



DEPARTMENT OF PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

APPENDIX D
STANDARD DETAIL DRAWINGS

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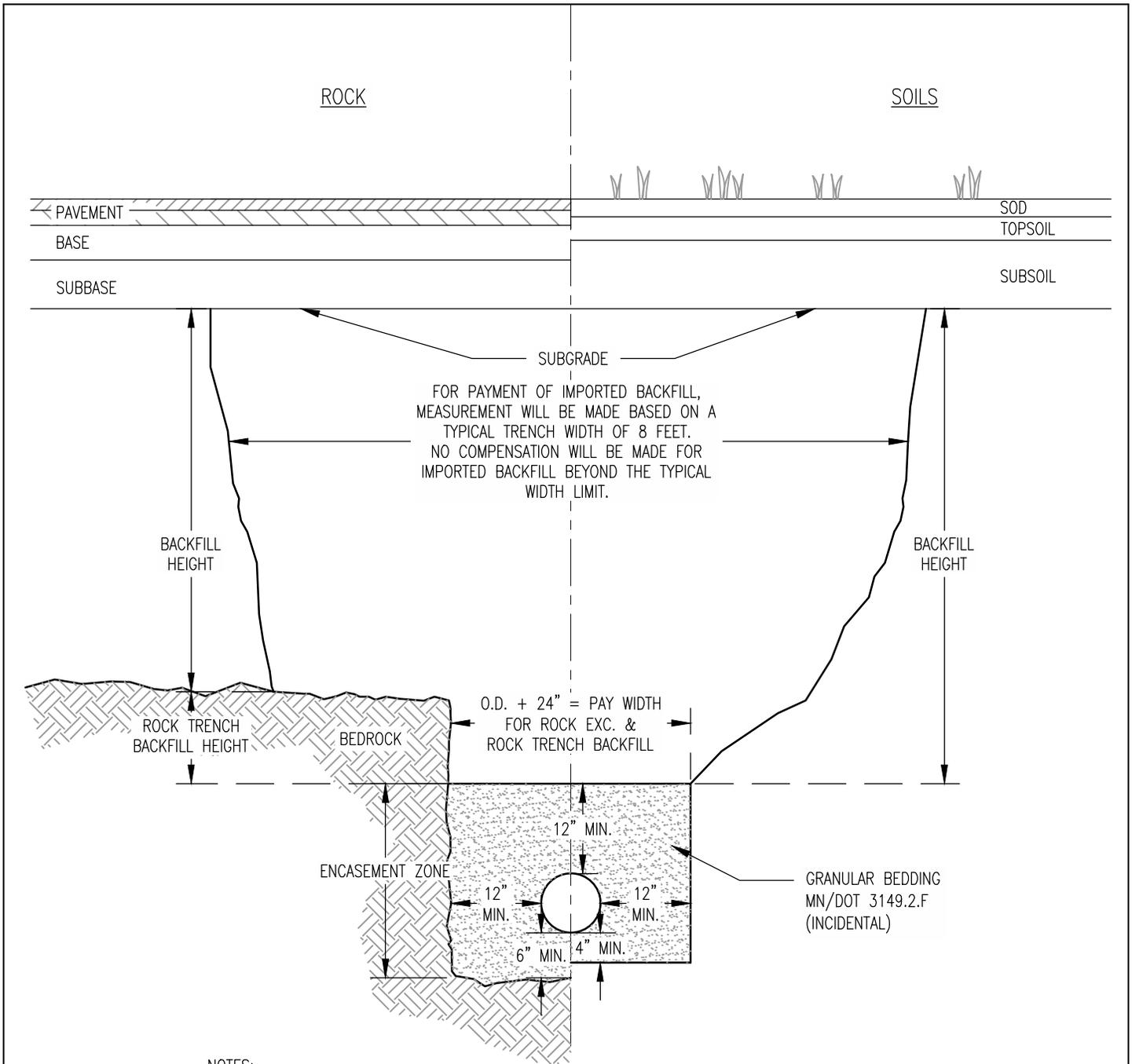
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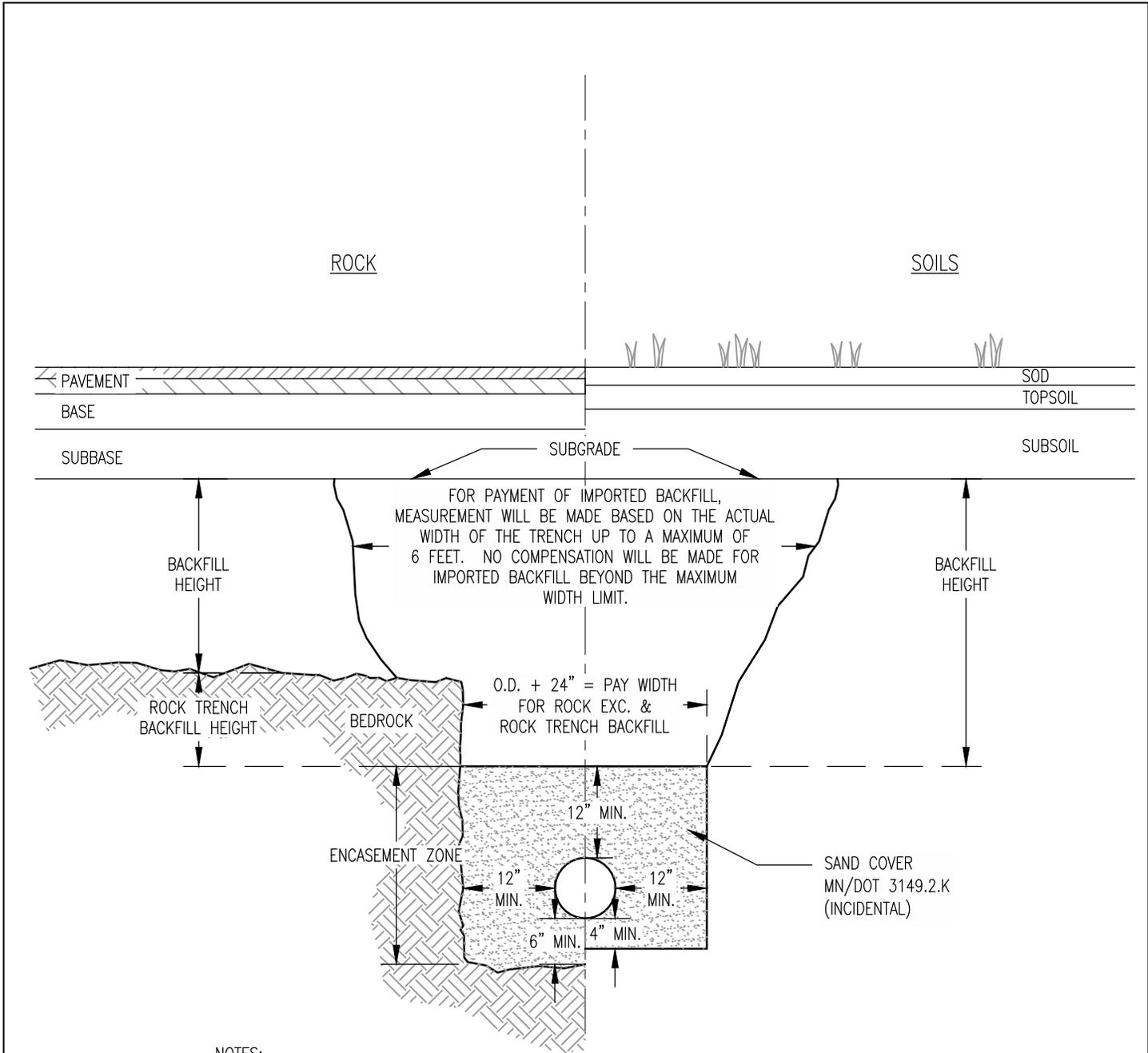
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NOTES:

1. EXCESS EXCAVATION MATERIAL SHALL BE DISPOSED OF OFF PROJECT R.O.W. (INCIDENTAL)
2. PAY WIDTH FOR ROCK EXCAVATION SHALL BE BASED ON OUTSIDE DIAMETER OF PIPE PLUS 24".
3. A MINIMUM OF 1 CUBIC YARD OF STRUCTURE EXCAVATION, CLASS R, WILL BE PAID FOR EVERY 10' OF PIPE WHERE ROCK REMOVAL IS REQUIRED.
4. TRENCH STABILIZATION BEDDING MATERIAL MAY BE USED IN AREAS AS DETERMINED BY THE ENGINEER.
5. ENCASEMENT ZONE MATERIAL SHALL BE COMPACTED TO 95% OF MAXIMUM STANDARD PROCTOR DENSITY.
6. BACKFILL SHALL BE SELECT GRADING MATERIAL FOUND ON-SITE WHEN DEEMED SUITABLE BY THE ENGINEER OR AS OTHERWISE DEFINED IN THE PROJECT SPECIAL PROVISIONS. WHEN ON-SITE MATERIAL IS NOT SUITABLE AND WHEN BACKFILL MATERIAL IS NOT SPECIFIED, IMPORTED MATERIAL MEETING MN/DOT 3149.2.D.1 GRANULAR BACKFILL SHALL BE PROVIDED. USE OF NATIVE ON-SITE MATERIAL IS INCIDENTAL.
7. COMPACT BACKFILL MATERIALS TO 100% OF MAXIMUM STANDARD PROCTOR DENSITY FOR THE UPPER 3' BELOW THE SUBGRADE, AND TO 95% OF MAXIMUM STANDARD PROCTOR DENSITY BELOW THE UPPER 3'.

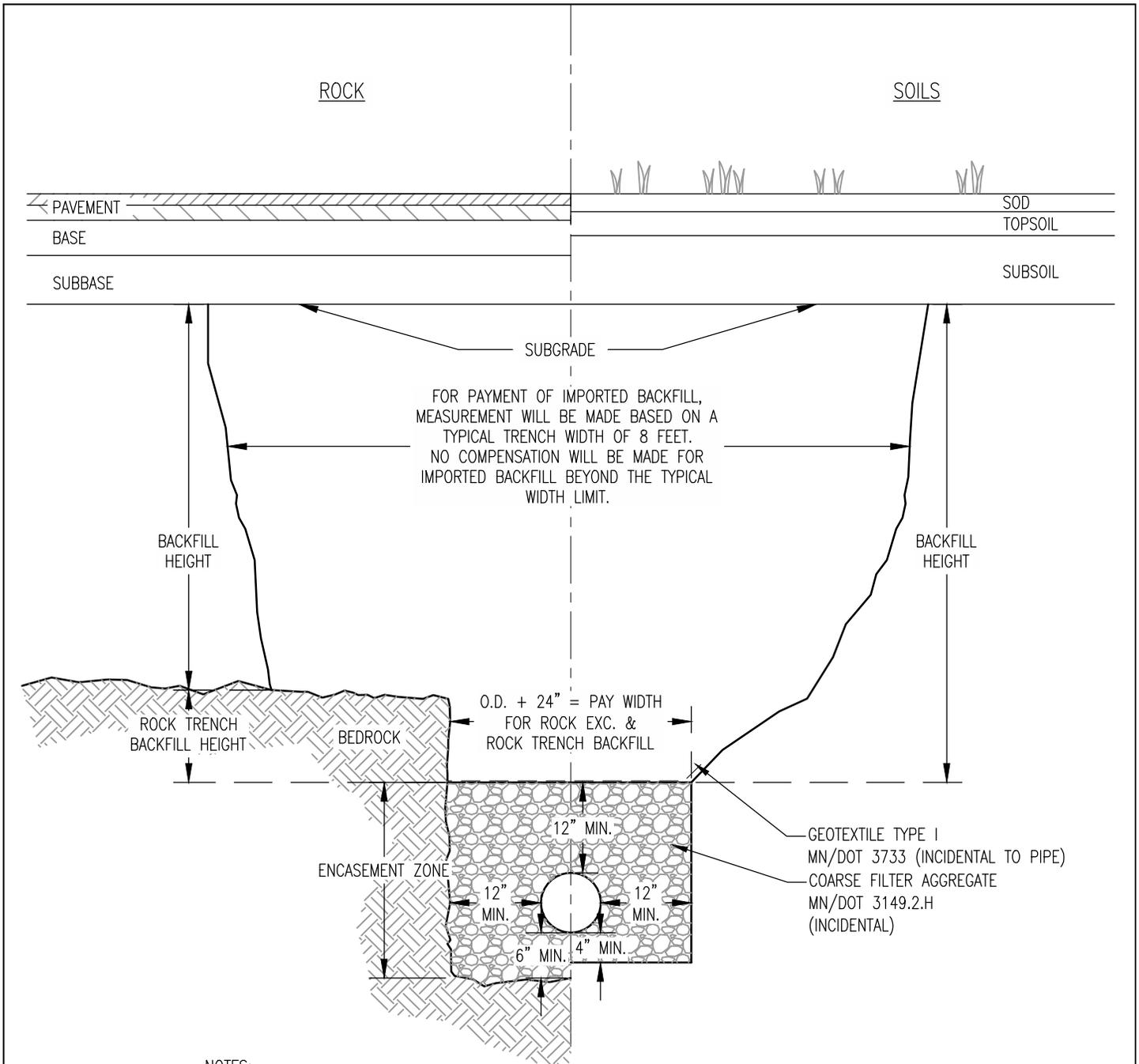
DUCTILE IRON, PE WATERMAIN, PRESSURE SEWER, & FORCEMAIN BEDDING		EX-1
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

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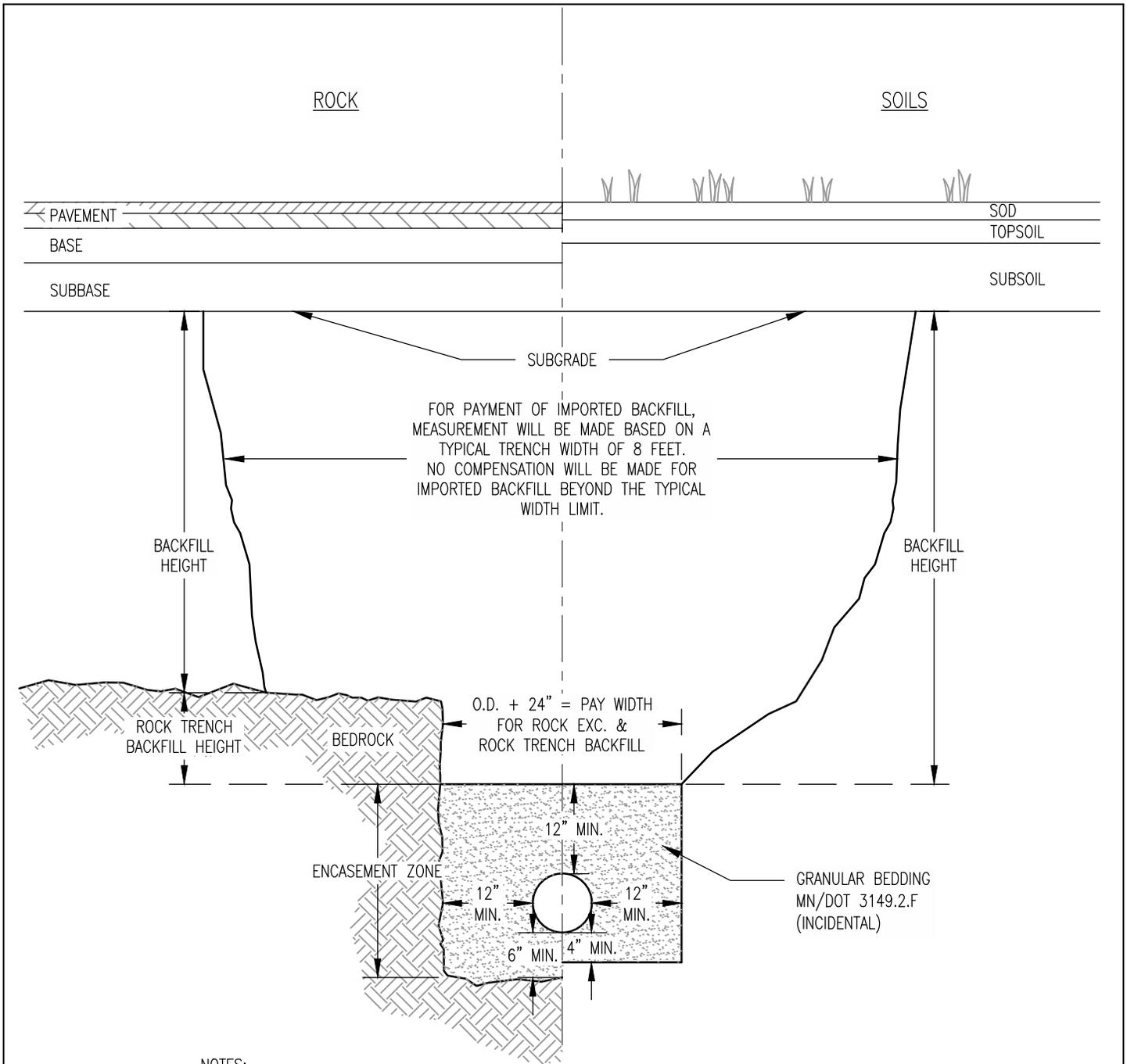
ALL STEEL & 4" AND LARGER PE GAS MAIN BEDDING	EX-2
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE	



NOTES:

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PVC AND CORRUGATED POLYETHYLENE SEWER PIPE BEDDING		EX-3
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

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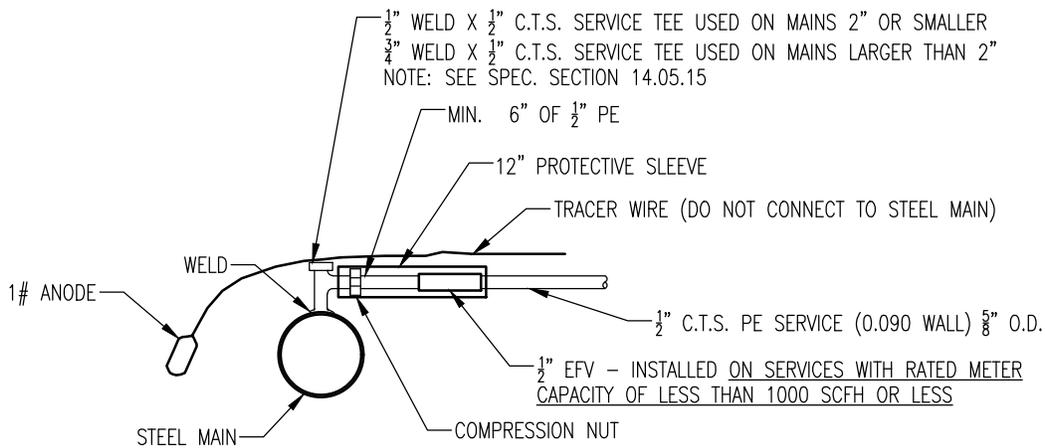
CONCRETE STORM SEWER BEDDING

EX-4

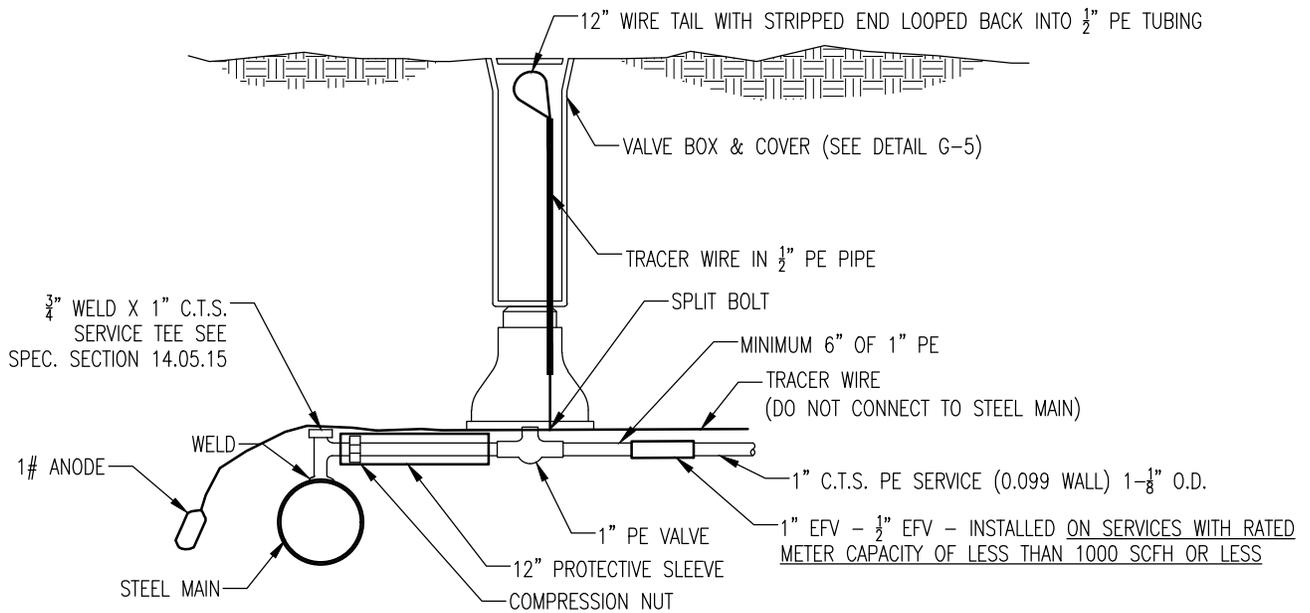
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



1/2" C.T.S. PE SERVICE ON STEEL MAIN



1" C.T.S. PE SERVICE ON STEEL MAIN

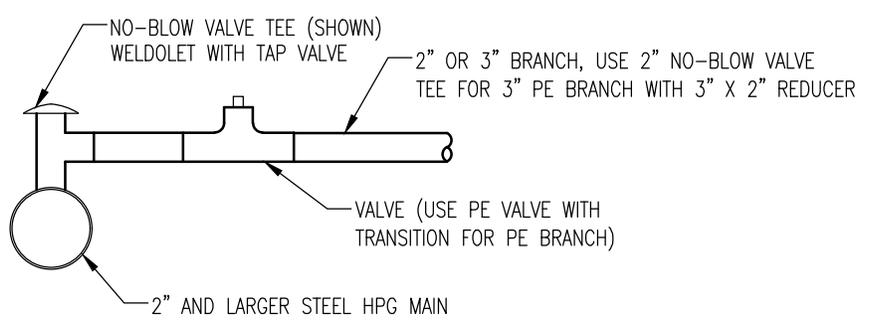
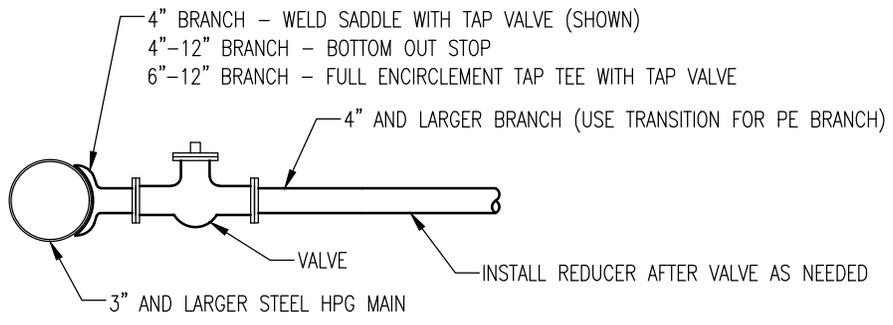
STEEL TO PE SERVICE CONNECTION

G-2

REVISED/APPROVED 05/01/2018

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



GAS MAIN BRANCH CONNECTIONS TO STEEL MAIN

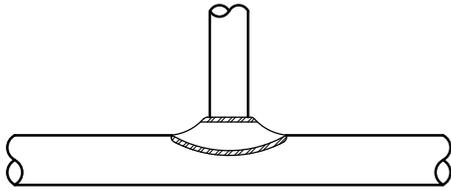
G-3

REVISED/APPROVED 02/07/2018

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

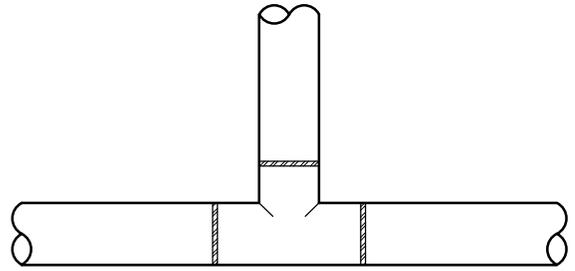
NO SCALE

REDUCED LATERAL

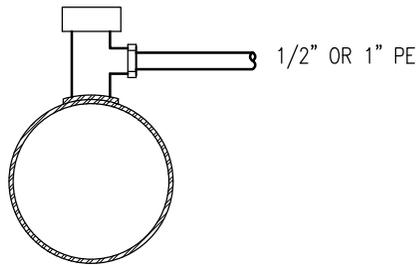


SADDLE

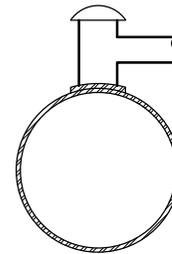
FULL SIZE OR REDUCED ONE SIZE ONLY



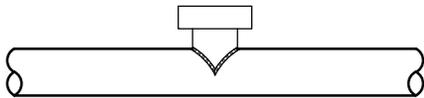
WELDING TEE IN LINE



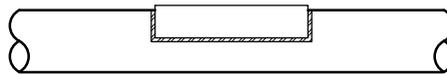
1/2" AND 1" TAP TEES



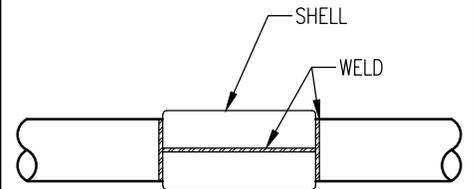
1", 1-1/2", 2" NO-BLOW TEE



MUELLER STOP - 2" & 3" RUBBER PLUG

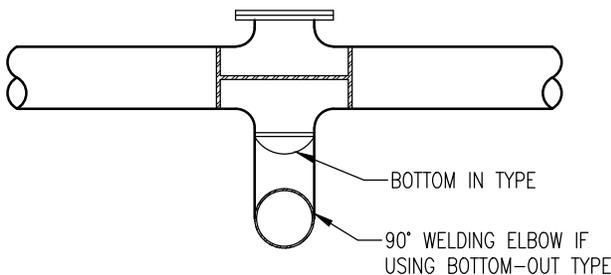


HALF SOLE REPAIR



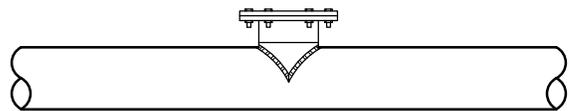
PUMPKIN ENCIRCLEMENT

MUELLER LINE STOP



MUELLER STOP
4" - 6" - 8" - 10" - 12"
(STEEL PLUG)

T.D. WILLIAMSON LINE STOP



T.D. WILLIAMSON STOP
10" - 12" - 14" - 16"

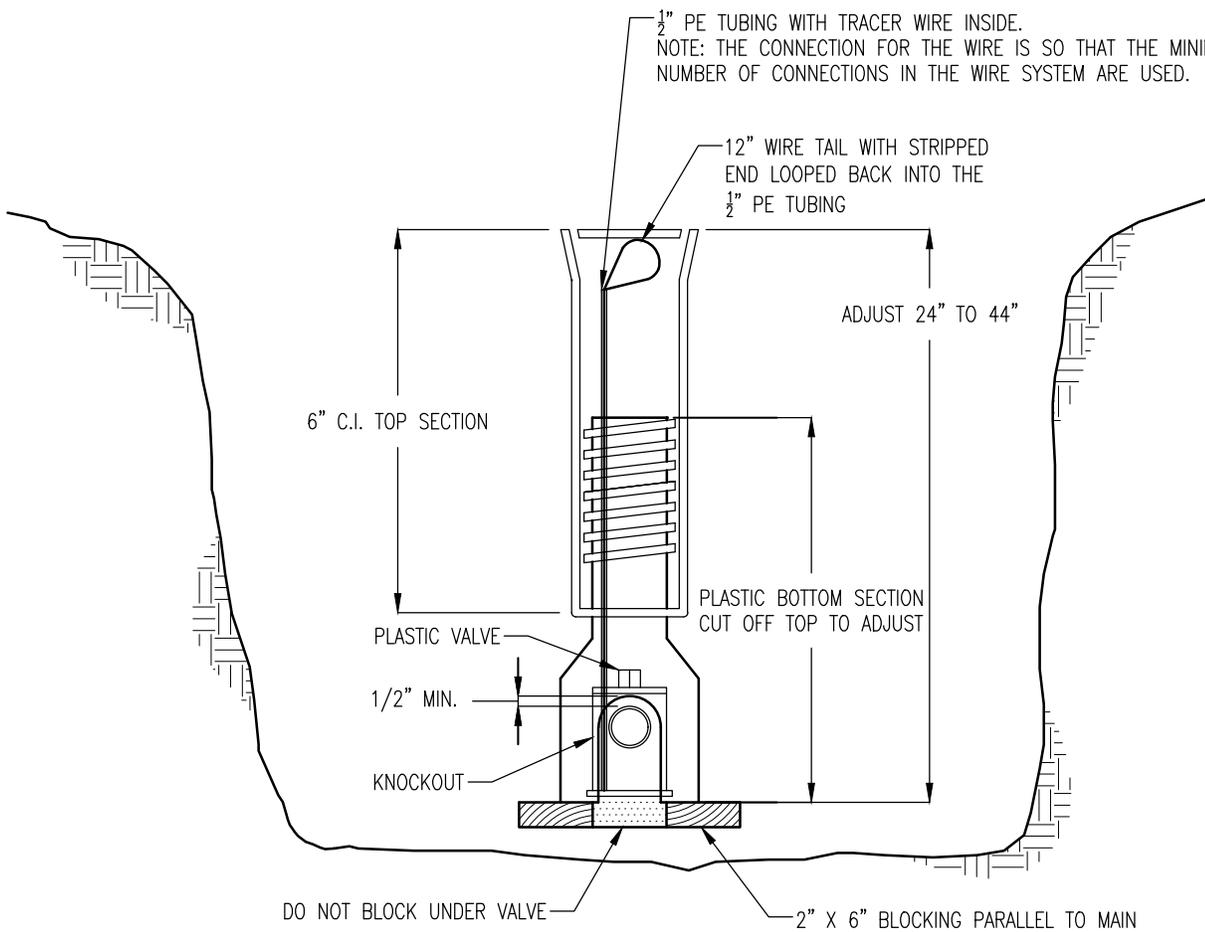
TYPICAL WELD JOINTS

G-4

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



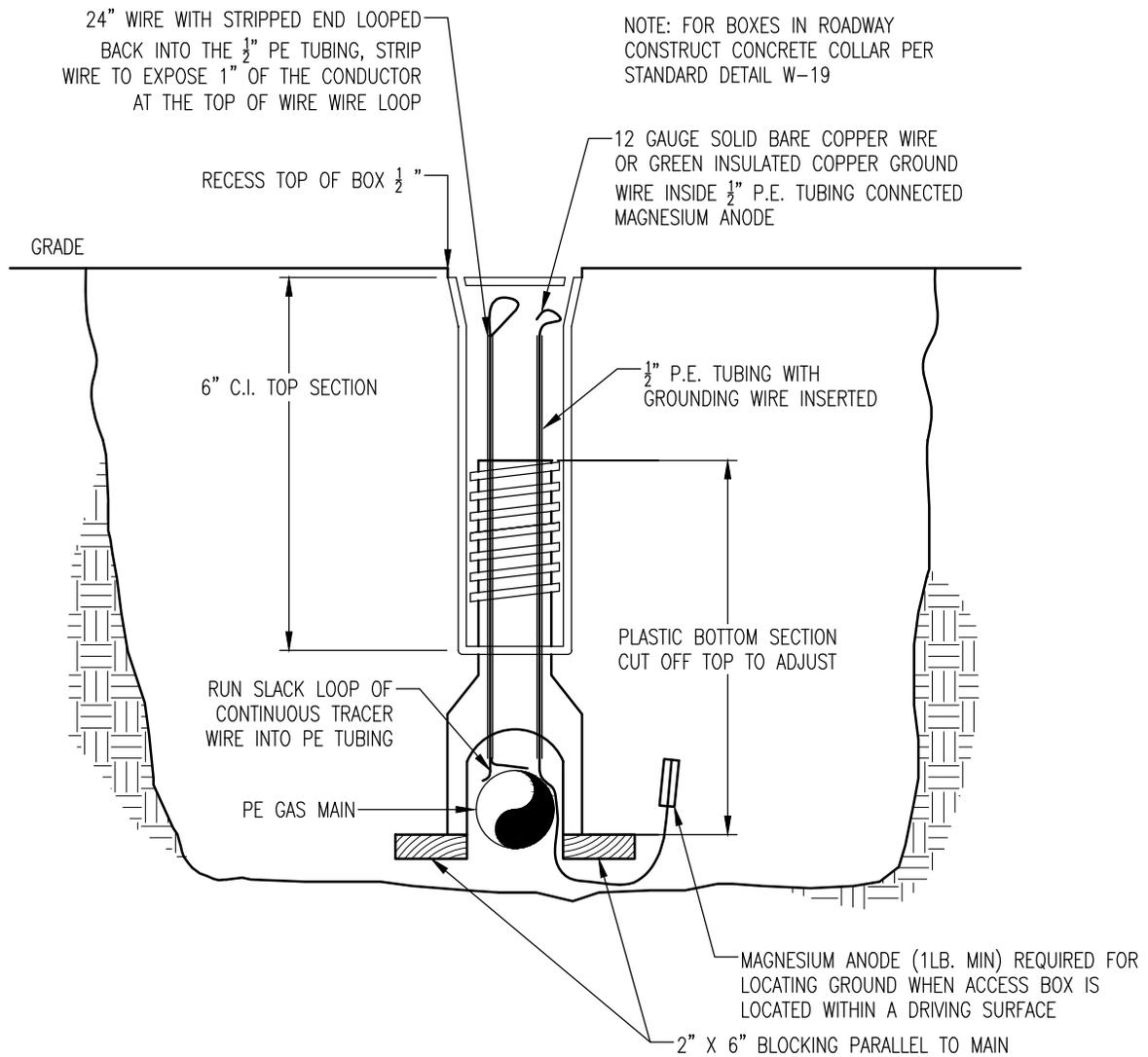
PE VALVE BOX SETTING

G-5

REVISED/APPROVED 05/01/2018

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



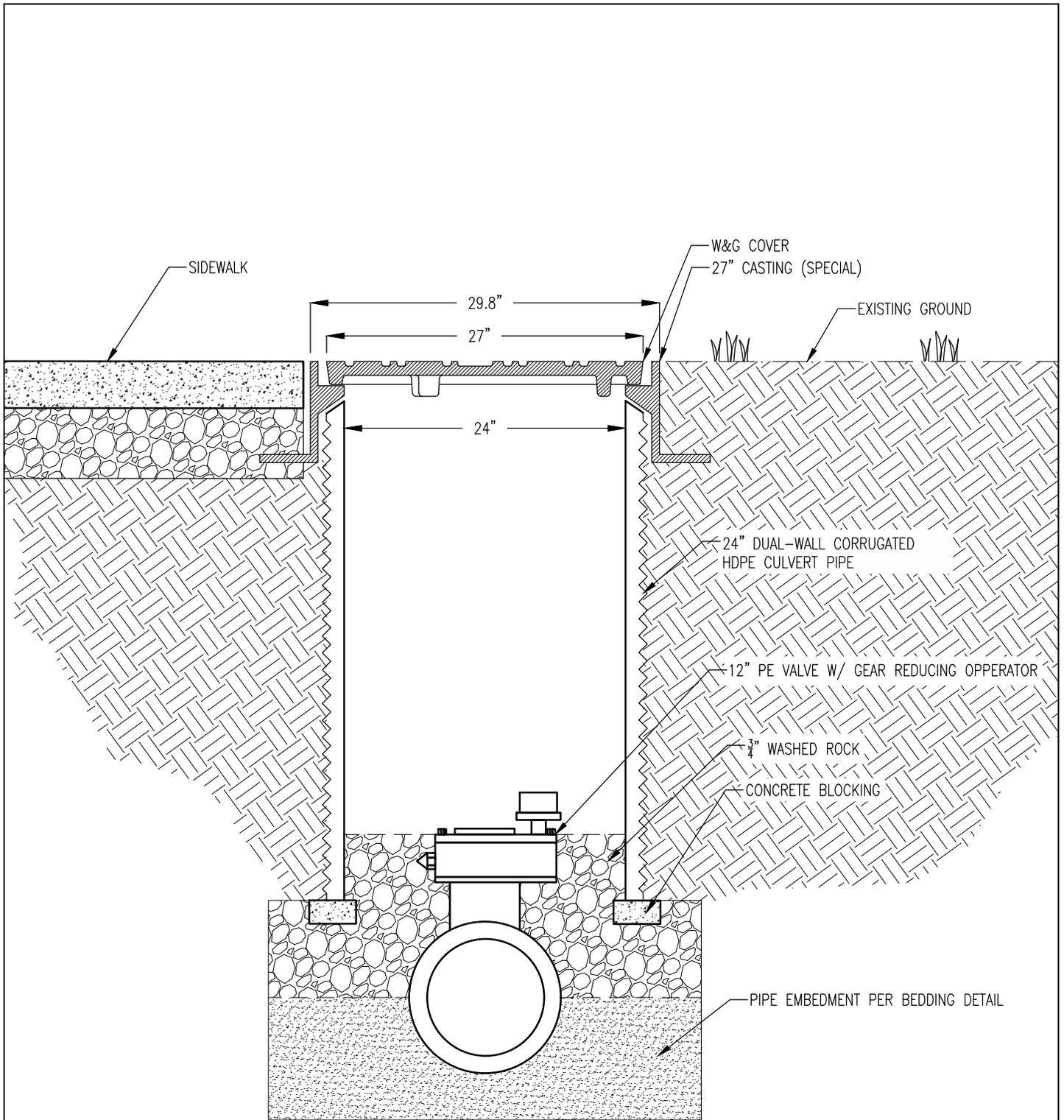
TRACER WIRE ACCESS BOX

G-6

REVISED/APPROVED 05/01/2018

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



12" POLYVALVE CUSTOM VALVE BOX
FOR TURF AND SIDEWALK APPLICATIONS

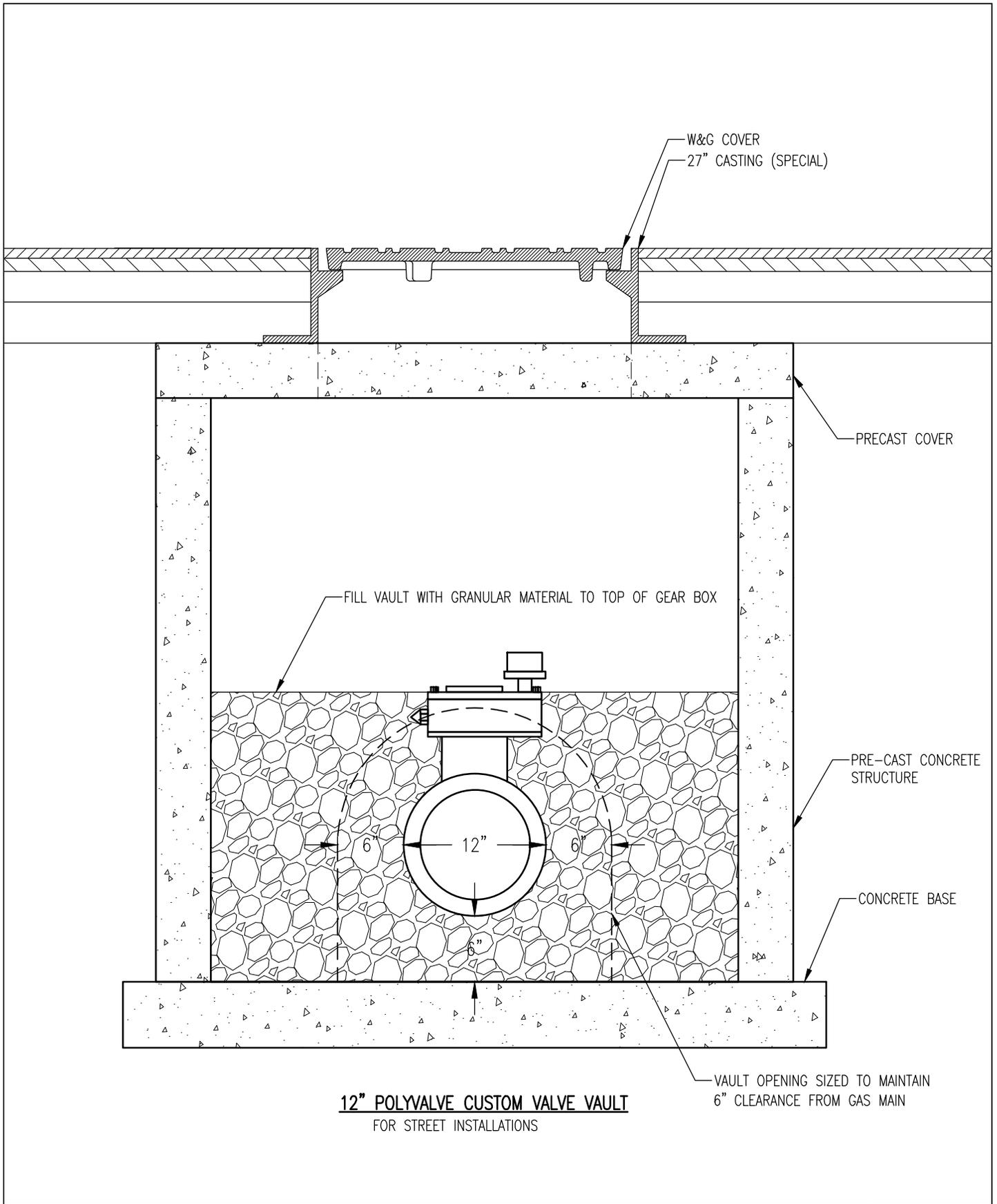
12" POLYVALVE CUSTOM VALVE BOX

G-7

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CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

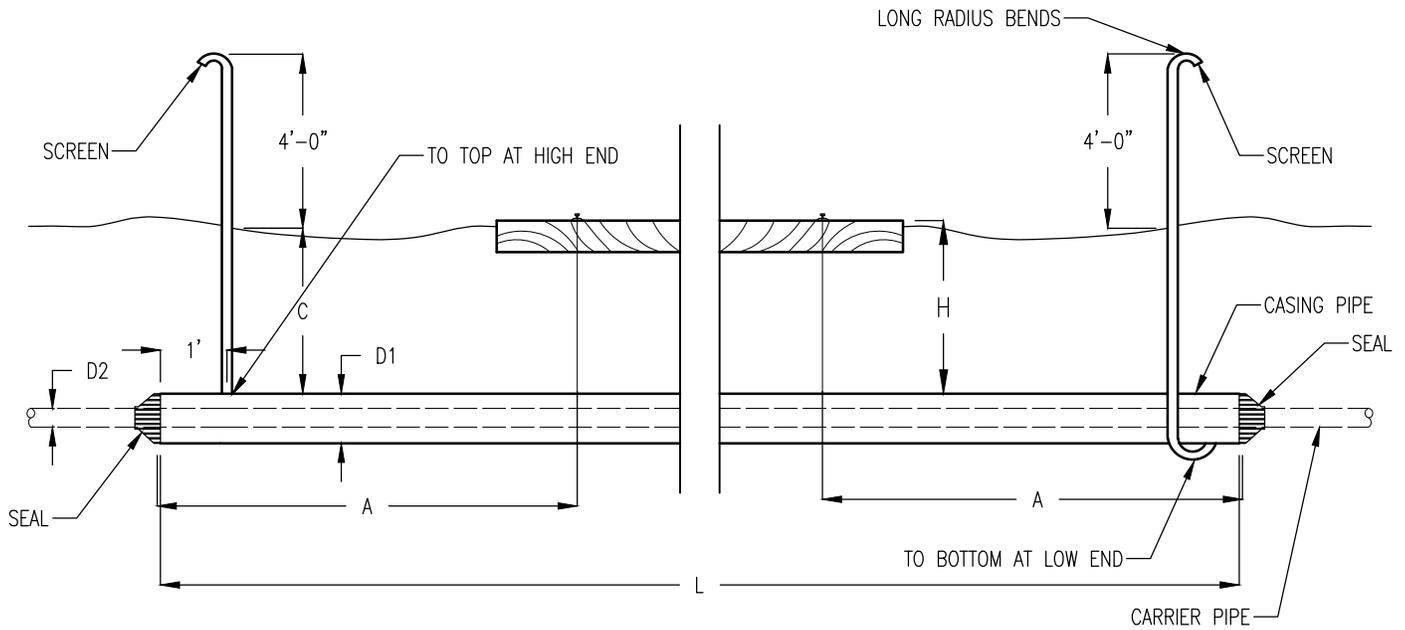
NO SCALE



12" POLYVALVE CUSTOM VALVE VAULT
FOR STREET INSTALLATIONS

VAULT OPENING SIZED TO MAINTAIN
6" CLEARANCE FROM GAS MAIN

12" POLYVALVE CUSTOM VALVE VAULT		G-7A
REVISED/APPROVED 05/01/2018	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



DIMENSIONS

A = _____ D1 (CASING DIAMETER) = _____
 L = _____ D2 (CARRIER DIAMETER) = _____
 H = _____ CASING THICKNESS = _____
 C = _____
 1/4" - 6" THRU 16"
 5/16" - 18" THRU 20"
 3/8" - 22" THRU 24"

MATERIALS

CASING = _____ CARRIER PIPE = _____
 CASING SEALS - P.S.I. MODEL "S"
 FOR PE, LINK SEAL FOR STEEL PIPE = _____ VENT PIPE - 2" WELDED
 STEEL AS DETAILED _____
 CASING INSULATORS = _____ OPERATING PRESSURE = _____

GENERAL INFORMATION

RAILROAD COMPANY = _____ CROSSING LOCATION = _____
 NUMBER OF TRACKS = _____ METHOD OF INSTALLATION = _____

HP GAS CROSSING AT RAILROAD

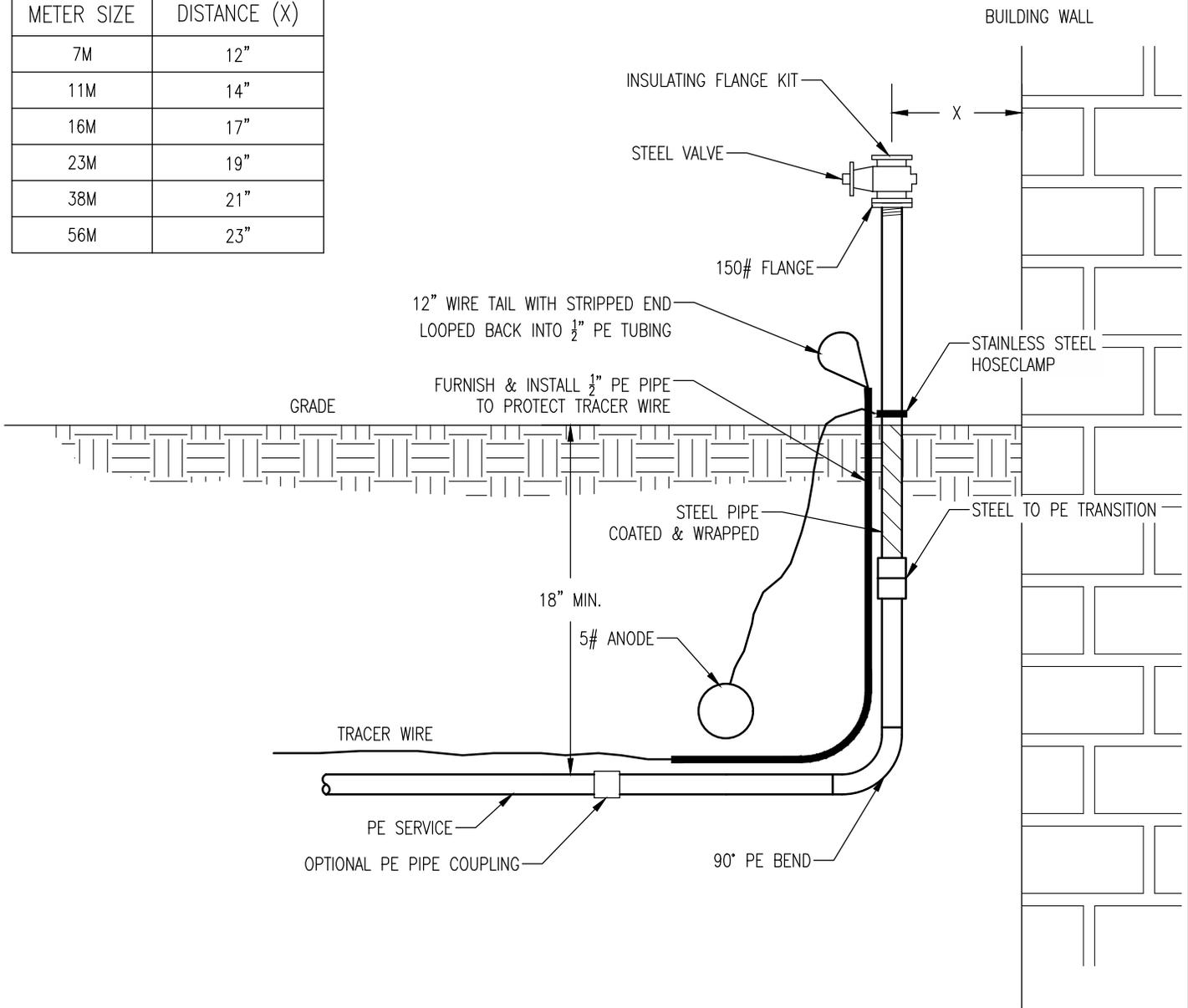
G-8

REVISED/APPROVED 25/01/2013

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

METER SIZE	DISTANCE (X)
7M	12"
11M	14"
16M	17"
23M	19"
38M	21"
56M	23"



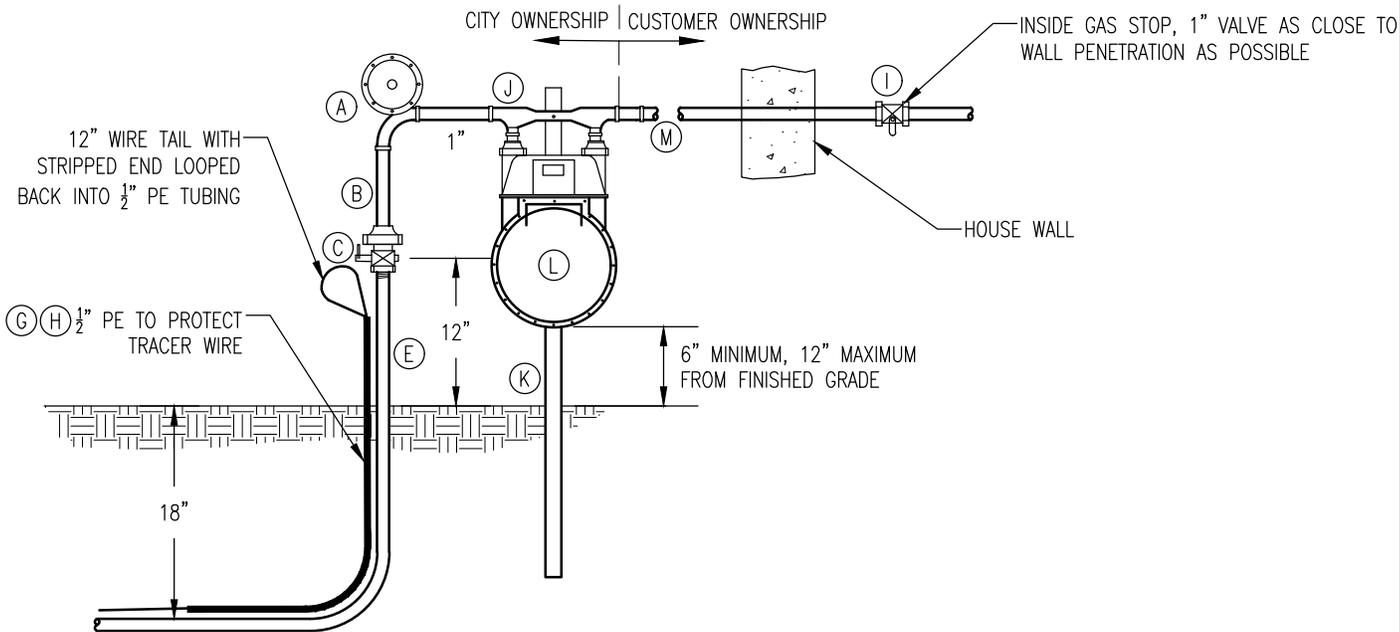
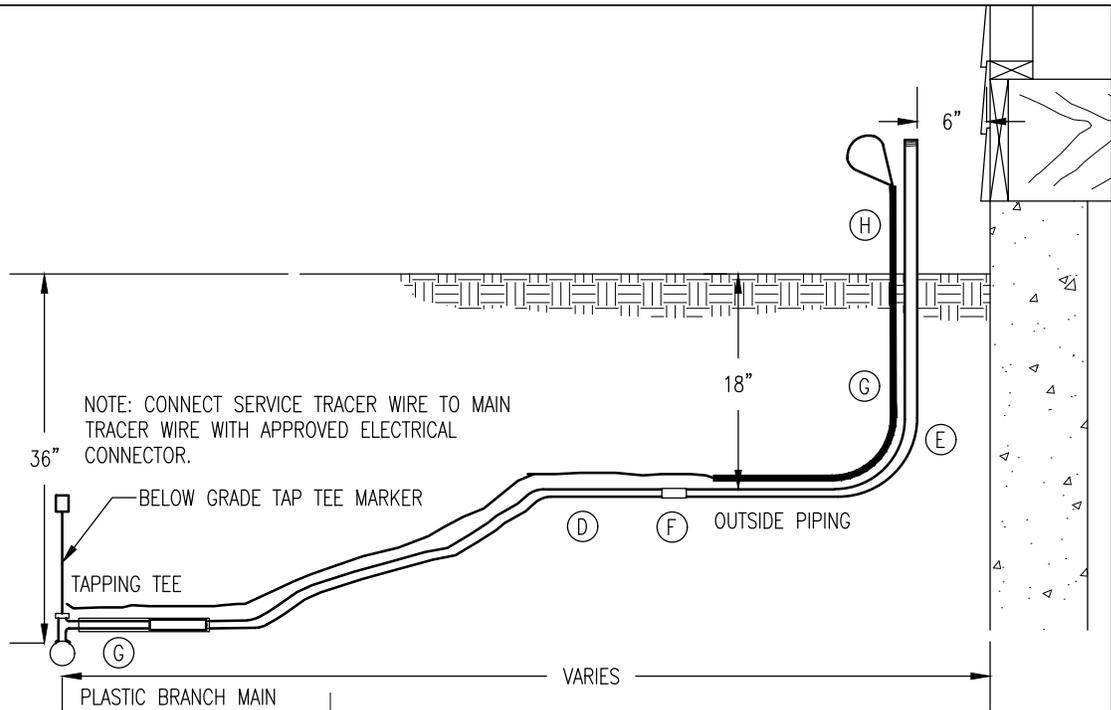
TYPICAL STEEL GAS SERVICE RISER – 3" AND LARGER

G-9

REVISED/APPROVED 05/01/2018

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- A. REGULATOR, SCHUMBERGER B-42 WITH 1/8" ORIFICE
- B. 3/4" NIPPLE
- C. 3/4" METER STOP
- D. 1/2" C.T.S. PE PIPE (5/8" O.D.)
- E. 1/2" X 3/4" ANODELESS SERVICE RISER
- F. 1/2" C.T.S. PE SOCKET COUPLING
- G. PLASTIC PROTECTIVE SLEEVE (PE PIPE)
- H. COATED TRACER WIRE
- I. 1" BRONZE BALL VALVE
- J. ROCKFORD ECLIPSE 701173 26-M WEDGESEAL METER BAR (OR EQUAL)
- K. ADVANCE ENG. CORP. D.P. 1004 METER MOUNTING BRACKET (OR EQUAL)
- L. METER
- M. 1" MINIMUM BLACK STEEL PIPE

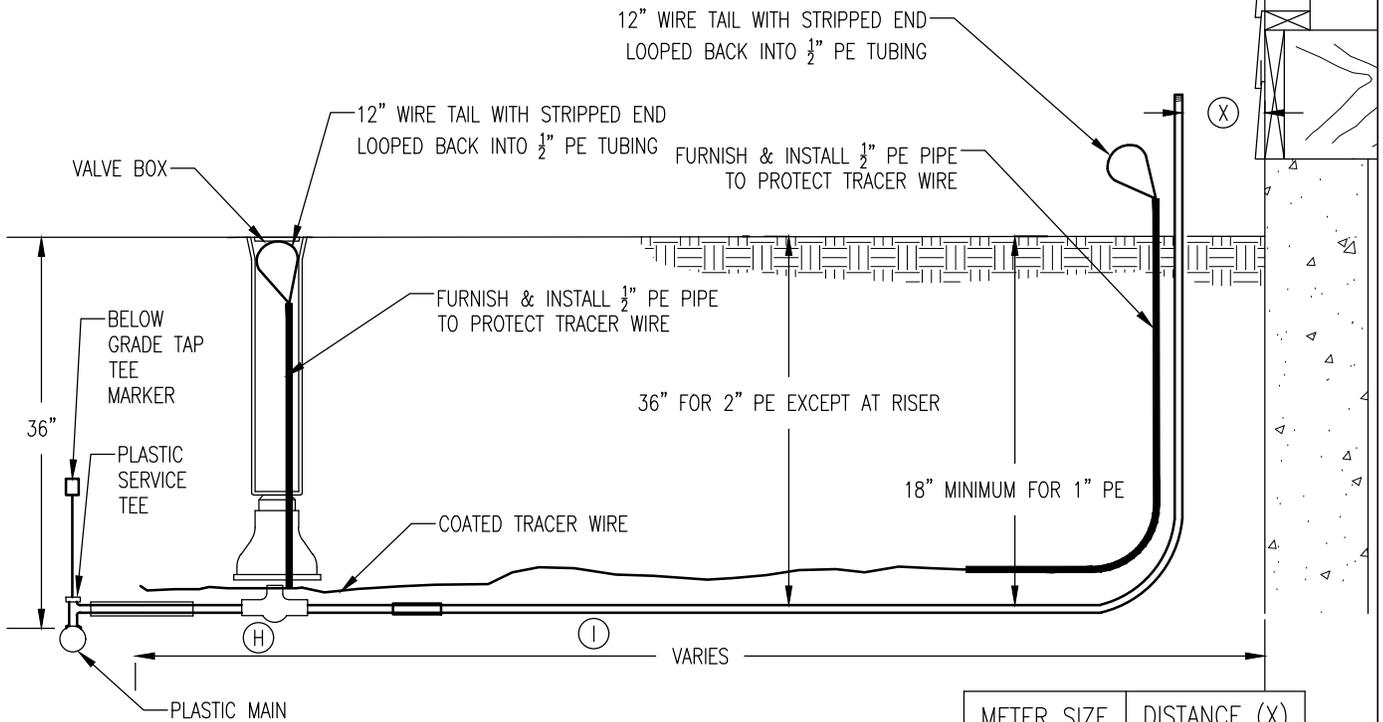
HIGH PRESSURE 1/2" GAS SERVICE INSTALLATION – RESIDENTIAL

G-10

REVISED/APPROVED 04/05/2019

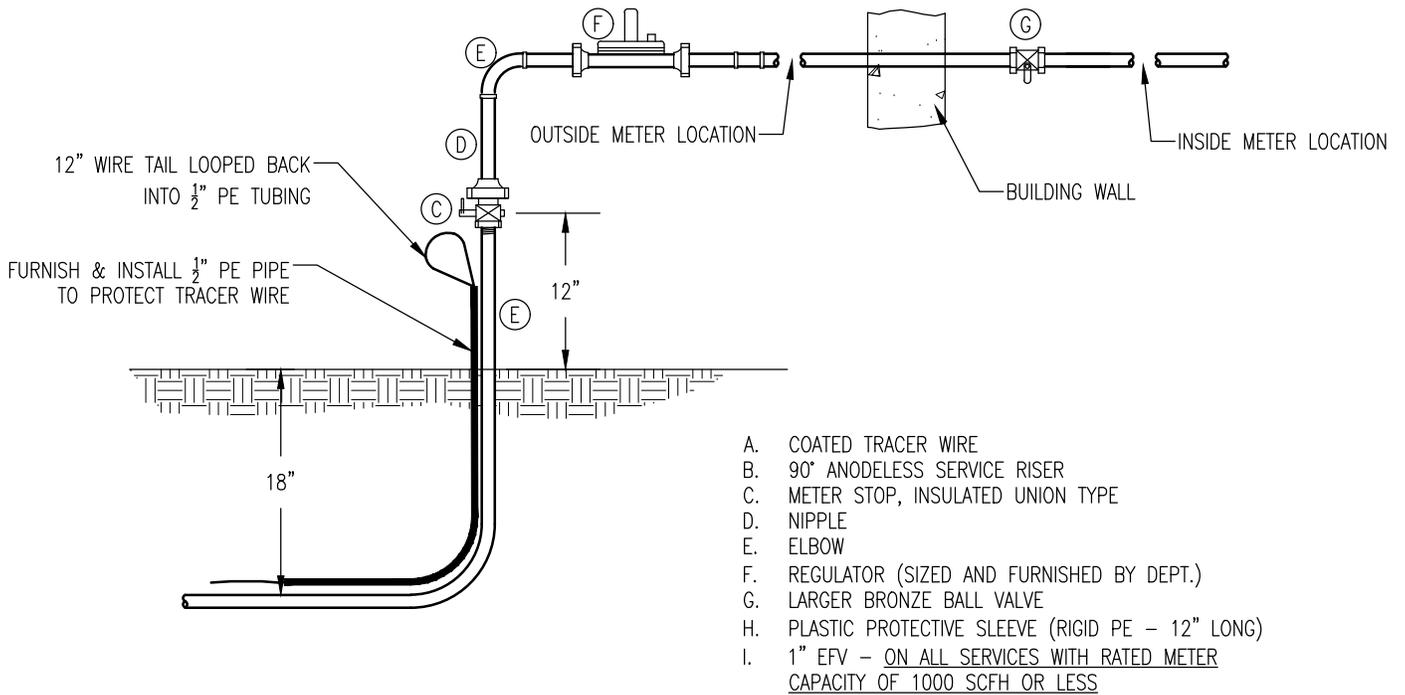
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



1. CONNECT SERVICE TRACER WIRE TO MAIN TRACER WIRE WITH ELECTRIC CONNECTOR.
2. IN MULTIPLE METER SITUATIONS, EACH METER SHALL HAVE A LOCKING VALVE WHICH ALLOWS ANY METER TO BE LOCKED OUT OF SERVICE WHILE THE OTHER REMAIN IN SERVICE.
3. TEST POINTS SHALL BE INSTALLED WITH 1-1/4" OR LARGER REGULATOR ON HIGH AND LOW SIDES USING WELD ON 1/4" COUPLING COMPLETE WITH PETE'S PLUGS.

