

SECTION 11

SPECIFICATIONS AND STANDARD DETAILS

EASEMENT STANDARDS

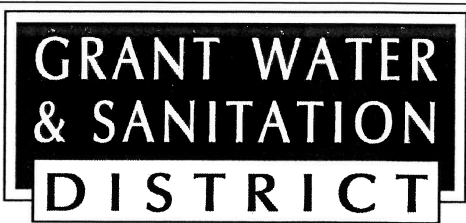
GENERAL NOTES

REVIEW BLOCK

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GRANT WATER AND SANITATION DISTRICT EASEMENT STANDARDS

THE FOLLOWING ITEMS ARE MINIMUM REQUIREMENTS FOR REAL PROPERTY DESCRIPTIONS FOR ALL EASEMENTS PROVIDED TO THE GRANT WATER AND SANITATION DISTRICT. WE ASK THAT YOU BE FAMILIAR WITH OUR NEEDS AS STATED BELOW.

1. BEARINGS AS RECITED IN THE WRITTEN DESCRIPTION MUST SHARE THE SAME DIRECTION IN THE ACCOMPANYING SKETCH.
2. EACH "COURSE" MUST BE SEPARATED BY THE WORD THENCE.
3. IF A "COURSE" LIES COINCIDENT WITH A LINE OF "RECORD" SO STATE.
4. IF THE END OF A LINE (LINES) STOPS ON A LINE OF "RECORD" SO STATE.
5. PROVIDE BASIS OF BEARINGS. IF BASIS OF BEARING CHANGES DURING DESCRIPTIONS, SO STATE.
6. PROVIDE A POINT OF BEGINNING OR POINT OF COMMENCEMENT, AS APPROPRIATE.
7. PROVIDE A TRUE POINT OF BEGINNING OR TRUE POINT OF COMMENCEMENT, AS APPROPRIATE.
8. DO NOT STATE THAT THE EASEMENT IS "X" FEET WIDE UNLESS THIS IS TRUE THROUGHOUT THE DESCRIPTION.
9. IF CREATING MULTIPLE EASEMENT PARCELS THAT ARE INTENDED TO JOIN ONE ANOTHER, THERE MUST BE A CONCLUSIVE "TIE" INDICATING THAT SUCH IS THE CASE.
10. PROVIDE PAGINATION WHEN APPROPRIATE.
11. IF INSTRUMENTS OF "RECORD" ARE RECITED, THEIR LOCATION MUST BE INCLUDED, I.E. COUNTY SEAT.
12. DESCRIPTIONS MUST BE TIED TO A SECTION CORNER. INCLUDE A PHYSICAL DESCRIPTION OF THE MONUMENT, AND STATE WHETHER FOUND OR SET.
13. PROVIDE NAME, COMPANY, ADDRESS AND PHONE NUMBER ALONG WITH PLS SIGNATURE AND SEAL AT THE END OF THE WRITTEN DESCRIPTION.
14. WRITTEN DESCRIPTIONS AND SKETCHES ARE BOTH PREFERRED ON 8 1/2"X 11" FORMAT.
15. AREA OF THE PARCEL IS TO BE EXPRESSED IN SQUARE FEET AND ACRES.

WHEN REVIEWING SUBMITTED DESCRIPTIONS AND SKETCHES, WE ARE LOOKING FOR CLARITY, BREVITY AND UNIQUELY LOCATABLE REAL PROPERTY PARCELS.

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**EASEMENT
STANDARDS**

GRANT WATER & SANITATION DISTRICT GENERAL NOTES

GENERAL

1. ALL SANITARY SEWER WORK SHALL BE IN ACCORDANCE WITH THE GRANT WATER & SANITATION DISTRICT'S SPECIFICATIONS AND THOSE OF THE CITY AND COUNTY OF DENVER DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION. ADDITIONALLY, DRAINAGE, SEWER, UTILITY AND RELATED CASTINGS MUST MEET AASHTO DESIGNATION M 310 WHICH INCLUDE THE REFERENCE DOCUMENTS AASHTO M 105, ASTM A 48, A 536 AND B 26, AND FEDERAL SPECIFICATION CID A-A-60005, FRAMES, COVERS, GRATINGS, STEPS, SUMP AND CATCH BASIN MANHOLE. IF THE GRANT WATER AND SANITATION DISTRICT'S STANDARD NOTES OR DETAILS ARE IN CONFLICT WITH THE CITY AND COUNTY OF DENVER DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION THE CITY STANDARDS APPLY WITH THE EXCEPTION OF:
 - A. ECCENTRIC CONES SHALL BE USED FOR ALL SANITARY SEWER MANHOLES.
 - B. ALL SANITARY MANHOLE LIDS ARE REQUIRED TO BE IDENTIFIED AS "SEWER" OR "SANITARY".
 - C. ALL UNDERDRAIN MANHOLE LIDS ARE REQUIRED TO BE IDENTIFIED AS "UNDERDRAIN".
 - D. A CUT-OFF WALL SHALL BE PLACED AT THE PROPERTY LINE OF SANITARY SEWER AND UNDERDRAIN SERVICES.

THE DETAILS PROVIDED WITHIN THIS PLAN SET ARE PROVIDED FOR CONVENIENCE DURING CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN A COPY OF THE CITY AND COUNTY OF DENVER DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION STANDARD DETAILS ON THE SITE AT ALL TIMES. THE CITY AND COUNTY OF DENVER DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION DETAILS SHALL BE USED IN THE EVENT OF A DISCREPANCY.

2. ALL WORK PERFORMED WITHIN THE PUBLIC RIGHT-OF-WAY SHALL CONFORM TO CONSTRUCTION SPECIFICATIONS ANY DESIGN STANDARDS FOR THE LOCAL JURISDICTION. IN ADDITION, AND WORK PERFORMED WITHIN THE PUBLIC RIGHT-OF-WAY SHALL OBTAIN THE APPLICABLE STATE, COUNTY AND/OR CITY CONSTRUCTION PERMIT.
3. AT LEAST 48 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE TO NOTIFY THE UTILITY NOTIFICATION CENTER OF COLORADO BY CALLING 811 FOR LOCATION OF UNDERGROUND UTILITIES. THE CONTRACTOR SHALL ALSO NOTIFY THE GRANT WATER AND SANITATION DISTRICT AT 303-674-3379 TO ALLOW FOR SCHEDULING OF CONSTRUCTION OBSERVATION. THE CONTRACTOR SHALL REPLACE DISTURBED BURIED UTILITIES AND SURFACE IMPROVEMENTS TO THEIR ORIGINAL CONDITION WHETHER SHOWN ON THE PLANS OR NOT.
4. DURING CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL HAVE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE PLANS SIGNED BY THE DISTRICT.
5. HORIZONTAL AND VERTICAL CONTROL: ALL SURVEY WORK SHALL BE TIED TO SECTION CORNERS AND RECOGNIZE VERTICAL DATUM. THE FOLLOWING BENCHMARKS SHALL BE USED:

BENCHMARK Q 409 ELEVATION= 5540.69 SET BY NGS IN 1984

ORIGINAL DESCRIPTION:
 IN THE COLUMBINE HILLS SUBDIVISIONS, AT THE JUNCTION OF SOUTH WADSWORTH BOULEVARD AND WEST BOWLES AVENUE, 169.8 METERS (557.1 FEET) SOUTH OF THE CENTERLINE OF WEST BOWLES AVENUE, 49.1 METERS (161.1 FEET) SOUTHEAST OF THE CENTERLINE OF THE EAST END OF A 5.0 FOOT METAL CULVERT, 20.4 METERS (66.9 FEET) EAST OF THE CENTERLINE OF THE NORTH BOUND LANES OF THE BOULEVARD, AND 17.7 METERS (58.1 FEET) SOUTHEAST OF THE SOUTH END OF A GUARDRAIL. NOTE: ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP. A STAINLESS STEEL ROD SET TO THE DEPTH OF 10.7 METERS ENCASED IN A PIPE FLUSH WITH THE GROUND, 0.9 METERS BELOW THE BOULEVARD, 0.3 METERS WEST FROM A WITNESS POST AND FENCE.

CONSTRUCTION

1. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL INSTALL A TEMPORARY PIPE PLUG IN THE DOWNSTREAM END OF THE TIE-IN MANHOLE FOR THE NEW SEWER. THE PIPE PLUG MUST BE SECURED TO THE FIRST STEP OF THE MANHOLE TO PREVENT PLUG FROM MOVING OUT OF REACH. ALL MUD AND DEBRIS MUST BE REMOVED FROM THE NEW PIPE AND MANHOLE PRIOR TO CONNECTING IT TO THE EXISTING SYSTEM. CONTRACTOR SHALL PROVIDE FOR THE CONTINUOUS OPERATION OF THE SANITARY SEWER WITH BY-PASS PUMPING.
2. THE CONTRACTOR SHALL VERIFY ELEVATIONS, BASED ON THE DISTRICT BENCHMARK LISTED ABOVE, OF EXISTING SEWERS AT POINTS OF CONNECTION PRIOR TO CONSTRUCTION OR STAKING OF SANITARY SEWER.

3. PIPE MATERIAL SHALL BE CLOSED PROFILE PIPE MEETING ASTM D3034 FOR SEWER PIPE. ACCEPTABLE PRODUCTS INCLUDE PVC (SDR 35 AND SDR 26) GRAVITY SEWER PIPE. JOINTS SHALL BE INTEGRAL BELL AND SPIGOT WITH RUBBER GASKET. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTION. PIPE SHALL BE BEDDED IN CLASS B BEDDED MATERIAL.
4. ALL PRECAST MANHOLE SECTIONS, FLAT TOPS, BARRELS, REDUCERS, ETC., SHALL CONFORM TO ASTM C-478 STANDARD SPECIFICATION FOR PRECAST REINFORCED MANHOLE SECTIONS. FLAT TOP SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
5. NO PIPE OR MANHOLE SHALL BE PLACED WHERE GROUNDWATER IS VISIBLE OR UNTIL THE GROUNDWATER TABLE HAS BEEN LOWERED BELOW THE PROPOSED IMPROVEMENTS. ANY UNSTABLE AREAS AS A RESULT OF GROUNDWATER IMPROVEMENTS SHALL BE STABILIZED AS AGREED UPON BY THE CONTRACTOR, THE DISTRICT AND THE DESIGN ENGINEER AT THE TIME OF THEIR OCCURRENCE.
6. TRENCHES ARE TO BE SLOPED OR BRACED AND SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND PROTECTION OF OTHER UTILITIES IN COMPLIANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS. THE OWNER, DISTRICT, DISTRICT ENGINEER, THEIR REPRESENTATIVE OR DESIGN ENGINEER IS NOT RESPONSIBLE FOR SAFETY IN, ON OR ABOUT THE PROJECT SITE NOR FOR THE COMPLIANCE BY THE APPROXIMATE PARTY OF ANY REGULATIONS RELATING THERETO.
7. ALL EXCAVATIONS SHALL BE COMPACTED TO THE STANDARDS ESTABLISHED BY THE AUTHORITY HAVING JURISDICTION. WHERE NO STANDARDS EXISTS THE FOLLOWING MINIMUM SHALL BE USED FOR TRENCH COMPACTION: PAVED AREAS - 95% STANDARD PROCTOR UNPAVED/LANDSCAPE AREAS - 90% STANDARD PROCTOR.
8. MANHOLE RIM ELEVATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. RIM ELEVATIONS SHALL BE ADJUSTED TO FINAL GRADE USING A MAXIMUM OF 12 INCHES COMPOSED OF THE THREE OR FEWER CONCRETE RINGS. FINAL RIM ELEVATIONS SHALL BE SET AS FOLLOWS:

PAVED AREAS:	0" TO 1" BELOW SURROUNDING PAVEMENT SURFACE
MOWED GRASS AREAS:	0" TO 1" ABOVE SURROUNDING SOIL SURFACE
OTHER AREAS:	2" TO 6" ABOVE SURROUNDING SURFACE

FINAL ACCEPTANCE

1. IN PUBLIC RIGHT-OF-WAY, COMPACTION OF ALL TRENCH BACKFILL MUST BE ATTAINED ACCORDING TO THE LOCAL AUTHORITY STANDARDS PRIOR TO PROBATIONARY ACCEPTANCE. THE CONTRACTOR SHALL SUBMIT COMPACTION TEST RESULTS TO THE DESIGN ENGINEER, THE DISTRICT ENGINEER OR THEIR REPRESENTATIVE, AND LOCAL JURISDICTION AS REQUIRED.
2. THE CONTRACTOR SHALL PROVIDE AS-BUILT ELEVATIONS TO THE DESIGN ENGINEER WHICH REPRESENT THE CONSTRUCTED ELEVATIONS AND LENGTHS OF THE SANITARY SEWER AND UNDERDRAIN SYSTEMS. THE DESIGN ENGINEER WILL THEN FURNISH RECORD DRAWINGS TO THE GRANT WATER & SANITATION DISTRICT, IN ACCORDANCE WITH THE DISTRICT'S RULES AND REGULATIONS.
3. THE CONTRACTOR SHALL AIR PRESSURE TEST 100% OF THE SEWER IN THE PRESENCE OF THE DISTRICT ENGINEER OR THEIR REPRESENTATIVE AFTER BACKFILLING IN ACCORDANCE WITH THE DISTRICT SPECIFICATIONS PRIOR TO PROBATIONARY ACCEPTANCE. THE CONTRACTOR SHALL TELETYPE AND RECORD THE FULL LENGTH OF THE INSTALLED MAINS AND PERFORM A 5% DIAMETER DEFLECTION TEST IN THE PRESENCE OF THE DISTRICT ENGINEER OR THEIR REPRESENTATIVE PRIOR TO PROBATIONARY ACCEPTANCE. SHOULD CONSTRUCTED MAINS SHOW VISIBLE DEFECTS BASED ON THE CCTV INSPECTION OR IF THE DEFLECTION TEST IS FAILED, THE CONTRACTOR SHALL RECONSTRUCT THE MAIN AT NO ADDITIONAL EXPENSE TO THE DISTRICT.
4. FINAL ACCEPTANCE OF THE SANITARY SEWER SYSTEM WILL OCCUR AT THE LATER OF THE FOLLOWING: THE END OF THE ONE-YEAR WARRANTY PERIOD OR 60 DAYS AFTER FINAL PAYMENT. IF PROBATIONARY ACCEPTANCE BEGINS PRIOR TO PAVING, THE DISTRICT'S ENGINEER OR THEIR REPRESENTATIVE CONSULTANTS WILL PROVIDE INSPECTION SERVICES IMMEDIATELY FOLLOWING ASPHALT PLACEMENT TO VERIFY ACCEPTABILITY OF THE SYSTEM.
5. AT LEAST 8 MONTHS AFTER THE PROBATIONARY ACCEPTANCE BUT NO LATER THAN 30 DAYS PRIOR TO FINAL ACCEPTANCE, THE CONTRACTOR SHALL PERFORM, IN THE PRESENCE OF THE DISTRICT ENGINEER OR THEIR REPRESENTATIVE, A 5% DIAMETER DEFLECTION TEST AND CCTV INSPECTION. ALL PIPE EXCEEDING THIS DEFLECTION SHALL BE RE-LAID OR REPLACED PRIOR TO FINAL ACCEPTANCE BY THE DISTRICT, AT THE CONTRACTOR'S EXPENSE.

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**GENERAL
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GRANT WATER AND SANITATION DISTRICT

NO EXCEPTIONS TAKEN _____ MAKE CORRECTIONS NOTED _____
 REJECTED _____ REVISE AND RESUBMIT _____

SUBMIT SPECIFIED ITEM _____

FOR PURPOSES OF THIS REVIEW, IT IS ASSUMED THAT THE DESIGN PROFESSIONAL WHOSE REGISTRATION STAMP APPEARS ON THE DRAWINGS HAS PREPARED THE DESIGN INCLUDING SPECIFICATIONS, IF ANY, IN ACCORDANCE WITH THE APPROPRIATE STANDARD OF CARE FOR THE PARTICULAR PROJECT. THE DISTRICT'S ENGINEER OR THEIR REPRESENTATIVE CONSULTANTS HAS MADE A GENERAL REVIEW IN AN EFFORT TO ASCERTAIN WHETHER THE SUBMISSION COMPLIES WITH THE GRANT WATER & SANITATION DISTRICT'S APPLICATION CRITERIA. NO DETAILED OR EXTENSIVE DESIGN REVIEW HAS BEEN MADE. UNDER NO CIRCUMSTANCES SHALL THE DISTRICT'S ENGINEER OR THEIR REPRESENTATIVE CONSULTANTS HAVE ANY LIABILITY OR RESPONSIBILITY WHATSOEVER FOR THE DESIGN OR CONSTRUCTION OF THE IMPROVEMENTS DESCRIBED IN THE SUBMISSION. THE REVIEWMENTS UPON THIS SUBMISSION IS SOLELY FOR THE USE AND BENEFIT OF THE GRANT WATER & SANITATION DISTRICT AND ALTHOUGH THE DISTRICT'S ENGINEER OR THEIR REPRESENTATIVE CONSULTANTS IN ITS DISCRETION MAY OBSERVE SOME ASPECTS OF THE CONSTRUCTION, THE DISTRICT'S ENGINEER OR THEIR REPRESENTATIVE CONSULTANTS DOES NOT APPROVE OR COMMENT UPON CONSTRUCTION MEANS, METHODS, SEQUENCES, AND TECHNIQUES. NO SOILS OR GEOTECHNICAL ANALYSIS HAS BEEN MADE BY THE DISTRICT'S ENGINEER OR THEIR REPRESENTATIVE CONSULTANTS.

DISTRICT ENGINEER: _____

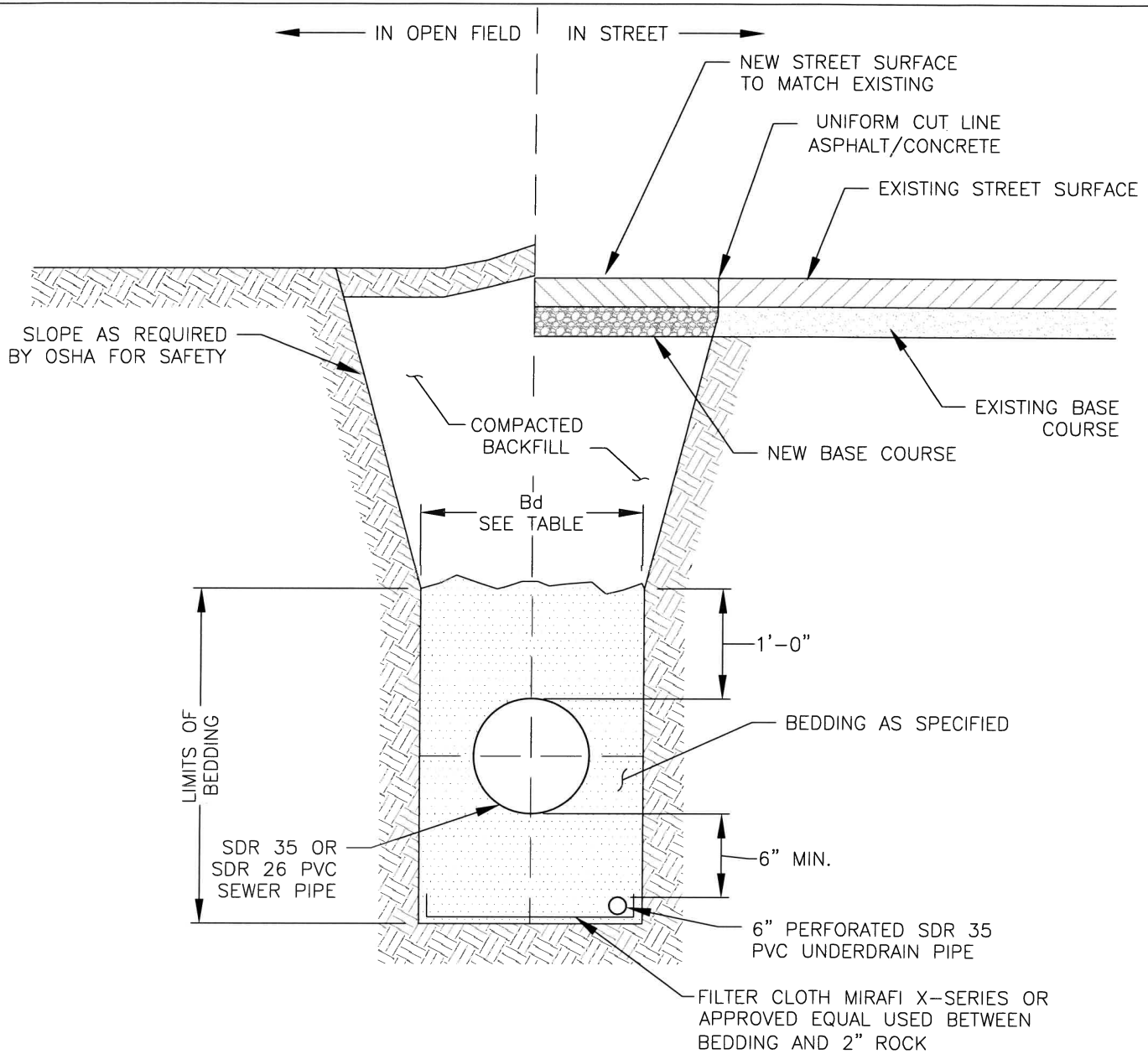
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**REVIEW
BLOCK**

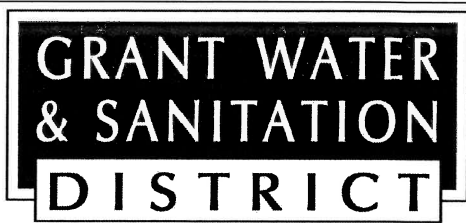
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TRENCH WIDTH (Bd)		
PIPE SIZE (Bd)	MINIMUM	MAXIMUM
8"-10"	2'-0"	4'-0"
12"-16"	2'-2"	4'-6"
18"-21"	2'-6"	5'-0"
2'-0"	3'-0"	5'-6"

SEWER BEDDING MATERIAL GRADATION	
NOMINAL SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90-100
3/8"	20-55
NO. 4	10/1/2000
NO. 8	5/1/2000

