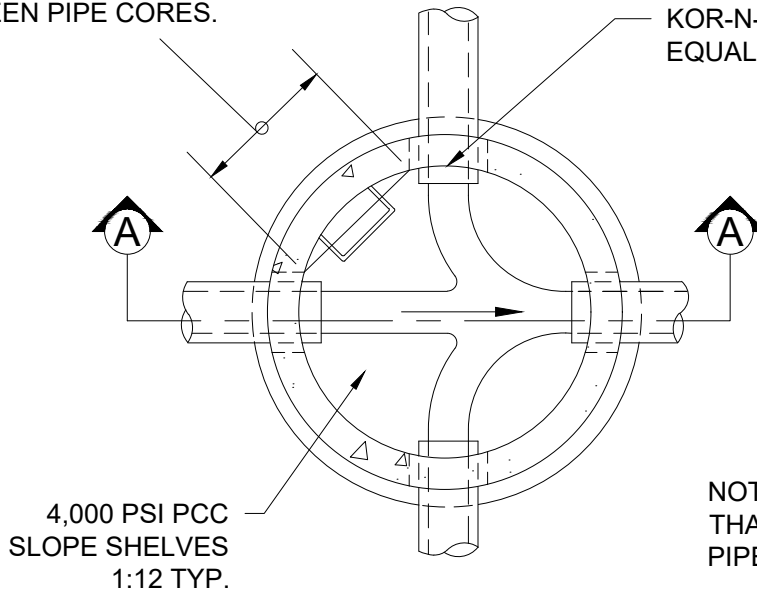


FILENAME: y:\inter-departmental\development engineering projects\public works standards\20 pws revision copy\details\cad - all\200_general\201.dwg, Plotted 4/20/2026 11:56 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

MINIMUM OF 12" PRECAST WALL BETWEEN PIPE CORES.

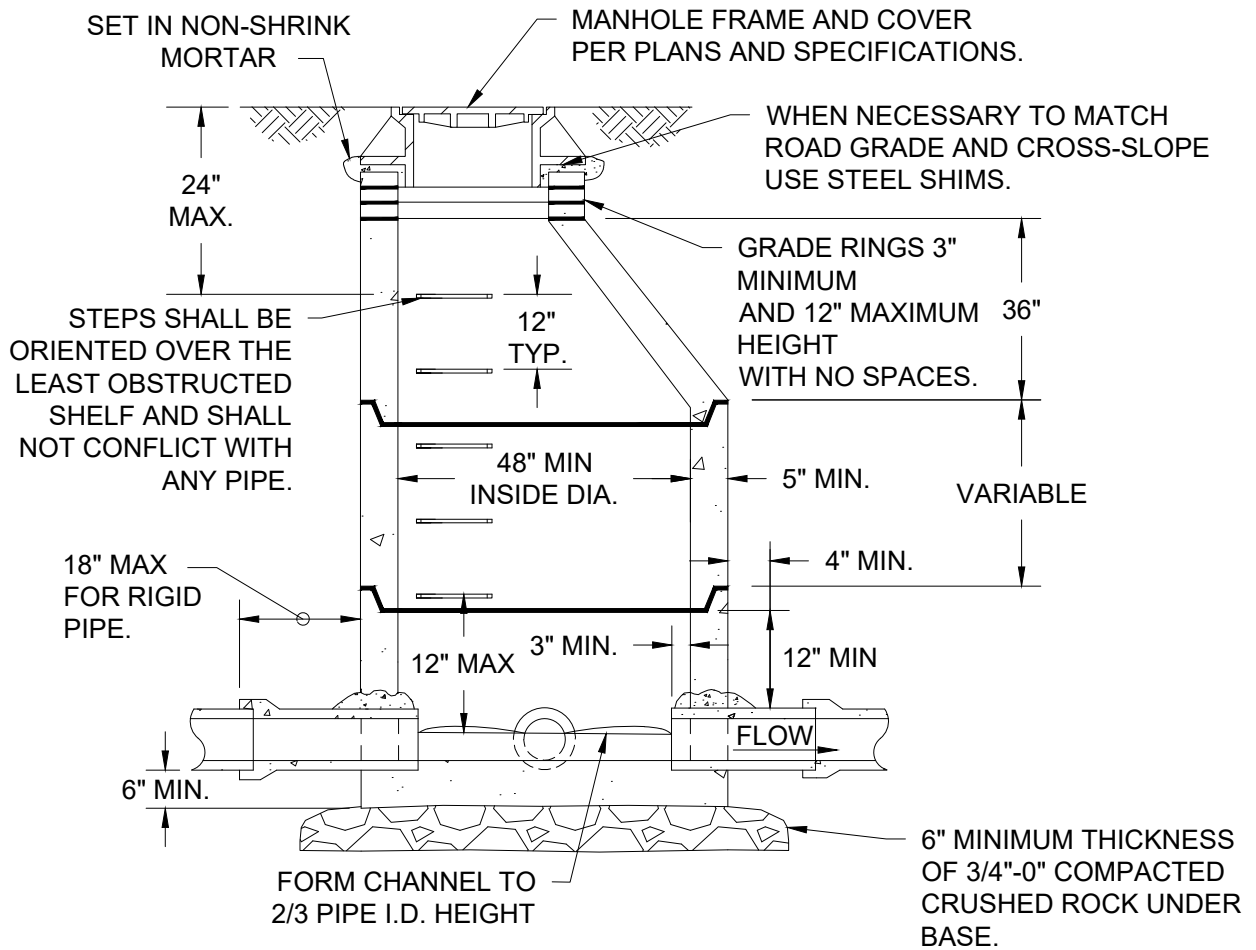
KOR-N-SEAL OR APPROVED EQUAL MANHOLE ADAPTOR



4,000 PSI PCC
SLOPE SHELVES
1:12 TYP.

NOTE: FOR MANHOLES LESS THAN 60" FROM RIM TO TOP OF PIPE, SEE STANDARD DETAIL 203.

PLAN



SET IN NON-SHRINK MORTAR

MANHOLE FRAME AND COVER PER PLANS AND SPECIFICATIONS.

WHEN NECESSARY TO MATCH ROAD GRADE AND CROSS-SLOPE USE STEEL SHIMS.

24" MAX.

STEPS SHALL BE ORIENTED OVER THE LEAST OBSTRUCTED SHELF AND SHALL NOT CONFLICT WITH ANY PIPE.

12" TYP.

GRADE RINGS 3" MINIMUM AND 12" MAXIMUM HEIGHT WITH NO SPACES.

48" MIN INSIDE DIA.

5" MIN.

VARIABLE

18" MAX FOR RIGID PIPE.

4" MIN.

12" MAX 3" MIN.

12" MIN

6" MIN.

FORM CHANNEL TO 2/3 PIPE I.D. HEIGHT

6" MINIMUM THICKNESS OF 3/4"-0" COMPACTED CRUSHED ROCK UNDER BASE.

SECTION A-A

CITY OF GRESHAM

STANDARD MANHOLE FOR 27" AND LESSER DIAMETER PIPES

PWS VERSION: JULY 2026

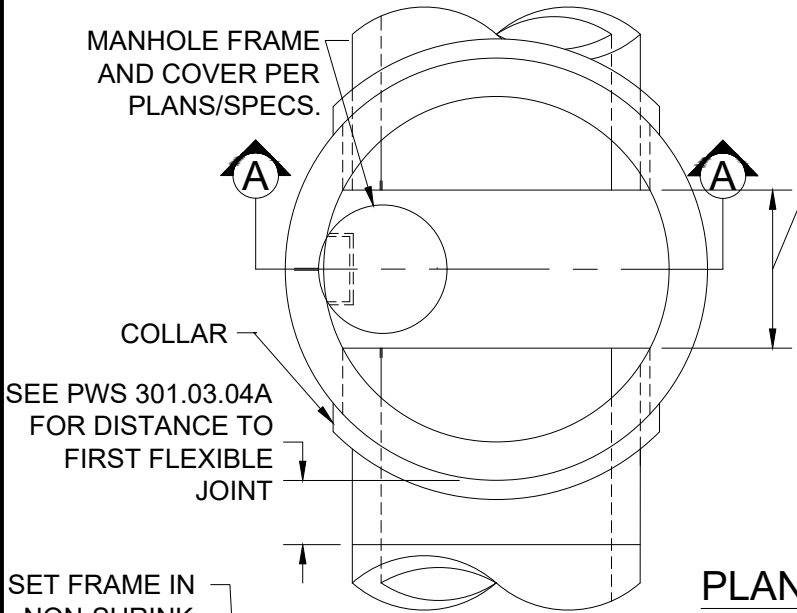
DRAWN AAD

REV. DATE MARCH 2026

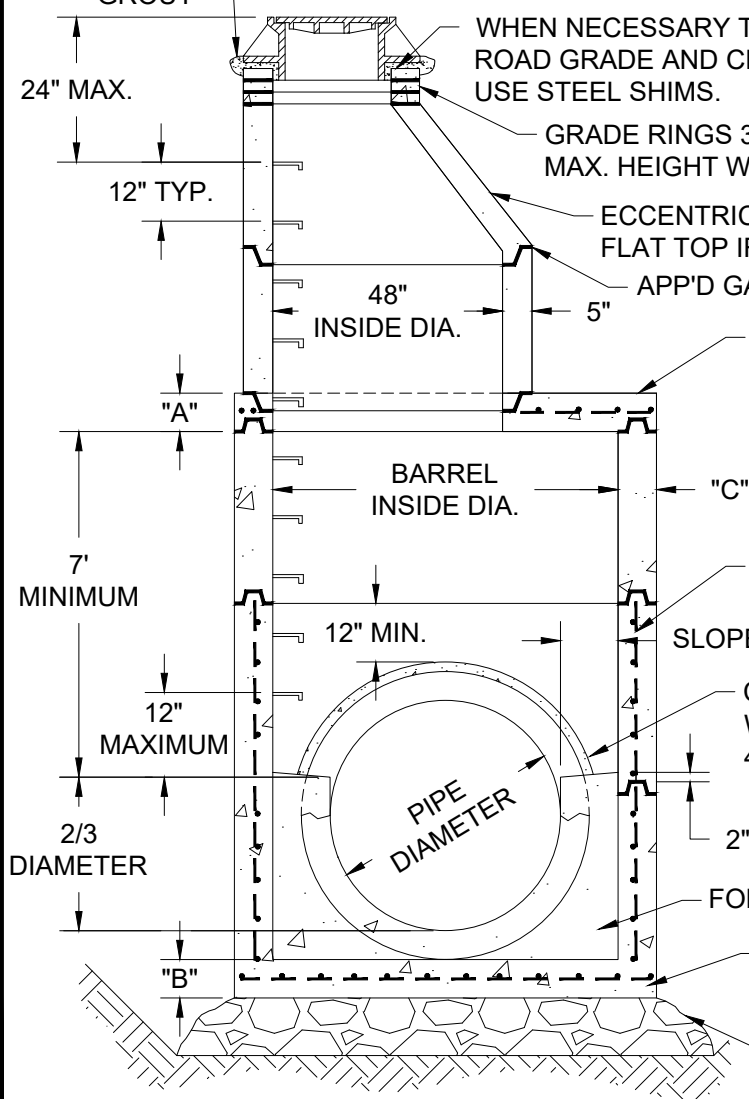
APPR.