METER SIZE	DISTANCE (X)
7M	12"
11M	14"
16M	17"
23M	19"



- A. COATED TRACER WIRE
- B. 90° ANODELESS SERVICE RISER
- C. METER STOP, INSULATED UNION TYPE
- D. NIPPLE
- E. ELBOW
- F. REGULATOR (SIZED AND FURNISHED BY DEPT.)
- G. LARGER BRONZE BALL VALVE
- H. PLASTIC PROTECTIVE SLEEVE (RIGID PE - 12" LONG)
- I. 1" EFV - ON ALL SERVICES WITH RATED METER CAPACITY OF 1000 SCFH OR LESS

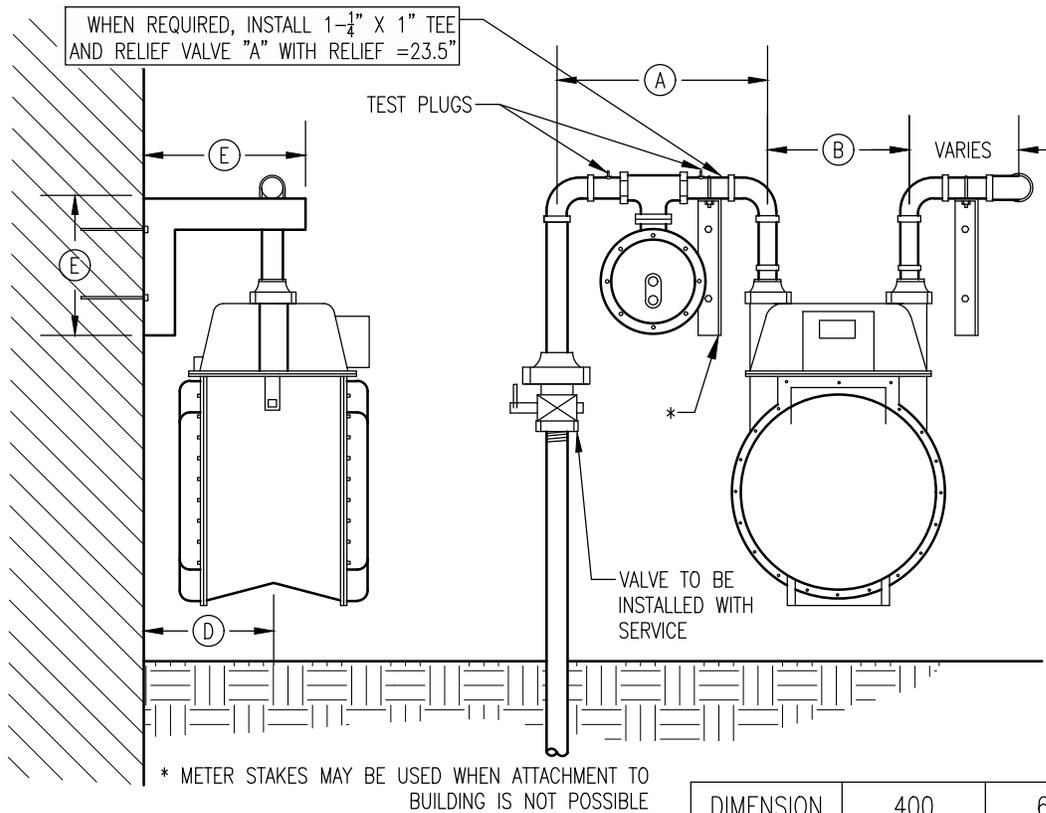
HIGH PRESSURE GAS SERVICE INSTALLATION - 1" CTS & 2" IPS SERVICES

G-11

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE:

1. EXTEND VENT ONLY WHEN NECESSARY, SEE O & M SECTION 30. DEPT. TO FURNISH: REGULATOR, TEST "PETE'S PLUG" - 2 EACH WITH 1-1/4" NIPPLES, METER WITH SWIVELS AND NUTS, AND ANGLE BRACKETS.
2. SECONDARY RELIEF DEVICE MAY BE REQUIRED.

DIMENSION	400	675	1000
A	17-9/16"	17-11/16"	17-15/16"
B	7"	10"	11"
C	27"	32"	36"
D	9"	9"	9"
E	11"	11"	11"

CUSTOMER LOAD (CFH)	397 TO 600		600 TO 900		900 TO 1428	
METER SIZE	400		675		1000	
METER CONNECTION	1-1/2"		1-1/2"		2"	
PRESSURE LOSS (WC)	1/2" @ 397 CFH		1/2" @ 397 CFH		1/2" @ 397 CFH	
	1" @ 595 CFH		1" @ 918 CFH		1" @ 1428 CFH	
REGULATOR TYPE	ITRON B42R		ITRON B42R		ITRON B42R	
SYSTEM PRESSURE	22#-10#	66#-30#	22#-10#	66#-30#	22#-10#	66#-30#
ORIFICE	1/8"	1/8"	3/16"	1/8"	3/16"	3/16" ²
CAP @ PIN MAX.	600	1560	1560	1560	2240	2500
CAP @ PIN MIN.	400	765	870	765	1470	2025
VENT MAX. LENGTH ¹	130'	20'	18'	20'	0'-3/4", 30'-1"	0'-3/4", 8'-1"
CAPACITY DATA IS FOR SANDARD 7" (WC) DELIVERY PRESSURE						

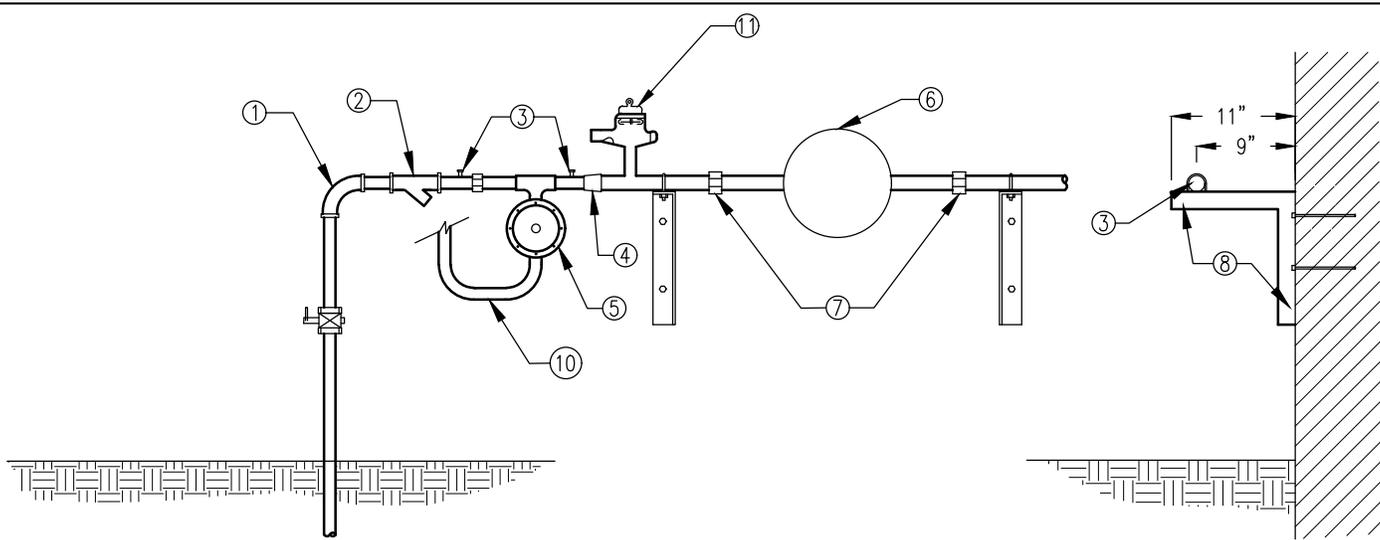
METER INSTALLATION DETAIL - SIZES 400, 675, & 1000

G-11A

REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

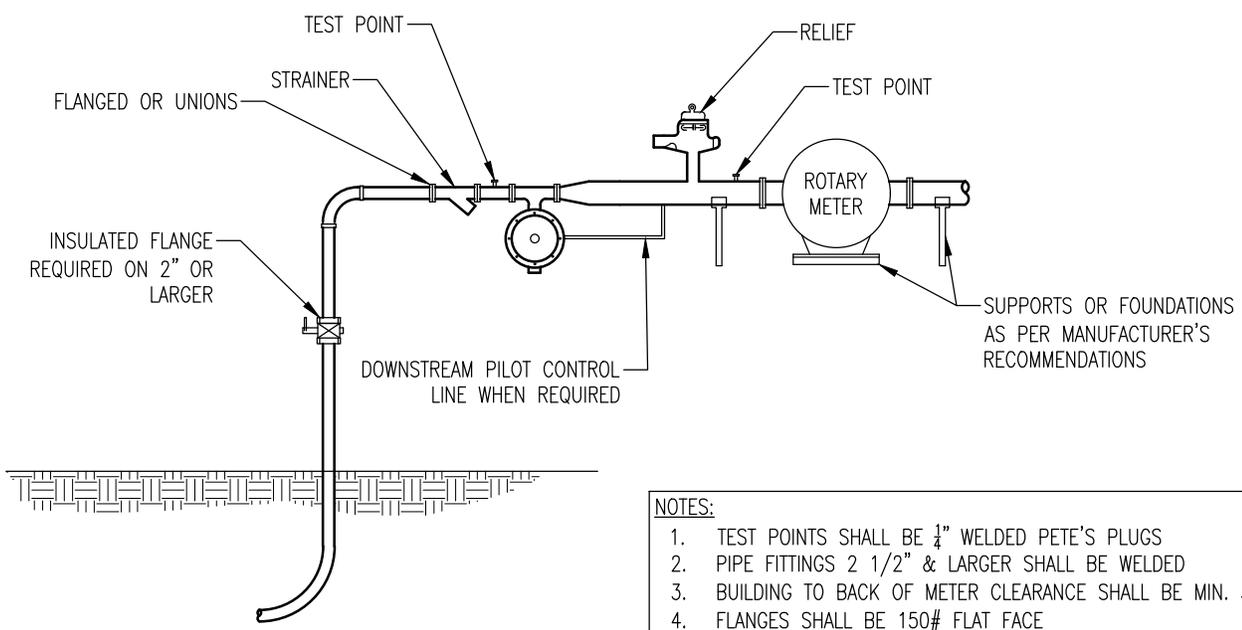


1. 1-1/4" x 1" REDUCING EL
2. 1-1/4" STRAINER W/BLOWDOWN
3. 1/4" WELD ON COUPLING & PETE'S PLUGS
4. 1-1/2" x 1-1/4" REDUCER
5. B42R OR S202
6. 1.5M125 ROOTS METER
7. 1-1/2" UNIONS
8. 1-1/2" WELDED ANGLE
9. 1-1/2" x 1/4" U-CLAMPS
10. VENT W/RAIN CAP WHERE REQUIRED
11. RELIEF (IF NECESSARY)

REGULATOR CAPACITY (CFH)					
P OUT	7" WC			2 PSI*	
ORIFICE	1/8"	3/16"	1/4"	3/16"	1/4"
P IN					
55	1300	-	-	850	1450
35	860	2280	-	1560	1100
15	-	1080	1640	-	-
10	-	-	1470	-	-

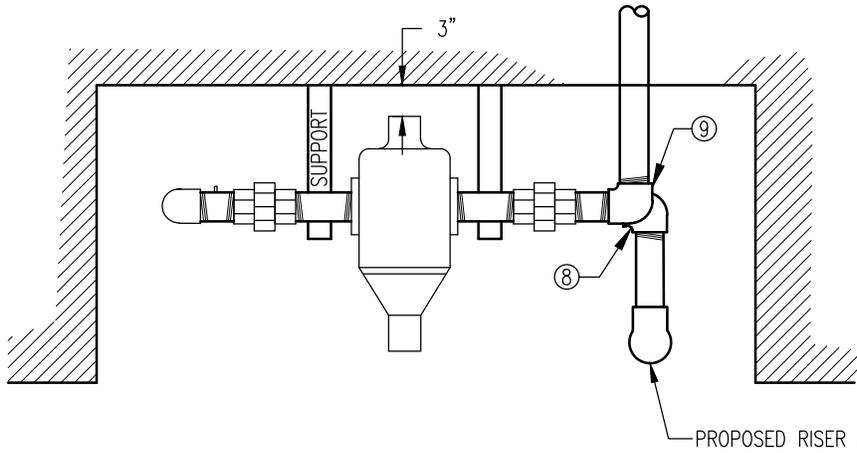
*METER PRESSURE 1.83 PSI @ MAX. FLOW

1.5M125 ROOTS METER & REGULATOR DETAIL



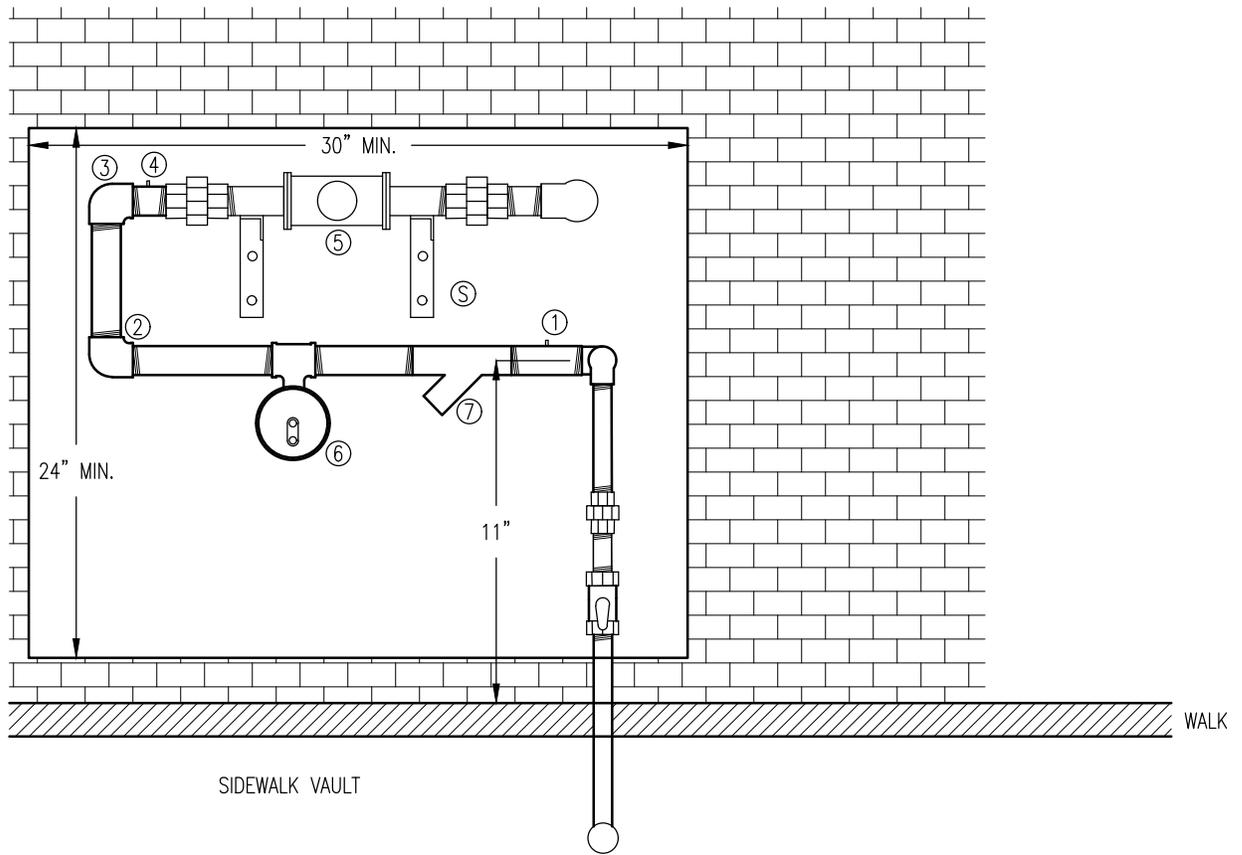
- NOTES:**
1. TEST POINTS SHALL BE 1/4" WELDED PETE'S PLUGS
 2. PIPE FITTINGS 2 1/2" & LARGER SHALL BE WELDED
 3. BUILDING TO BACK OF METER CLEARANCE SHALL BE MIN. 3"
 4. FLANGES SHALL BE 150# FLAT FACE

**TYPICAL DETAIL
3M125 ROOTS METER & LARGER**



- MATERIALS LIST**
1. 1-1/4" x 3" NIPPLE W/ TEST PLUG
 2. 1-1/4" x 1/1/2" RED. EL.
 3. 1-1/2" EL.
 4. 1-1/2" x 3" NIPPLE W/ TEST PLUG
 5. 15C ROOTS METER
 6. B-31-R WITH 3/16" ORF. REG.
 7. 1-1/4" STRAINER
 8. 3/4" x 1-1/4" RED. EL.
 9. 1-1/2" EL.
 - S. ANGLE IRON SUPPORTS

TOP VIEW



FRONT VIEW

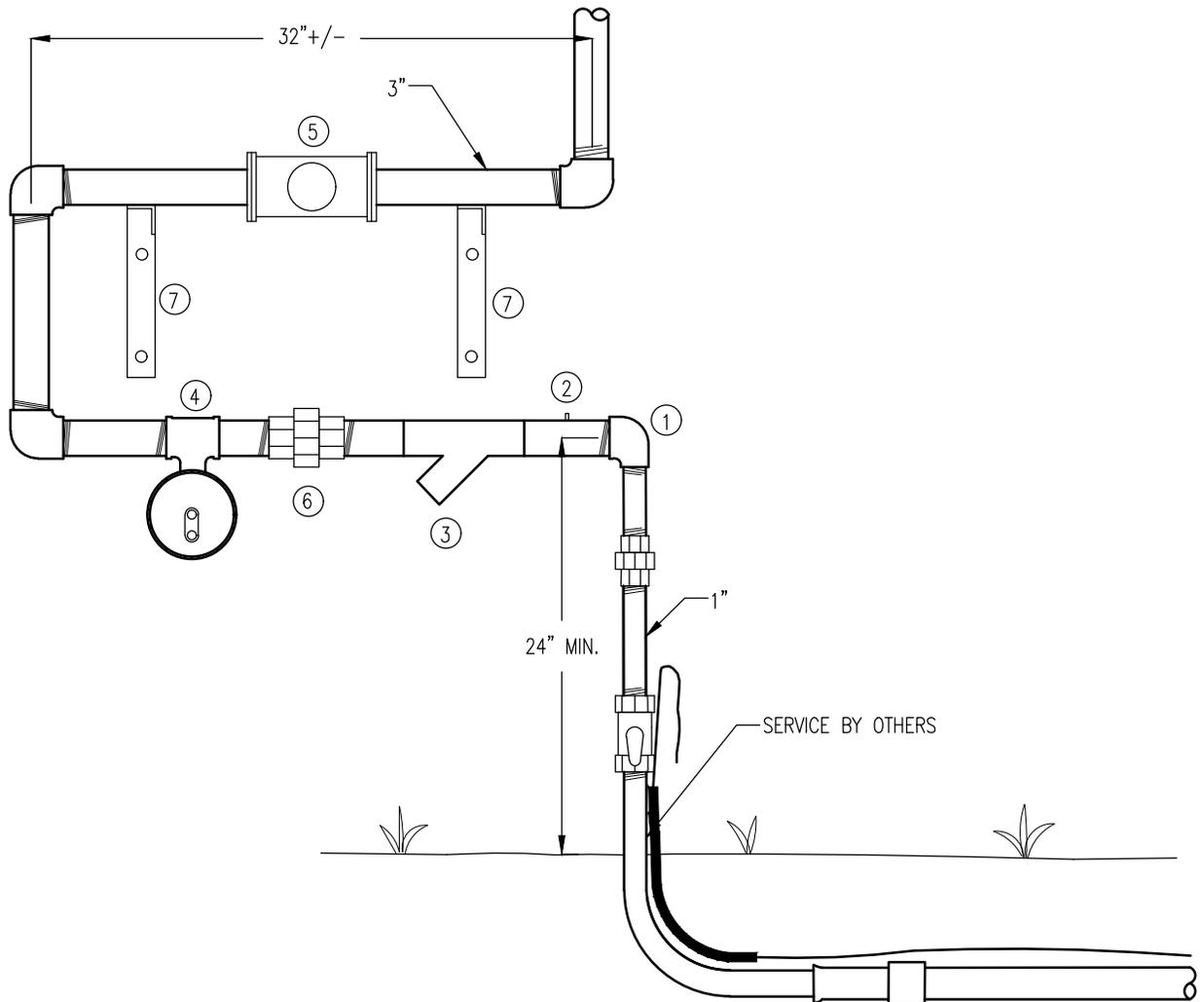
15C ROOTS COMPACT METER INSTALLATION

G-12A

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



MATERIALS LIST

1. 1" x 2" STREET EL
 2. TEST POINTS (D)
 3. 2" STRAINER (D)
 4. FISHER S202 - 2" - W/ 3/8" ORIFICE REGULATOR (D)
 5. 5M ROOTS METER - 3" FLANGE CONNECTION (D)
 6. 2" UNION
 7. ANGLE IRON BRACKETS (D)
- (D) INDICATES TO BE FURNISHED BY DEPARTMENT

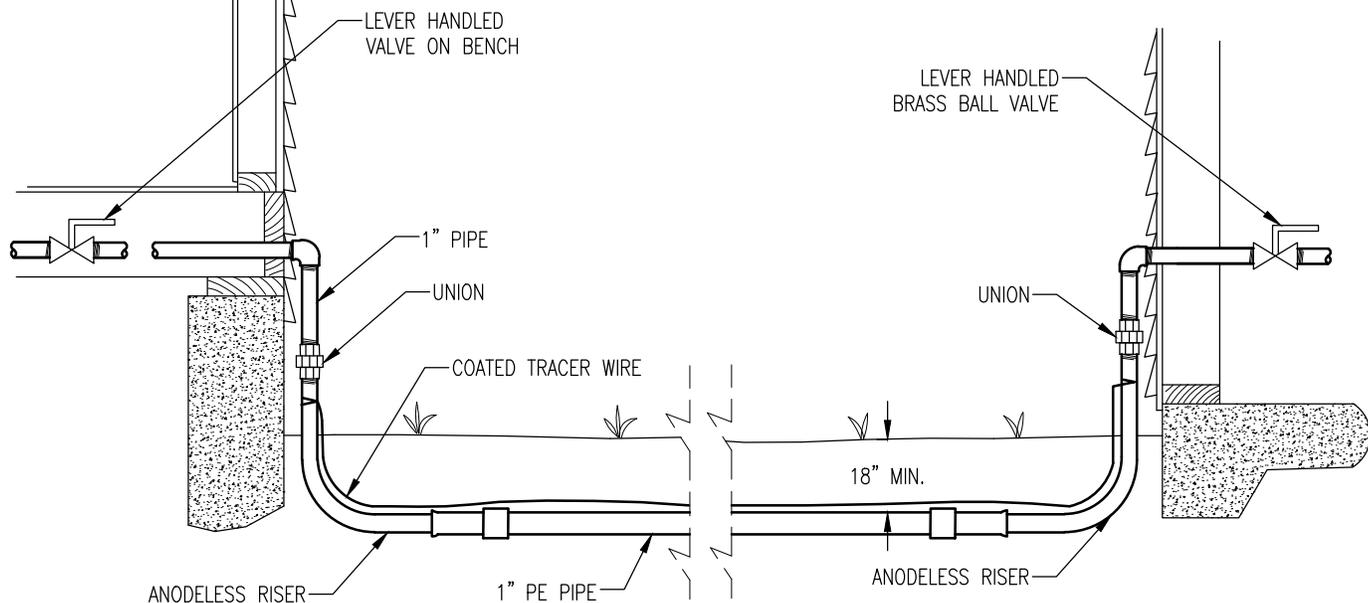
5M ROOTS COMPACT METER INSTALLATION

G-12B

REVISED/APPROVED 02/01/2013

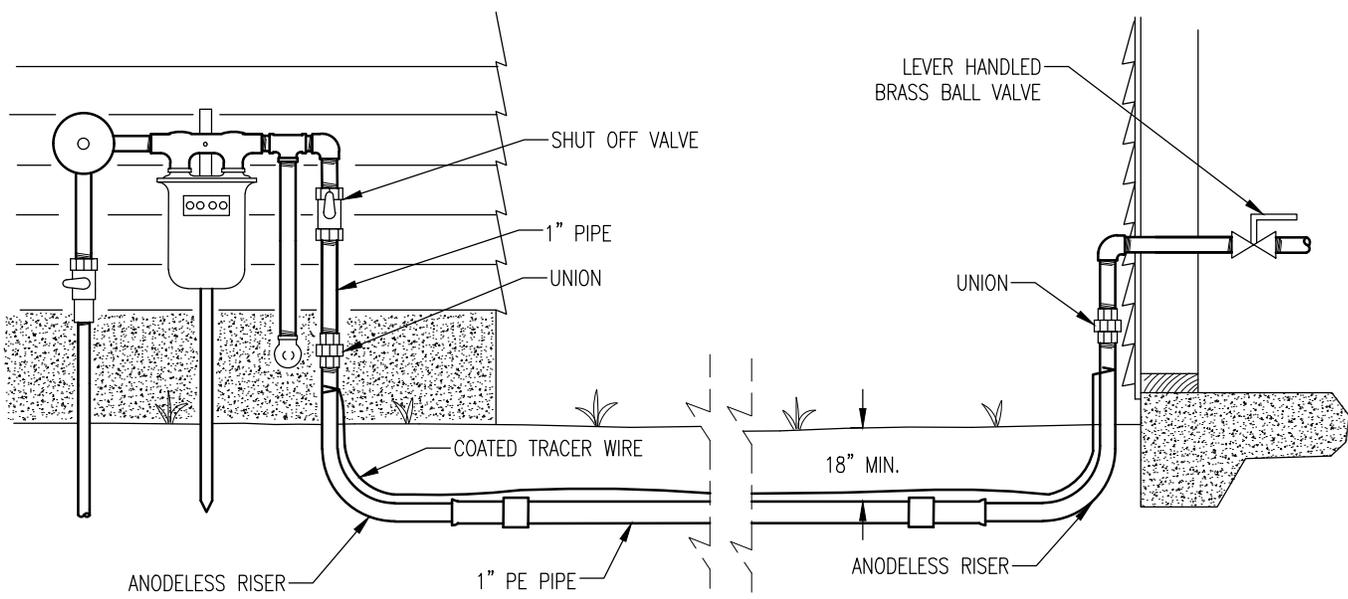
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



CAPACITY 250 CFH MAX.

STANDARD TYPICAL GAS FUEL LINE TO OUT BUILDING



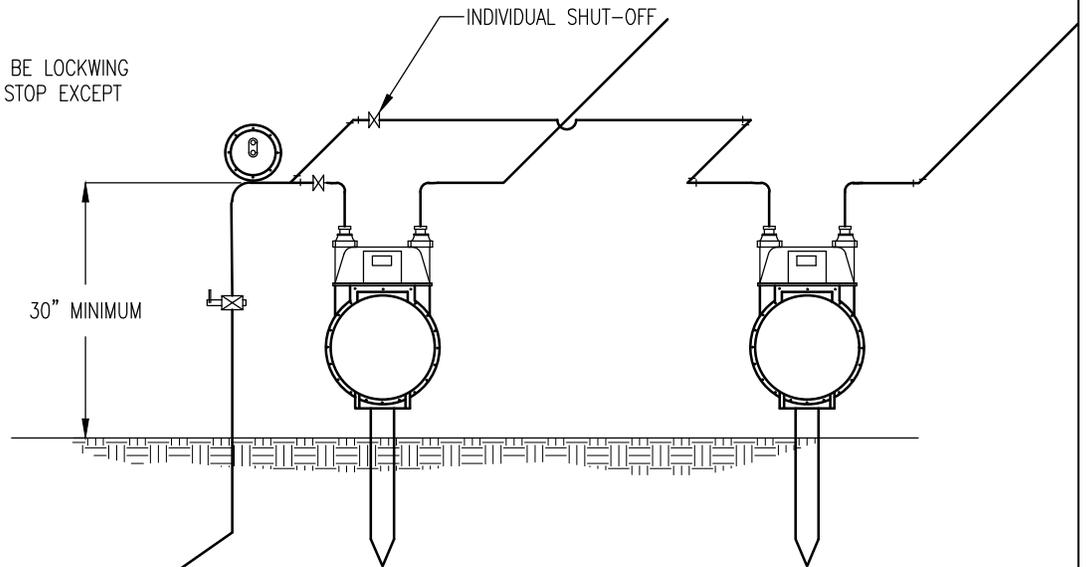
CAPACITY 250 CFH MAX.

STANDARD NON-TYPICAL GAS FUEL LINE TO OUT BUILDING

UNDERGROUND GAS FUEL LINE PIPING – PAST METER		G-13
REVISED/APPROVED 07/06/2016	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE

SEE SPEC. SECTION 22.03
FOR INSIDE SHUTOFF REQUIRED

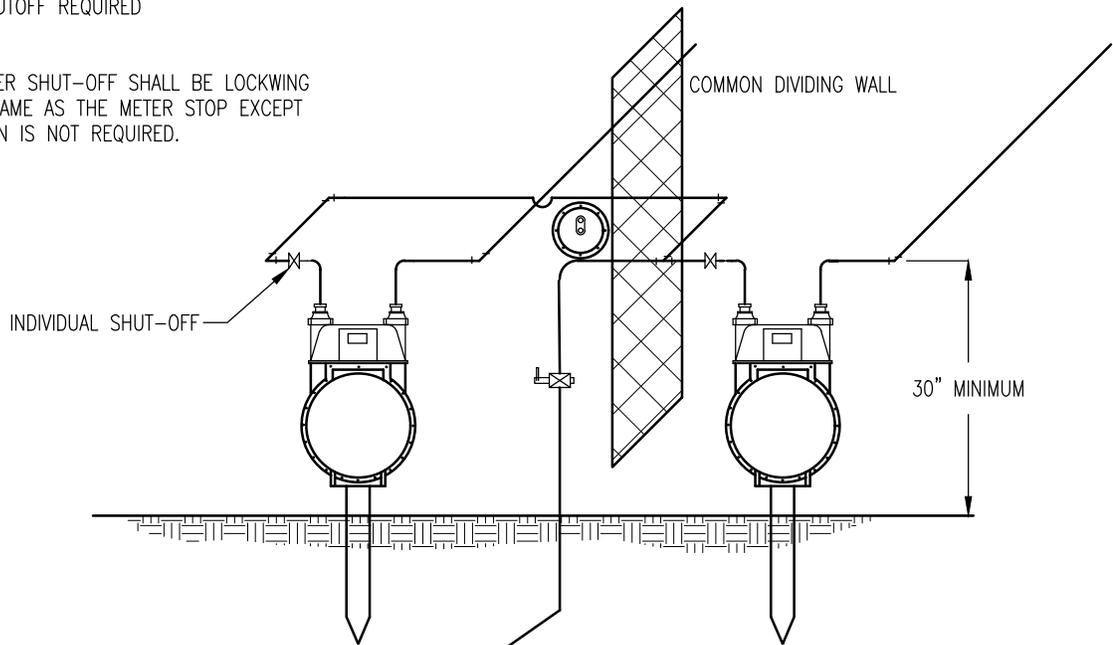
NOTE:
INDIVIDUAL METER SHUT-OFF SHALL BE LOCKWING
STYLE VALVE, SAME AS THE METER STOP EXCEPT
ISOLATING UNION IS NOT REQUIRED.



TYPICAL DUPLEX

SEE SPEC. SECTION 22.03
FOR INSIDE SHUTOFF REQUIRED

NOTE:
INDIVIDUAL METER SHUT-OFF SHALL BE LOCKWING
STYLE VALVE, SAME AS THE METER STOP EXCEPT
ISOLATING UNION IS NOT REQUIRED.



SIDE-BY-SIDE DUPLEX

(IF METERS CAN BE AT DIVIDING WALL)

DUPLEX METER CONNECTION

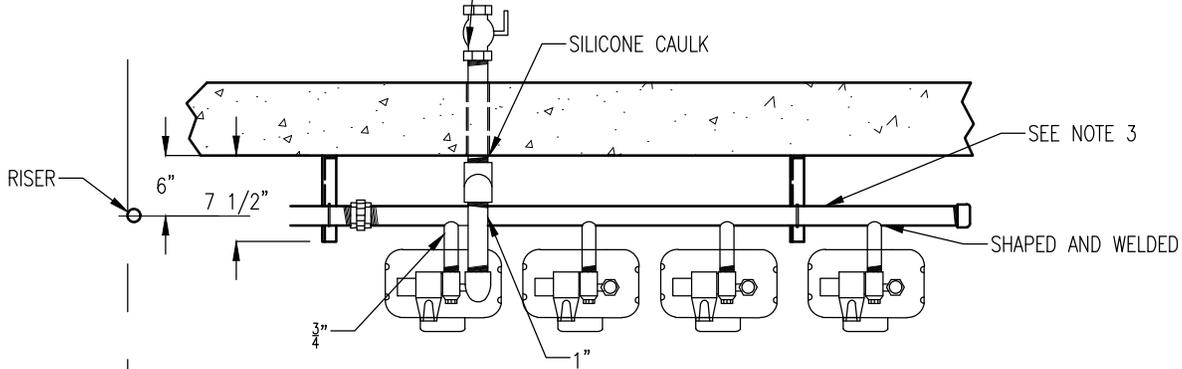
G-14

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

VALVE REQUIRED WHEN SERVING ADJACENT UNIT ONLY. UNITS WHICH ARE REMOTE FROM METER WILL HAVE VALVE CUT IN AT THE UNIT SERVED.

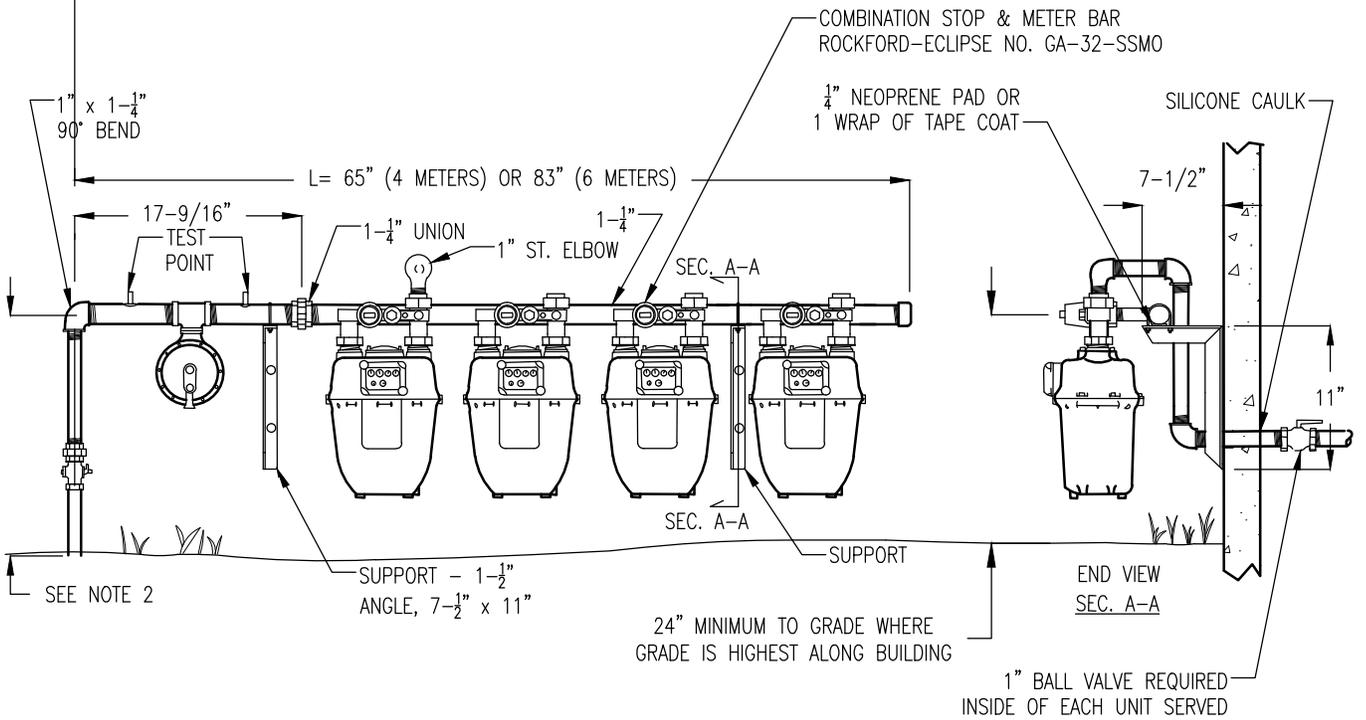


NOTES:

1. 6 METER SET REQUIRES 4 ANGLE SUPPORTS.
2. HEIGHT IS DETERMINED BY ANY METER NOT BEING CLOSER THAN 6" OFF GRADE. MANIFOLD SHALL BE HORIZONTAL.
3. 1-1/4" MANIFOLD BY DEPARTMENT OR MANUFACTURER.
4. DEPARTMENT TO ATTACH BRASS TAG WITH NUMBER OF UNITS SERVICED TO EACH METER BAR.

TOP VIEW

3 OR MORE RESIDENTIAL METERS



FRONT VIEW

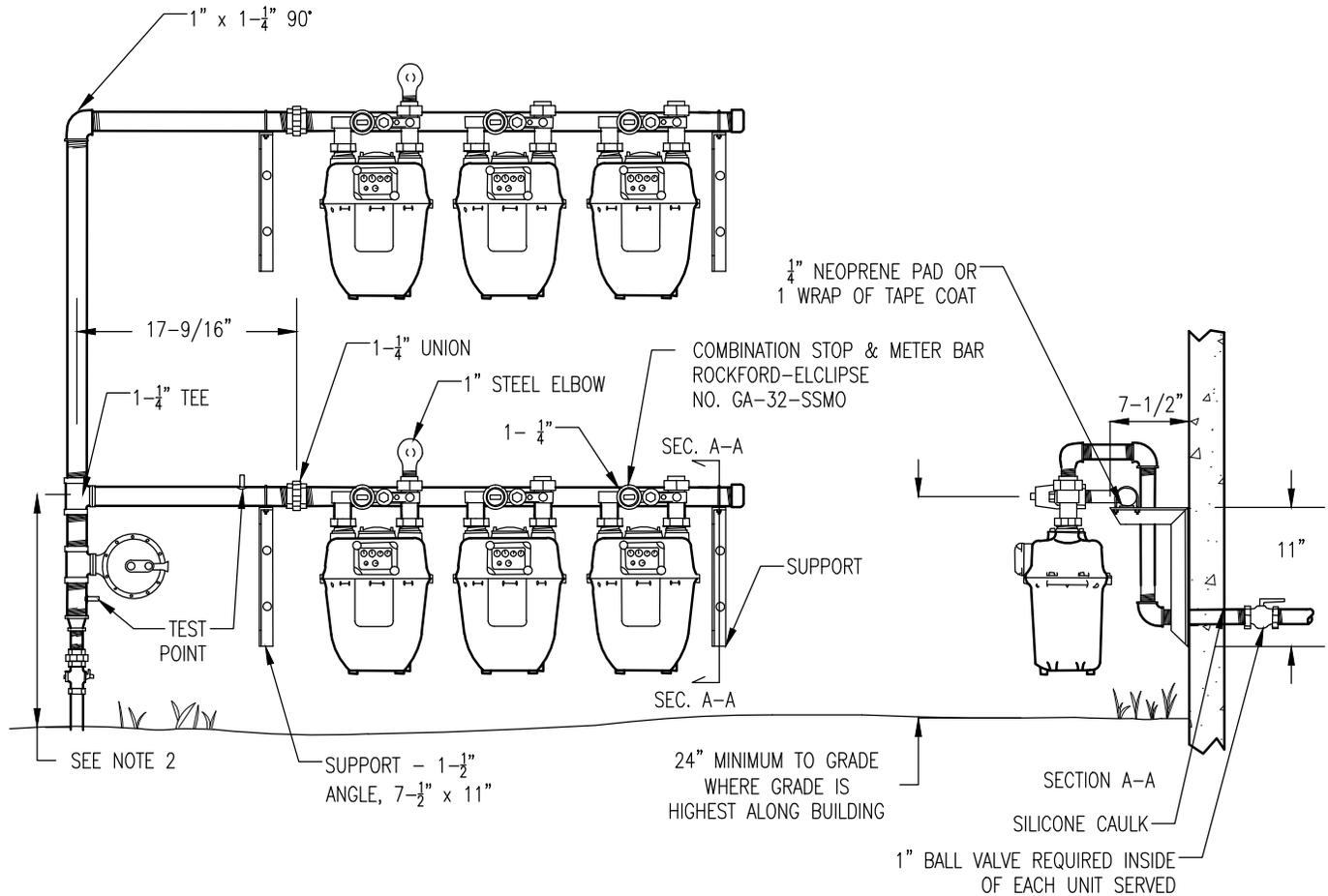
TYPICAL MULTI-METER INSTALLATION

G-14A

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



FRONT VIEW

END VIEW

NOTES

1. 6 METER SET REQUIRES 4 ANGLE SUPPORTS
2. HEIGHT IS DETERMINED BY ANY METER NOT BEING CLOSER THAN 6" OFF GRADE. MANIFOLD SHALL BE HORIZONTAL.
3. 1- $\frac{1}{4}$ " MANIFOLD BY DEPARTMENT OR MANUFACTURER.
4. DEPARTMENT TO ATTACH BRASS TAG W/NUMBER OF UNIT SERVICED TO EACH METER BAR.

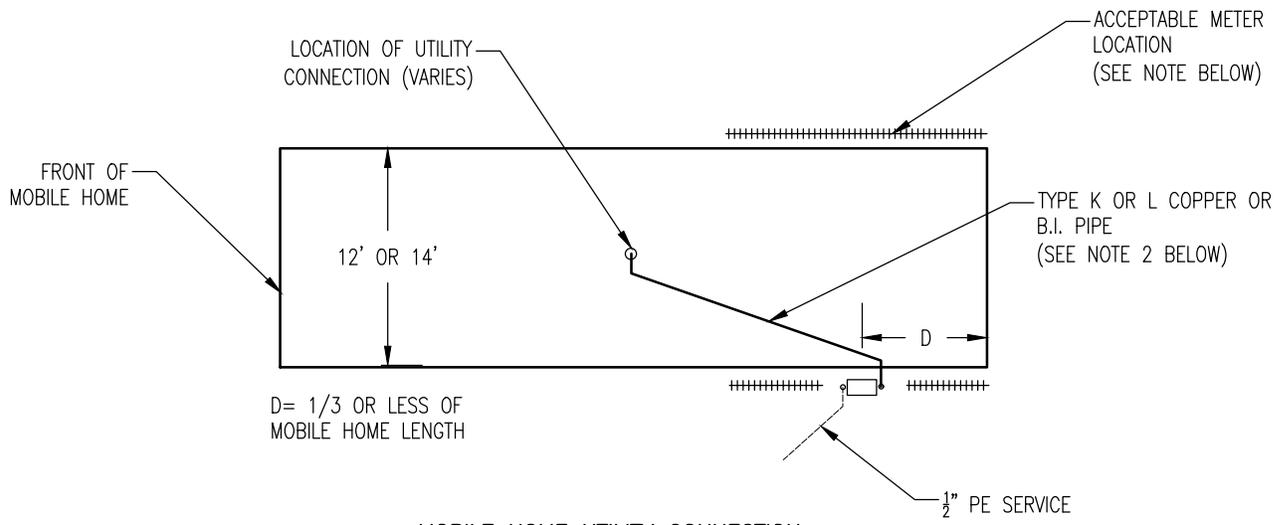
TYPICAL MULTI-METER INSTALLATION - 6 RESIDENTIAL METERS

G-14B

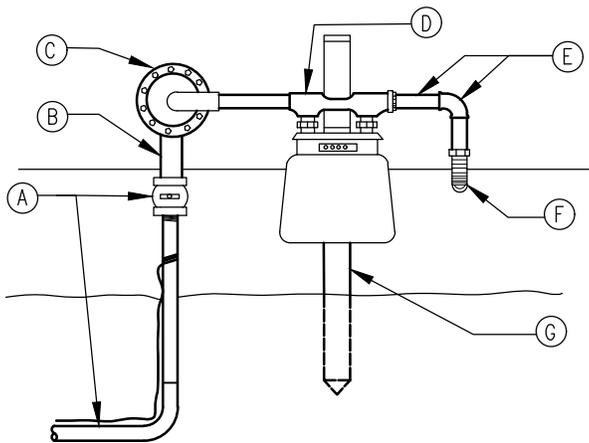
REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

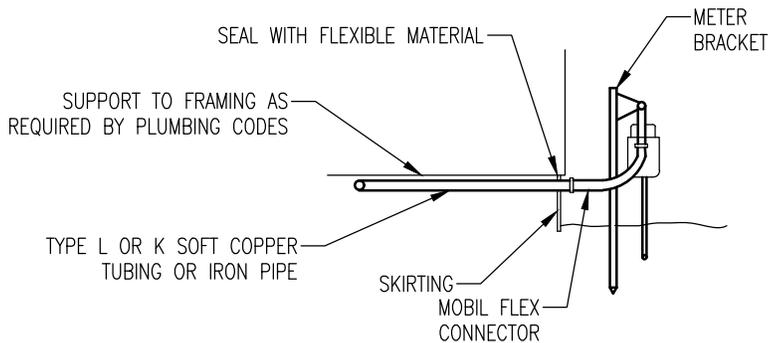
NO SCALE



MOBILE HOME UTILITY CONNECTION



METER SET – FRONT VIEW N.T.S.



MOBILE HOME ENTRANCE – SIDE VIEW N.T.S.

- A. RISER & METER STOP (TO BE INSTALLED BY OTHERS)
- B. 3/4" NIPPLE
- C. REGULATOR – 252 (TO BE FURNISHED BY DEPARTMENT)
- D. METER BAR (TO BE FURNISHED BY DEPARTMENT)
- E. 1" NIPPLE W/ 1" X 3/4" REDUCING ELBOW
- F. MOBILE FLEX CONNECTOR
- G. METER BRACKET (TO BE FURNISHED BY DEPARTMENT)

SPECIFICATIONS:

1. METER LOCATION SHALL BE ALONG THE SIDE AND WITHIN THE REAR 1/3 OF THE TRAILER.
2. ALL HEATING ACCOUNTS TO HAVE NOT LESS THAN 3/4" COPPER LINE WITH FLARED FITTINGS OR 3/4" B.I. PIPE THREADED FROM METER TO POINT WHERE EXISTING LINE ENTERS FLOOR FROM UNDERNEATH. NON-HEATING ACCOUNTS TO HAVE NOT LESS THAN 5/8" COPPER OR 1/2" B.I. PIPE BETWEEN ABOVE MENTIONED POINTS.
3. ANY EXISTING PIPING WHICH MEETS THE ABOVE REQUIREMENTS MAY BE UTILIZED IN MAKING THE CONNECTION.
4. EXISTING AND NEW PIPING DOWNSTREAM FROM FLEXIBLE CONNECTOR SHALL BE PRESSURE TESTED AT 10 PSI BEFORE SETTING METER.

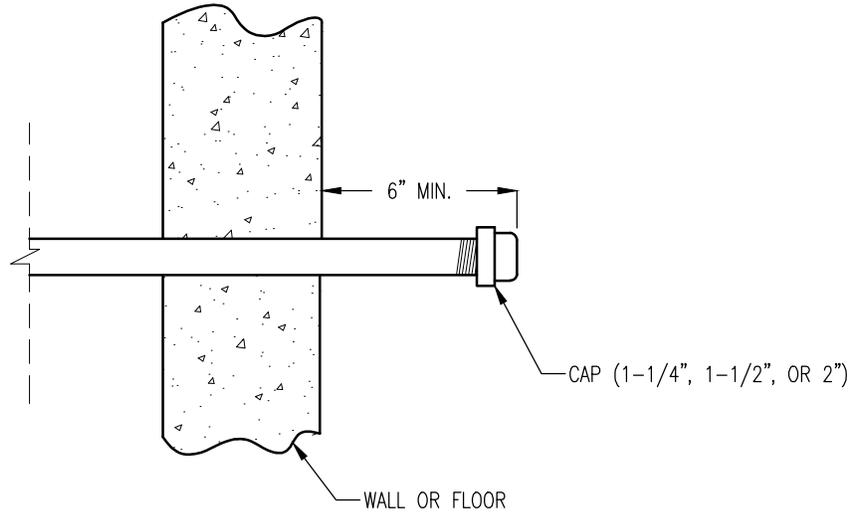
MOBILE HOME GAS METER CONNECTION

G-15

REVISED/APPROVED 02/01/2013

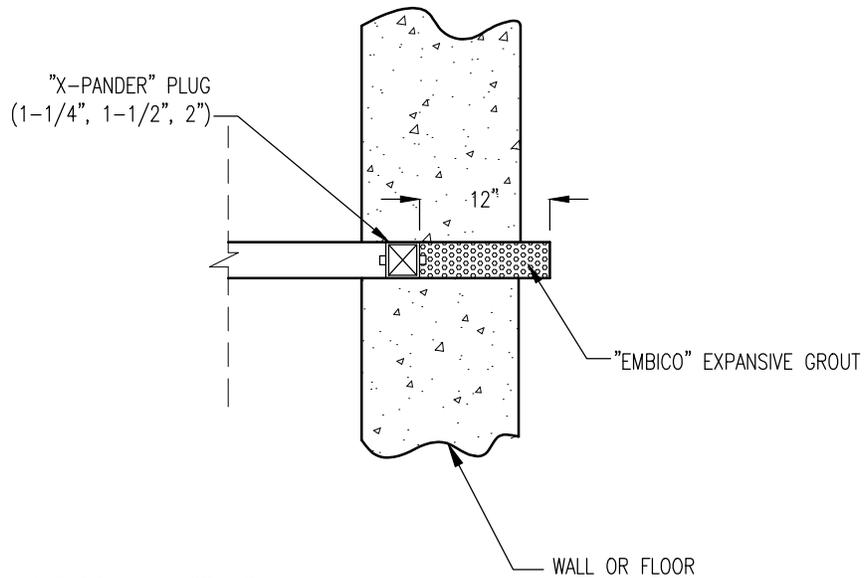
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE: CAP TO BE INSTALLED AT LAST EXISTING
 THREAD NEAREST WALL OR FLOOR EXCEPT WHEN
 REQUESTED SHORTER BY OWNER.

STANDARD METHOD



NOTES:

1. DEPARTMENT WILL CUT PIPE OFF CLOSE AS POSSIBLE AND INSTALL EXPANDING RUBBER PLUG AND EXPANSIVE GROUT ONLY UPON SPECIFIC REQUEST BY OWNER. (DEPT POLICY)
2. STREET MAIN MUST BE INACTIVE

SPECIAL METHOD

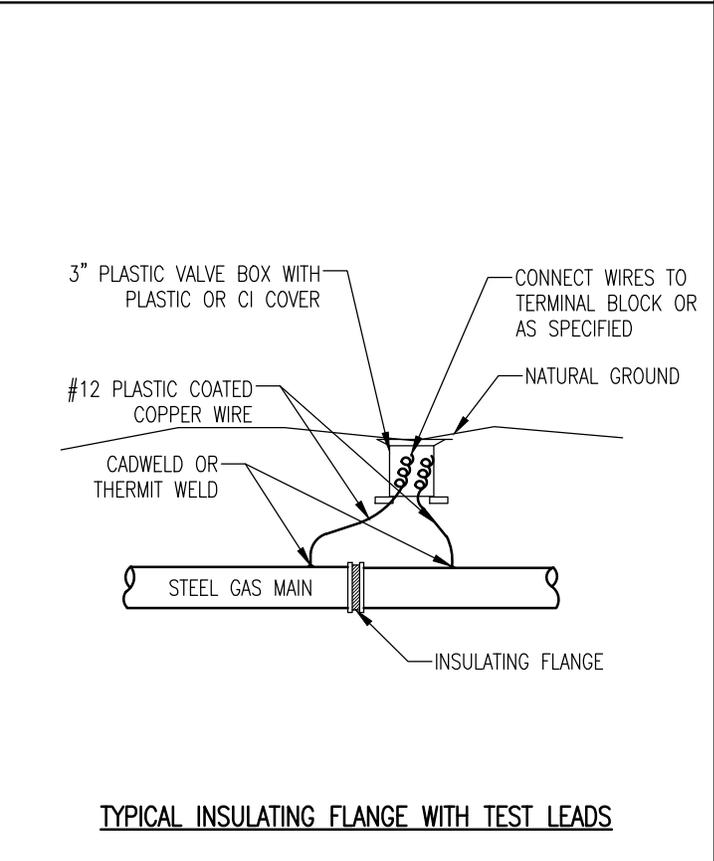
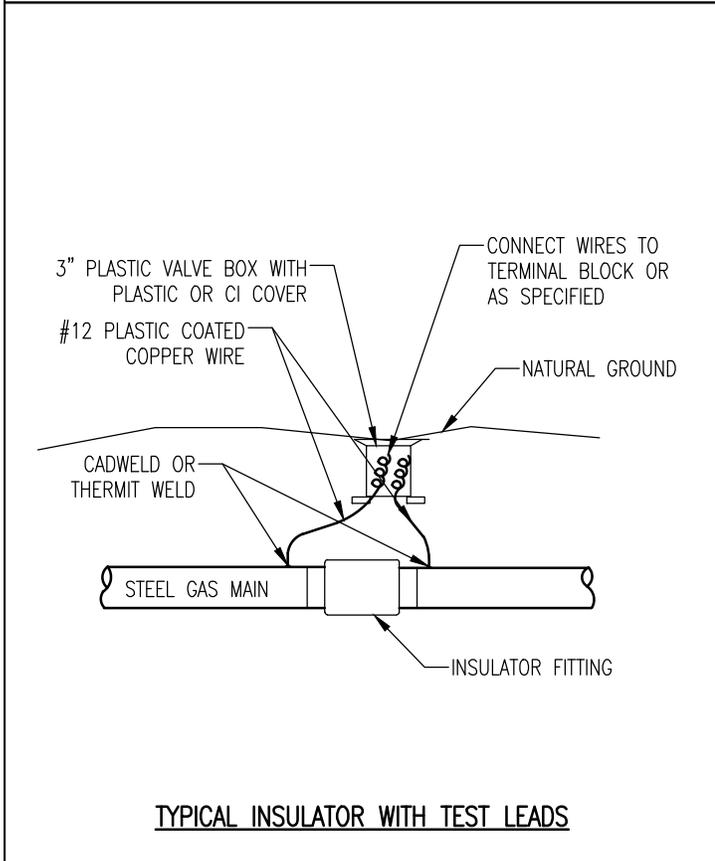
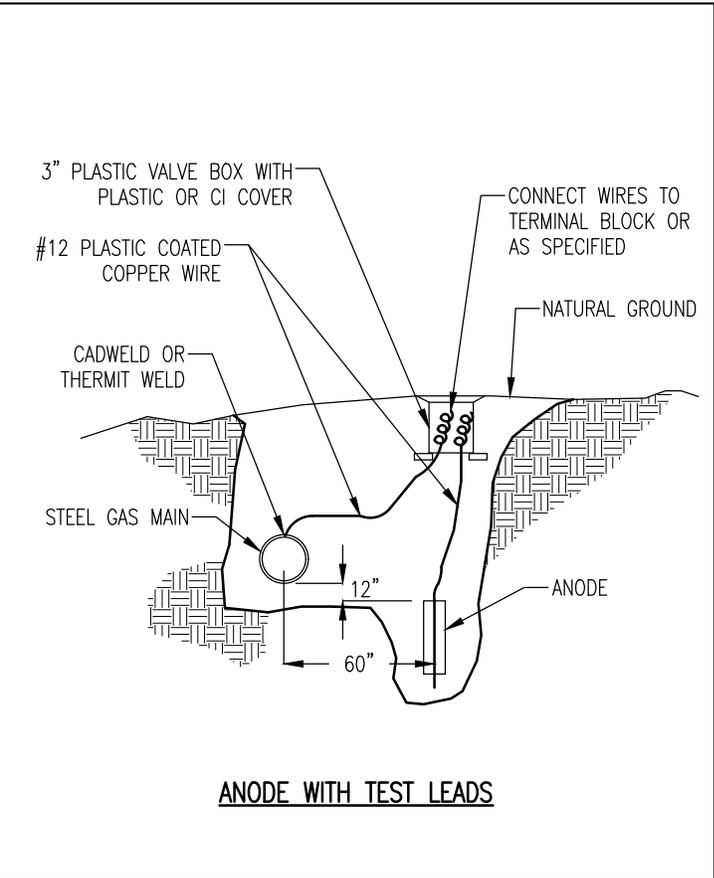
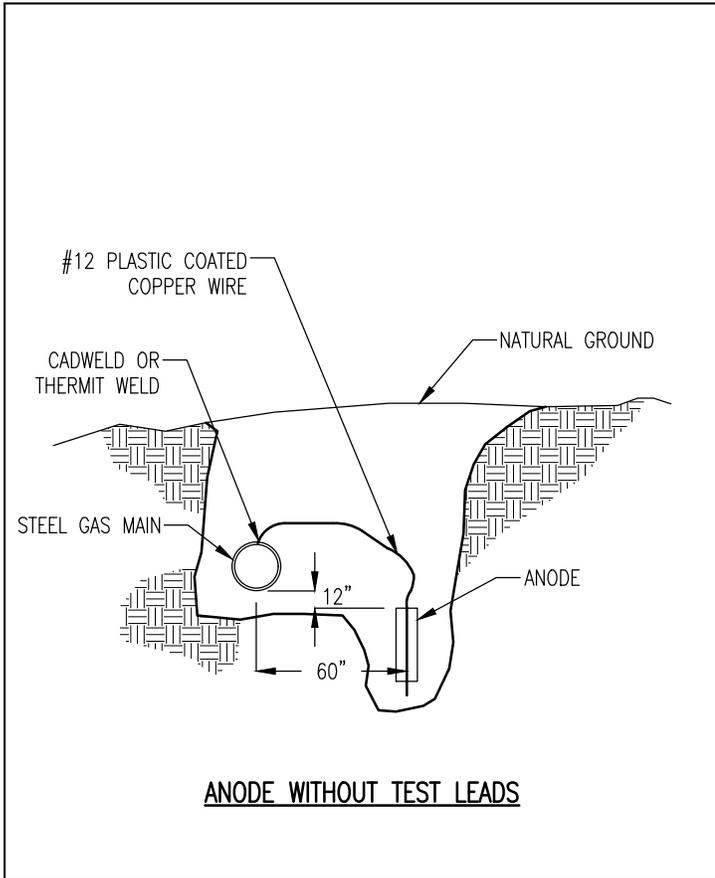
SEALING UNUSED LP GAS SERVICES

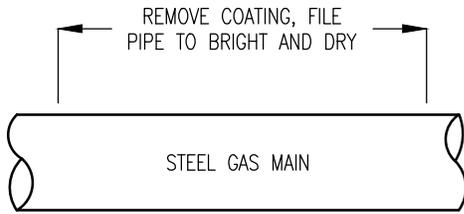
G-16

REVISED/APPROVED 02/01/2013

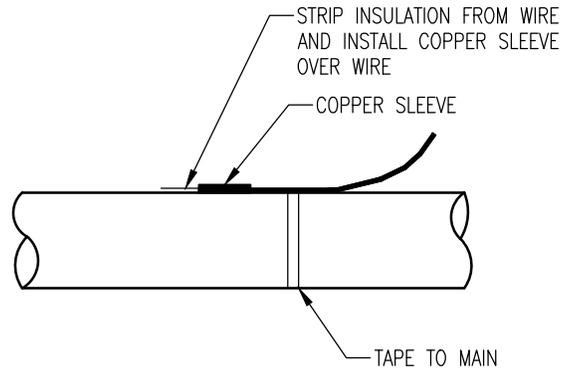
CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE





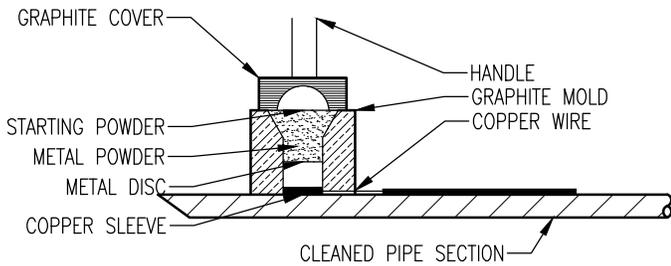
STEP 1



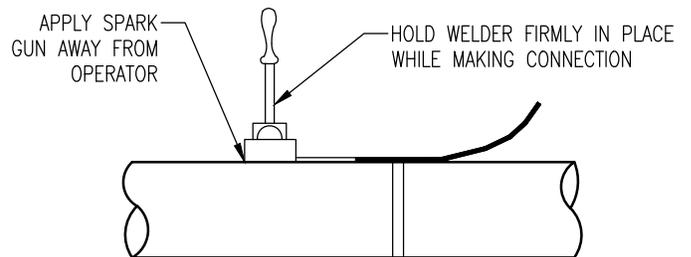
STEP 2

PROCEDURES

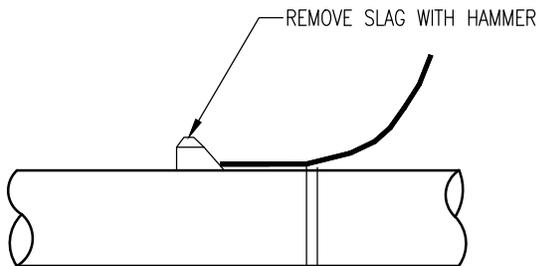
1. PREPARE GRAPHITE MOLD AS SHOWN IN DETAIL.
 - A. PLACE METAL DISC
 - B. PLACE METAL POWDER
 - C. FILL WITH STARTING POWDER
 - D. PLACE GRAPHITE COVER
 2. PLACE GRAPHITE MOLD ON PIPE
- MAXIMUM SIZE CHARGE TO BE USED SHALL BE "CADWELD" CA-15.



