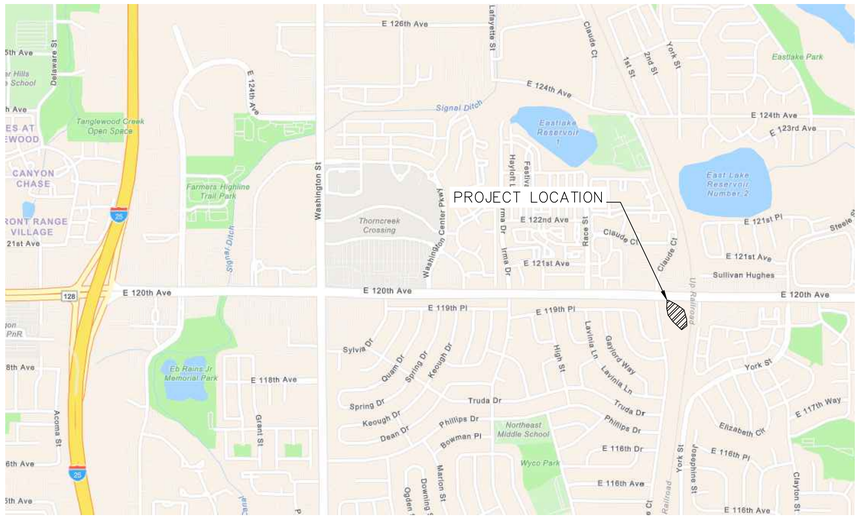
CITY OF THORNTON

NON-POTABLE IRRIGATION IMPROVEMENTS
CONCEPTUAL CONSTRUCTION PLANS

PROJECT NO.: 24-33

SW CORNER OF E120TH AVENUE AND CLAUDE STREET INTERSECTION

SEPTEMBER 2025



LOCATION MAP

NOT TO SCALE

CONTACT LIST		
CITY OF THORNTON	**NAME**	**NUMBER**
PROJECT MANAGER	MARSHALL DAVIS	913-660-8641
SENIOR WATER RESOURCES ADMIN	ELENA ACKER	720-977-6507
UTILITY MAINTENANCE SUPERVISOR	JASON HELMS	303-255-7712
CONSTRUCTION COORDINATOR	SCOTT WENGER	303-726-6692
COLORADO AGRICULTURAL DITCH COMPANY	MATT STOCKTON	720-977-6511

811 Know what's **below.** **Call** before you dig.

INFRASTRUCTURE DEPARTMENT
INFRASTRUCTURE ENGINEERING SECTOR
ENGINEERING SERVICES DIVISION
12450 WASHINGTON STREET
THORNTON, COLORADO
80241
(720) 977-6210

MARK	DATE	DESCRIPTION

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DESIGNED BY: MD
FIELD BOOK NO: N/A