DETAIL NO. 201

FILENAME: y:\inter-departmental\development_engineering\projects\public works standards\20 pws revision copy\details\cad - all\200_general\202.dwg, Plotted 4/20/2026 11:39 AM, By: Anthony Dolowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PIPE DIA. IN.	BARREL DIA.* IN.	MINIMUMS		
		"A" DIM. IN.	"B" DIM. IN.	"C" DIM. IN.
30"	72"	7"	10"	7"
33"	72"	7"	10"	7"
36"	72"	7"	10"	7"
42"	84"	12"	12"	8"
48"	84"	12"	12"	8"
54"	96"	12"	12"	9"
60"	96"	12"	12"	9"
66"	108"	12"	12"	10"
72"	108"	12"	12"	10"
78"	120"	12"	12"	11"
84"	120"	12"	12"	11"
90"	132"	12"	12"	11"
96"	132"	12"	12"	11"



WHEN NECESSARY TO MATCH ROAD GRADE AND CROSS-SLOPE USE STEEL SHIMS.

GRADE RINGS 3" MIN. & 12" MAX. HEIGHT WITH NO SPACES

ECCENTRIC CONE OR FLAT TOP IF REQ'D.

APP'D GASKET MATERIAL, TYP.

REDUCING TOP SLAB TO BE DESIGNED & CONSTRUCTED FOR DEPTH AND TRAFFIC CONDITIONS BY MANUFACTURER. FOR SLABS WITHIN 17" OF STREET, OPENING TO BE 25"

DESIGN BARREL REINFORCING FOR CONDITIONS

SLOPE SHELVES 1:12, 18" MINIMUM WIDTH

CORE MANHOLE WALL 2" MIN., 4" MAX. CLEAR OF PIPE WALL. GROUT WITH NON-SHRINK GROUT & INCLUDING 4"x4" COLLAR AROUND PIPE CONNECTION

2" MIN. FOR CAST-IN-PLACE BASE

FORM 4,000 PSI PCC CHANNEL TO 2/3 DIA. HEIGHT

REINFORCED PRE-CAST OR CAST-IN-PLACE BOTTOM SLAB. SUBMIT CALCULATIONS & DESIGN FOR PRIOR APPROVAL

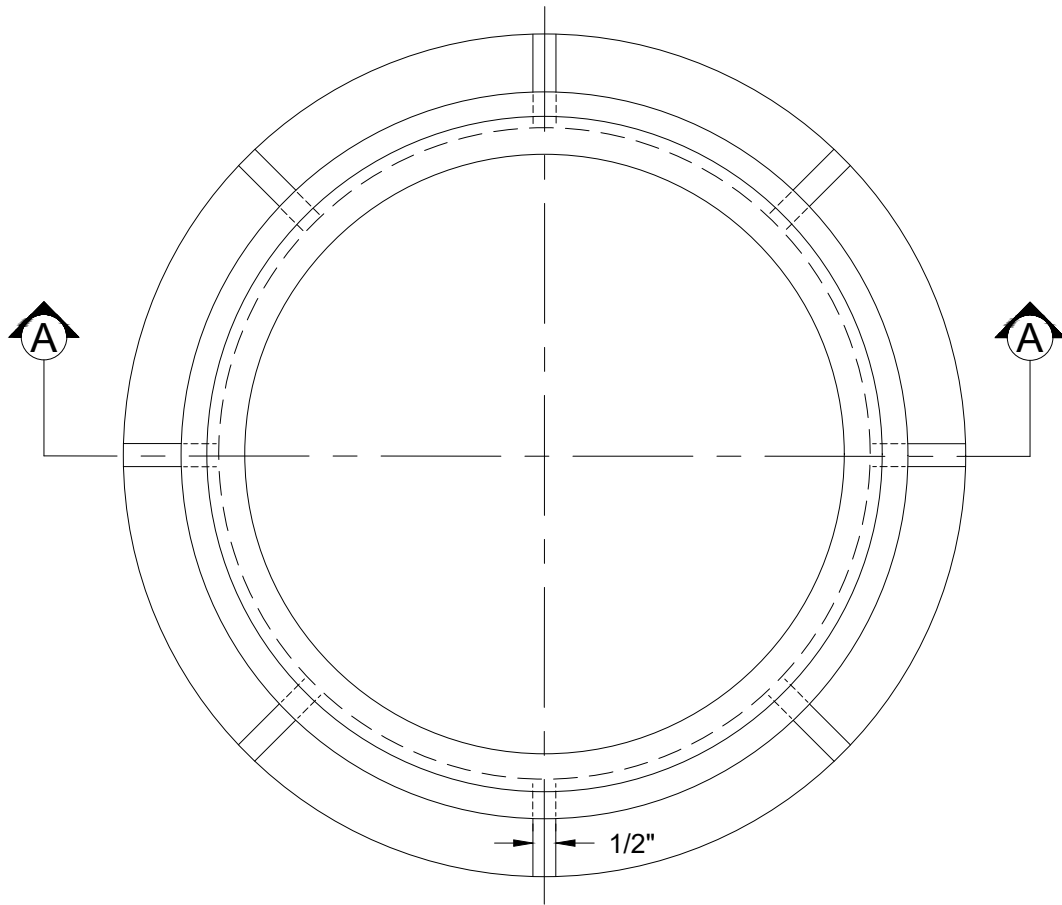
12" MINIMUM THICKNESS OF 3/4"-0" COMPACTED CRUSHED ROCK

* APPLIES TO (2) PIPE MANHOLES WITH 0° DEFLECTION. OTHER NUMBERS OF PIPES OR DEFLECTION WILL REQUIRE LARGER SIZE.

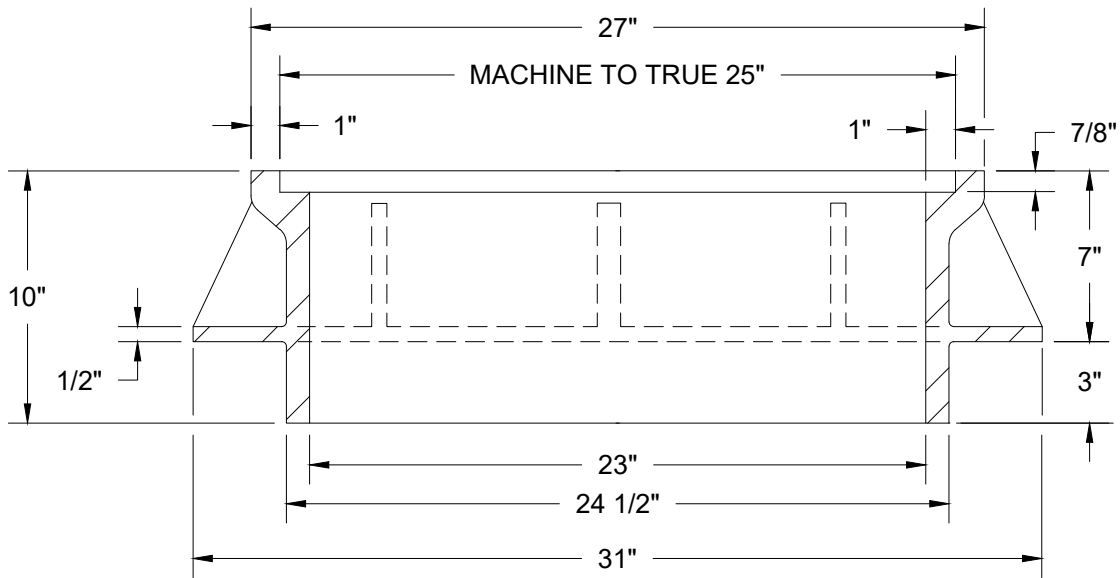
NOTES:
STEPS TO BE AS DETAILED IN STANDARD DETAIL 210

	<p align="center">STANDARD MANHOLE FOR 30" AND LARGER DIAMETER PIPES</p> <p>PWS VERSION: JULY 2026</p>	<p>DRAWN KCK</p>
		<p>REV. DATE MARCH 2026</p>
		<p>APPR.</p>
		<p>DETAIL NO. 202</p>

FILENAME: y:\inter-departmental\development_engineering_projects\public works standards\20 pws revision copy\details\cad - all\200_general\205a.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PLAN



SECTION A-A

NOTES:

1. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30, APPROXIMATE WEIGHT = 237 LBS.
2. TO BE USED IN ASPHALT GREATER THAN 4" IN DEPTH.

