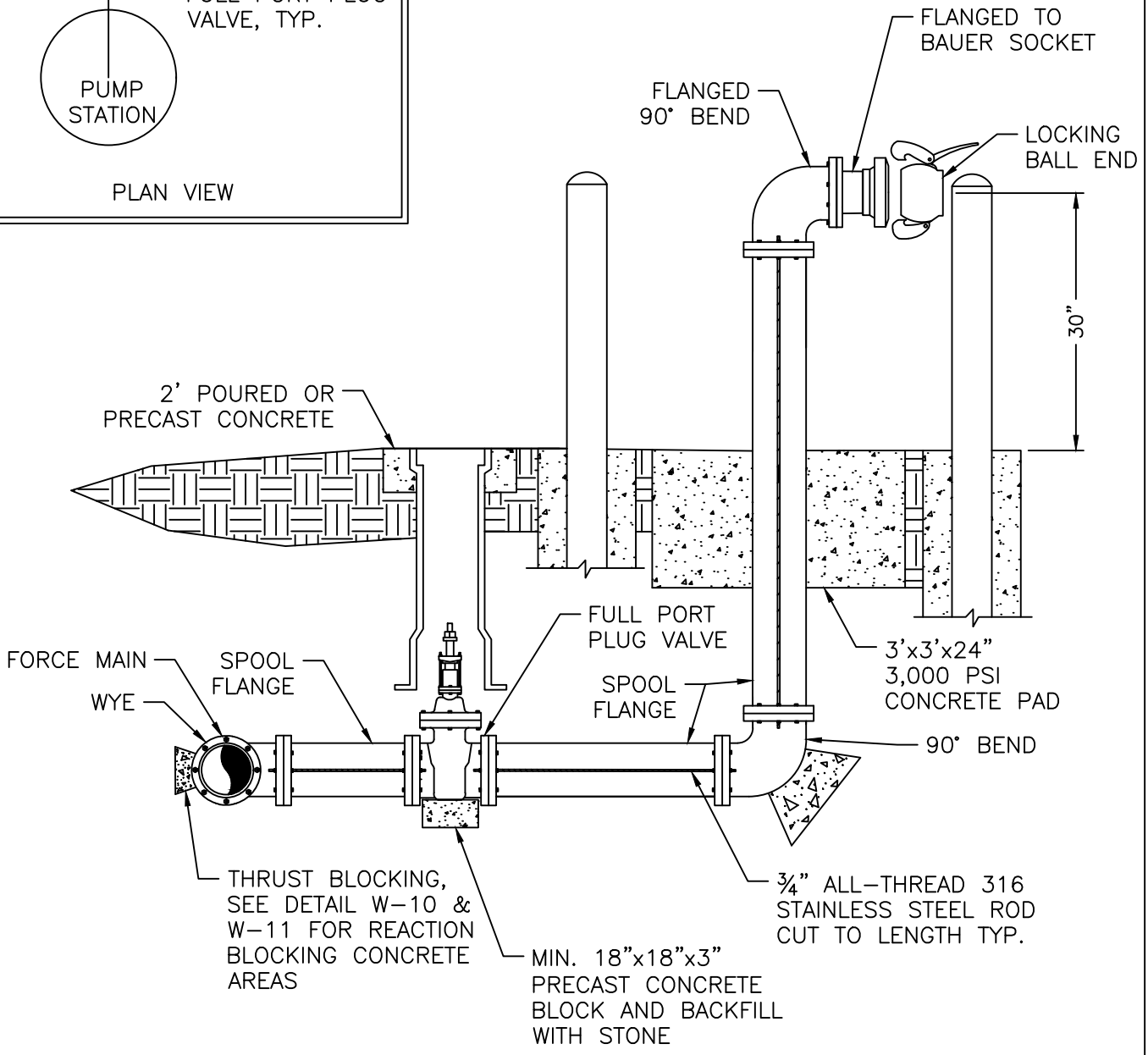
NOTES:

1. ENCASE ENTIRE DROP ASSEMBLY IN CONCRETE. 1' MINIMUM CONC. COVER ON EACH SIDE AND BOTTOM.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	OUTSIDE DROP MANHOLE
	S-54