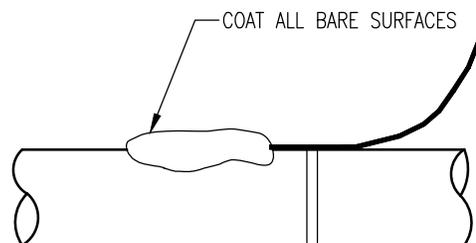
STEP 3



STEP 4



STEP 5



STEP 6

TYPICAL METHOD OF BRAZED CONNECTION TO PIPE

G-18

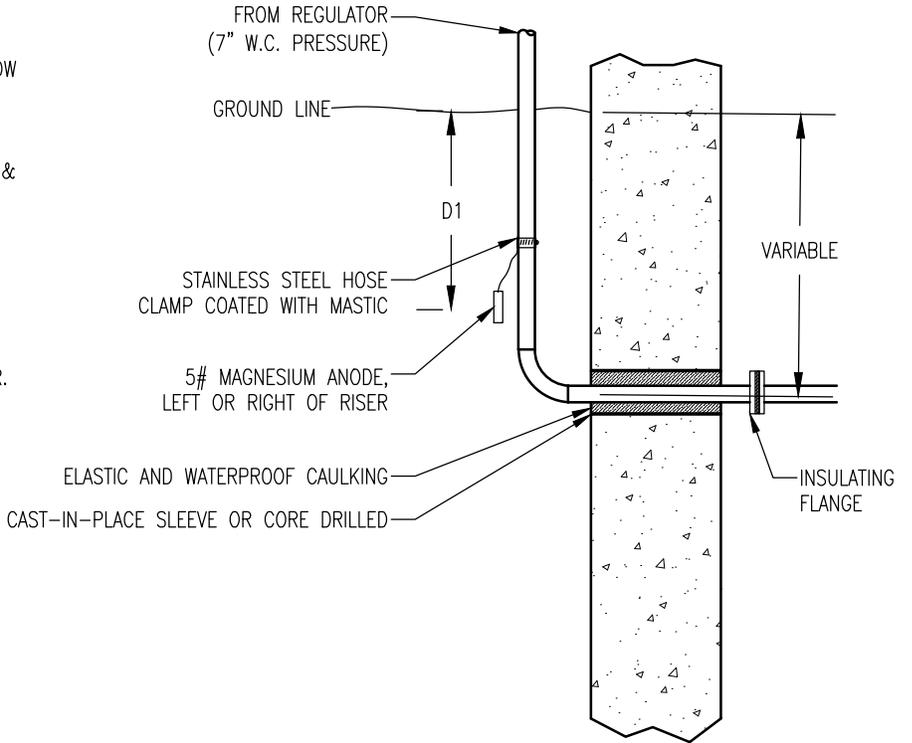
REVISED/APPROVED 02/01/213

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTES:

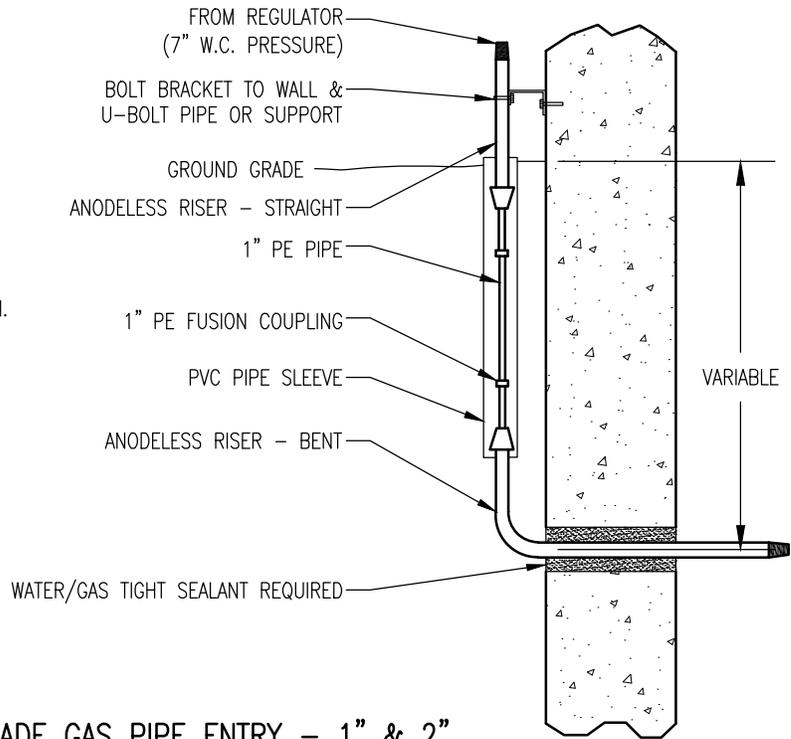
1. ABOVE GRADE ENTRY IS REQUIRED GENERALLY, BELOW GRADE WILL BE PERMITTED ONLY BY SPECIAL EXCEPTION.
2. PIPE SHALL BE AT LEAST STANDARD WEIGHT STEEL, CONFORMING TO A53 OR API 5L, WELDED, COATED, & WRAPPED ACCORDING TO STANDARD SPECIFICATION SECTION 25.
3. GAS PIPE THROUGH WALL SHALL BE IN SLEEVE OR CORE DRILLED HOLE AND ANNULAR SPACE SEALED WITH ELASTIC & WATERPROOF CAULKING. CEMENT CAULK NOT PERMITTED.
4. ANODE DEPTH (D1) SHALL BE A MINIMUM OF 2' OR BELOW MID DEPTH OF RISER, WHICHEVER IS DEEPER.



BELOW GRADE GAS PIPE ENTRY - 2 1/2" & LARGER

NOTES

1. ABOVE GRADE ENTRY IS REQUIRED GENERALLY, BELOW GRADE WILL BE PERMITTED ONLY BY SPECIAL EXCEPTION.
2. PE COUPLING SHALL BE FUSED ONLY BY CERTIFIED FUSORS - STANDARD SPECIFICATION SEC. 17.



BELOW GRADE GAS PIPE ENTRY - 1" & 2"

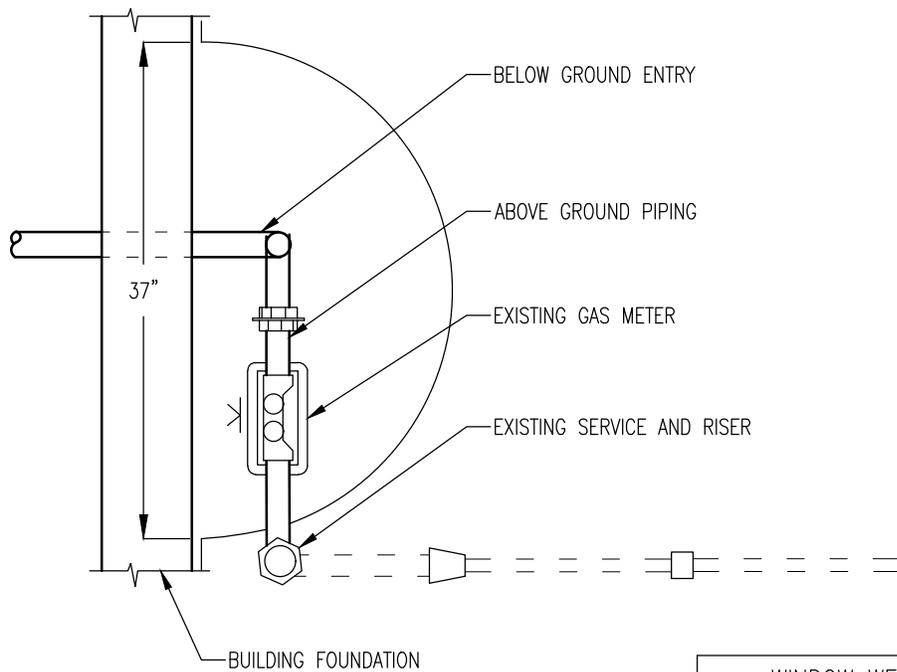
GAS PIPING BUILDING ENTRY BELOW GRADE

G-22

REVISED/APPROVED 01/08/216

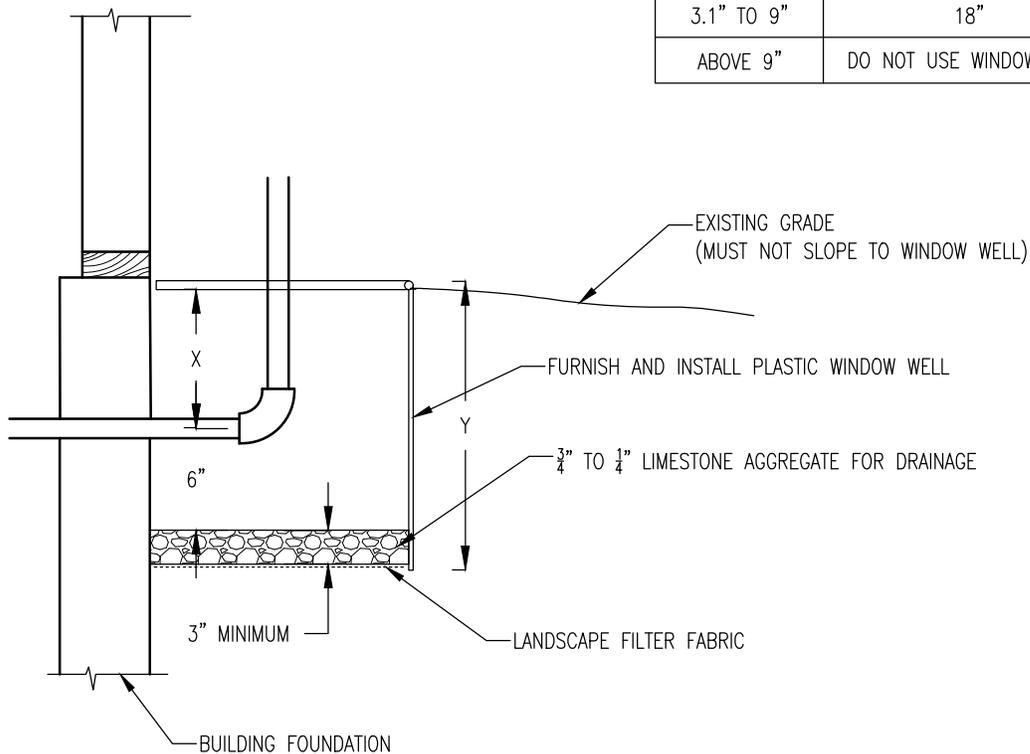
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



PLAN VIEW

WINDOW WELL SIZING CHART	
IF X IS...	Y=
3" OR LESS	12"
3.1" TO 9"	18"
ABOVE 9"	DO NOT USE WINDOW WELL



SIDE VIEW

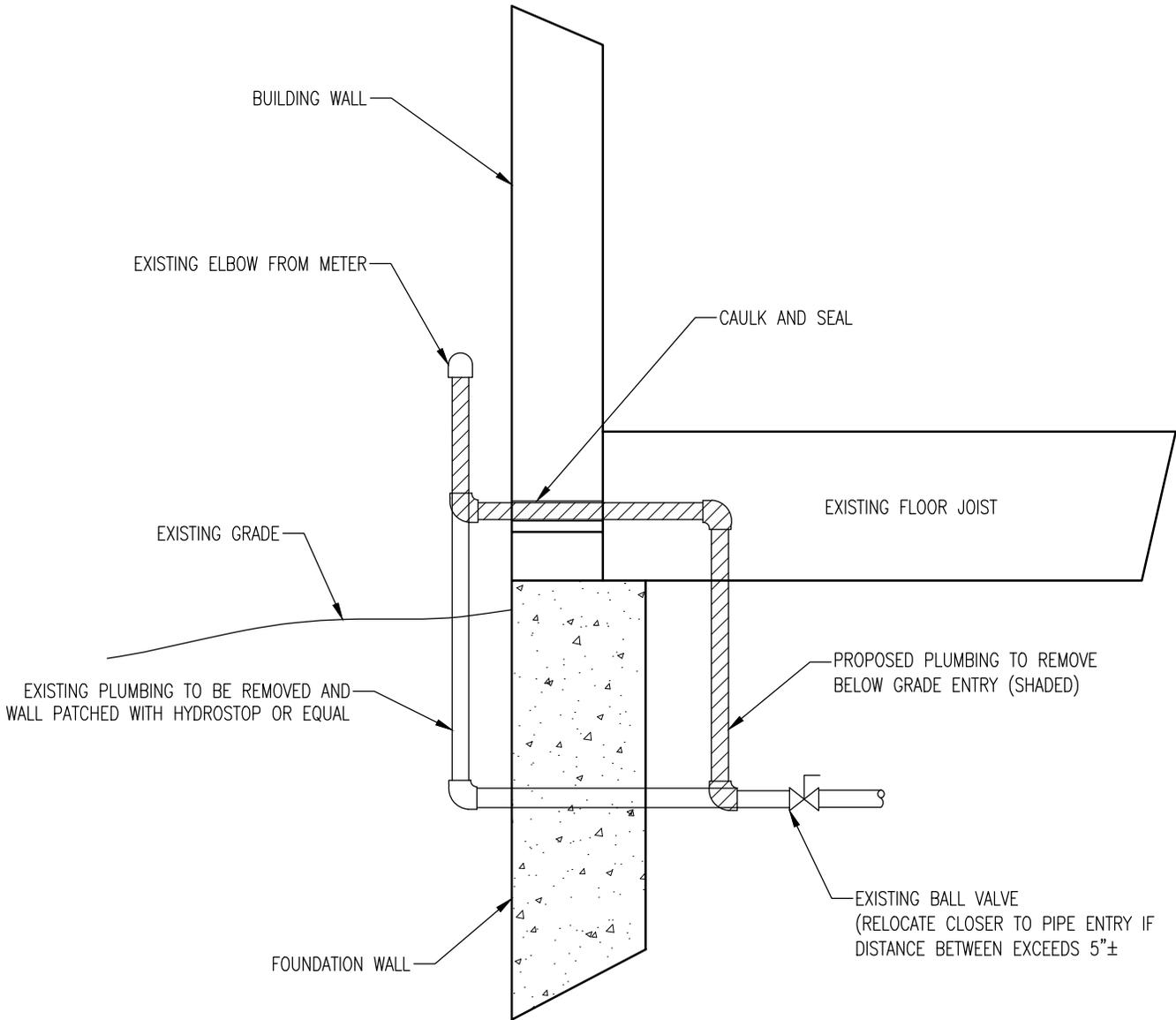
TYPICAL WELL FOR BELOW GRADE GAS PIPE ENTRY

G-23

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



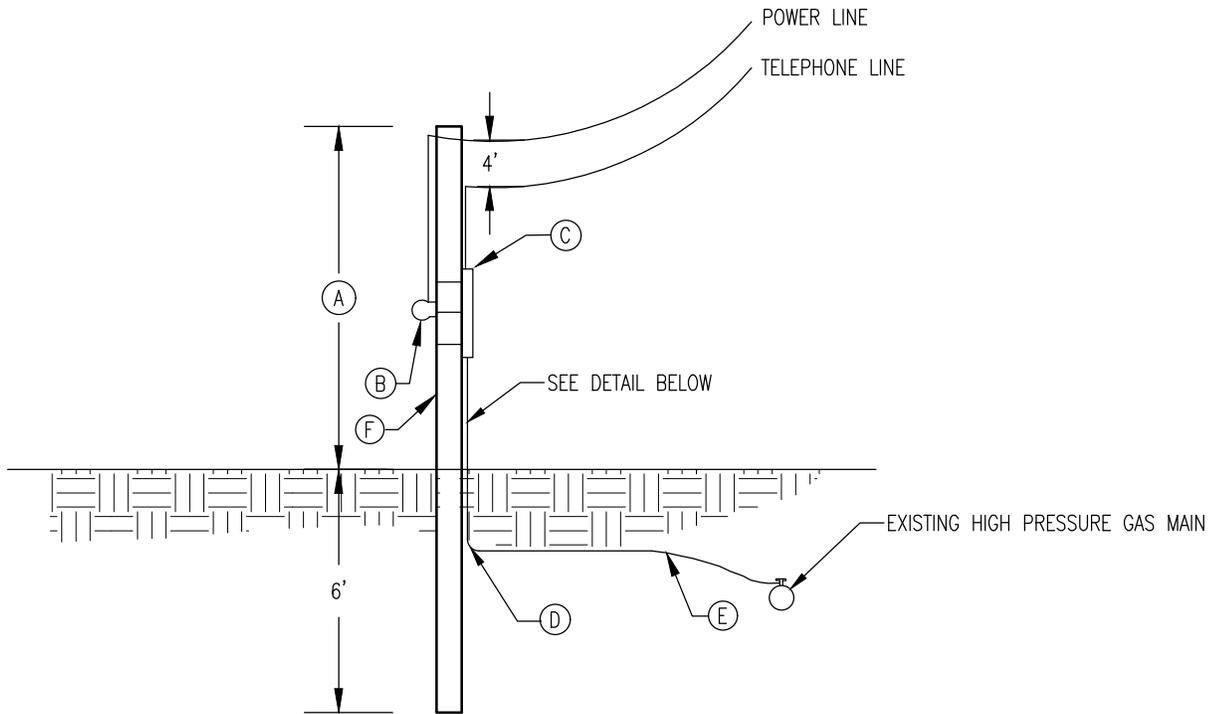
TYPICAL GAS PIPING REVISION

G-24

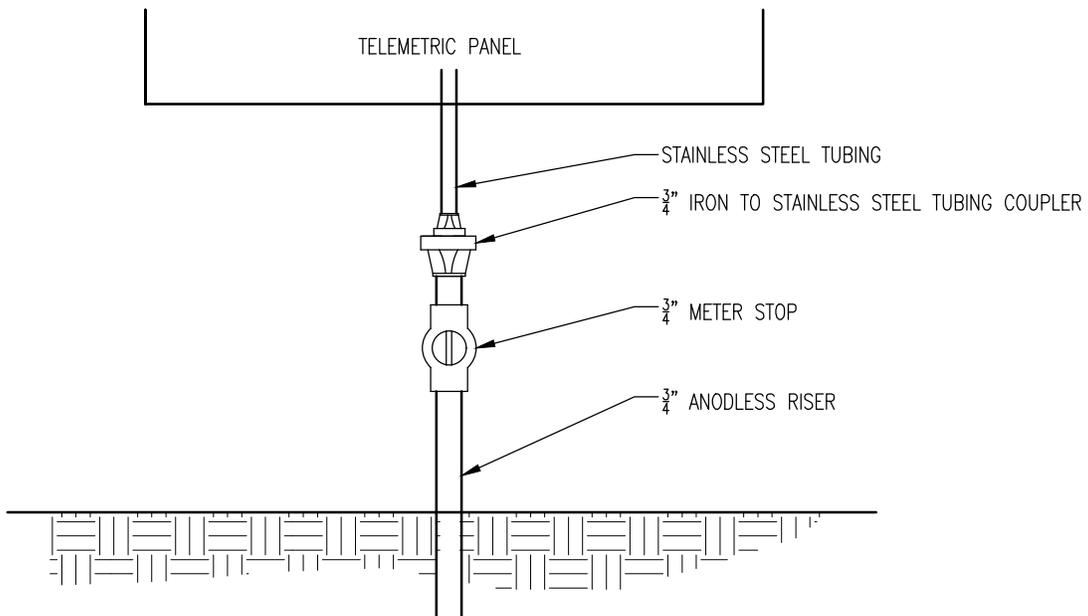
REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- A. 22' MIN. FOR STREET X-ING OR 18' MINIMUM OTHERWISE
- B. ELECTRIC METER
- C. TELEMETRIC PANEL (6' MAXIMUM TO TOP)
- D. 3/4" ANODELESS RISER
- E. 1/2" C.T.S. PE H.P. GAS SERVICE
- F. 6" STEEL POLE FOR STREET CROSSING, 4" STEEL POLE FOR OTHERS



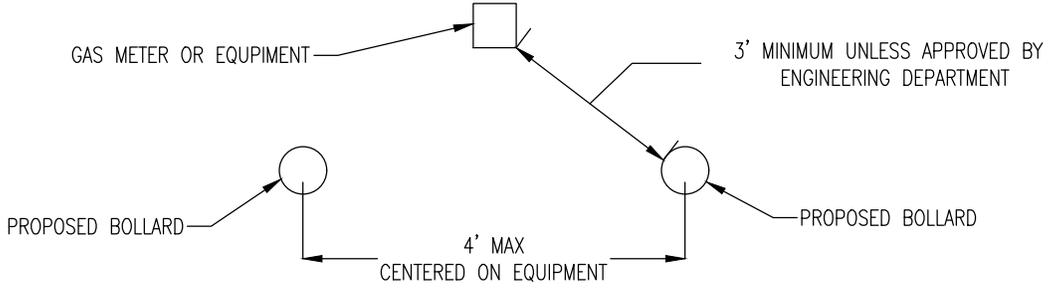
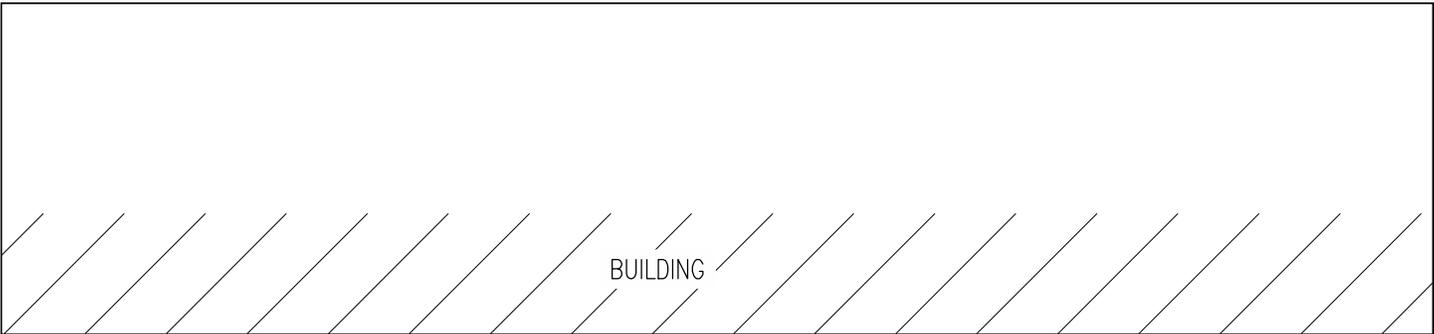
TELEMETRIC GAS PRESSURE STATION

G-26

REVISED/APPROVED 02/07/2018

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

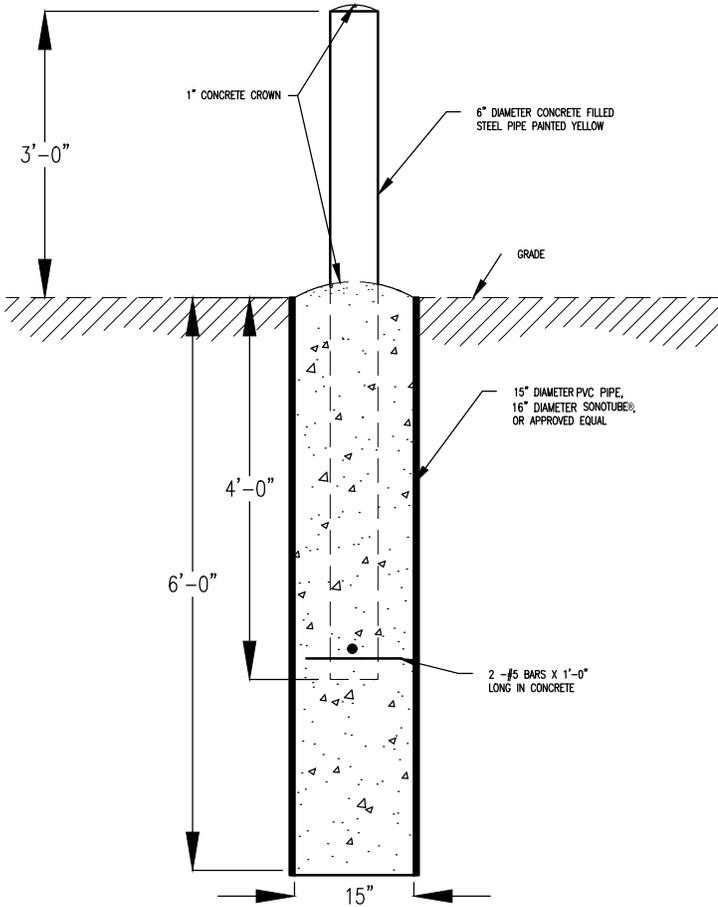


NOTES

1. MULTIPLE BOLLARDS SHALL BE SPACED AT 4' ON CENTER
2. BACKFILL BOLLARD WITH WASTE CUTTINGS, COMPACT TO 95% MAXIMUM DENSITY.
3. BOLLARD SHALL BE FINISHED WITH ONE OF THE FOLLOWING METHODS:
 - A. COVERED WITH A HDPE PLASTIC BOLLARD SLEEVE DESIGNED TO FIT OVER A 6" PIPE BOLLARD. THE SLEEVE SHALL HAVE A SMOOTH FINISH, DOME TOP, AND BE YELLOW IN COLOR. AN ADHESIVE SEALANT SHALL BE USED TO AFFIX THE SLEEVE TO THE BOLLARD.
 - B. PAINTED TO THE FOLLOWING SPECIFICATIONS

SURFACE PREPARATION	BLAST TO THE EXTENT OF AN SSPC-SP6 COMMERCIAL-GRADE LEVEL OF CLEANLINESS AND PRIME BEFORE ANY RUST BLOOM REFORMS
PRIMER	APPLY ONE EVEN COAT OF TNEMEC SERIES 69-COLOR PRIMER TO A DFT OF 5.0 MILS
FIELD FINISH	APPLY ONE EVEN COAT OF TNEMEC SERIES 69-COLOR TO A DFT OF 5.0 MILS
FINAL FINISH	APPLY ONE COAT TNEMEC SERIES 73-COLOR TO A DFT OF 2.0-2.5 MILS OVER THE FIELD FINISH
COLORS	BOLLARDS: SAFETY YELLOW

- C. COVERED WITH A HDPE PLASTIC BOLLARD SLEEVE DESIGNED TO FIT OVER A 6" PIPE BOLLARD. THE SLEEVE SHALL HAVE A SMOOTH FINISH, DOME TOP, AND BE YELLOW IN COLOR. AN ADHESIVE SEALANT SHALL BE USED TO AFFIX THE SLEEVE TO THE BOLLARD.



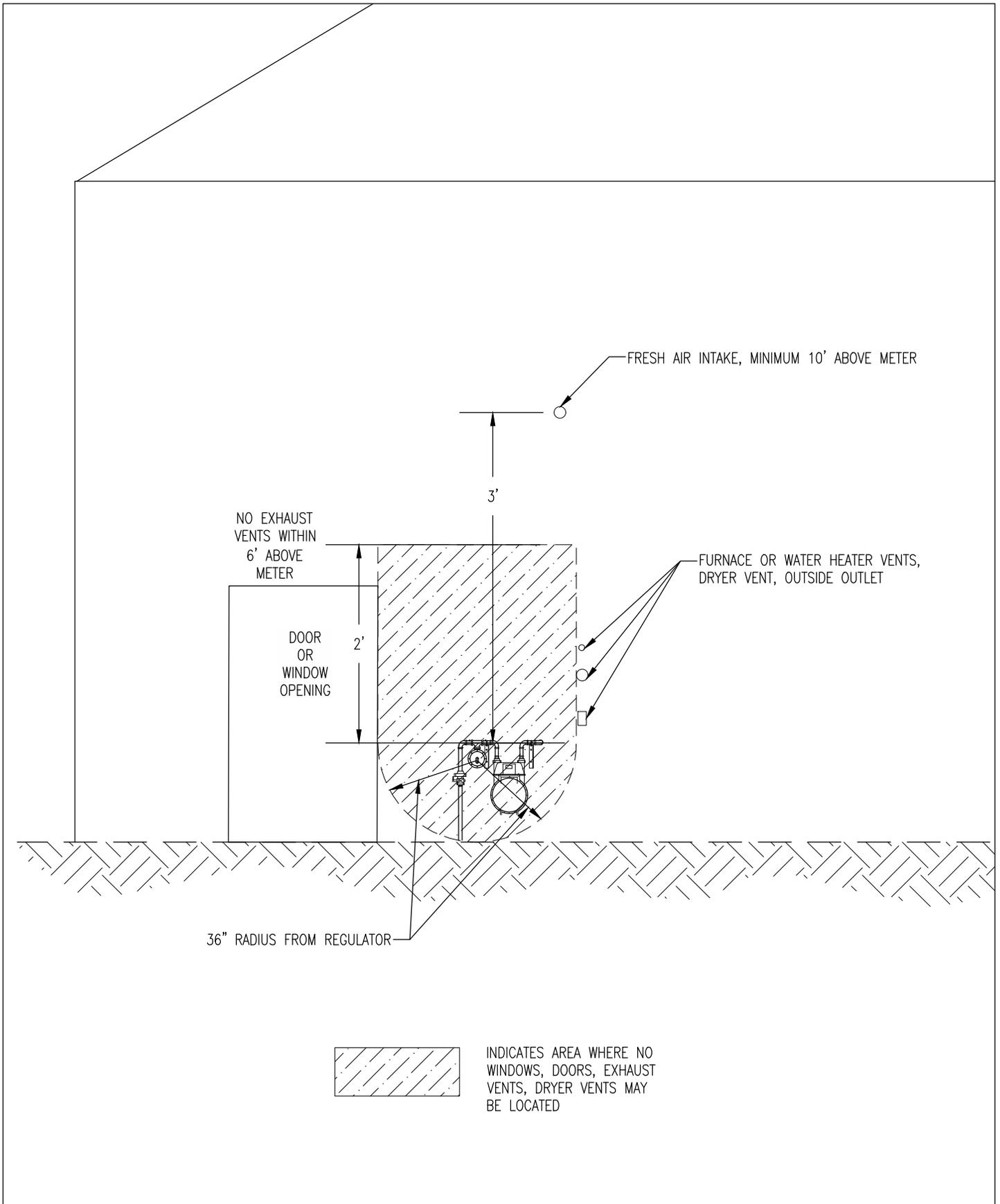
BOLLARD DETAIL

G-33

REVISED/APPROVED 02/19/2015

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



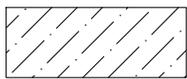
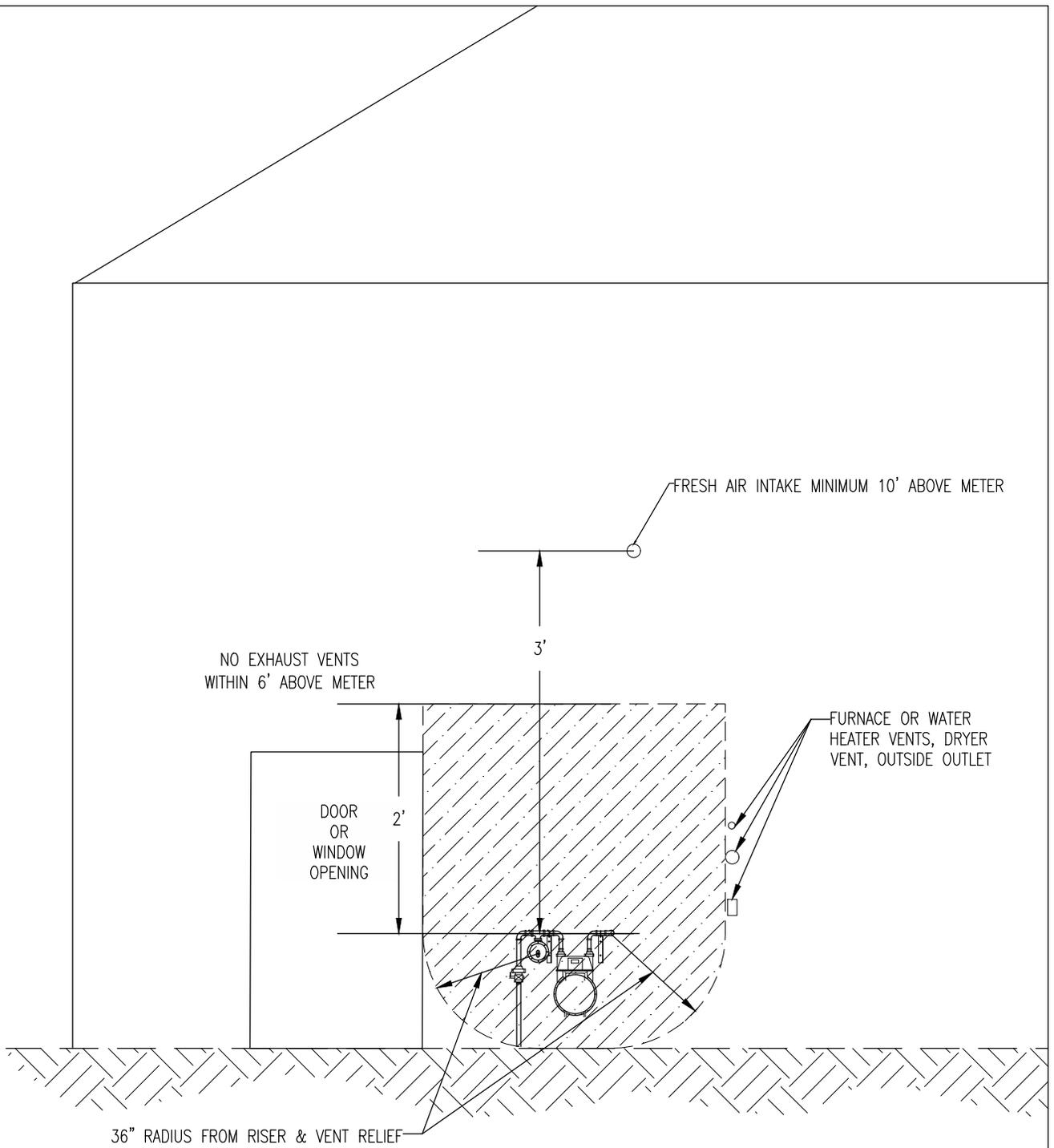
7" WC METERING PRESSURE METER LOCATION

G-35

REVISED/APPROVED 06/01/2014

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



INDICATES AREA WHERE NO WINDOWS, DOORS, EXHAUST VENTS, DRYER VENTS MAY BE LOCATED

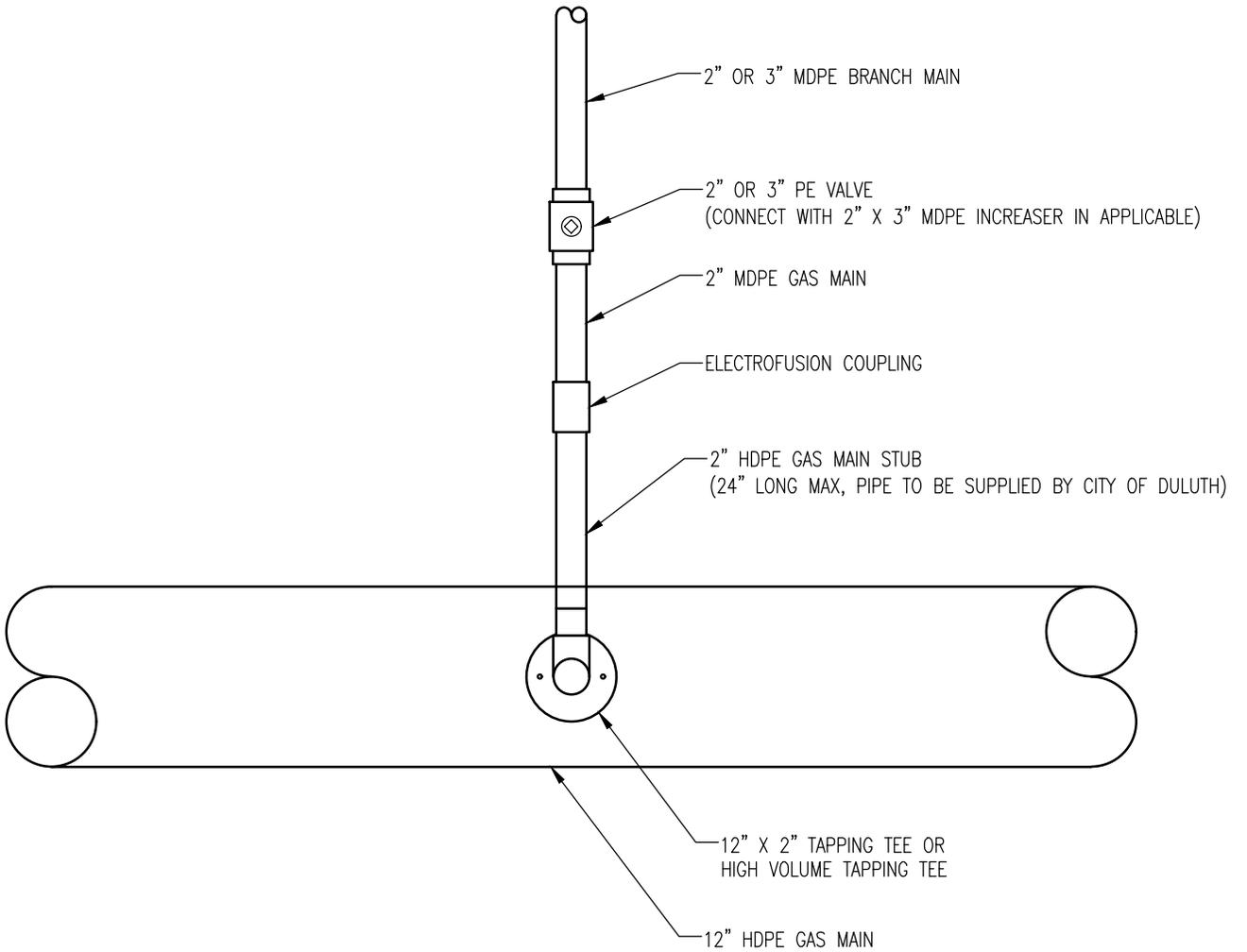
ELEVATED PRESSURE METER LOCATION

G-36

REVISED/APPROVED 06/01/2014

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



2" OR 3" BRANCH MAIN CONNECTION DETAIL FOR HDPE GAS MAINS

G-37

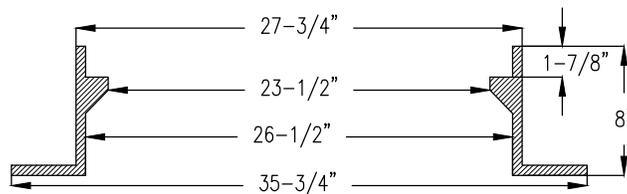
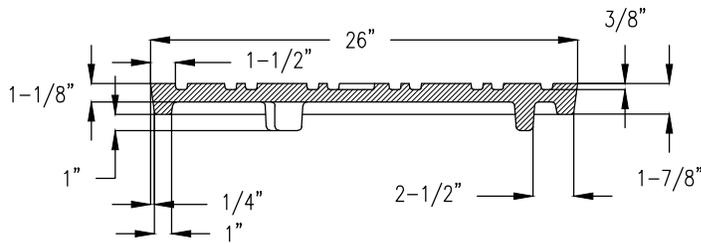
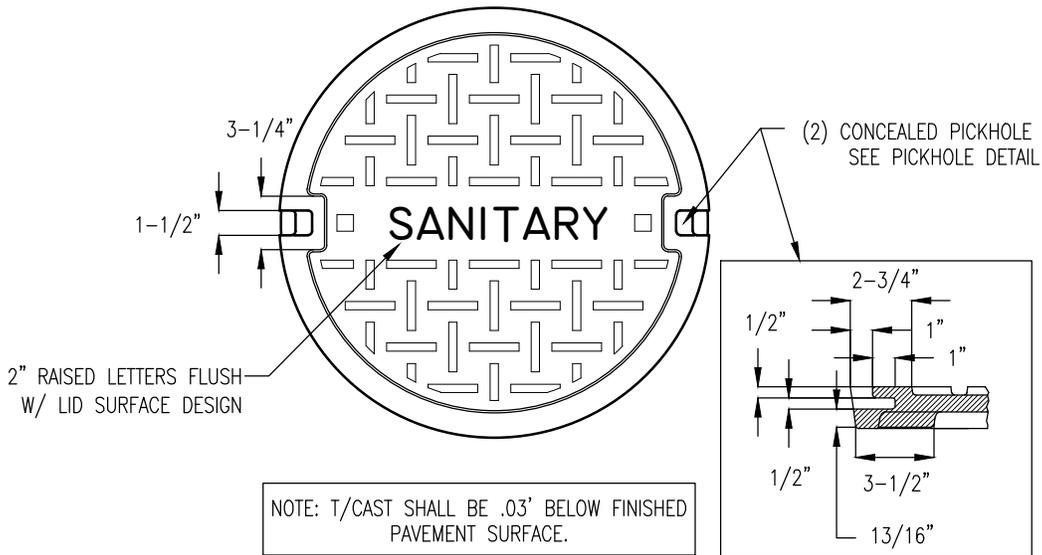
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

WGT. 298 LBS		MATERIAL: GRAY IRON CLASS 35B
WGT. 122 LBS	TOTAL WEIGHT 420 LBS.	SPEC.: ASTM A-48-74

NOTE: SUITABLE FOR HS25 WHEEL LOADS



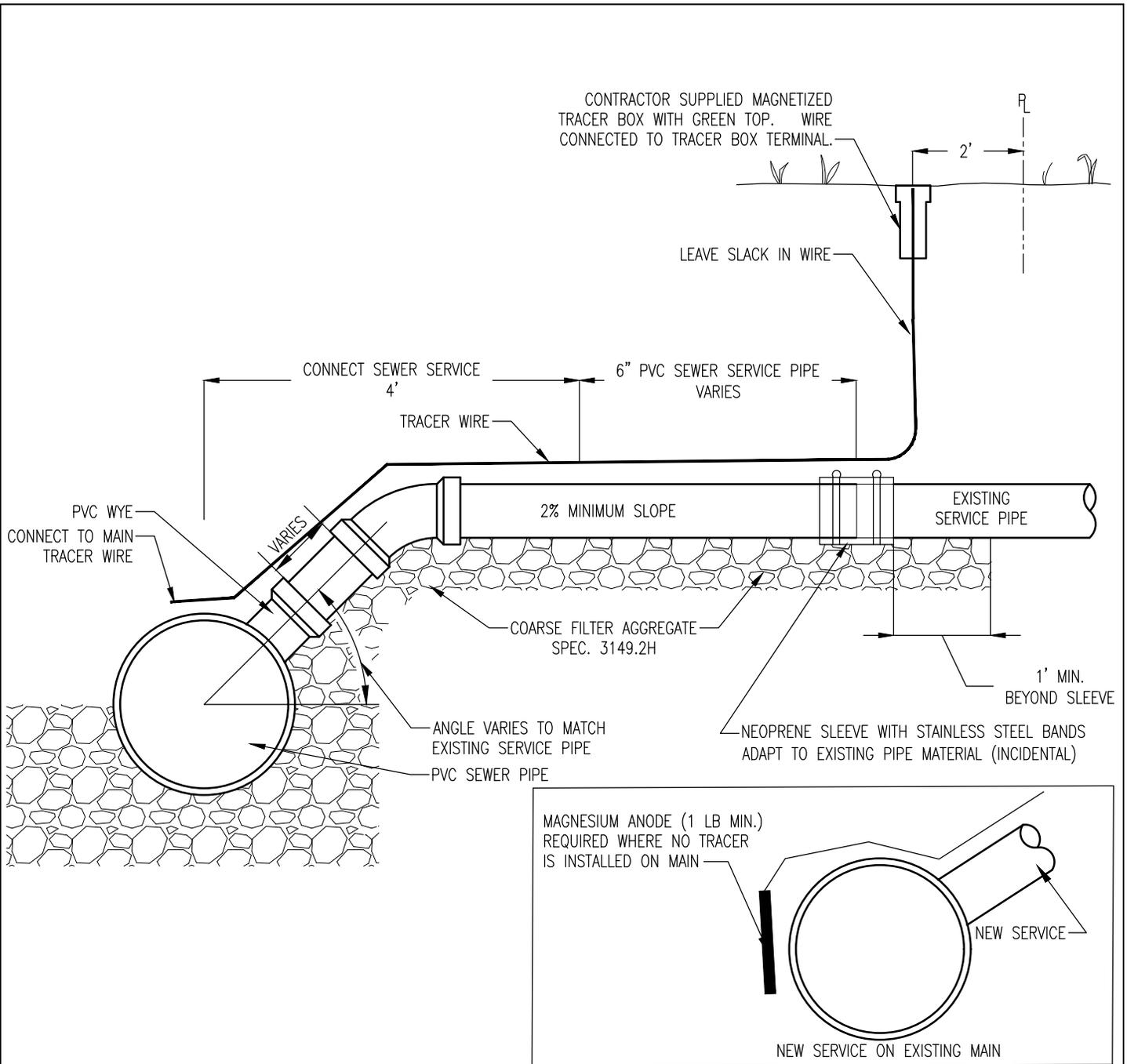
SANITARY CASTING DETAIL

SAN-1

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES

1. BID ITEM FOR PVC WYE INCLUDES FURNISHING AND INSTALLING WYE IN SEWER MAIN.
2. CONNECT SEWER SERVICE INCLUDES 6" PVC SEWER SERVICE PIPE (TO 4' FROM C/L) AND ALL FITTINGS
3. 6" PVC SEWER SERVICE PIPE IS INTENDED FOR THE RECONSTRUCTION OF SEWER SERVICES (WHEN FOUND TO BE IN NEED BY THE ENGINEER) COMPLETE IN PLACE FROM 4.0' BEYOND THE C/L OF THE SEWER MAIN TO A POINT DESIGNATED BY THE ENGINEER
4. FOR NEW SERVICES, PIPE TO STOP AT RIGHT OF WAY
5. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED WITH SANITARY SEWER MAINS AND SERVICES. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DETERMINED BY THE ENGINEER
6. FOR SERVICES, TRACER WIRE SHALL RUN FROM THE WYE AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON LOCKABLE TOP.
7. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

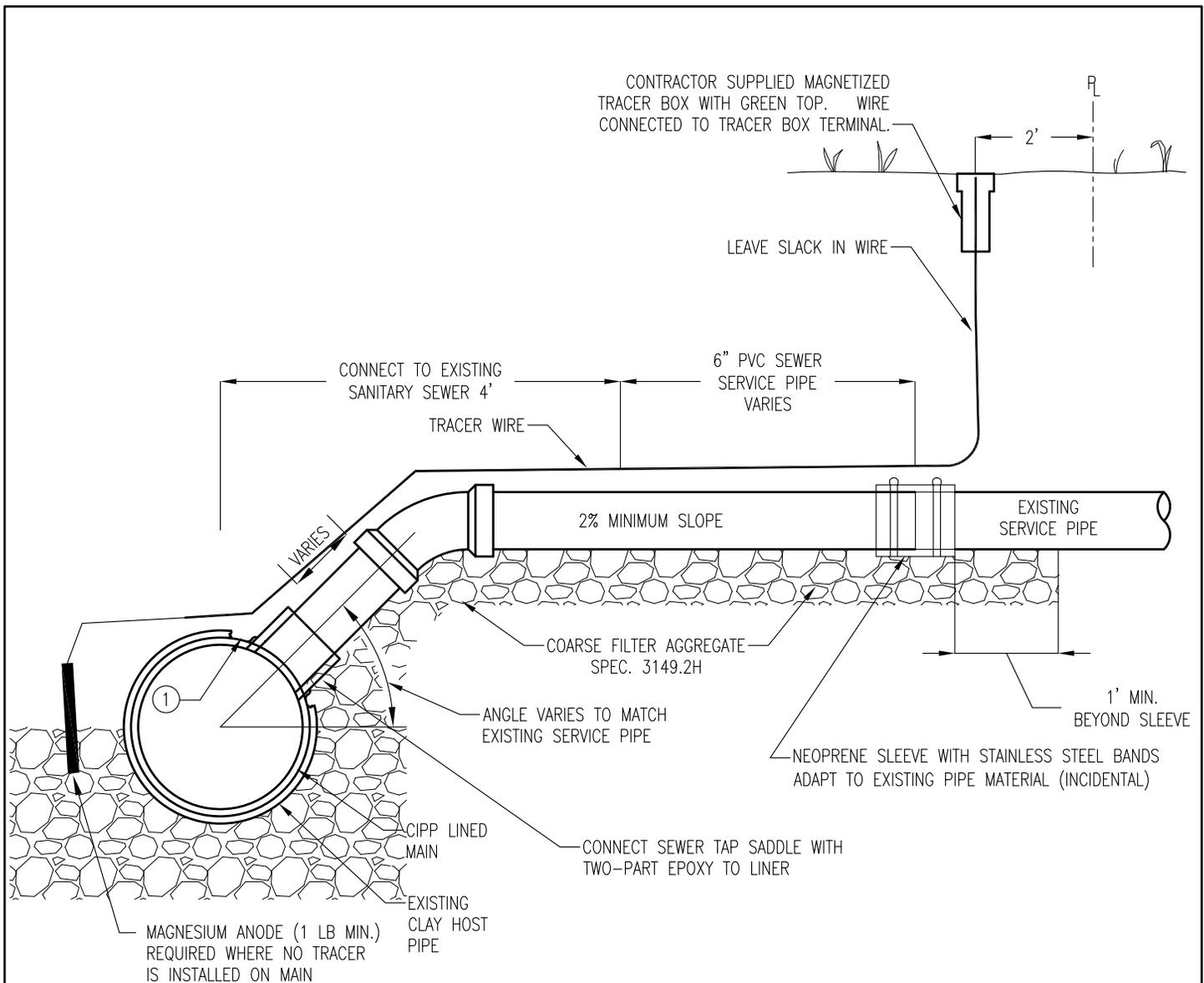
TYPICAL SEWER SERVICE CONNECTION

SAN-2

REVISED/APPROVED 02/19/2015

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES

1. REMOVE PORTION OF EXISTING HOST PIPE TO EXPOSE CIPP LINER. CUT CIRCULAR HOLE IN CIPP LINER. WHERE THE EXISTING OPENING OF THE CIPP LINER EXCEEDS THE SIZE FOR A NEW SEWER TAP SADDLE, CONSTRUCT EPOXY LINER PATCH, AND CUT CIRCULAR HOLE IN CURED PATCH.
2. PROVIDE NEW PVC SEWER TAP SADDLE ON IN-PLACE SEWER MAIN LINER CONNECTED BY TWO-PART EPOXY GLUED JOINT FORMING A WATERTIGHT CONNECTION TO CIPP LINER.
3. CONNECT SEWER SERVICE INCLUDES SEWER TAP SADDLE, 6" PVC SEWER SERVICE PIPE (TO 4' FROM C/L) AND ALL FITTINGS.
4. 6" PVC SEWER SERVICE PIPE INTENDED FOR THE RECONSTRUCTION OF SEWER SERVICES (WHEN FOUND TO BE IN NEED BY THE ENGINEER) COMPLETE IN PLACE FROM 4.0' BEYOND THE C/L OF THE SEWER MAIN TO A POINT DESIGNATED BY THE ENGINEER.
5. FOR NEW SERVICES, PIPE TO STOP AT THE RIGHT OF WAY.
6. #12 GAUGE GREEN INSULATED SOLID COPPER WIRE SHALL BE INSTALLED WITH SANITARY SEWER MAINS AND SERVICES. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DIRECTED BY ENGINEER.
7. FOR SERVICES, TRACER WIRE SHALL RUN FROM A 1 POUND MAGNESIUM ANODE PLACE ADJACENT TO THE SADDLE TAP CONNECTION AT THE MAIN AND TERMINATE IN A FLUSH MOUNTED TRACER BOX.
8. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN TRACER WIRE SHALL BE WITH SPLIT BOLT CONNECTORS. WIRES NUTS ARE NOT ACCEPTABLE. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

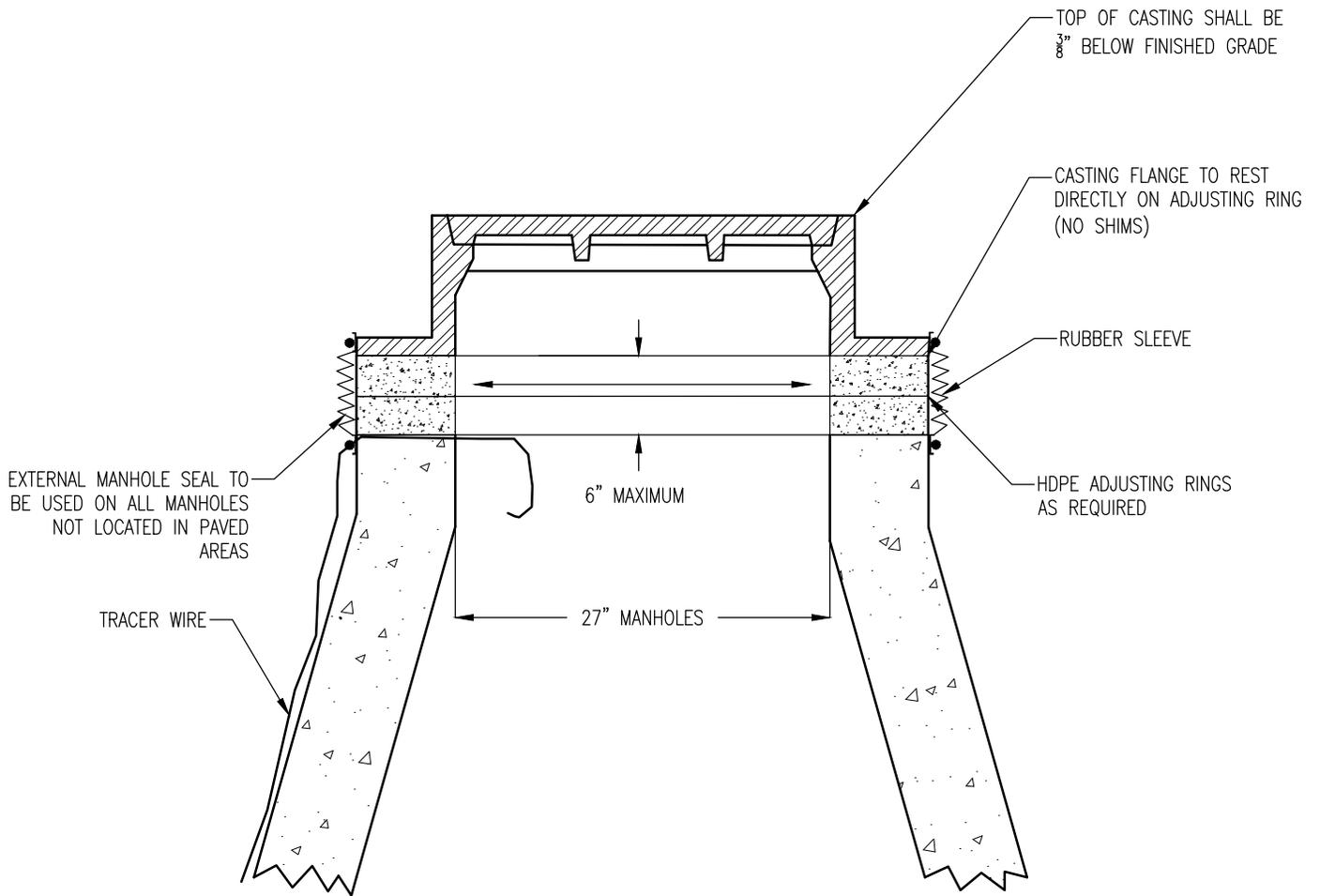
SEWER SERVICE CONNECTION FOR CIPP LINED SEWER MAIN

SAN-2A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- NOTE:
1. ALL SEALS SHALL EXTEND FROM THE CASTING TO THE CONE
 2. TRACER WIRE REQUIRED ON ALL SANITARY SEWER MAINS

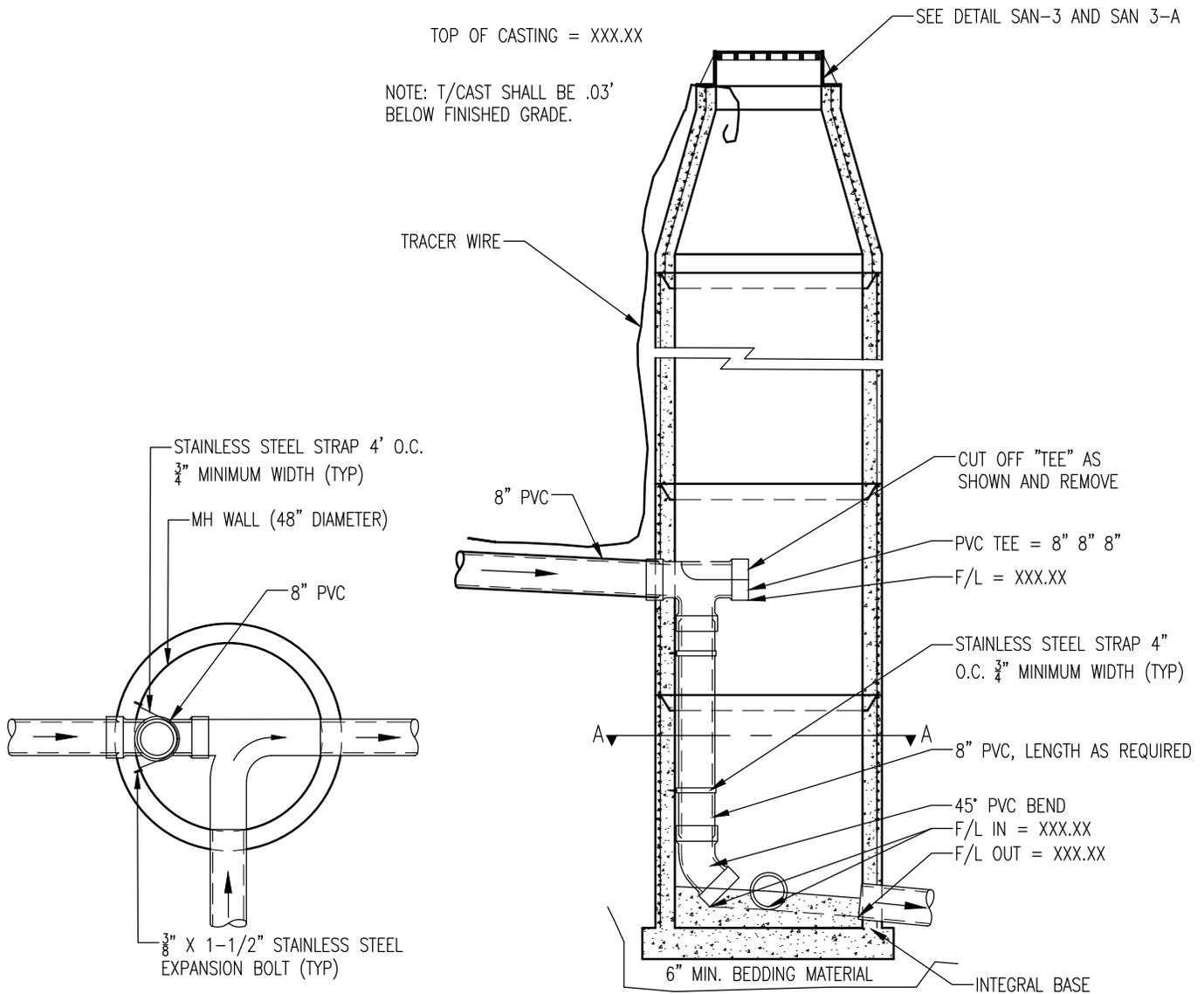
SANITARY MANHOLE NON-PAVED AREAS

SAN-3

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES: REFER TO PLAN/PROFILES FOR ELEVATIONS

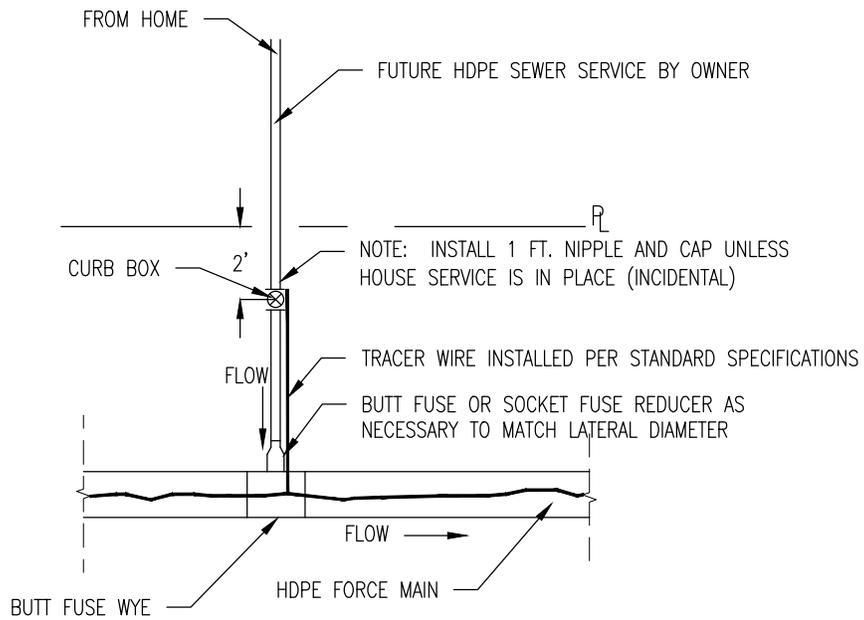
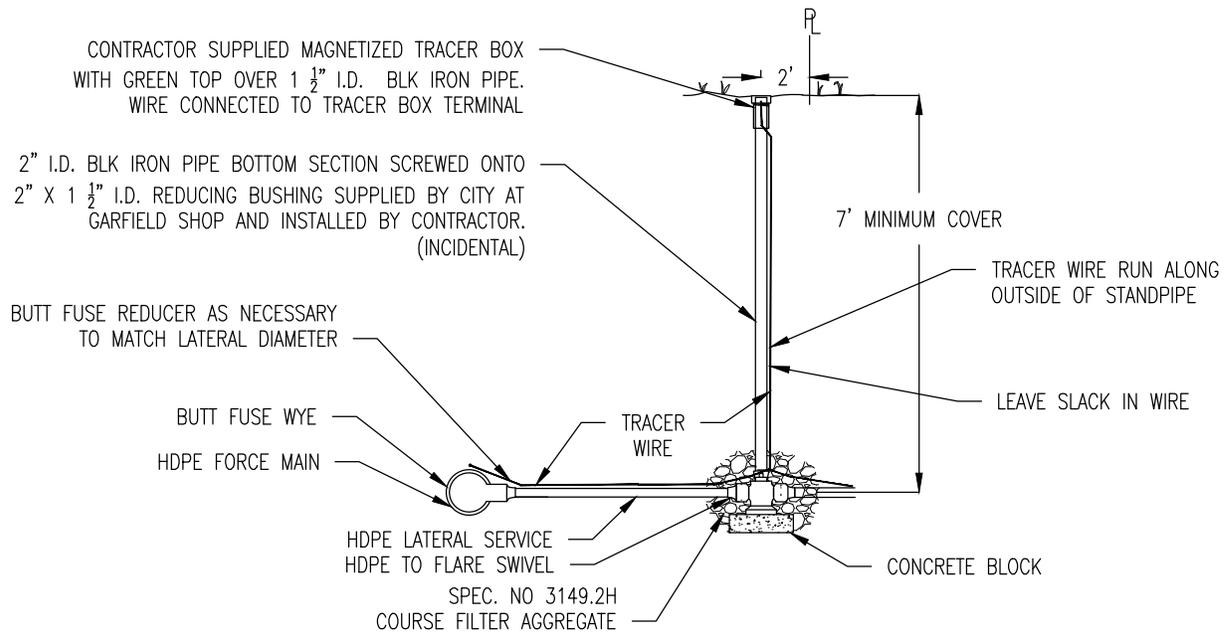
CONSTRUCT INSIDE DROP STRUCTURE

SAN-4

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED WITH THE NON-CONDUCTIVE SERVICE PIPE. TRACER WIRE INSTALLATION REQUIRES ACCESS POINTS AT LEAST EVERY 300 FEET.
2. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.
3. TRACER WIRE SHALL RUN FROM THE WYE AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON TOP.

