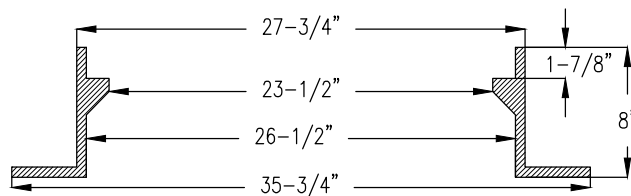
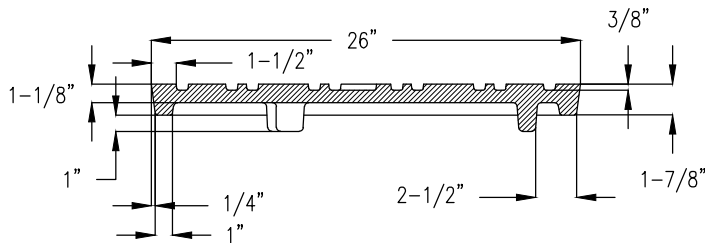
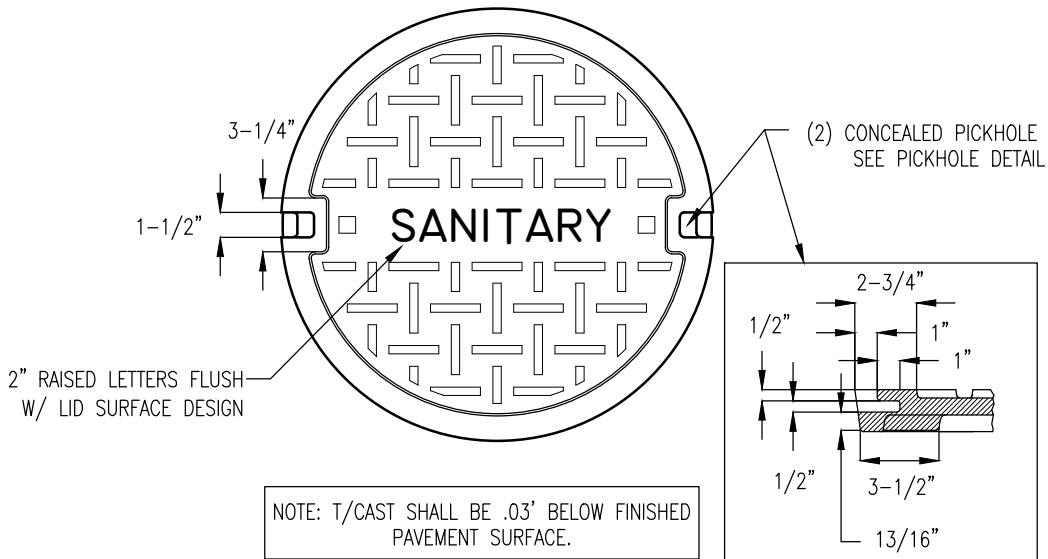


SANITARY SEWER DETAILS

- SAN-1** SANITARY CASTING DETAIL
- SAN-2** TYPICAL SEWER SERVICE CONNECTION
- SAN-2A** SEWER SERVICE CONNECTION FOR CIPP LINED SEWER MAIN
- SAN-3** SANITARY MANHOLE NON-PAVED AREAS
- SAN-3A** CONCRETE ENCASED CASTING COLLAR FOR SANITARY MH IN ROADWAY, WALKS, & DRIVES
- SAN-4** CONSTRUCT INSIDE DROP STRUCTURE
- SAN-5** HDPE SANITARY SEWER PRESSURE LATERAL CONNECTION
- SAN-6** HDPE FORCEMAIN TO GRAVITY MAIN MANHOLE
- SAN-7** AIR-RELEASE MANHOLE
- SAN-8** CLEANOUT MANHOLE
- SAN-8A** DEAD END CLEAN OUT HANDHOLE
- SAN-9** POLYETHYLENE MH ADJUSTING RING - FLAT
- SAN-10** POLYETHYLENE MH ADJUSTING RING - WEDGE
- SAN-11** PRECAST MECHANICAL JOINT SEWER MANHOLE

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



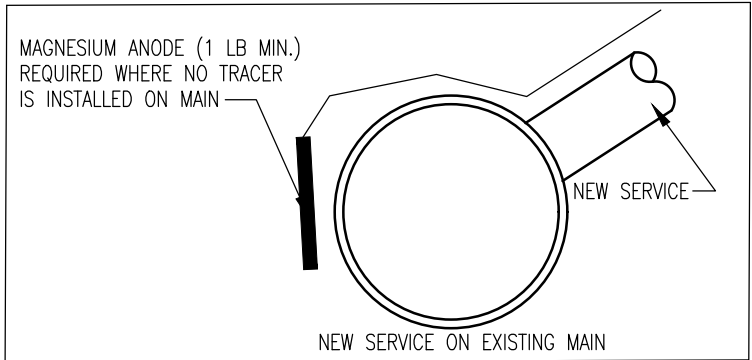
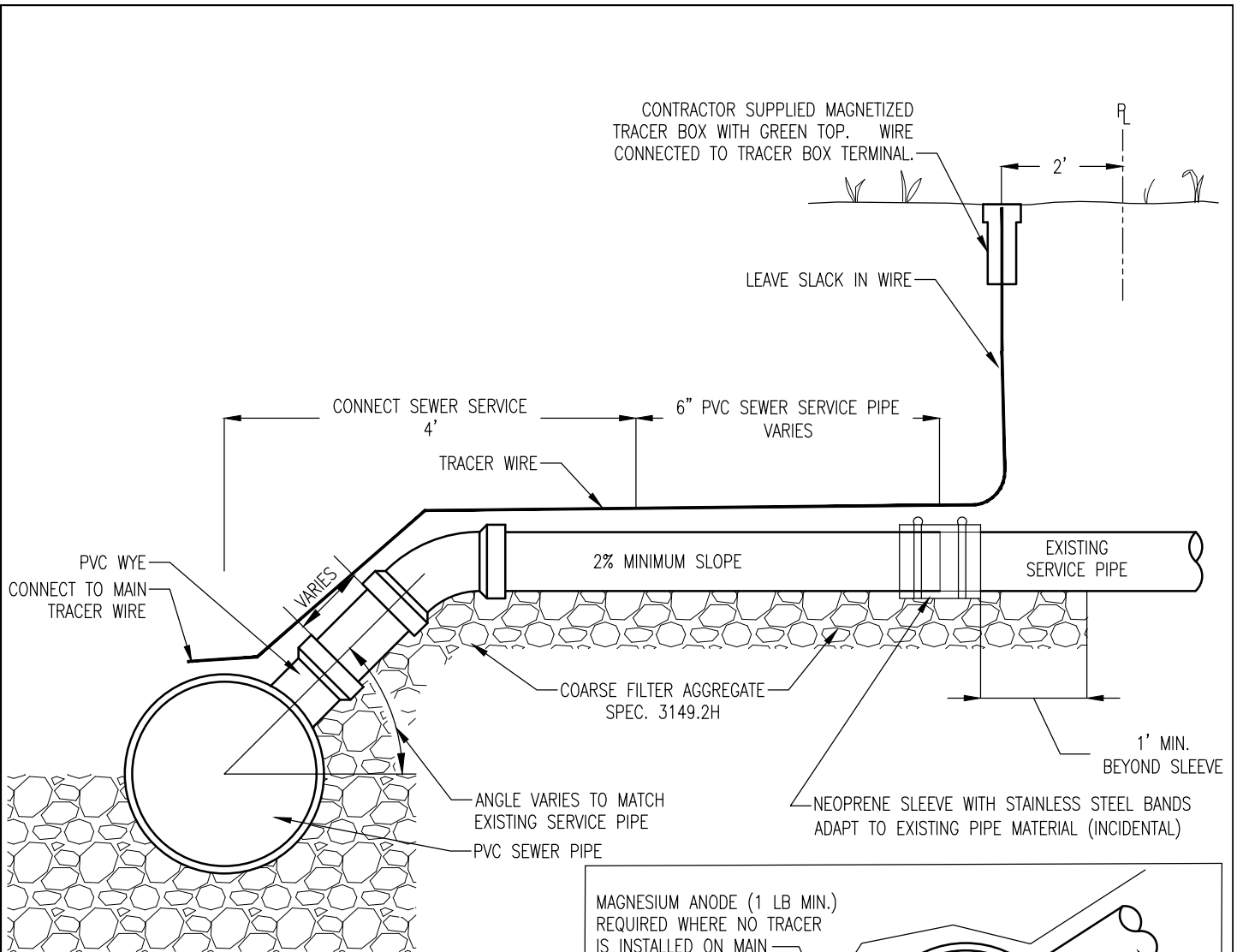
SANITARY CASTING DETAIL

