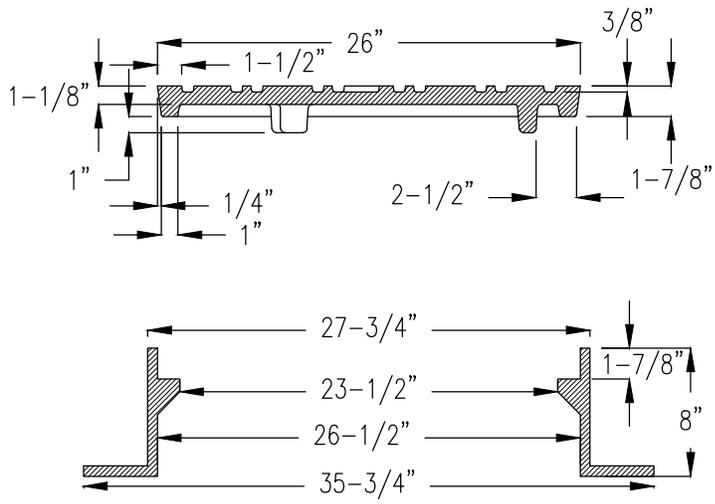
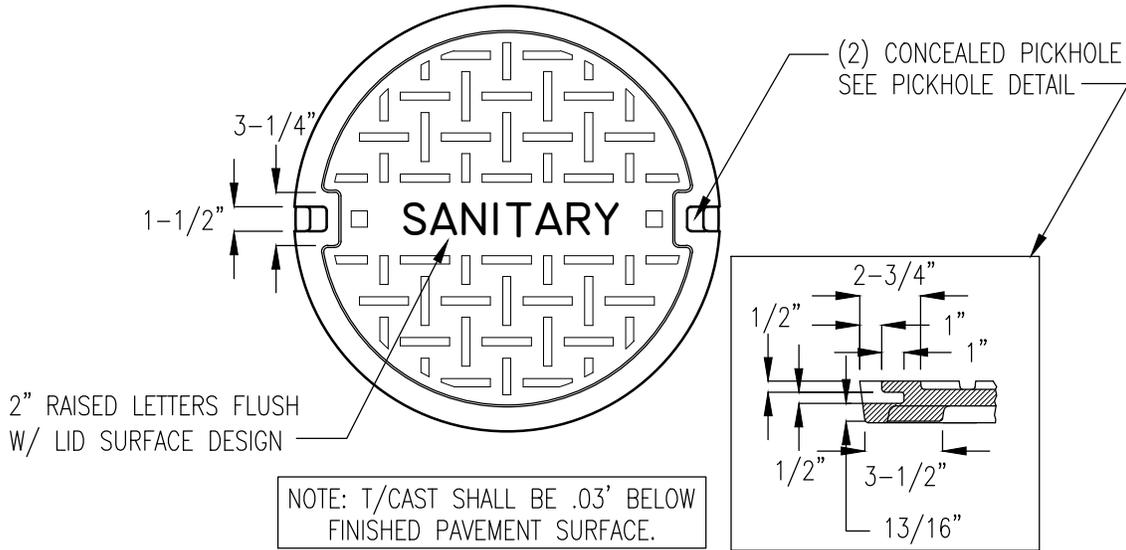


SANITARY SEWER DETAILS

- SAN-1** SANITARY CASTING DETAIL
- SAN-2** TYPICAL SEWER SERVICE CONNECTION
- 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-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