SHEET TITLE

COVER SHEET

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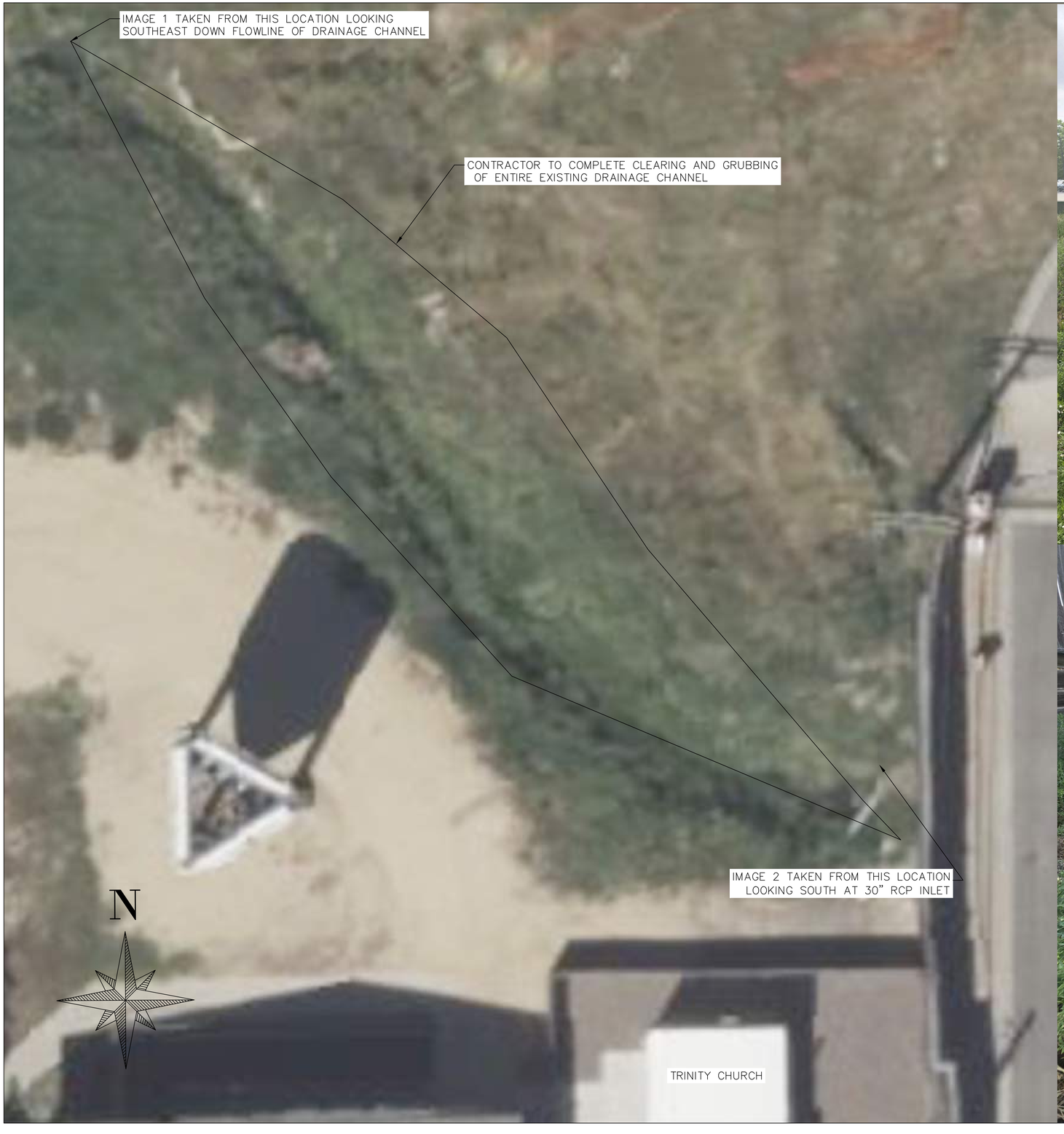
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SITE LAYOUT





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CLEAR, GRUB AND DEMO

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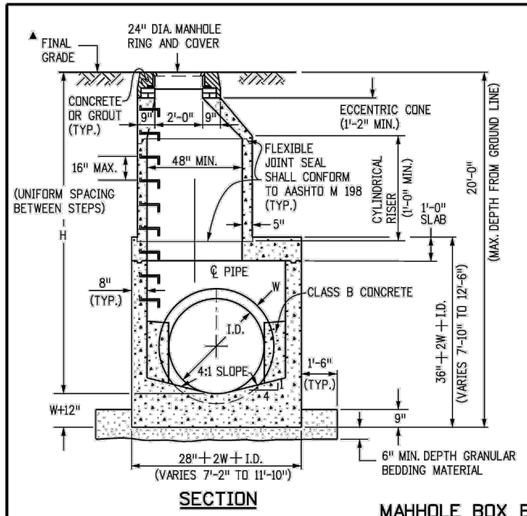
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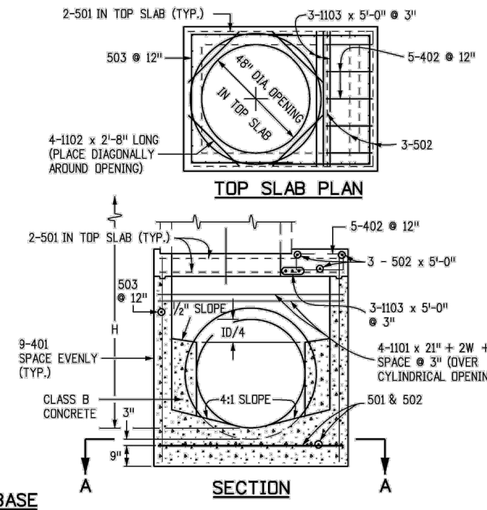
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PROPOSED IMPROVEMENTS