**CITY OF
GRESHAM**

STANDARD MANHOLE FRAME

PWS VERSION: JULY 2026

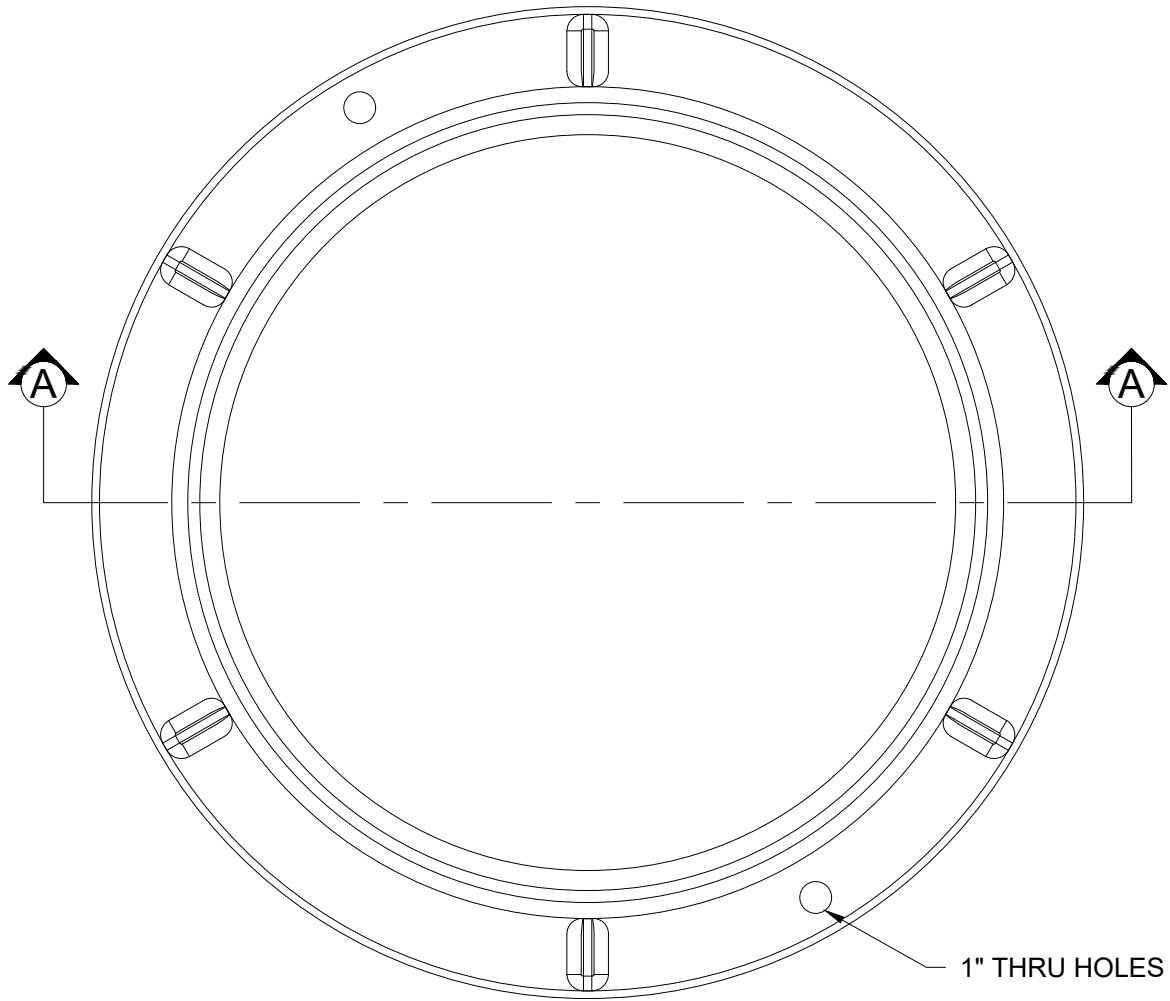
DRAWN KCK

REV. DATE JAN 2019

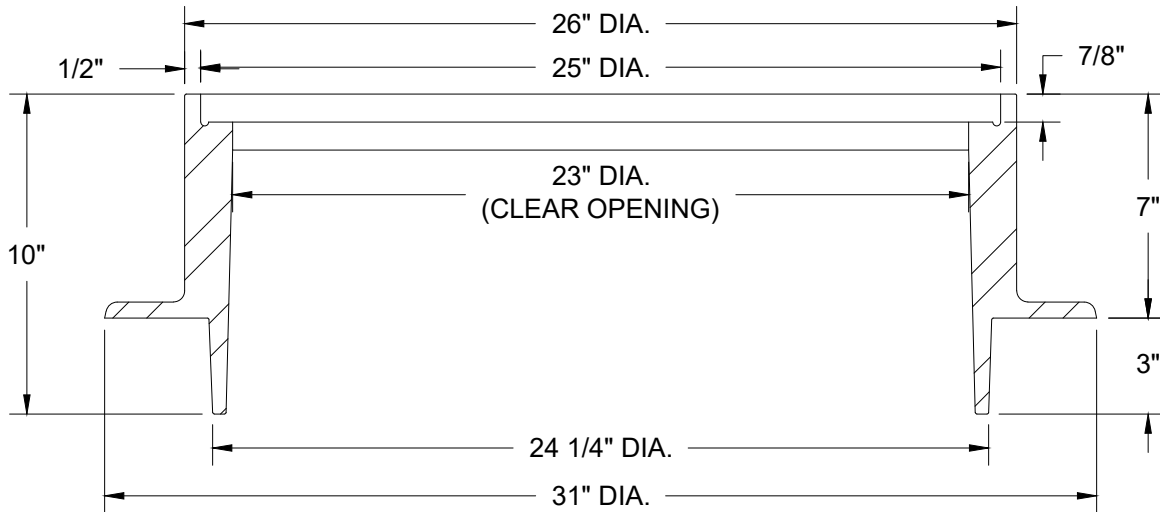
APPR.

DETAIL NO. 205A

FILENAME: y:\inter-departmental\development engineering projects\public works standards\20 pws revision copy\details\cad - all\200_general\205b.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PLAN



SECTION A-A

NOTES:

1. MANHOLE FRAME MANUFACTURED BY EJ, PRODUCT NUMBER 2603Z2, OR APPROVED EQUAL.
2. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.
3. TO BE USED IN ASPHALT GREATER THAN 4" IN DEPTH.

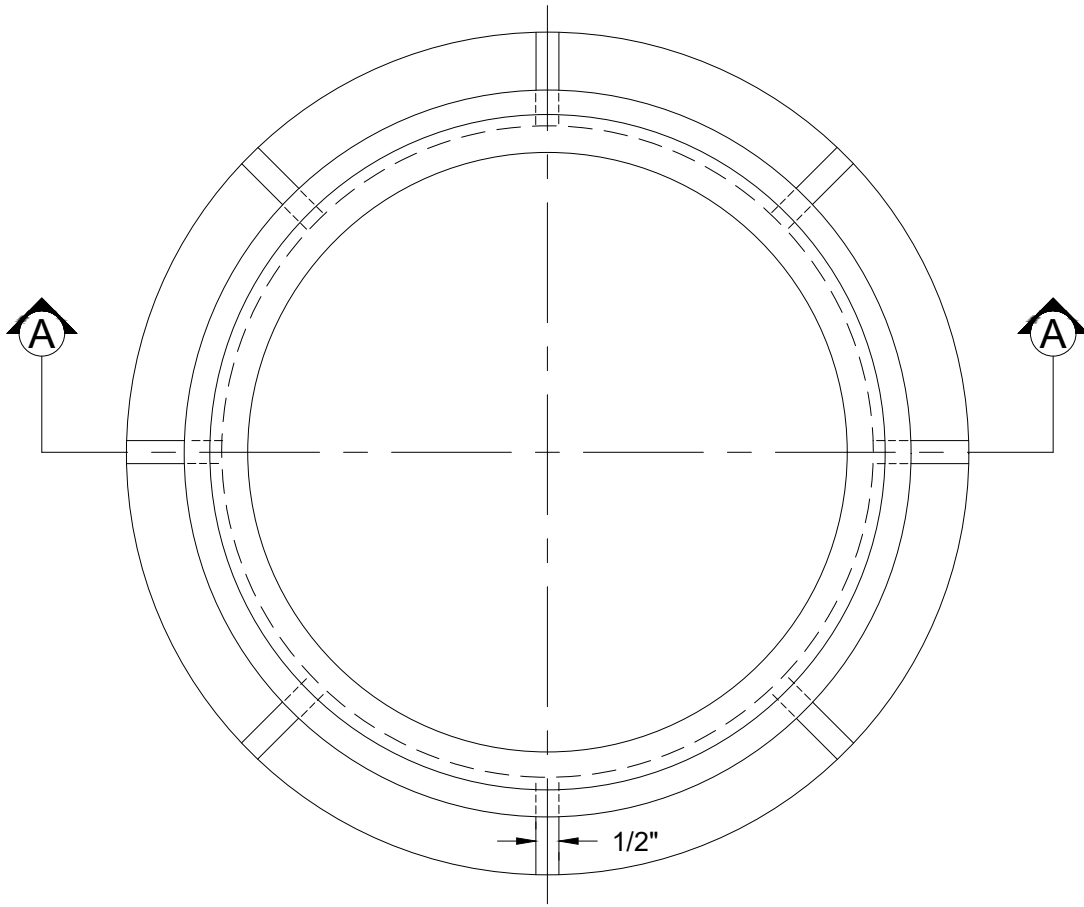
CITY OF GRESHAM

STANDARD MANHOLE STRAIGHT WALL FRAME

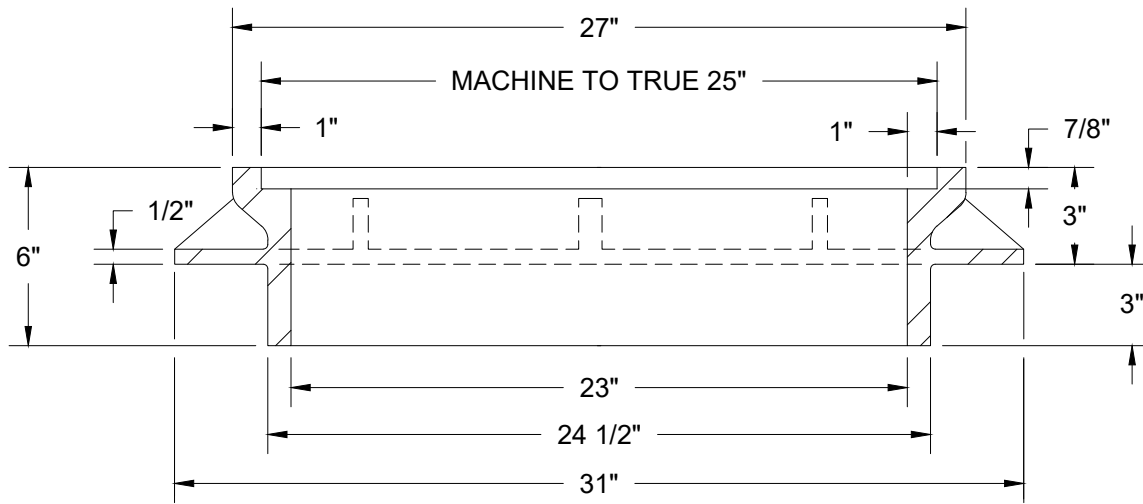
PWS VERSION: JULY 2026

DRAWN	KRB
REV. DATE	NOV 2025
APPR.	
DETAIL NO.	205B

FILENAME: y:\inter-departmental\development_engineering_projects\public_works_standards\20 pws_revision_copy\details\cad - all\200_general\206a.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PLAN SECTION



SECTION A-A

- NOTES:**
1. THIS MANHOLE FRAME MAY BE USED ONLY FOR LOCAL ROAD LOCATIONS.
 2. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30. APPROX. WEIGHT = 172 LBS.