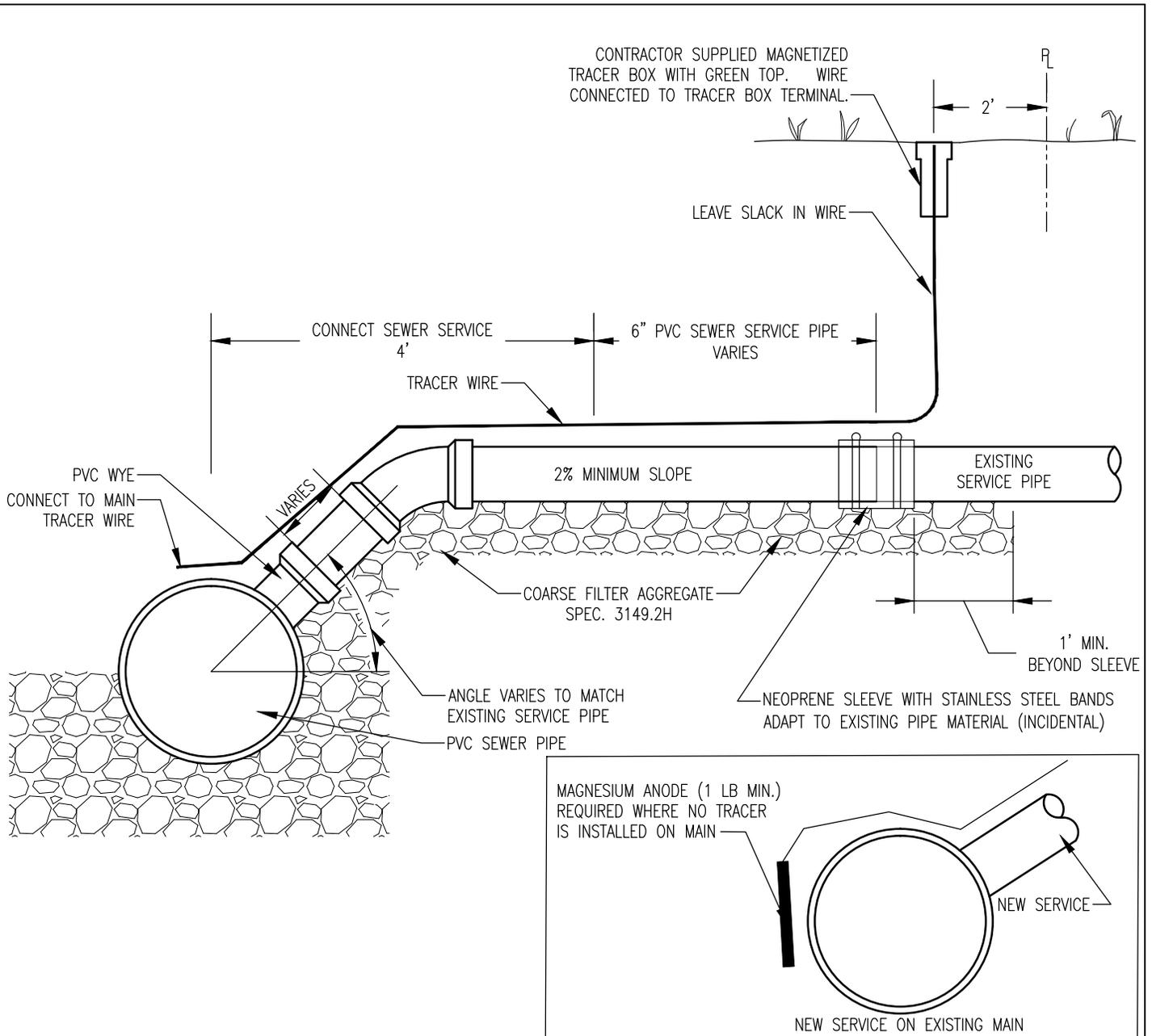
SANITARY CASTING DETAIL

SAN-1

REVISED/APPROVED 2/01/2013

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.