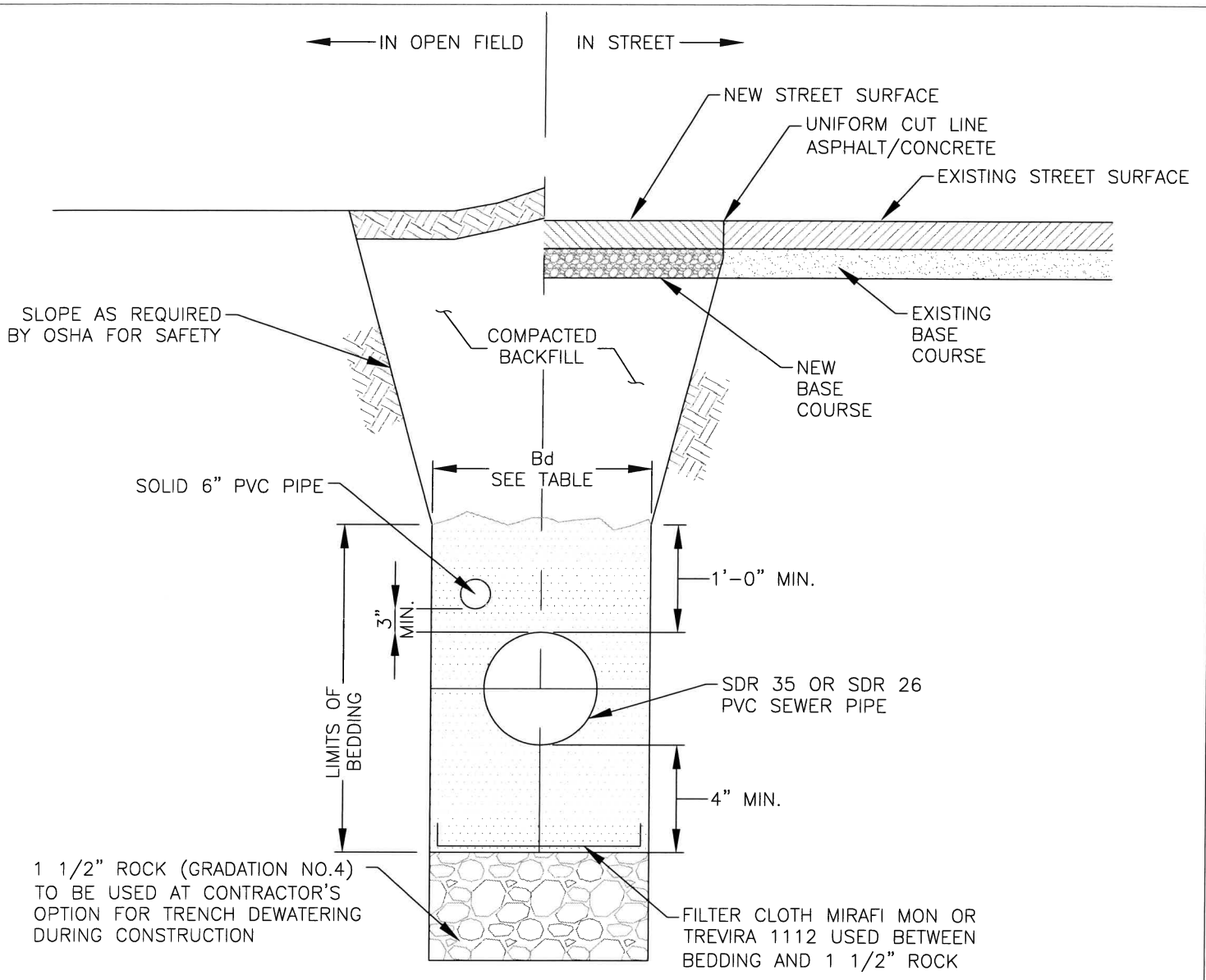
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TYPICAL SANITARY SEWER TRENCH WITH UNDERDRAIN

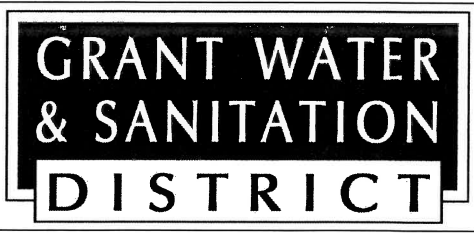
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TRENCH WIDTH (Bd)		
PIPE SIZE (Bd)	MINIMUM	MAXIMUM
8"-10"	2'-0"	4'-0"
12"-16"	2'-2"	4'-6"
18"-21"	2'-6"	5'-0"
24"	3'-0"	5'-6"

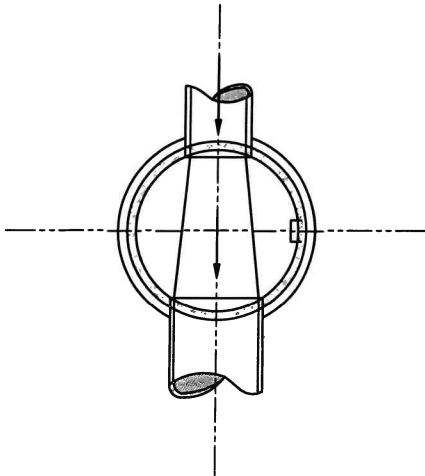
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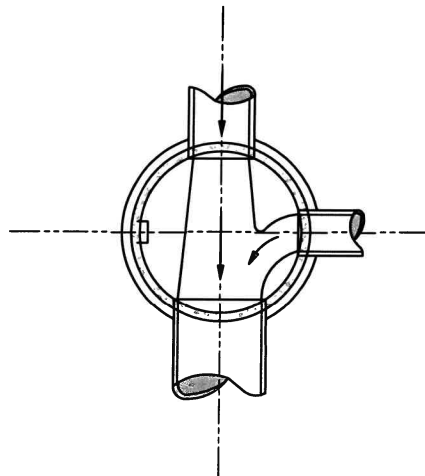
TYPICAL SANITARY SEWER TRENCH WITH OVERDRAIN

S-2

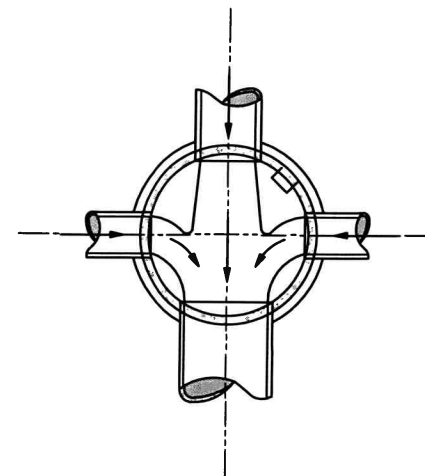
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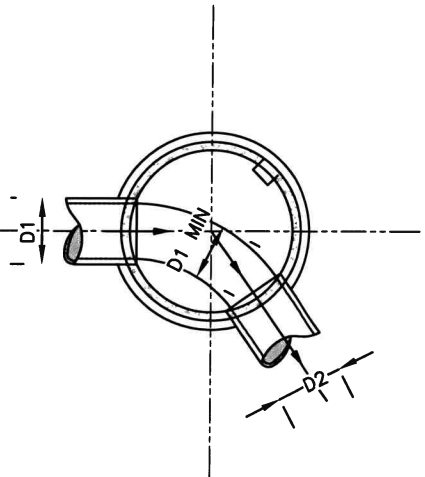
THROUGH PIPE



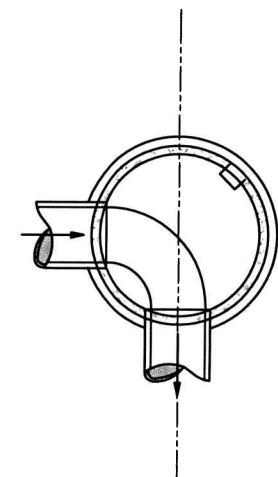
THROUGH PIPE
ONE COLLECTION LINE



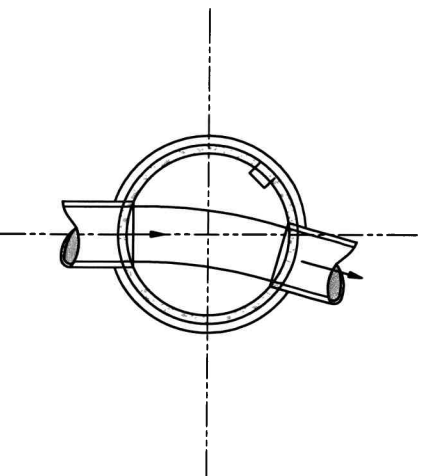
THROUGH PIPE
TWO COLLECTION LINES



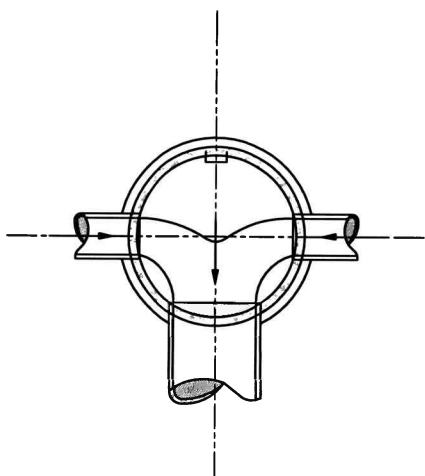
INTERMEDIATE ANGLE



SHARP ANGLE



SLIGHT ANGLE



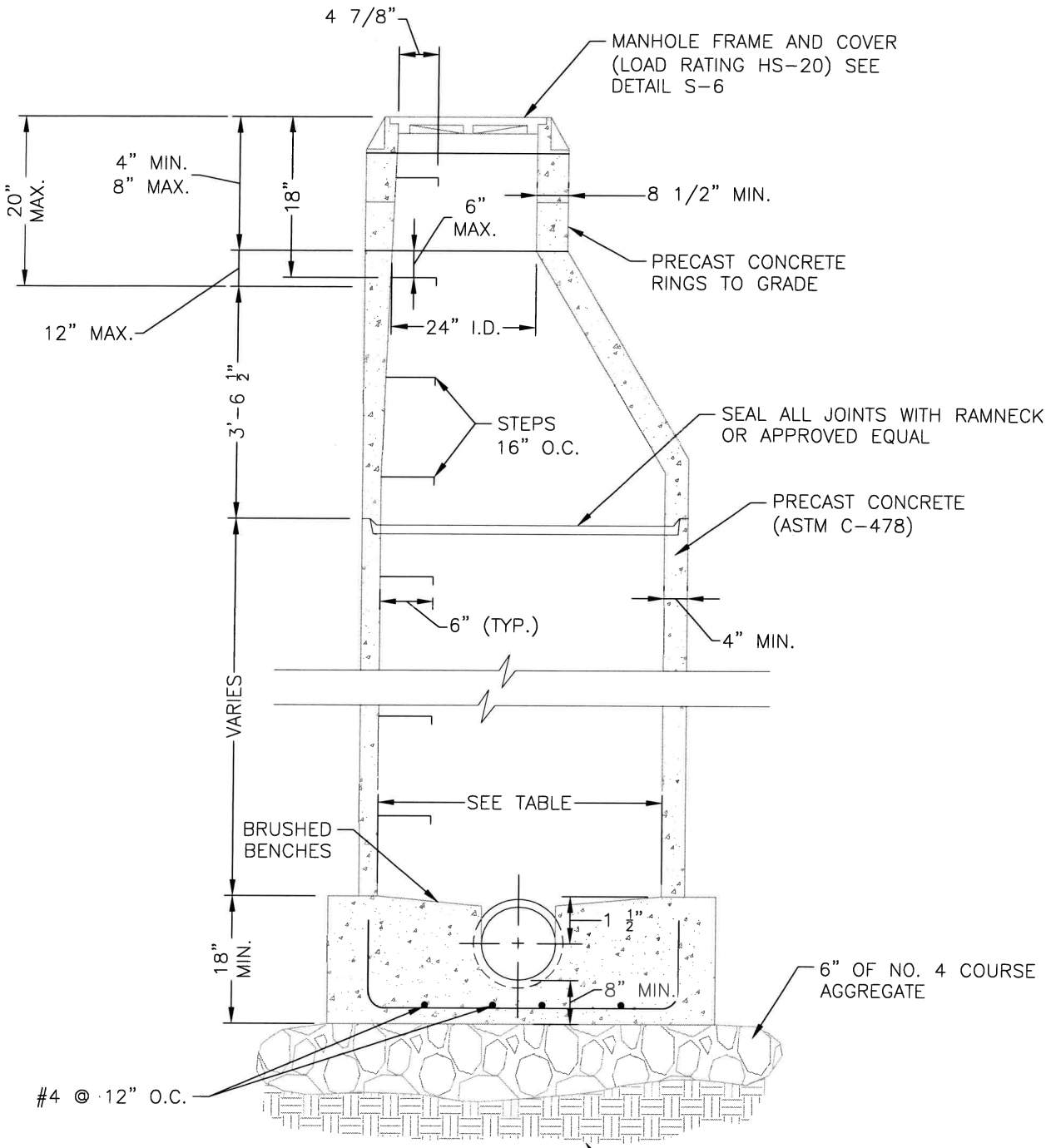
OPPOSED LATERALS

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**GRANT WATER
& SANITATION
DISTRICT**