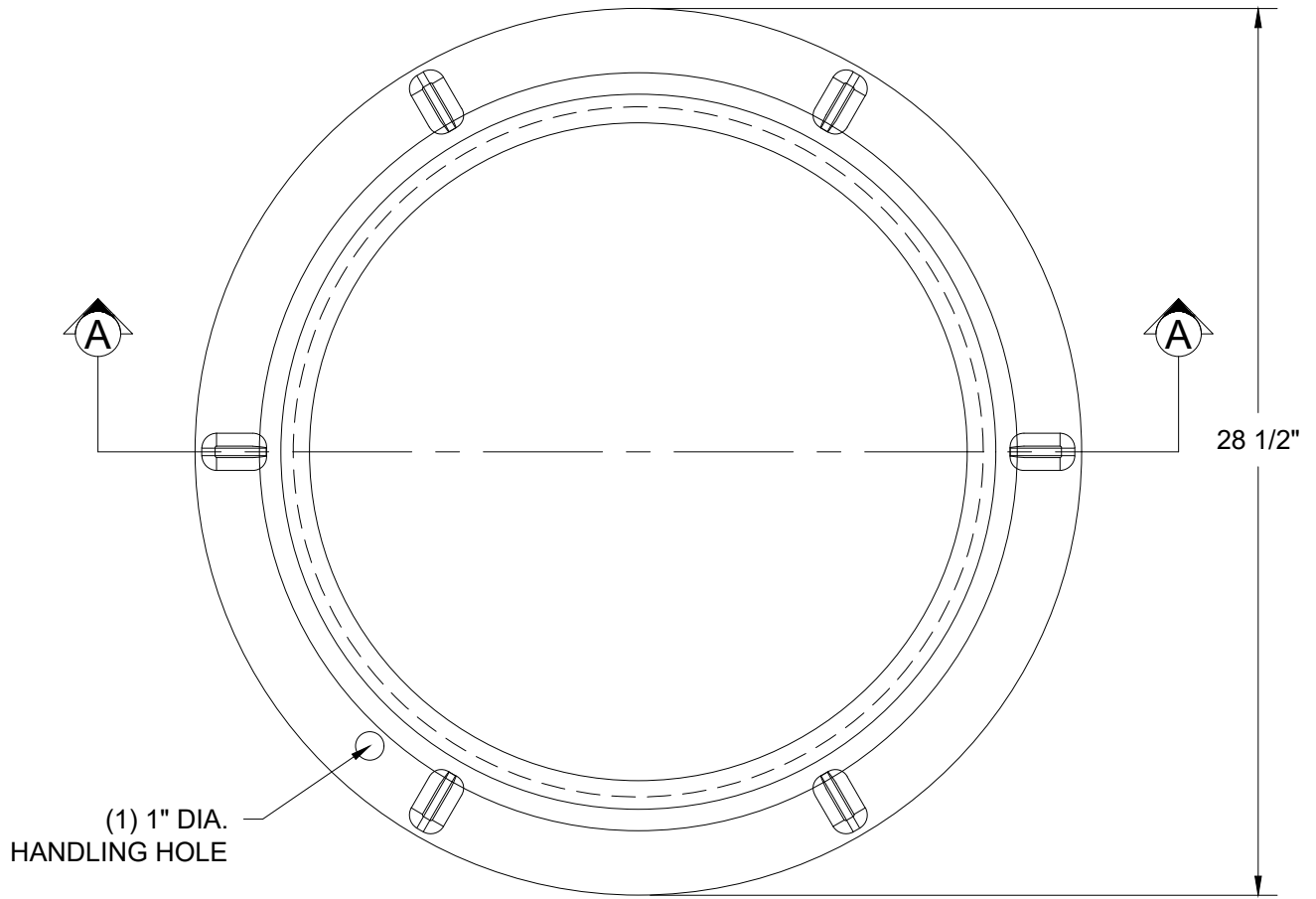
**CITY OF
GRESHAM**

SUBURBAN MANHOLE FRAME

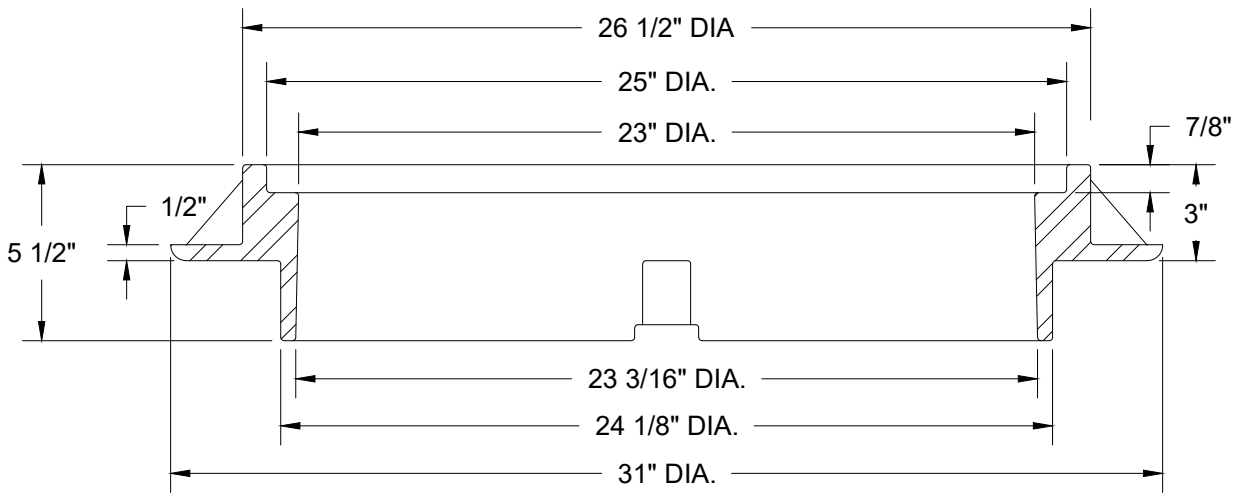
PWS VERSION: JULY 2026

DRAWN	KCK
REV. DATE	JAN 2019
APPR.	
DETAIL NO.	206A

FILENAME: y:\inter-departmental\development engineering projects\public works standards\20 pws revision copy\details\cad - all\200_general\2066.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PLAN SECTION



SECTION A-A

NOTES:

1. THIS MANHOLE FRAME MAY BE USED ONLY FOR LOCAL ROAD LOCATIONS.
2. MANHOLE FRAME MANUFACTURED BY EJ, PRODUCT NUMBER 2601Z, OR APPROVED EQUAL.
3. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.

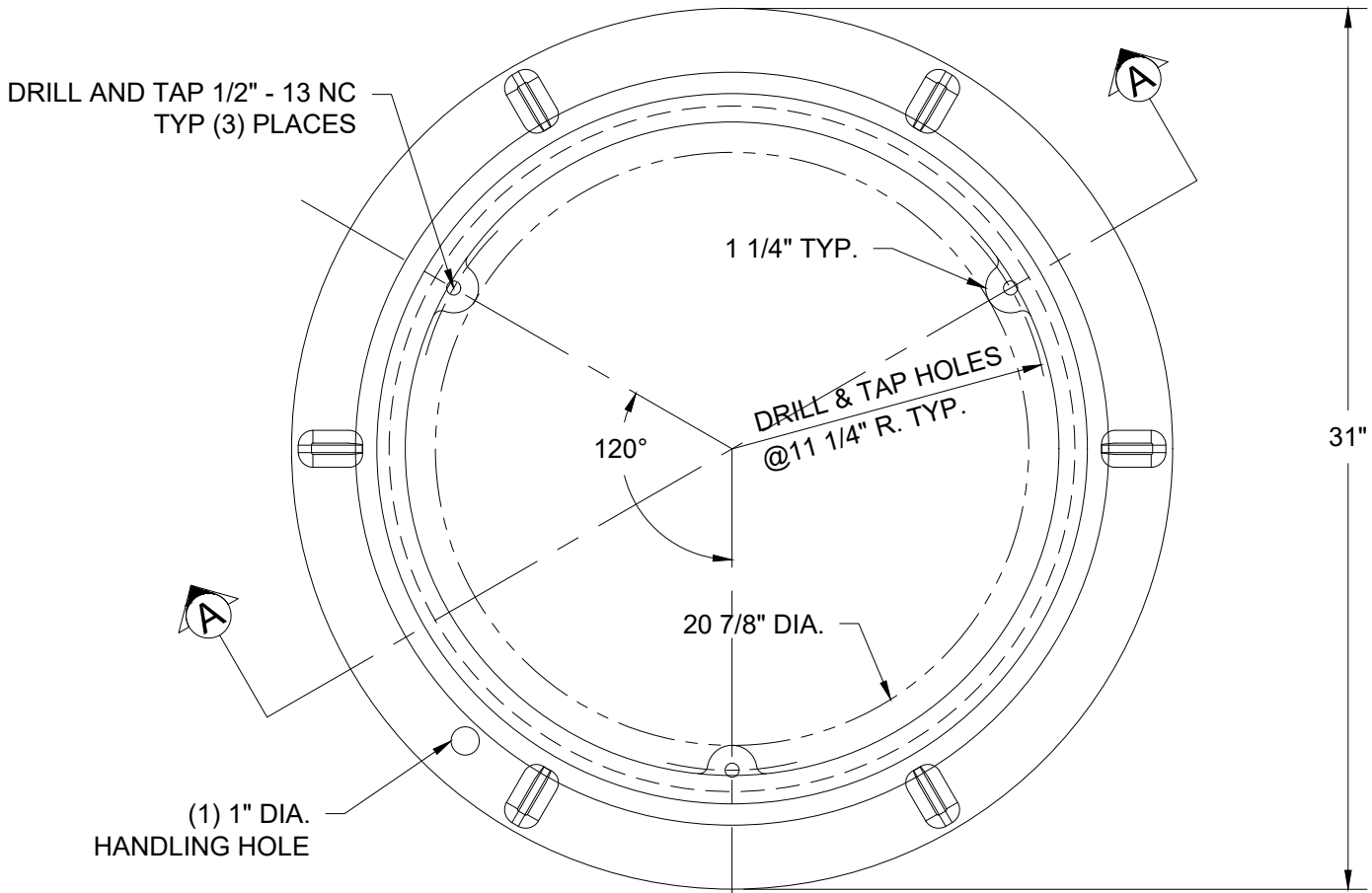
CITY OF GRESHAM

SUBURBAN MANHOLE STRAIGHT WALL FRAME

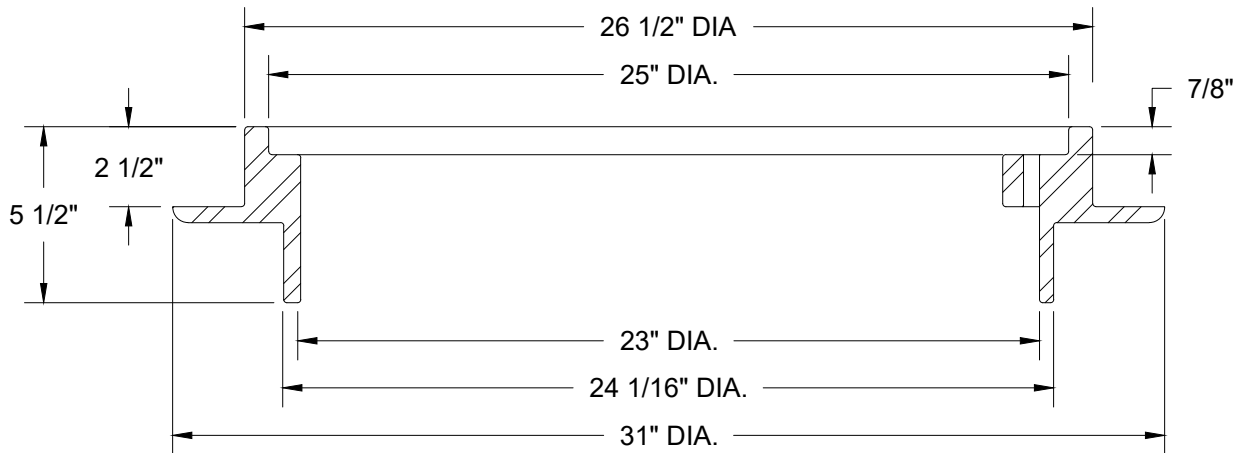
PWS VERSION: JULY 2026

DRAWN	AAD
REV. DATE	NOV 2025
APPR.	
DETAIL NO.	206B

FILENAME: y:\inter-departmental\development_engineering_projects\public_works_standards\20 pws_revision copy\details\cad - all\200_general\206c.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PLAN SECTION