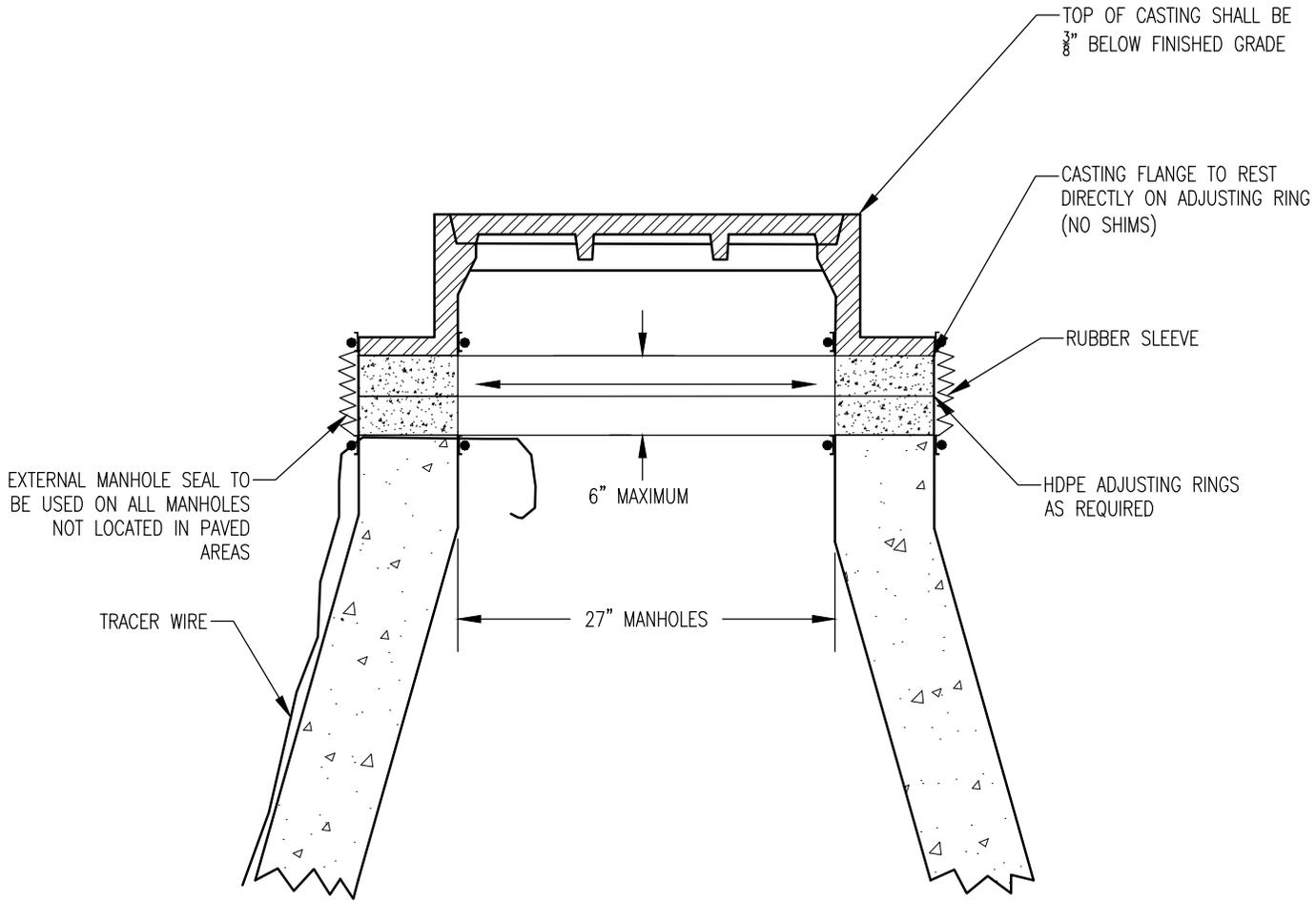
TYPICAL SEWER SERVICE CONNECTION

SAN-2

REVISED/APPROVED 02/19/2015

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

NO SCALE



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

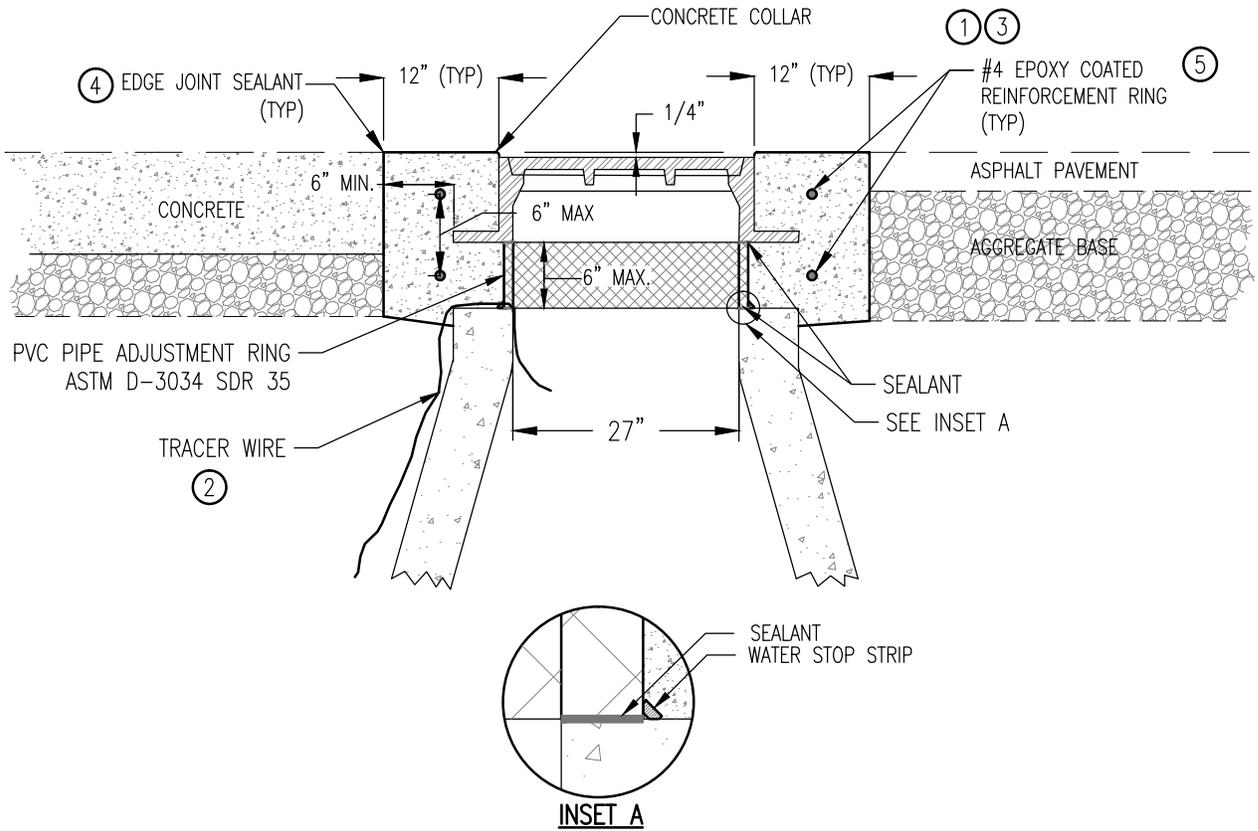
SANITARY MANHOLE NON-PAVED AREAS

SAN-3

REVISED/APPROVED 02/19/2015

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

NO SCALE



NOTES:

1. CONCRETE (MIX NO. 3Y43) 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

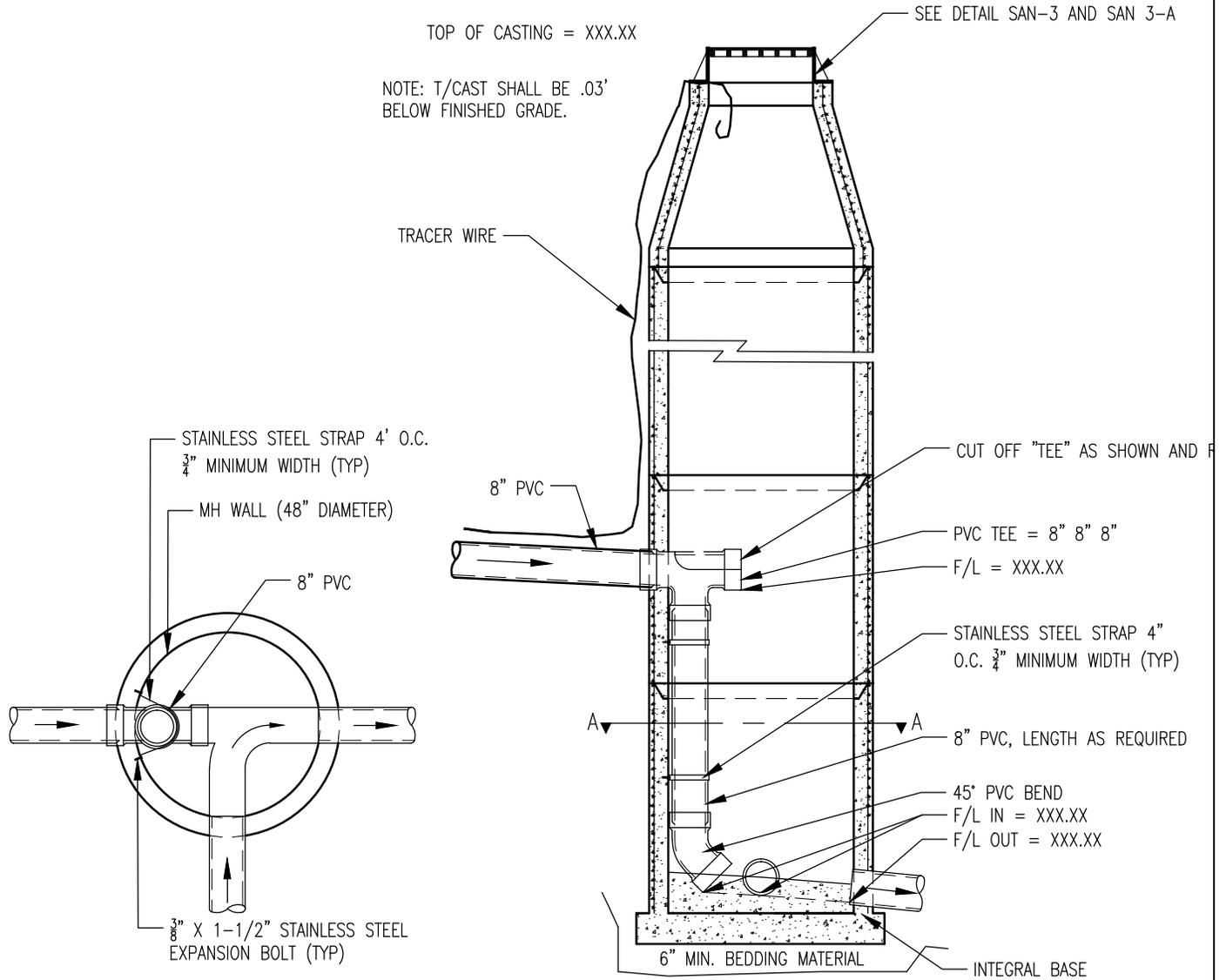
CONCRETE ENCASED CASTING COLLAR FOR SANITARY MH IN ROADWAY, WALKS, & DRIVES

SAN-3A

REVISED/APPROVED 1/8/2016

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

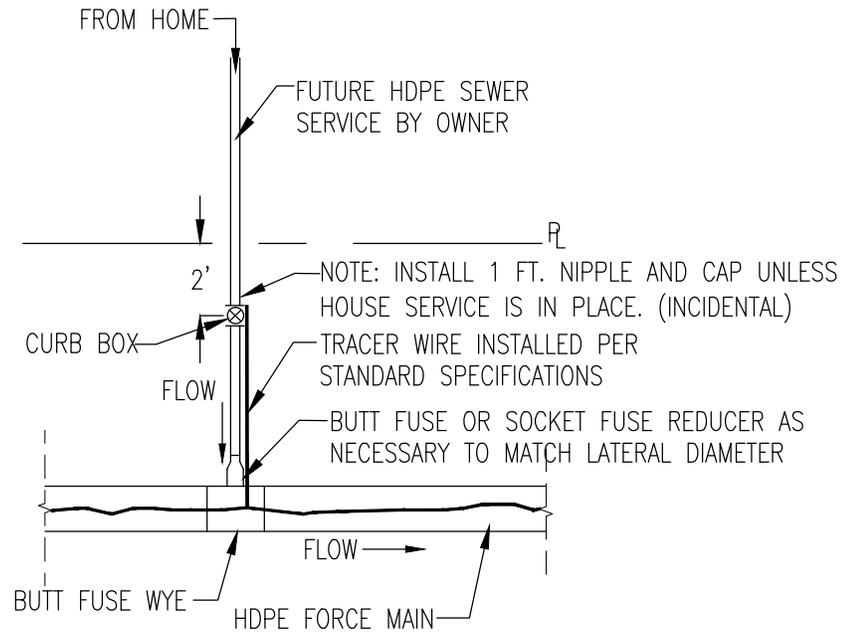
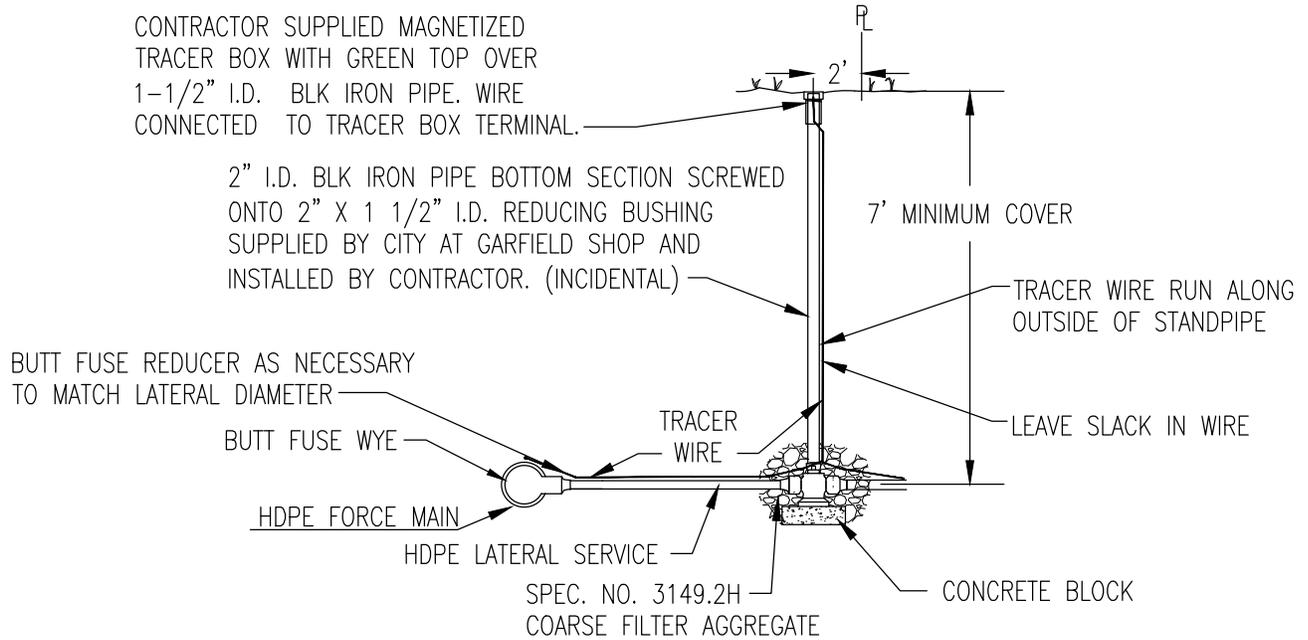
NO SCALE