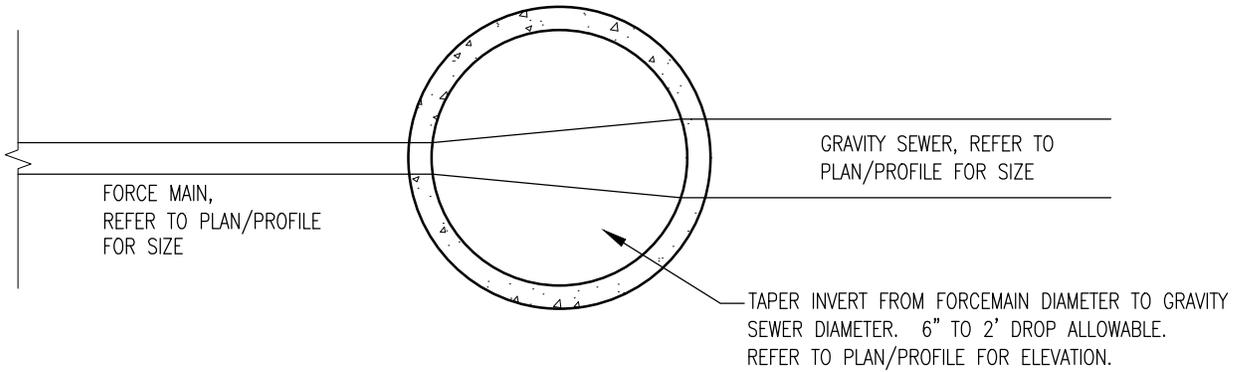
HDPE SANITARY SEWER PRESSURE LATERAL CONNECTION

SAN-5

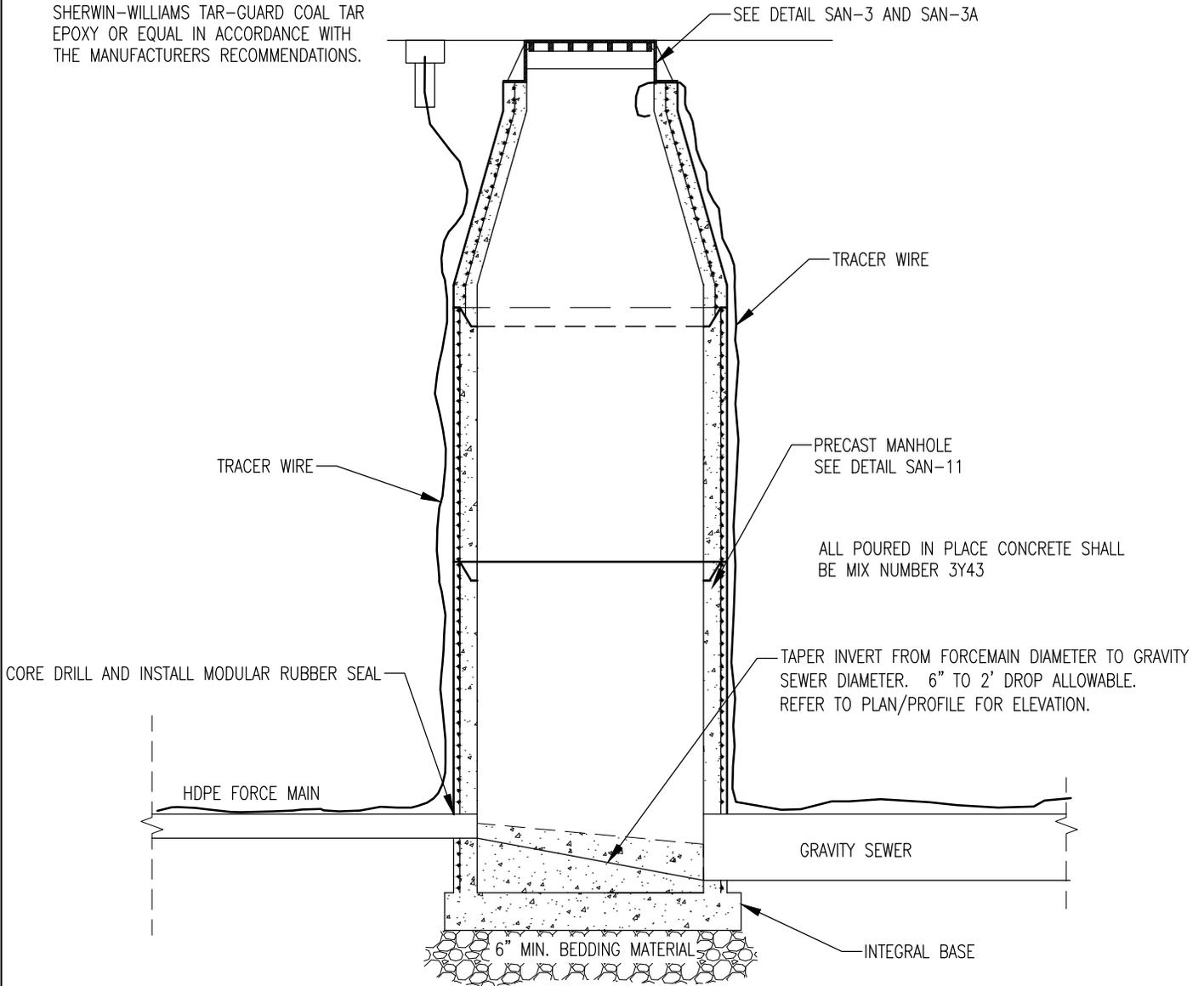
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



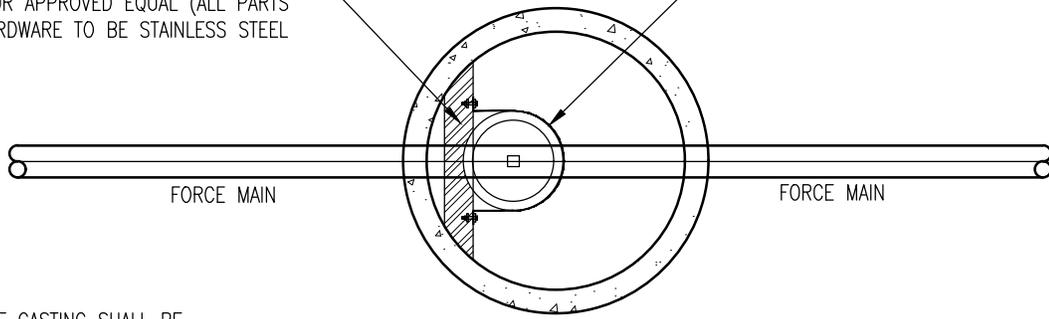
NOTE:
 ALL CONCRETE SURFACES INSIDE OF
 MANHOLES TO BE COATED WITH
 SHERWIN-WILLIAMS TAR-GUARD COAL TAR
 EPOXY OR EQUAL IN ACCORDANCE WITH
 THE MANUFACTURERS RECOMMENDATIONS.



HDPE FORCEMAIN TO GRAVITY MAIN MANHOLE		SAN-6
REVISED/APPROVED 01/08/2016	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE

1 1/2" X 1 1/2" S.S. SUPPORT BRACKETS WITH S.S. BAND OR APPROVED EQUAL (ALL PARTS AND HARDWARE TO BE STAINLESS STEEL)

AIR VACUUM RELEASE VALVE



FORCE MAIN

FORCE MAIN

NOTE: TOP OF CASTING SHALL BE .03' BELOW FINISHED GRADE

SEE DETAIL SAN-3 AND SAN-3A

MAGNETIZED TRACER WIRE BOX

6" POLYSTYRENE INSULATION BOARD (DOW STYROFOAM HI 40, CERTIFOAM 40, OR EQUIVALENT)

1/2" TREATED PLYWOOD SUPPORTED BY 1" S.S. ANGLE IRON W/ STAINLESS LAG BOLTS

INCIDENTAL TO MH CONSTRUCTION

ALL POURED IN PLACE CONCRETE SHALL BE MIX NUMBER 3Y43

MAGNETIZED TRACER WIRE BOX

8' X 8' X 3" POLYSTYRENE INSULATION

PRECAST MANHOLE SEE DETAIL SAN-11

3" X 12" X 4' INSULATION STRIPS

TRACER WIRE

1 1/2" X 1 1/2" S.S. SUPPORT BRACKET WITH S.S. BAND OR APPROVED EQUAL

AIR VACUUM RELEASE VALVE APCO MODEL 443, VAL-MATIC 801WA, OR APPROVED EQUAL

TRACER WIRE

2" GALVANIZED IRON PIPE

ELECTROFUSION SERVICE SADDLE WITH 2" BRASS INSERT

2" PE FULLY PORTED THREADED BALL VALVE

CORE DRILL AND INSTALL MODULAR RUBBER SEAL

HDPE FORCE MAIN

HDPE FORCE MAIN

CONCRETE SUPPORT, MIN. 8" HIGH

6" MIN. BEDDING MATERIAL

INTEGRAL BASE

NOTE: MANHOLE TO MEET ALL REQUIREMENTS OF SAN-11

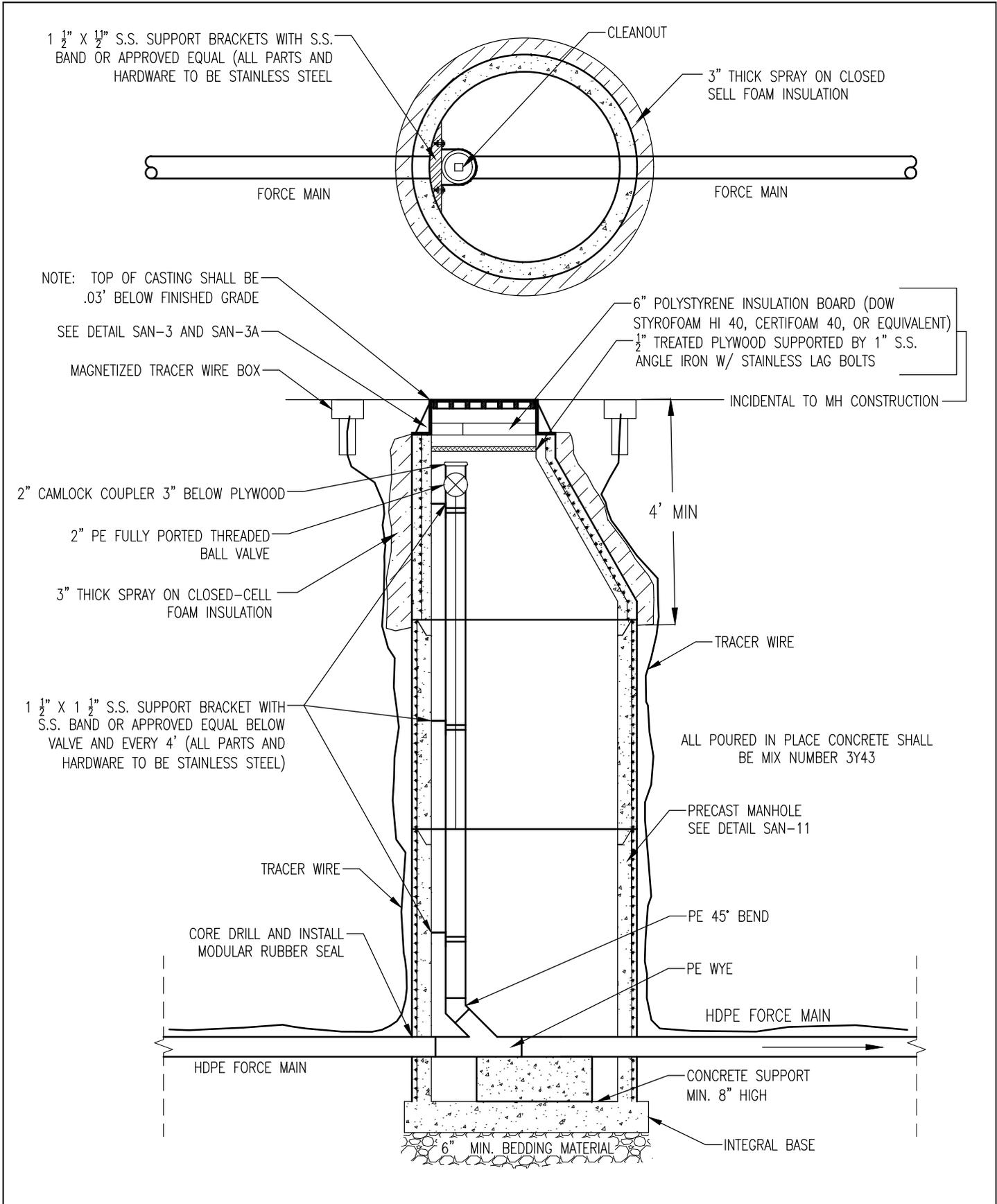
AIR-RELEASE MANHOLE

SAN-7

REVISED/APPROVED 01/08/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



CLEANOUT MANHOLE

SAN-8

REVISED/APPROVED 04/05/2019

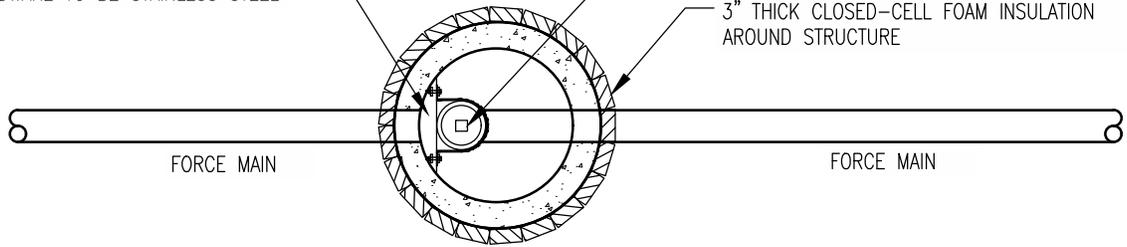
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

1-1/2" X 1-1/2" S.S. SUPPORT BRACKETS
WITH S.S. BAND OR APPROVED EQUAL (ALL
PARTS AND HARDWARE TO BE STAINLESS STEEL)

CLEANOUT (DEAD END)

3" THICK CLOSED-CELL FOAM INSULATION
AROUND STRUCTURE



NOTE: TOP OF CASTING SHALL BE
.03' BELOW FINISHED GRADE

SEE DETAIL SAN-3/SAN-3A

MAGNETIZED TRACER WIRE BOX

6" POLYSTYRENE INSULATION
BOARD (DOW STYROFOAM HI 40,
CERTIFOAM 40, OR EQUIVALENT)

1/2" TREATED PLYWOOD SUPPORTED
BY 1" S.S. ANGLE IRON W/
STAINLESS LAG BOLTS

THESE ITEMS ARE INCIDENTAL TO
HANDHOLE CONSTRUCTION AND
SHALL BE CUSTOM FIT TO
ACHIEVE MANHOLE INSULATION
AND MAINTAIN ACCESSIBILITY.

PE PIPE END THREADED PLUG
3" BELOW PLYWOOD

2" PE FULLY PORTED THREADED
BALL VALVE

STRUCTURE COATED WITH 3" THICK SPRAY
ON CLOSED-CELL FOAM INSULATION

48" DEEP 30" DIAMETER PRECAST MANHOLE
(MNDOT STANDARD PLATE 4005M) DESIGN "F"
W/O CONCRETE BASE

1-1/2" X 1-1/2" S.S. SUPPORT BRACKET
WITH S.S. BAND OR APPROVED EQUAL
BELOW VALVE (ALL PARTS AND HARDWARE
TO BE STAINLESS STEEL)

2" HDPE SANITARY FORCEMAIN

TRACER WIRE

GRANULAR BACKFILL

HDPE FORCE MAIN

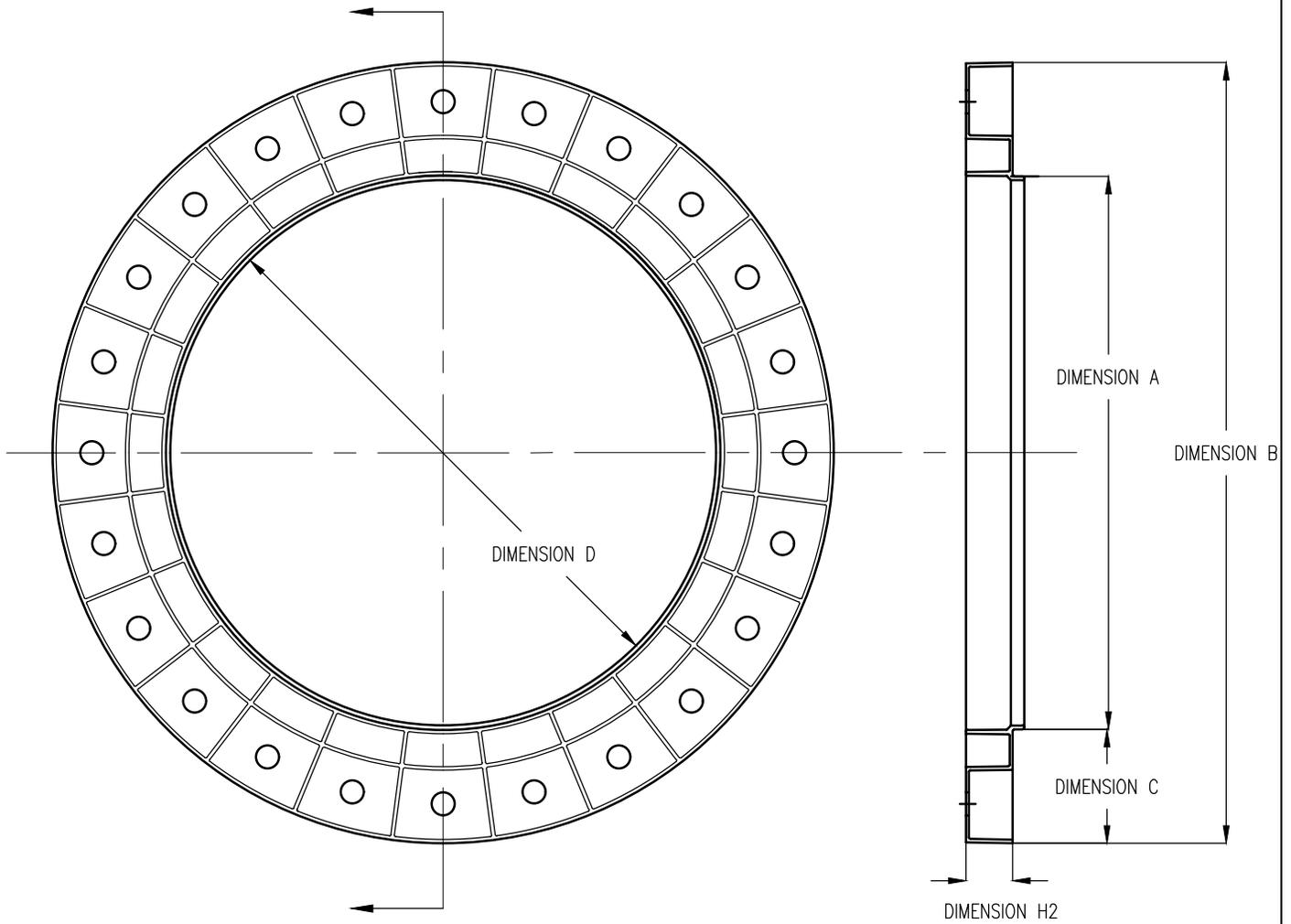
DEAD END CLEANOUT HAND HOLE

SAN-8A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



DIMENSION SCHEDULE

CONE SIZE	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION H1
27.00	26.75	36.50	5.00	26.25	1.20, 1.50, 2.00, 4.00

DESCRIPTION

1. PLASTIC INJECTION MOLDED ADJUSTMENT RING
2. MOLDED FROM HIGH DENSITY POLYETHYLENE AS DEFINED IN ASTM SPECIFICATION D1248
3. ACTUAL RESIN PROPERTIES WILL VARY ALLOWING FOR THE UTILIZATION OF A MAXIMUM PERCENT OF RECYCLED MATERIAL
4. THE PERCENT OF POST CONSUMER WASTE TO INDUSTRIAL WASTE WILL VARY WITH AVAILABILITY AND PROPERTY RETENTION NEEDS
5. COLOR, SHADE AND UNIFORMITY WILL VARY WITH THE MIX OF THE POST CONSUMER AND INDUSTRIAL WASTE MATERIALS
6. DIMENSIONS SHOWN ARE NOMINAL - ACTUAL SIZE WILL VARY WITHIN ALLOWABLE TOLERANCE AND REQUIRED FIT

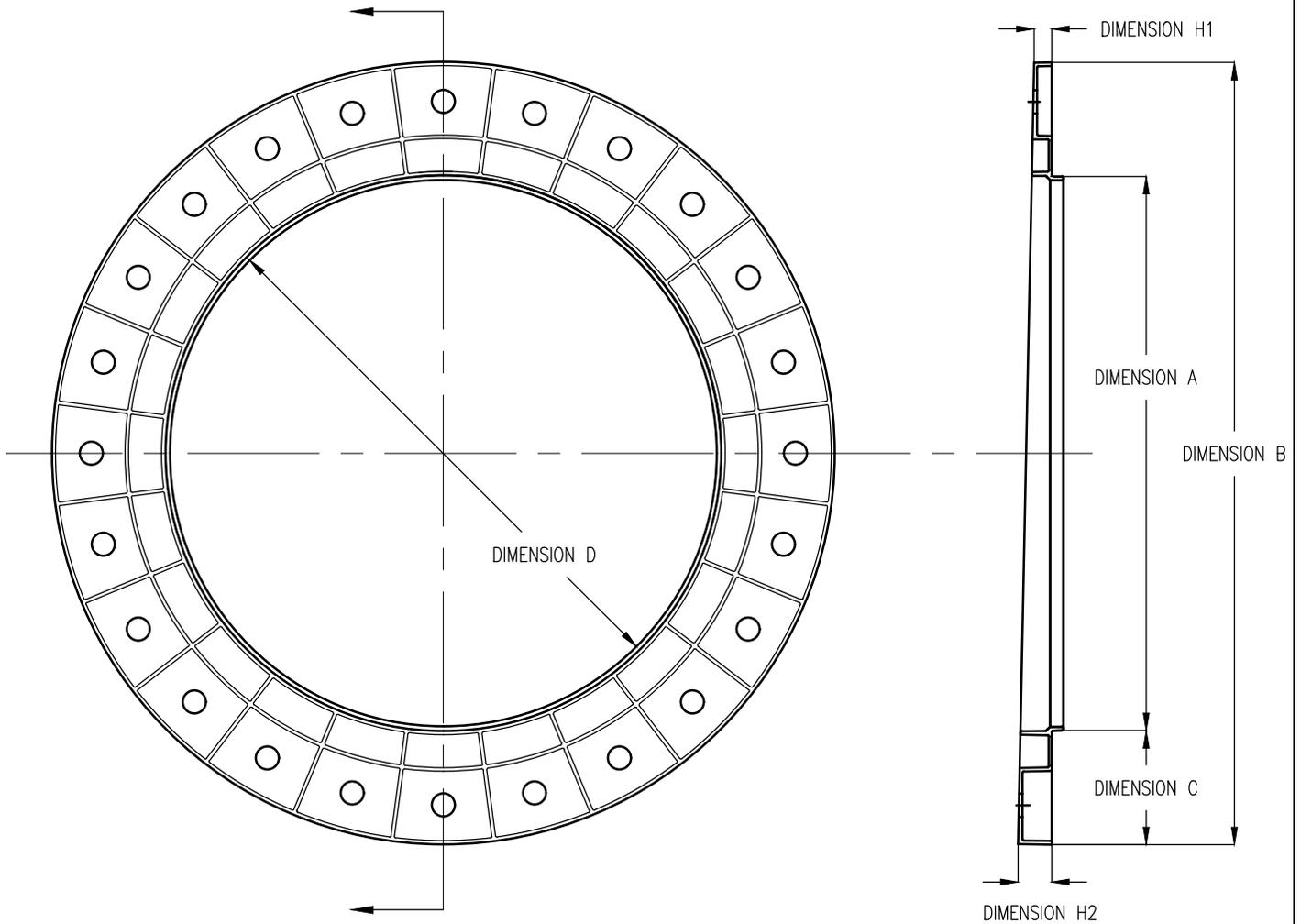
POLYETHYLENE MH ADJUSTING RING - FLAT

SAN-9

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



DIMENSION SCHEDULE

CONE SIZE	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION H1-H2
27.00	26.75	36.50	5.00	26.25	0.75 - 1.50

DESCRIPTION

1. PLASTIC INJECTION MOLDED ADJUSTMENT RING
2. MOLDED FROM HIGH DENSITY POLYETHYLENE AS DEFINED IN ASTM SPECIFICATION D1248
3. ACTUAL RESIN PROPERTIES WILL VARY ALLOWING FOR THE UTILIZATION OF A MAXIMUM PERCENT OF RECYCLED MATERIAL
4. THE PERCENT OF POST CONSUMER WASTE TO INDUSTRIAL WASTE WILL VARY WITH AVAILABILITY AND PROPERTY RETENTION NEEDS
5. COLOR, SHADE AND UNIFORMITY WILL VARY WITH THE MIX OF THE POST CONSUMER AND INDUSTRIAL WASTE MATERIALS
6. DIMENSIONS SHOWN ARE NOMINAL - ACTUAL SIZE WILL VARY WITHIN ALLOWABLE TOLERANCE AND REQUIRED FIT

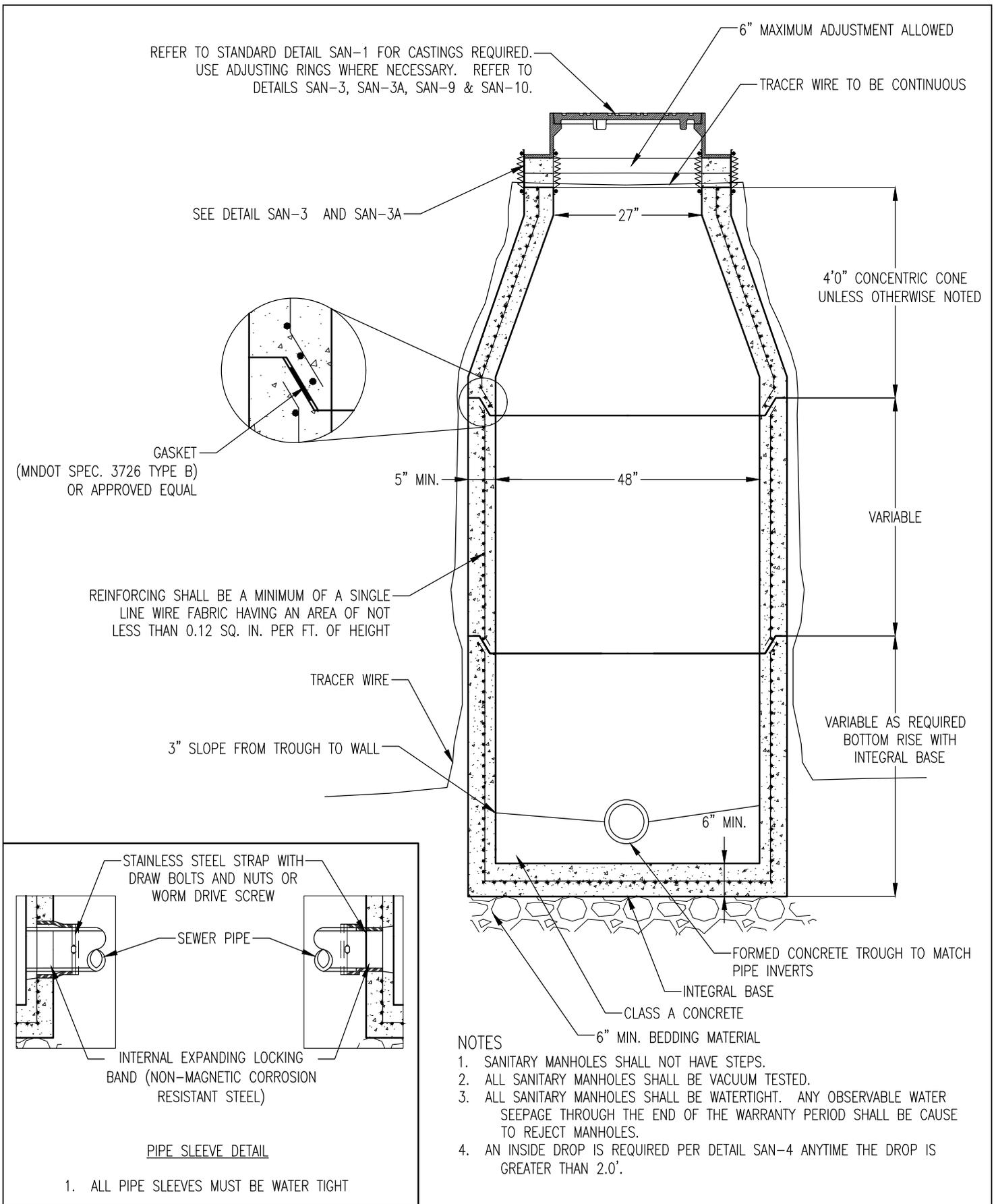
POLYETHYLENE MH ADJUSTING RING - WEDGE

SAN-10

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



PRECAST MECHANICAL JOINT SEWER MANHOLE

SAN-11

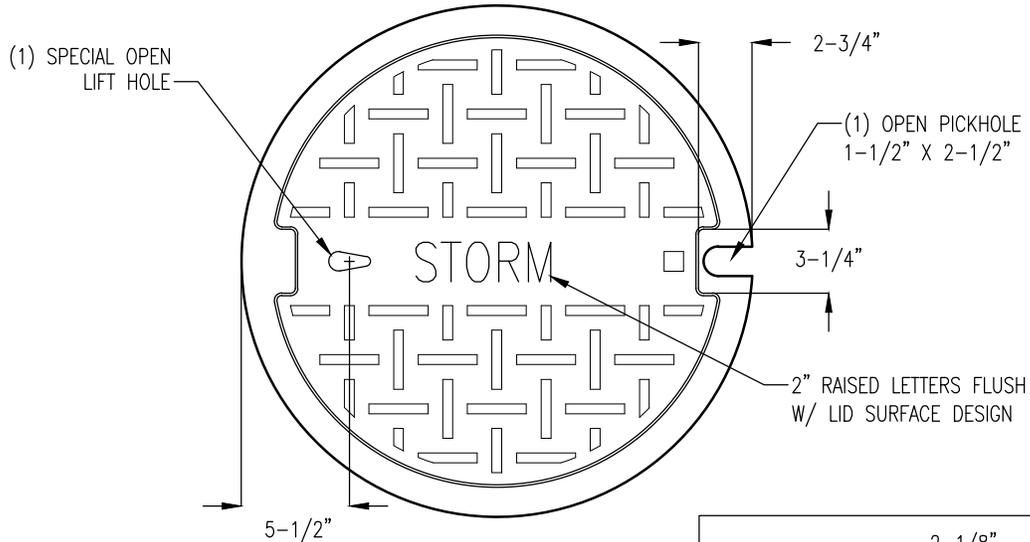
REVISED/APPROVED 01/08/2016

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

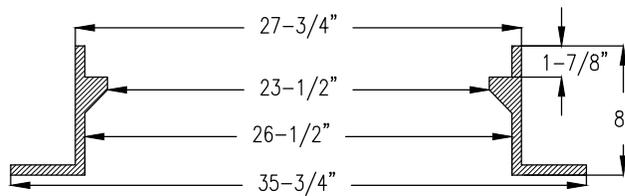
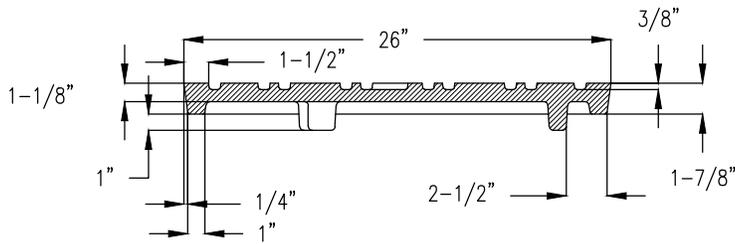
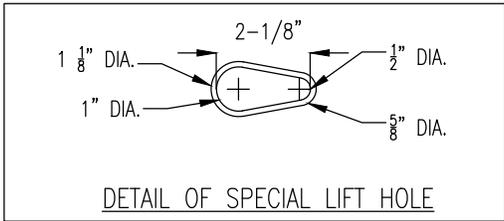
NO SCALE

WEIGHT 298 LBS		MATL. GRAY IRON CLASS 35B
WEIGHT 122 LBS	TOTAL WEIGHT 420 LBS.	SPEC. ASTM A-48-74

NOTE: SUITABLE FOR HS25 WHEEL LOADS



NOTE: T/CAST SHALL BE .03' BELOW FINISHED
PAVEMENT SURFACE.



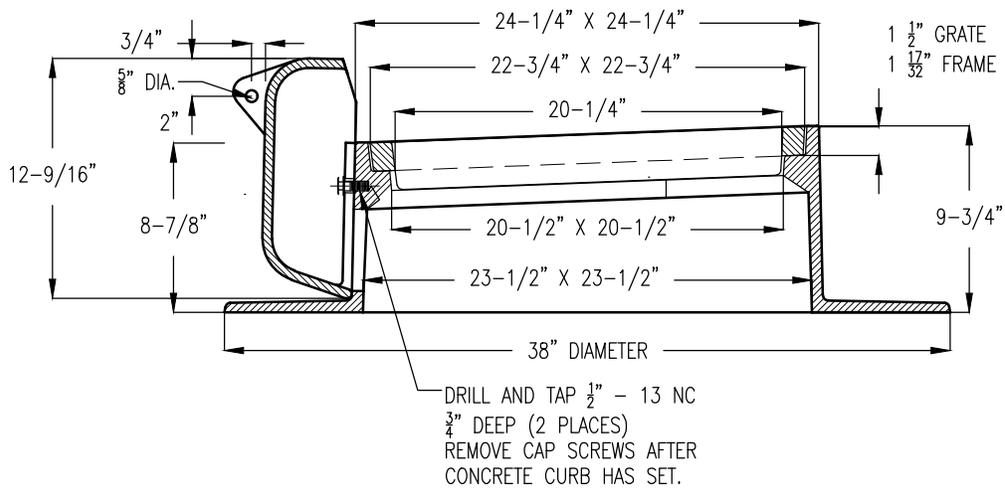
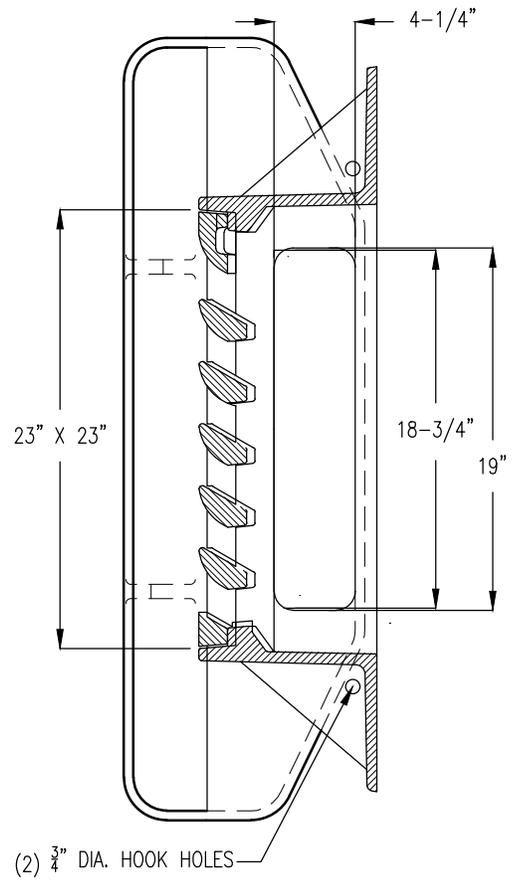
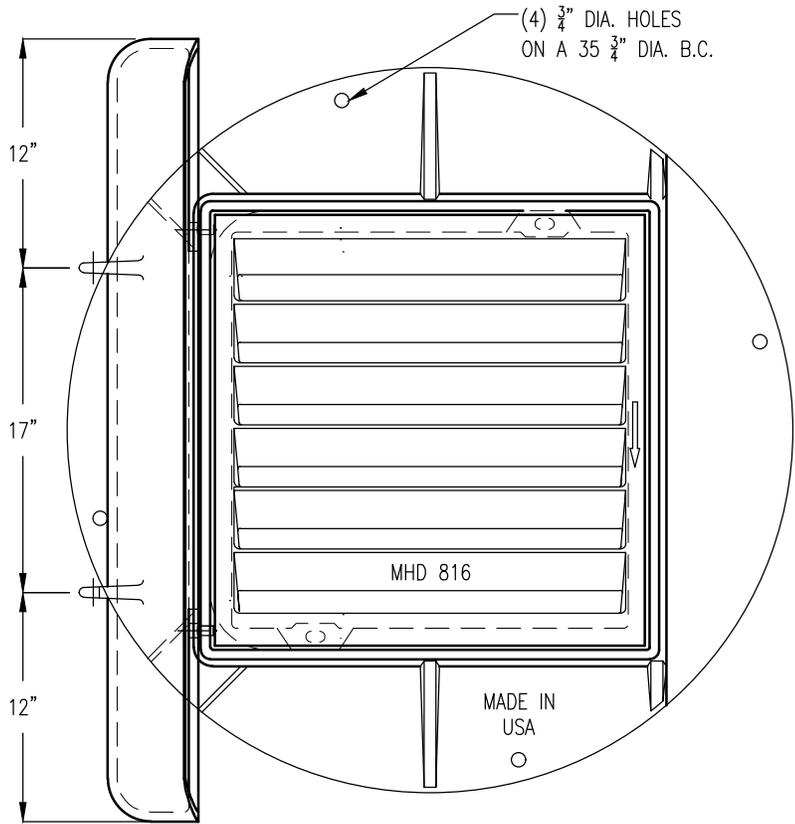
STORM MANHOLE CASTING

STRM-1

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. COMPONENT NO'S: FRAME 5002, GRATE MHD 816 (STD PLATE 4154), CURB BOX 823A (STD PLATE 4160).
2. MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
3. WEIGHT: FRAME APPROX. 257#, GRATE 131#, CURB BOX 105#.
4. ALL GUTTERS UPSTREAM OF CATCH BASINS SHALL BE STAMPED, "NO DUMPING, LEADS TO LAKE" WITH A CITY SUPPLIED STAMP.

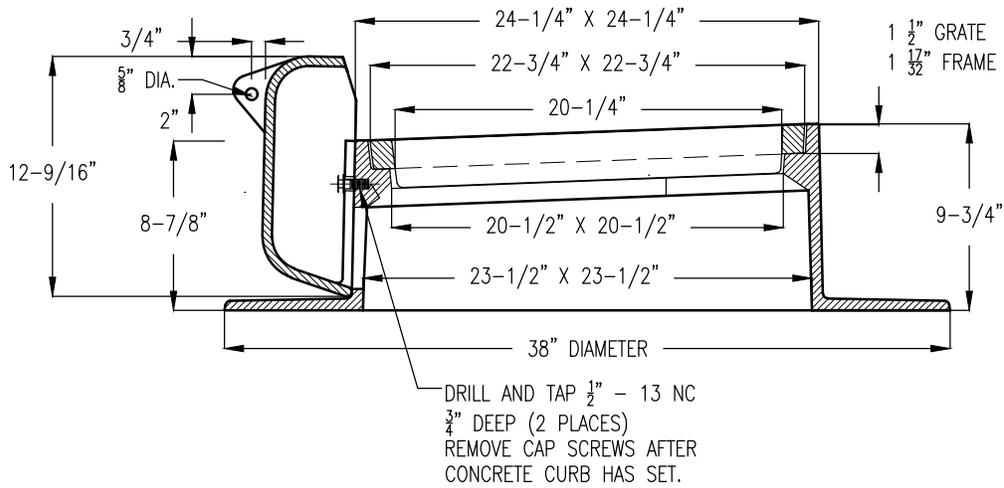
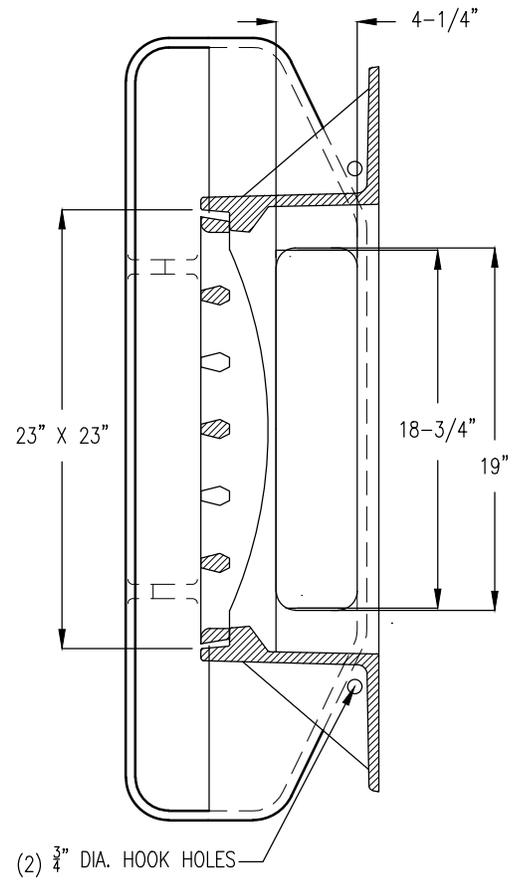
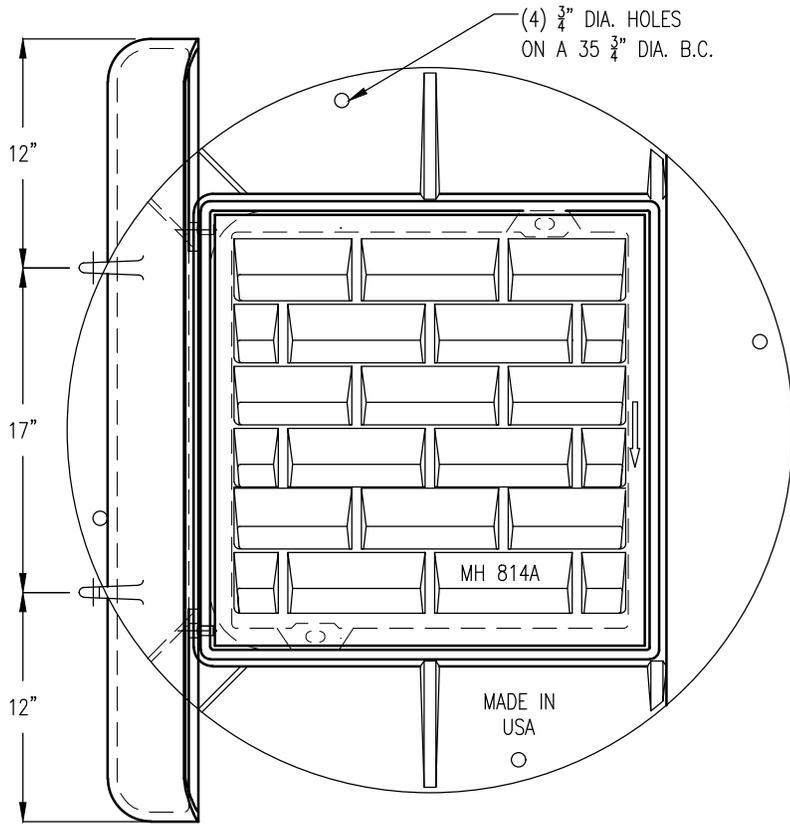
CATCH BASIN/CURB BOX CASTINGS

STRM-2

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. COMPONENT NO'S: FRAME 5002, GRATE MHD 814A (STD PLATE 4152), CURB BOX 823A (STD PLATE 4160).
2. MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
3. WEIGHT: FRAME APPROX. 257#, GRATE 131#, CURB BOX 105#.
4. ALL GUTTERS UPSTREAM OF CATCH BASINS SHALL BE STAMPED, "NO DUMPING, LEADS TO LAKE" WITH A CITY SUPPLIED STAMP.

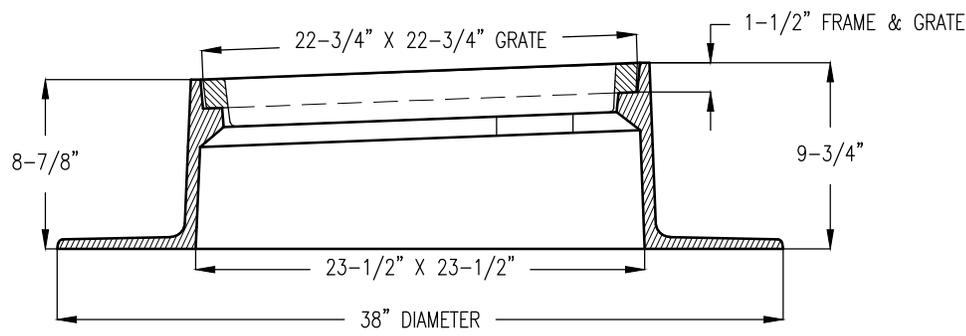
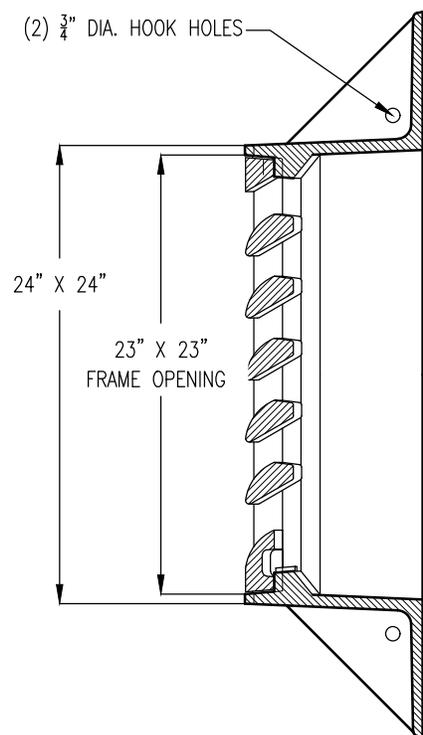
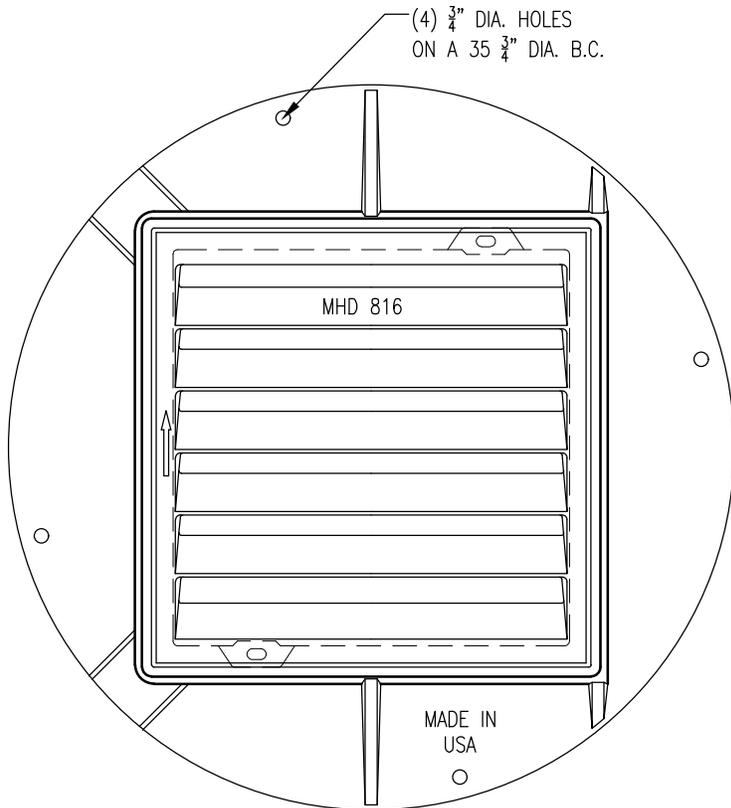
CATCH BASIN/CURB BOX CASTINGS - BICYCLE SAFE

STRM-2B

REVIEWED/APPROVED 04/05/2019

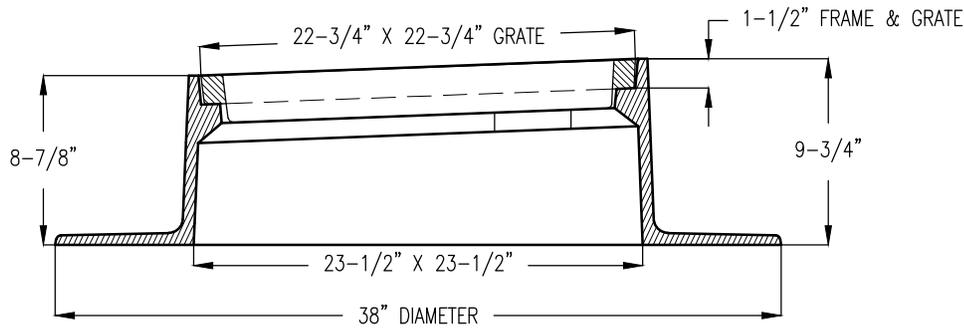
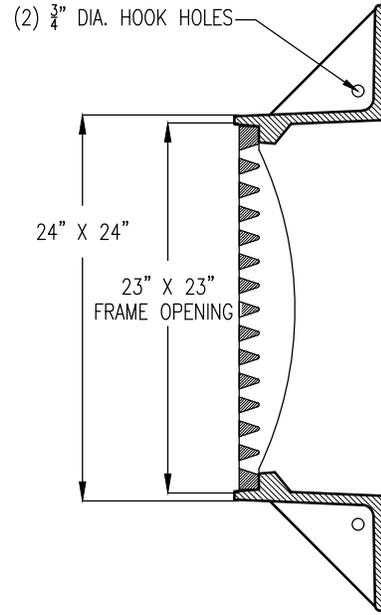
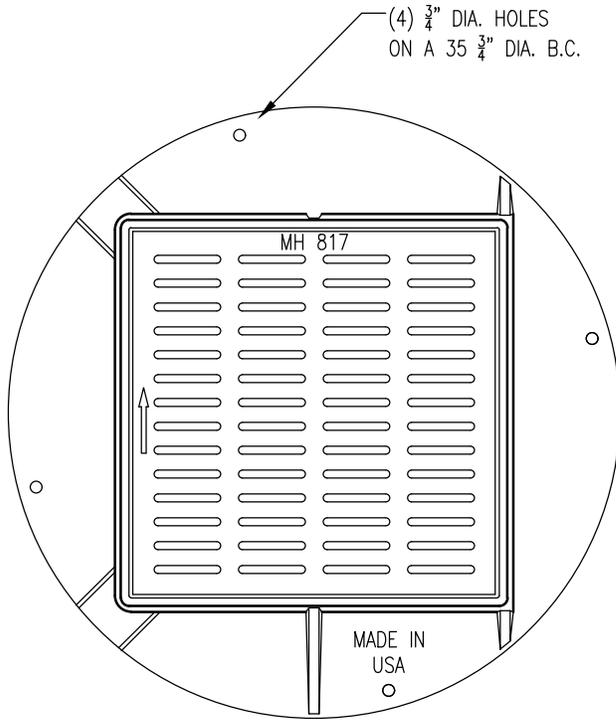
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- NOTES:
1. COMPONENT NO'S: FRAME 5005, GRATE 816 (STD PLATE 4154).
 2. MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
 3. WEIGHT: FRAME 262#; GRATE 131#
 4. ALL GUTTERS UPSTREAM OF CATCH BASINS SHALL BE STAMPED, "NO DUMPING, LEADS TO LAKE" WITH A CITY SUPPLIED STAMP.

CATCH BASIN CASTINGS		STRM-3
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

1. COMPONENT NO'S: FRAME 5005, GRATE 817 (STD PLATE 4155).
2. MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
3. WEIGHT: FRAME 262#; GRATE 131#
4. ALL GUTTERS UPSTREAM OF CATCH BASINS SHALL BE STAMPED, "NO DUMPING, LEADS TO LAKE" WITH A CITY SUPPLIED STAMP.

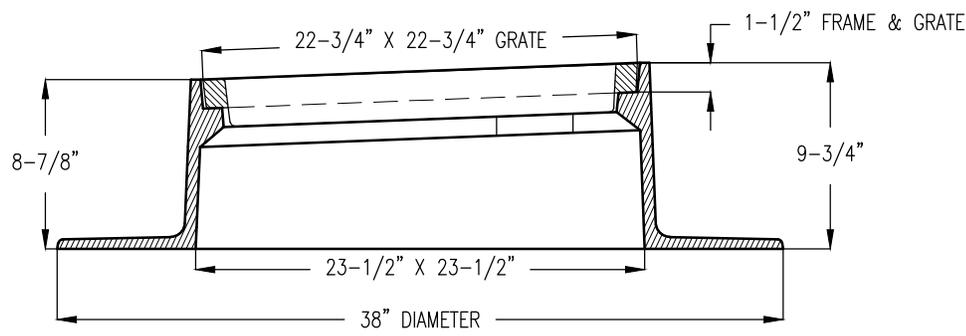
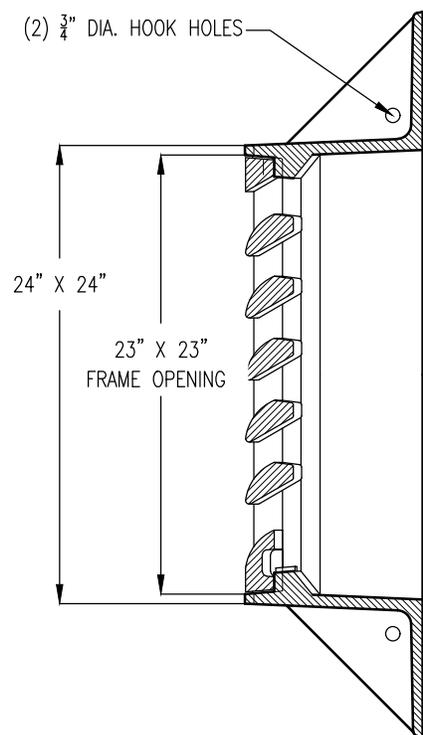
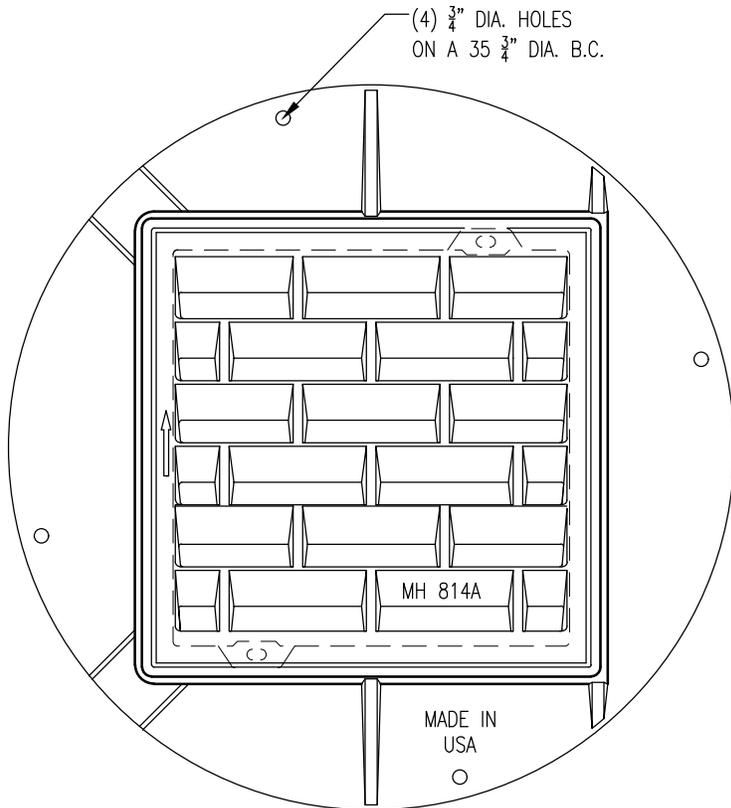
CATCH BASIN CASTINGS – ADA

STRM-3A

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- NOTES:
1. COMPONENT NO'S: FRAME 5005, GRATE 814A (STD PLATE 4152).
 2. MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
 3. WEIGHT: FRAME 262#; GRATE 131#
 4. ALL GUTTERS UPSTREAM OF CATCH BASINS SHALL BE STAMPED, "NO DUMPING, LEADS TO LAKE" WITH A CITY SUPPLIED STAMP.

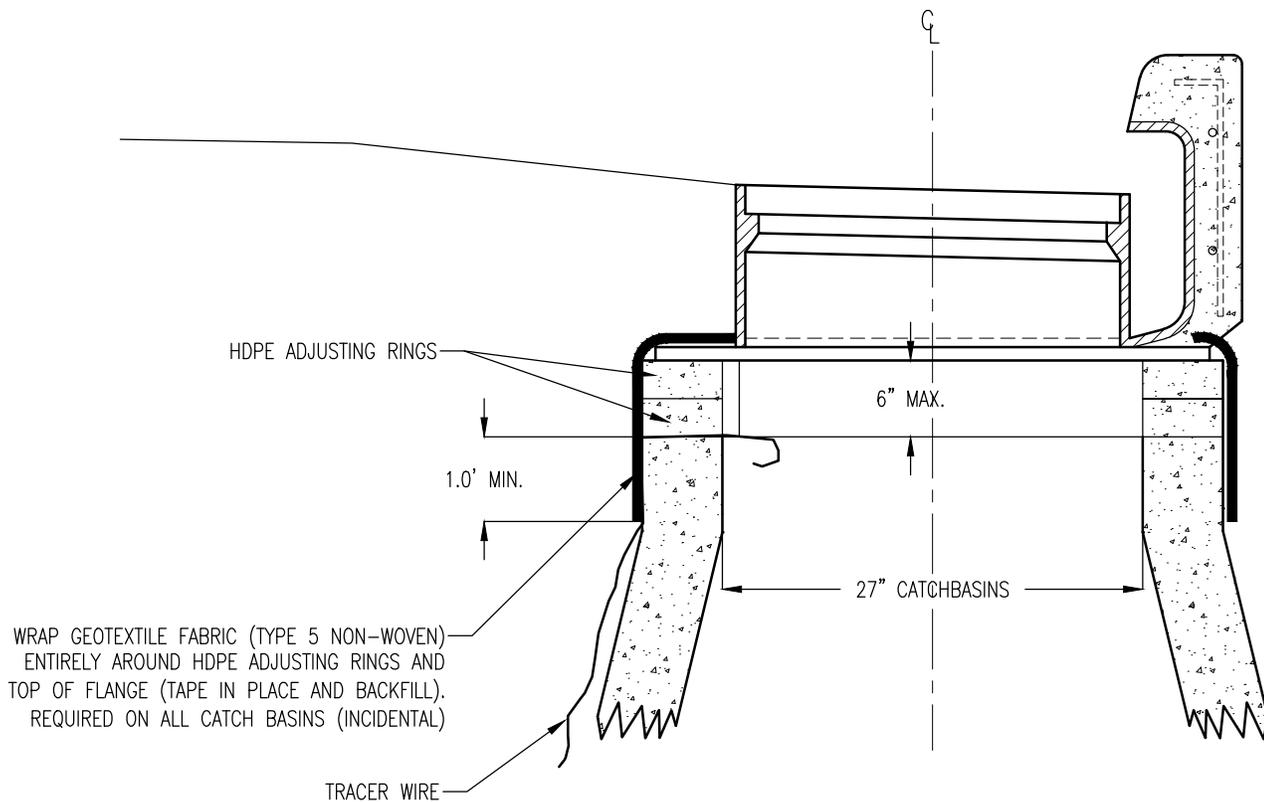
CATCH BASIN CASTINGS – BICYCLE SAFE

STRM-3B

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE:
TRACER WIRE REQUIRED ON ALL PLASTIC STORM SEWER PIPES

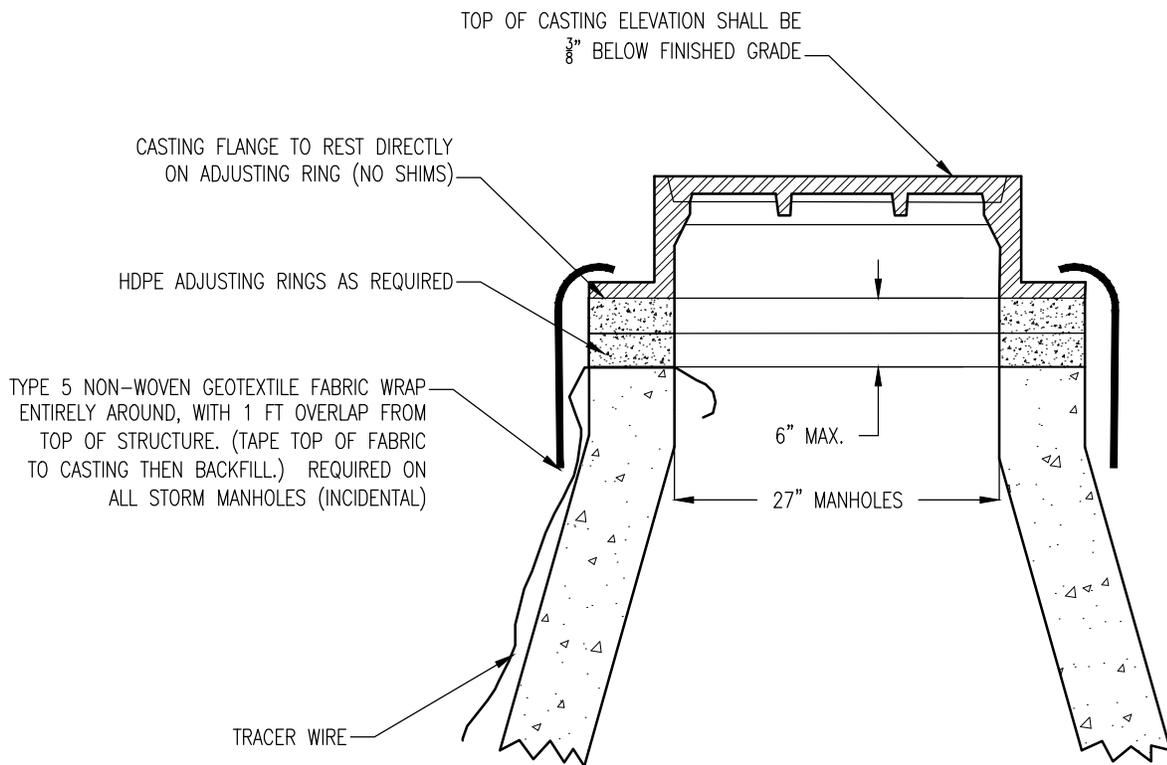
FABRIC WRAPPED CATCH BASIN CASTING

STRM-4

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE:
TRACER WIRE REQUIRED ON ALL PLASTIC STORM SEWER PIPE

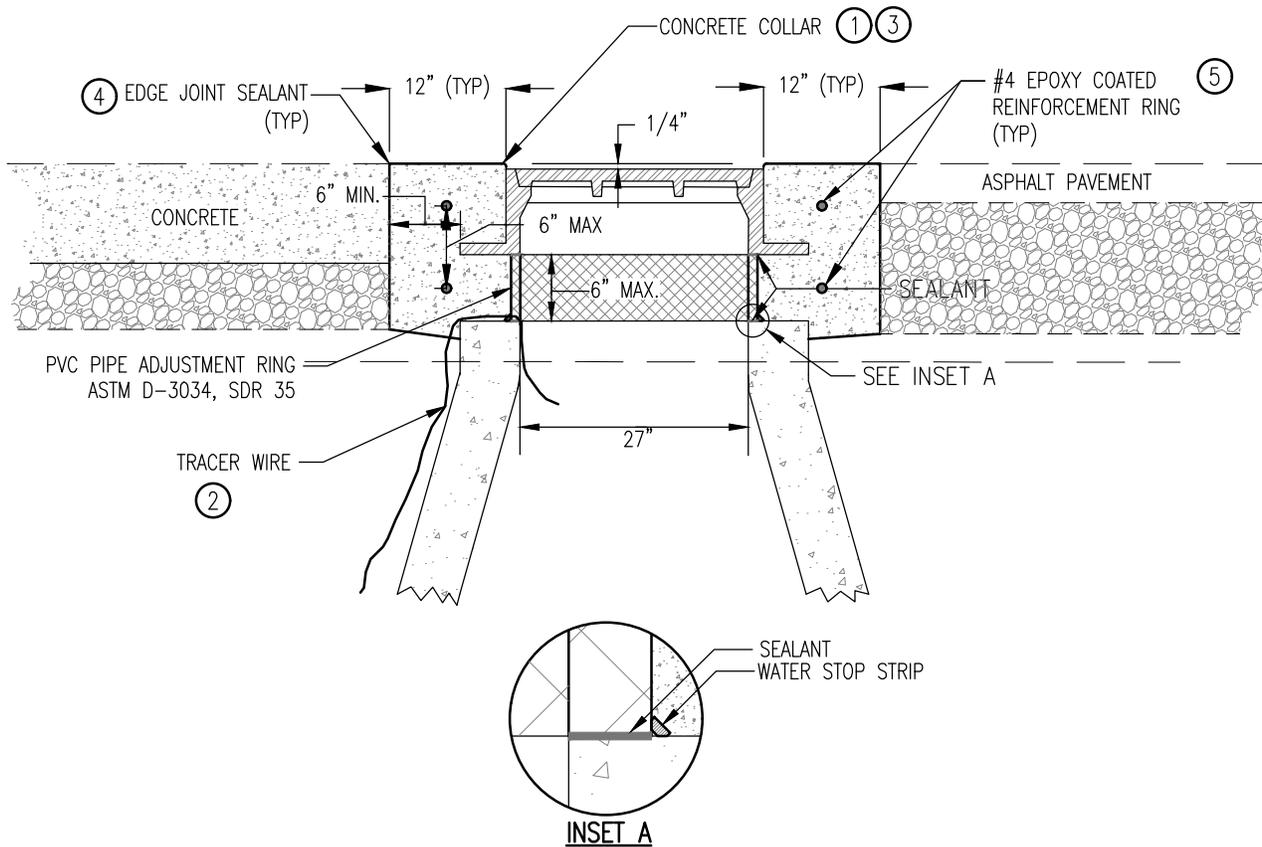
STORM MANHOLE NON-PAVED AREAS

STRM-5

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

- ① CONCRETE (MIX NO. 3G52) COLLAR TO ENCASE CASTING AND ADJUSTMENT RING.
- ② TRACER WIRE, IF REQUIRED, FOR PLASTIC PIPE ON PROJECT
- ③ CONCRETE COLLAR SHALL BE CIRCULAR LAYOUT. PAVEMENT AND BASE SHALL BE CUT OUT WITH ROTATING CUTTING DEVICE
- ④ FINISH CONCRETE EDGE WITH 1/4" RADIUS. SEAL JOINT BETWEEN PAVEMENT AND COLLAR.
- ⑤ MAINTAIN 3.5" COVER ON REINFORCEMENT.