MANHOLE BASE
CHANNELIZATION

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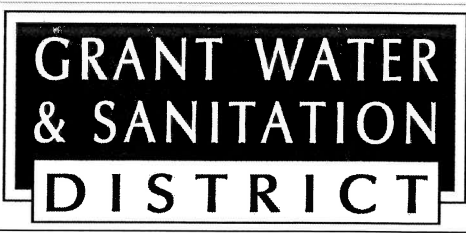


SEWER MAIN NOMINAL DIA.	MANHOLE INSIDE DIA.
8" - 10"	4'
12" - 18"	5'
>18"	6'

SCARIFY AND COMPACT UPPER 12" NATIVE SOIL TO 95% STANDARD PROCTOR

NOTE:
MANHOLE INVERTS WILL BE FORMED AS INDICATED ON BASE CHANNELIZATION DETAIL S-3 TO ENSURE SMOOTH FLOW THROUGH MANHOLE

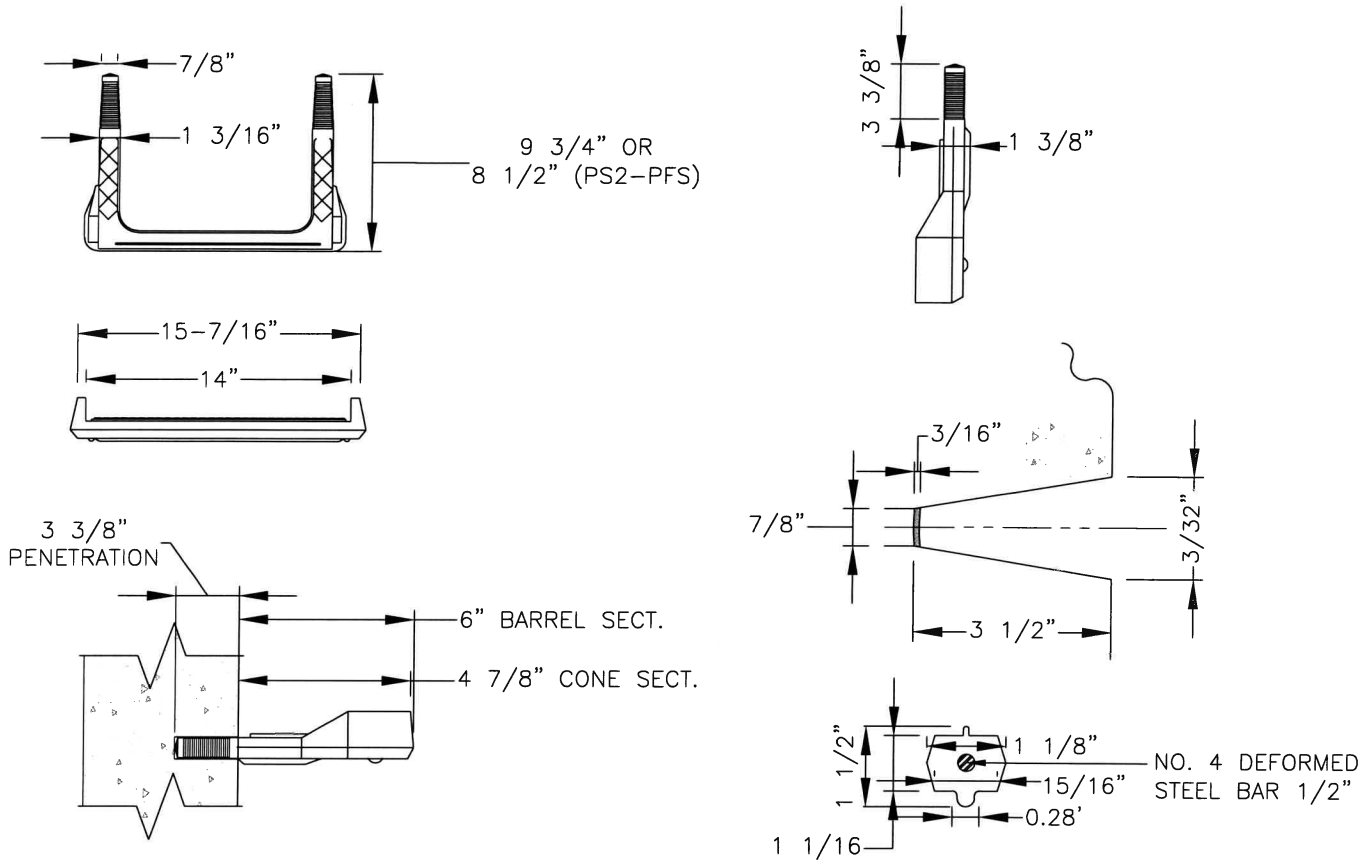
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MANHOLE

S-4

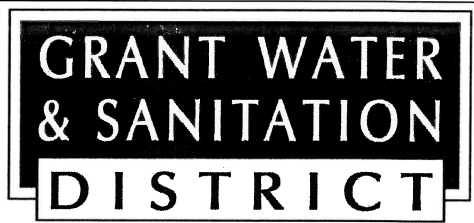
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NOTES: POLYPROPYLENE REINFORCED STEP

1. ASTM SPECIFICATION
 - A. ASTM C-478
 - B. ASTM A-615 GRADE 80 (STEEL REBAR)
 - C. ASTM 2148-69, TYPE II, GRADE 16906 (POLYPROPYLENE)
2. STEPS INSTALLED IN MANHOLE BARREL SECTIONS OR VERTICAL WALLS OF STRUCTURES SHALL HAVE 9 3/8" LEG AND SHALL PROJECT FROM THE WALL 6 INCHES.
3. STEPS INSTALLED IN MANHOLE CONE SECTIONS SHALL HAVE AN 8 1/2" LEG AND SHALL PROJECT FROM WALL 4 7/8".
4. ALL STEPS SHALL HAVE A PENETRATION DEPTH INTO WALL OF 3 3/8".
5. STEPS SHALL BE INSTALLED BY THE "PRESS-FIT" METHOD UTILIZING A SPECIALLY TAPERED PIN TO FORM THE INSERT HOLE AS SHOWN, FOLLOWING MANUFACTURER'S RECOMMENDED PROCEDURE AND SHALL NOT BE GROUTED IN PLACE.
6. INSTALLED STEPS SHALL BE CAPABLE OF WITHSTANDING A PULLOUT FORCE OF 2500 LB PER LEG FOR A MINIMUM PERIOD OF TWO MINUTES.
7. PINS MUST BE SMOOTH AND CONTINUOUSLY TAPERED. DIMENSIONS OF THE PIN AND THE INSERTED PORTION OF THE MANHOLE STEP ARE TYPICALLY ONLY. W.M.D. INSTALLATION REQUIRED A MATCHED COMBINATION OF A TAPERED INSERT PIN AND MANHOLE STEP, AS RECOMMENDED OF REQUIRED BY SPECIFIC MANUFACTURER OF THE STEP TO BE USED.
8. THIS STEP CAN ALSO BE USED IN TOE POCKET INSTALLATIONS PROVIDED 5" TOE CLEARANCE IS ALLOWED.