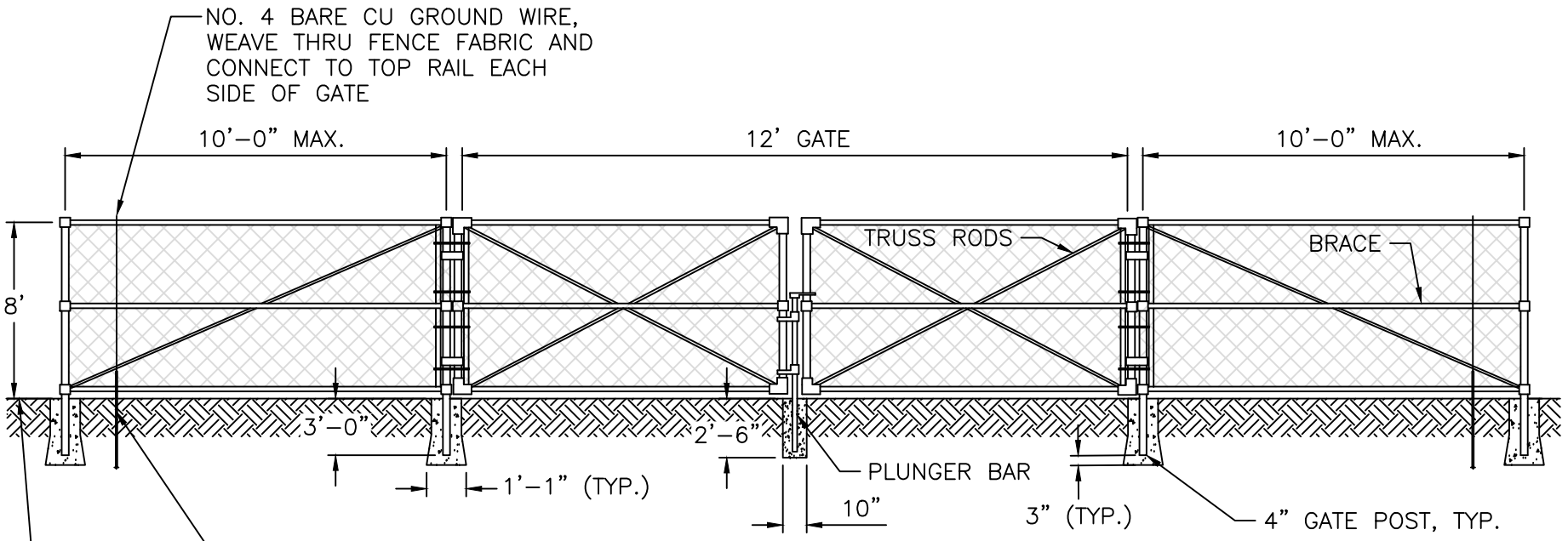




NOTES:
1. BYPASS DIAMETER SHALL MATCH FM DIAMETER UNLESS APPROVED BY RALEIGH WATER.
2. THE DESIGN ENGINEER SHALL LAYOUT BYPASS CONNECTION RISER TO PREVENT MAINTENANCE ACCESS CONFLICTS WITH THE PUMP STATION.