SECTION A-A

NOTES:

1. THIS MANHOLE FRAME MAY BE USED ONLY FOR LOCAL ROAD LOCATIONS.
2. MANHOLE FRAME MANUFACTURED BY EJ, PRODUCT NUMBER 2601ZPT, OR APPROVED EQUAL.
3. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30. APPROXIMATE WEIGHT = 172 LBS
4. ONE BOLT DOWN TAB MUST BE ORIENTED DIRECTLY OVER CENTER OF MANHOLE STEPS

CITY OF GRESHAM

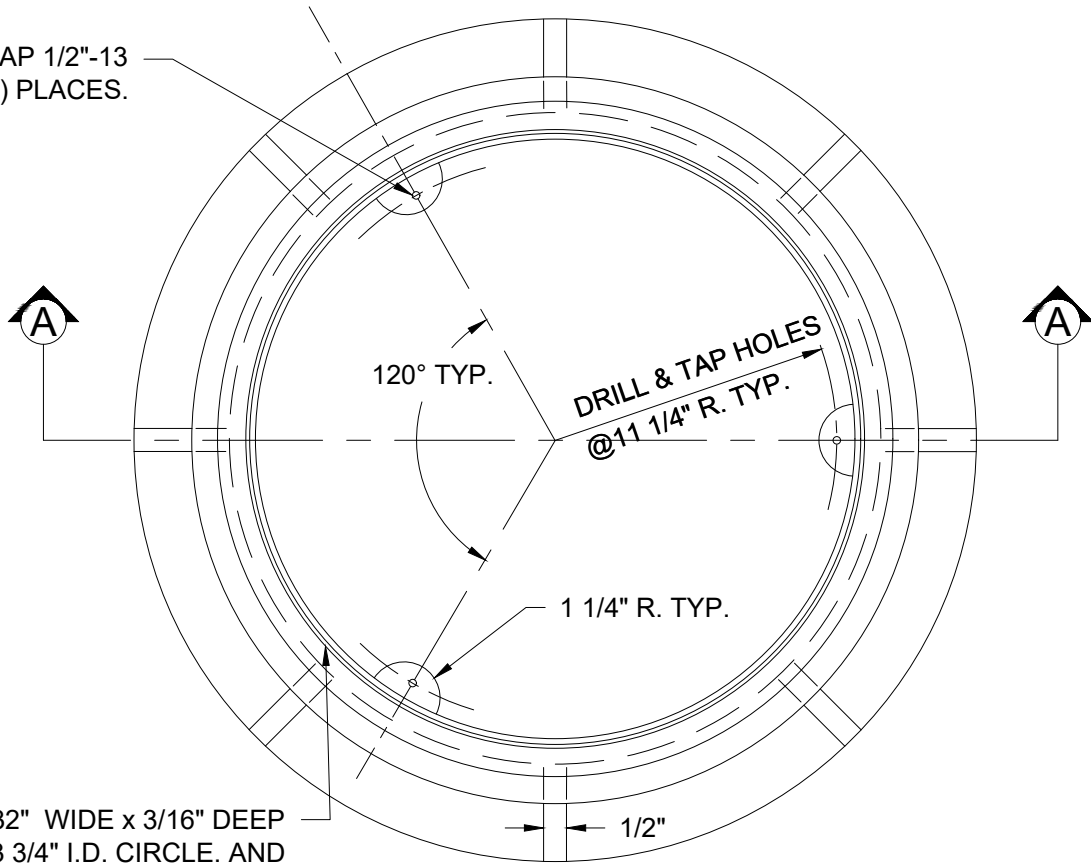
SUBURBAN TAMPERPROOF AND WATERTIGHT MANHOLE STRAIGHT WALL FRAME

PWS VERSION: JULY 2026

DRAWN	AAD
REV. DATE	NOV 2025
APPR.	
DETAIL NO.	206C

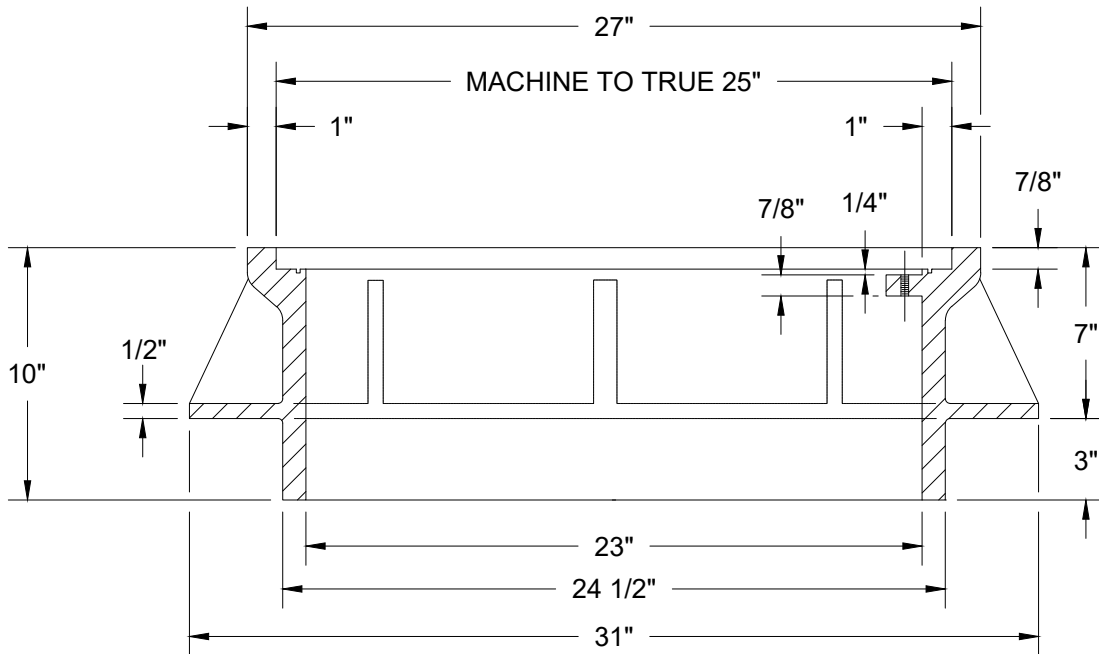
FILENAME: y:\inter-departmental\development_engineering_projects\public_works_standards\20 pws_revision_copy\details\cad - all\200_general\207a.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

DRILL AND TAP 1/2"-13 NC, TYPICAL (3) PLACES.



MACHINE 9/32" WIDE x 3/16" DEEP GROOVE ON 23 3/4" I.D. CIRCLE. AND INSTALL 23 3/4" I.D., 1/4" WIDE X 1/4" DEEP NEOPRENE GASKET.

PLAN



SECTION A-A

NOTE:

1. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30. APPROXIMATE WEIGHT = 237 (INDUSTRIAL)
2. TO BE USED IN ASPHALT GREATER THAN 4" IN DEPTH .
3. ONE BOLT DOWN TAB MUST BE ORIENTED DIRECTLY OVER CENTER OF MANHOLE STEPS