SECTION AA

NOTES: REFER TO PLAN/PROFILES FOR ELEVATIONS

CONSTRUCT INSIDE DROP STRUCTURE		SAN-4
REVISED/APPROVED 1/8/2016	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.

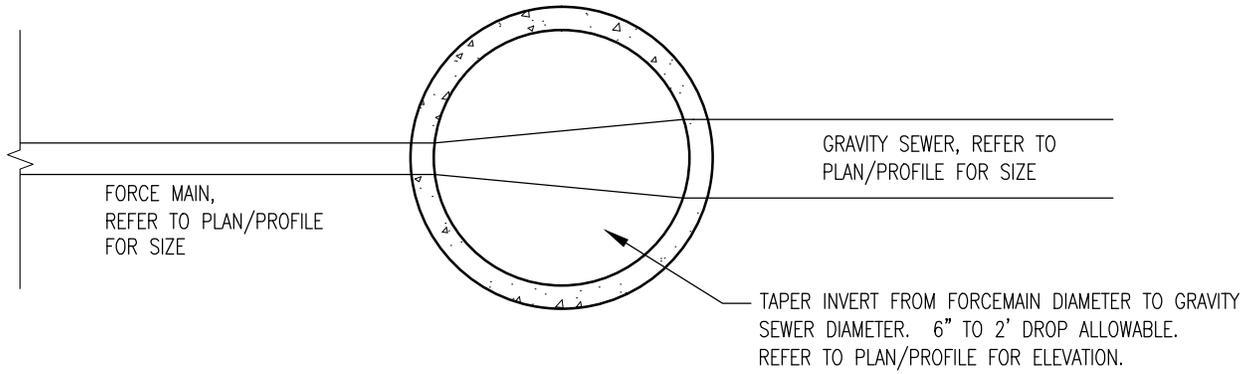
HDPE SANITARY SEWER PRESSURE LATERAL CONNECTION

SAN-5

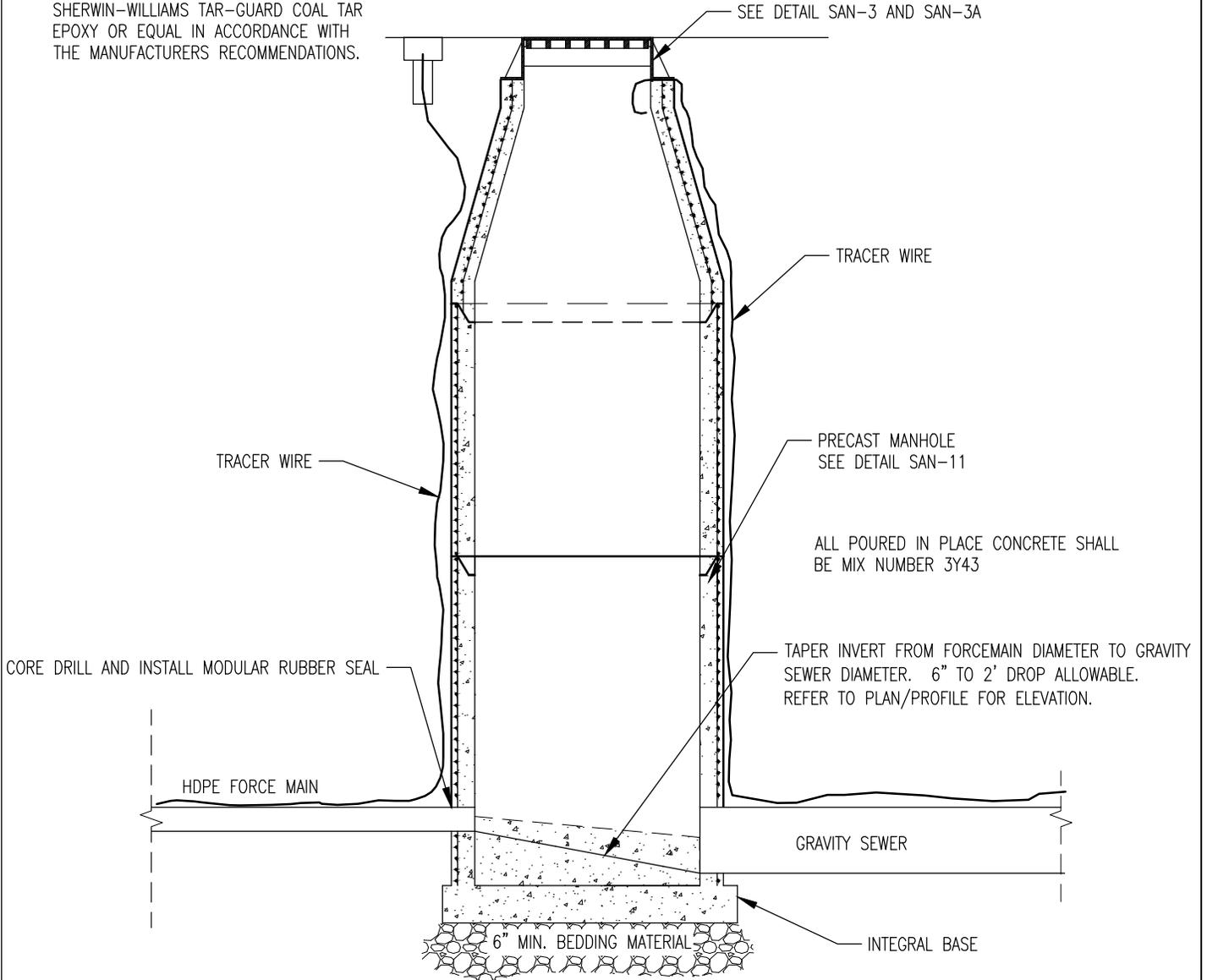
REVISED/APPROVED 06/01/2014

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

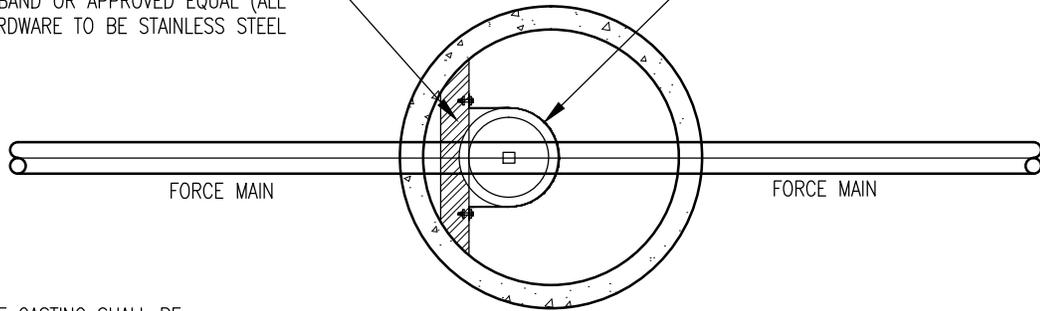
REVISED/APPROVED 1/8/2016

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



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

8' X 8' X 3"
POLYSTYRENE INSULATION

MAGNETIZED TRACER WIRE BOX

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