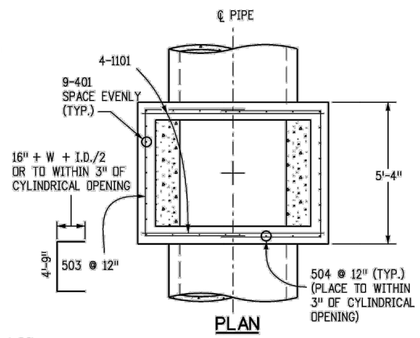


SECTION

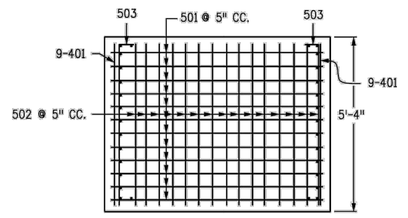


SECTION

MAHHOLE BOX BASE



PLAN

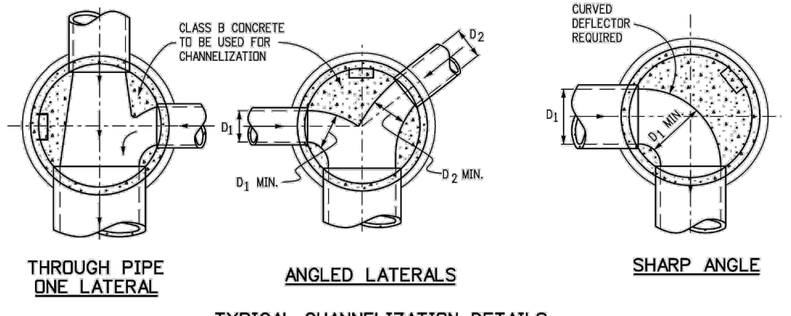


SECTION A-A
(STEEL IN BOTTOM OF BASE)

MARK	SIZE	TYPE	WT. #/FT.	BARS	I.D. 54"	60"	66"	72"	84"	96"	FORMULAS
401	4	I	0.668	NO. REQ'D.	18	18	18	18	18	18	401
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-0"	12'-2"	BAR LENGTH = 32" + 2W + I.D.
				WEIGHT *	97.2	104.2	111.2	118.2	132.3	146.3	
402	4	III	0.668	NO. REQ'D.	5	5	5	5	5	5	402
				LENGTH	5'-5"	6'-0"	6'-7"	7'-2"	8'-4"	9'-6"	BAR LENGTH = I.D. + 2W
				WEIGHT *	18.1	20.0	22.0	23.9	27.8	31.7	
501	5	I	1.043	NO. REQ'D.	17	17	17	17	17	17	501
				LENGTH	7'-5"	8'-0"	8'-7"	9'-2"	10'-4"	11'-6"	BAR LENGTH = 24" + I.D. + 2W
				WEIGHT *	131.5	141.8	152.2	162.5	183.2	203.9	
502	5	I	1.043	NO. REQ'D.	22	23	25	26	29	32	502
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	NUMBER BARS REQ'D. = 3 + (24+I.D.+2W / @ 5" +1)
				WEIGHT *	114.7	119.9	130.4	135.6	151.2	166.9	
503	5	II	1.043	NO. REQ'D.	16	16	18	18	20	24	503
				LENGTH	12'-10"	13'-5"	14'-0"	14'-7"	15'-9"	16'-11"	NUMBER BARS REQ'D. = 2 (13+I.D.+2W / @ 12" +1)
				WEIGHT *	214.2	223.9	262.8	273.8	328.5	423.5	BAR LENGTH = 4'-9"+2(16+W+I.D./2)
504	5	I	1.043	NO. REQ'D.	12	14	14	16	18	20	504
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-0"	12'-2"	NUMBER BARS REQ'D. = 2 (2W+I.D.-4 / @ 12" +1)
				WEIGHT *	101.2	126.6	135.1	164.1	206.5	253.8	BAR LENGTH = 32"+2W+I.D.
1101	11	I	5.313	NO. REQ'D.	4	4	4	4	4	4	1101
				LENGTH	7'-2"	7'-9"	8'-4"	8'-11"	10'-1"	11'-3"	BAR LENGTH = 21" + I.D. + 2W
				WEIGHT *	152.3	164.7	177.1	189.5	214.3	239.1	
1102	11	I	5.313	NO. REQ'D.	4	4	4	4	4	4	BENDING
				LENGTH	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	56.7	TYPE I STRAIGHT
				WEIGHT *	56.7	56.7	56.7	56.7	56.7	2'-8"	TYPE II 4'-9" 16"+W+I.D./2
1103	11	I	5.313	NO. REQ'D.	3	3	3	3	3	3	TYPE III 12" 12" 7" I.D.+2W-38"
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	
				WEIGHT *	79.7	79.7	79.7	79.7	79.7	79.7	
* REINFORCING STEEL TOTAL					965.6	1,037.5	1,127.2	1,204.0	1,380.2	1,601.6	
CONCRETE - CUBIC YARDS - TOTAL					6.0	6.6	7.3	8.0	9.5	11.1	