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.

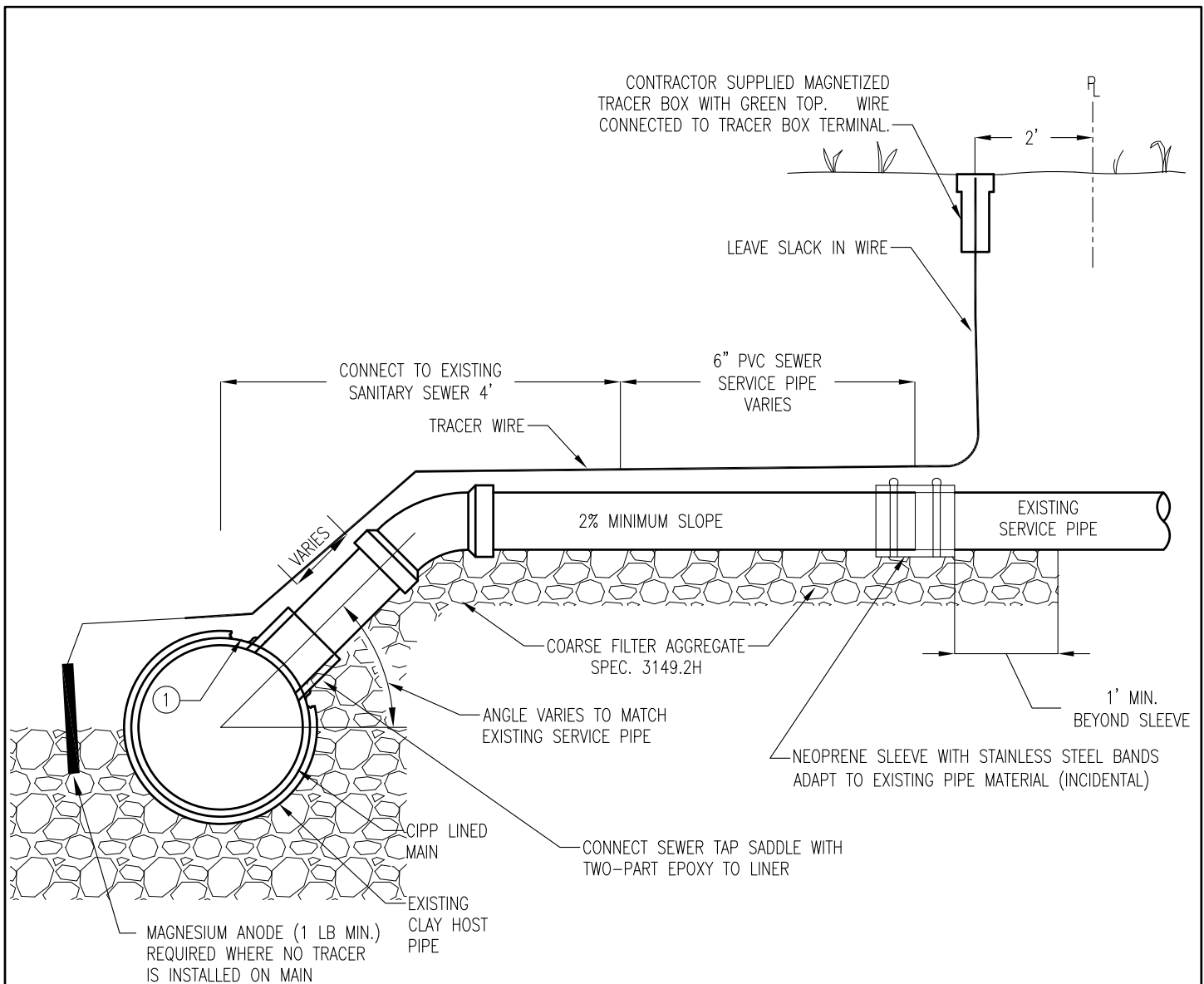
TYPICAL SEWER SERVICE CONNECTION

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.