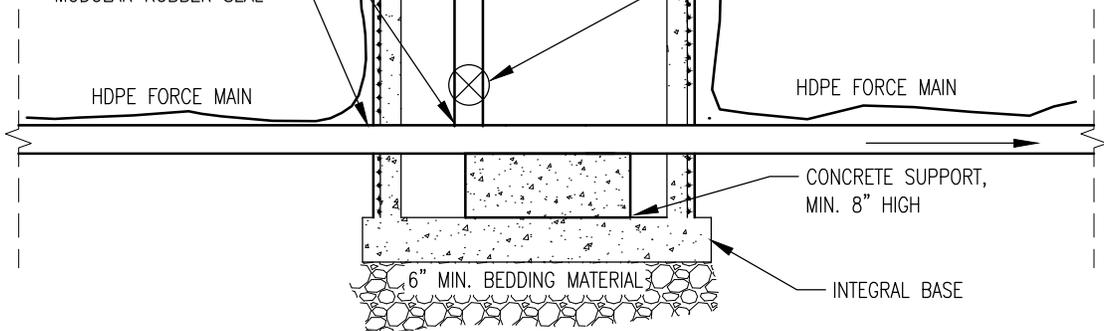
ELECTROFUSION SERVICE
SADDLE WITH 2" BRASS INSERT

2" PE FULLY PORTED THREADED
BALL VALVE

CORE DRILL AND INSTALL
MODULAR RUBBER SEAL

HDPE FORCE MAIN

HDPE FORCE MAIN



NOTE: MANHOLE TO MEET ALL REQUIREMENTS OF SAN-11

AIR-RELEASE MANHOLE

SAN-7

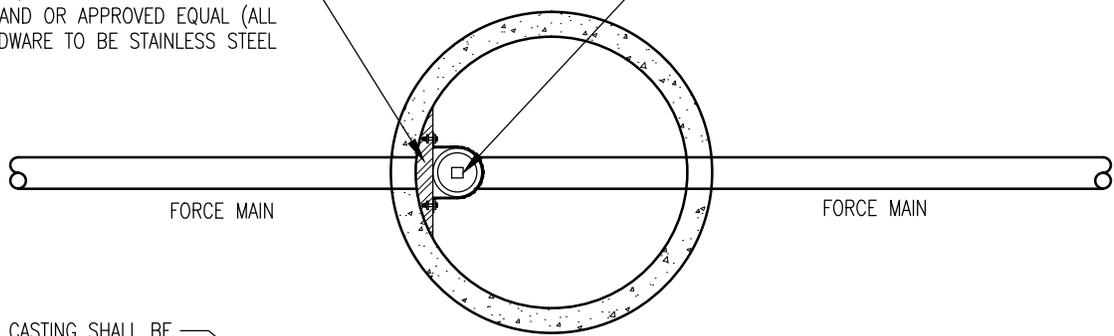
REVISED/APPROVED 1/8/2016

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)

CLEANOUT



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

2" CAMLOCK COUPLER 3" BELOW PLYWOOD

2" PE FULLY PORTED THREADED
BALL VALVE

TRACER WIRE

1-1/2" X 1-1/2" S.S. SUPPORT BRACKET
WITH S.S. BAND OR APPROVED EQUAL
BELOW VALVE AND EVERY 4' (ALL PARTS
AND HARDWARE TO BE STAINLESS STEEL)