NOTE: QUANTITIES ARE BASED ON SAME SIZE PIPE ENTRANCE TO AND EXIT FROM, BASE AND A 4 FT. MANHOLE ENTRANCE INTO TOP SLAB OF BASE.

QUANTITIES FOR CONCRETE MANHOLE BOX BASE



THROUGH PIPE ONE LATERAL

ANGLED LATERALS

SHARP ANGLE

TYPICAL CHANNELIZATION DETAILS

GENERAL NOTES

1. SINCE ALL PIPE ENTRIES INTO THE BASE ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK.
2. THE PRECAST FLAT TOP MAY BE USED ON ANY MANHOLE. THE ECCENTRIC CONE MAY BE USED WHEN THE MANHOLE "H" HEIGHT IS AT LEAST 8 FT.
3. THE MANHOLE RING FRAME SHALL BE SET IN A BED OF GROUT. THE FRAME SHALL BE SURROUNDED WITH A CEMENT GROUT IN UNPAVED AREA, OR A CONCRETE COLLAR IN PAVED AREA. SEE DETAILS ON SHEETS 2 AND 3.
4. DESIGN OF BOX BASE IS BASED ON STRAIGHT RUNS OF PIPE OR CHANGE IN DIRECTION OF LESS THAN 45°. SPECIAL DESIGN IS REQUIRED FOR 45° OR GREATER.
5. PRECAST MANHOLES AND REINFORCEMENT SHALL CONFORM TO AASHTO M 199 (ASTM C 478).
6. CAST-IN-PLACE MANHOLES SHALL BE CLASS B CONCRETE.
7. STEPS SHALL BE REQUIRED WHEN THE MANHOLE DEPTH EXCEEDS 3 FT.-6 IN. AND SHALL CONFORM TO AASHTO M 199.
8. ALL REINFORCING STEEL SHALL BE GRADE 60 AND EPOXY COATED. VERTICAL STEEL SHALL BE PLACED AT CENTERLINE OF WALL. ALL BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.
9. ALL PIPE ENTRIES INTO THE BASE OF MANHOLE SHALL BE CONNECTED BY OPEN CHANNELIZATION ADJUSTED FOR PIPE SIZE, SHAPE, SLOPE, AND DIRECTION OF FLOW. DETAILS SHOWN ARE TYPICAL FOR INSTALLATIONS WITH ALL INVERTS OF SAME RELATIVE ELEVATION. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, SPECIAL BASE/CHANNEL DETAILS WILL BE SHOWN ON THE PLANS.
10. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH CLASS B CONCRETE OR APPROVED GROUT.
11. STUB-OUTS SHALL EXTEND 2 FT. MINIMUM BEYOND OUTSIDE WALL SURFACE OF MANHOLE AND BE SATISFACTORILY PLUGGED.
12. THE SLOPE OF THE MANHOLE COVER SHALL MATCH THE ROADWAY PROFILE AND CROSS SLOPE.

▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.

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Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

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MANHOLES

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-604-20
Standard Sheet No. 1 of 3
Project Sheet Number:

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ENGINEERING SERVICES DIVISION
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(720) 977-6210

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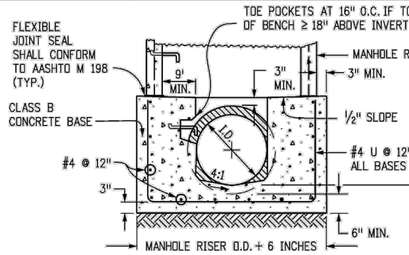
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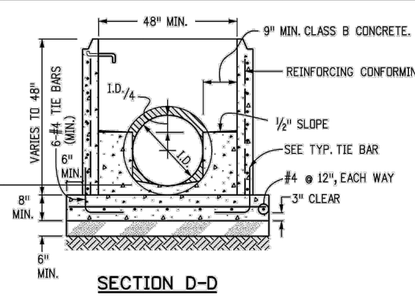
DETAILS 1