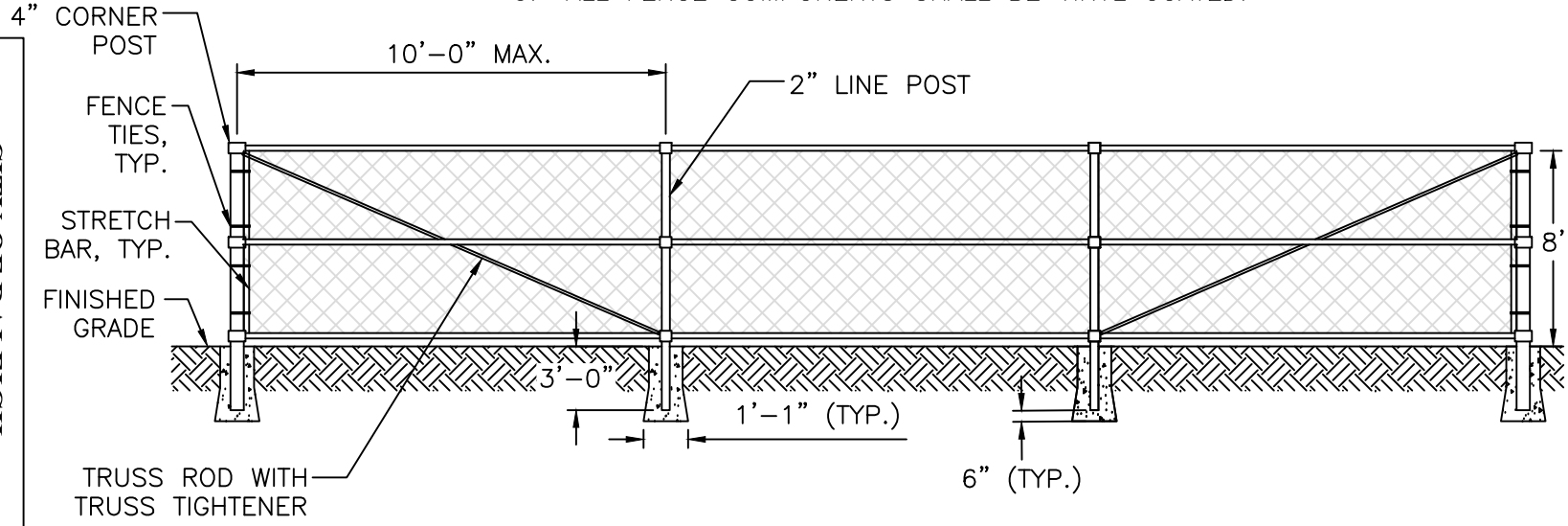
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025 NOT TO SCALE
	BYPASS CONNECTION FOR PUMP STATIONS AND FORCE MAINS
	S-55



NOTES:

1. ALL FENCING INCLUDING GATES SHALL INCLUDE A COMMERCIAL WEIGHT, BLACK UV RESISTANT VINYL OR POLYESTER PRIVACY SCREEN
2. USE A MINIMUM OF 9 GA EASY TWIST FENCE TIES. PLASTIC ZIP TIES ARE NOT ALLOWED.
3. ALL FENCE COMPONENTS SHALL BE VINYL COATED.