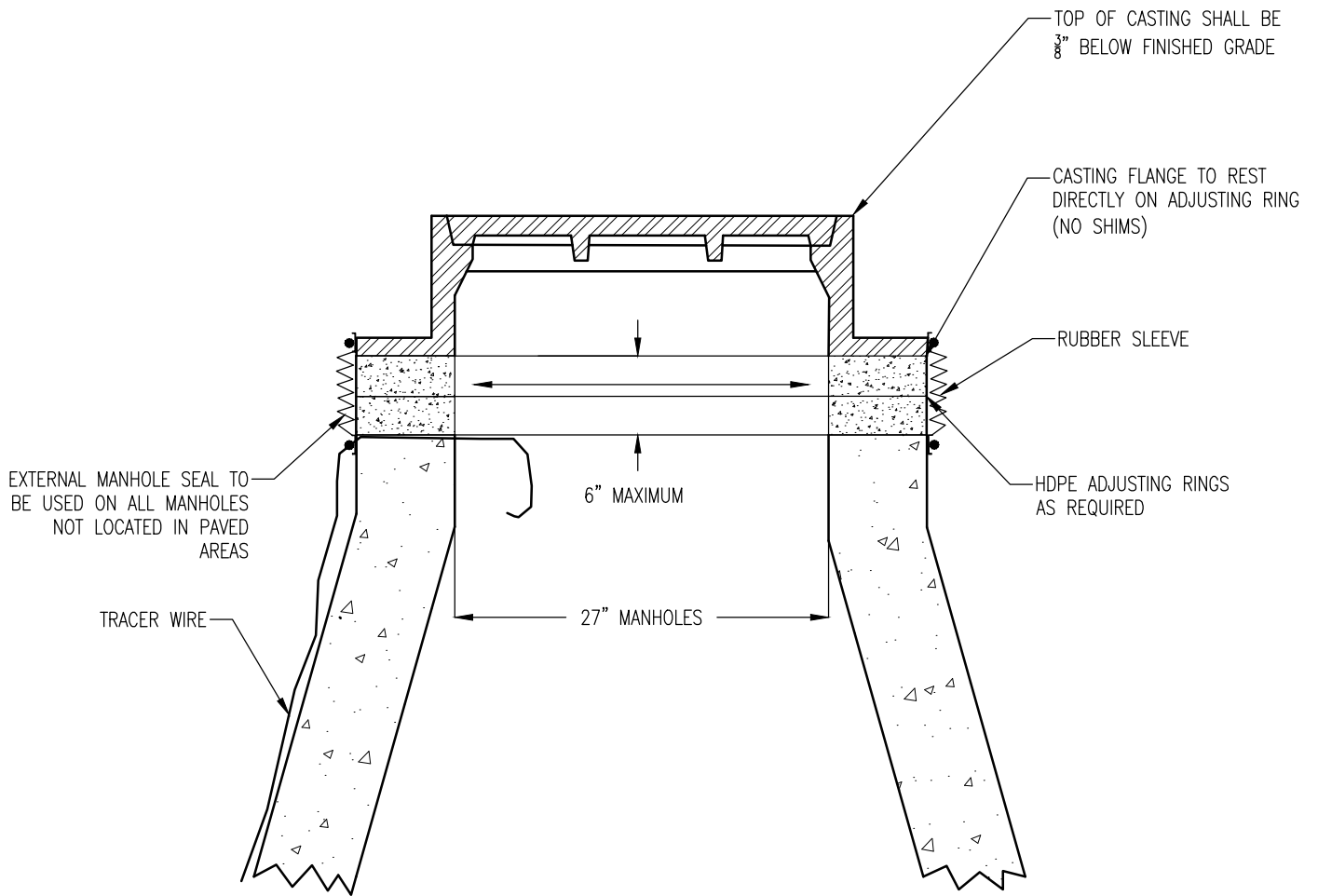
SEWER SERVICE CONNECTION FOR CIPP LINED SEWER MAIN

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

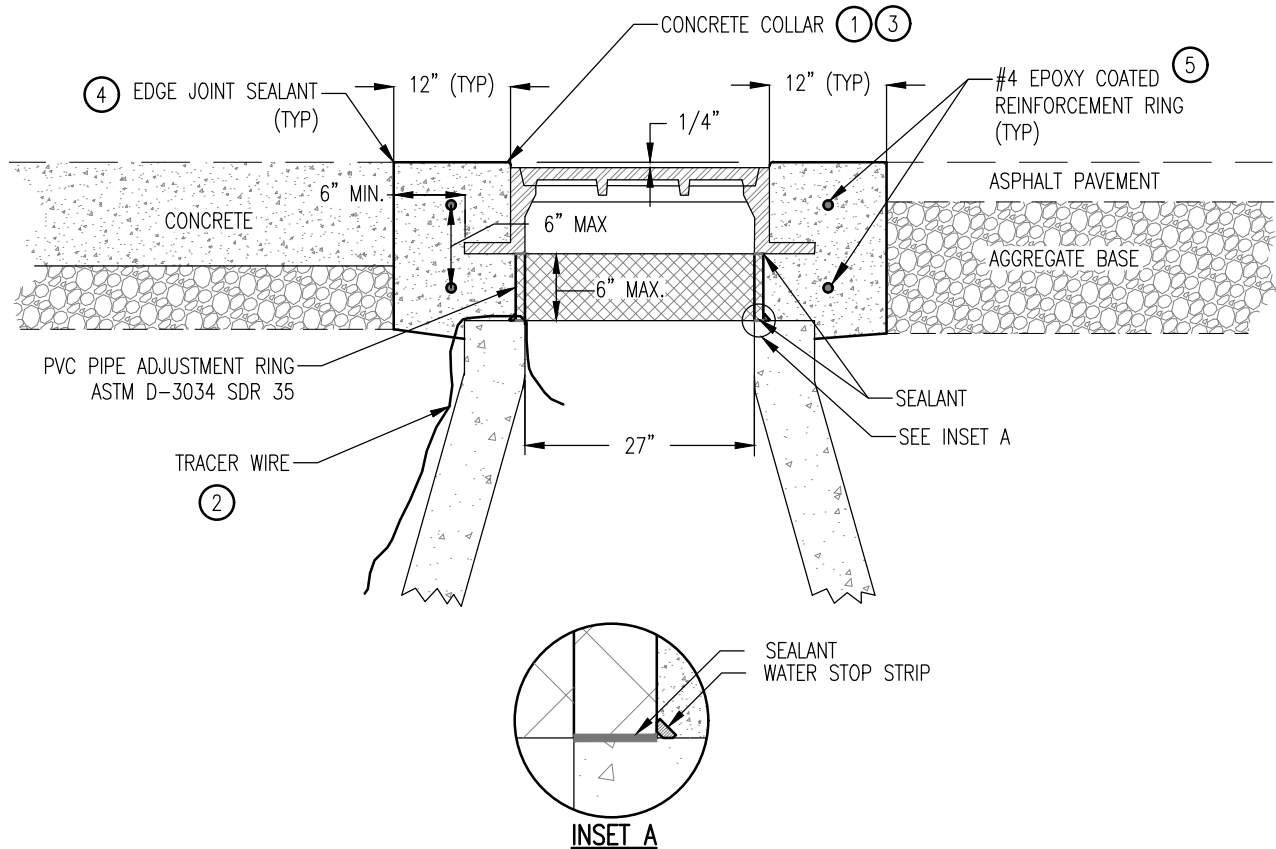
SANITARY MANHOLE NON-PAVED AREAS

SAN-3

REVISED/APPROVED 04/05/2019

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

NO SCALE



NOTES:

- ① CONCRETE (MIX NO. 3G52) COLLAR TO ENCASE CASTING AND ADJUSTMENT RING.
- ② TRACER WIRE REQUIRED ON ALL SANITARY SEWER MAINS.
- 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 SANITARY MH IN ROADWAY, WALKS, & DRIVES

SAN-3A

REVISED/APPROVED 04/05/2019

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

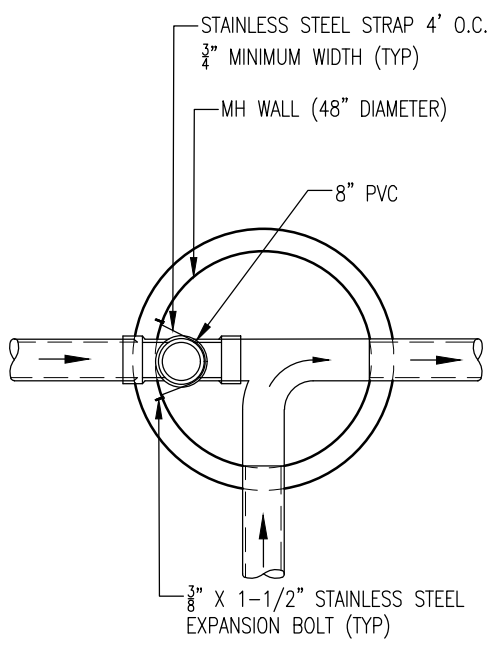
NO SCALE

TOP OF CASTING = XXX.XX

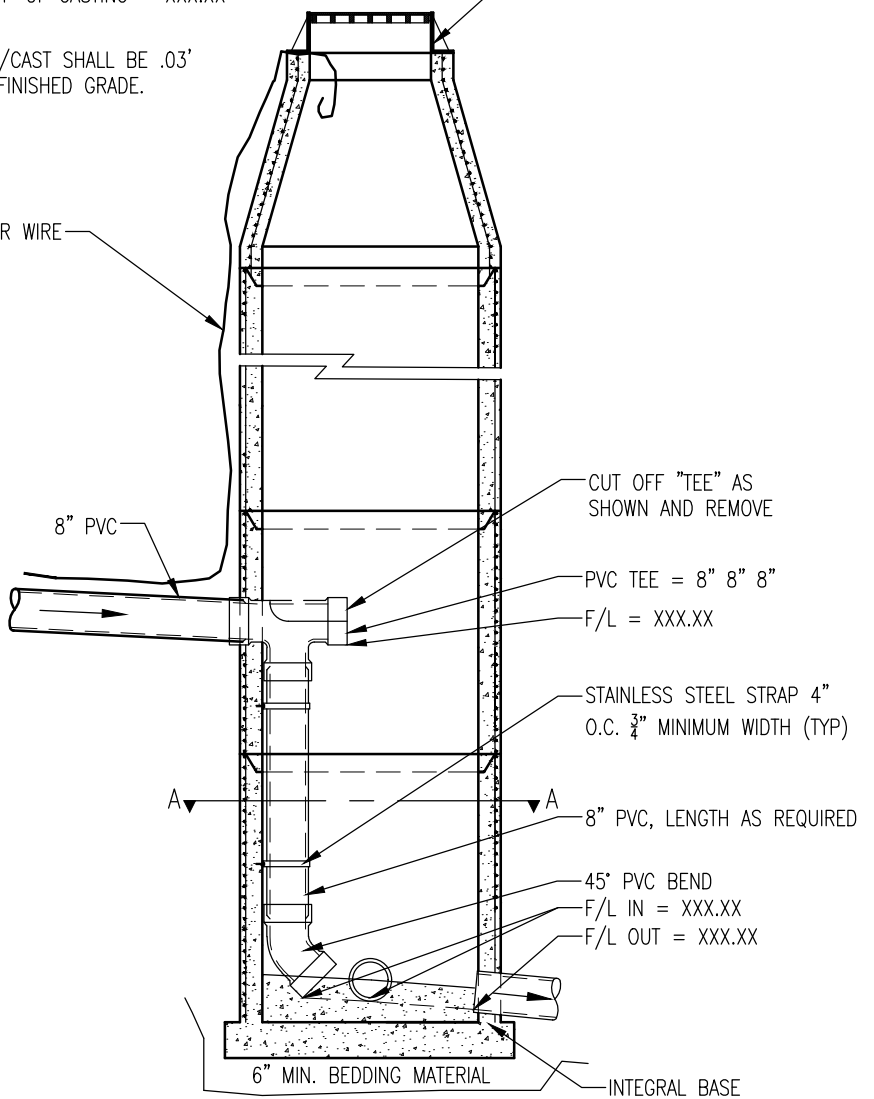
NOTE: T/CAST SHALL BE .03'
BELOW FINISHED GRADE.