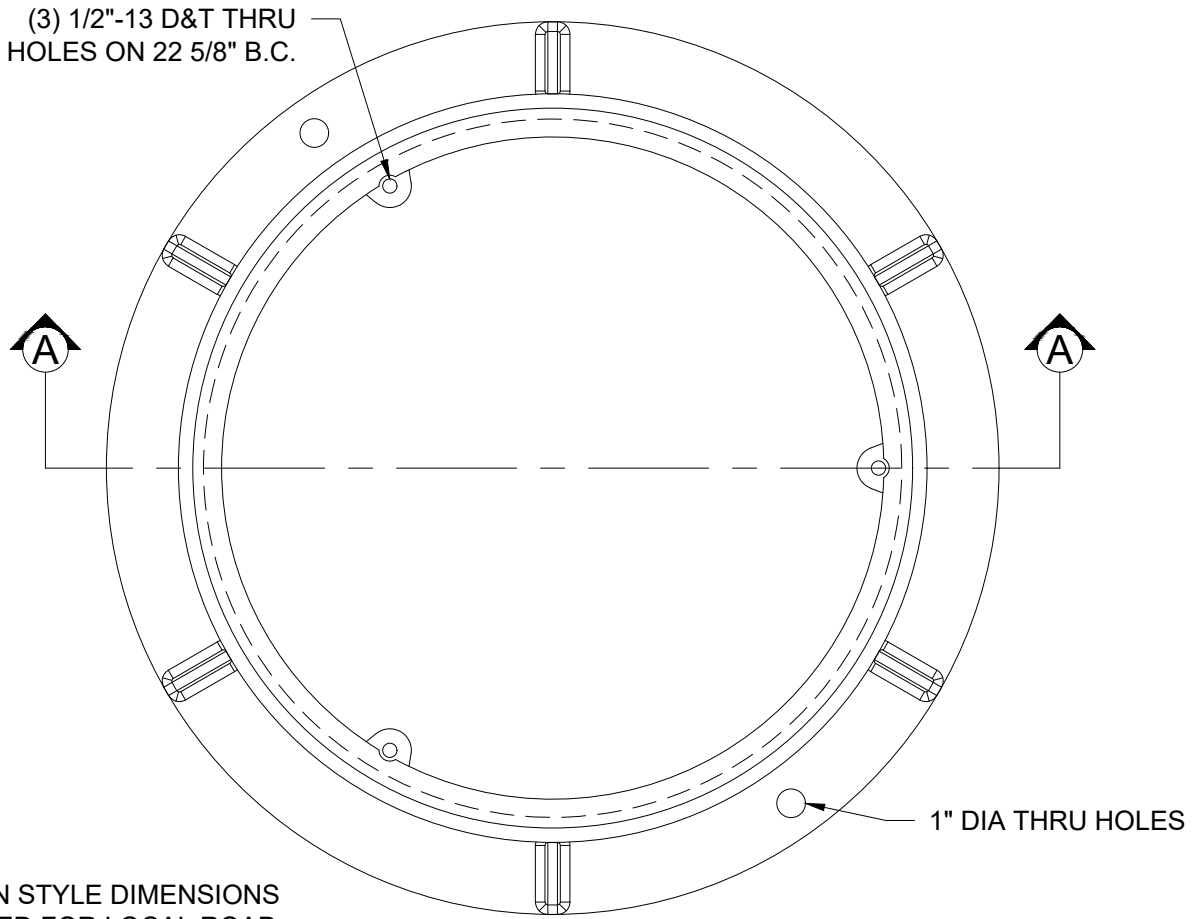
CITY OF GRESHAM

TAMPERPROOF AND WATERTIGHT MANHOLE FRAME

PWS VERSION: JULY 2026

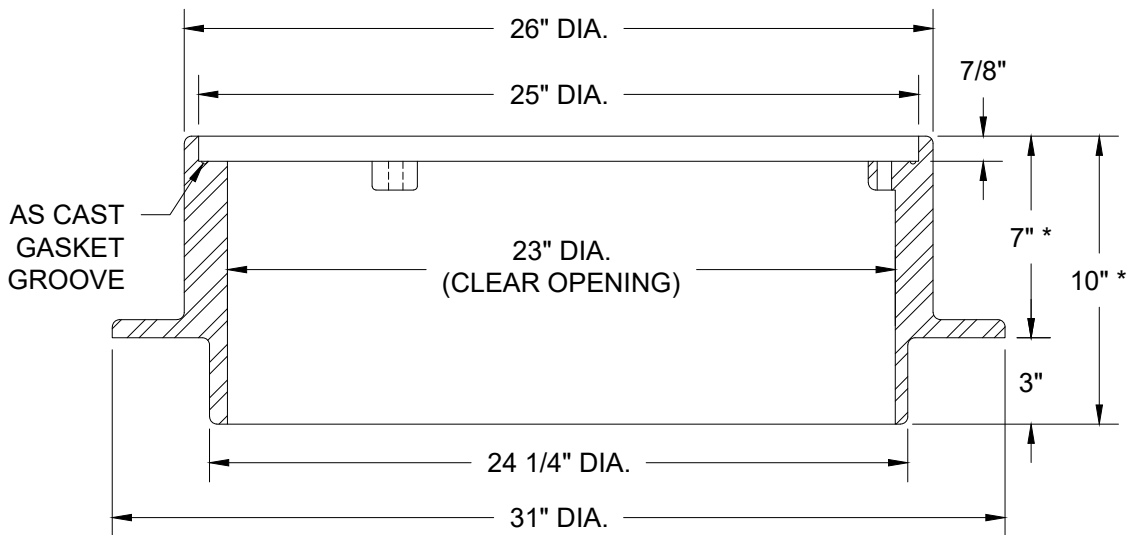
DRAWN	AAD
REV. DATE	NOV 2025
APPR.	
DETAIL NO.	207A

FILENAME: y:\inter-departmental\development engineering projects\public works standards\20 pws revision copy\details\cad - all\200_general\207b.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



* SUBURBAN STYLE DIMENSIONS MAY BE USED FOR LOCAL ROAD INSTALLATION. SEE DETAIL 206C.

PLAN



SECTION A-A

NOTE:

1. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.
2. MANHOLE FRAME MANUFACTURE BY EJ, PRODUCT NUMBER 2603Z2PT, OR APPROVED EQUAL.

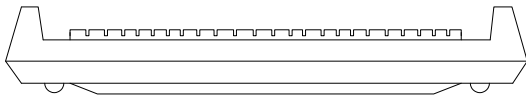
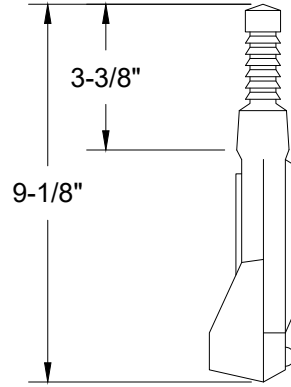
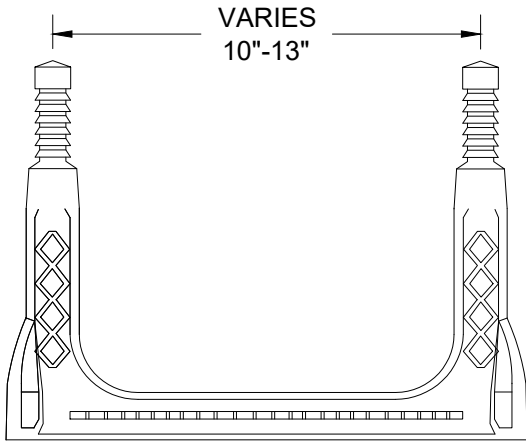


**STANDARD TAMPERPROOF AND WATERTIGHT
MANHOLE STRAIGHT WALL FRAME**

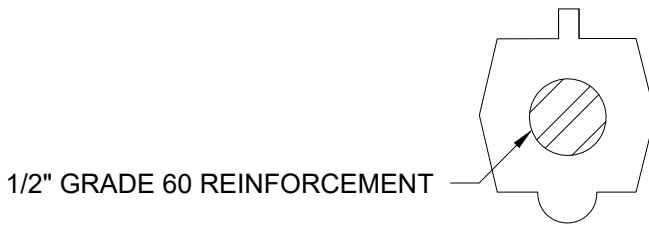
PWS VERSION: JULY 2026

DRAWN	KRB
REV. DATE	JAN 2024
APPR.	
DETAIL NO.	207B

FILENAME: y:\inter-departmental\development engineering projects\public works standards\2.0 pws revision copy\details\cad - all\200_general\210.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



COPOLYMER POLYPROPYLENE PLASTIC



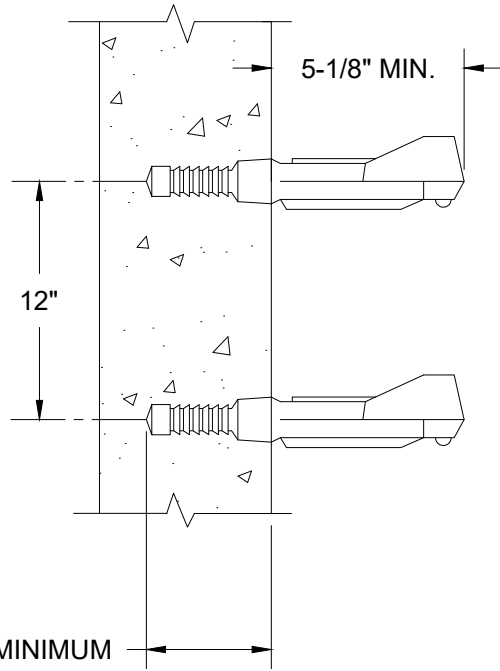
1/2" GRADE 60 REINFORCEMENT

NOTE:

MANHOLE STEPS MUST BE TIGHT AND FIRMLY EMBEDDED. THEY MUST ALSO MEET THE ASTM TEST FOR WITHSTANDING PULLING OUT.

MATERIALS:

PLASTIC: MUST CONFORM WITH ASTM C478.
STEEL REINFORCING BAR MINIMUM 1/2" GRADE 60 MEETING REQUIREMENTS OF ASTM A615
ENCAPSULATED WITH INJECTION MOLDED COPOLYMER POLYPROPYLENE WITH SERRATED SURFACES.



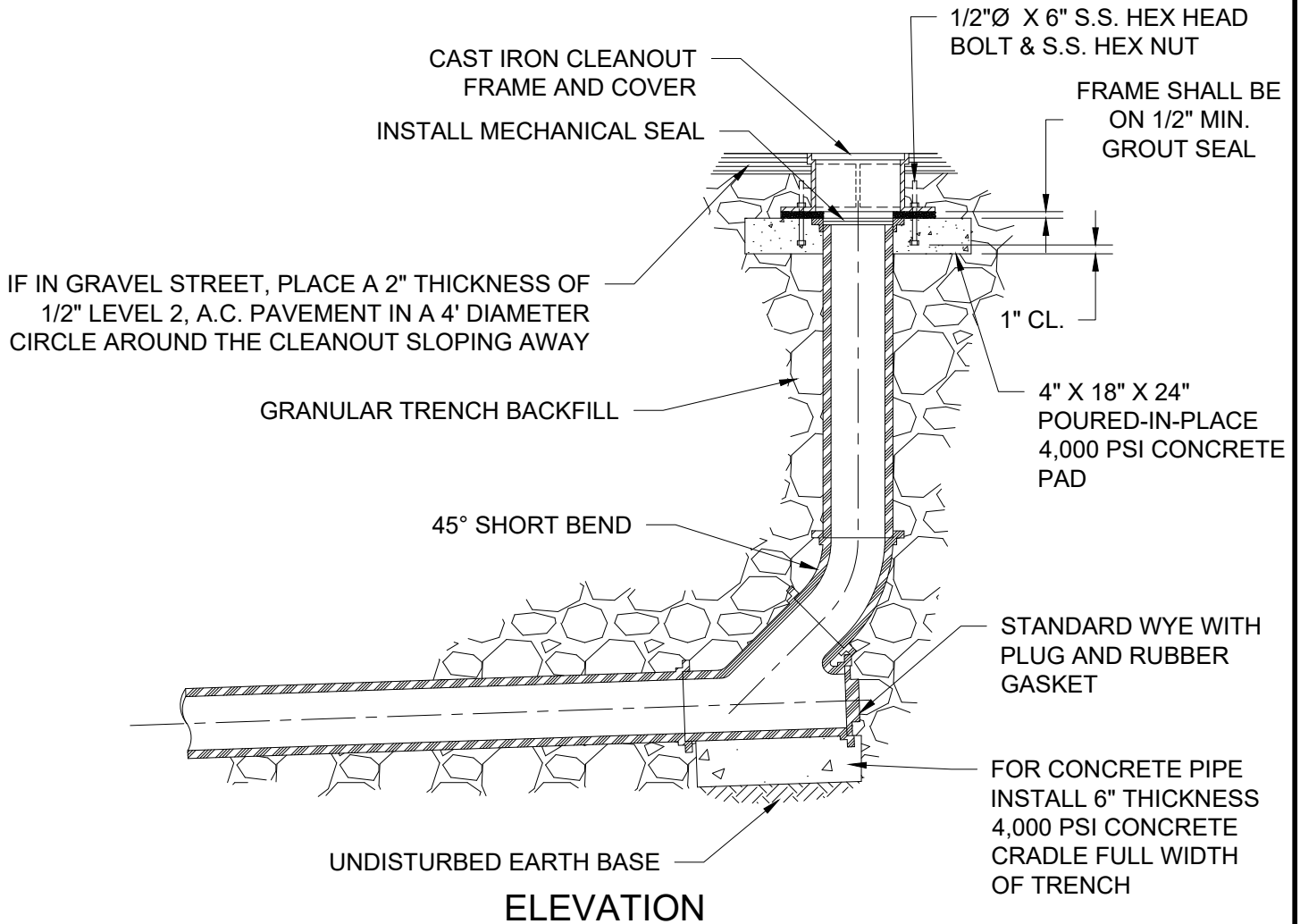
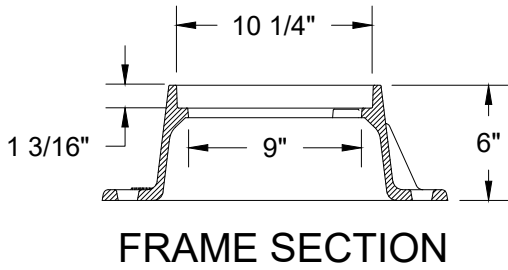
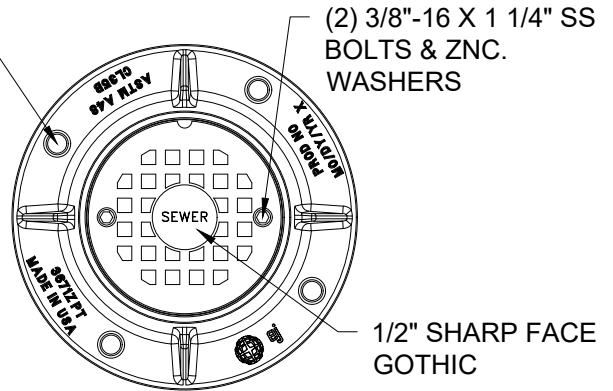
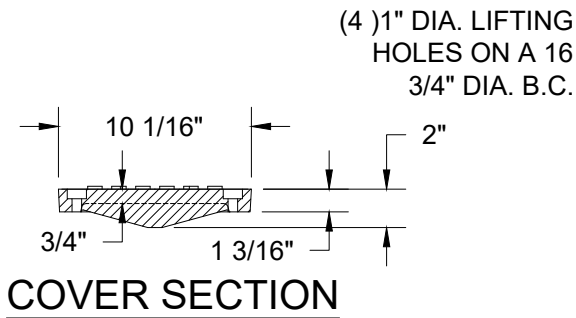
CITY OF GRESHAM