CITY OF RALEIGH
STANDARD DETAIL

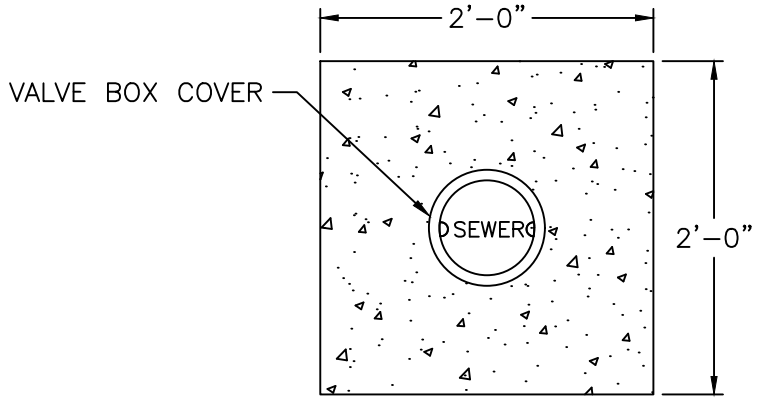
REVISIONS

DATE: 01/10/2025

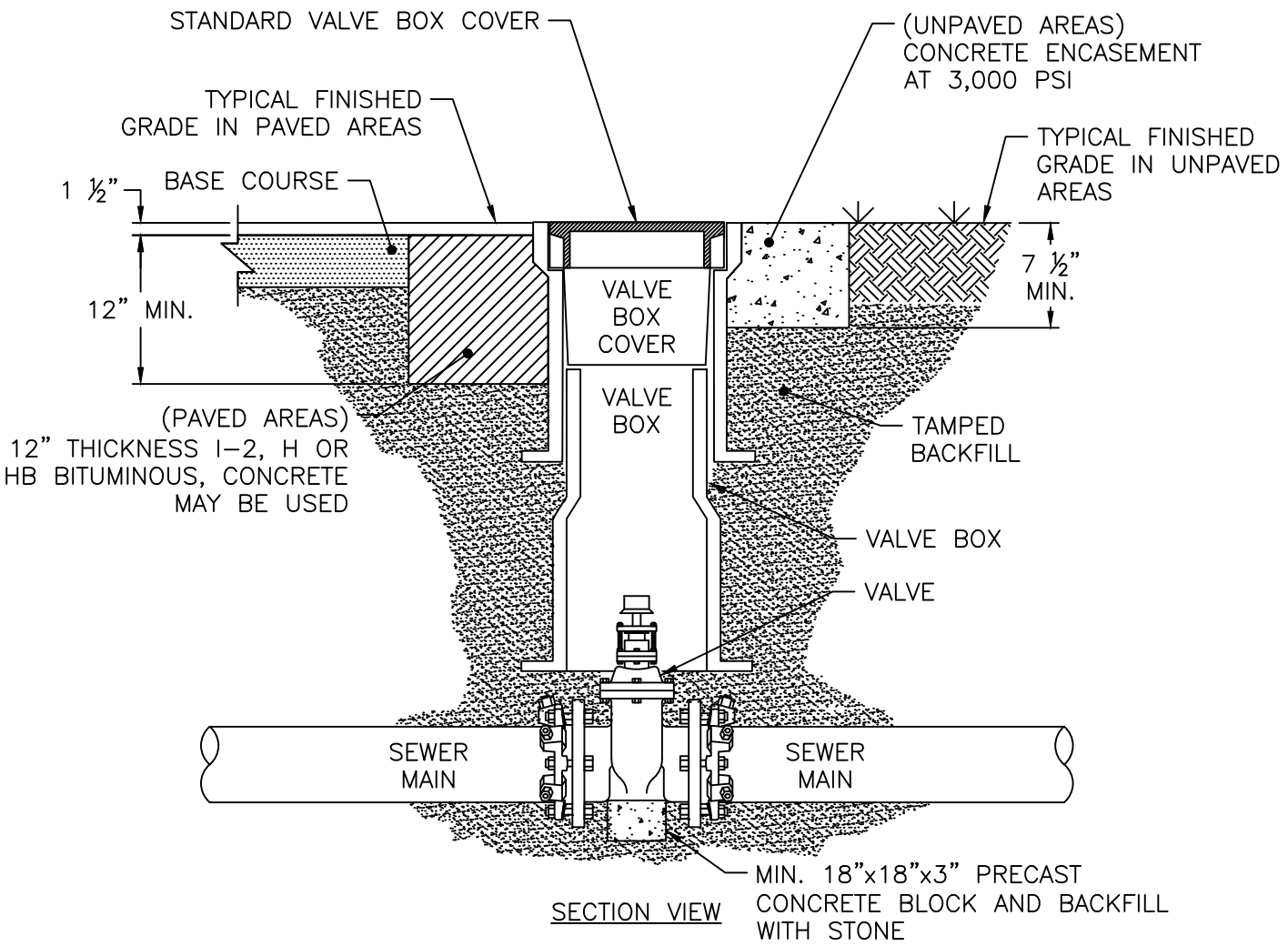
NOT TO SCALE

CHAIN LINK FENCE

S-56



PLAN VIEW



SECTION VIEW

NOTES:

1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. VALVE OPERATING NUT MUST BE EXTENDED SO THAT THE DEPTH IS NO GREATER THAN 5' FROM THE SURFACE USING A MANUFACTURER APPROVED EXTENSION KIT.
3. PRECAST CONCRETE ENCASEMENT IS ALLOWED OUTSIDE OF PAVED AREAS.
4. VALVE BOX SHOULD NOT CONTACT MAIN OR VALVE.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	SEWER VALVE AND BOX INSTALLATION	
	S-57	