SEE DETAIL SAN-3 AND SAN 3-A

TRACER WIRE



SECTION AA



NOTES: REFER TO PLAN/PROFILES FOR ELEVATIONS

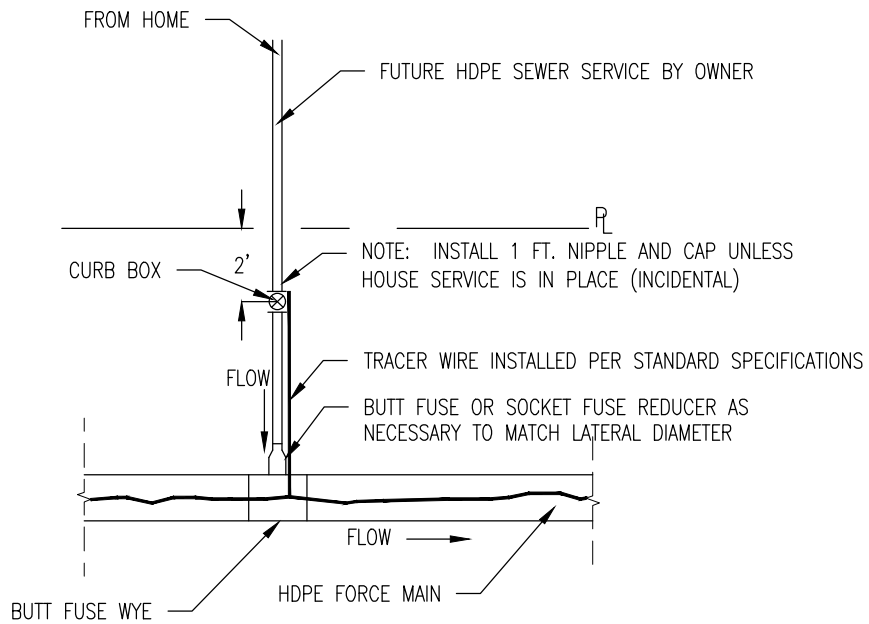
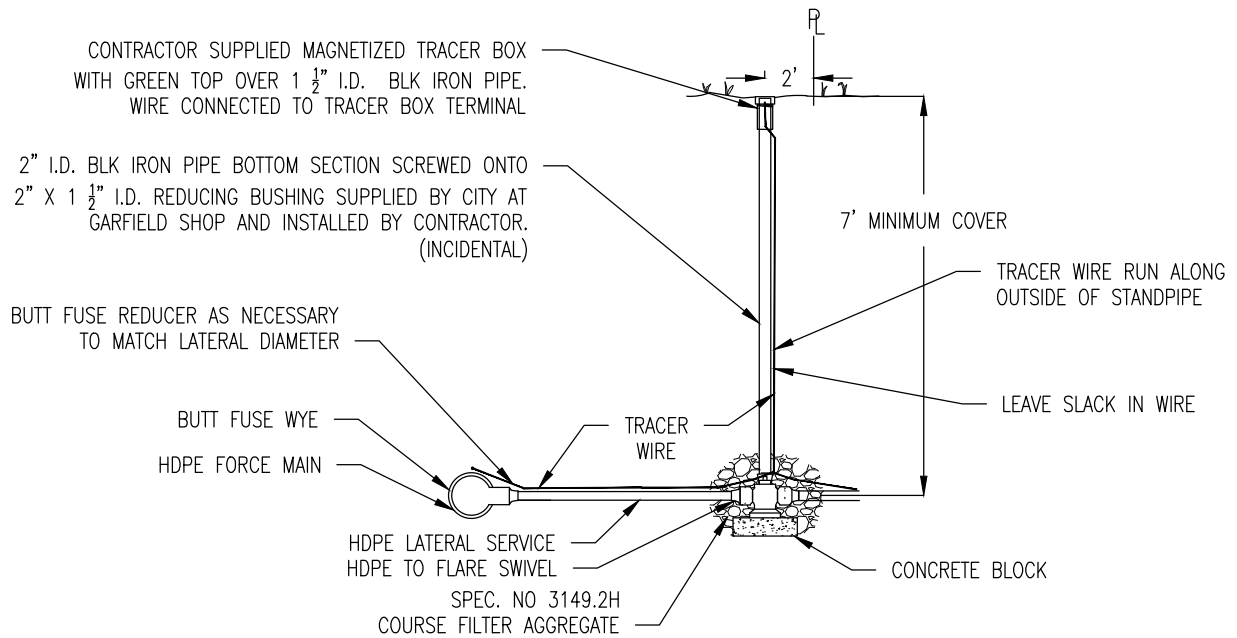
CONSTRUCT INSIDE DROP STRUCTURE

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.