MANHOLE STEP

PWS VERSION: JULY 2026

DRAWN	KCK
REV. DATE	JAN 2020
APPR.	
DETAIL NO.	210

FILENAME: y:\inter-departmental\development engineering projects\public works standards\2.0 pws revision copy\details\cad - all\200_general\211.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

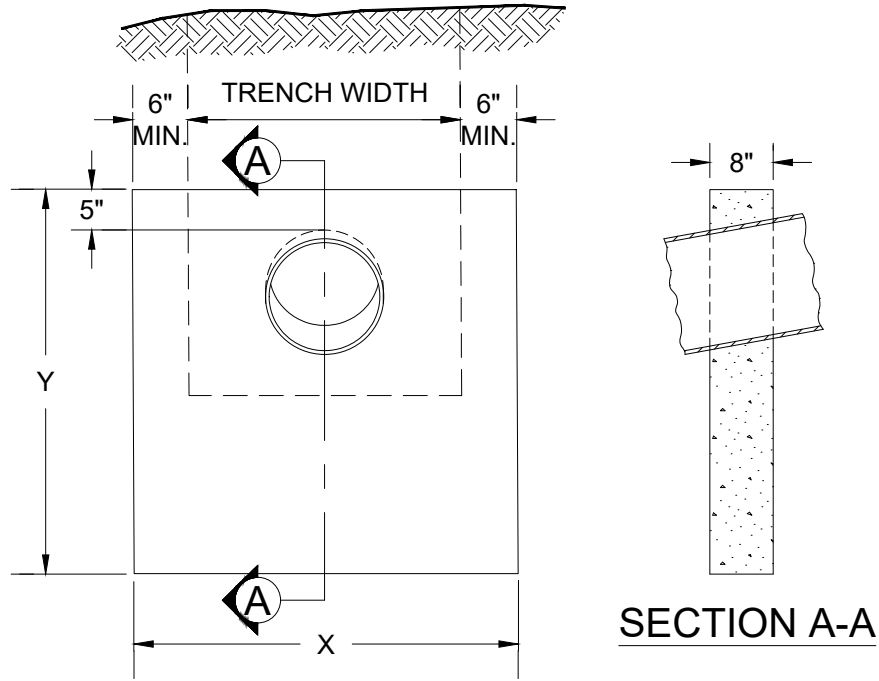


CITY OF GRESHAM

STANDARD CLEANOUT

PWS VERSION: JULY 2026

DRAWN	KCK
REV. DATE	JAN 2024
APPR.	
DETAIL NO.	211



DIMENSION TABLE			
PIPE DIA.	X, MIN. (ft)	Y (ft)	MIN VOL (CY)
6" TO 10"	4	3	0.29
12" TO 15"	4	4	0.37
18" TO 24"	5	4	0.42
> 24"	TO BE DETERMINED BY ENGINEER OF RECORD		

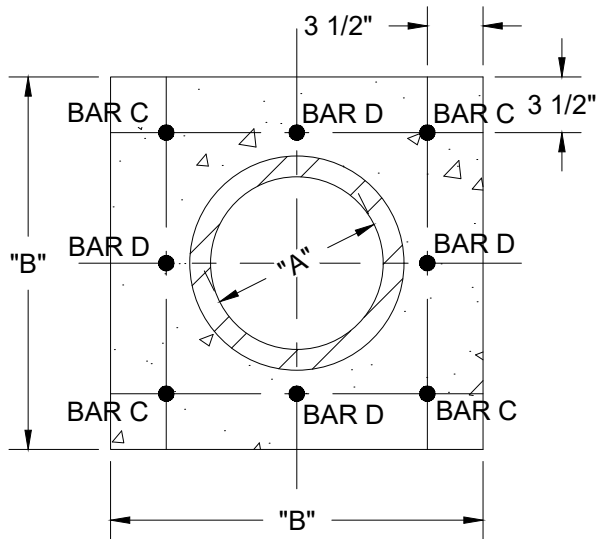
NOTES:

1. ALL CONCRETE SHALL BE 4,000 PSI 28 DAY COMPRESSIVE STRENGTH, WITH 2" TO 4" SLUMP.
2. ANCHOR WALLS MUST BE USED WITH PIPES WITH SLOPES OVER 20%. ANCHOR WALLS TO BE EQUALLY SPACED. PROPORTION SPACING WITH SLOPE.

PIPE SLOPE	WALL SPACING
20%	21'
100%	12'
> 100%	NOT ALLOWED

3. PLACE WALL IMMEDIATELY BELOW BELL OF PIPE WHERE POSSIBLE.

FILENAME: y:\inter-departmental\development engineering projects\public works standards\20 pws revision copy\details\cad - all\200_general\213.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



DIMENSIONS (IN.)		BARS REQ'D
"A"	"B"	
6	16	C
8	19	C
10	21	C
12	23	C
15	26 1/2	C
18	30 1/2	C
21	39	C & D
24	43	C & D
27	50	C & D

VERTICAL SECTION

NOTES:

1. ALL CONCRETE SHALL BE 4,000 PSI, 3" TO 5" SLUMP.
2. STEEL REINFORCING SHALL BE NO. 5 IN CONFORMANCE WITH ASTM A615, GRADE 60, WITH DEFORMATIONS PER ASTM A305.

**CITY OF
GRESHAM**

PIPE CONCRETE ENCASEMENT

PWS VERSION: JULY 2026

DRAWN **KRB**

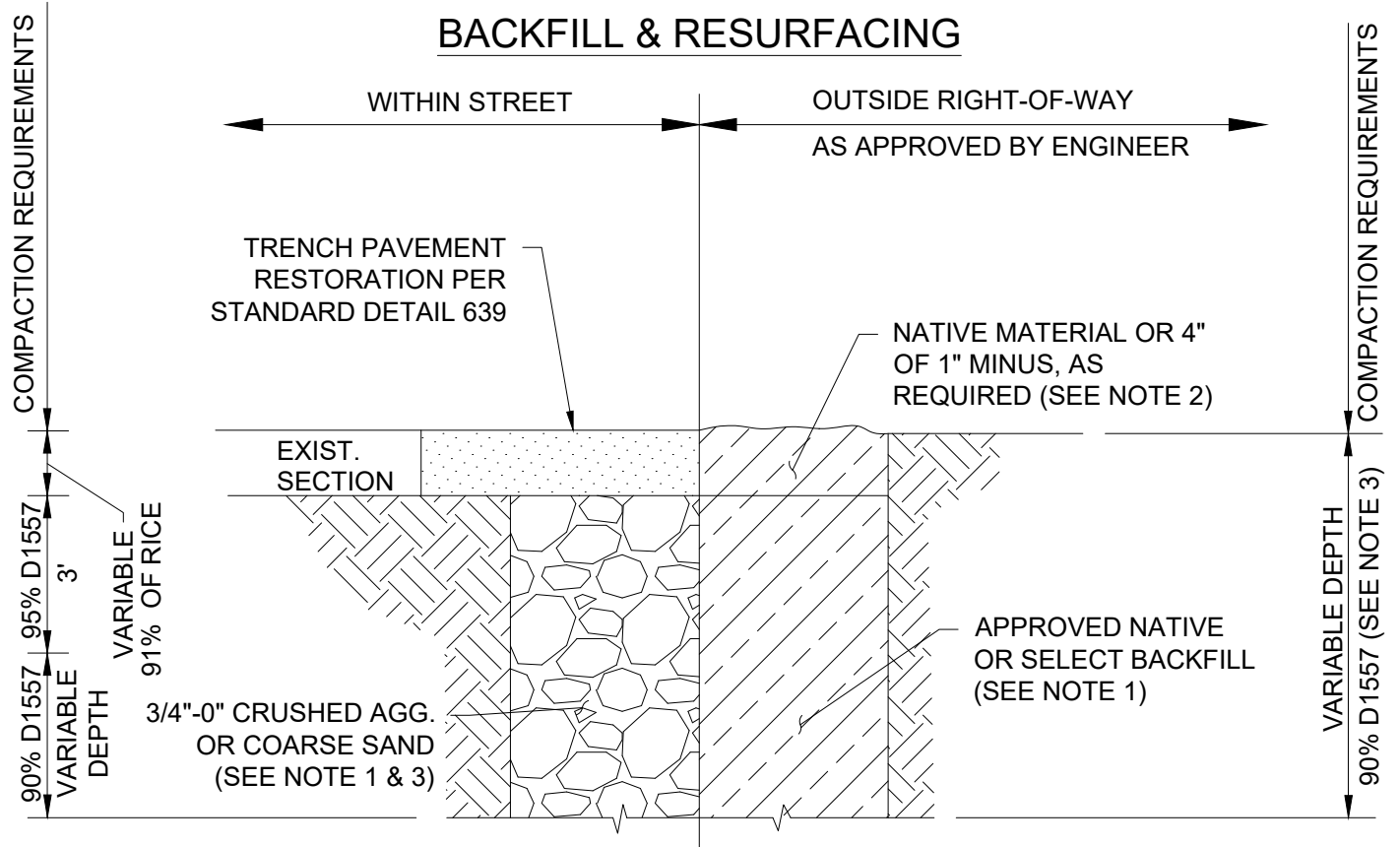
REV. **JAN 2024**
DATE

APPR.