SHEET 5 OF 8

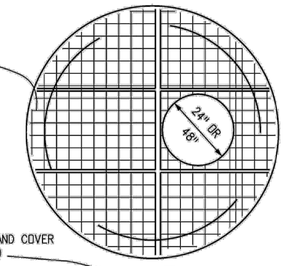
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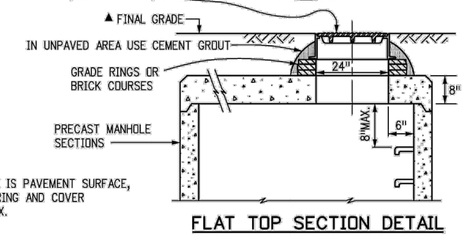


SECTION B-B



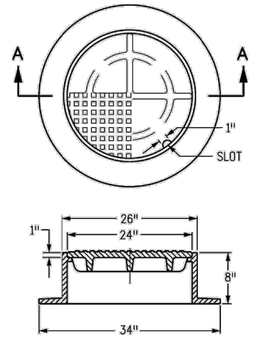
SECTION D-D





▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER ¼" MIN. TO ½" MAX.

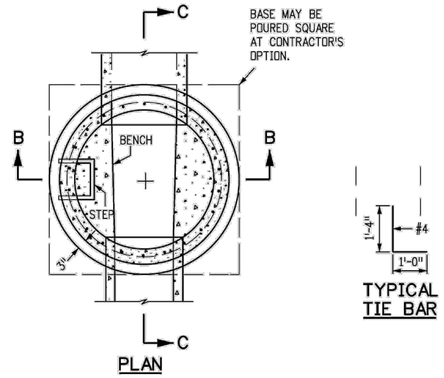
FLAT TOP SECTION DETAIL



TOTAL WEIGHT: APPROXIMATELY 400 LBS. SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06.

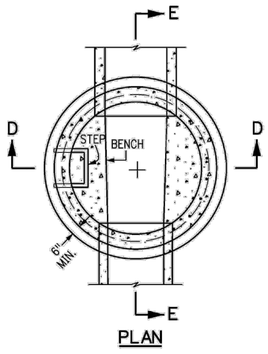
SECTION A-A

MANHOLE RING AND COVER

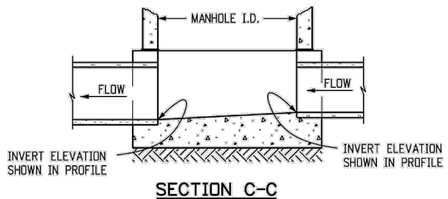


PLAN

TYPICAL TIE BAR

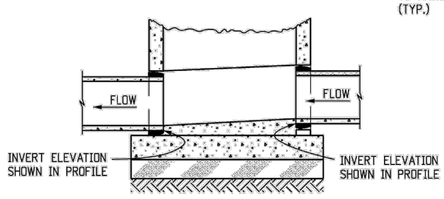


PLAN



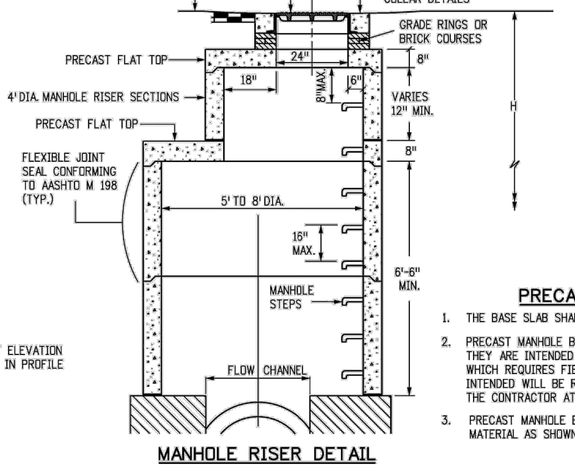
SECTION C-C

CAST-IN-PLACE SLAB BASE



SECTION E-E

PRECAST SLAB BASE



MANHOLE RISER DETAIL

LEGEND

- SUITABLE SUBGRADE
- GRANULAR BEDDING MATERIAL
- CONCRETE

PRECAST MANHOLE BASES NOTES:

1. THE BASE SLAB SHALL BE POURED MONOLITHICALLY WITH BOTTOM RISER SECTION.
2. PRECAST MANHOLE BASES SHALL FIT THE CONDITIONS AND LOCATIONS FOR WHICH THEY ARE INTENDED WITHOUT ANY FIELD MODIFICATIONS. ANY MANHOLE BASE WHICH REQUIRES FIELD CUTTING OR MODIFICATION IN ORDER TO FIT THE LOCATIONS INTENDED WILL BE REJECTED BY THE ENGINEER AND REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO THE DEPARTMENT.
3. PRECAST MANHOLE BASES SHALL BE BEDDED ON AN APPROVED GRANULAR BEDDING MATERIAL AS SHOWN ABOVE.