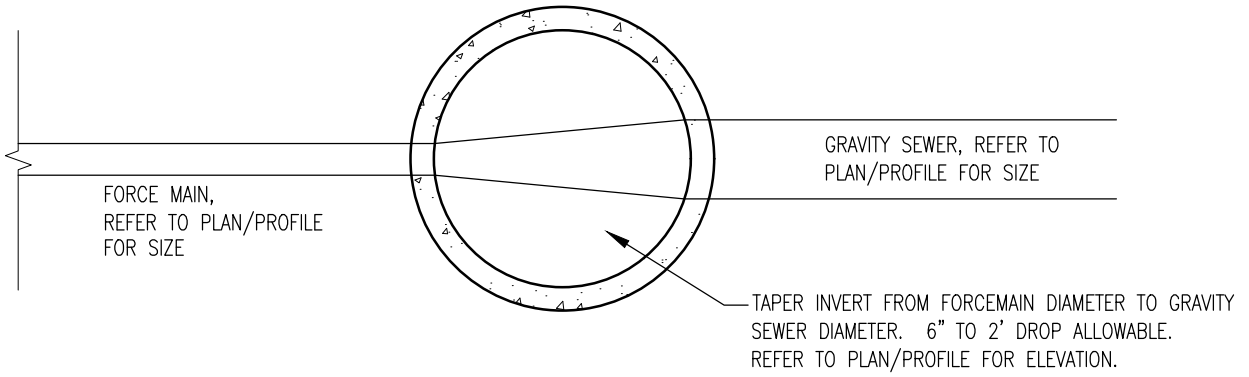
HDPE SANITARY SEWER PRESSURE LATERAL CONNECTION

SAN-5

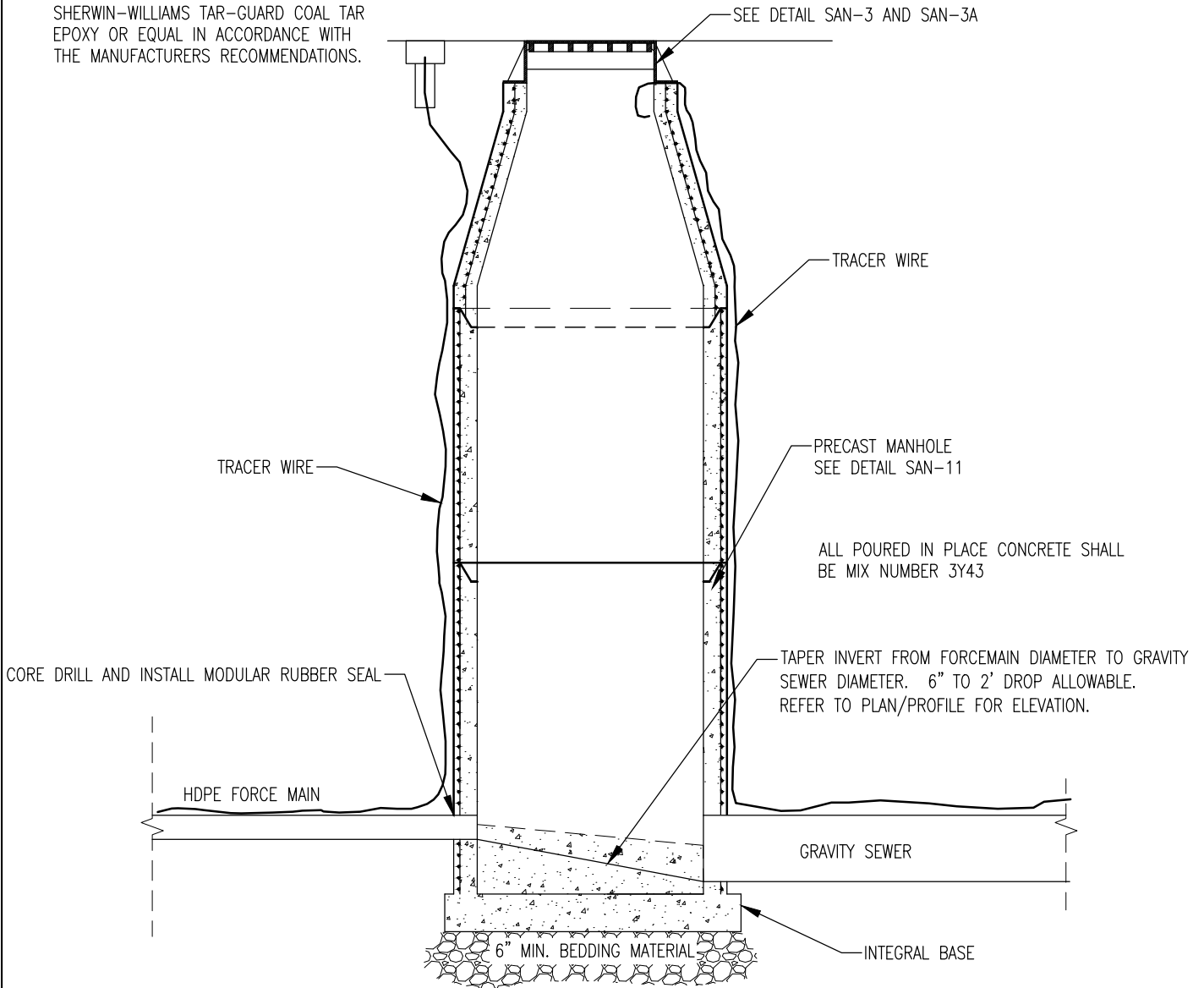
REVISED/APPROVED 04/05/2019

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

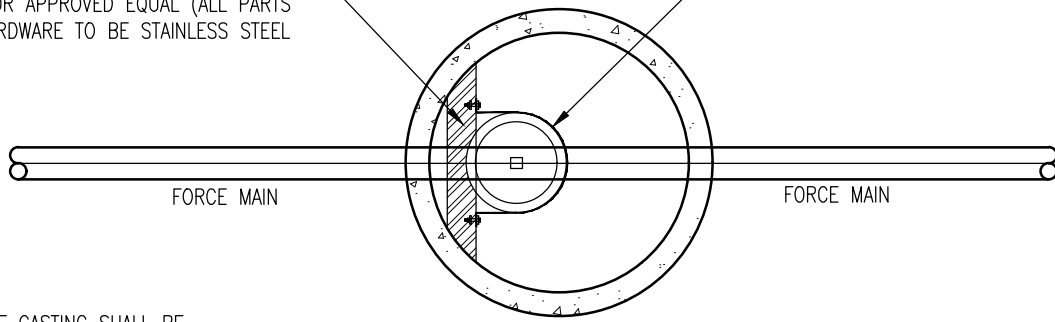
REVISED/APPROVED 01/08/2016

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