ALL POURED IN PLACE CONCRETE SHALL
BE MIX NUMBER 3Y43

PRECAST MANHOLE
SEE DETAIL SAN-11

TRACER WIRE

PE 45° BEND

CORE DRILL AND INSTALL
MODULAR RUBBER SEAL

PE WYE

HDPE FORCE MAIN

HDPE FORCE MAIN

CONCRETE SUPPORT
MIN. 8" HIGH

6" MIN. BEDDING MATERIAL

INTEGRAL BASE

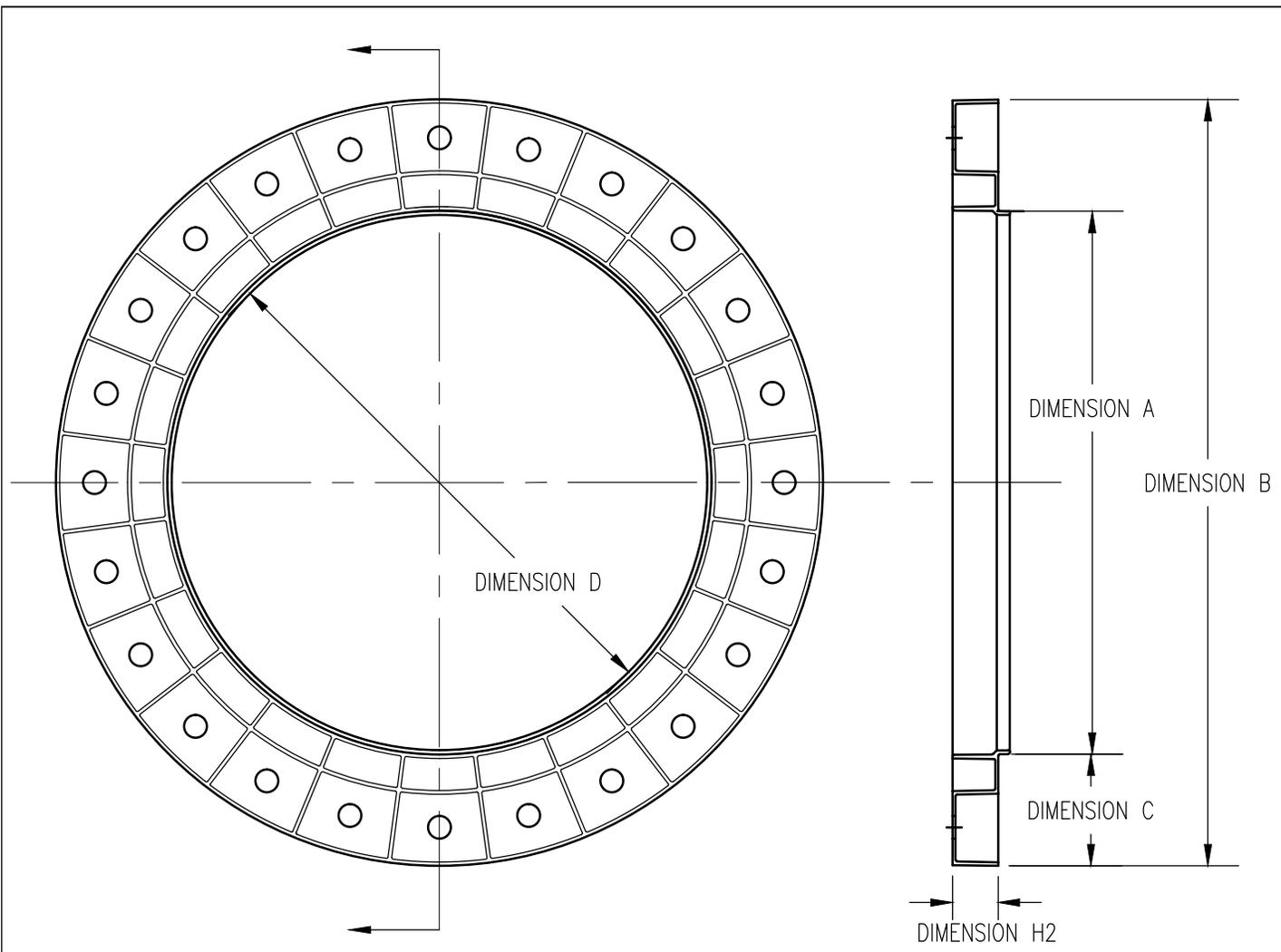
CLEANOUT MANHOLE

SAN-8

REVISED/APPROVED 1/8/2016

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

NO SCALE

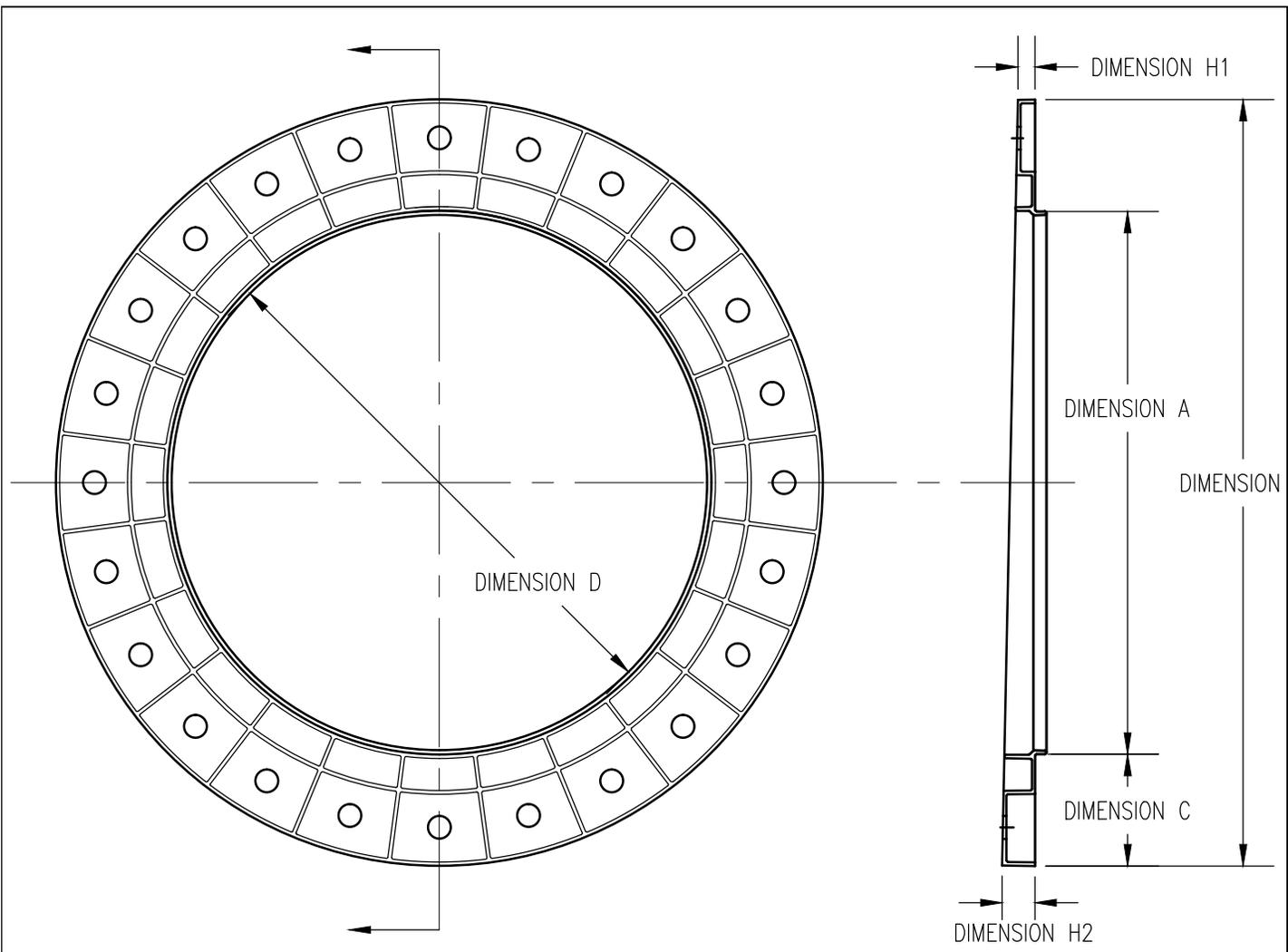


DIMENSION SCHEDULE					
CONE SIZE	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION H1
27.00	26.75	36.50	5.00	26.25	1.20, 1.50, 2.00, 4.00

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 2/01/2013	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 2/01/2013	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE

REFER TO STANDARD DETAIL SAN-1 FOR CASTINGS REQUIRED.
 USE ADJUSTING RINGS WHERE NECESSARY. REFER TO
 DETAILS SAN-3, SAN-3A, SAN-9 & SAN-10.

6" MAXIMUM ADJUSTMENT ALLOWED

TRACER WIRE TO BE CONTINUOUS