DETAIL NO. **213**

FILENAME: y:\inter-departmental\development engineering projects\public works standards\2.0 pws revision copy\details\cad - all\200_general\214a.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

BACKFILL & RESURFACING



NOTES:

1. USE CLSM WHERE SPECIFIED AND WHERE REQUIRED BY THE ENGINEER.
2. IN AREAS WHERE NATIVE BACKFILL IS BROUGHT TO THE SURFACE AND IS TO BE SEEDED, DO NOT COMPACT THE TOP 4".
3. COARSE SAND NOT FOR USE IN AREAS OF HIGH GROUNDWATER

CITY OF GRESHAM

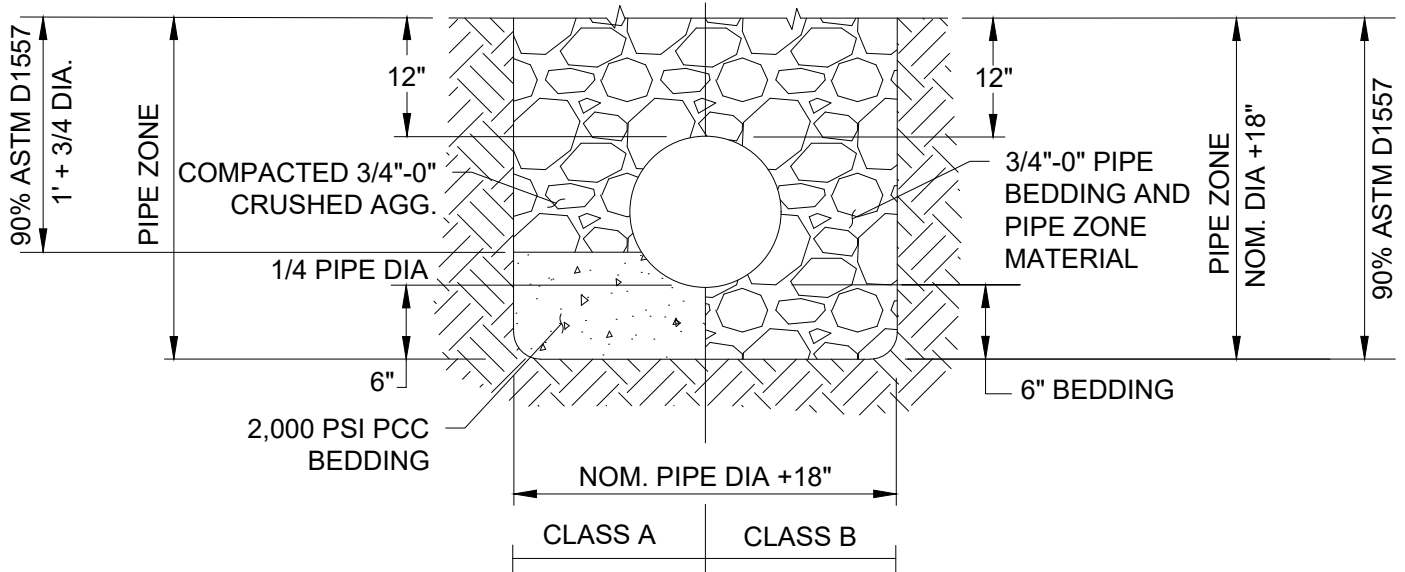
BACKFILL AND RESURFACING

PWS VERSION: JULY 2026

DRAWN	AAD
REV. DATE	MAY 2026
APPR.	
DETAIL NO.	214A

FILENAME: y:\inter-departmental\development_engineering_projects\public_works_standards\20_pws_revision_copy_details\cad - all\200_general\214b.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dollowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

BEDDING & PIPE ZONE

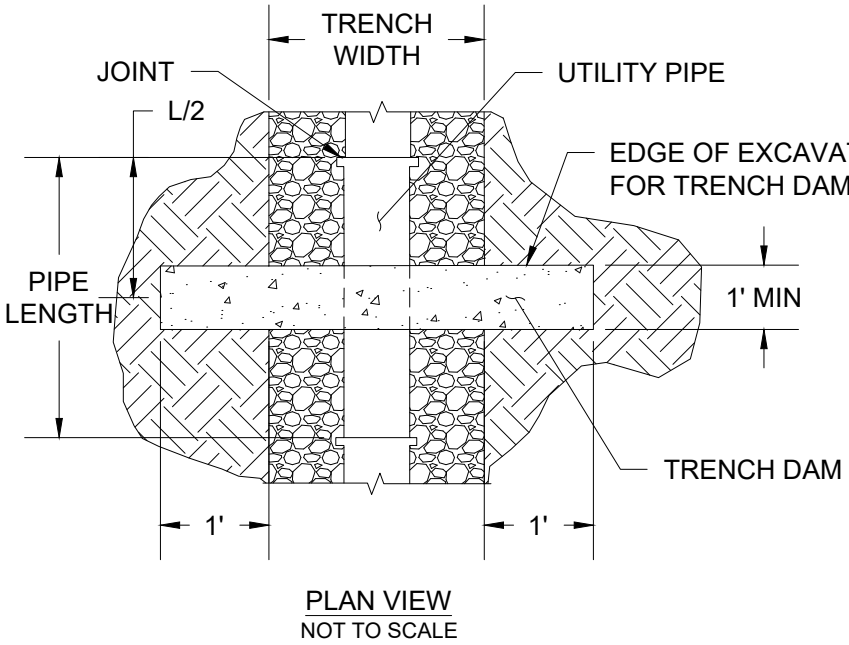


NOTES:

1. WHERE REQUIRED BY THE ENGINEER OF RECORD OR THE CITY, GRANULAR TRENCH STABILIZATION SHALL BE PLACED BELOW PIPE ZONE MATERIAL. SIZE AND DEPTH TO BE BASED ON SOIL CONDITIONS.
2. WHERE WATERLINES ARE WRAPPED WITH POLYETHYLENE ENCASMENT OR EQUIVALENT, SAND SHALL BE USED WITHIN THE ENTIRE PIPE ZONE AREA.

	<h2 style="margin: 0;">BEDDING & PIPE ZONE</h2> <p style="margin-top: 10px;">PWS VERSION: JULY 2026</p>	DRAWN AAD
		REV. DATE MAY 2026
		APPR.
		DETAIL NO. 214B

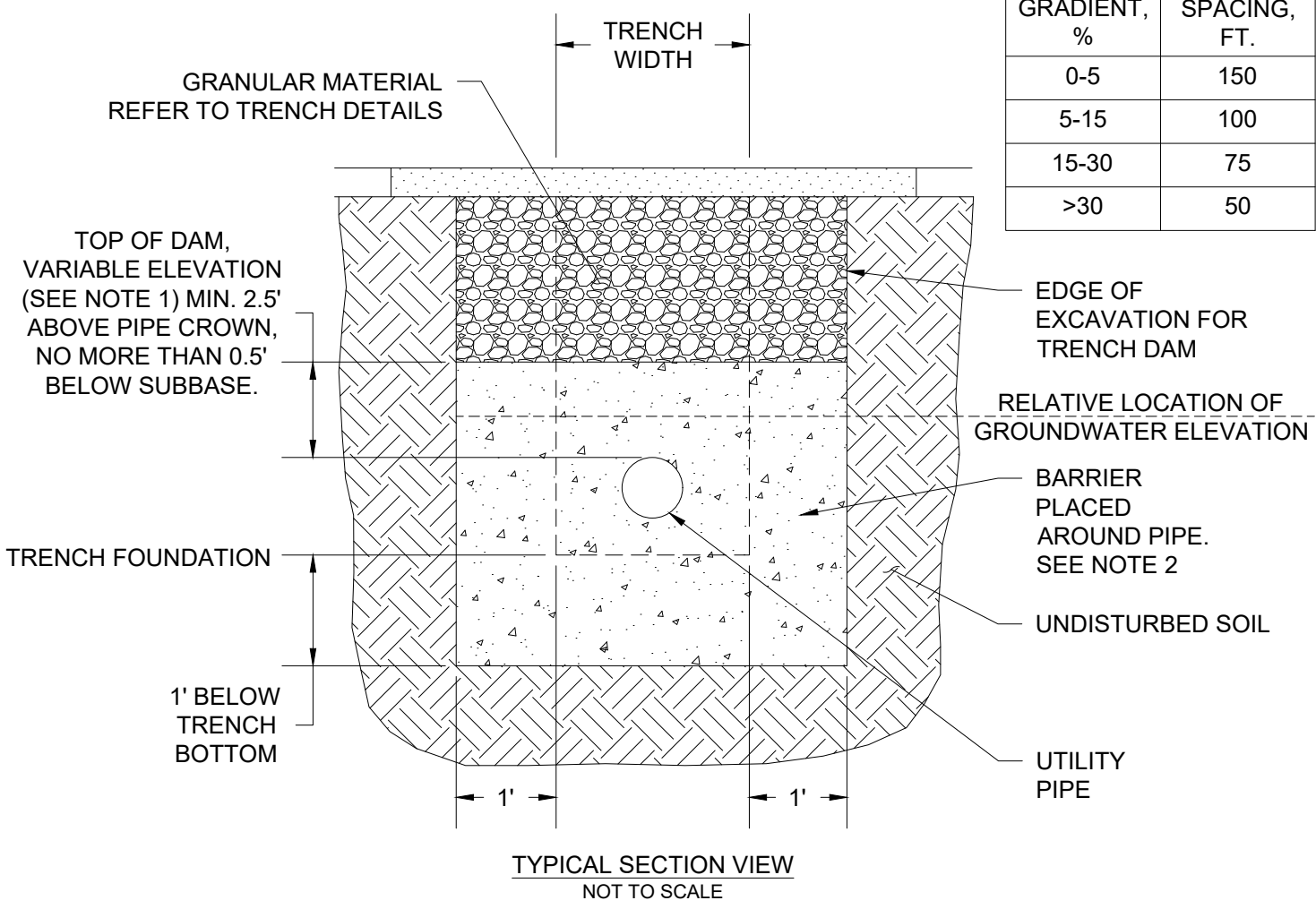
FILENAME: y:\inter-departmental\development engineering projects\public works standards\2.0 pws revision copy\details\cad - all\200_general\215.dwg, Plotted 4/20/2026 11:40 AM, By: Anthony Dolowitch, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



- NOTES:
1. REFER TO PLANS FOR TRENCH DAM LOCATIONS AND TOP ELEVATIONS DETERMINED BY CITY.
 2. PLUG SHALL BE IMPERMEABLE AND COMPOSED OF A BENTONITE CLAY, OR CONTROLLED LOW STRENGTH MATERIAL (CLSM), CONSTRUCTED AS SHOWN.
 3. TRENCH DAM SHALL EXTEND BEYOND THE EXISTING UTILITY TRENCH WIDTH INTO NATIVE SOIL PER THE MINIMUM DIMENSIONS SHOWN.
 4. WHEN REQUIRED, TRENCH DAM SHALL BE CONSTRUCTED IN AREAS OF SHALLOW GROUNDWATER, SEE TABLE 1.

TABLE 1

FLOW GRADIENT, %	DAM SPACING, FT.
0-5	150
5-15	100
15-30	75
>30	50



CITY OF GRESHAM

IMPERVIOUS DAM

PWS VERSION: JULY 2026

DRAWN	AAD
REV. DATE	MARCH 2026
APPR.	
DETAIL NO.	215