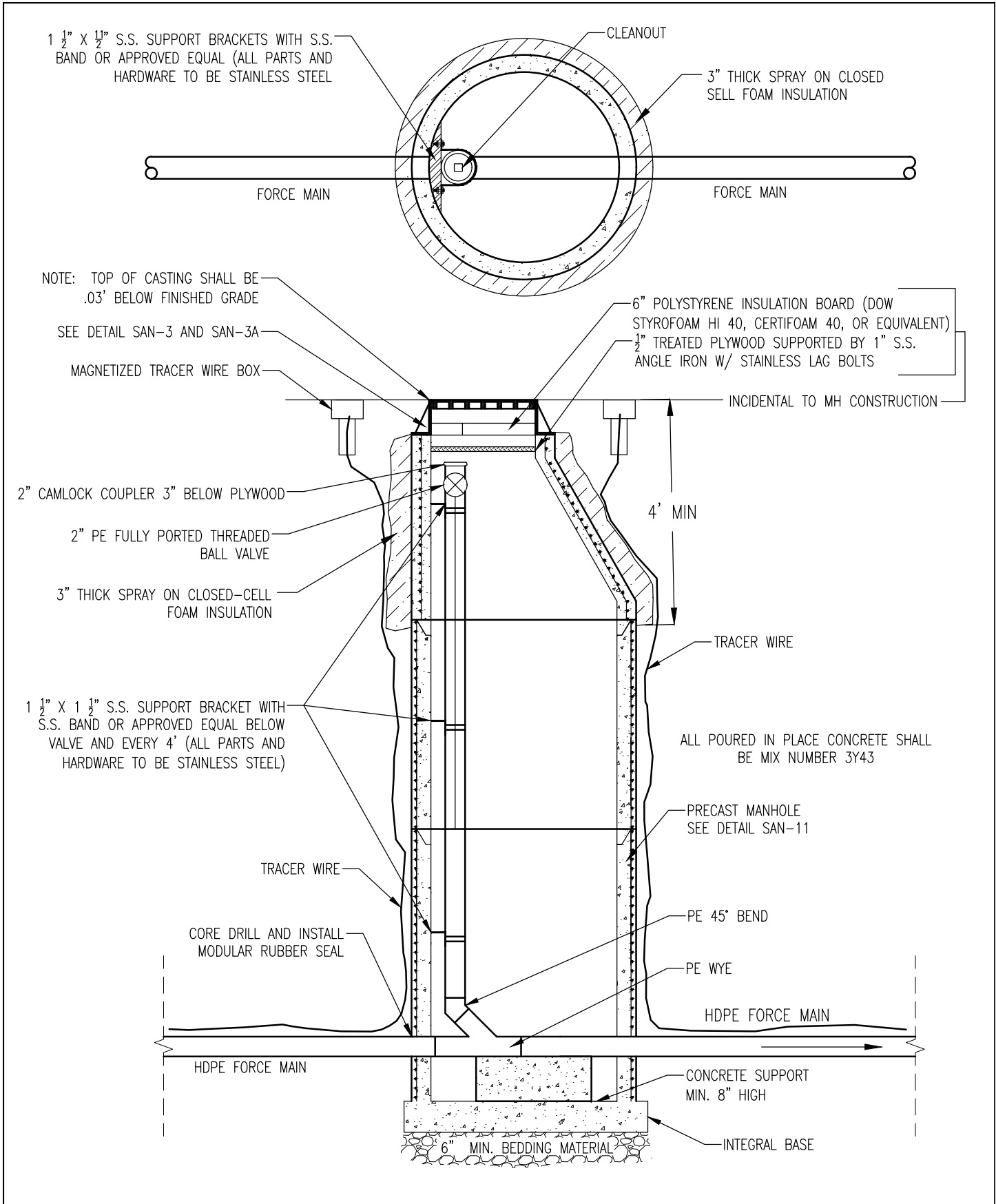
AIR-RELEASE MANHOLE

SAN-7

REVISED/APPROVED 01/08/2019

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

NO SCALE

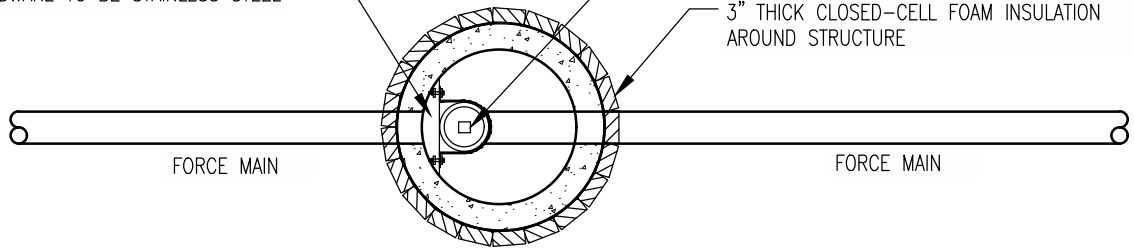


CLEANOUT MANHOLE		SAN-8
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE

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

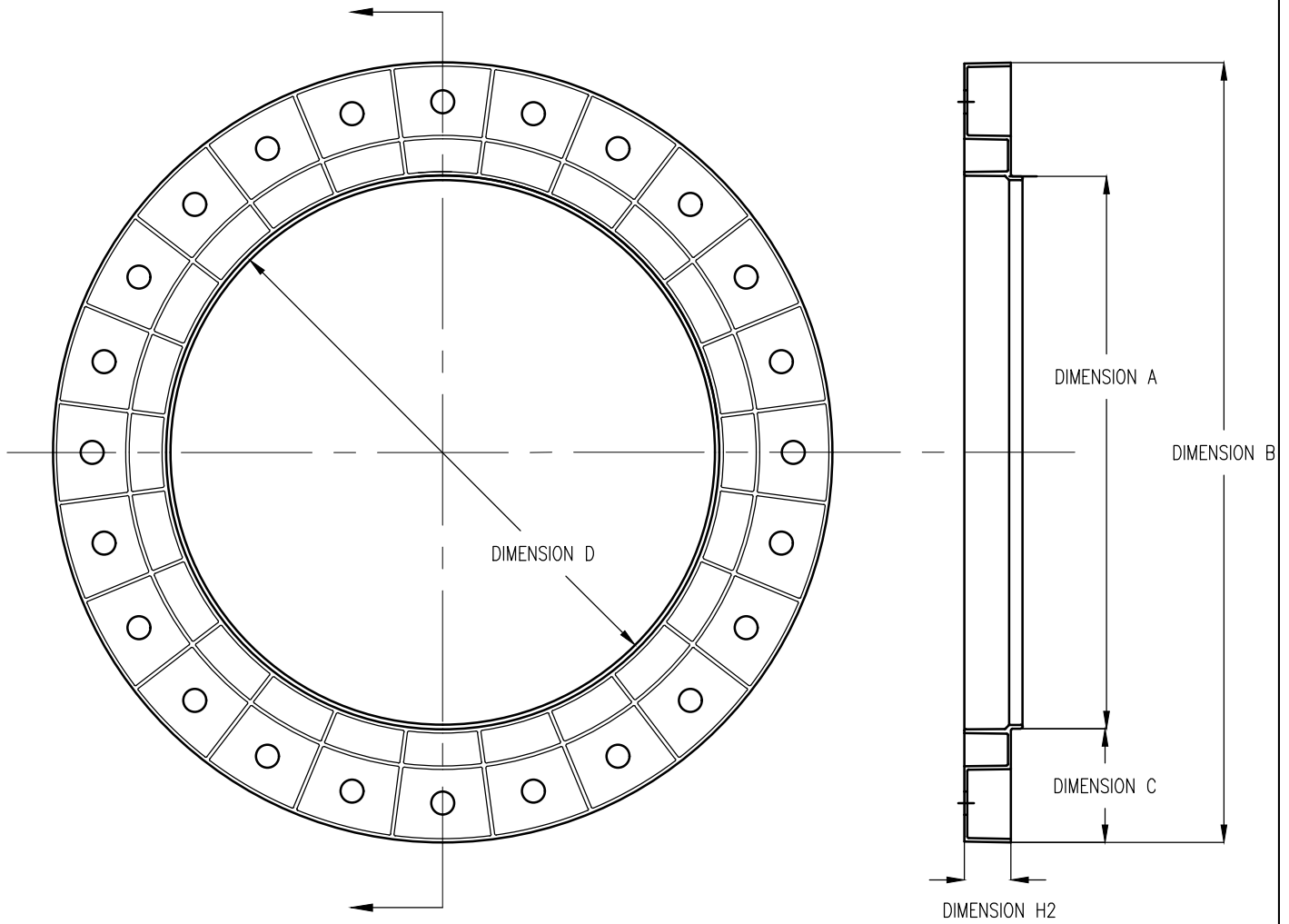