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MANHOLES

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STANDARD PLAN NO.
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Standard Sheet No. 2 of 3
Project Sheet Number:

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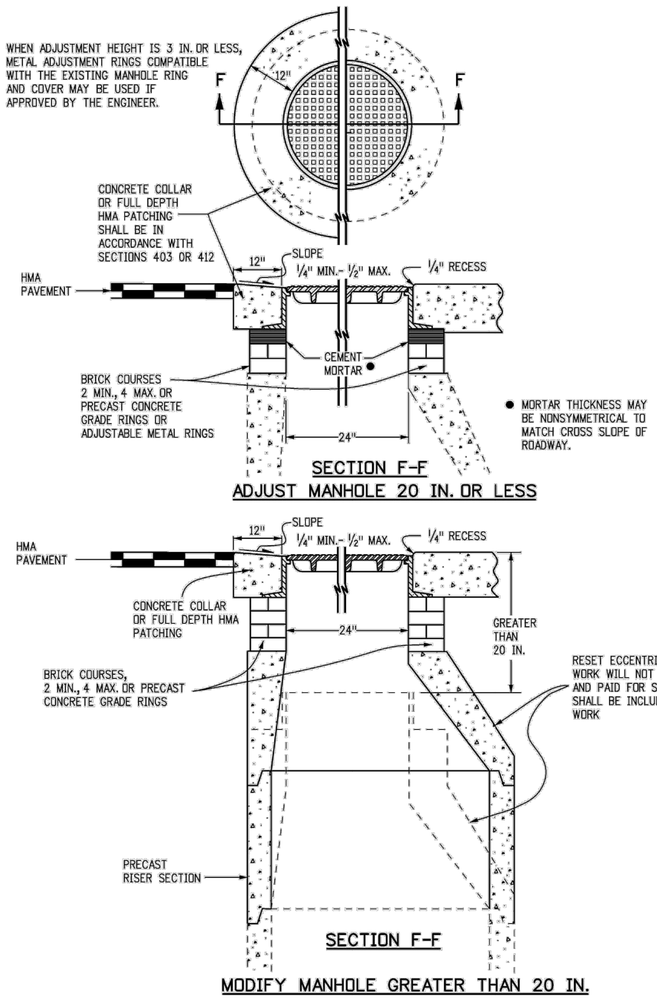
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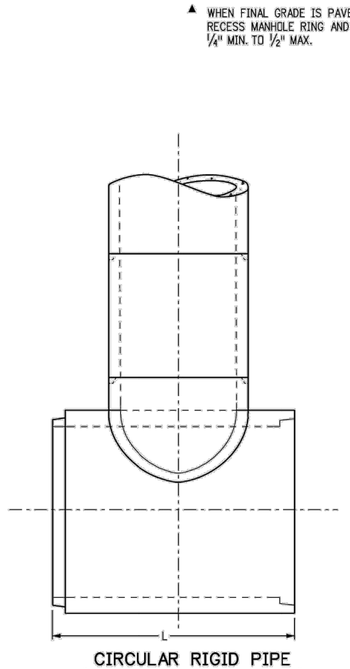
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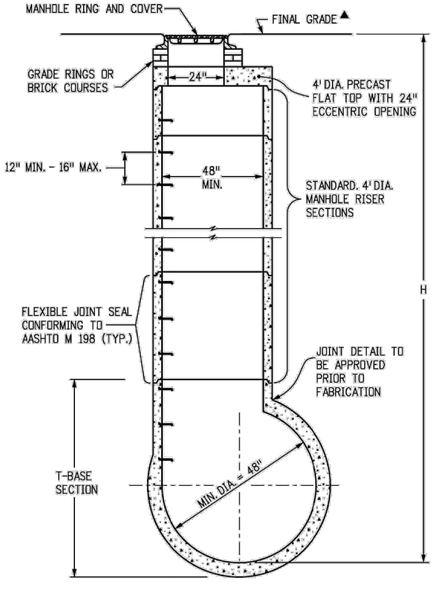