NOT TO SCALE

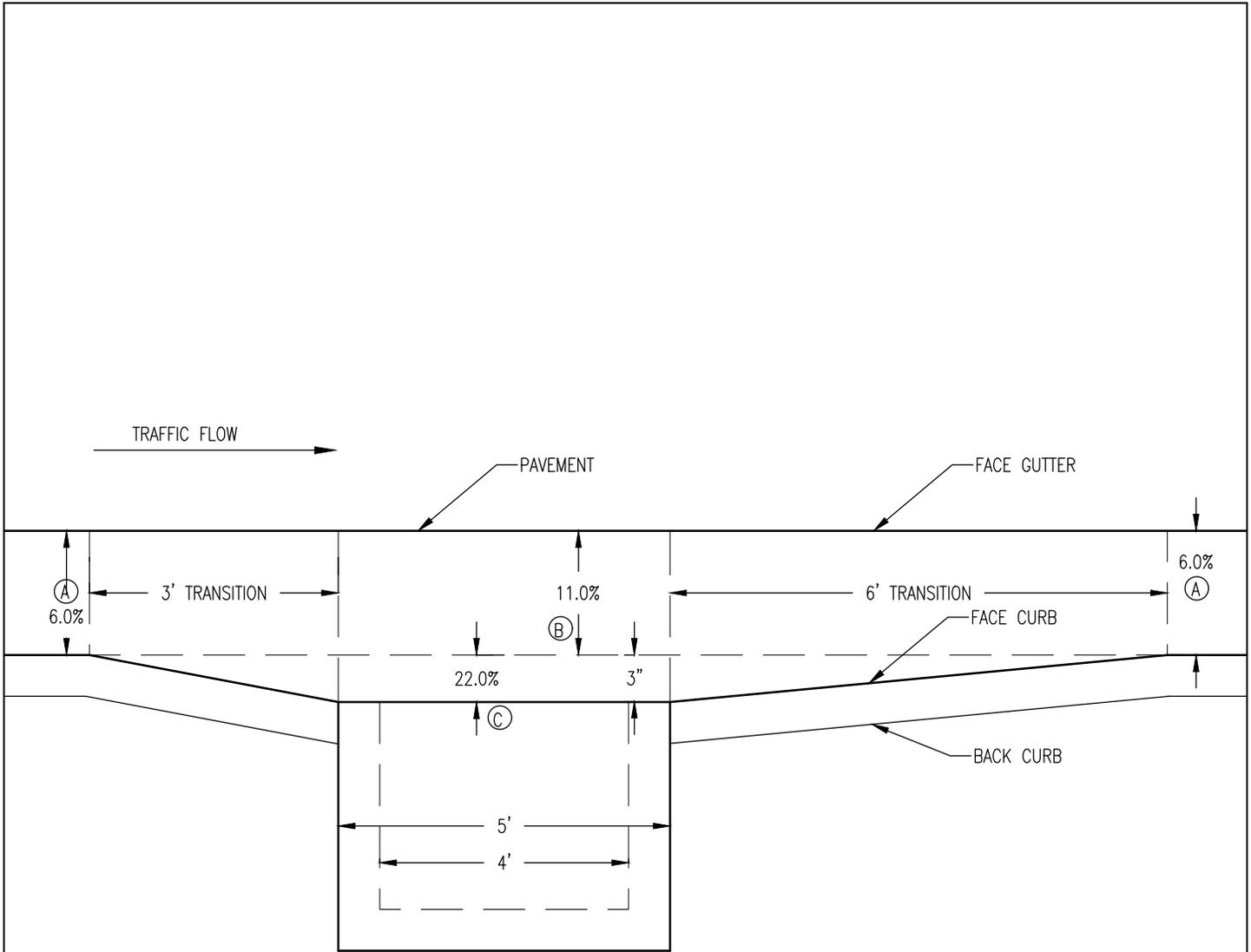
CONCRETE ENCASED CASTING COLLAR FOR STORM MH IN ROADWAY, WALKS, & DRIVES

STRM-5A

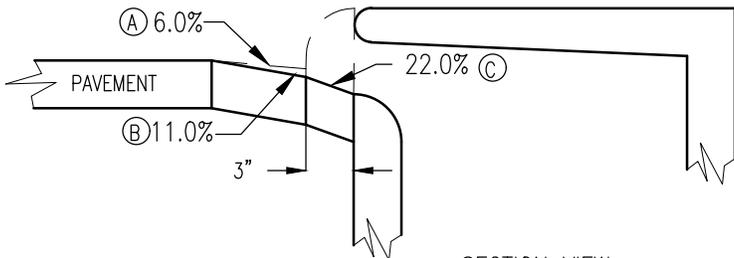
REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



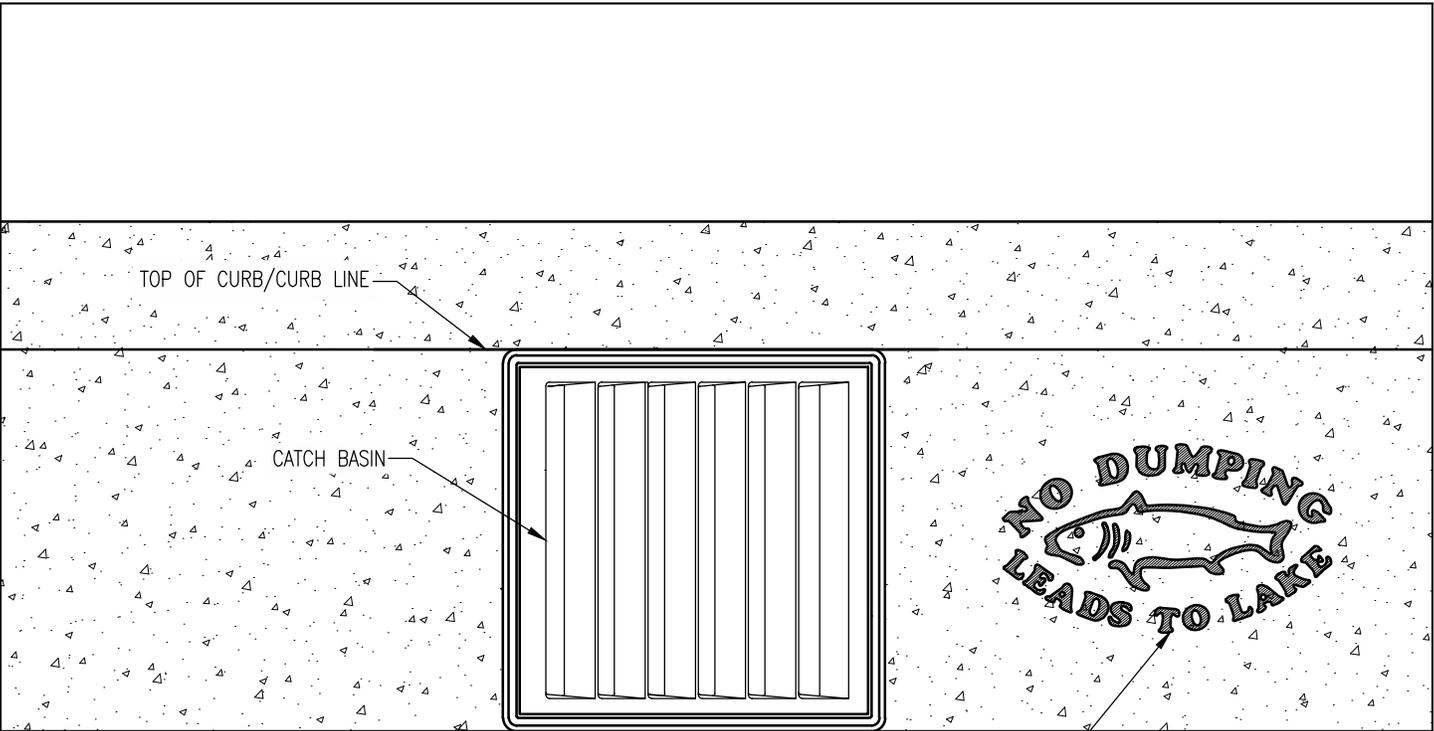
PLAN VIEW



SECTION VIEW

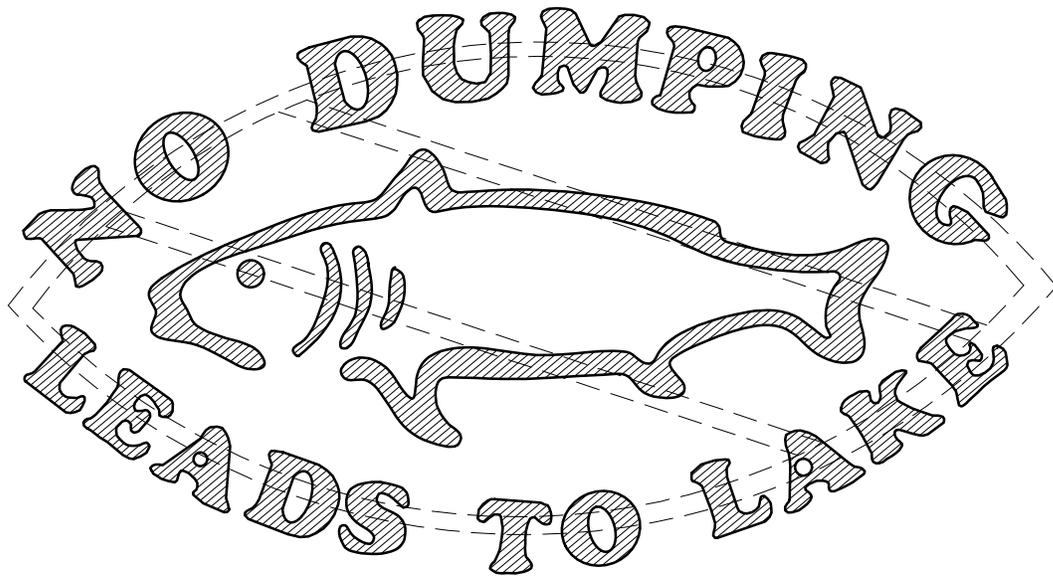
SEE STANDARD PLATE 4021 FOR CATCH BASIN CONSTRUCTION DETAILS.

GUTTER SWALE		STRM-6
REVIEWED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



GUTTER STAMP TO BE PLACED A MAXIMUM OF 18" FROM CATCH BASIN GRATE ON UPHILL SIDE AND CENTERED IN GUTTER

GUTTER STAMP TO BE OBTAINED FROM CITY OF DULUTH BY CONTRACTOR.



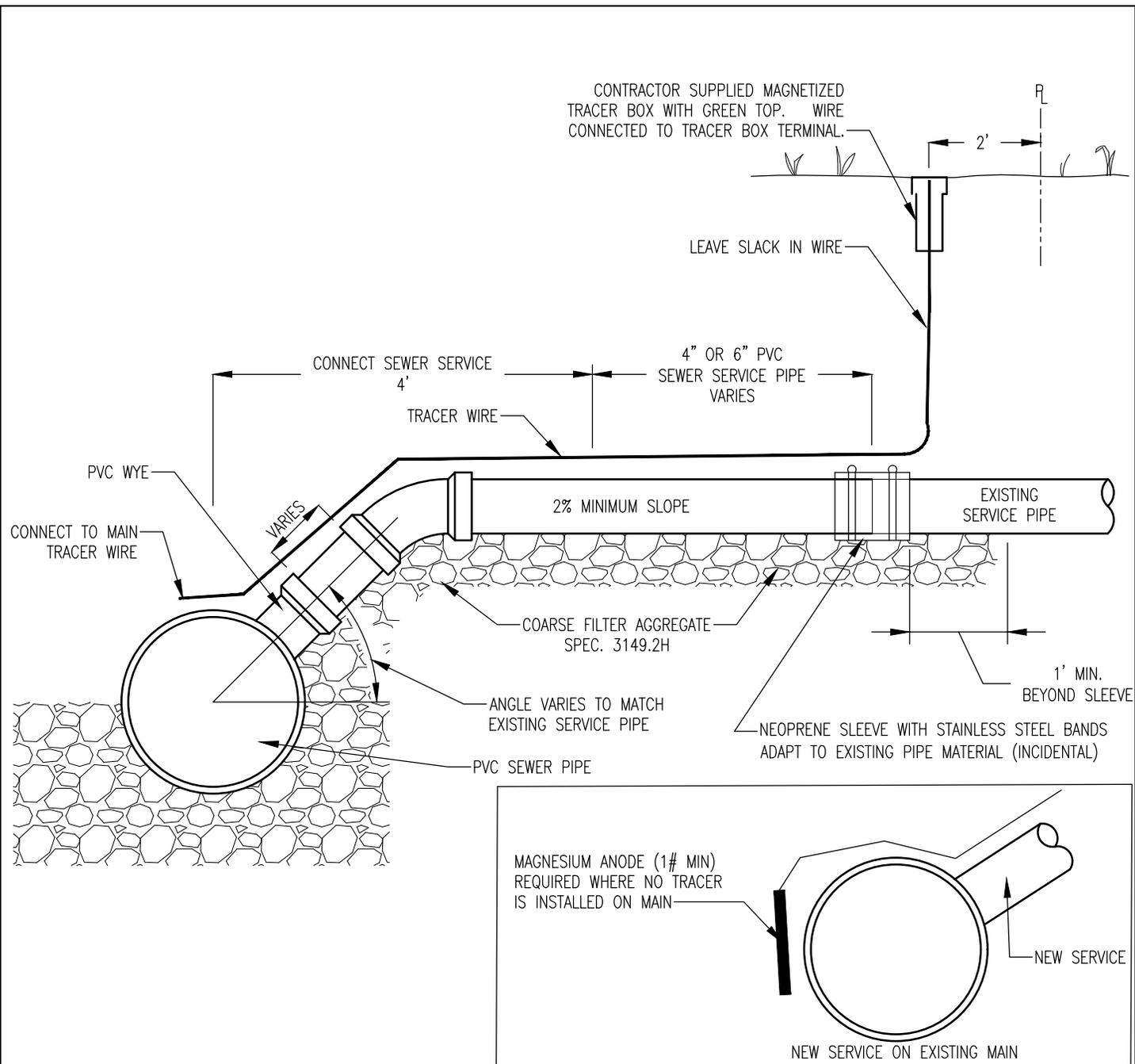
GUTTER STAMP

STRM-7

REVIEWED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES

1. BID ITEM FOR PVC WYE INCLUDES FURNISHING AND INSTALLING WYE IN SEWER MAIN.
2. CONNECT SEWER SERVICE INCLUDES 4" OR 6" PVC SEWER SERVICE PIPE (TO 4' FROM C/L) AND ALL FITTINGS
3. 4" OR 6" PVC SEWER SERVICE PIPE IS INTENDED FOR THE RECONSTRUCTION OF SEWER SERVICES (WHEN FOUND TO BE IN NEED BY THE ENGINEER) COMPLETE IN PLACE FROM 4.0' BEYOND THE C/L OF THE SEWER MAIN TO A POINT DESIGNATED BY THE ENGINEER
4. FOR NEW SERVICES, PIPE TO STOP AT RIGHT OF WAY
5. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED WITH SEWER MAINS AND SERVICES. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DETERMINED BY THE ENGINEER
6. FOR SERVICES, TRACER WIRE SHALL RUN FROM THE WYE AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON LOCKABLE TOP.
7. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

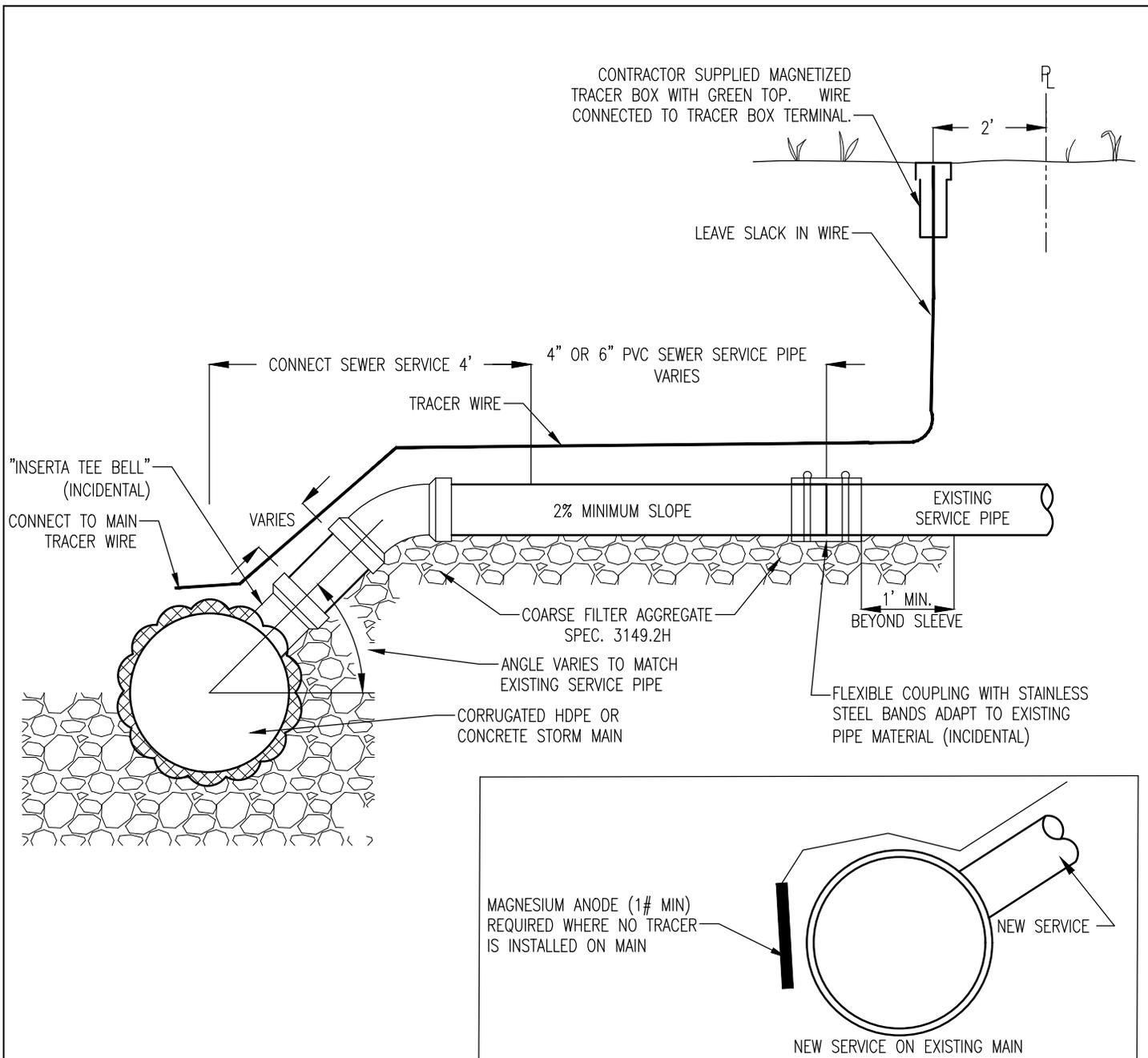
PRIVATE STORM SERVICE – TYPE A

STRM-8

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES

1. PROVIDE AND INSTALL INSERTA TEE (INCIDENTAL).
2. CONNECT SEWER SERVICE INCLUDES 4" OR 6" PVC SEWER SERVICE PIPE (TO 4' FROM C/L) AND ALL FITTINGS
3. 4" OR 6" PVC SEWER SERVICE PIPE IS INTENDED FOR THE RECONSTRUCTION OF SEWER SERVICES (WHEN FOUND TO BE IN NEED BY THE ENGINEER) COMPLETE IN PLACE FROM 4.0' BEYOND THE C/L OF THE SEWER MAIN TO A POINT DESIGNATED BY THE ENGINEER
4. FOR NEW SERVICES, PIPE TO STOP AT RIGHT OF WAY
5. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED WITH SEWER MAINS AND SERVICES. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DETERMINED BY THE ENGINEER
6. FOR SERVICES, TRACER WIRE SHALL RUN FROM THE WYE AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON LOCKABLE TOP.
7. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

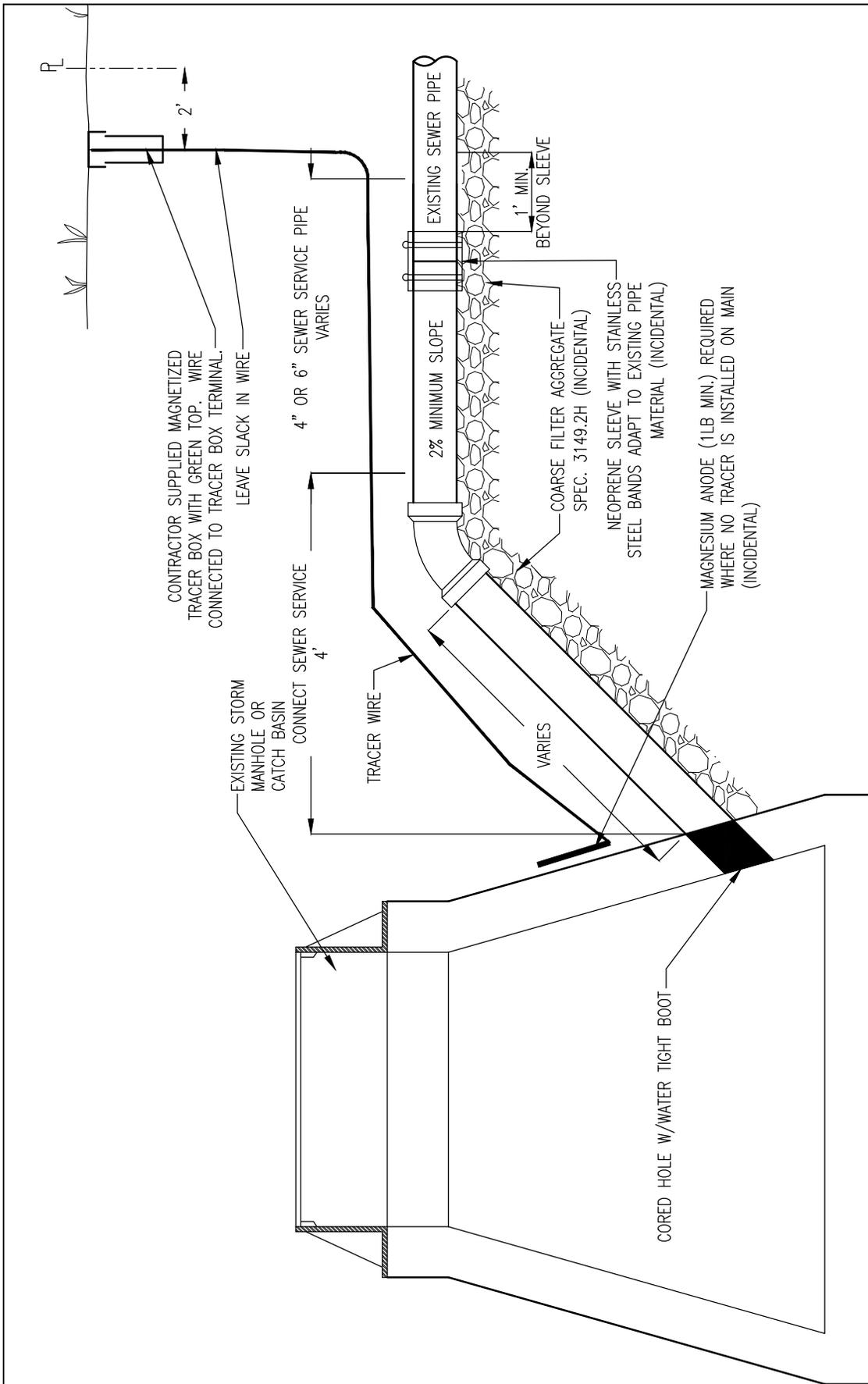
PRIVATE STORM SERVICE – TYPE B

STRM-9

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES

1. CONNECT SEWER SERVICE INCLUDES 4" OR 6" PVC SEWER SERVICE PIPE (TO 4' FROM STRUCTURE) AND ALL FITTINGS
2. 4" & 6" PVC SEWER SERVICE PIPE IS INTENDED FOR THE RECONSTRUCTION OF SEWER SERVICES (WHEN FOUND TO BE IN NEED BY THE ENGINEER) COMPLETE IN PLACE FROM 4.0' BEYOND THE STRUCTURE OF THE SEWER MAIN TO A POINT DESIGNATED BY THE ENGINEER
3. FOR NEW SERVICES, PIPE TO STOP AT RIGHT OF WAY
4. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED WITH SEWER SERVICES. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DETERMINED BY THE ENGINEER
5. FOR SERVICES, TRACER WIRE SHALL RUN FROM THE WYE AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON LOCKABLE TOP.
6. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

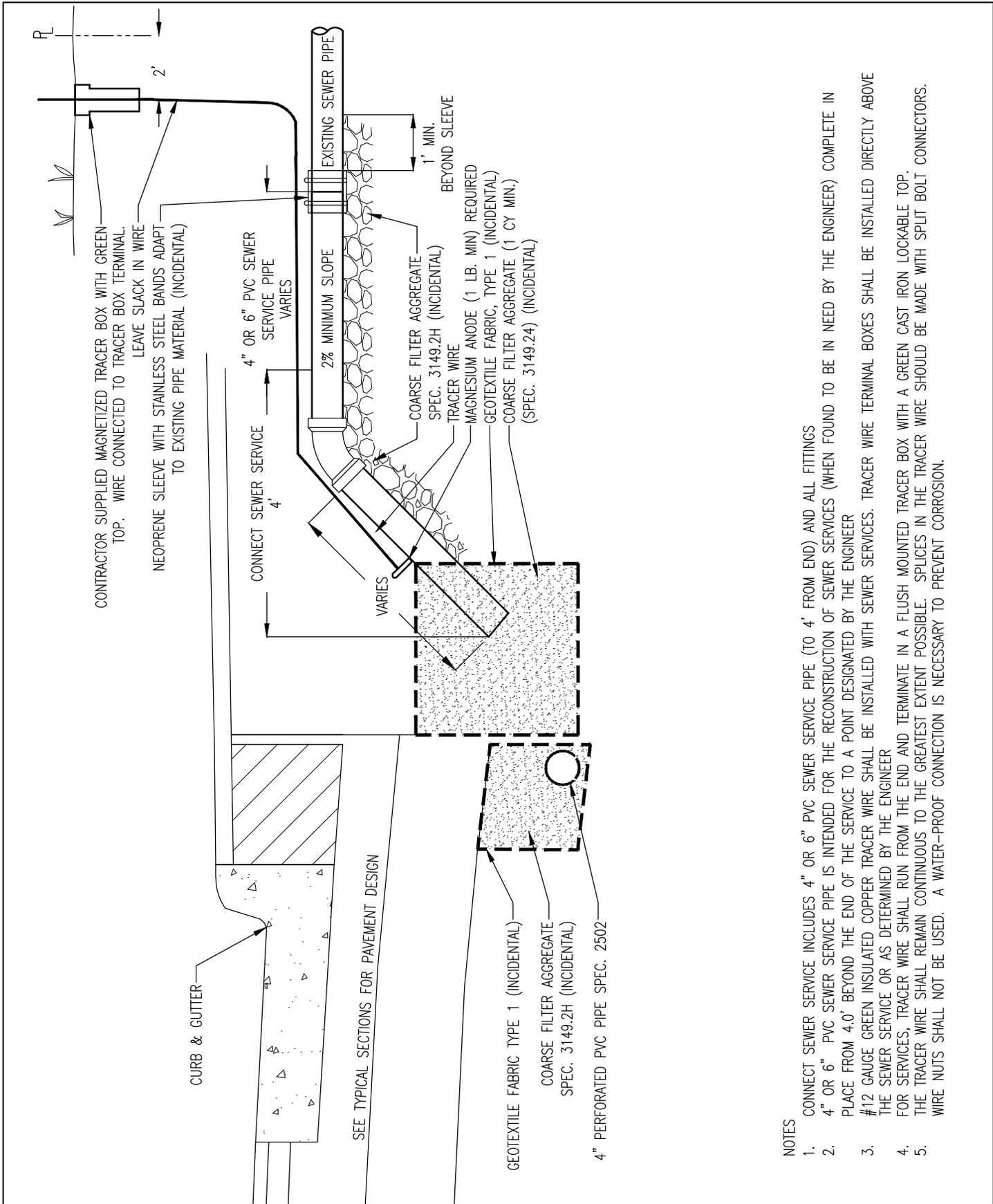
PRIVATE STORM SERVICE – TYPE C

STRM-10

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES

1. CONNECT SEWER SERVICE INCLUDES 4" OR 6" PVC SEWER SERVICE PIPE (TO 4' FROM END) AND ALL FITTINGS
2. 4" OR 6" PVC SEWER SERVICE PIPE IS INTENDED FOR THE RECONSTRUCTION OF SEWER SERVICES (WHEN FOUND TO BE IN NEED BY THE ENGINEER) COMPLETE IN PLACE FROM 4.0' BEYOND THE END OF THE SERVICE TO A POINT DESIGNATED BY THE ENGINEER
3. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED WITH SEWER SERVICES. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DETERMINED BY THE ENGINEER
4. FOR SERVICES, TRACER WIRE SHALL RUN FROM THE END AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON LOCKABLE TOP.
5. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

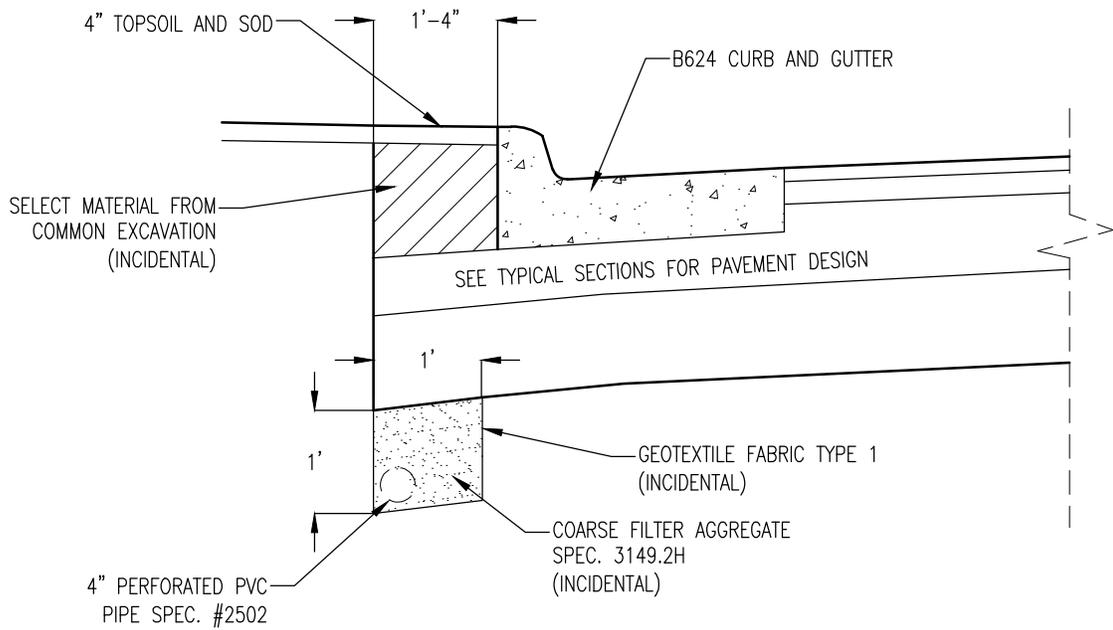
PRIVATE STORM SERVICE – TYPE D

STRM-11

REVIEWED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



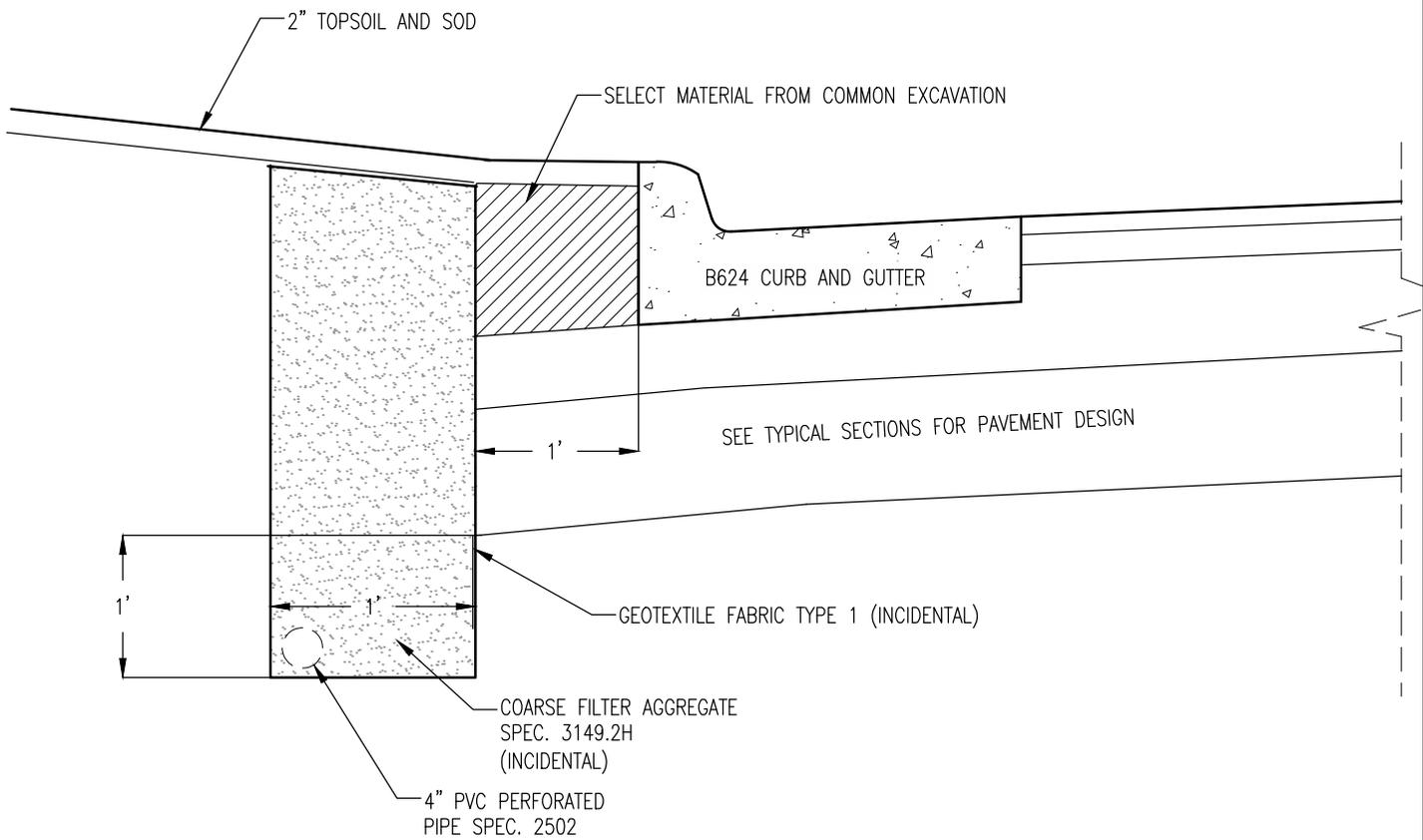
PERFORATED PIPE DETAIL

STR-1

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



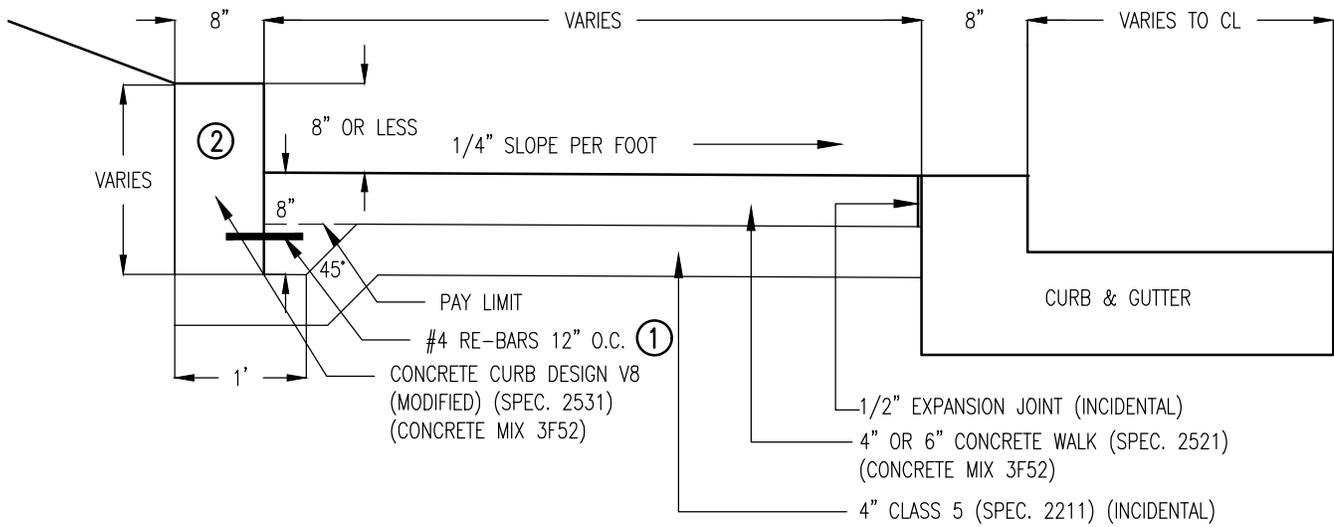
PERFORATED PIPE – SPECIAL

STR-2

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. OPTIONAL REINFORCEMENT TIE BARS (INCIDENTAL) IF CURB IS POURED SEPARATELY FROM SIDEWALK
2. EXACT LOCATION AND ELEVATION OF CONCRETE CURB WILL BE DETERMINED IN THE FIELD BY THE ENGINEER

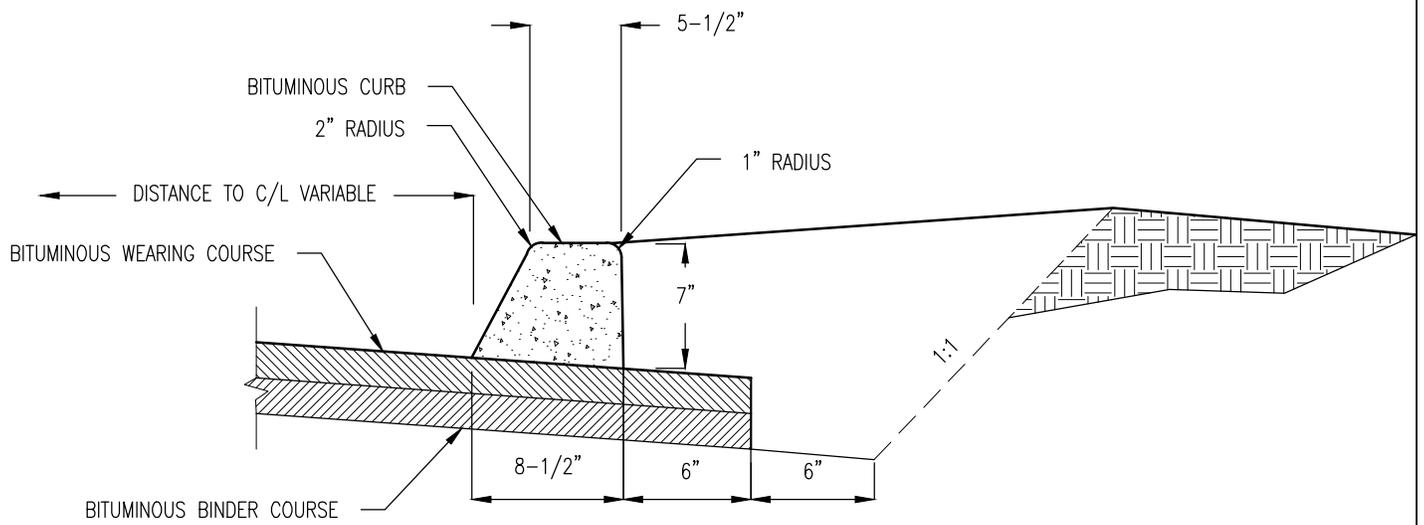
4" OR 6" CONCRETE WALK WITH CONCRETE CURB DESIGN V8 (MODIFIED)

STR-3

REVISED/APPROVED 01/20/2017

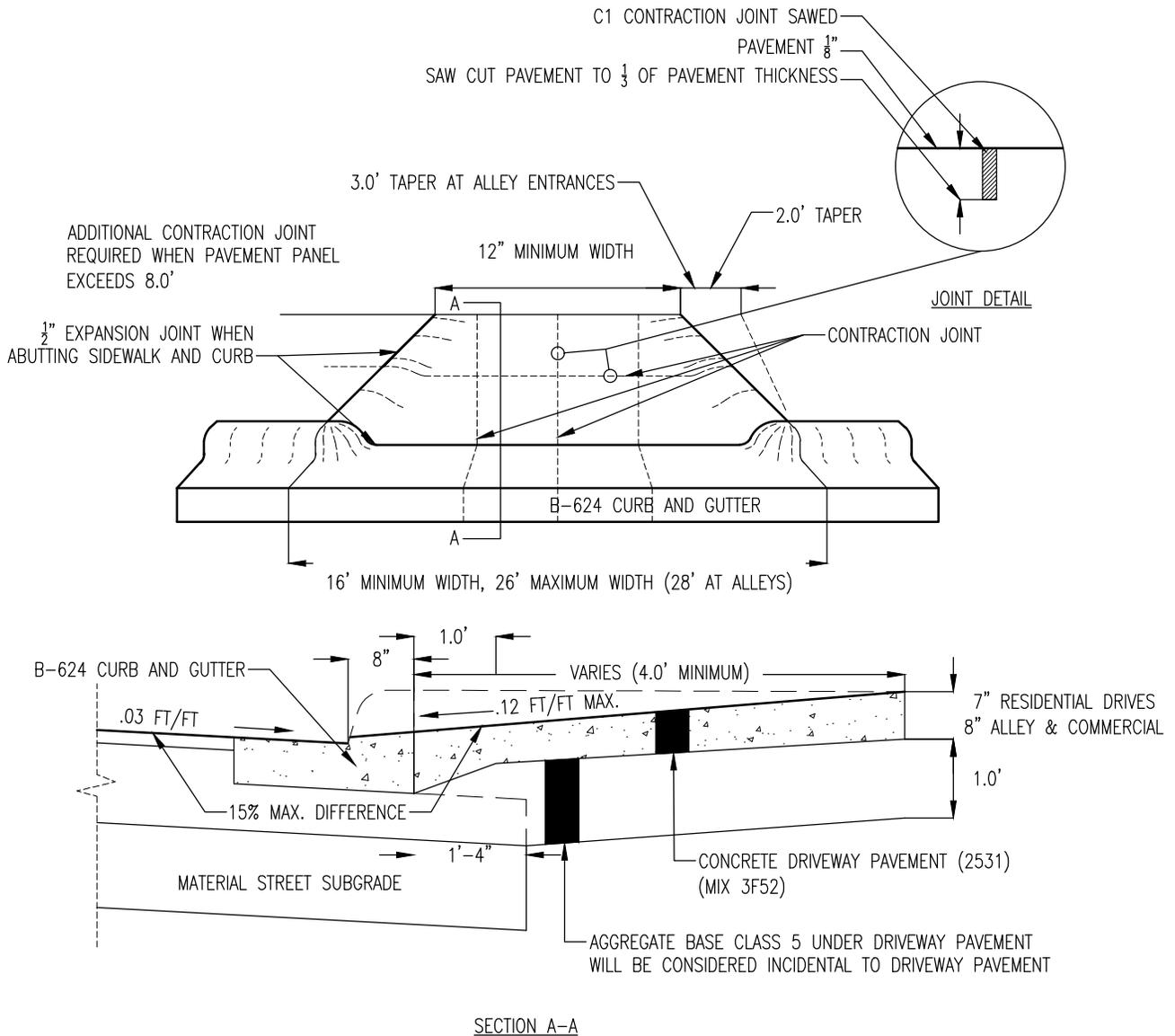
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



VOLUME OF CURB
 0.338 CU. FT. PER LIN. FT.

BITUMINOUS CURB		STR-4
REVISED/APPROVED 02/01/2013	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

1. WHERE THERE IS NO SIDEWALK OR THERE IS A GRASS BOULEVARD BETWEEN THE SIDEWALK AND THE BACK OF CURB THE CREST OF THE DRIVEWAY MUST BE AT LEAST 6" ABOVE GUTTER TO CONTAIN RUNOFF.
2. WHERE THERE IS SIDEWALK DIRECTLY BEHIND THE CURB, DRIVEWAY PROFILE SLOPE SHALL BE FLATTENED TO MEET ADA ACCESSIBLE ROUTE STANDARDS

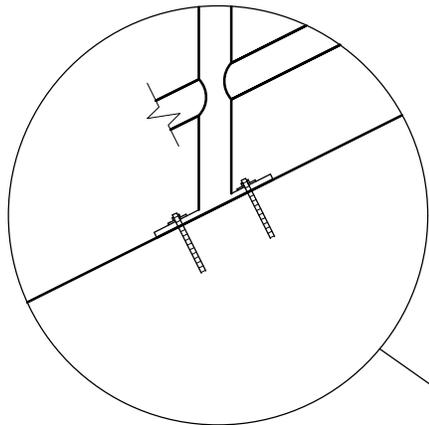
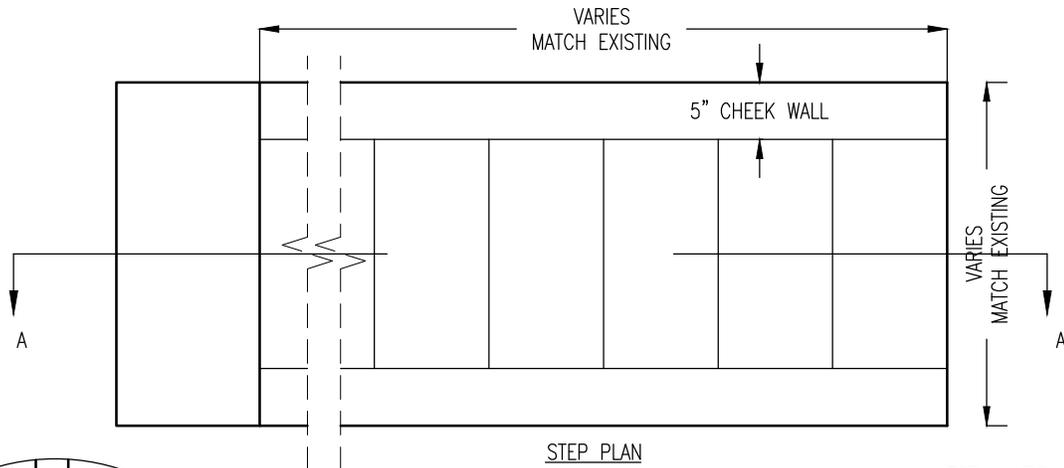
DRIVEWAY & ALLEY ENTRANCES

STR-5

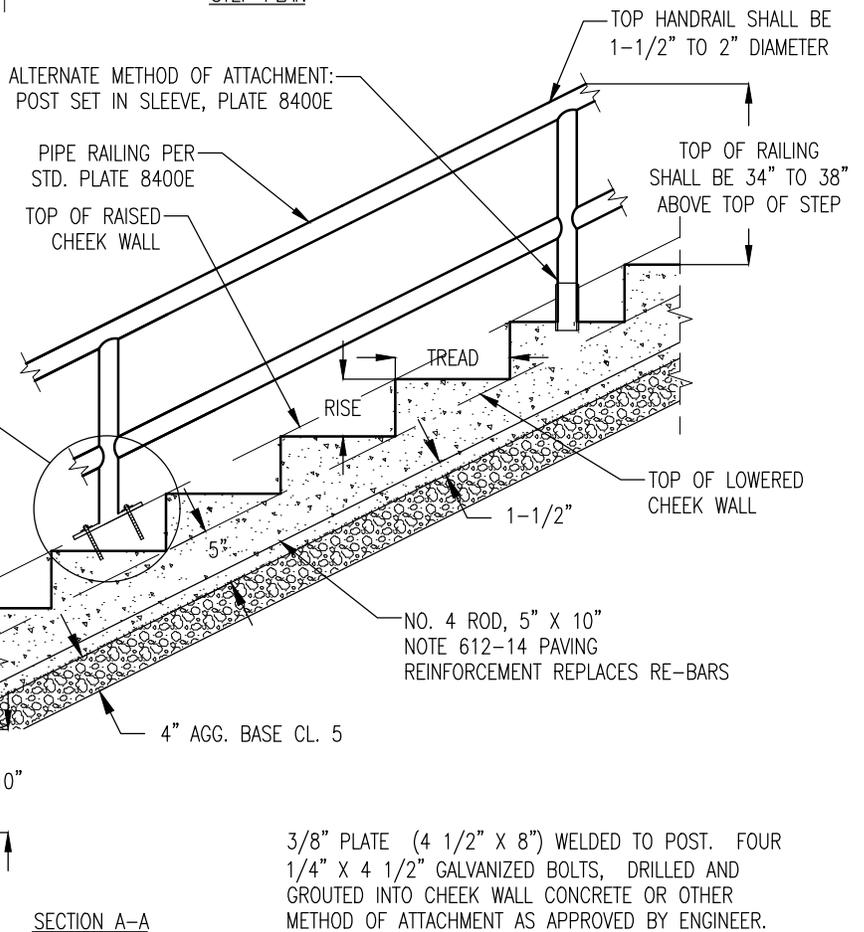
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



TREAD + RISER = 18" RISE WILL BE 4-1/2" MIN., 7" MAX. TREAD 1% SLOPE



③
NO.4 ROD 5" C-C
NO.4 ROD 10" C-C

SECTION A-A

3/8" PLATE (4 1/2" X 8") WELDED TO POST. FOUR 1/4" X 4 1/2" GALVANIZED BOLTS, DRILLED AND GROUTED INTO CHEEK WALL CONCRETE OR OTHER METHOD OF ATTACHMENT AS APPROVED BY ENGINEER.

NOTES:

1. 5" WIDE RAISED OR LOWERED CHEEK WALLS TO BE DETERMINED IN FIELD BY ENGINEER.
2. RAILINGS WILL BE REQUIRED WHERE MORE THAN THREE STEPS ARE NEEDED. RAILINGS TO BE PAINTED WITH BLACK PAINT PER CITY STANDARD SPEC. 2402
3. THE CONCRETE LUG ANCHOR MAY NOT BE NEEDED FOR 2 STEPS OR LESS.
4. INCLUDES: ALL EXCAVATION (EXCEPT ROCK EXC.), REMOVAL OF EXISTING STEPS, FORMING, CLASS 5, REINFORCING BAR, BACKFILL, AND CONCRETE (MIX 3G52),

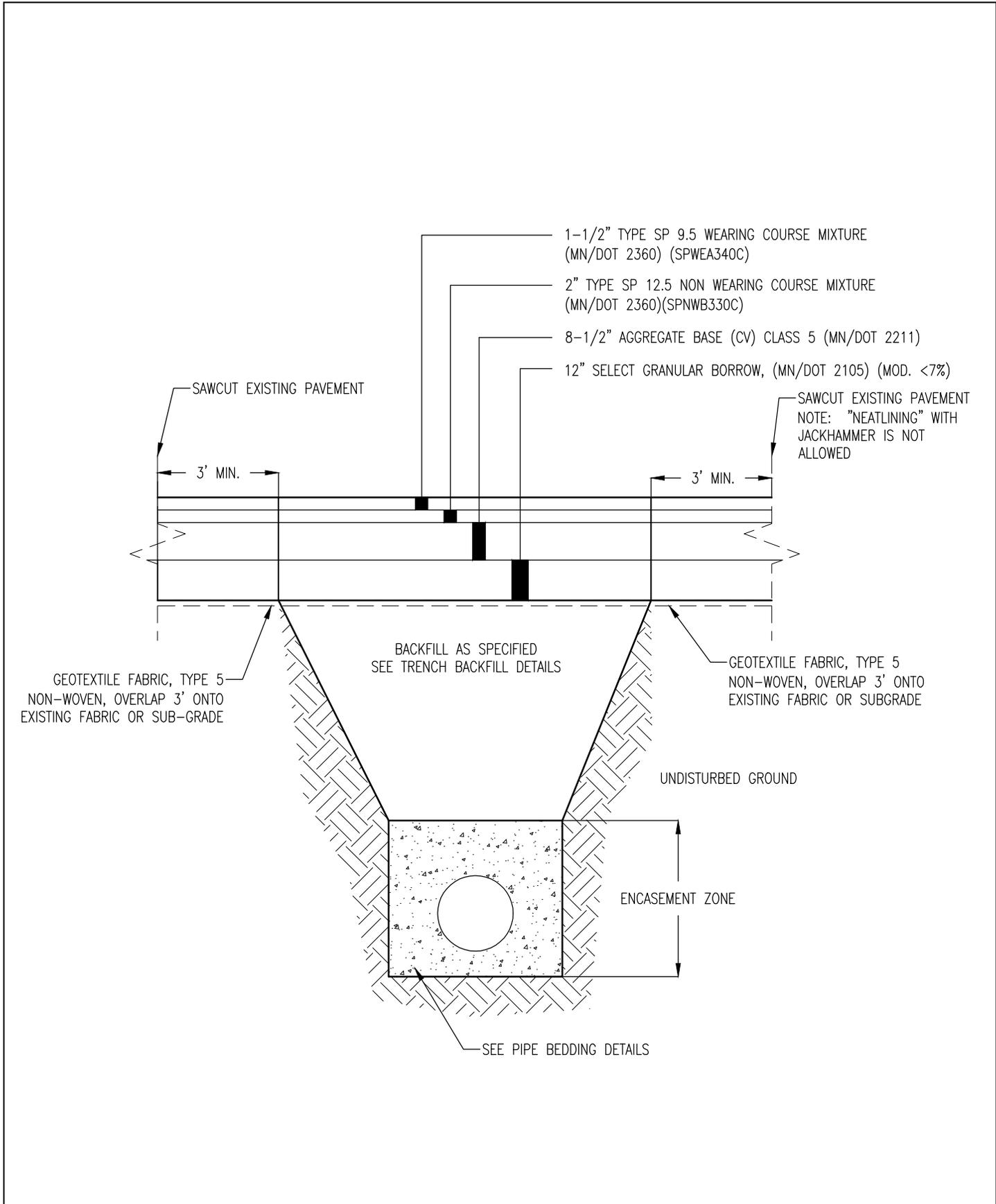
CONCRETE STEPS

STR-7

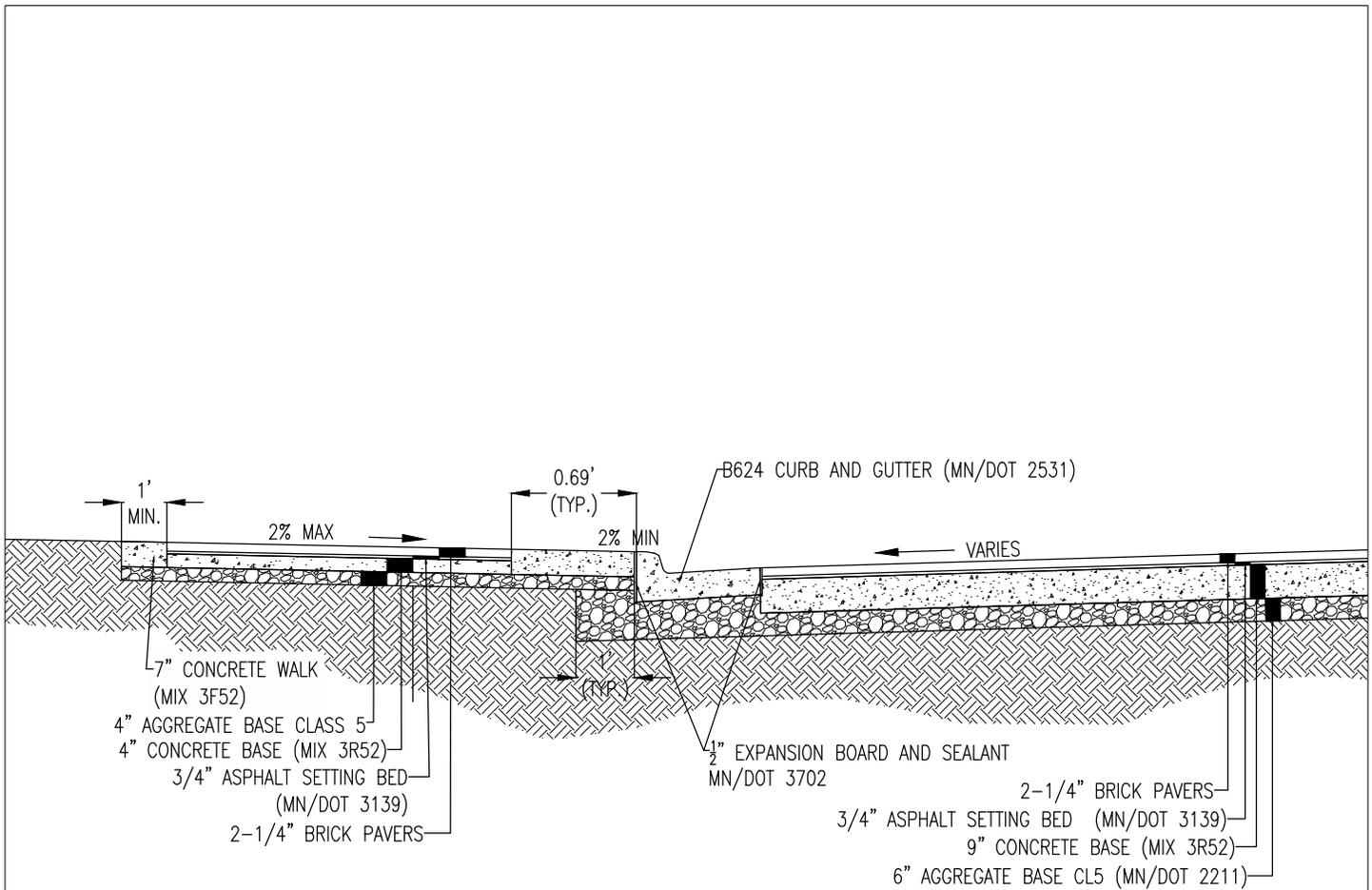
REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
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NO SCALE



STREET RESTORATION OVER TRENCH		STR-8
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

1. REFER TO 2540 BRICK PAVEMENT RESTORATION IN THE CITY OF DULUTH CONSTRUCTION STANDARDS
2. DRILL AND GROUT 1" DIA. DOWEL BARS (24" LENGTH) 16" O.C. INTO ADJACENT EXISTING CONCRETE BASE
3. ASPHALT SETTING BED MATERIALS SHALL MEET GRADATION "A" OF TABLE 3139-2 OF MN/DOT 3139
4. CONCRETE MIX 3F52 (SIDEWALK) OR MIX 3R52 (CONCRETE BASE) SHALL MEET THE PROVISIONS OF MN/DOT 2301 AND MN/DOT 2461
5. BRICK PAVERS (4" X 8" X 2-1/4") SHALL MEET ASTM C902-79A, EXCEPT AS MODIFIED IN THE CITY OF DULUTH CONSTRUCTION STANDARDS. BRICK COLOR AND TEXTURE SHALL MATCH EXISTING OR AS APPROVED BY ENGINEER.