DEAD END CLEANOUT HAND HOLE

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

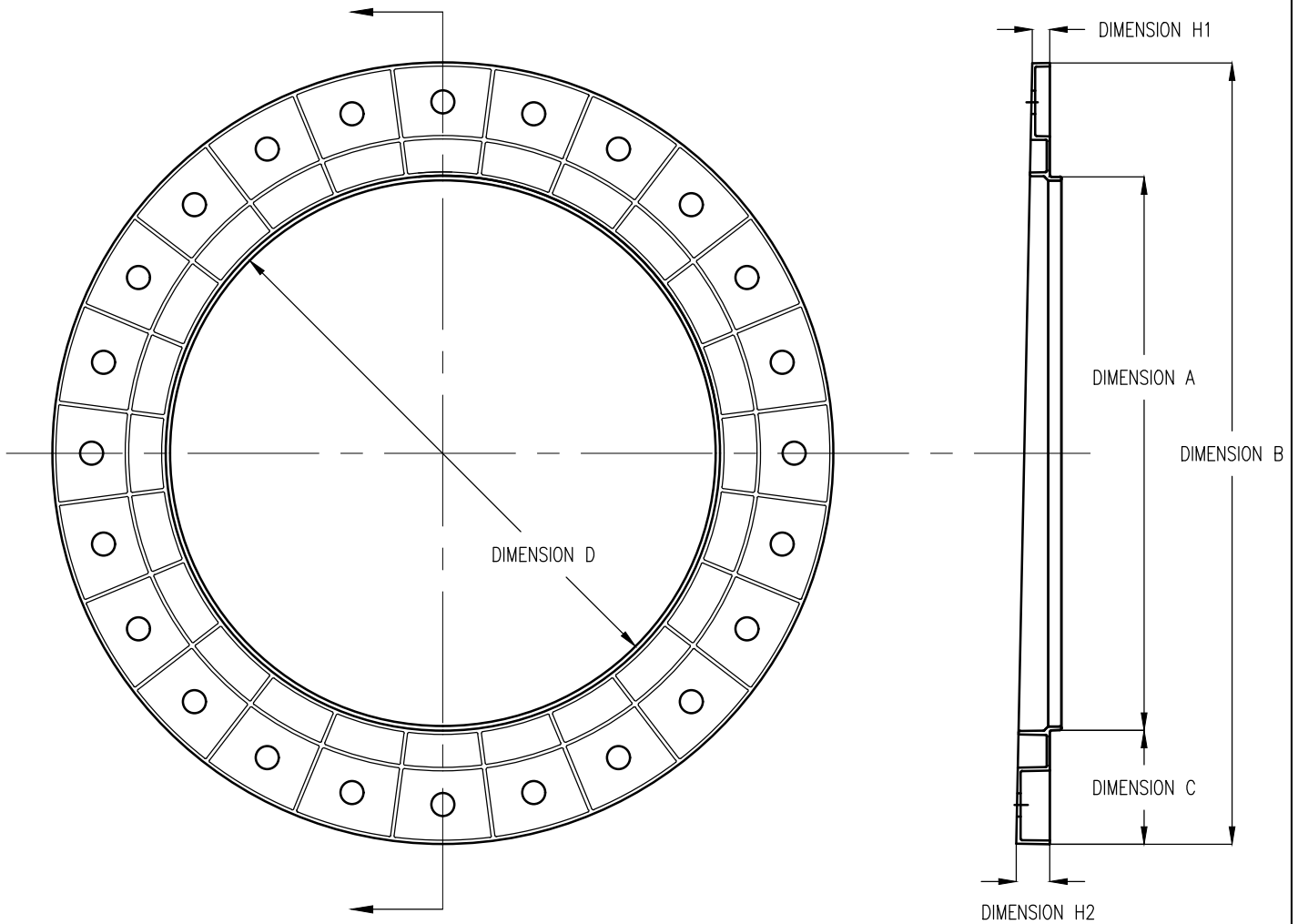
POLYETHYLENE MH ADJUSTING RING - FLAT

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

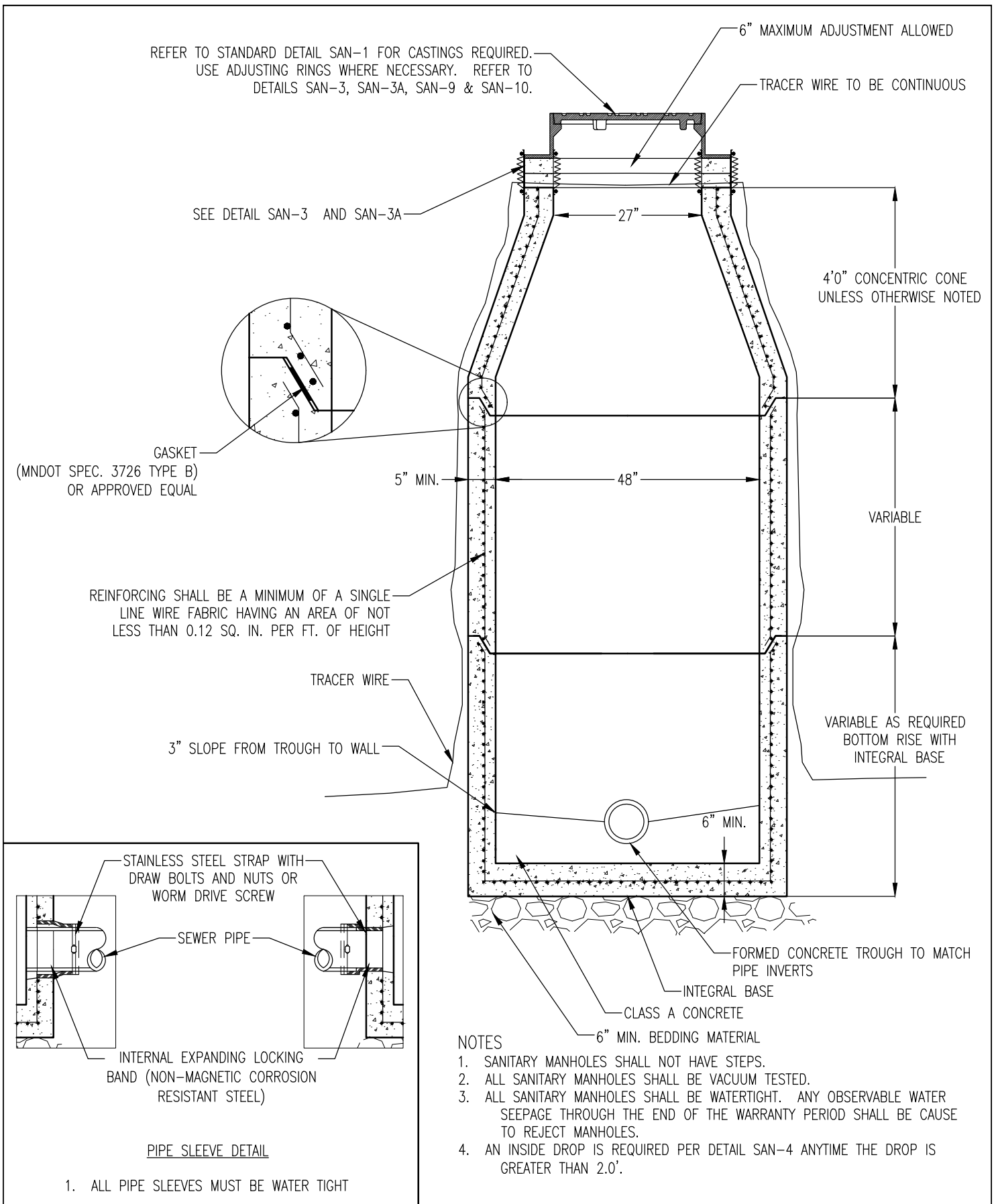
POLYETHYLENE MH ADJUSTING RING - WEDGE

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