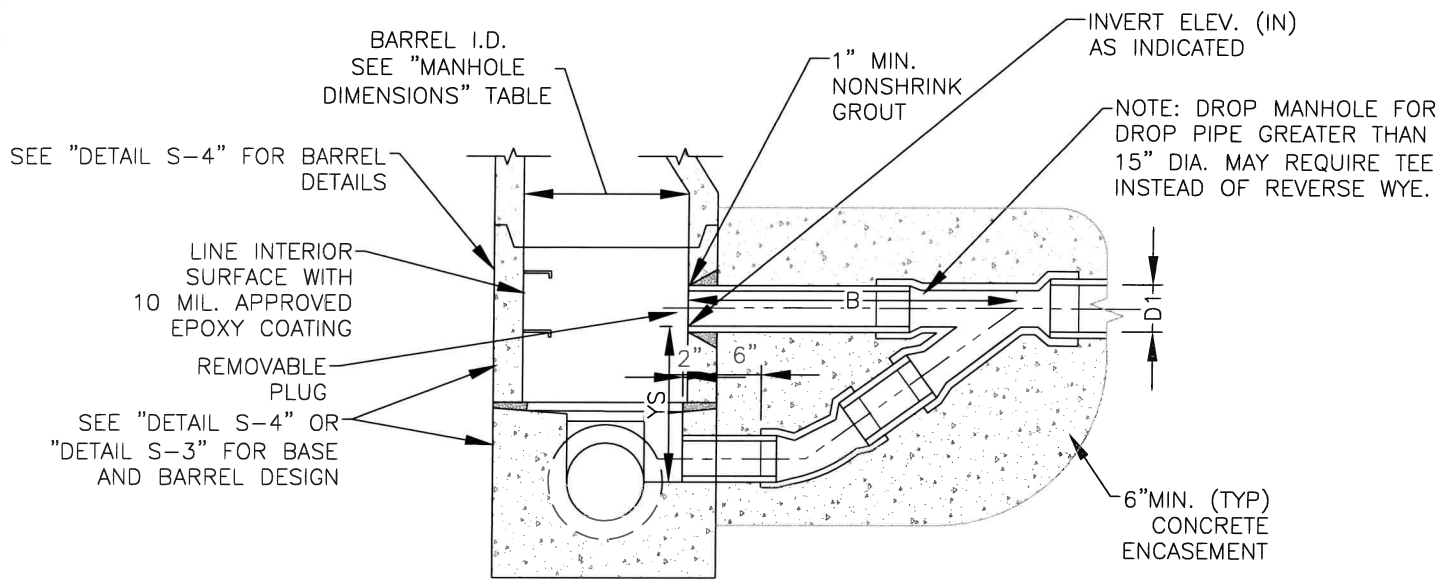
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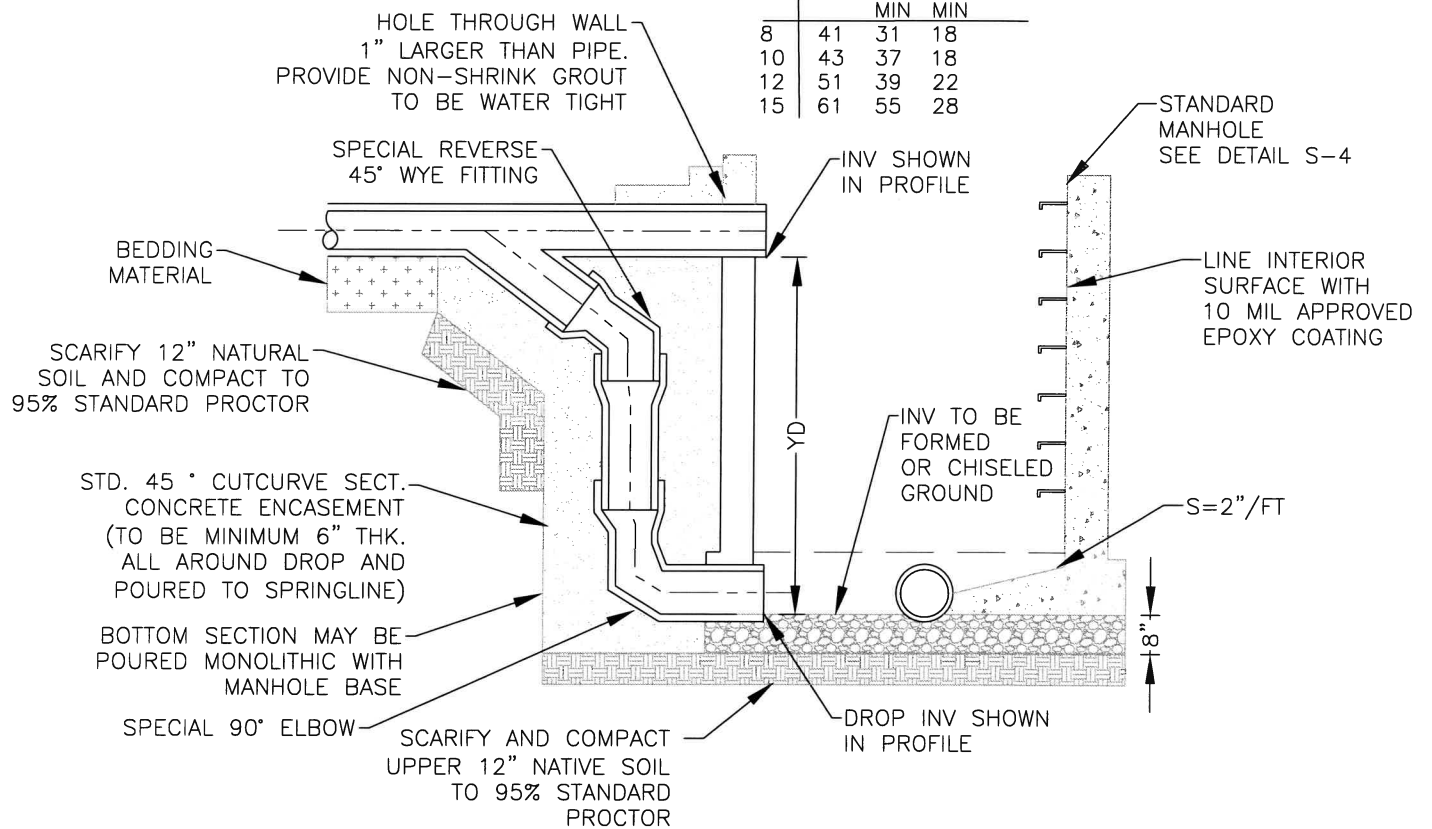
MANHOLE STEPS

S-6

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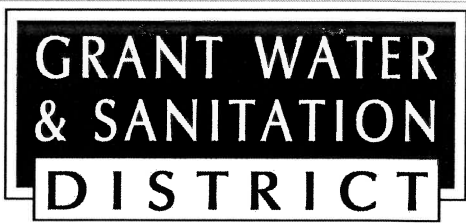
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8	41	31	18
10	43	37	18
12	51	39	22
15	61	55	28



NOTE: WALL OPENING SHALL BE PRECAST BLOCKOUT, IF NEW MANHOLE OR CORED IF EXISTING MANHOLE. JACK HAMMERING NOT ALLOWED EXTERIOR DROP TYPE MANHOLE

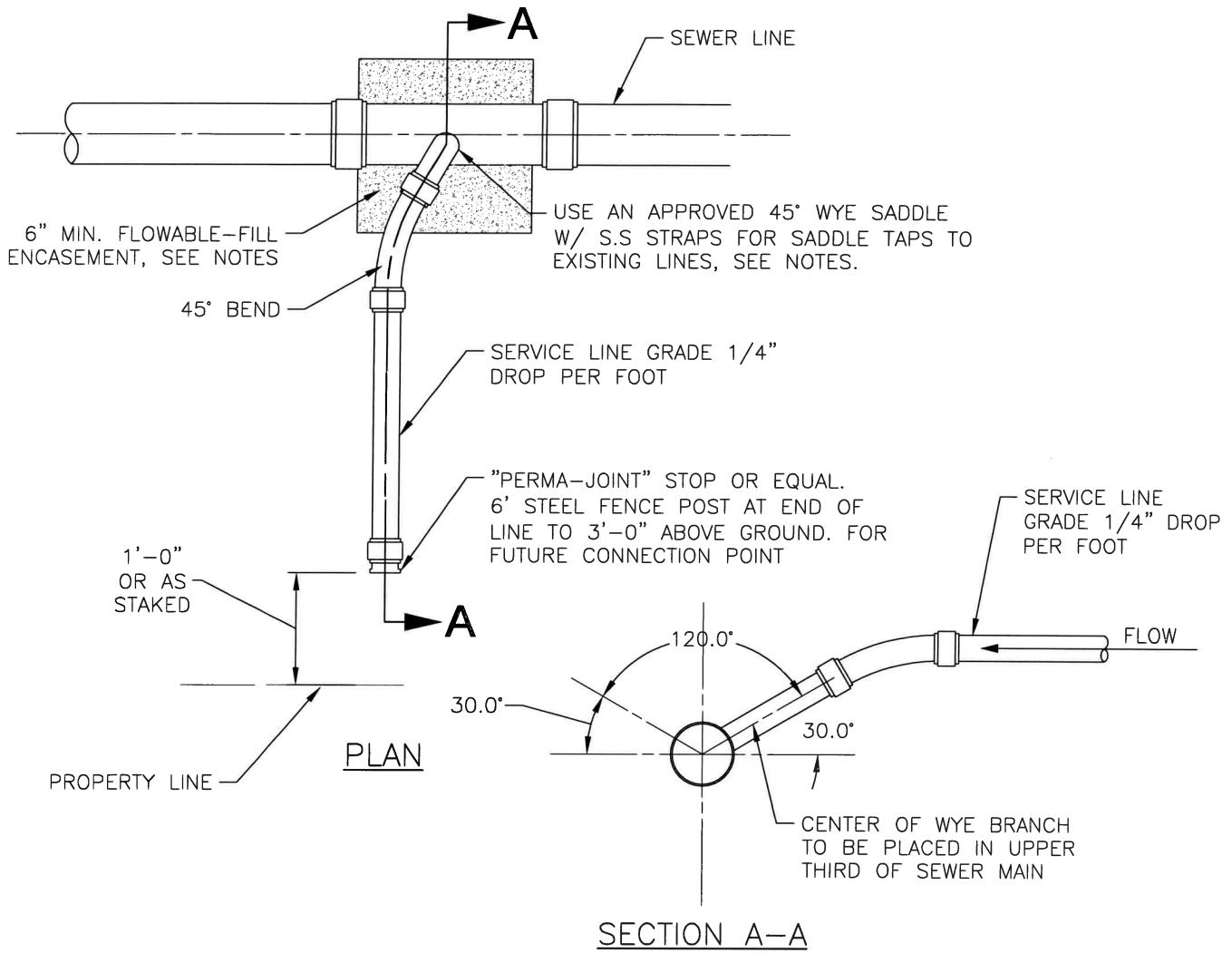
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DROP MANHOLE