SEE DETAIL SAN-3 AND SAN-3A

27"

4'0" CONCENTRIC CONE
 UNLESS OTHERWISE NOTED

GASKET
 (MNDOT SPEC. 3726 TYPE B)
 OR APPROVED EQUAL

5" MIN.

48"

VARIABLE

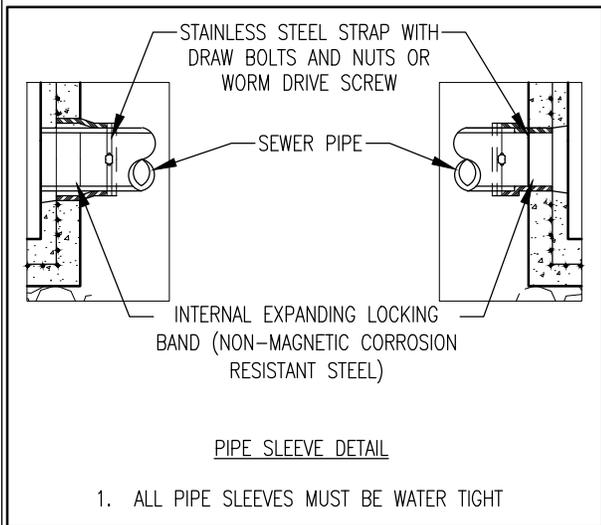
REINFORCING SHALL BE A MINIMUM OF A SINGLE
 LINE WIRE FABRIC HAVING AN AREA OF NOT
 LESS THAN 0.12 SQ. IN. PER FT. OF HEIGHT

TRACER WIRE

3" SLOPE FROM TROUGH TO WALL

VARIABLE AS REQUIRED
 BOTTOM RISE WITH
 INTEGRAL BASE

6" MIN.



FORMED CONCRETE TROUGH TO MATCH
 PIPE INVERTS

INTEGRAL BASE

CLASS A CONCRETE

6" MIN. BEDDING MATERIAL

NOTES

1. SANITARY MANHOLES SHALL NOT HAVE STEPS.
2. ALL SANITARY MANHOLES SHALL BE VACUUM TESTED.
3. ALL SANITARY MANHOLES SHALL BE WATERTIGHT. ANY OBSERVABLE WATER SEEPAGE THROUGH THE END OF THE WARRANTY PERIOD SHALL BE CAUSE TO REJECT MANHOLES.
4. AN INSIDE DROP IS REQUIRED PER DETAIL SAN-4 ANYTIME THE DROP IS GREATER THAN 2.0'.

PRECAST MECHANICAL JOINT SEWER MANHOLE

SAN-11

REVISED/APPROVED 1/8/2016

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

NO SCALE