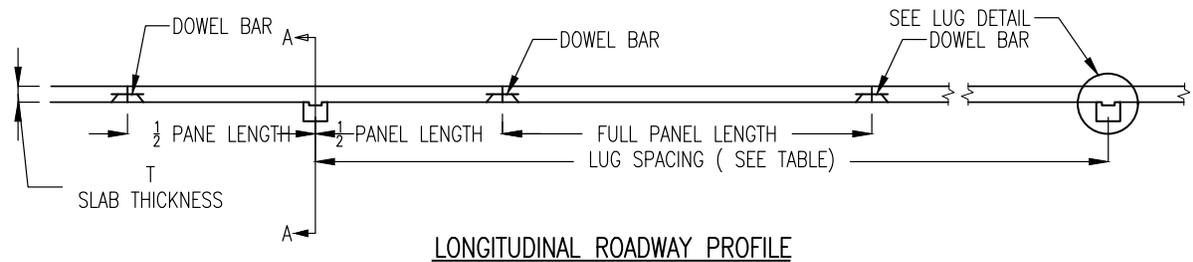
BRICK PAVEMENT RESTORATION

STR-9

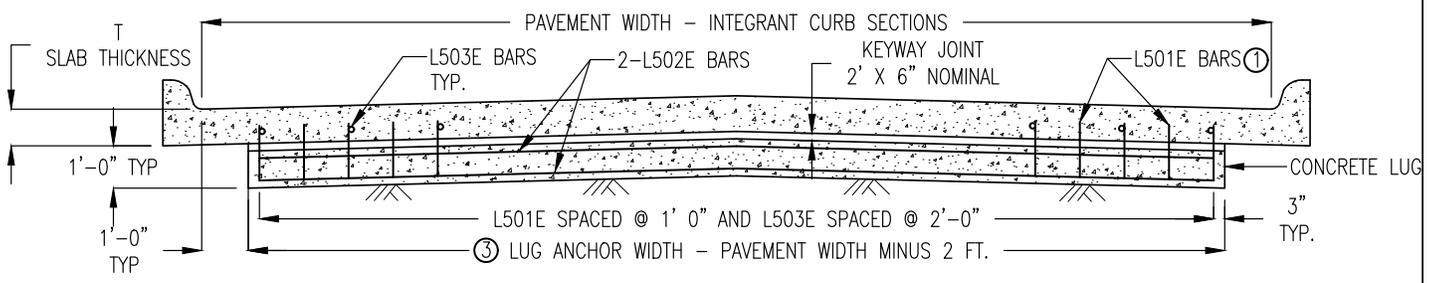
REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

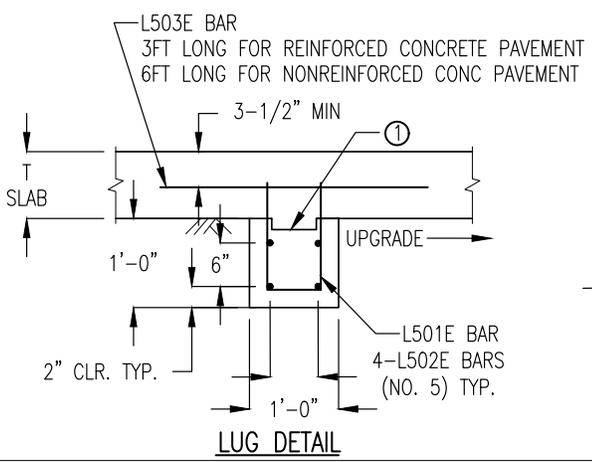
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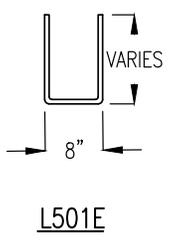
LONGITUDINAL ROADWAY PROFILE



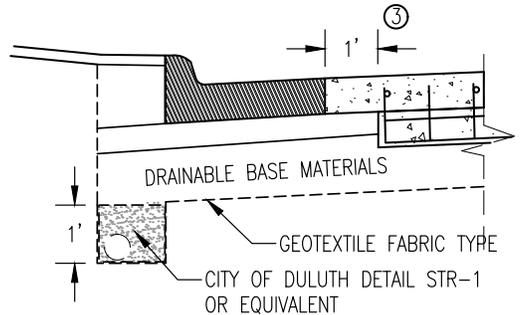
SECTION A-A



LUG DETAIL



L501E



STANDARD CURB & GUTTER

LUG ANCHOR SPACING TABLE		
ROADWAY GRADE	LUG ANCHOR SPACING	
	REINFORCED PAVEMENTS	UNREINFORCED PAVEMENTS*
OVER 3%	162 FT	153 FT
OVER 3-1/4%	135 FT	140 FT
OVER 3-1/2%	108 FT	111 FT
OVER 3-3/4%	81 FT	91 FT
OVER 4%	81 FT	78 FT
OVER 4-1/4%	54 FT	62 FT
OVER 4-1/2%	54 FT	45 FT

* ADJUST TO FALL IN THE MIDDLE OF THE CONCRETE PANEL

SEE SPECIAL PROVISIONS FOR INSTALLATION AND MATERIAL DETAILS.

GENERAL NOTES

- NO LUG DRAIN REQUIRED ON STREET SECTIONS CONSTRUCTED WITH A DRAINABLE BASE AND PERFORATED EDGE DRAIN SYSTEM.
- FINAL GRADING OPERATIONS SHALL BE COMPLETED PRIOR TO EXCAVATING FOR LUG ANCHORS. ANY OVER TRENCHING SHALL BE FILLED WITH CONCRETE.
- LUG ANCHORS SHALL BE CONSTRUCTED 2 DAYS PRIOR TO PAVEMENT CONSTRUCTION, WITH CONCRETE MIX 3C52 HE.
- ALL REINFORCEMENT TO BE EPOXY COATED NO. 5 DEFORMED BARS AS PER MN/DOT SPEC. 3301, GRADE 60 AND TO HAVE A MINIMUM OF 2" COVER EXCEPT AS NOTED.

NOTES

- KEYWAY JOINT APPROXIMATELY 5-1/2" X 1-1/2", USE NOMINAL 2" X 6" PLANK TO FORM KEYWAY.
- CONTRACTOR MAY BEND OR USE THREADED CONNECTOR ON L501E BARS AND / OR MODIFY KEYWAY TO FACILITATE FINE GRADING UPON APPROVAL BY THE ENGINEER.
- LUG ANCHOR WIDTH SHALL BE DETERMINED FROM FACE OF CURB MEASURE FOR INTEGRANT CURB DESIGNS, OR EDGE OF PAVEMENT FOR NON-INTEGRANT CURB AND GUTTER DESIGNS.

LUG ANCHOR - CONCRETE PAVEMENT

STR-10

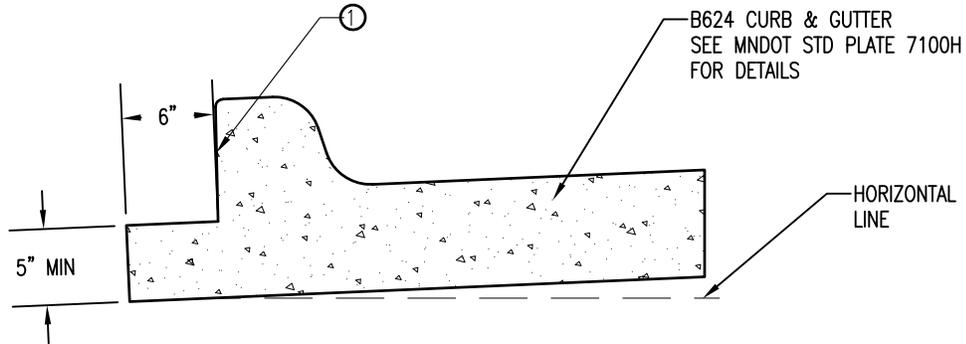
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

SILL CURB DETAIL

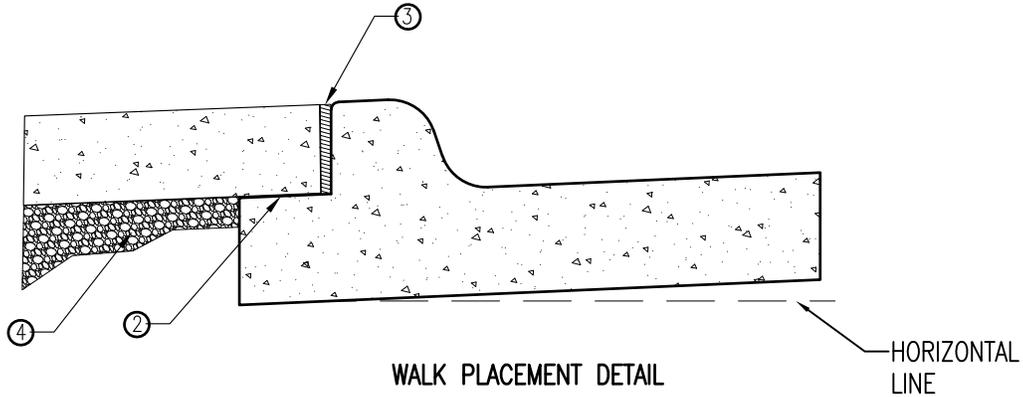
FOR 6 OR 8 INCH CONCRETE WALKS



SILL SHALL BE INTEGRAL TO THE CURB & GUTTER

NOTES

- ① DIMENSION TO BE THE SAME AS SIDEWALK. (MIN 6")
- ② PLACE BOND BREAKER BETWEEN WALK AND TOP OF SILL
- ③ 1/2" PREFORMED JOINT FILL MNDOT SPEC. 3702
- ④ COMPACTED AGGREGATE BASE CLASS 5 MNDOT SPEC 2211
- ⑤ INCIDENTAL TO SIDEWALK CONSTRUCTION.



WALK PLACEMENT DETAIL

DESIGN TYPE	CONCRETE	
	CU YDS. PER LINEAL FOOT	LINEAL FT. PER CU YD
B624 - 6" WALK	0.0793	12.61
B624 - 8" WALK	0.0756	13.28

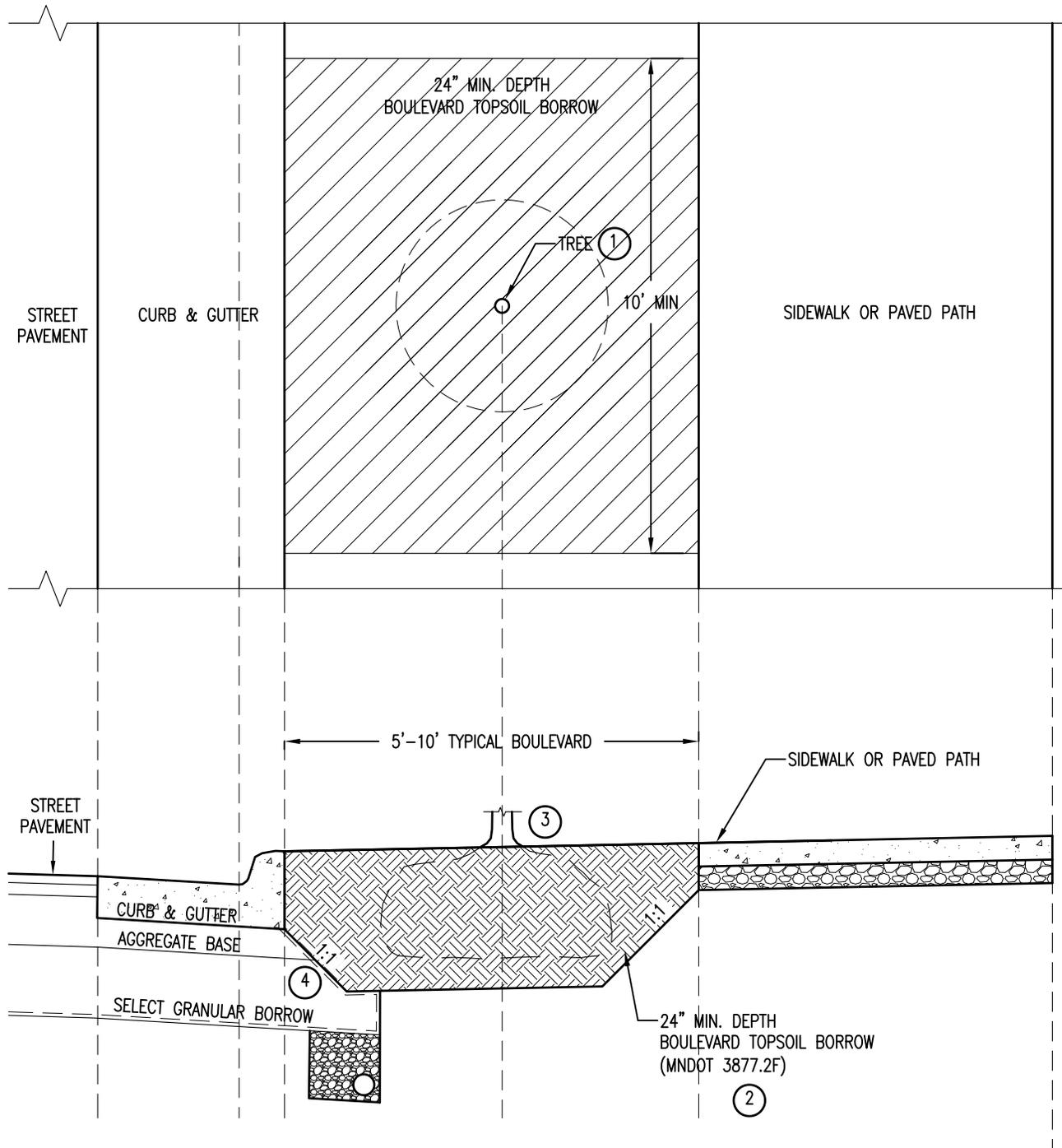
SILL CURB TYPE B624 (SPECIAL)

STR-11

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

- ① TREE SPECIES AND LOCATIONS SHALL BE IN ACCORDANCE WITH SECTION 2571 OF THE CONSTRUCTION STANDARDS.
- ② SUBMIT BOULEVARD TOPSOIL BORROW DESIGN MIX AT LEAST 3 WEEKS PRIOR TO USE.
- ③ DEPTH OF TREE PLANTING PER MN/DOT 2571 AND (ICAMMLP)
- ④ EXTEND GEOTEXTILE SEPARATION FABRIC BETWEEN PLANTING ZONE AND STREET SUBBASE/BASE.

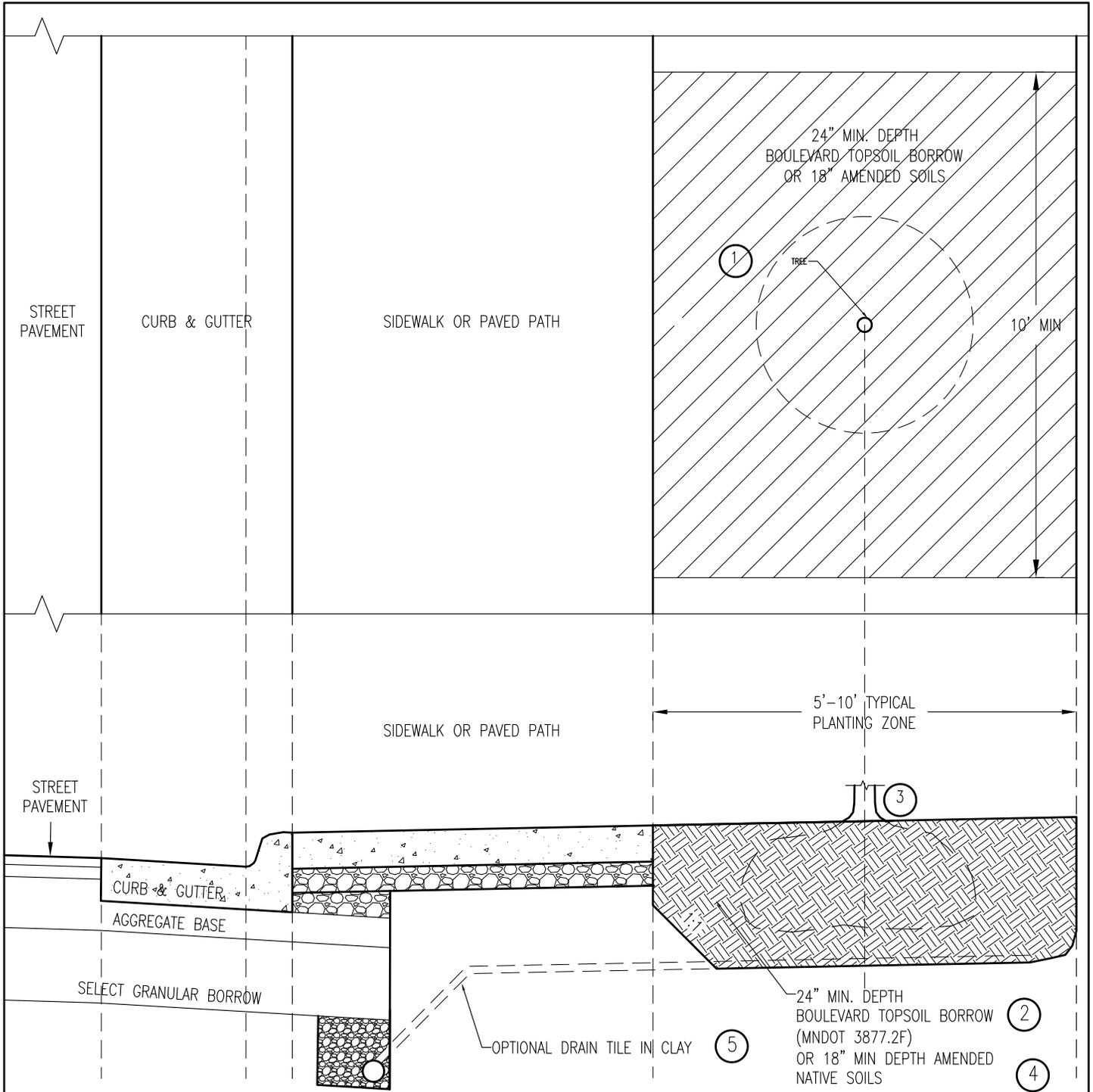
STREET TREE PLANTING ZONE SOIL TREATMENT – BLVD

STR-12

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

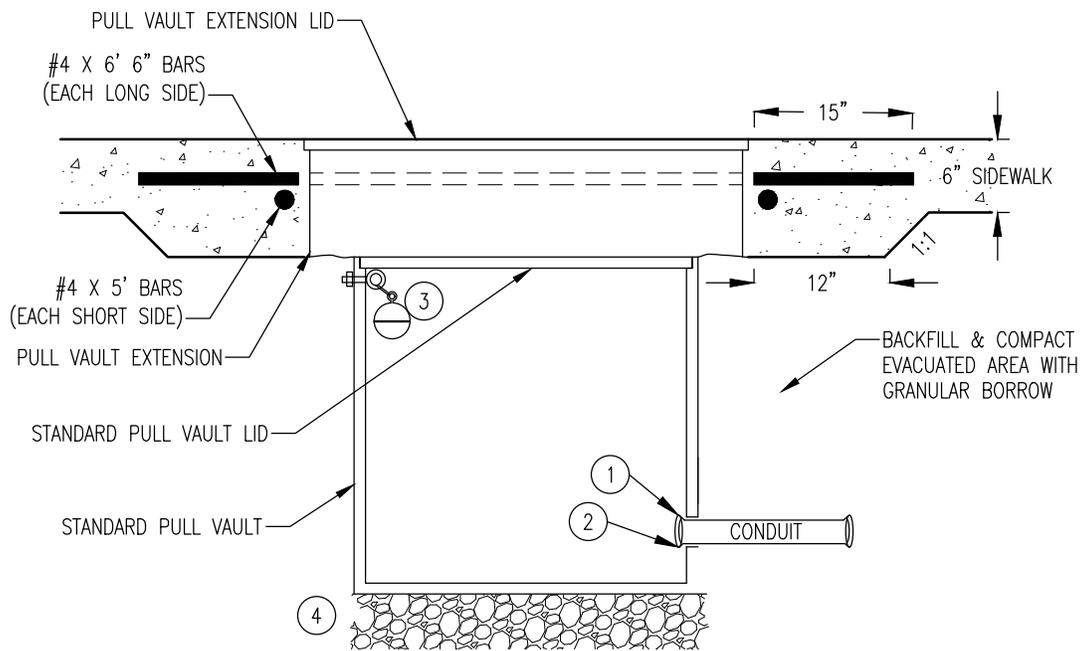
NO SCALE



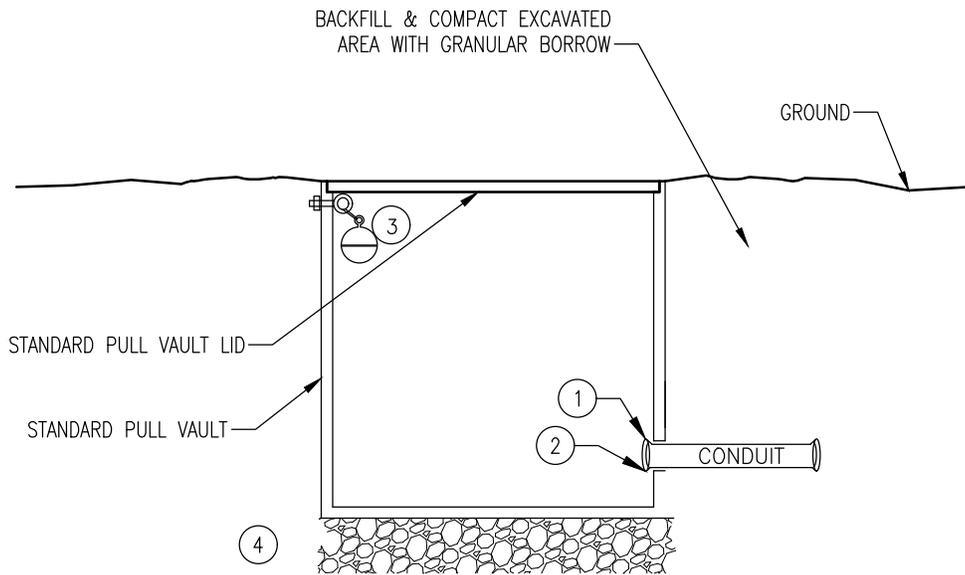
NOTES:

- ① TREE SPECIES AND LOCATIONS SHALL BE IN ACCORDANCE WITH SECTION 2571 OF THE CONSTRUCTION STANDARDS.
- ② SUBMIT BOULEVARD TOPSOIL BORROW DESIGN MIX AT LEAST 3 WEEKS PRIOR TO USE.
- ③ DEPT OF TREE PLANTING PER MN/DOT 2571 AND (ICAMMLP)
- ④ SUBMIT SOIL AMENDMENT DESIGN MIX AT LEAST 4 WEEKS PRIOR TO USE.
- ⑤ CONNECT OPTIONAL PLANTING ZONE DRAIN TILE TO STREET PIPE UNDERDRAIN OR NEARBY DRAINAGE STRUCTURE AS DIRECTED BY ENGINEER.

STREET TREE PLANTING ZONE SOIL TREATMENT—BEHIND SIDEWALK		STR-13
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



HAND HOLE VAULT INSTALLATION
(SIDEWALK)



VAULT INSTALLATION (GROUND)
(CITY OWNED)

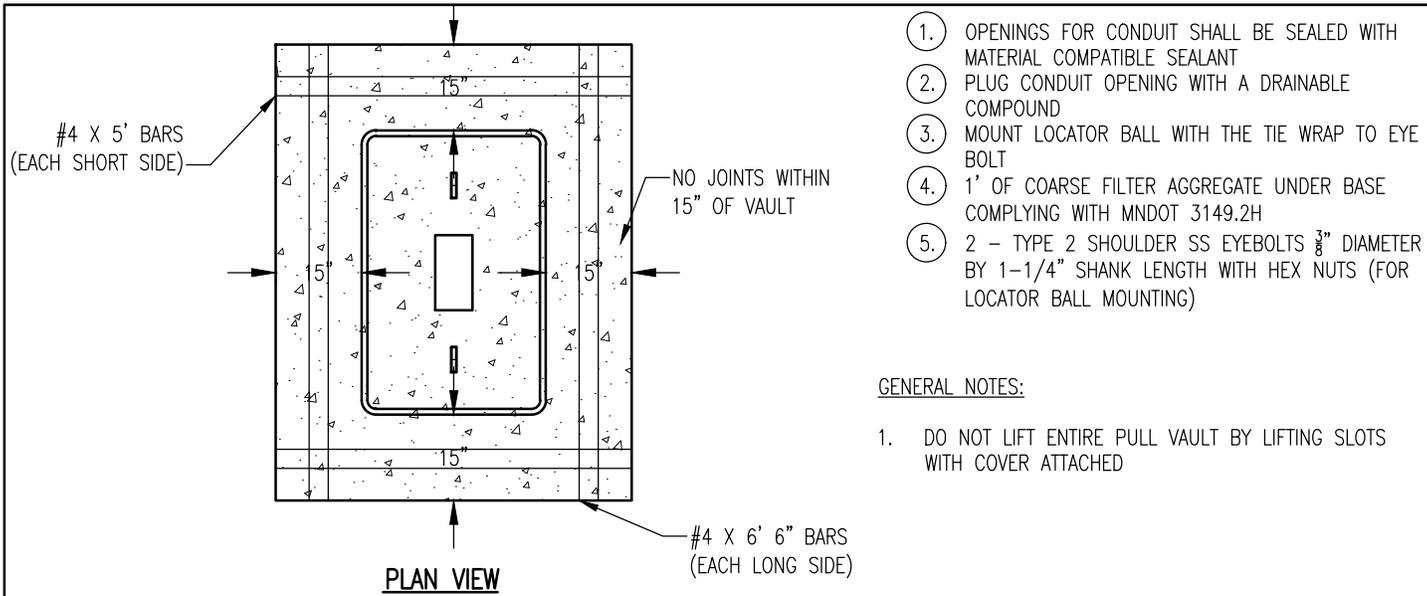
PULL VAULT INSTALLATION A

STR-14A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

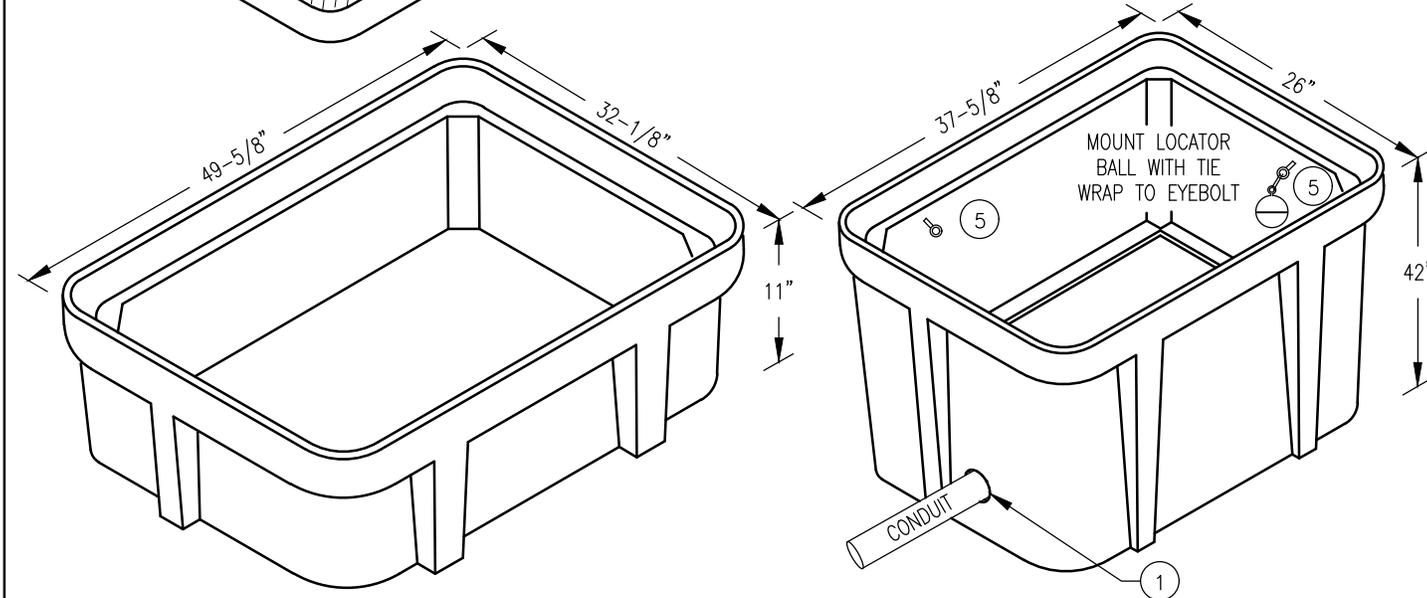
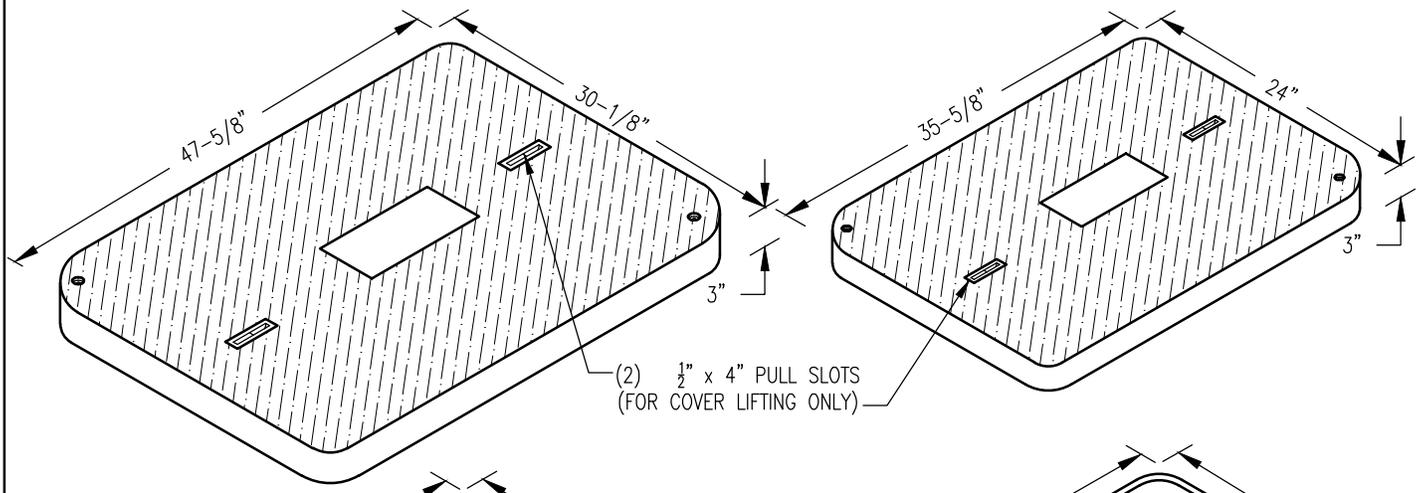
NO SCALE



- ① OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT
- ② PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND
- ③ MOUNT LOCATOR BALL WITH THE TIE WRAP TO EYE BOLT
- ④ 1' OF COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MNDOT 3149.2H
- ⑤ 2 - TYPE 2 SHOULDER SS EYEBOLTS $\frac{3}{8}$ " DIAMETER BY 1-1/4" SHANK LENGTH WITH HEX NUTS (FOR LOCATOR BALL MOUNTING)

GENERAL NOTES:

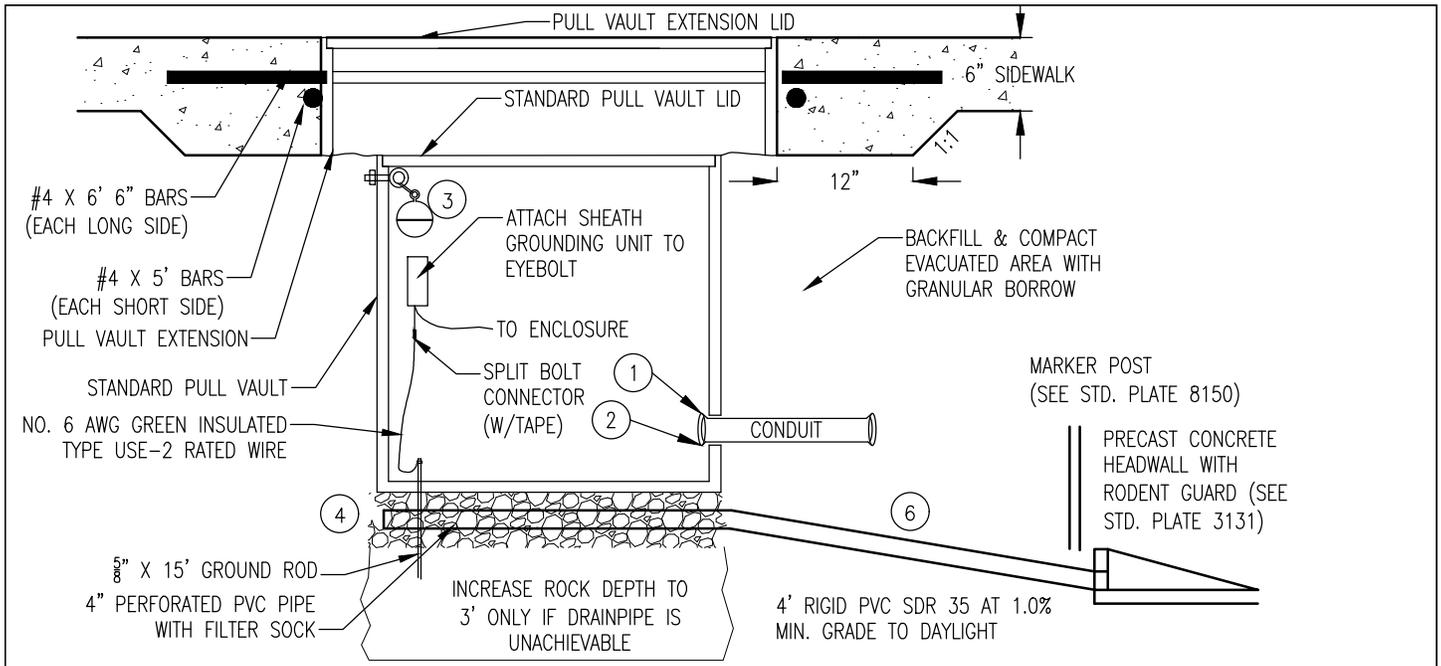
1. DO NOT LIFT ENTIRE PULL VAULT BY LIFTING SLOTS WITH COVER ATTACHED



PULL VAULT EXTENSION AND LID
(ONLY REQUIRED FOR SIDEWALK INSTALLATIONS)

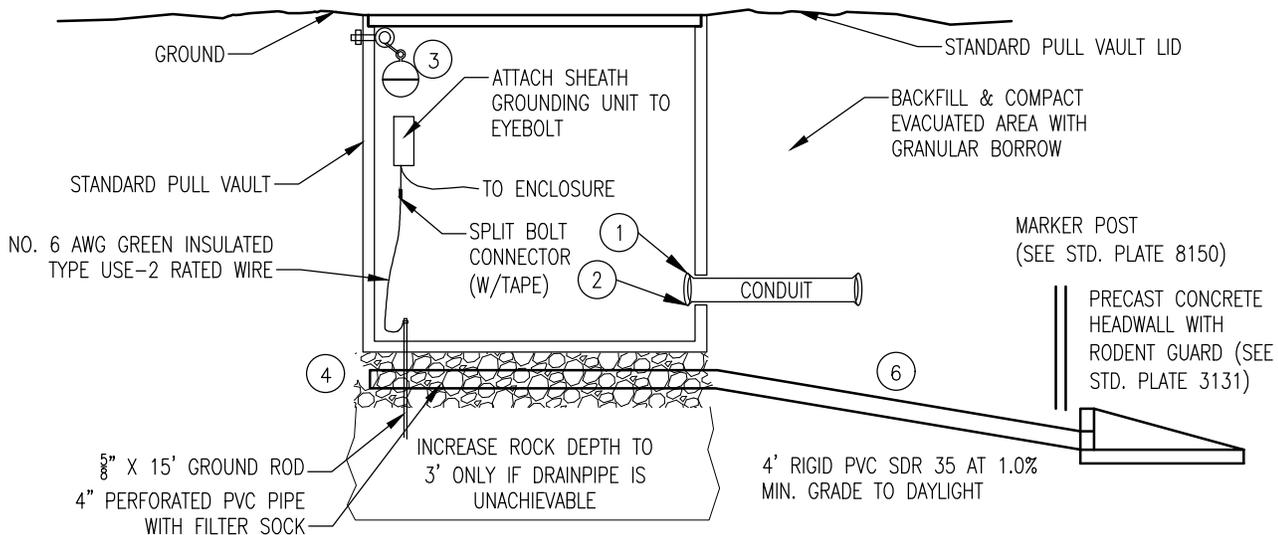
STANDARD PULL VAULT AND LID
(CITY OWNED)

PULL VAULT INSTALLATION B		STR-14B
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



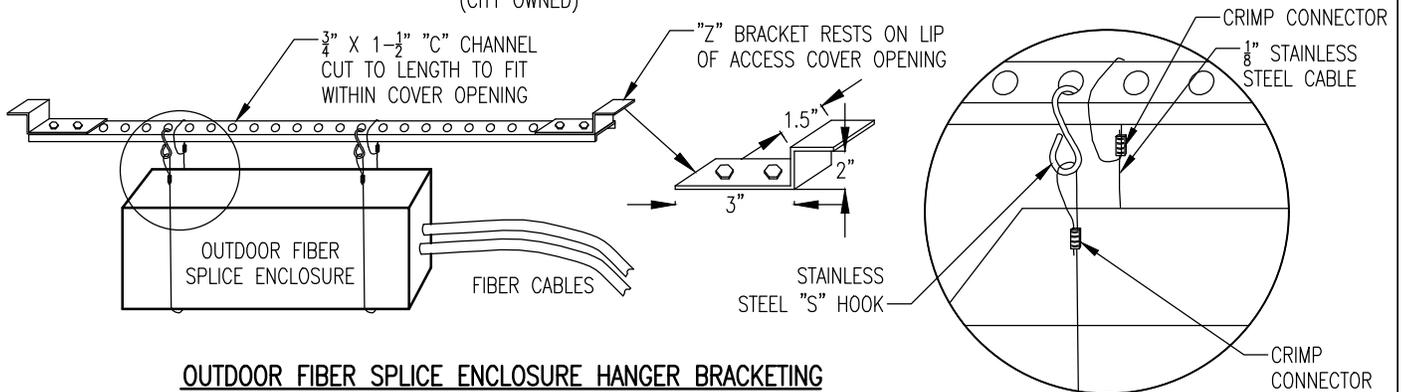
PULL/SPLICE VAULT INSTALLATION

(SIDEWALK)



VAULT INSTALLATION (GROUND)

(CITY OWNED)



OUTDOOR FIBER SPLICE ENCLOSURE HANGER BRACKETING

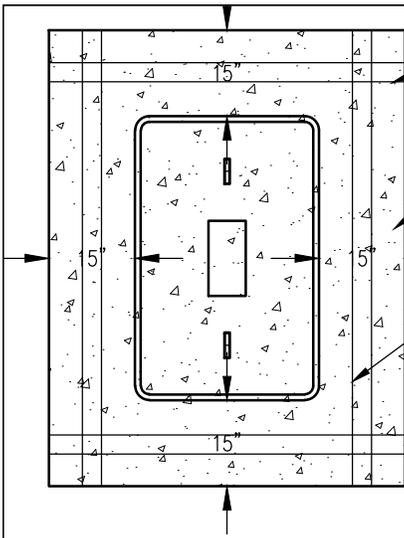
PULL VAULT INSTALLATION C

STR-14C

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

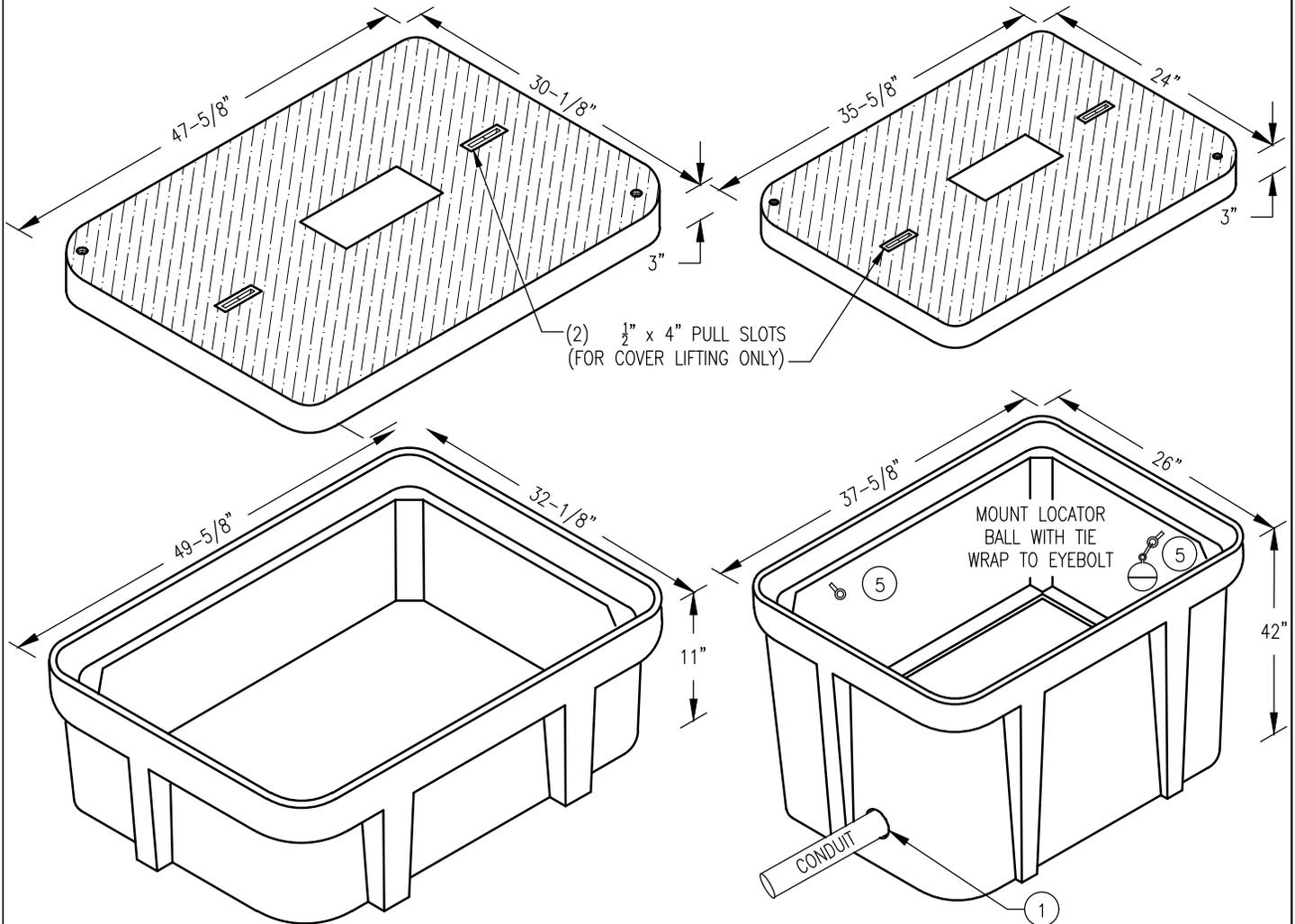


PLAN VIEW

- ①. OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT
- ②. PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND
- ③. MOUNT LOCATOR BALL WITH THE TIE WRAP TO EYE BOLT
- ④. 1' OF COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MNDOT 3149.2H
- ⑤. 2 - TYPE 2 SHOULDER SS EYEBOLTS $\frac{3}{8}$ " DIAMETER BY 1-1/4" SHANK LENGTH WITH HEX NUTS (FOR LOCATOR BALL MOUNTING)
- ⑥. DRAIN PIPE MAY BE PLACED IN SIDEWALL OF PULL VAULT TO ACHIEVE DRAINAGE IN AREAS WHERE MINIMUM PIPE OUTFALL IS AVAILABLE.

GENERAL NOTES:

1. DO NOT LIFT ENTIRE PULL VAULT BY LIFTING SLOTS WITH COVER ATTACHED
2. GROUND CONNECTIONS SHALL BE COATED WITH OXIDATION PROHIBITING COMPOUND.
3. CABLE SHALL ENTER BELOW THE SUPPORT BRACKETS WITH A MINIMUM OF 70' OF SLACK FOR EACH CABLE OUTSIDE OF THE ENCLOSURE. CABLE SHALL BE COILED AROUND INSIDE OF SUPPORT BRACKETS. CABLES SHALL BE CUT TO THE SAME LENGTH AT THE ENCLOSURE.



PULL VAULT EXTENSION AND LID
(ONLY REQUIRED FOR SIDEWALK INSTALLATIONS)

STANDARD PULL VAULT AND LID
(CITY OWNED)

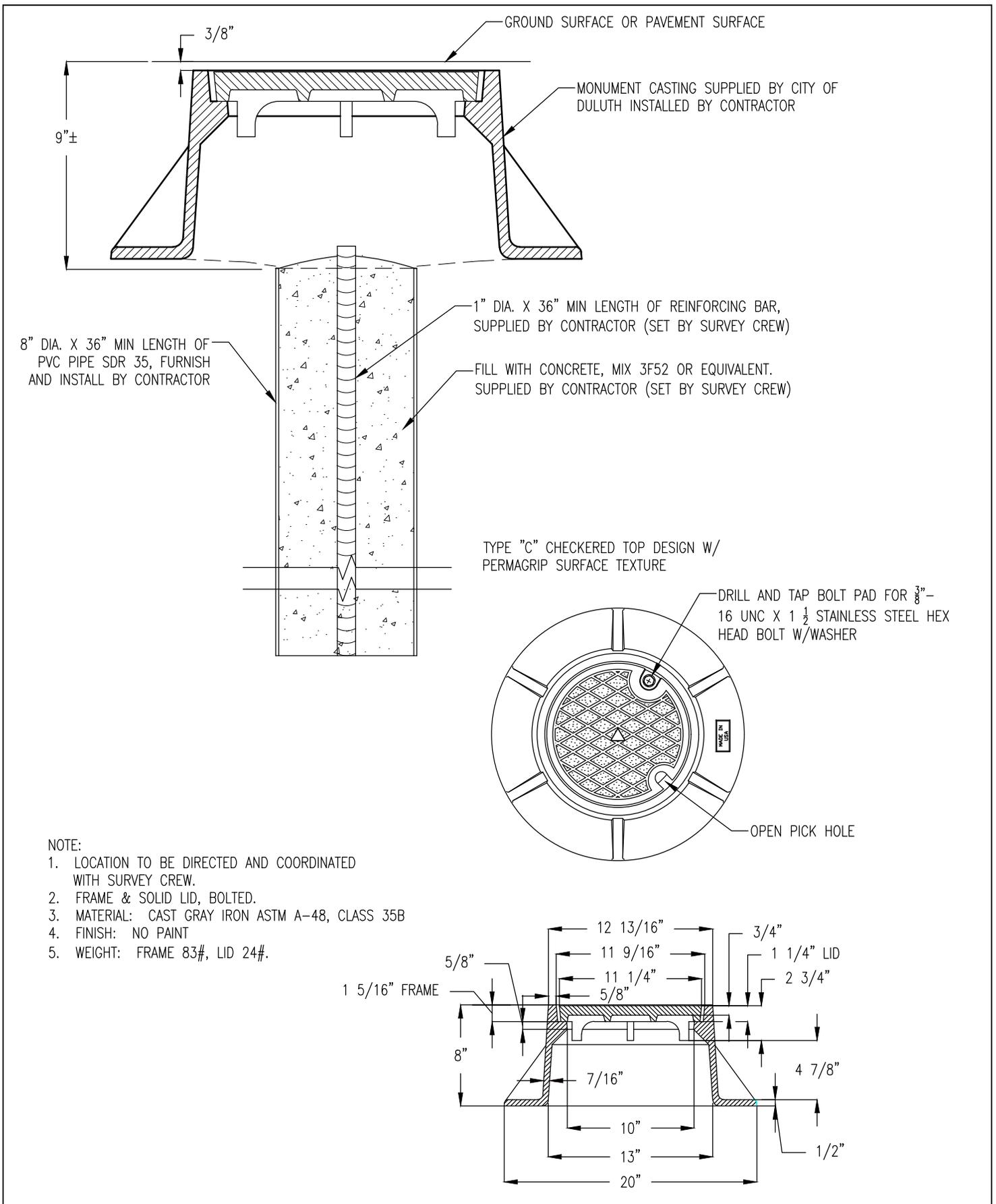
PULL VAULT INSTALLATION D

STR-14D

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



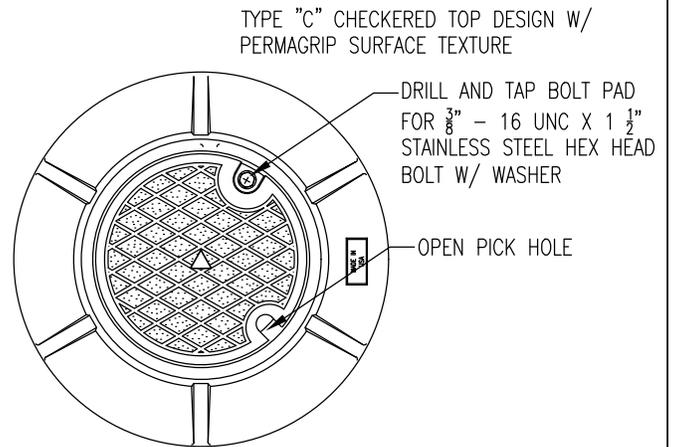
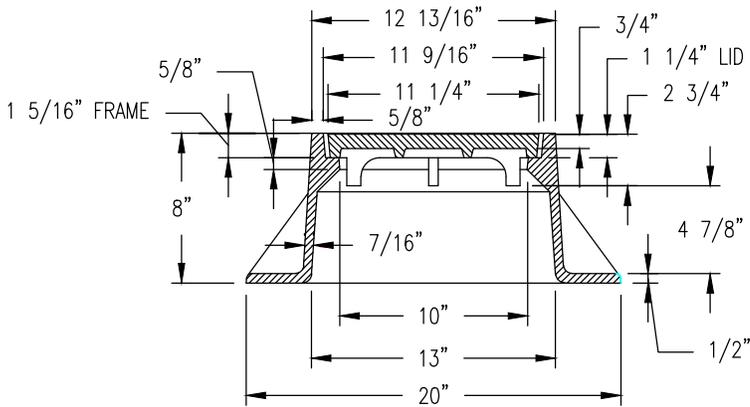
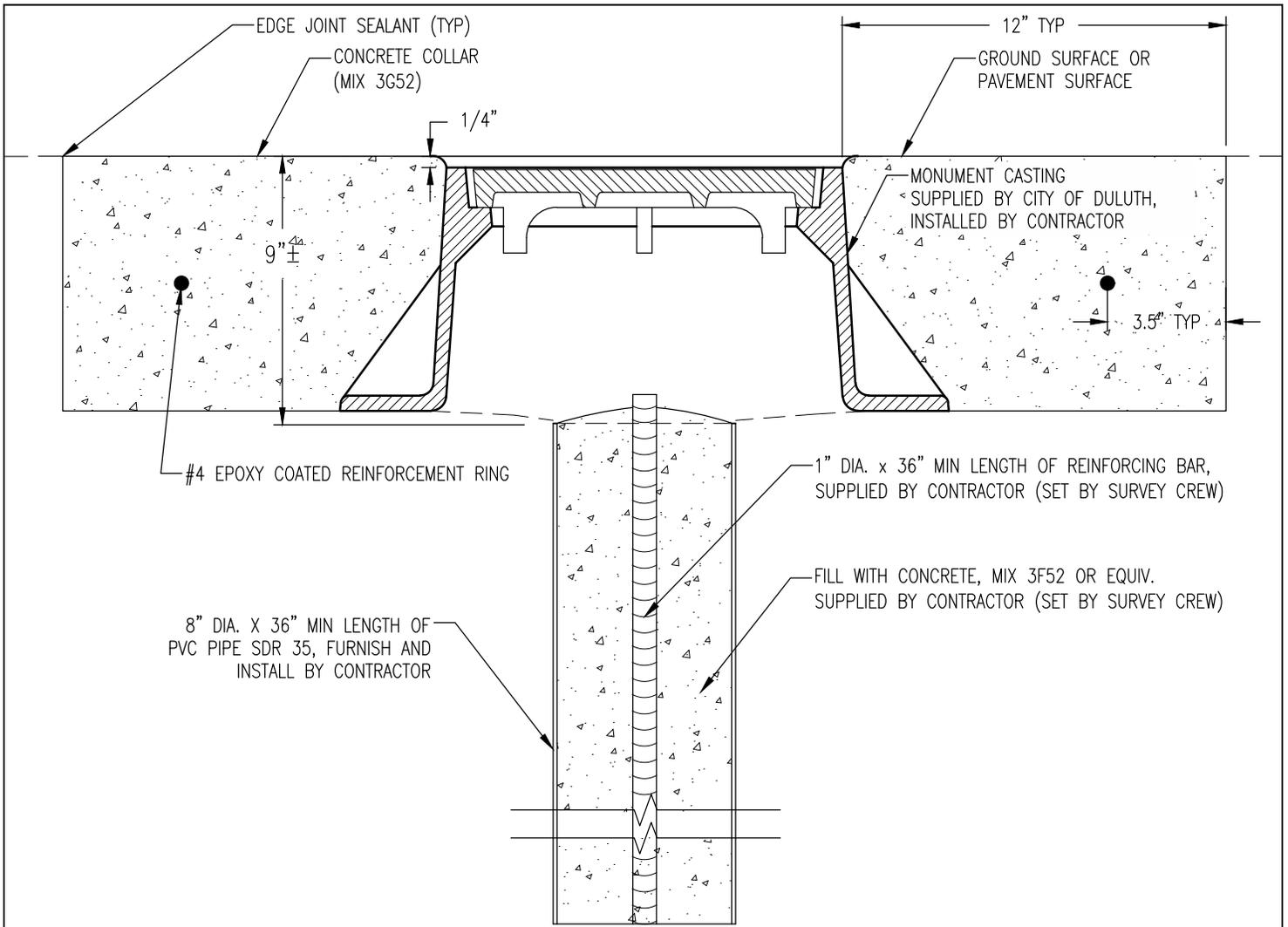
CONSTRUCT SURVEY MONUMENT

SUR-1

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



GENERAL NOTE:

1. LOCATION TO BE DIRECTED AND COORDINATED WITH SURVEY CREW.
2. FRAME & SOLID LID, BOLTED.
3. MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
4. FINISH: NO PAINT
5. WEIGHT: FRAME 83#, LID 24#.
6. CONCRETE (MIX NO 3G52) COLLAR TO ENCASE CASING.
7. CONCRETE COLLAR SHALL BE CIRCULAR LAYOUT. REMOVE PAVEMENT AND BASE WITH ROTATING CUTTING DEVICE.
8. FINISH CONCRETE EDGE WITH 1/4" RADIUS. SEAL JOINT BETWEEN PAVEMENT AND COLLAR.

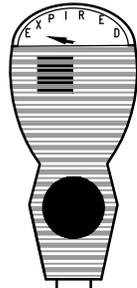
CONCRETE ENCASED CASTING COLLAR IN ROADWAY

SUR-2

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



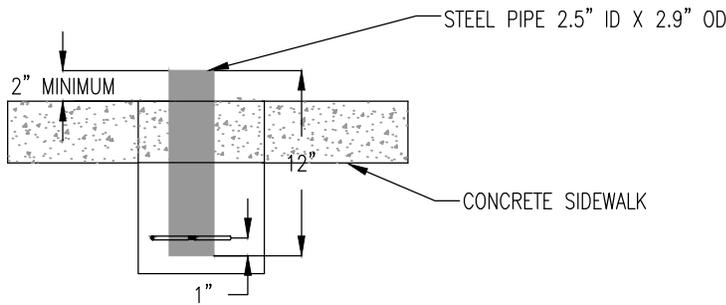
TYPICAL INSTALLATION BASE COLLAR IN CONCRETE WALK

REMOVE CONCRETE WALK, CORE, OR SAW OPENING FOR METER BASE COLLAR, AS DIRECTED BY ENGINEER

BASE COLLAR
STEEL PIPE

2" MINIMUM

REBAR SUPPORT FOR PIPE

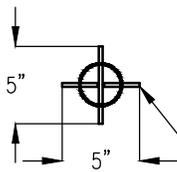


STEEL PIPE 2.5" ID X 2.9" OD

2" MINIMUM

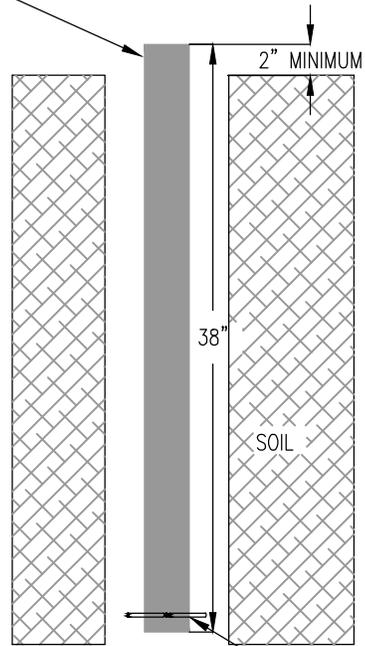
CONCRETE SIDEWALK

1"



TYPICAL TOP VIEW

$\frac{5}{16}$ " REBAR OR EQUIVALENT
FOR BOTTOM TEE



38"

SOIL

2" MINIMUM

REBAR SUPPORT FOR PIPE

TYPICAL PARKING METER BASE COLLAR IN
CONCRETE SIDEWALK

TYPICAL PARKING METER BASE COLLAR
INSTALLATION IN SOIL

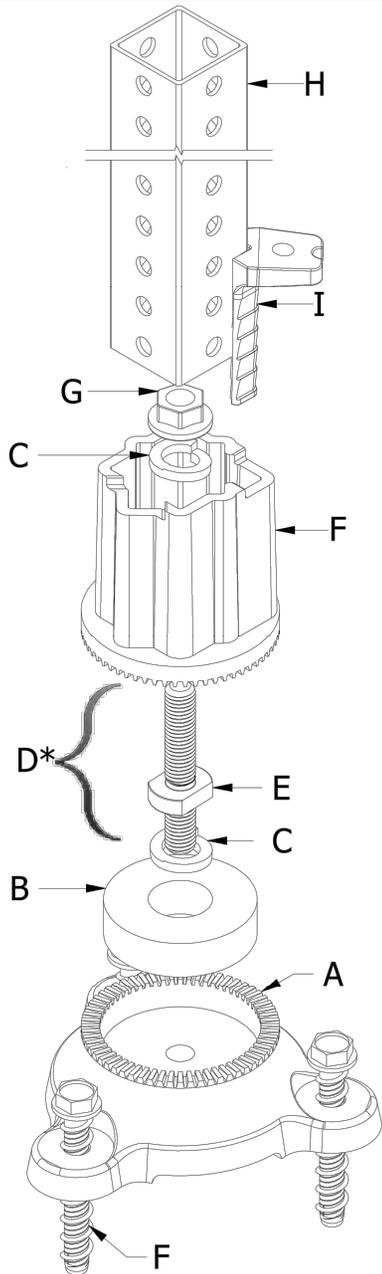
TYPICAL PARKING METER INSTALLATION

T-1

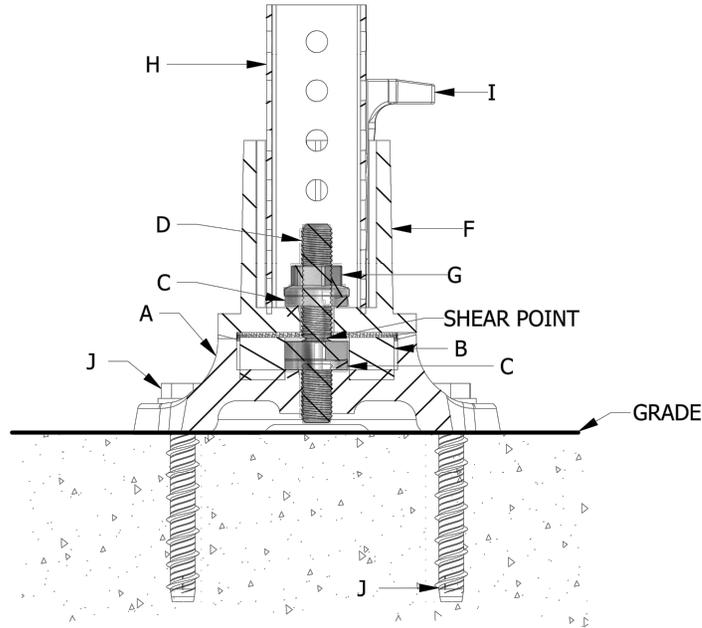
REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



ISOMETRIC VIEW



INSTALLED CROSS SECTION VIEW

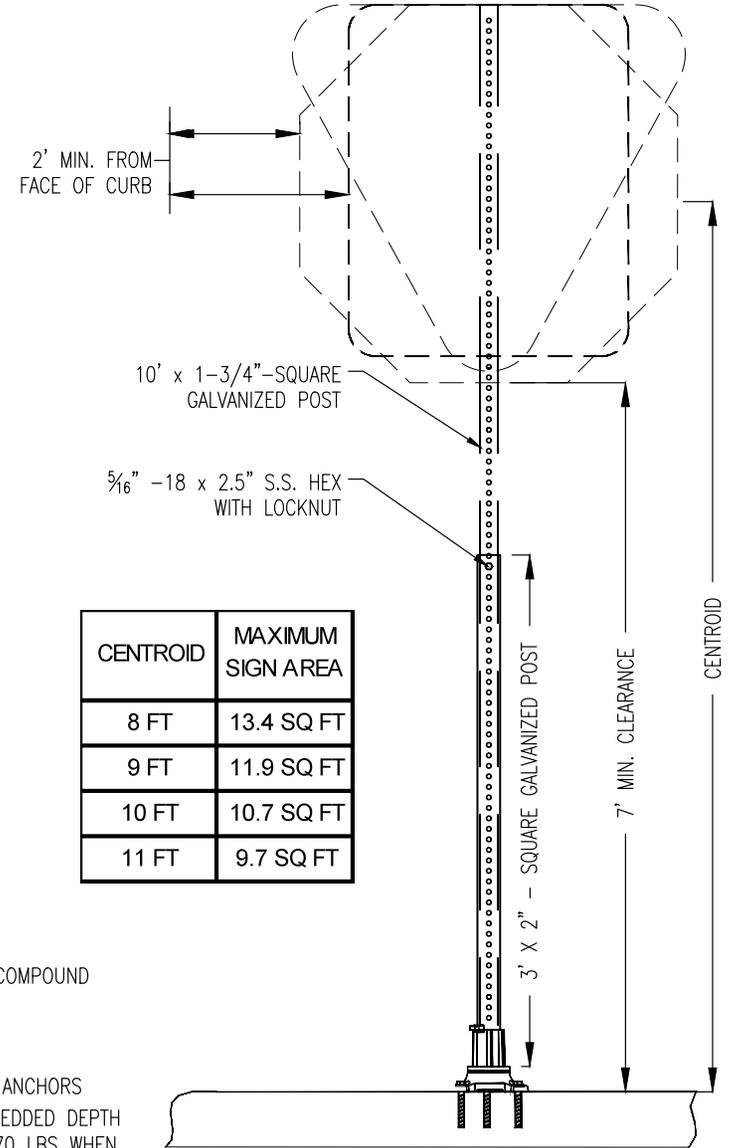
PARTS LIST

- A. SURFACE MOUNT ANCHOR BASE
- B. RUBBER BUSHING
- C. LOCK WASHER
- D. $\frac{5}{8}$ " - 11 X 4" SHEAR BOLT
- E. SHOULDER
- F. TOP HALF COUPLER
- G. $\frac{5}{8}$ " - 11 SERRATED FLANGE NUT
- H. SIGN SUPPORT 2" X 2" (12 GAUGE)
- I. SIGN SUPPORT LOCKING WEDGE
- J. $\frac{1}{2}$ " X 4" CONCRETE ANCHOR BOLT. (SEE NOTE BELOW)

* PRIOR TO THREADING THE SHEAR BOLT INTO ANCHOR BASE AN ANTI-SIEZE COMPOUND SHALL BE GENEROUSLY APPLIED TO THE SHEAR BOLT AND BASE THREADS.