S-7

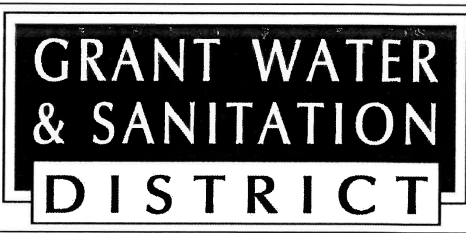


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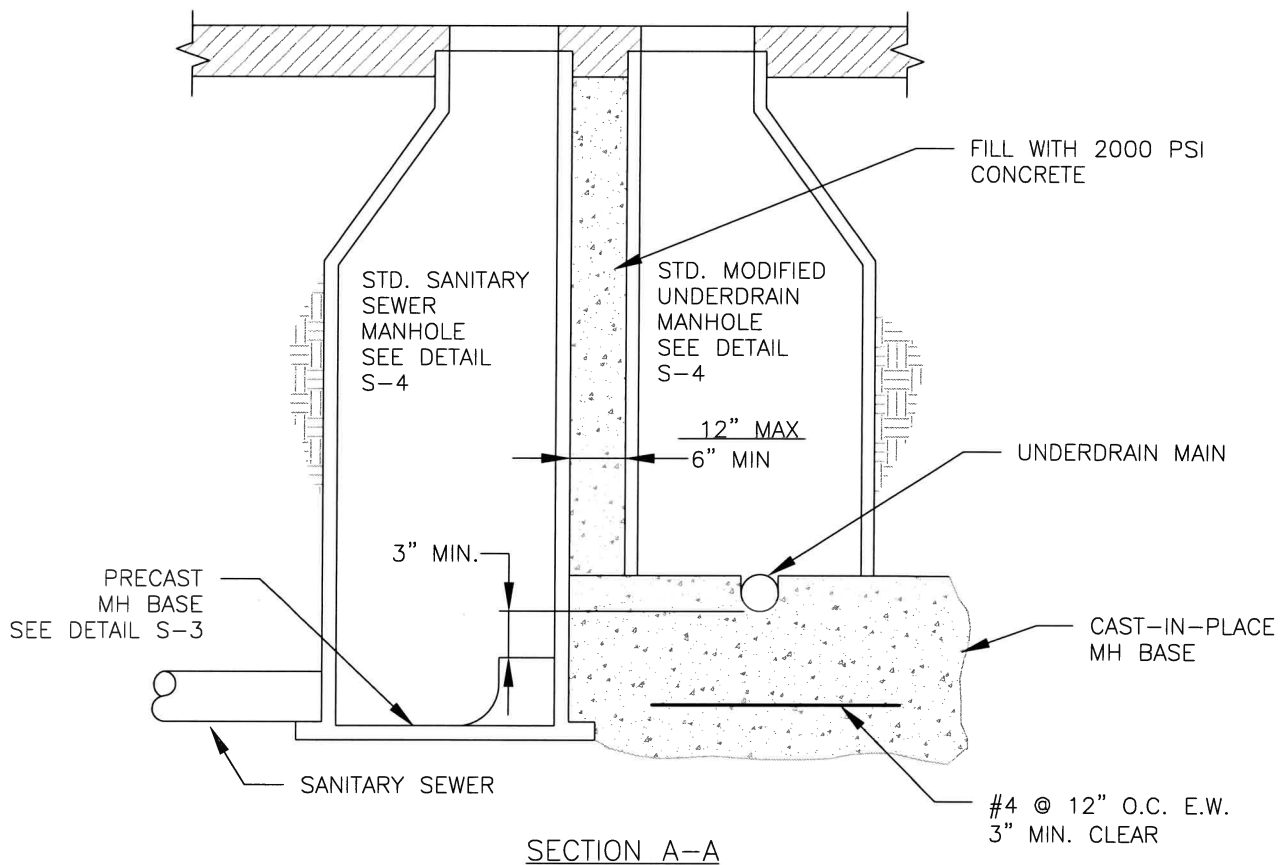
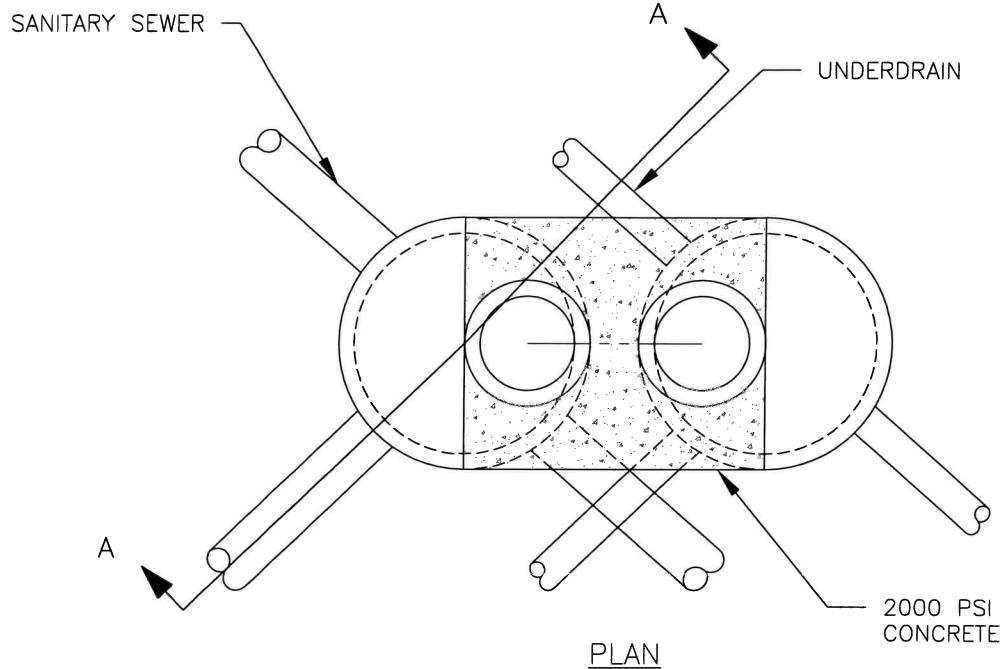
SEWER SERVICES CONNECTIONS SHALL BE POSITIONED AT EITHER THE 2 O'CLOCK OR THE 10 O'CLOCK POSITION OF THE CIRCUMFERENCE OF THE SEWER MAIN. ON NEW INSTALLATIONS, ONLY WYE FITTINGS SHALL BE USED. WHEN TAPPING INTO AN EXISTING SEWER MAIN, A WYE SADDLE CONNECTION AND DISTRICT ENGINEER APPROVED CORING METHOD SHALL BE USED. ALL SADDLE CONNECTIONS SHALL HAVE SERIES 300 STAINLESS STEEL STRAPS AND OTHER HARDWARE. THE MINIMUM DISTANCE BETWEEN SERVICE CONNECTIONS MADE ALONG THE PIPE SHALL BE 3- FEET. THE MINIMUM DISTANCE FROM EITHER THE BELL OR SPIGOT END OF PIPE SHALL BE 3- FEET. THE MINIMUM DISTANCE FROM CENTER OF A MANHOLE TO A SERVICE CONNECTION SHALL BE EITHER 5- FEET OF THE TRANSITION POINT FROM THE MANHOLE TRENCH TO THE NORMAL PIPE TRENCH, WHICHEVER IS GREATER. A MAXIMUM OF 4 SEWER SERVICES CONNECTIONS SHALL BE ALLOWED ALONG A 20- FOOT LENGTH OF PIPE. IN ALL CASES, A SPECIFIC SOILS INVESTIGATION SHOULD BE CONDUCTED TO ASSURE THAT THE EXTERNAL LOADING WILL BE WITH IN ALLOWABLE LIMITS REGARDLESS OF THE NUMBER OF TAPS INVOLVED. ALL SERVICE CONNECTIONS SHALL BE ENCASED IN A MINIMUM OF 6- INCHES OF FLOWABLE- FILL MATERIAL. FLOWABLE- FILL SHALL HAVE A MINIMUM STRENGTH OF 50 PSI AFTER CURING 28 DAYS.

DRAWING LOCATION: G:\SPECIAL DISTRICTS\13.0339-Grant WSD\BASE\DETAILS\DISTRICT STANDARD DETAILS\DOMESTIC SEWER TAP .dwg

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**DOMESTIC SEWER
TAP
S-8**



NOTE: IF UNDERDRAIN IS LOCATED BELOW SANITARY SEWER USE PRECAST BASE FOR UNDERDRAIN AND CAST-IN-PLACE FOR SANITARY SEWER.

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1	GENERAL	5/18	JVM

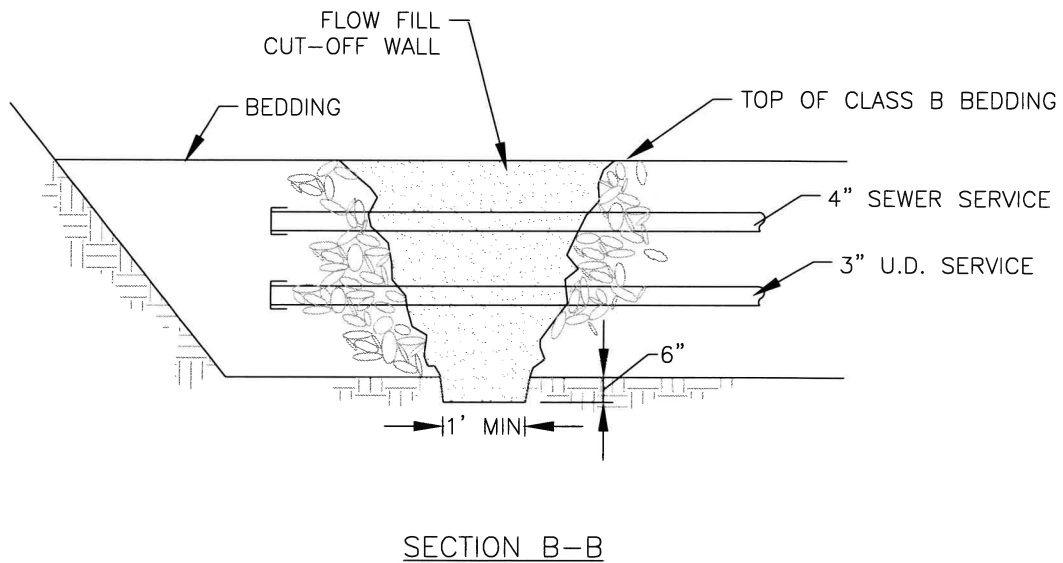
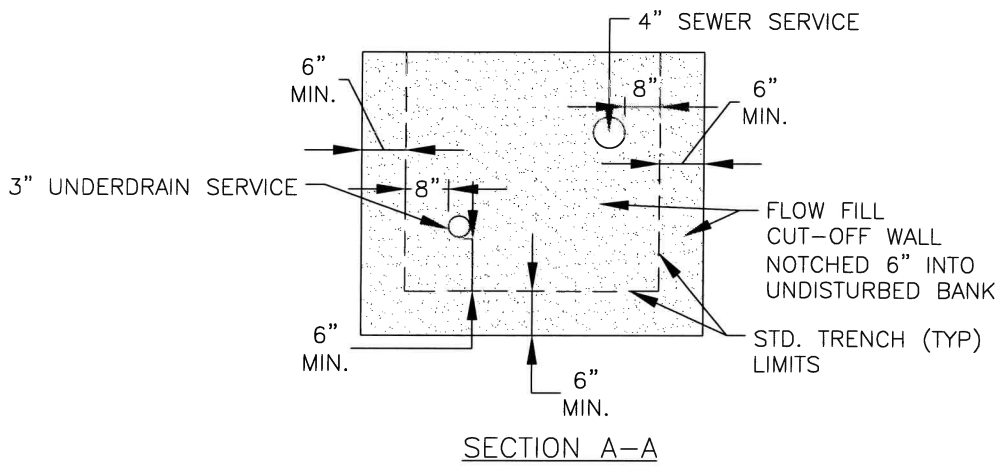
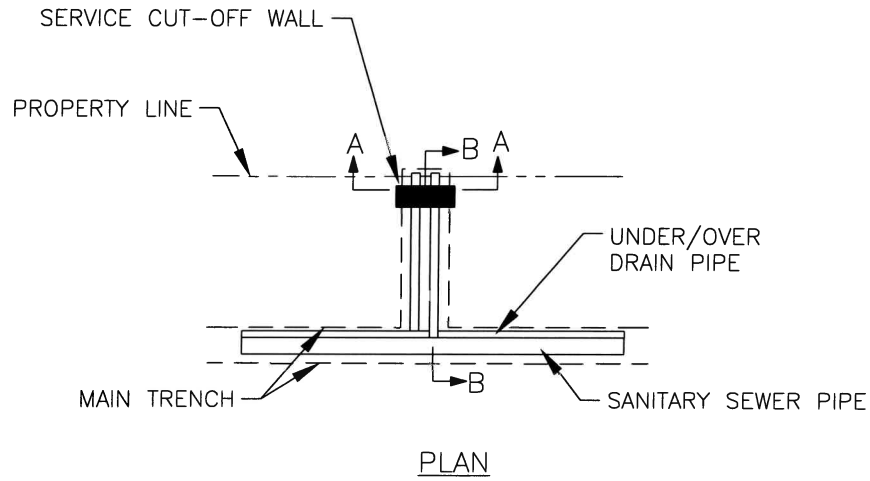