T-BASE MANHOLES NOTES

1. THE T-BASE SECTION SHALL BE SHOP-FABRICATED FOR DELIVERY TO THE CONSTRUCTION SITE AS A COMPLETE UNIT.
2. THESE DETAILS SHOW ONLY THE CONCEPTUAL AND STANDARD DIMENSIONAL REQUIREMENTS FOR TYPE T-BASE MANHOLES. THE CONTRACTOR SHALL FURNISH DETAILED SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION. THE DETAILS SHOWN HEREIN APPLY ONLY TO 48 IN. AND GREATER DIAMETER PIPES.
3. EXCEPT FOR CLASS OF PIPE, SPECIFICATIONS FOR THE MANHOLE SHALL BE THE SAME AS THOSE REQUIRED FOR THE ADJOINING PIPE.
4. THE T-BASE SECTION SHALL MAINTAIN ITS INTERNAL SHAPE AND FLOW AREA. GROUTING OR FILLING SHALL BE APPLIED SO AS TO NOT DISTURB THE NORMAL FLOW OR REDUCE THE AREA.



▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.



MANHOLE T-BASE

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MANHOLES

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STANDARD PLAN NO.
M-604-20
Standard Sheet No. 3 of 3
Project Sheet Number:

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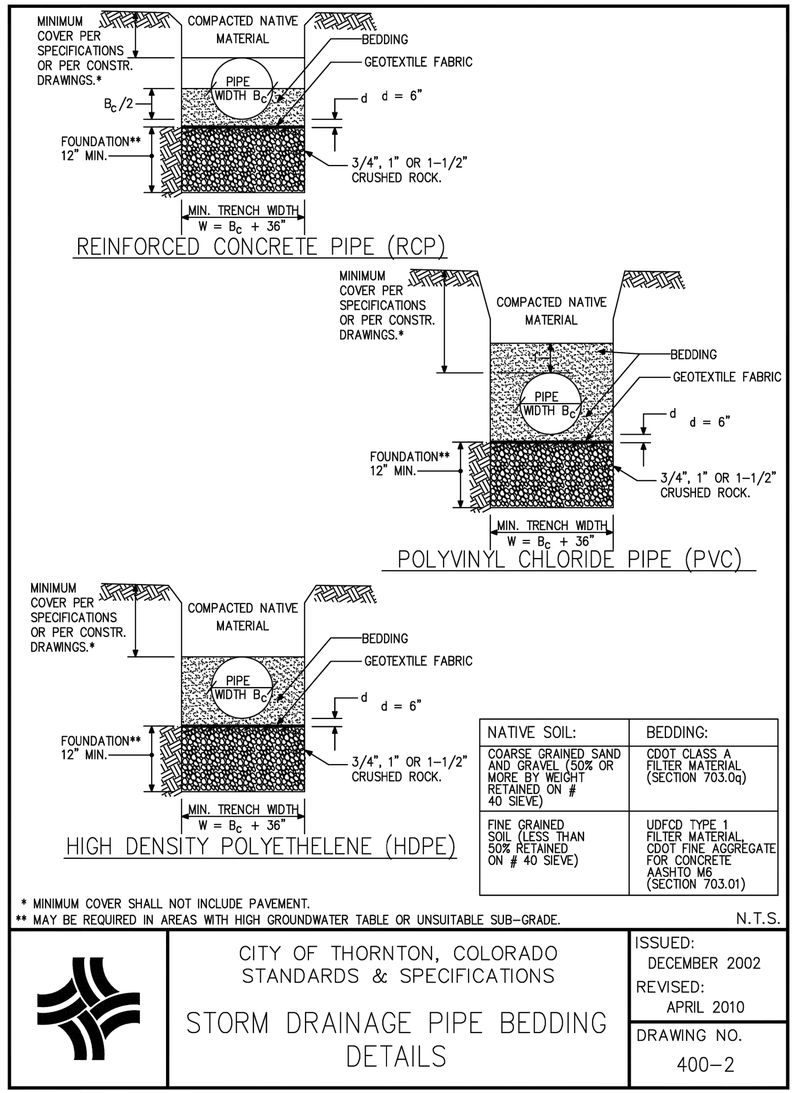
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DETAILS 3