NOTE

SURFACE MOUNTED UNIT SHALL BE ATTACHED WITH NO LESS THAN (3) CONCRETE ANCHORS WITH A MINIMUM DIAMETER OF $\frac{1}{2}$ " AND A MINIMUM LENGTH OF 4" LONG. THE EMBEDDED DEPTH SHALL BE A MINIMUM OF 3-5/8". THE ALLOWABLE TENSION LOAD SHALL BE 2,270 LBS WHEN INSTALLED IN NORMAL WEIGHT, 3000 PSI CONCRETE.

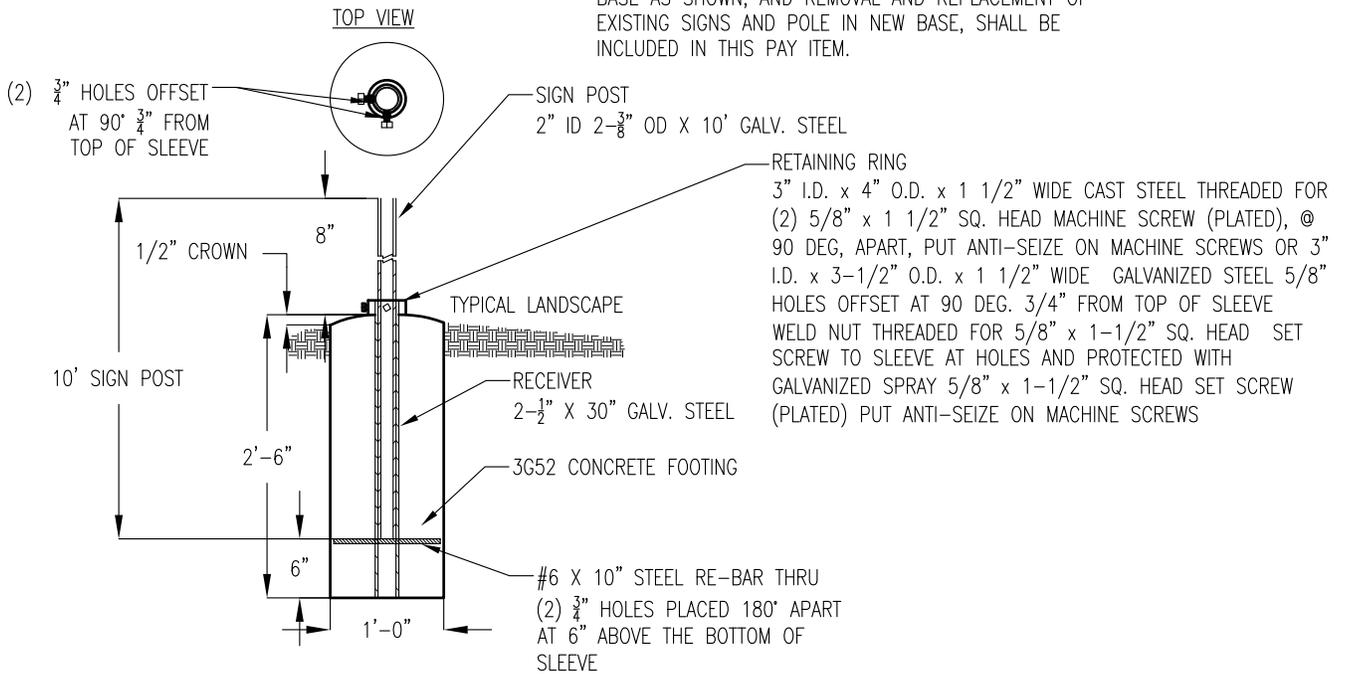


CENTROID	MAXIMUM SIGN AREA
8 FT	13.4 SQ FT
9 FT	11.9 SQ FT
10 FT	10.7 SQ FT
11 FT	9.7 SQ FT

SIGN & BREAKAWAY MOUNT INSTALLATION

T-2

ALL MATERIALS AND LABOR USED TO CONSTRUCT SIGN BASE AS SHOWN, AND REMOVAL AND REPLACEMENT OF EXISTING SIGNS AND POLE IN NEW BASE, SHALL BE INCLUDED IN THIS PAY ITEM.



SPEC. 2564.602, REMOVE AND REINSTALL SIGN, EACH

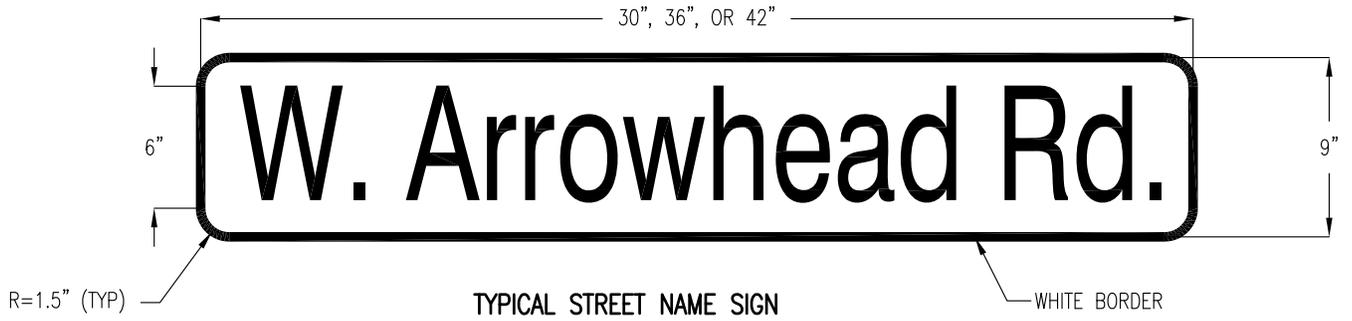
STREET NAME SIGN FOOTING DETAIL

T-3

REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

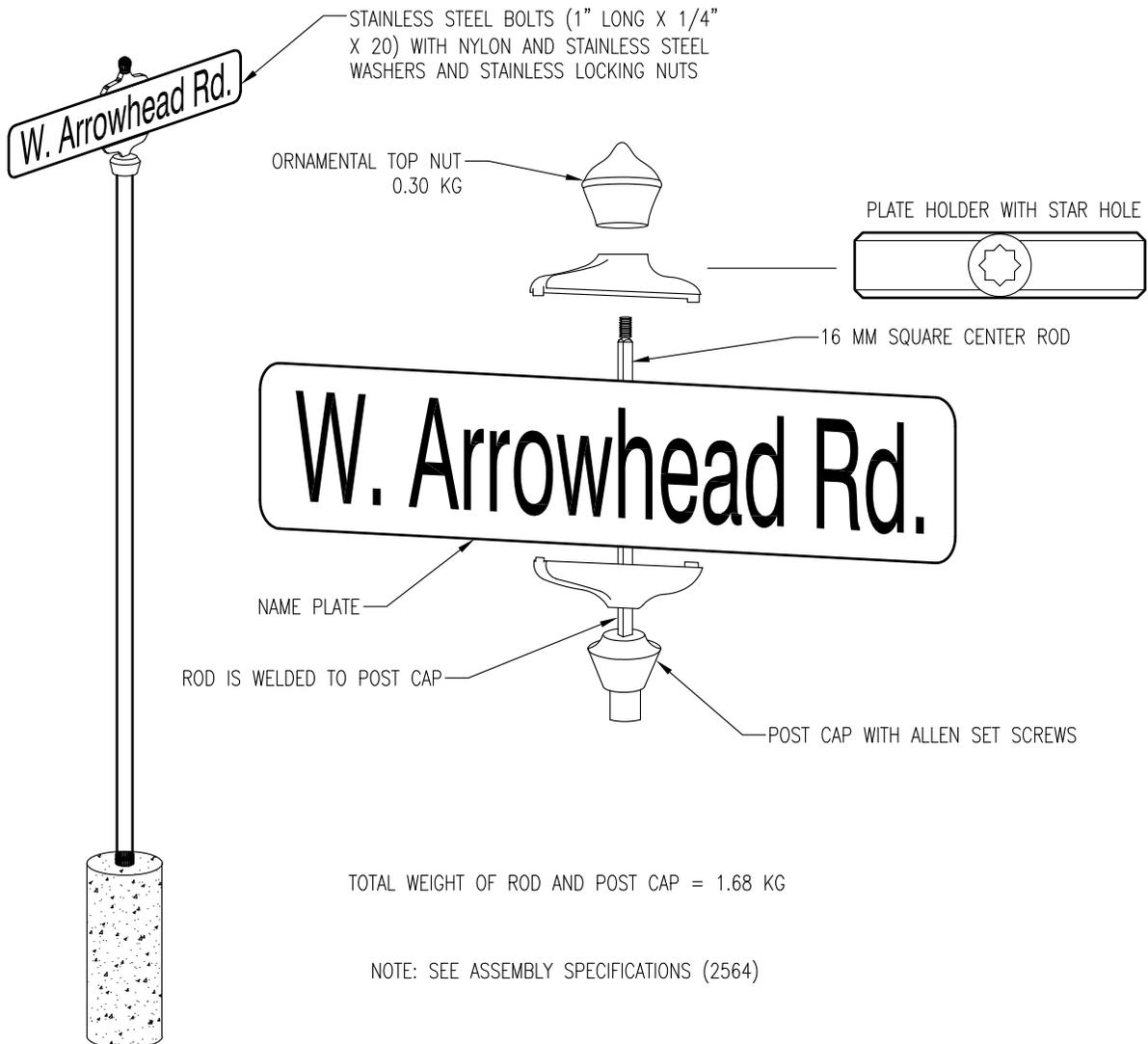
NO SCALE



NOTES:

- LETTERS AND NUMBERS SHALL BE SERIES "C" 6" UPPER AND LOWER CASE
- WHITE BORDER SHALL BE $\frac{3}{8}$ "

LEGEND



E-250 INSTALLATION

T-4

REVISED/APPROVED 04/01/216

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

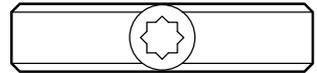
NO SCALE



ORNAMENTAL TOP NUT 0.30 KG



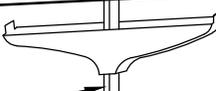
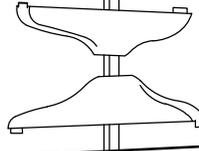
PLATE HOLDER WITH STAR HOLE



16 MM SQUARE CENTER ROD



NAME PLATE



ROD IS WELDED TO POST CAP

POST CAP WITH ALLEN SET SCREWS



TOTAL WEIGHT OF ROD AND POST CAP = 2.15 kg

NOTE: SEE ASSEMBLY SPECIFICATIONS (S-28)

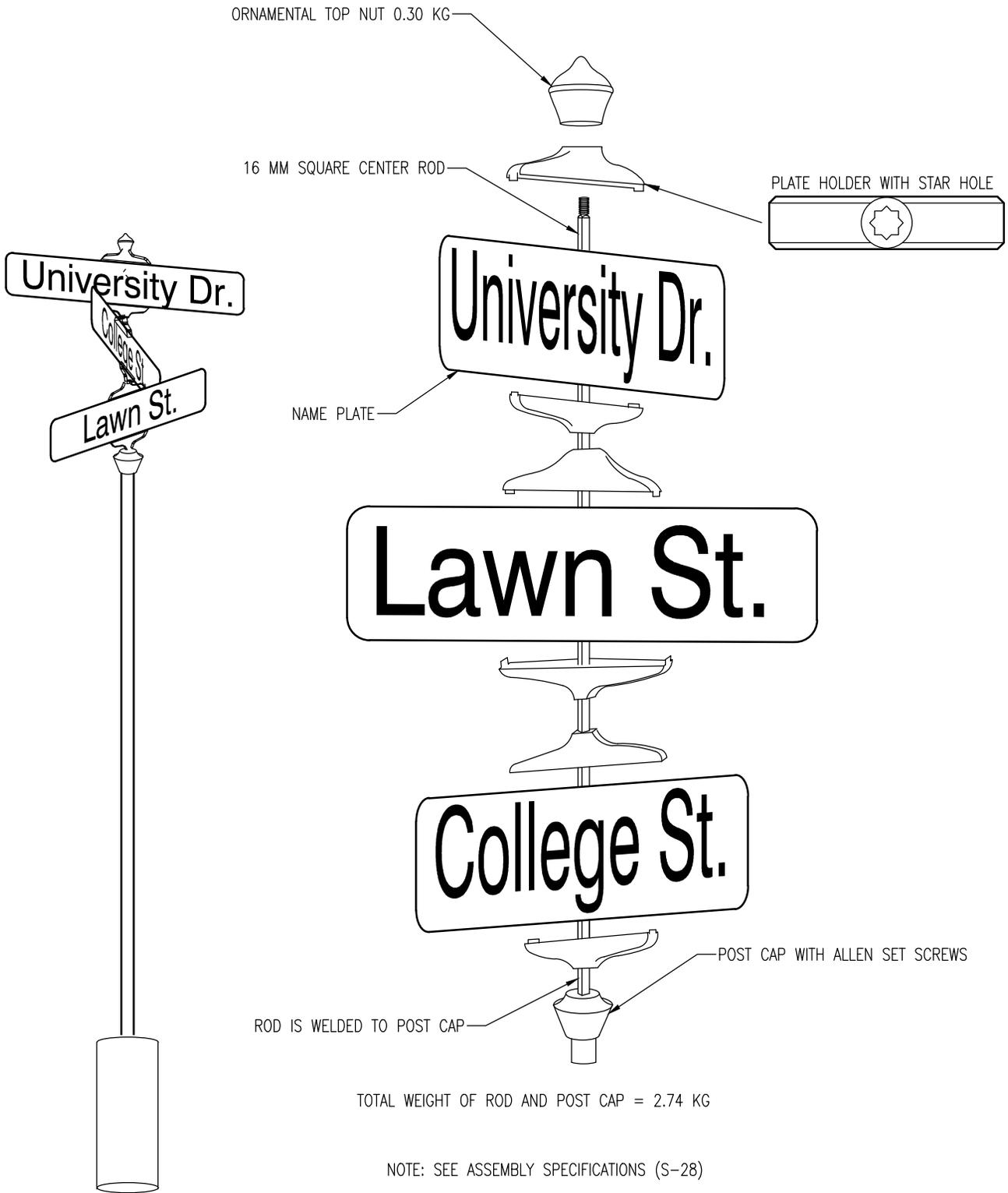
E-450 INSTALLATION

T-5

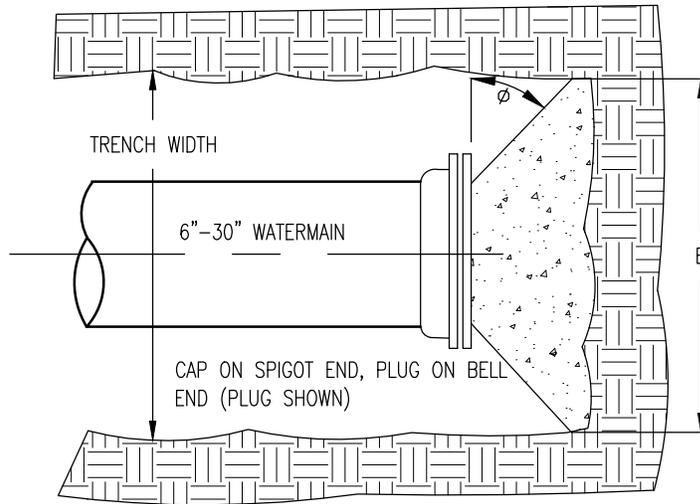
REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

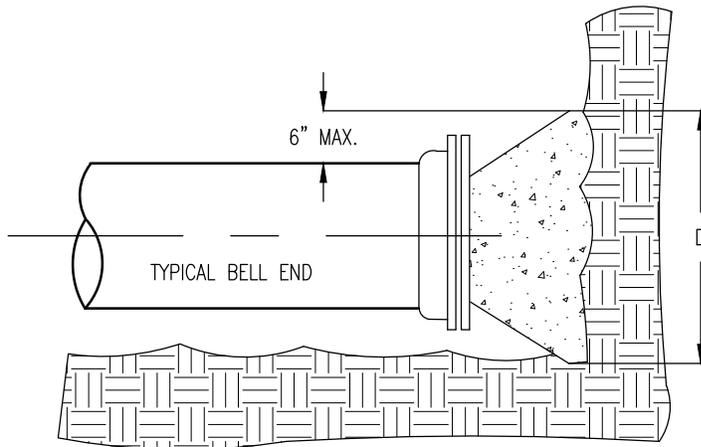
NO SCALE



E-650 INSTALLATION		T-6
REVISED/APPROVED 02/01/2013	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



PLAN



ELEVATION

BLOCKING DIMENSIONS		
PLUG SIZE	B	D
6"	12"	15"
8"	24"	15"
10"	24"	20"
12"	30"	22"
16"	40"	28"
20"	50"	34"
24"	62"	40"
30"	80"	48"

NOTES:

1. BLOCKING DIMENSIONS BASED ON EARTH RESISTANCE OF 2 TONS PER SQ. FT. WHERE, IN THE OPINION OF THE ENGINEER, EARTH IS POOR, BLOCKING SHALL BE INCREASED IN SIZE AS DIRECTED OR STRAPPING MAY BE NECESSARY.
2. ANGLE ϕ SHALL BE EQUAL TO OR LARGER THAN 45°.
3. BLOCKING SHALL BE CENTERED ON MAIN.
4. CONCRETE SHALL BE MIX 3G52 - MNDOT 2461.
5. POLYETHYLENE SHALL BE USED TO SEPARATE CONCRETE FROM FITTING.
6. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

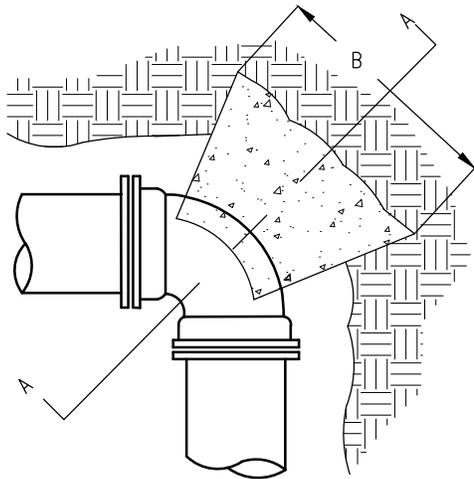
PLUG BLOCKING FOR WATERMAIN

W-2

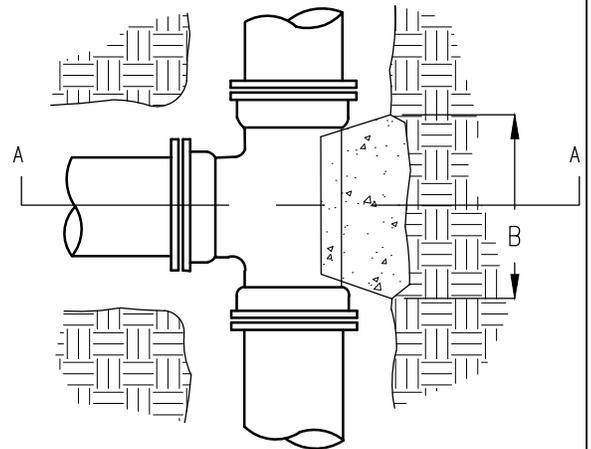
REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

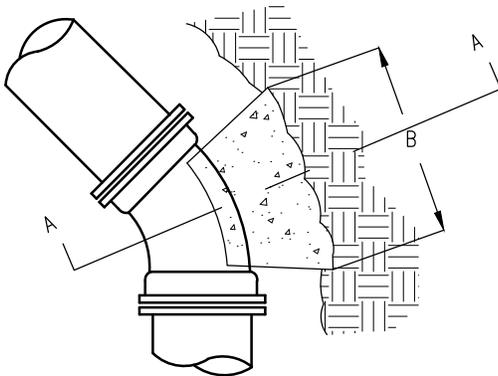
NO SCALE



PLAN - 90° BEND

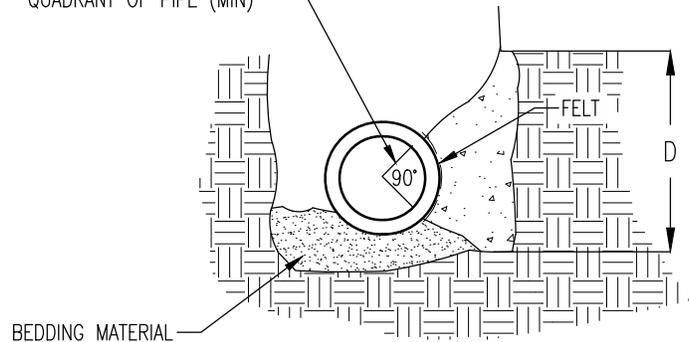


PLAN - TEE



PLAN - 45° BEND

CONCRETE SHALL BE IN CONTACT WITH THIS QUADRANT OF PIPE (MIN)



SECTION A-A

NOTES

1. DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 P.S.I. & AN EARTH RESISTANCE OF 2 TONS/S.F.
2. BLOCKING TO BE SET AGAINST UNDISTURBED SOIL.
3. CONCRETE SHALL BE MIX 3G52. (MNDOT SPEC. 2461) CONCRETE SHALL NOT INTERFERE WITH MECHANICAL JOINTS
4. POLYETHYLENE SHALL BE USED TO SEPARATE CONCRETE FROM FITTING.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

BLOCKING DIMENSIONS								
BEND OR BRANCH SIZE	22-1/2° BENDS		45° BENDS		90° BENDS		TEES	
	B	D	B	D	B	D	B	D
0'-6"	1'-0"	1'-0"	1'-0"	1'-0"	1'-4"	1'-2"	1'-3"	1'-0"
0'-8"	1'-0"	1'-0"	1'-4"	1'-2"	1'-10"	1'-6"	1'-6"	1'-4"
1'-0"	1'-4"	1'-4"	1'-10"	1'-10"	2'-8"	2'-3"	2'-3"	2'-0"
1'-4"	1'-10"	1'-8"	2'-6"	2'-4"	3'-10"	2'-10"	3'-2"	2'-4"
1'-8"	2'-4"	2'-0"	3'-3"	2'-10"	5'-0"	3'-4"	4'-0"	3'-0"
2'-0"	2'-10"	2'-4"	4'-0"	3'-3"	6'-4"	3'-10"	5'-3"	3'-4"
2'-6"	3'-6"	3'-0"	5'-4"	3'-10"	8'-0"	4'-8"	6'-3"	4'-3"

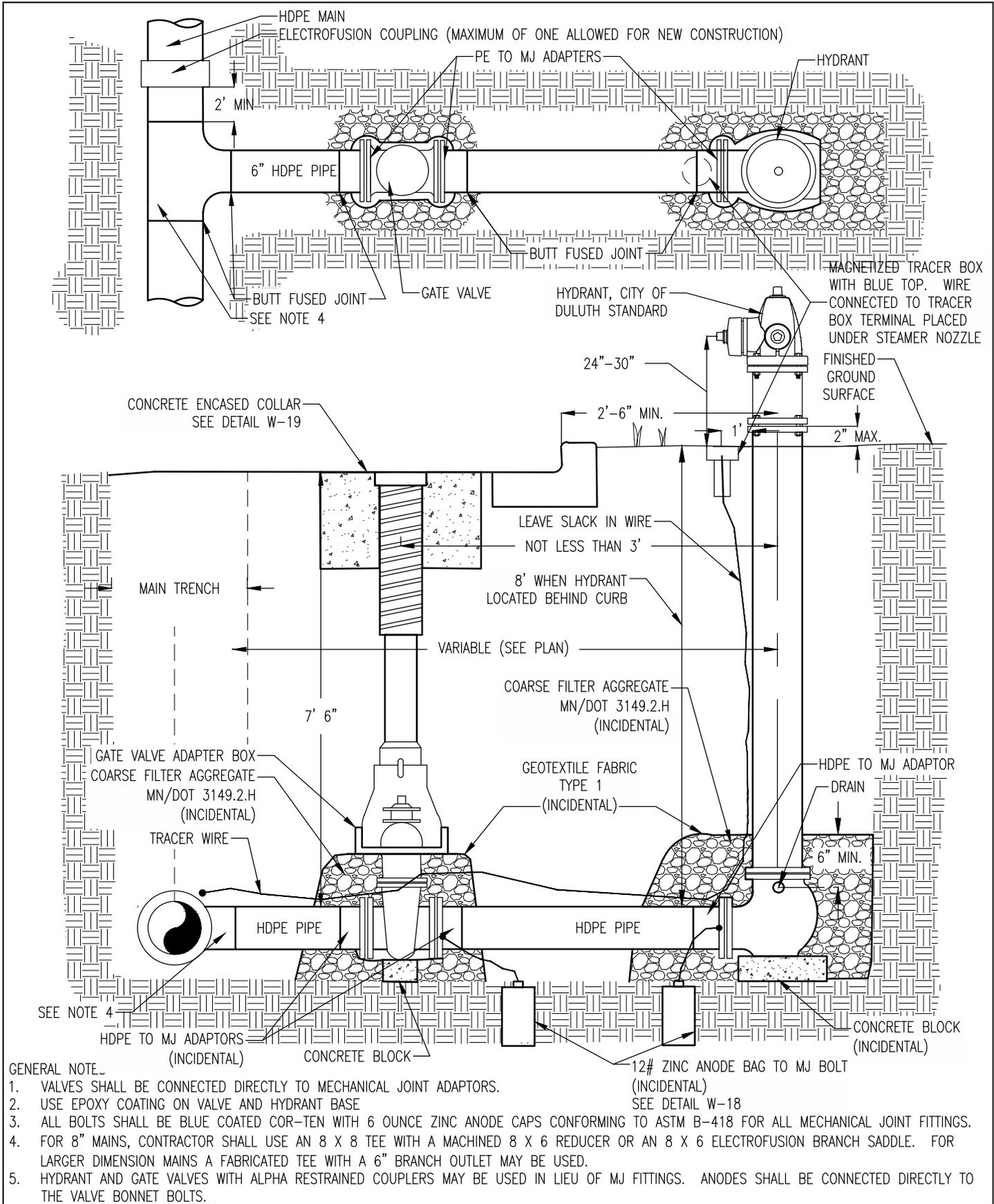
THRUST BLOCKING FOR WATERMAIN

W-3

REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



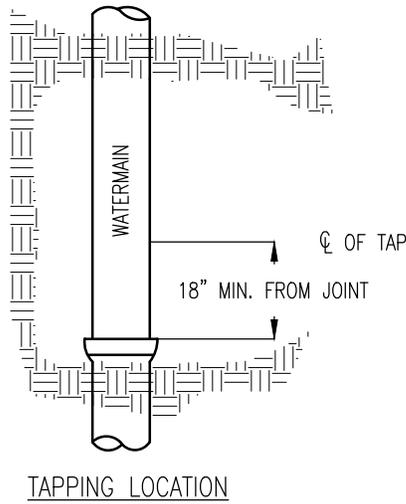
FIRE HYDRANT SETTING DETAIL – HDPE

W-4A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COARSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

CURB BOX WILL BE SUPPLIED BY CITY AT GARFIELD SHOP AND INSTALLED BY CONTRACTOR. (INCIDENTAL)

2" I.D. BLK. IRON CAP ON 6" LONG PIECE OF 2" I.D. BLK IRON SLIPPED OVER 1 1/2" I.D. BLK IRON PIPE.

1 1/2" I.D. BLK. IRON PIPE TOP SECTION SLIPPED IN 2" I.D. BLK. IRON PIPE

2" I.D. BLK IRON PIPE BOTTOM SECTION SCREWED ONTO 2" X 1 1/2" I.D. REDUCING BUSHING

7' 6" MIN. COVER

MN/DOT 3149.2.H
COARSE FILTER AGGREGATE
REQUIRED AROUND CORPORATION
STOP AND CURB STOP

VARIABLE PAY MEASURE - ONE PIECE

CORPORATION STOP
DIRECT CONNECTION

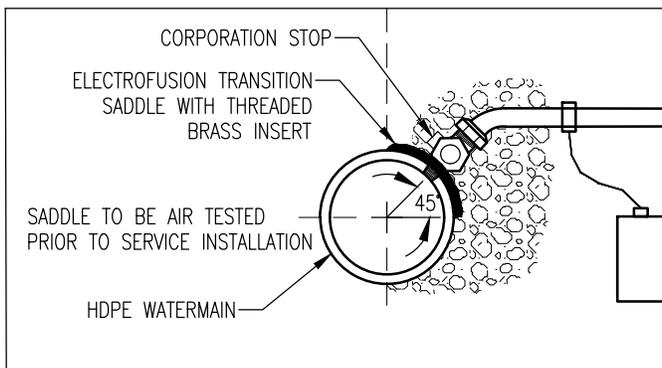
TYPE "K" COPPER
(FLARED FITTING)

BRASS CLAMP

FLARE BY FLARE
CURB STOP
CONCRETE SUPPORT

DI WATERMAIN

INSERT LEAD OR PLASTIC
SLUG & TIGHTEN
COUPLING TO SEAL END



5# ZINC ANODE BAG TO BRASS CLAMP
(INCIDENTAL)

TYPICAL COPPER WATER SERVICE - 3/4", 1", 1-1/4", AND 2"

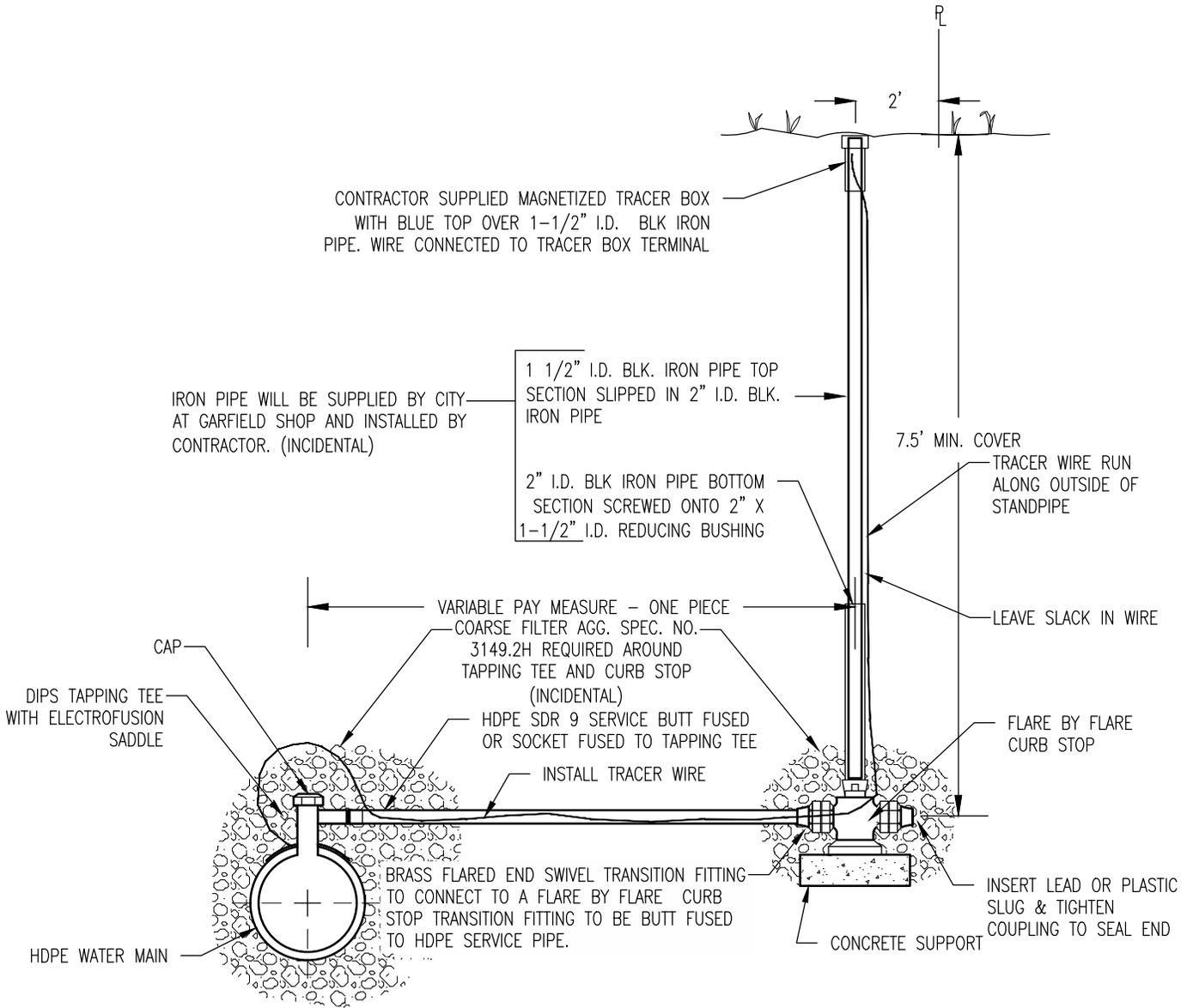
W-5

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COURSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.



NOTE: SERVICE TO BE AIR TESTED PRIOR TO TAPPING MAIN

THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTOR SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

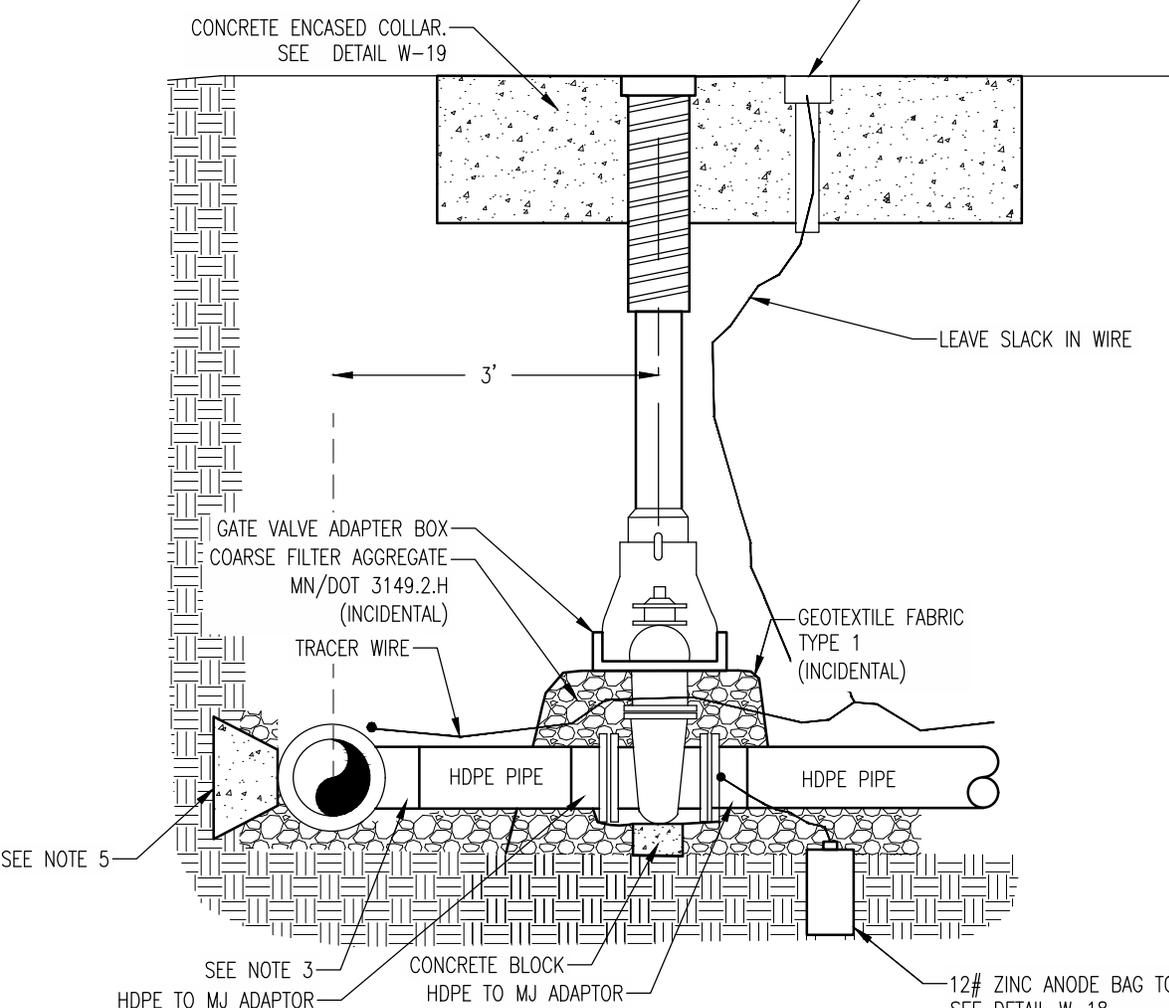
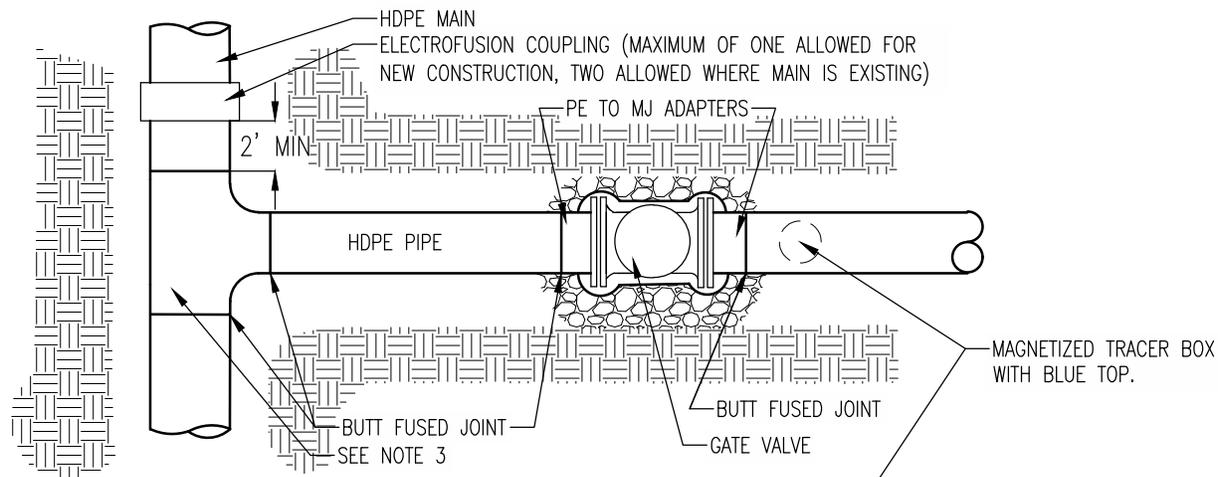
TYPICAL HDPE WATER SERVICE - 1", 1-1/4", AND 2"

W-5A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



GENERAL NOTES

1. VALVES SHALL BE CONNECTED DIRECTLY TO MECHANICAL JOINT ADAPTORS.
2. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
3. FOR 8" MAINS, CONTRACTOR SHALL USE AN 8 X 8 TEE WITH A MACHINED 8 X 6 REDUCER OR AN 8 X 6 ELECTROFUSION BRANCH SADDLE. FOR LARGER DIMENSION MAINS A FABRICATED TEE WITH A 6" BRANCH OUTLET MAY BE USED.
4. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODES SHALL BE CONNECTED DIRECTLY TO THE VALVE BONNET BOLTS.
5. WHEN RECONNECTING TO EXISTING SERVICE PIPING CONCRETE THRUST BLOCKING MAY BE REQUIRED

4" & LARGER WATER SERVICE – HDPE

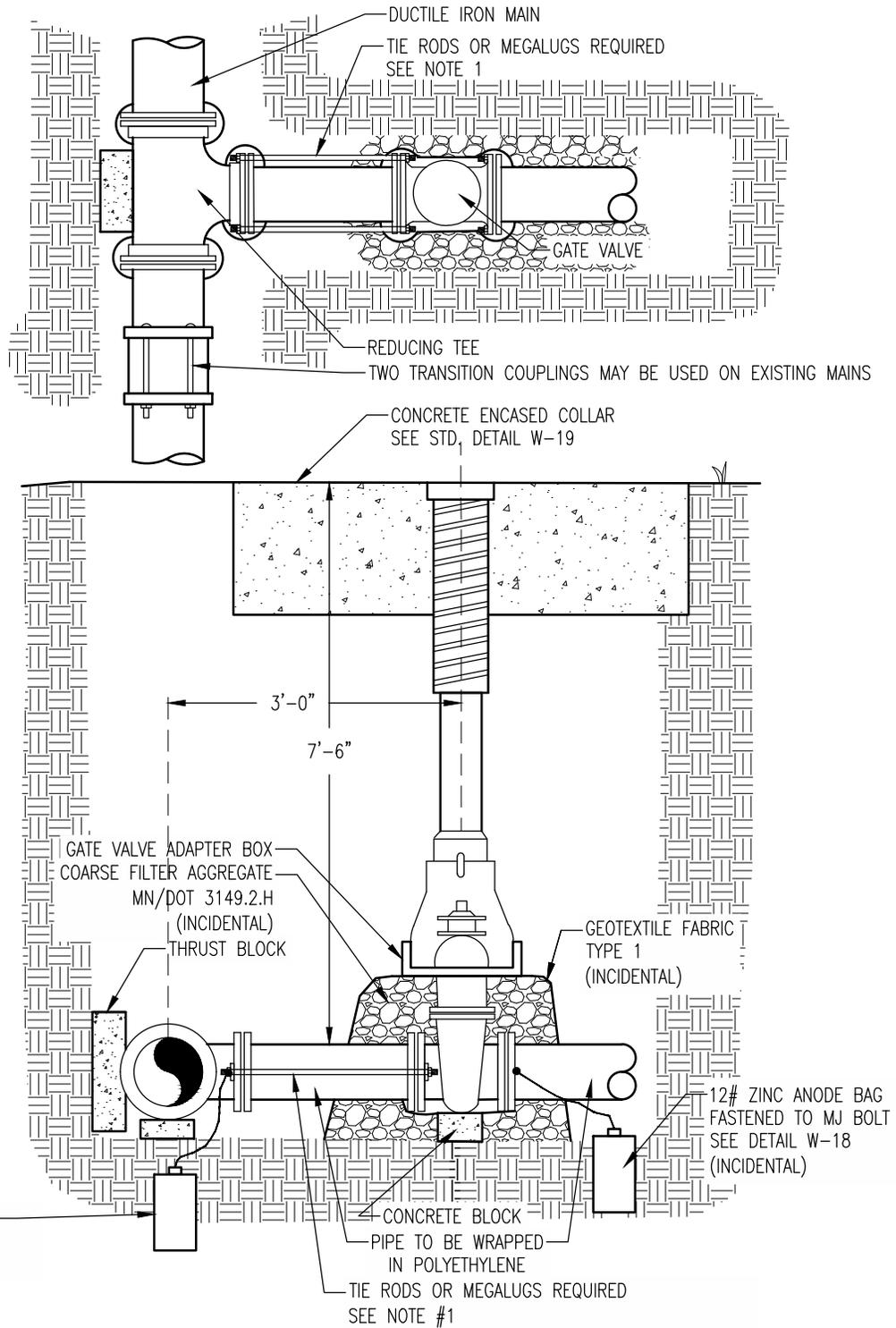
W-5B

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: ON EXISTING WATERMANS, HOT TAPS SHALL BE PERFORMED FOR NEW SERVICES WHEN POSSIBLE.



GENERAL NOTES:

1. VALVES SHALL BE CONNECTED DIRECTLY TO AN ANCHORING TEE. WHENEVER DIRECT CONNECTION IS NOT POSSIBLE, TIE RODS OR MEGALUGS SHALL BE USED. TIE RODS SHALL BE GALVANIZED.
2. USE EPOXY COATING ON VALVE.
3. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.

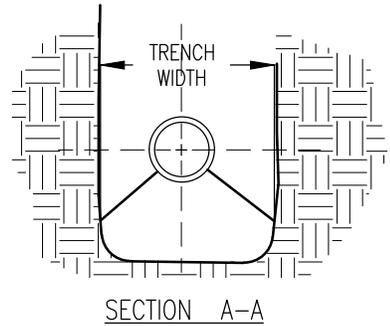
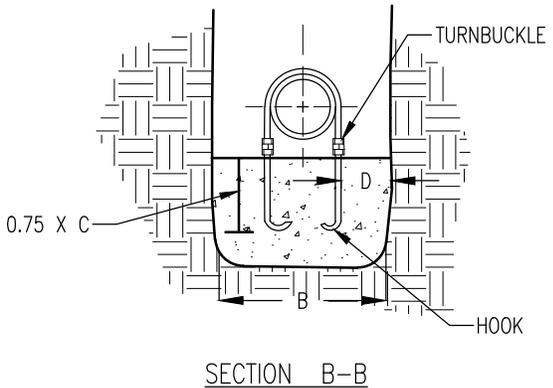
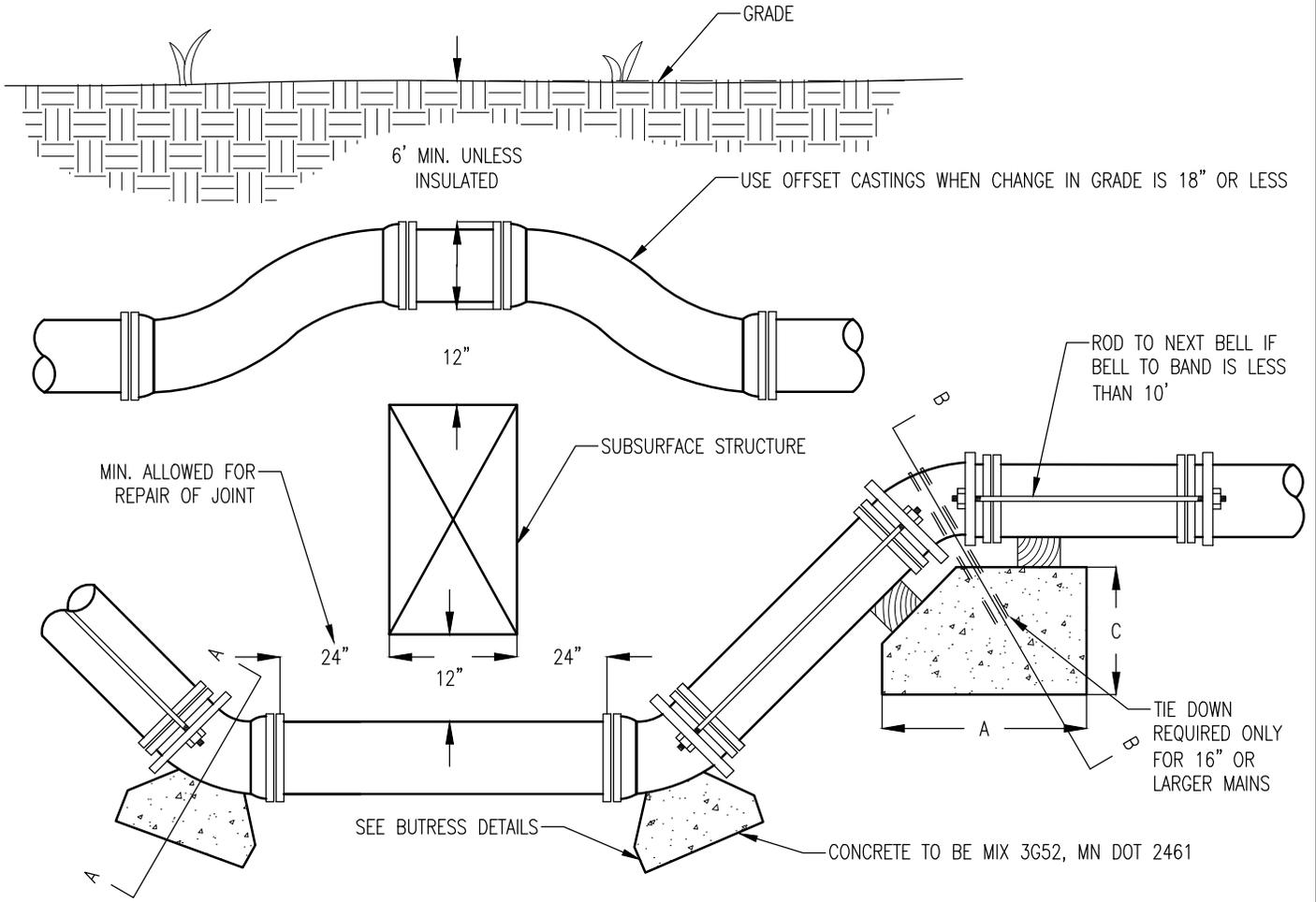
4" & LARGER WATER SERVICE – DUCTILE IRON

W-5C

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- NOTES:
1. TIE RODS, BOLTS, NUTS, BANDS, AND WASHERS TO BE FURNISHED BY THE CONTRACTOR AND INSTALLED BY CONTRACTOR. ALL RODS AND CONNECTING HARDWARE SHALL BE GALVANIZED. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH ZINC ANODE CAPS
 2. STRAPPING MATERIAL:
 - 2.1. NO. RODS 2 PER TIE
 - 2.2. DIA. RODS 1 INCH
 - 2.3. STRAP SIZE 1/2" X 2"
 - 2.4. BOLT DIA. 3/4"
 - 2.5. WASHER SIZE 1/2" X 3" X 5"
 3. OFFSETS FOR 16" WATER MAIN AND LARGER, TIE DOWNS SHALL BE INSTALLED AS SHOWN. TURNBUCKLE AND BLOCK SIZES:

PIPE SIZE	A	B	C	D
16"	6'-0"	2'-6"	3'-0"	0'-1"
20"	8'-0"	3'-0"	3'-0"	0'-1 1/4"
24"	8'-0"	3'-0"	5'-0"	0'-1 1/2"
30"	8'-0"	5'-0"	5'-0"	0'-2"

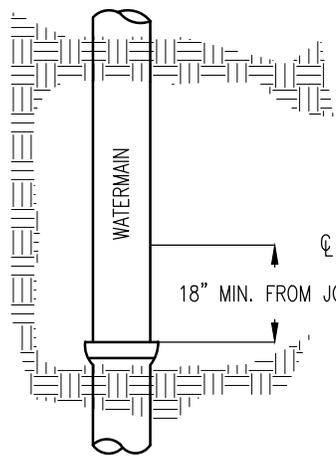
STRAPPING WATERMAIN VERTICAL OFFSETS

W-6

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COARSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

TAPPING LOCATION

CONTRACTOR SUPPLIED MAGNETIZED TRACER BOX WITH BLUE TOP OVER 1-1/2" I.D. BLK IRON PIPE. WIRE CONNECTED TO TRACER BOX TERMINAL.

IRON PIPE WILL BE SUPPLIED BY CITY AT GARFIELD SHOP AND INSTALLED BY CONTRACTOR. (INCIDENTAL)

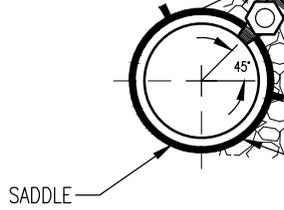
1 1/2" I.D. BLK. IRON PIPE TOP SECTION SLIPPED IN 2" I.D. BLK. IRON PIPE

2" I.D. BLK IRON PIPE BOTTOM SECTION SCREWED ONTO 2" X 1 1/2" I.D. REDUCING BUSHING

2" X 2" I.P.S. BRASS HDPE SWIVEL TRANSITION FITTING WITH IRON PIPE THREADS TO HDPE
 2" CU TUBE NUT. 2" FEMALE CU THREAD TO 2" FEMALE IRON PIPE THREAD.
 2" 45° BEND
 2" CORPORATION STOP

BUTT OR SOCKET FUSED INSTALL TRACER WIRE

SPEC. NO 3149H COARSE FILTER AGGREGATE (INCIDENTAL) REQUIRED AROUND CORPORATION STOP AND CURB STOP



2" HDPE SDR9

BRASS HDPE SWIVEL TRANSITION

DI OR CI WATERMAIN

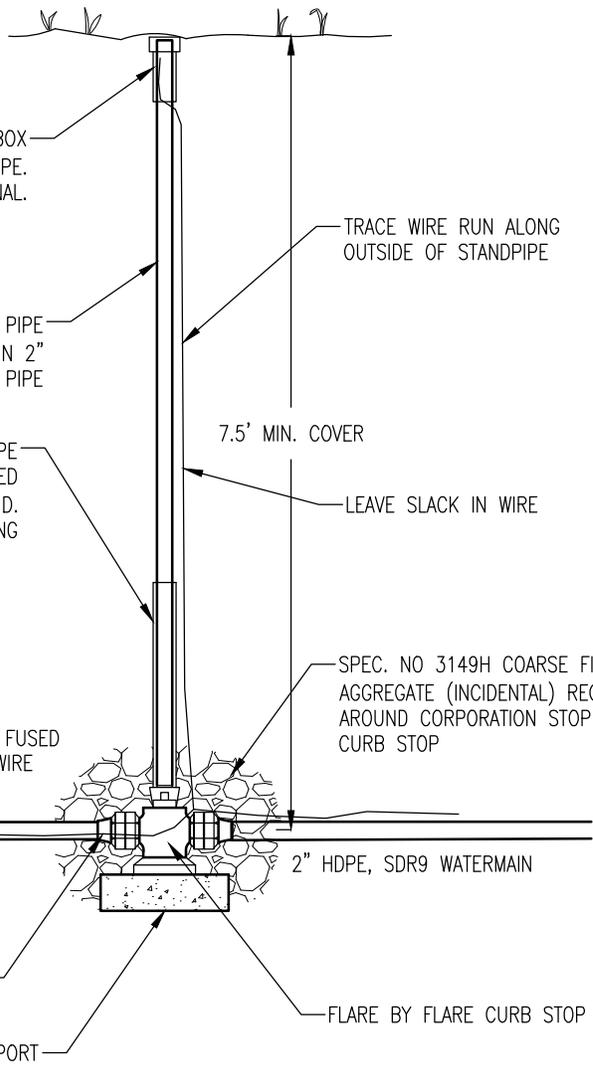
CONCRETE SUPPORT

2" HDPE, SDR9 WATERMAIN

FLARE BY FLARE CURB STOP

CONNECT TRACER WIRE TO WATERMAIN TO ENSURE ELECTRICAL CONDUCTIVITY OR PROVIDE 1 LB ANODE FOR TRACER WIRE.

THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. THE NUMBER OF CONNECTIONS MUST BE KEPT TO A MINIMUM. ANY SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTORS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.