**DOUBLE MANHOLE
GROUTING**

S-9

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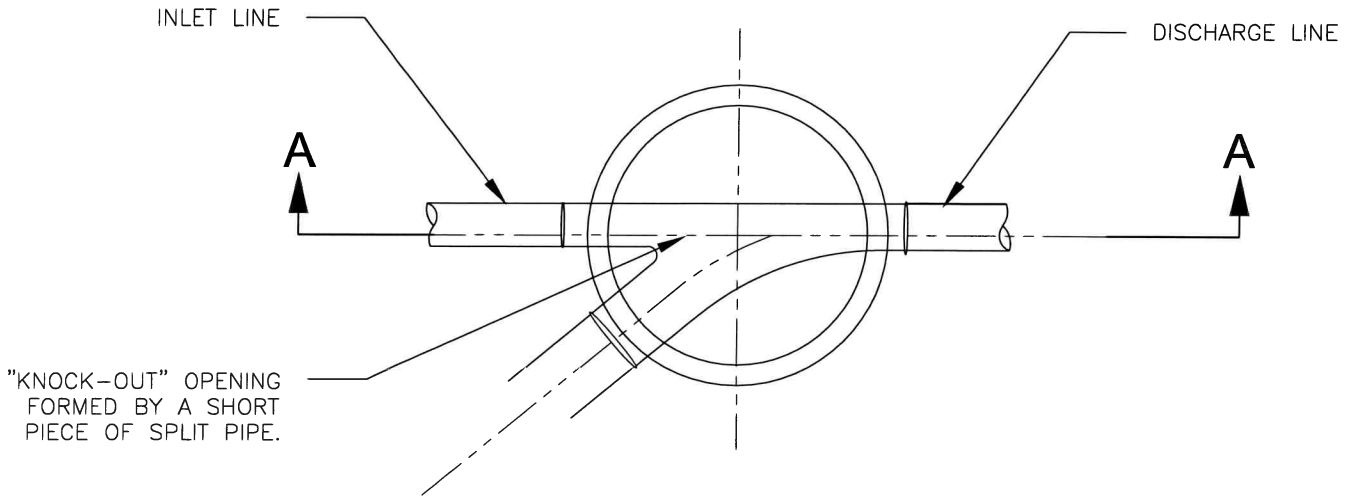
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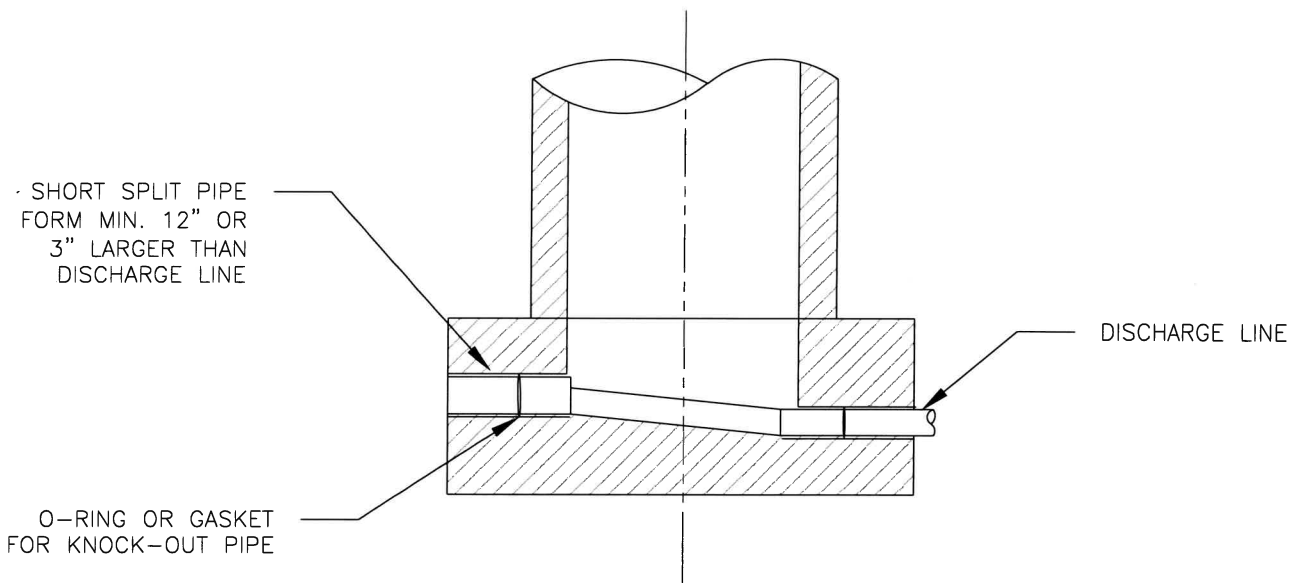
NO.	REVISIONS	DATE	BY
1	GENERAL	5/18	JVM

**GRANT WATER
& SANITATION
DISTRICT**

**SANITARY AND
UNDERDRAIN
SERVICE CUTOFF
WALL
S-10**

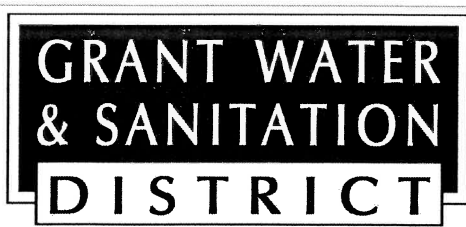


NOTE: "KNOCK-OUT" OPENING IN BASE SHALL BE FORMED WITH A SHORT PIECE OF "SPLIT PIPE" AND BENCH FORMED ACCORDINGLY. THE PIPE SHALL BE A MINIMUM OF 12" DIA. OR 3" LARGER THAN THE DISCHARGE LINE SIZE. AN "O" RING GASKET "KEY" FOR USE WHEN THE FUTURE PIPE IS CONSTRUCTED. AFTER THE CONCRETE HAS BEEN SET THE "SPLIT PIPE" SHALL BE BROKEN OUT AND THEN CLOSED WITH BRICK AND MORTAR.



SECTION A-A

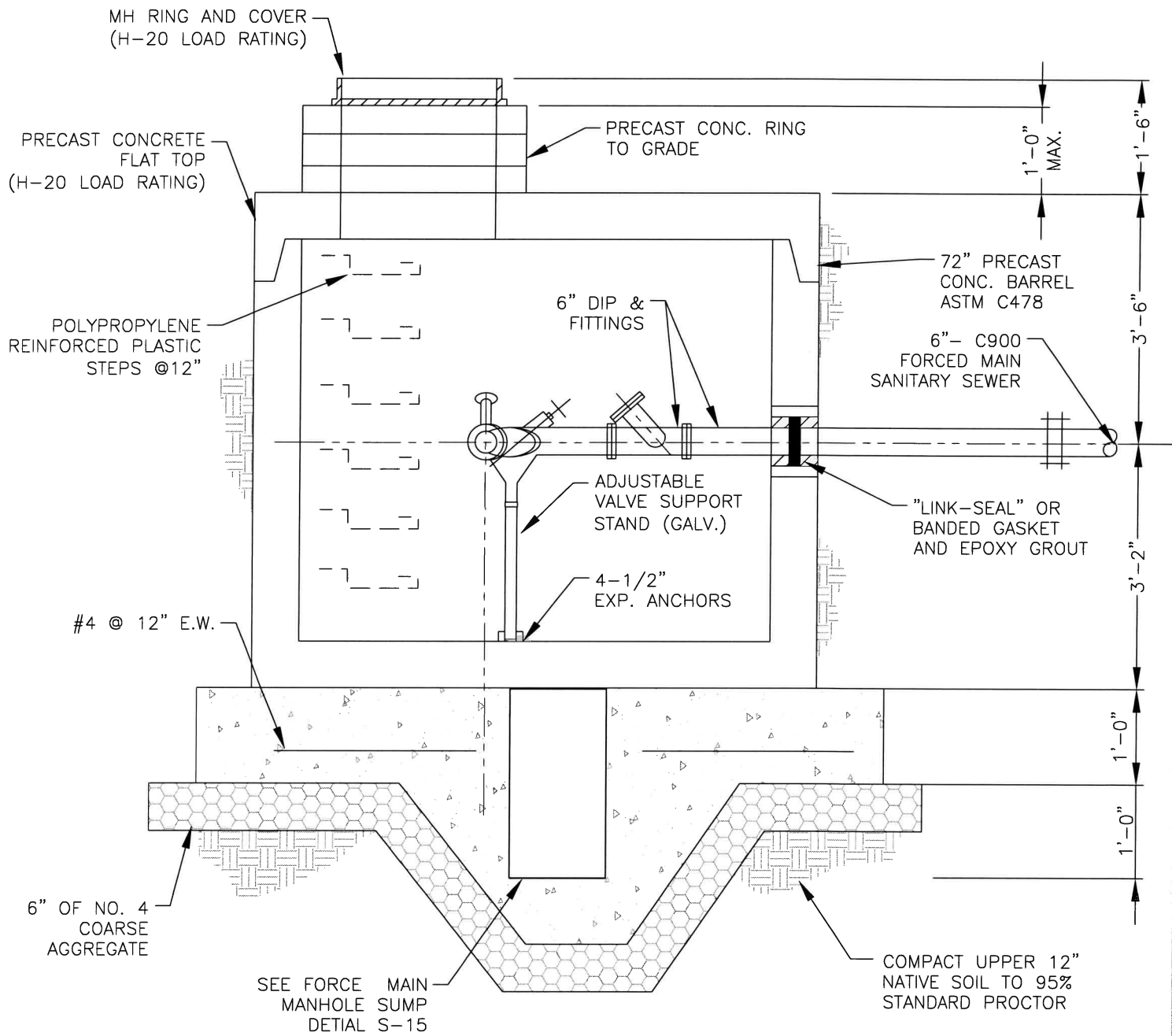
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**KNOCK-OUT
MANHOLE**

S-11

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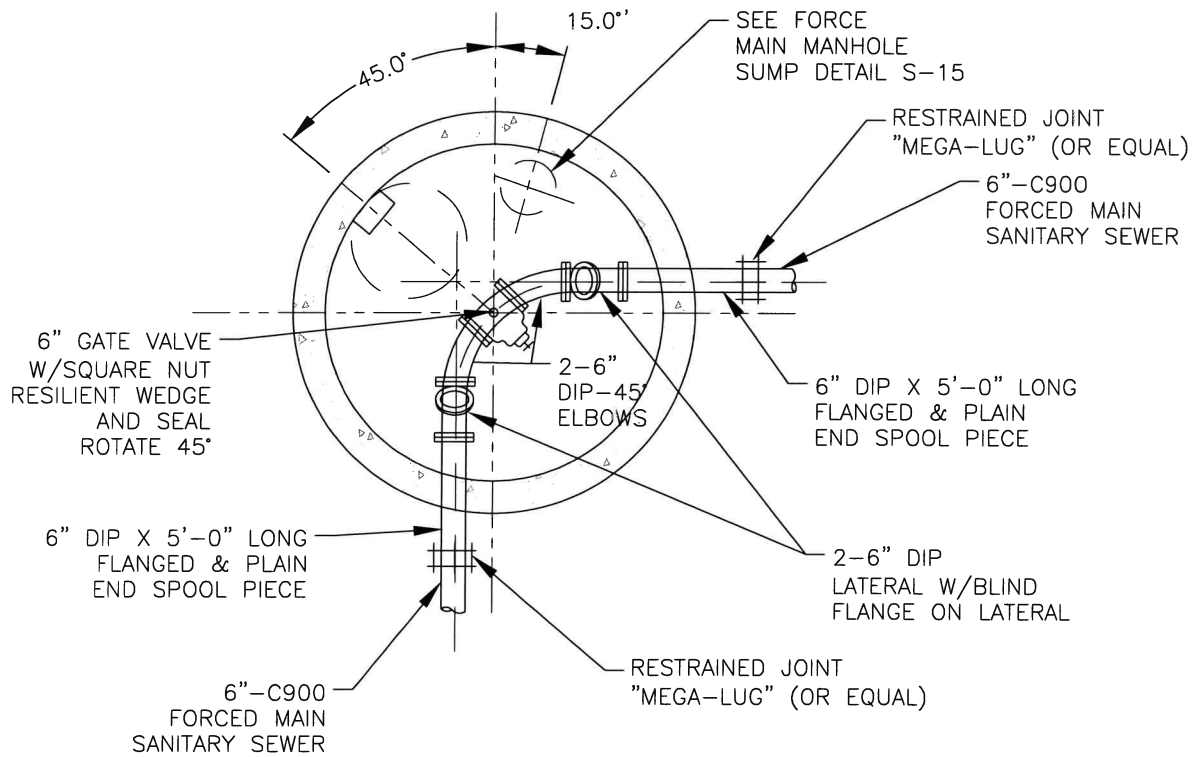
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GRANT WATER & SANITATION DISTRICT

FORCE MAIN MANHOLE SECTION

S-12

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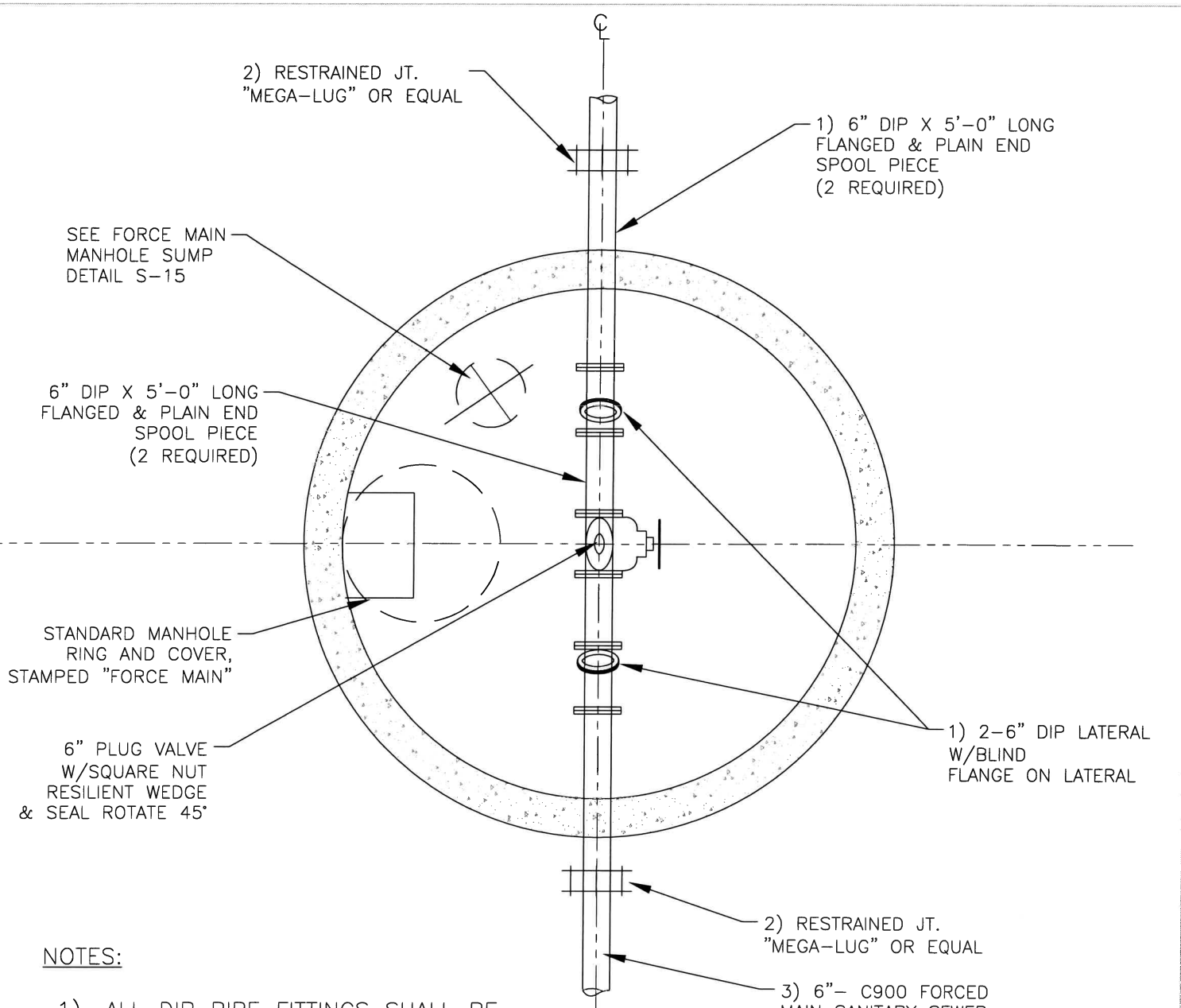
NO.	REVISIONS	DATE	BY
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**GRANT WATER
& SANITATION
DISTRICT**

**FORCE MAIN
MANHOLE WITH
BEND PLAN**

S-13

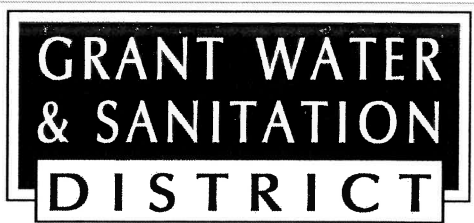
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NOTES:

- 1) ALL DIP PIPE FITTINGS SHALL BE EPOXY LINED PER SPECIFICATIONS
- 2) 6" FORCED MAIN SHALL BE RESTRAINED 45' FROM FLANGED JOINT.
- 3) HORIZONTAL DEFLECTIONS WITHIN FORCED MAIN MANHOLES SHALL BE OBTAINED USING STANDARD DIP ELBOW FITTING. CONTRACTOR MAY USE 11-1/4° DIP ELBOWS TO OBTAIN DESIGN ALIGNMENT OUTSIDE OF MANHOLE

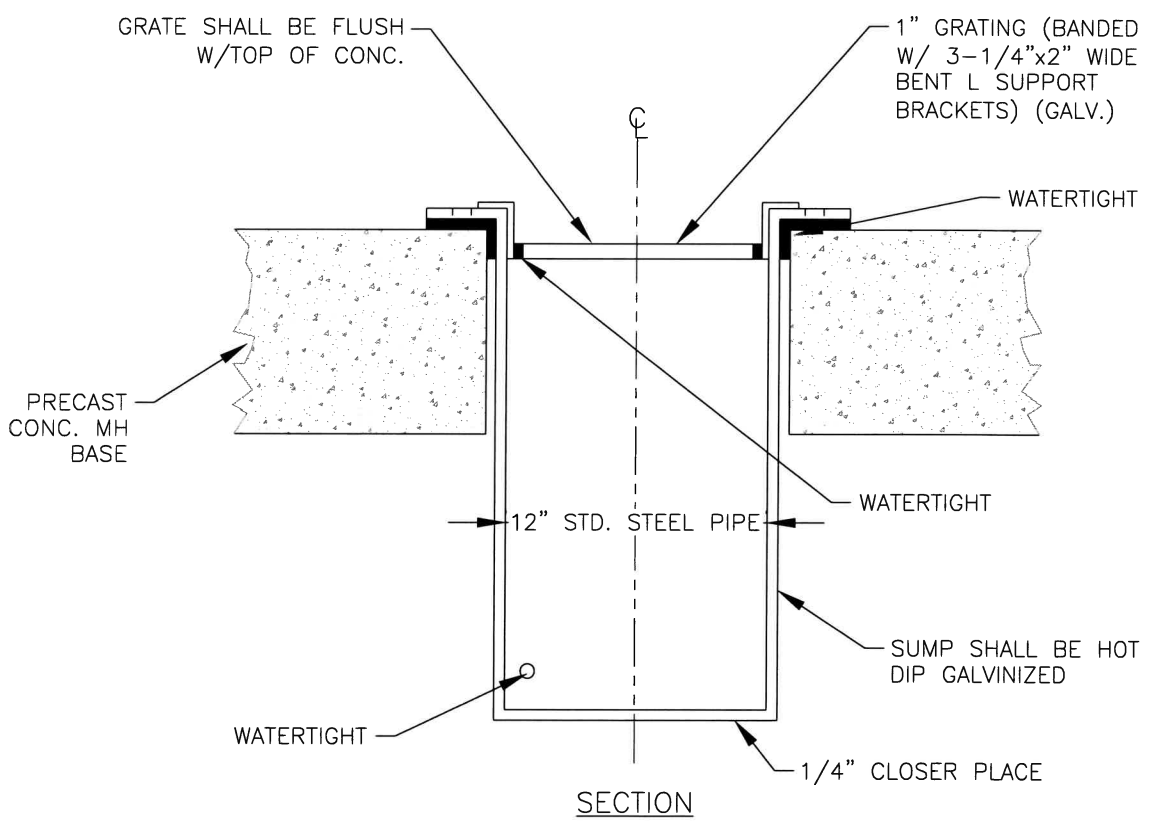
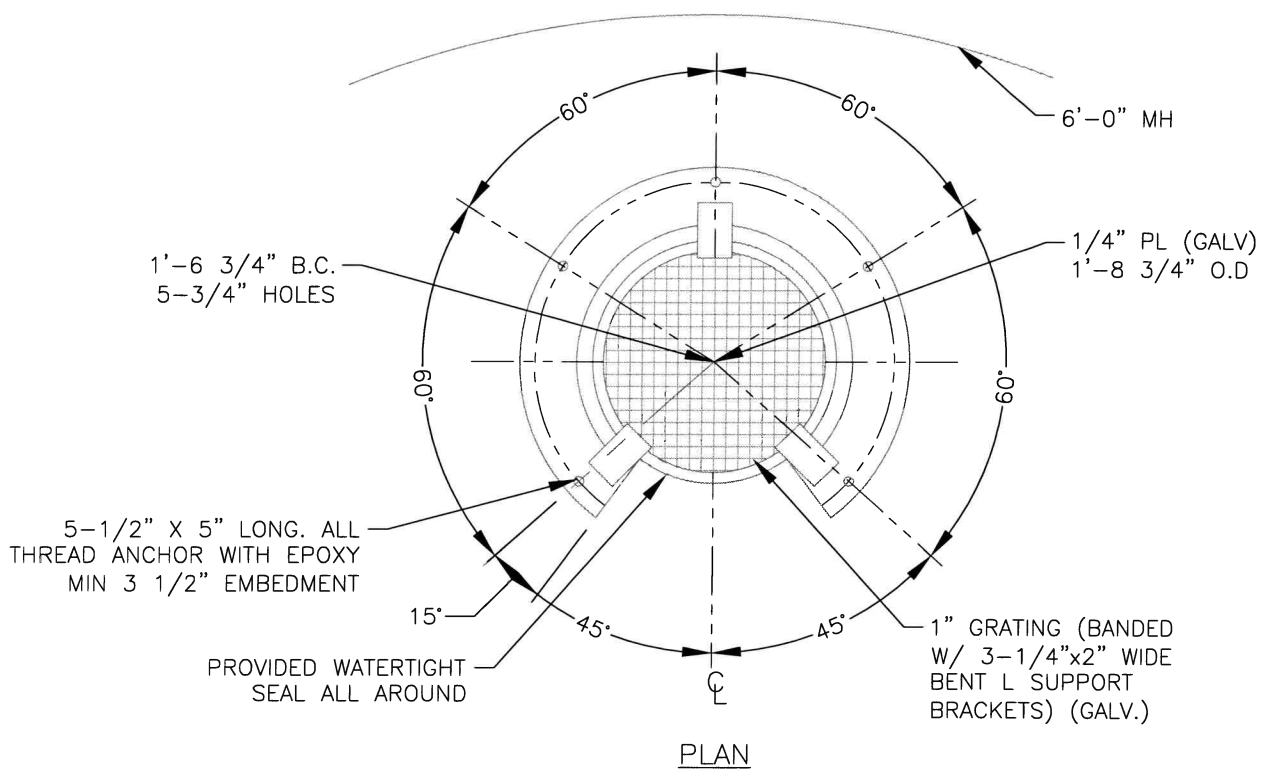
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**FORCE MAIN
MANHOLE STRAIGHT
THROUGH PLAN**

S-14

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**GRANT WATER
& SANITATION
DISTRICT**

**FORCE MAIN
MANHOLE SUMP**

S-15