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NATIVE SOIL:	BEDDING:
COARSE GRAINED SAND AND GRAVEL (50% OR MORE BY WEIGHT RETAINED ON # 40 SIEVE)	CDOT CLASS A FILTER MATERIAL (SECTION 703.0q)
FINE GRAINED SOIL (LESS THAN 50% RETAINED ON # 40 SIEVE)	UDFCD TYPE 1 FILTER MATERIAL, CDOT FINE AGGREGATE FOR CONCRETE AASHTO M6 (SECTION 703.01)

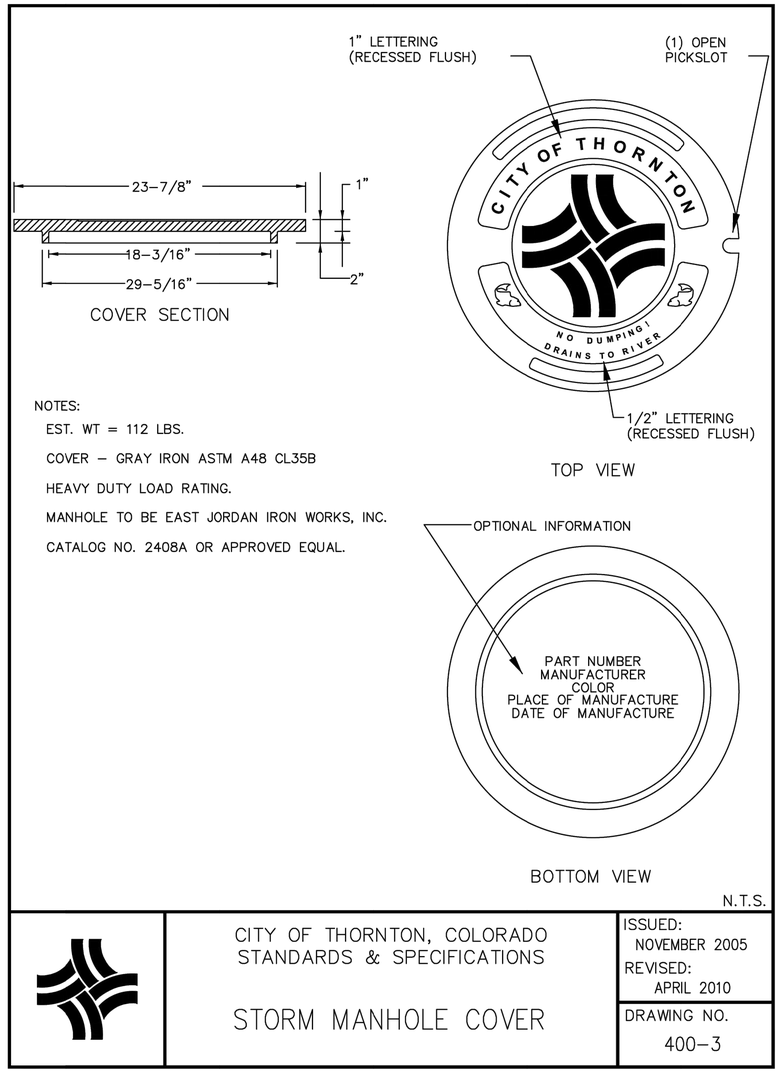
* MINIMUM COVER SHALL NOT INCLUDE PAVEMENT.
** MAY BE REQUIRED IN AREAS WITH HIGH GROUNDWATER TABLE OR UNSUITABLE SUB-GRADE.

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

STORM DRAINAGE PIPE BEDDING DETAILS

ISSUED: DECEMBER 2002
REVISED: APRIL 2010
DRAWING NO. 400-2



NOTES:
EST. WT = 112 LBS.
COVER - GRAY IRON ASTM A48 CL35B
HEAVY DUTY LOAD RATING.
MANHOLE TO BE EAST JORDAN IRON WORKS, INC.
CATALOG NO. 2408A OR APPROVED EQUAL.

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

STORM MANHOLE COVER

ISSUED: NOVEMBER 2005
REVISED: APRIL 2010
DRAWING NO. 400-3

CITY OF THORNTON

INFRASTRUCTURE DEPARTMENT
INFRASTRUCTURE ENGINEERING SECTOR
ENGINEERING SERVICES DIVISION
12450 WASHINGTON STREET
THORNTON, COLORADO
80241
(720) 977-6210

MARK	DATE	DESCRIPTION

CAD DWG FILE: 24-33_Design 8-7-25

DRAWN BY: MD
CHECKED BY: KS
DESIGNED BY: MD
FIELD BOOK NO: N/A

SHEET TITLE

DETAILS 4

SHEET 8 OF 8

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