2" HDPE WATERMAIN CONNECTION TO DI OR CI

W-7

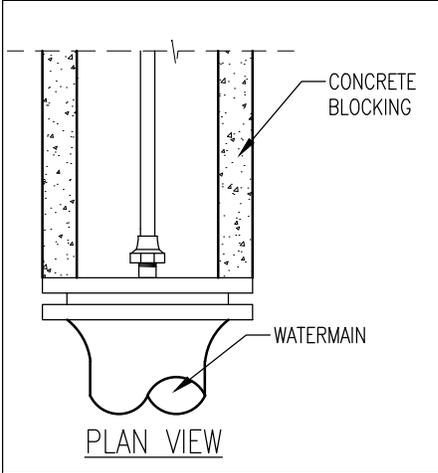
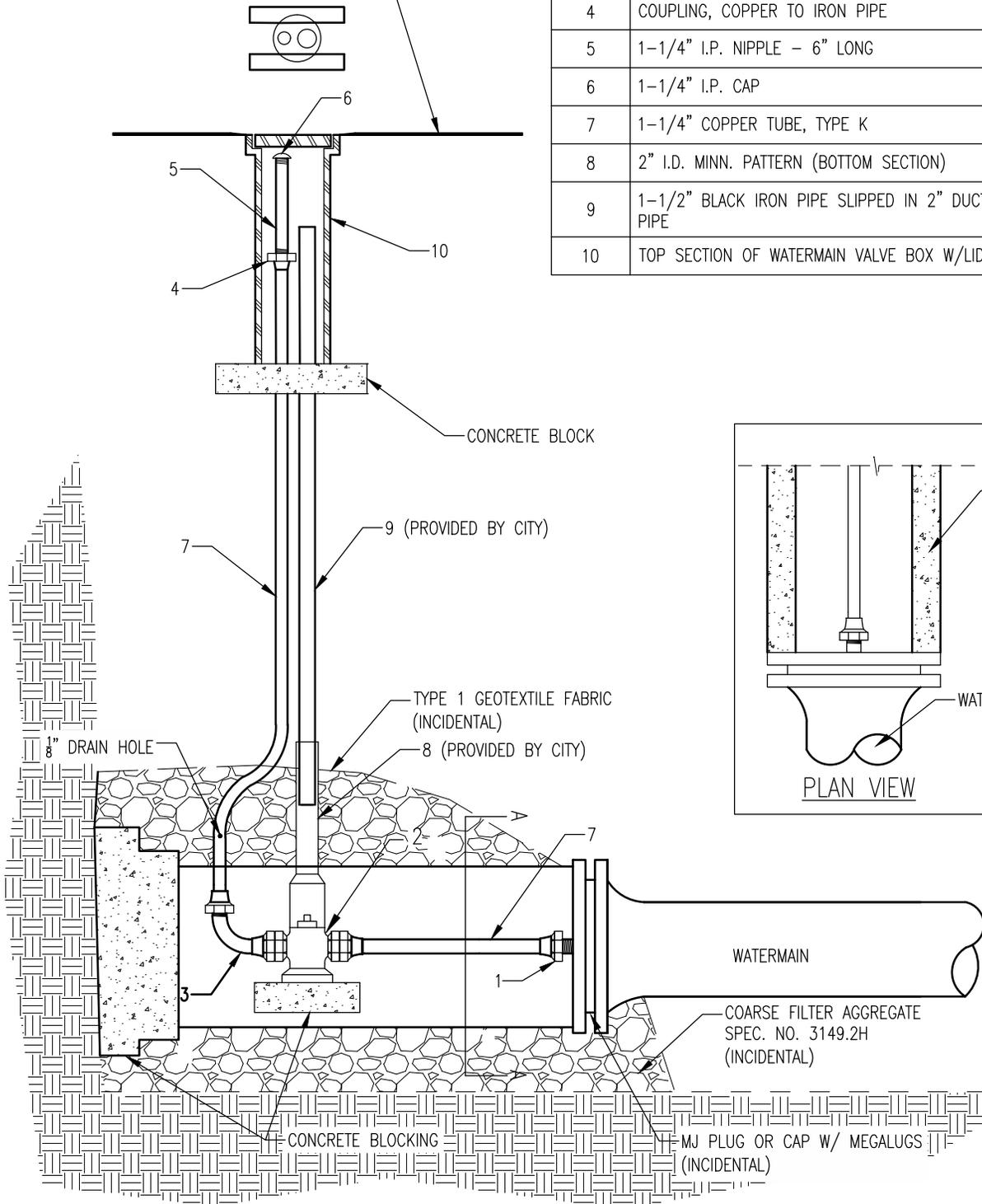
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

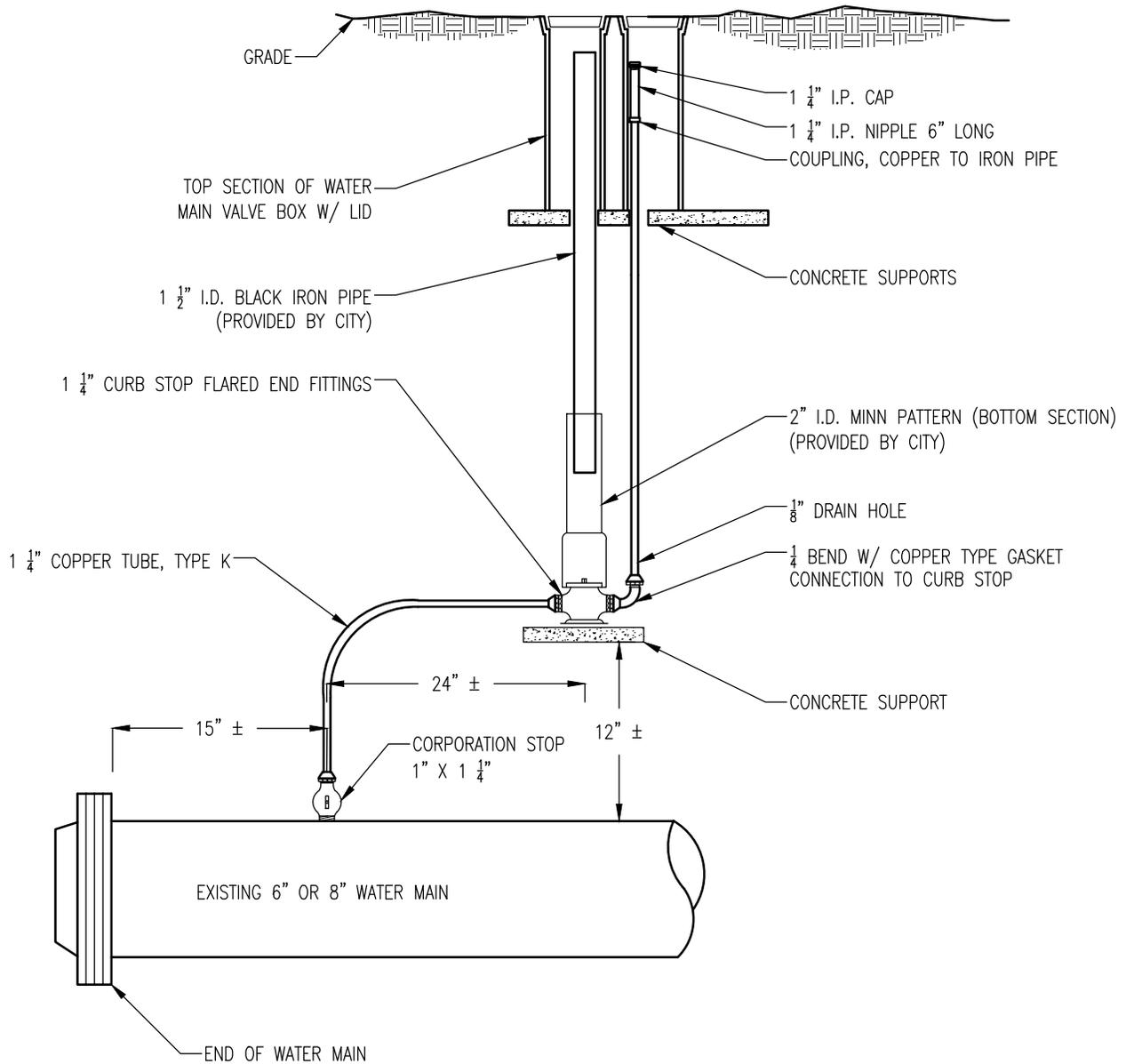
NO SCALE

NOTE: TOP OF CASTING SHALL BE $\frac{3}{8}$ " BELOW FINISHED SURFACE

ITEM	DESCRIPTION
1	1-1/4" I.P. THREAD TO FLARE COPPER COUPLING
2	1-1/4" CURB STOP, FLARED END FITTINGS
3	1-1/4" 90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP
4	COUPLING, COPPER TO IRON PIPE
5	1-1/4" I.P. NIPPLE - 6" LONG
6	1-1/4" I.P. CAP
7	1-1/4" COPPER TUBE, TYPE K
8	2" I.D. MINN. PATTERN (BOTTOM SECTION)
9	1-1/2" BLACK IRON PIPE SLIPPED IN 2" DUCTILE IRON BLACK PIPE
10	TOP SECTION OF WATERMAIN VALVE BOX W/LID



1-1/4" BLOWOFF FOR 6" & 8" IRON WATERMAINS		W-8
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



1-1/4" BLOW OFF (VALVE BOX TYPE) ON EXISTING WATERMAIN

W-8A

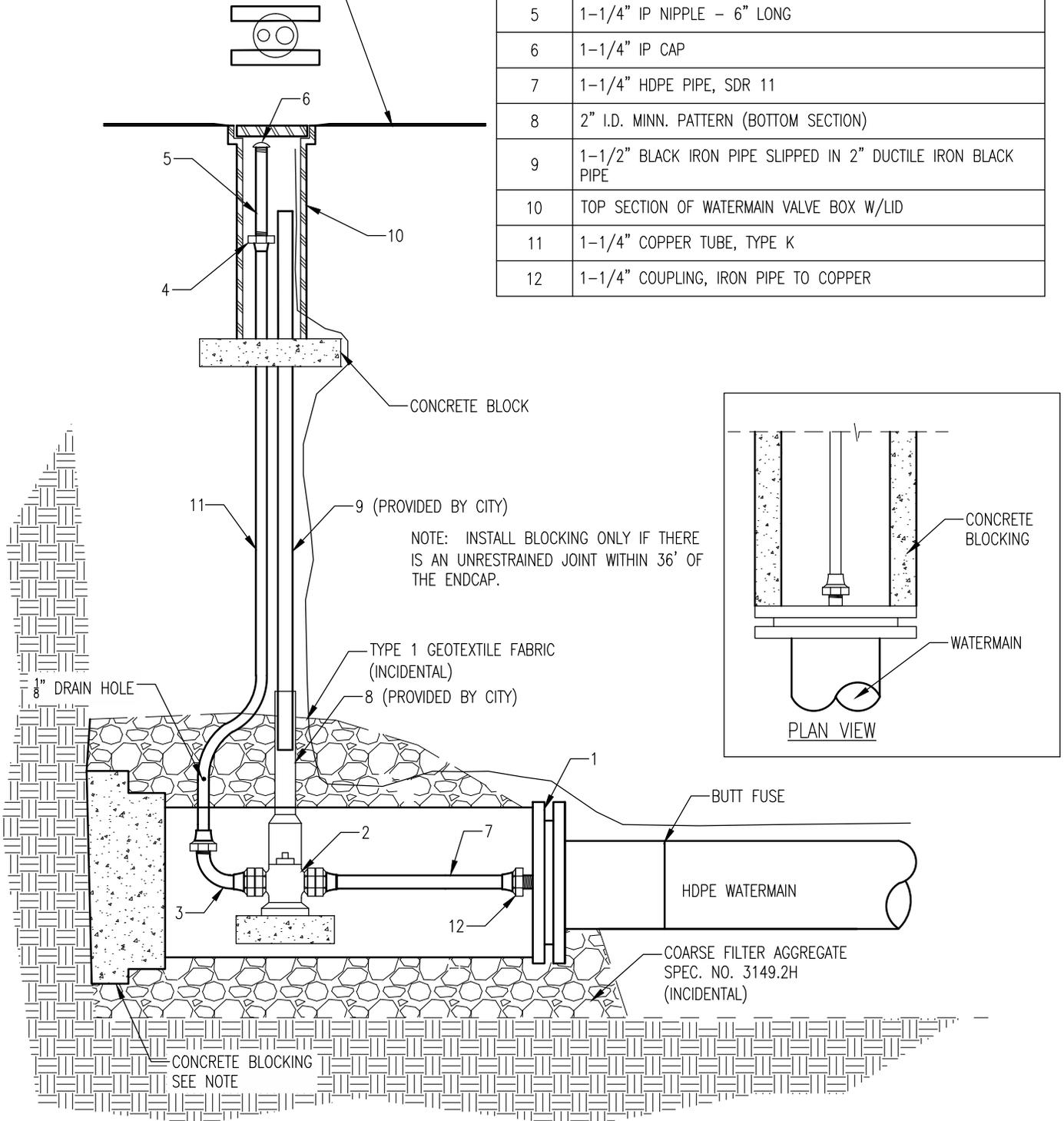
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

ITEM	DESCRIPTION
1	MJ ADAPTOR AND TAPPED DI ENDCAP
2	1-1/4" CURB STOP, FLARED END FITTINGS
3	1-1/4" 90° BEND W/COPPER TYPE GASKET CONNECTION TO CURB STOP
4	1-1/4" COUPLING, COPPER TO IRON PIPE
5	1-1/4" IP NIPPLE - 6" LONG
6	1-1/4" IP CAP
7	1-1/4" HDPE PIPE, SDR 11
8	2" I.D. MINN. PATTERN (BOTTOM SECTION)
9	1-1/2" BLACK IRON PIPE SLIPPED IN 2" DUCTILE IRON BLACK PIPE
10	TOP SECTION OF WATERMAIN VALVE BOX W/LID
11	1-1/4" COPPER TUBE, TYPE K
12	1-1/4" COUPLING, IRON PIPE TO COPPER

NOTE: TOP OF CASTING SHALL BE 3/8" BELOW FINISHED SURFACE



1-1/4" BLOWOFF FOR HDPE WATERMAINS

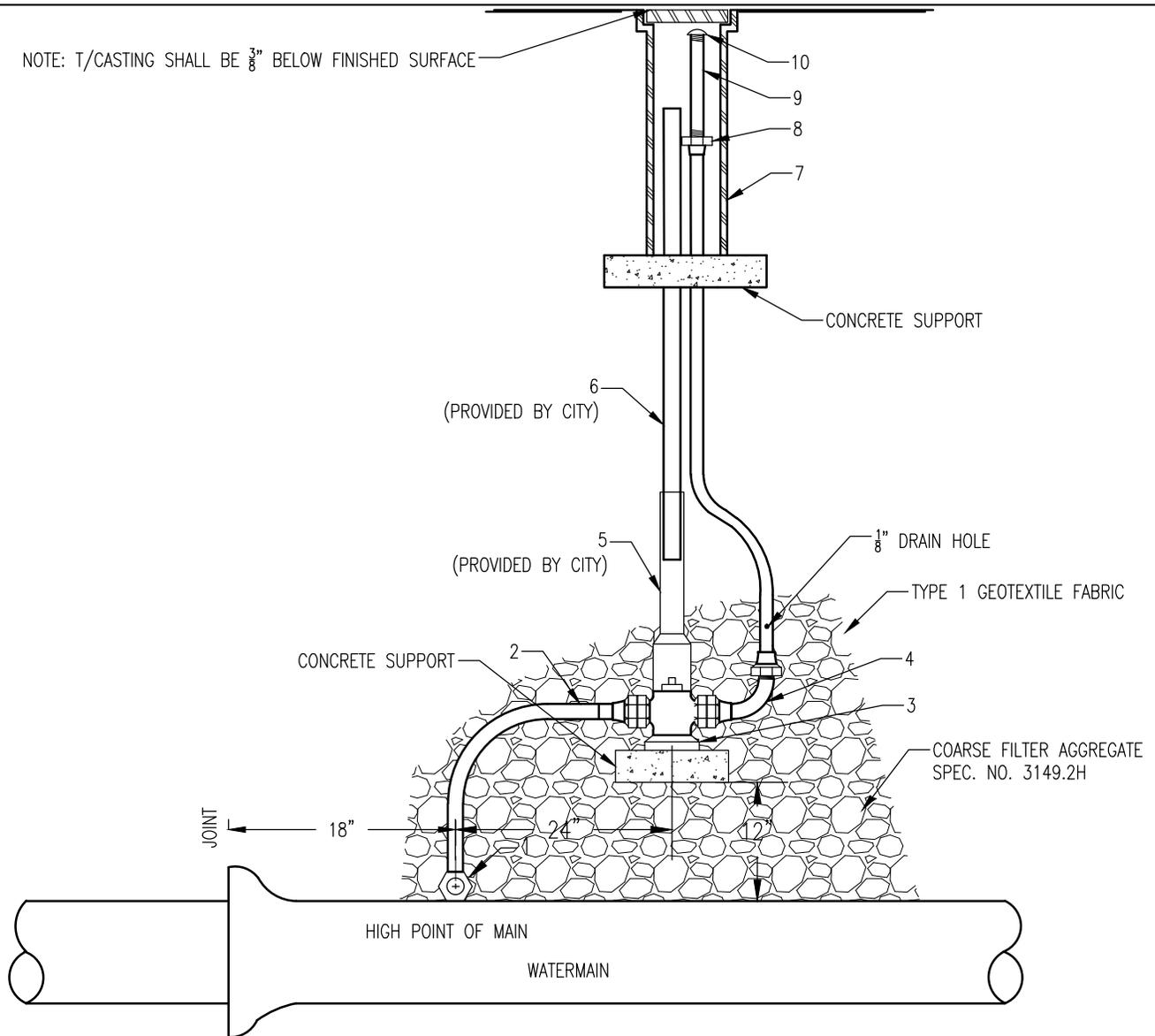
W-8B

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: T/CASTING SHALL BE $\frac{3}{8}$ " BELOW FINISHED SURFACE



ITEM	DESCRIPTION
1	1" CORPORATION STOP
2	1" COPPER TUBE, TYPE K
3	1" CURB STOP, FLARED END FITTINGS
4	1 90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP
5	2" I.D. MINN. PATTERN (BOTTOM SECTION)
6	1-1/2" I.D. BLACK IRON PIPE
7	TOP SECTION OF WATERMAIN VALVE BOX W/ LID
8	COUPLING, COPPER TO IRON PIPE
9	1" I.P. NIPPLE - 6" LONG
10	1" I.P. CAP

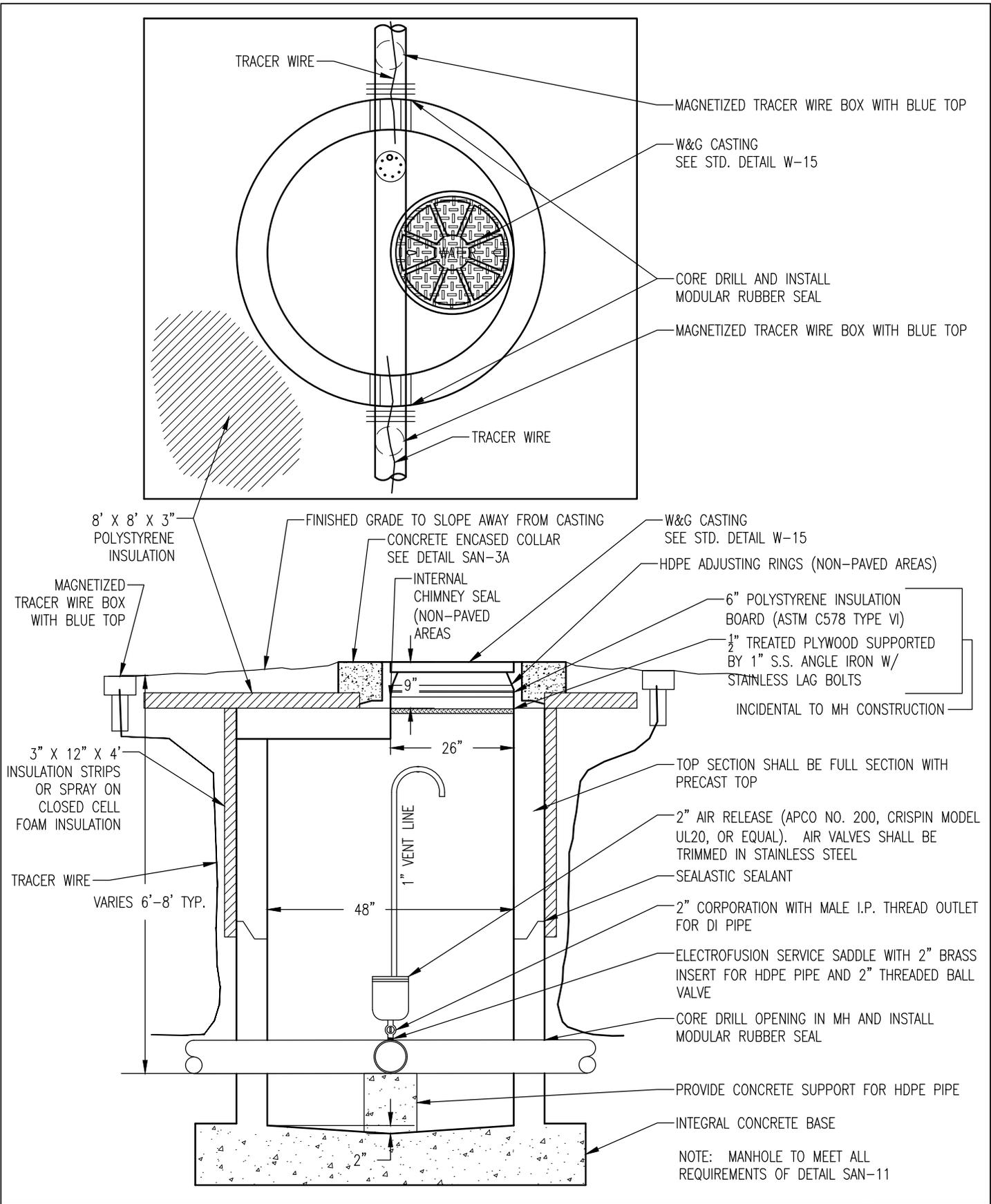
MANUAL AIR RELEASE VALVE BOX TYPE

W-9

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



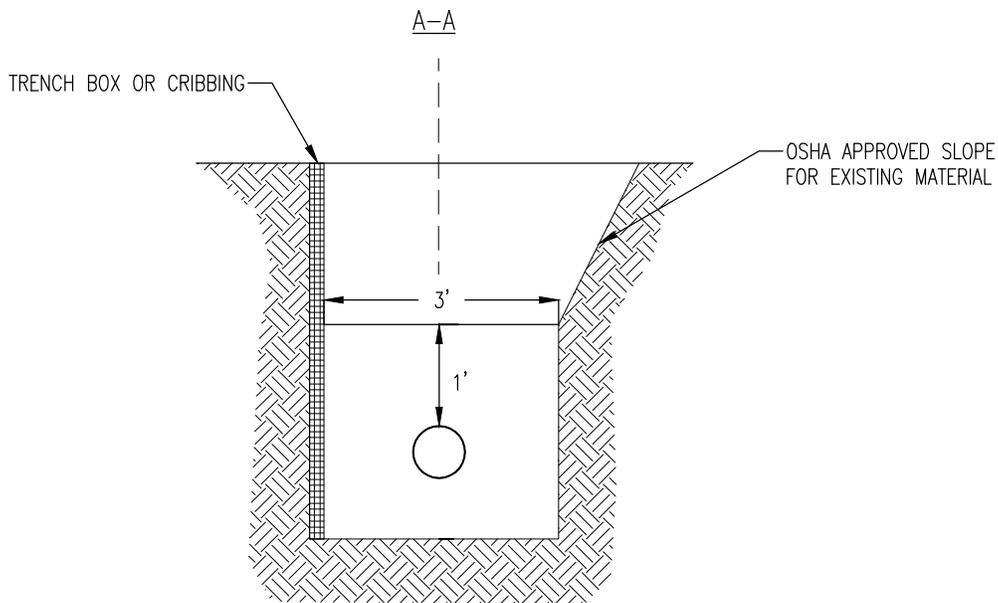
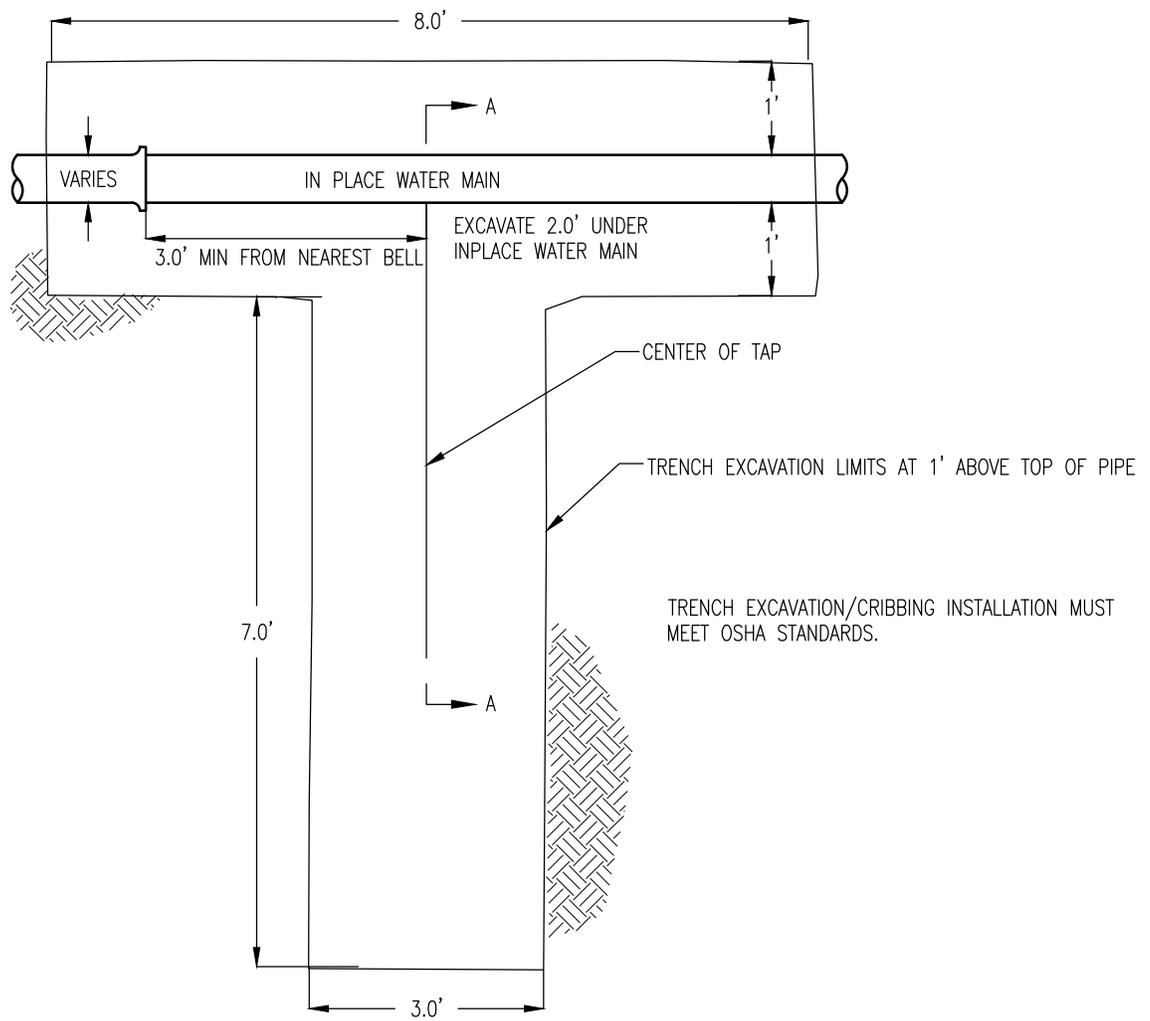
AUTO AIR-RELEASE VALVE AND MANHOLE

W-10

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



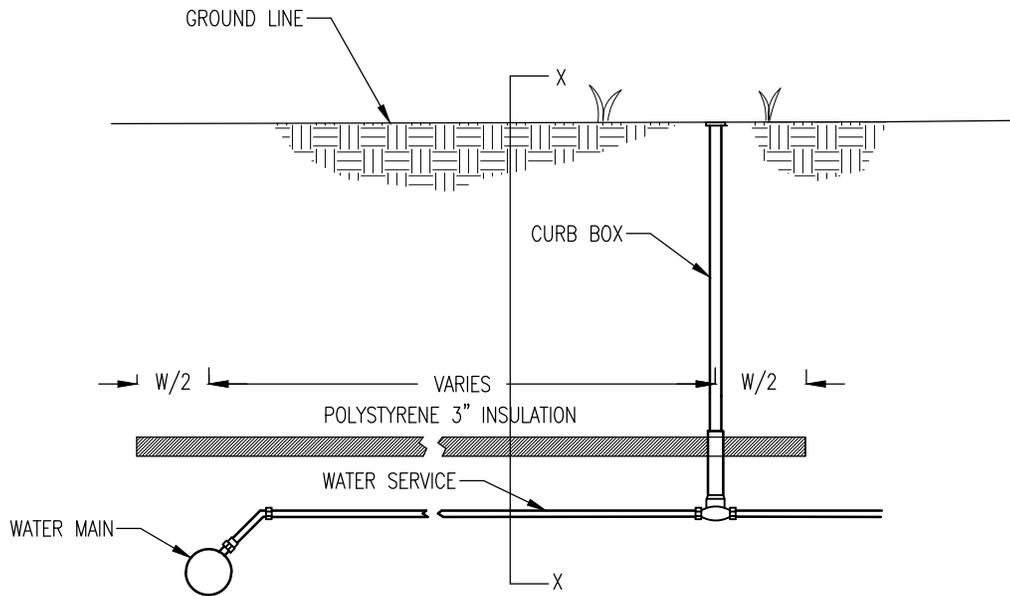
EXCAVATION FOR TAPPING SLEEVE AND VALVE

W-11

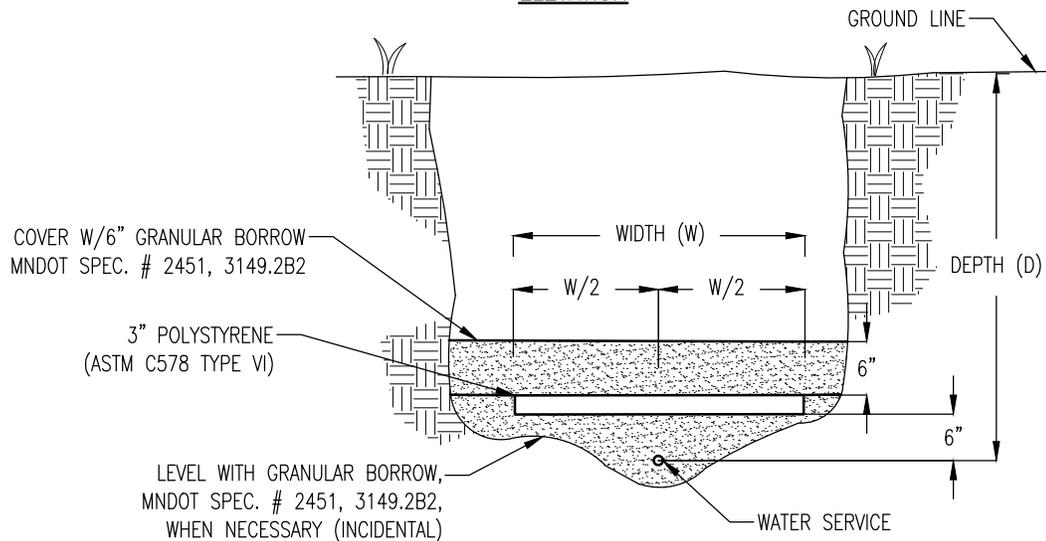
REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



ELEVATION



SECTION X-X

NOTES:

1. LAYERING OF 2 OR 3 SHEETS TO ARRIVE AT 3" IS REQUIRED WITH JOINTS OFFSET A MINIMUM OF 6".
2. POLYSTYRENE SHALL BE AS SPECIFIED IN THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES STANDARD CONSTRUCTION SPECIFICATIONS.
3. INSULATION SHALL ONLY BE USED WHERE APPROVED BY THE ENGINEER.

DEPTH (D)	WIDTH (W)
7' OR MORE	NONE
5.2' TO 6.9'	4'-0"
4.3' TO 5.1'	6'-0"
3.0' TO 4.2'	8'-0"

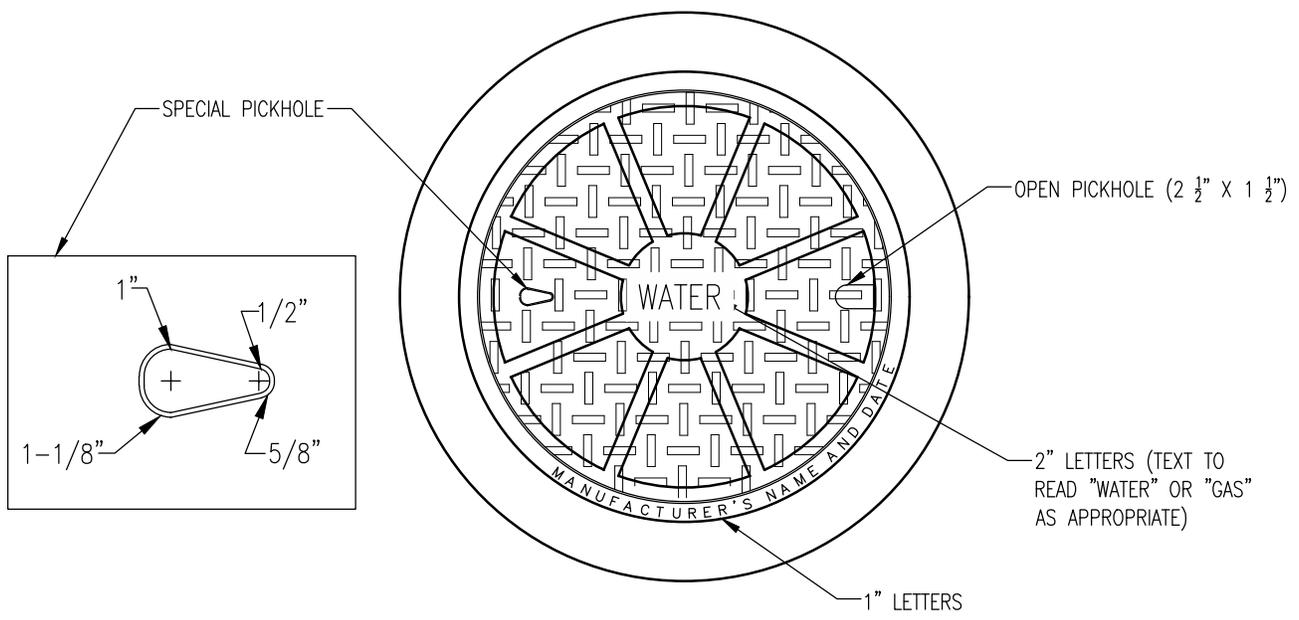
WATER SERVICE INSULATION

W-13

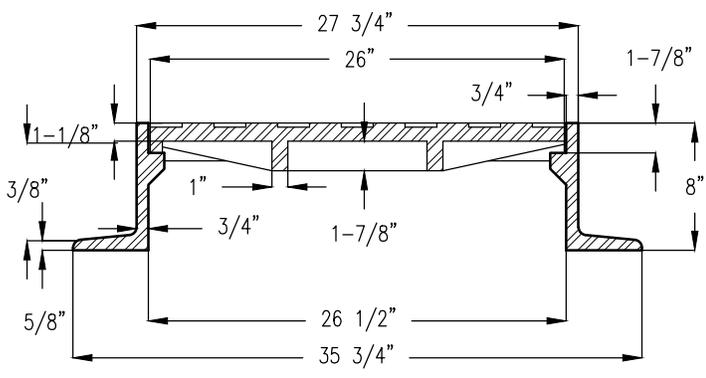
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



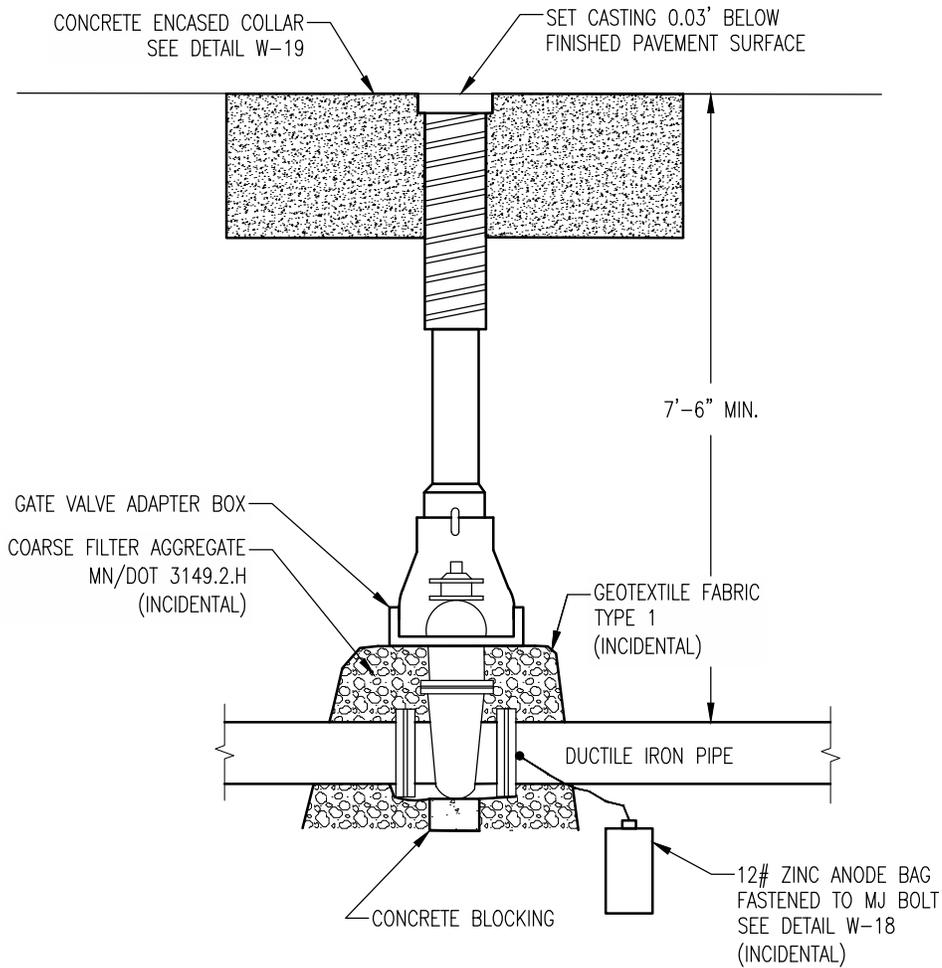
PLAN OF COVER



SECTION OF FRAME AND COVER

NOTE: ROUND OFF ALL EXPOSED EDGES FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACES.
 WEIGHT: RING-295 LBS. COVER - 162 LBS. SIMILAR OR EQUAL TO NEENAH FOUNDRY NQR-1723 (EXCEPT WITH LETTERING AS NOTED)

CAST IRON WATER MANHOLE FRAME AND COVER		W-15
REVISED/APPROVED 02/01/2013	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

1. USE EPOXY COATING ON EXTERIOR OF VALVES
2. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
3. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.

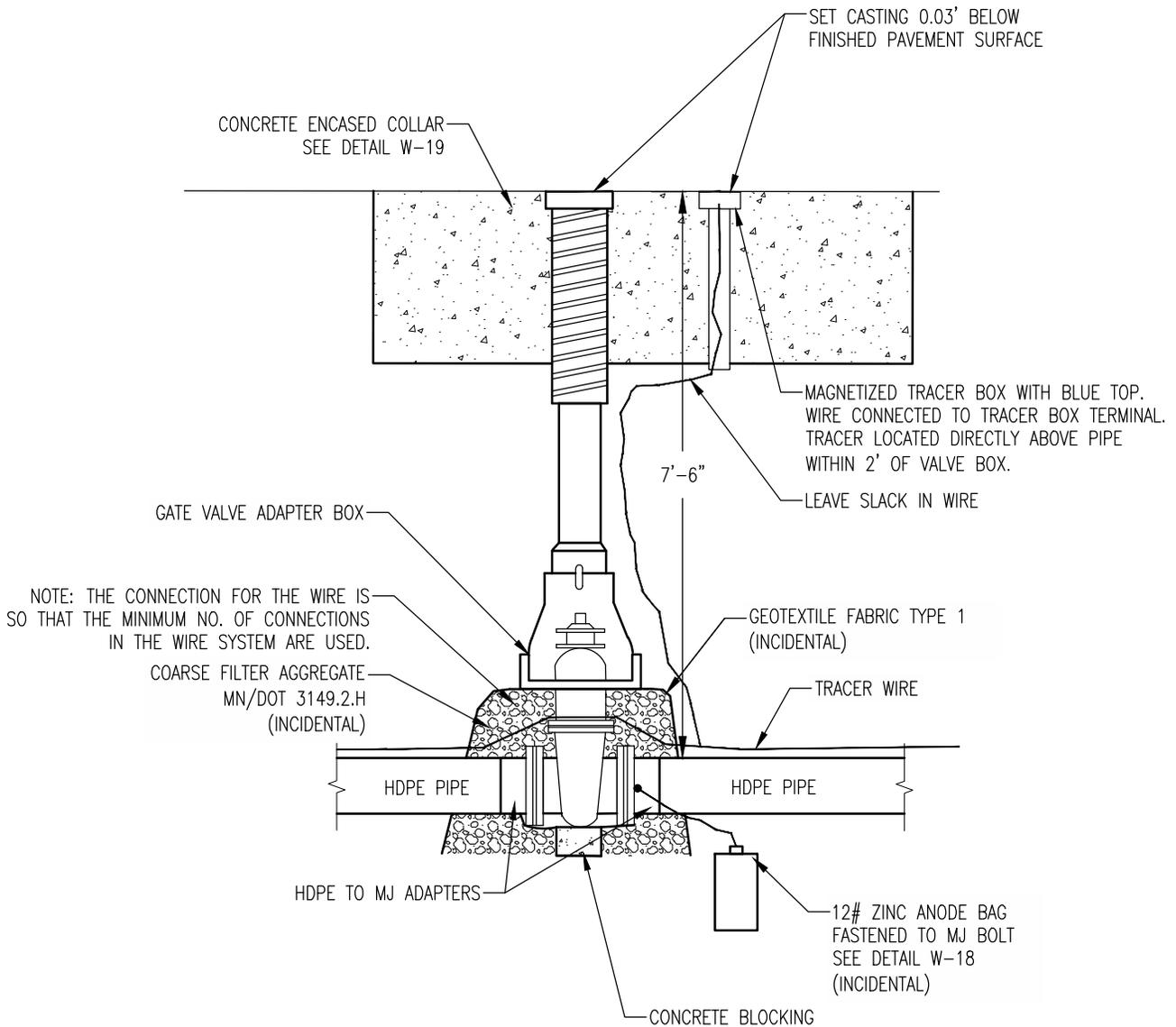
WATER VALVE BOX – DUCTILE IRON MAIN

W-17

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. VALVES SHALL BE CONNECTED DIRECTLY TO HDPE WITH HDPE TO MECHANICAL JOINT ADAPTERS.
2. USE EPOXY COATING ON EXTERIOR OF VALVES.
3. ALL BOLTS SHALL BLUE COATED BE COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. FOR OPEN CUT PIPE INSTALLATIONS, ELECTROFUSION COUPLINGS ARE NOT ALLOWED FOR CONNECTION OF HDPE TO MJ ADAPTERS. FOR DIRECTIONAL DRILLED INSTALLATIONS, ONE ELECTROFUSION COUPLING MAY BE USED PER VALVE.
5. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODE SHALL BE CONNECTED DIRECTLY TO THE VALVE BONNET BOLTS.

WATER VALVE BOX – HDPE MAIN

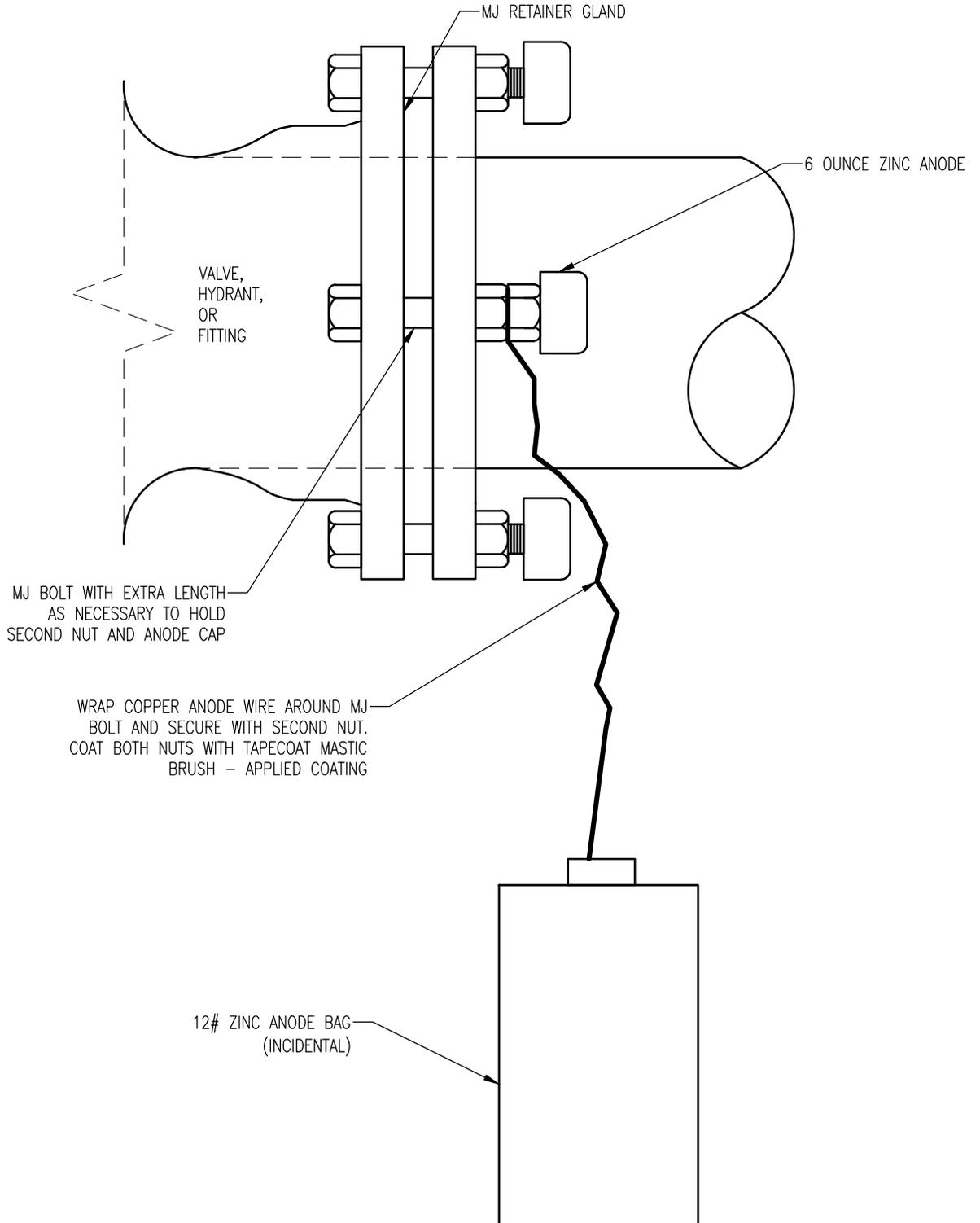
W-17A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: ALL DUCTILE IRON VALVES, HYDRANTS, OR FITTINGS SHALL RECEIVE ANODES.



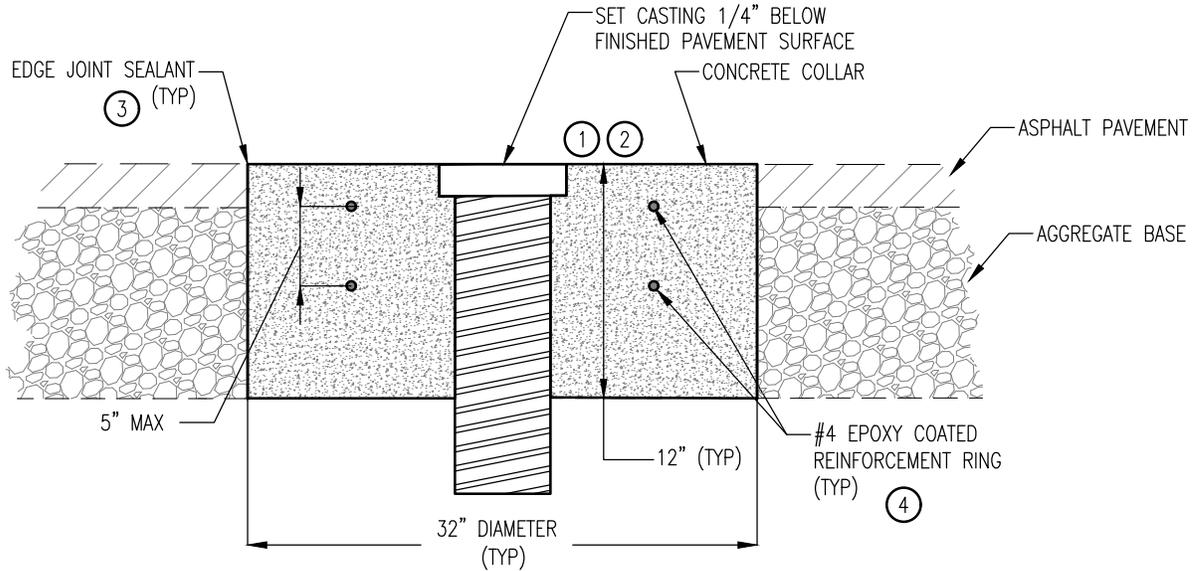
ANODE CONNECTION

W-18

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

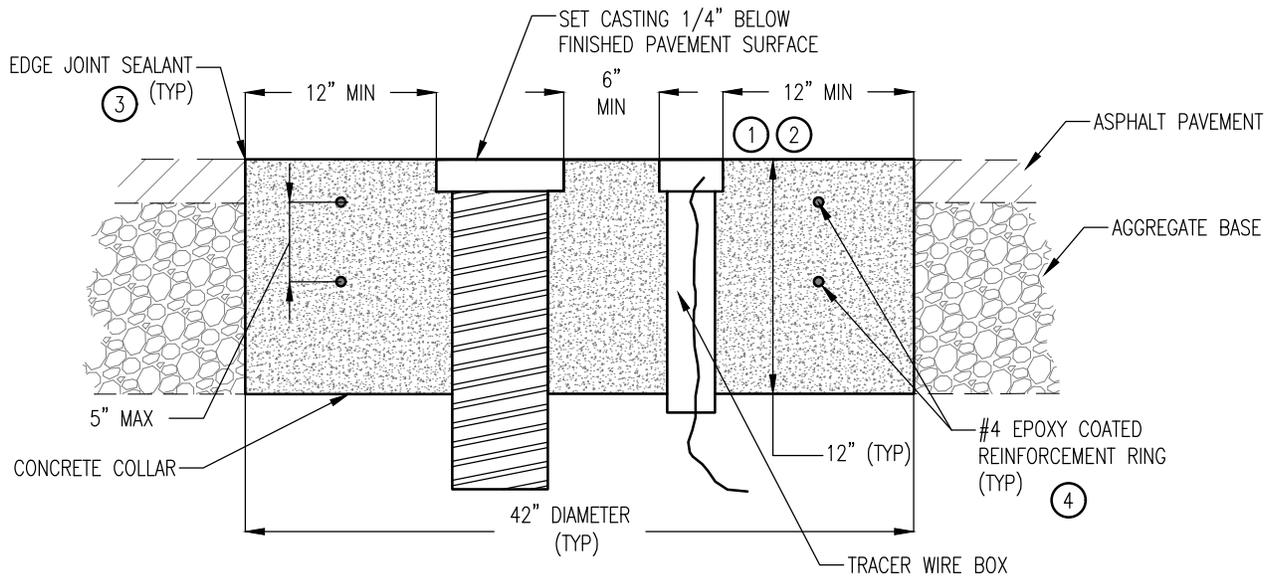
NO SCALE



NOTES:

- ① CONCRETE (MIX NO. 3G52) COLLAR TO ENCASE VALVE BOX CASTING.
- ② CONCRETE COLLAR SHALL BE CIRCULAR LAYOUT. PAVEMENT AND BASE SHALL BE CUT OUT WITH ROTATING CUTTING DEVICE
- ③ FINISH CONCRETE EDGE WITH 1/4" RADIUS. SEAL JOINT BETWEEN PAVEMENT AND COLLAR.
- ④ MAINTAIN 3.5" COVER ON REINFORCEMENT.

CONCRETE ENCASED WATER VALVE BOX COLLAR



**CONCRETE ENCASED WATER VALVE BOX COLLAR W/
TRACER BOX ALTERNATIVE**

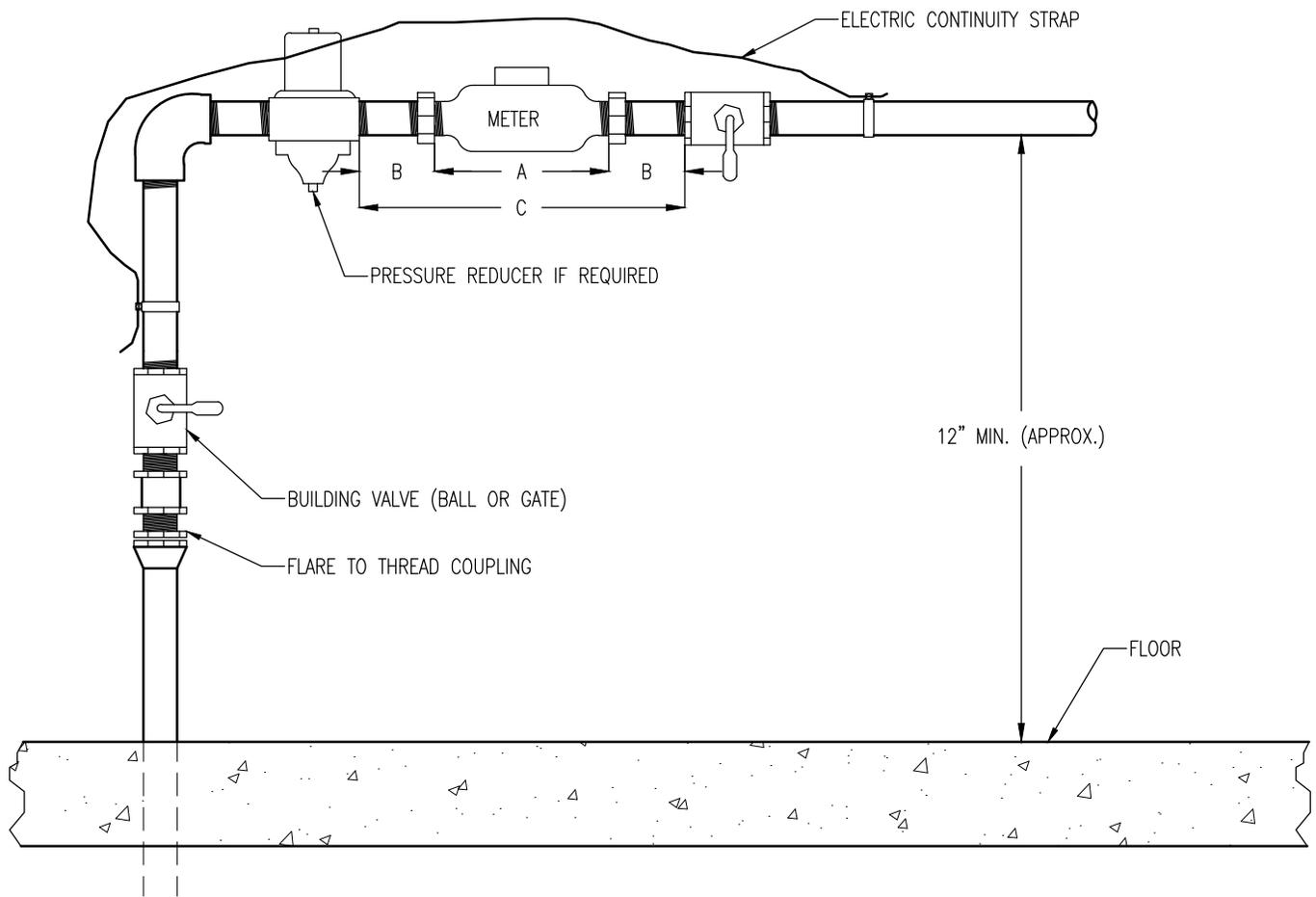
CONCRETE ENCASED VALVE BOX COLLAR IN ROADWAY

W-19

REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



WATER METER SIZE					
	5/8"	3/4"	1"	1 1/2"	2"
A - METER LENGTH	7-1/2"	9"	10 3/4"	12-5/8"	15-1/4"
B - METER TAIL PIECE	2-3/8"	2-1/2"	2 5/8"	2-1/2"	2-5/8"
C - METER W/ TAIL PIECE	12-1/2"	14"	16"	17-5/8"	20-1/2"
TAIL PIECE THREAD SIZE	1/2"	3/4"	1"	2-1/4" X 1-3/4"	2-1/4" X 1-3/4"
MAX. METER OUTPUT (GPM)	25	35	70	120	170

NOTES:

- SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE.
- METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION.
- VALVES SHALL BE GATE OR FULL-WAY BALL VALVES.
- PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI.
- ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE.

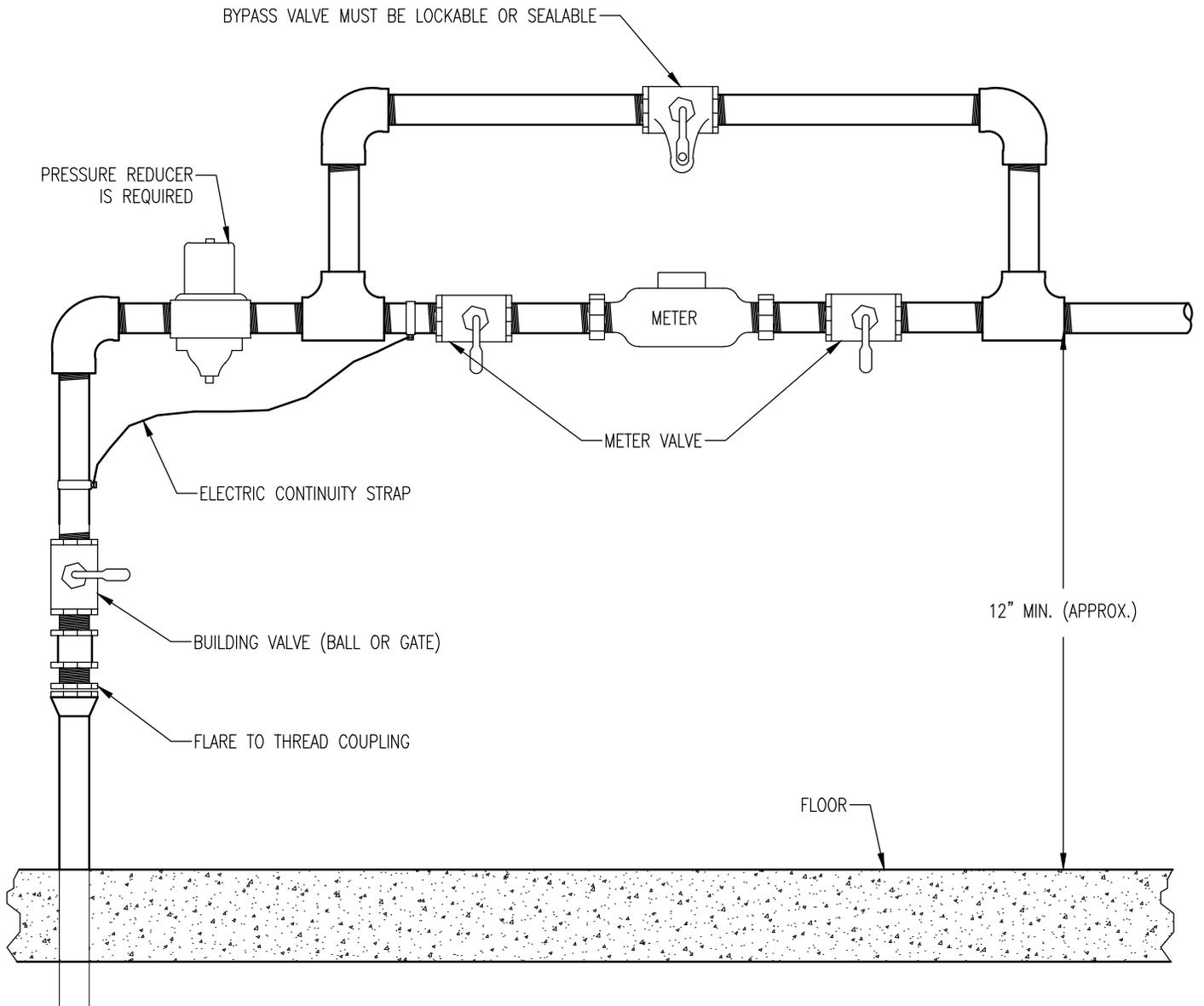
TYPICAL WATER METER INSTALLATION - SINGLE

W-30

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
3. VALVES SHALL BE GATE OR FULL-WAY BALL VALVES
4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
5. ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE
6. BYPASS VALVE MUST BE LOCKABLE OR SEALABLE
7. METER INSTALLATIONS 2" OR LARGER MAY REQUIRE A BYPASS IF POTENTIAL HEALTH OR SAFETY RISKS INCREASE IF WATER SUPPLY IS INTERRUPTED

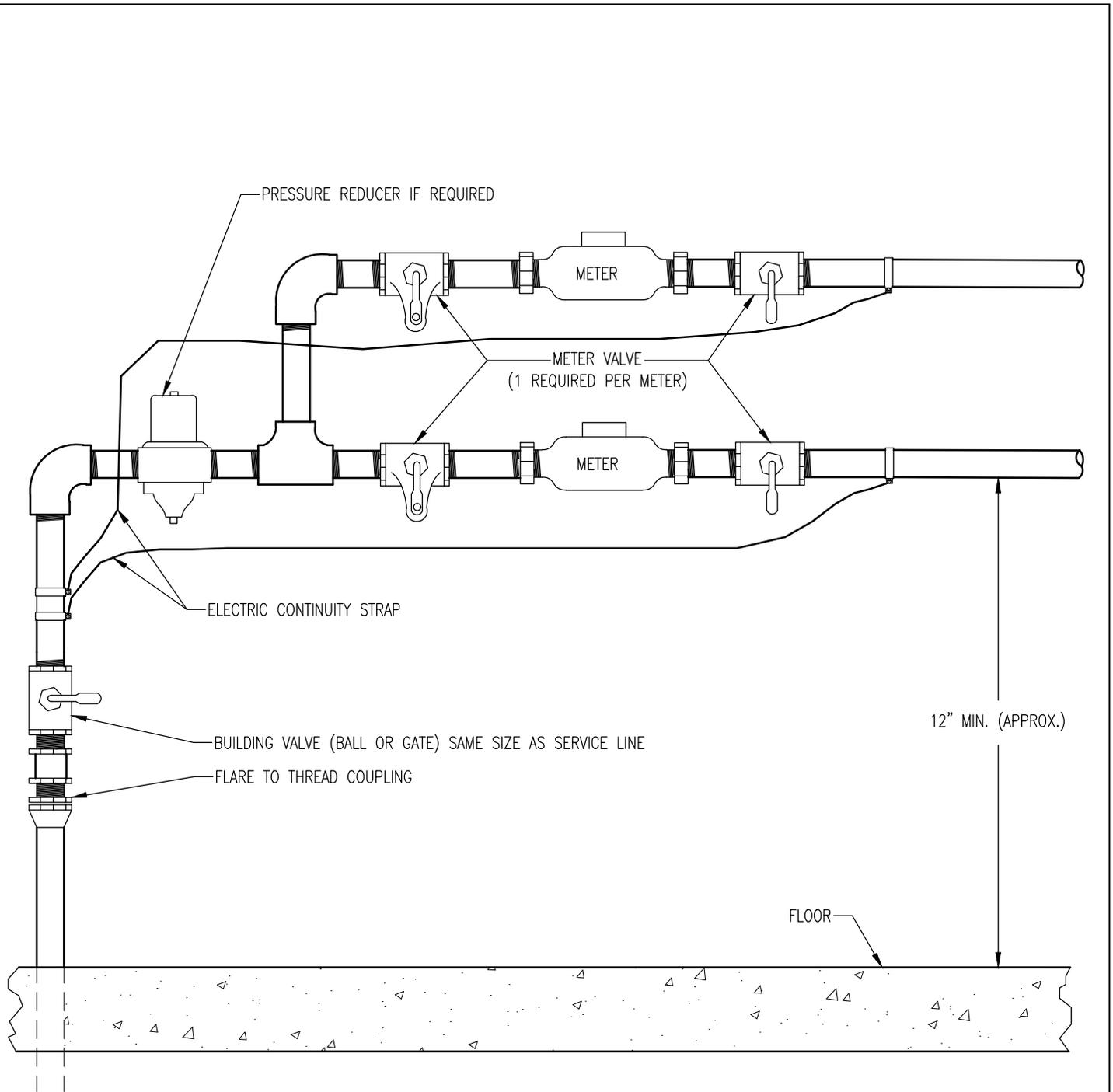
TYPICAL WATER METER INSTALLATION WITH BYPASS

W-31

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
3. VALVES SHALL BE GATE OR FULL-WAY BALL VALVES
4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
5. ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE
6. FOR METERS 3" AND LARGER, A STRAINER IS REQUIRED AHEAD OF METER
7. UPSTREAM METER VALVE ON MULTIMETER INSTALLATIONS MUST BE LOCKABLE

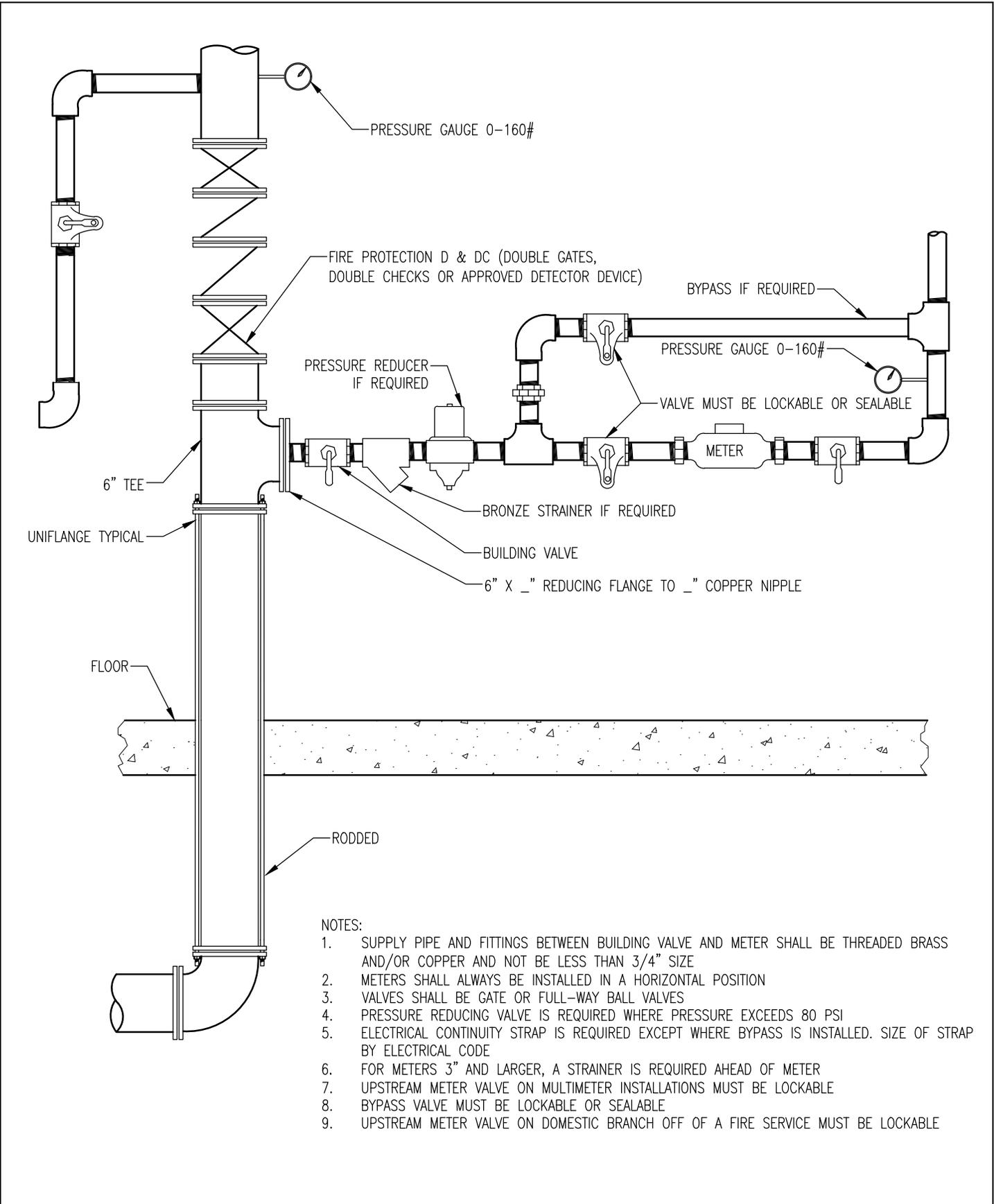
MULTIPLE WATER METER INSTALLATION

W-32

REVISED/APPROVED 02-01-2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



- NOTES:
1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
 2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
 3. VALVES SHALL BE GATE OR FULL-WAY BALL VALVES
 4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
 5. ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE
 6. FOR METERS 3" AND LARGER, A STRAINER IS REQUIRED AHEAD OF METER
 7. UPSTREAM METER VALVE ON MULTIMETER INSTALLATIONS MUST BE LOCKABLE
 8. BYPASS VALVE MUST BE LOCKABLE OR SEALABLE
 9. UPSTREAM METER VALVE ON DOMESTIC BRANCH OFF OF A FIRE SERVICE MUST BE LOCKABLE

TYPICAL 6" FIRE SERVICE WITH DOMESTIC WATER	W-34
REVISED/APPROVED 02/01/2013	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE	