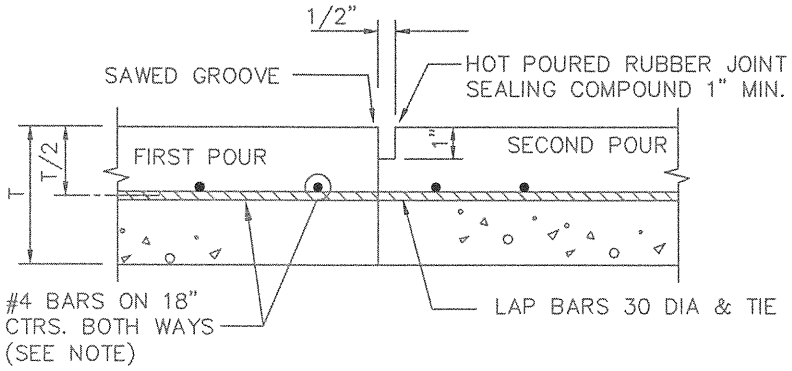
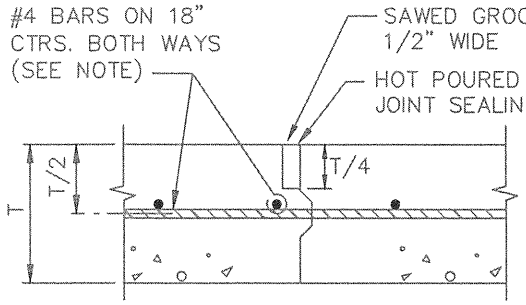


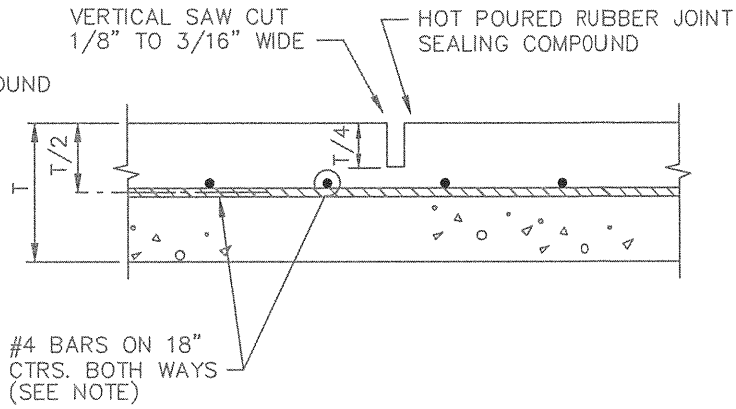
CONSTRUCTION JOINT

N.T.S.



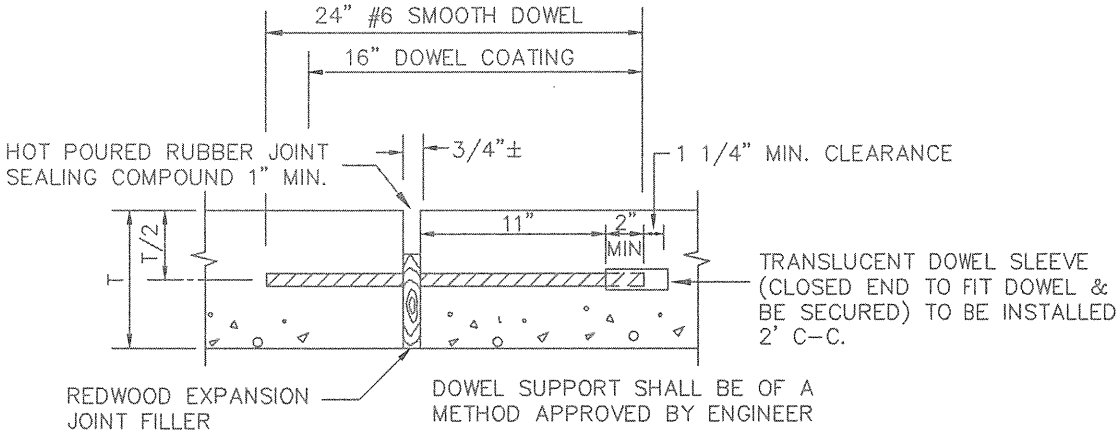
KEYWAY JOINT

(FOR PAVEMENT THICKNESS > 6")
N.T.S.



SAWED CONTRACTION JOINT

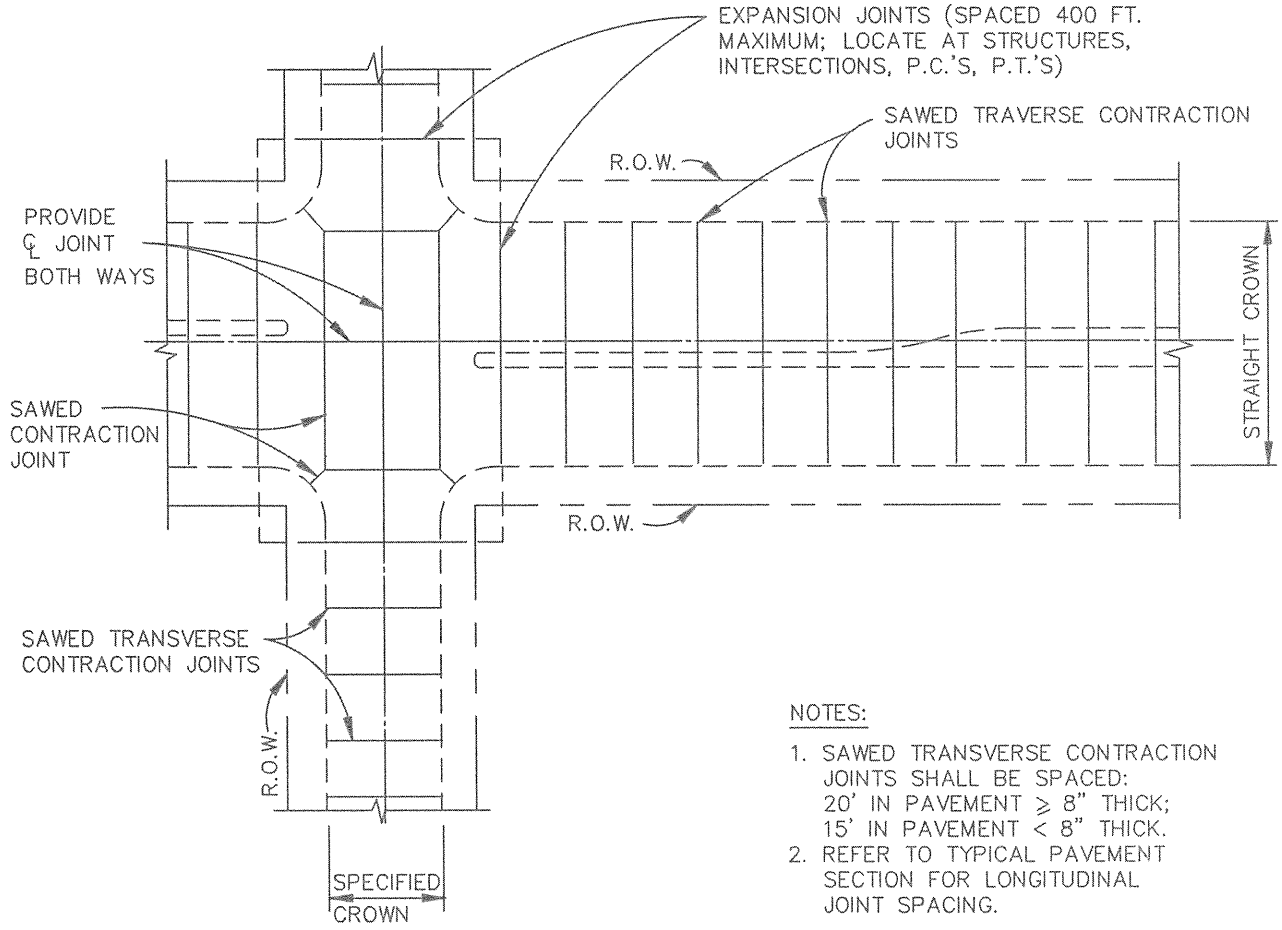
N.T.S.



EXPANSION JOINT

(SPACED 400 FT. MAXIMUM; LOCATE AT STRUCTURES AND AT INTERSECTION P.C.'S & P.T.'S)
N.T.S.

	REINFORCED CONCRETE PAVEMENT	
	JOINTS	STANDARD DRAWING NO. PAV-01



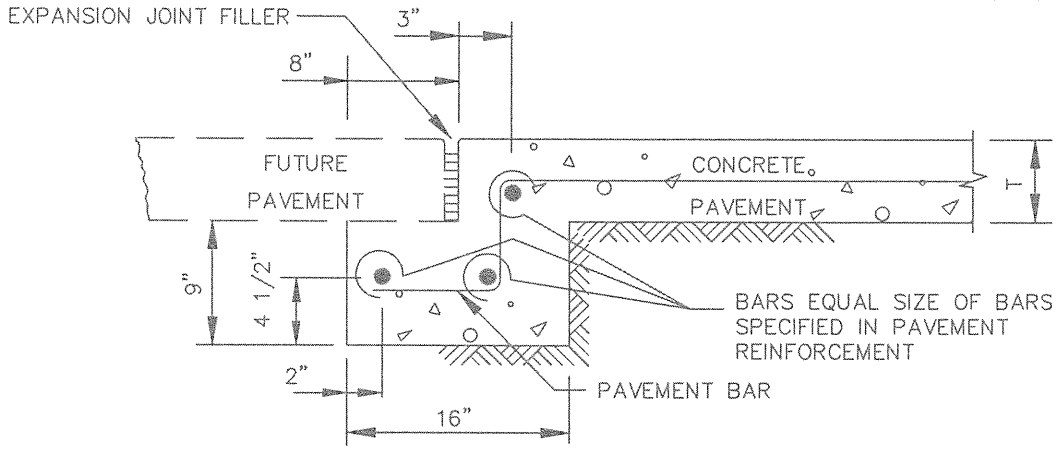
NOTES:

1. SAWED TRANSVERSE CONTRACTION JOINTS SHALL BE SPACED:
   20' IN PAVEMENT ≥ 8" THICK;
   15' IN PAVEMENT < 8" THICK.
2. REFER TO TYPICAL PAVEMENT SECTION FOR LONGITUDINAL JOINT SPACING.

SPACING DIAGRAM FOR TRANSVERSE JOINTS

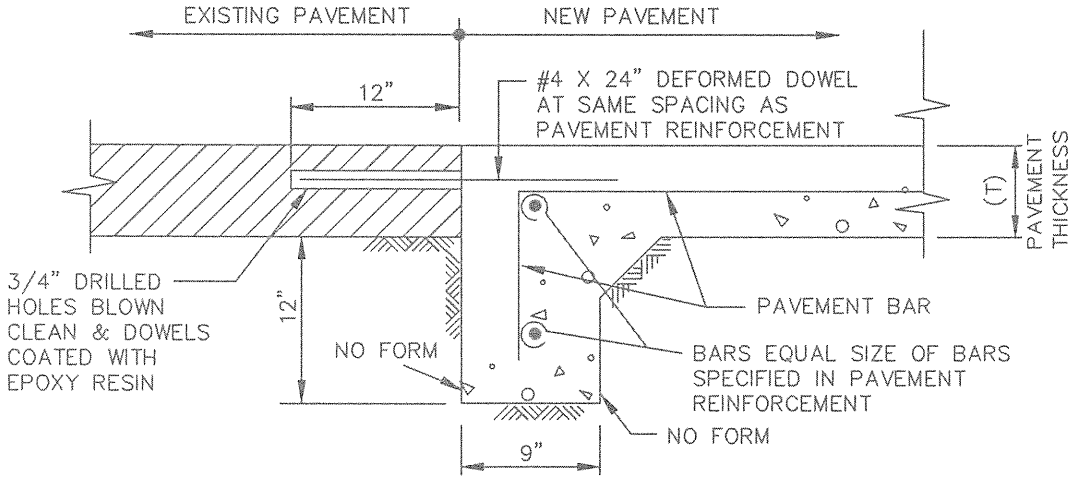
N.T.S.

	REINFORCED CONCRETE PAVEMENT	
	TRANSVERSE JOINT SPACING	STANDARD DRAWING NO. PAV-02



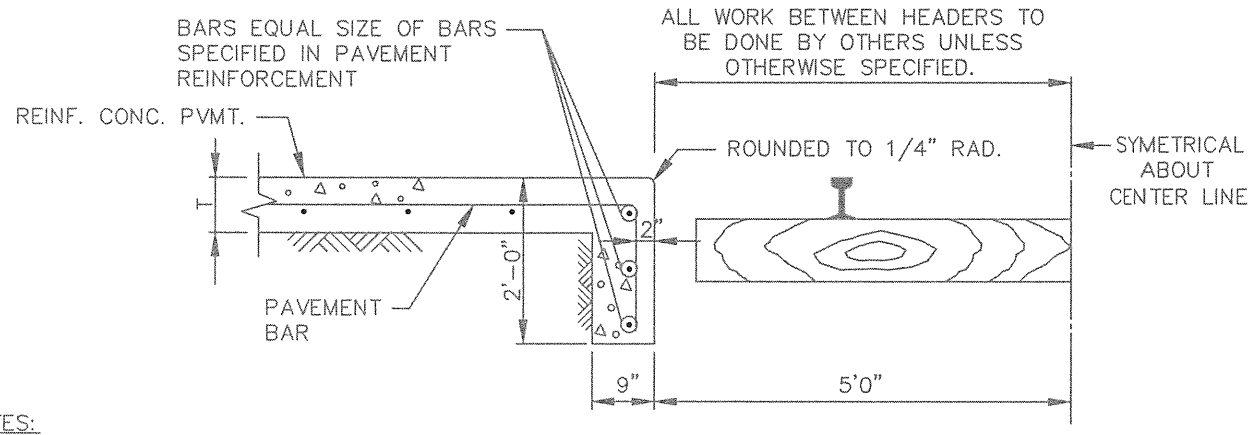
STREET HEADER FOR FUTURE PAVEMENT

N.T.S.



STREET HEADER AT EXISTING PAVEMENT

N.T.S.



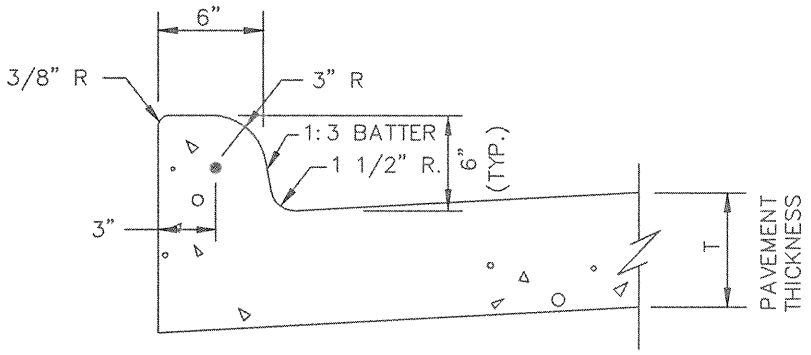
NOTES:

1. PAVEMENT BARS TO BE BENT DOWN INTO HEADER.
2. HEADER AND PAVEMENT TO BE MONOLITHIC.

STREET HEADER AT RAILROAD

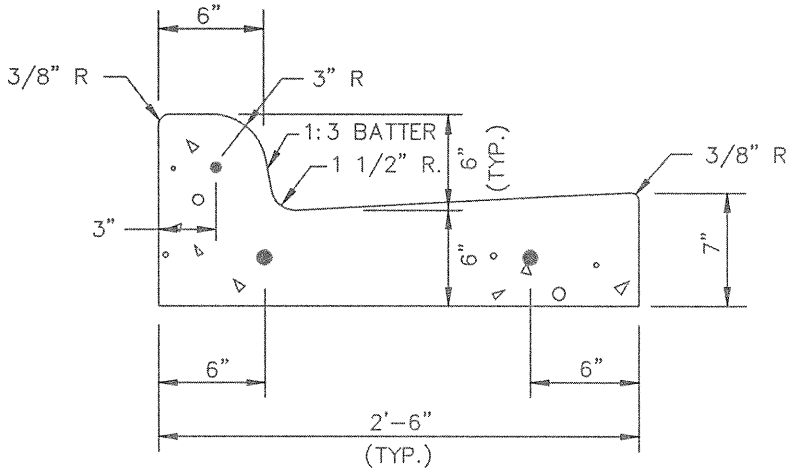
N.T.S.

	REINFORCED CONCRETE PAVEMENT	STANDARD DRAWING NO.
	STREET HEADERS	PAV-03



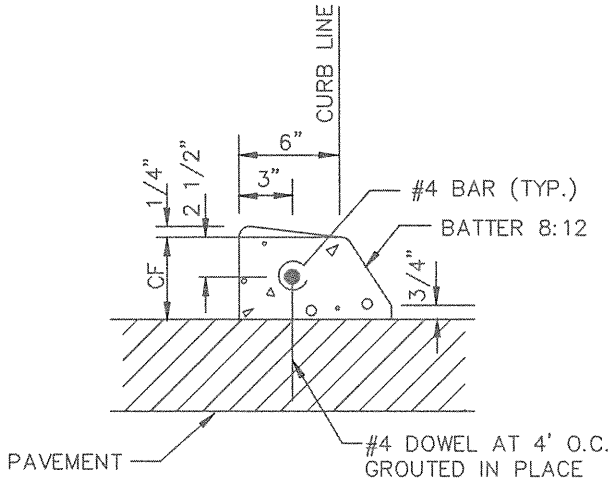
INTEGRAL CURB & GUTTER

N.T.S.



SEPARATE CURB & GUTTER

N.T.S.



DOWELED CURB

N.T.S.

NOTES:

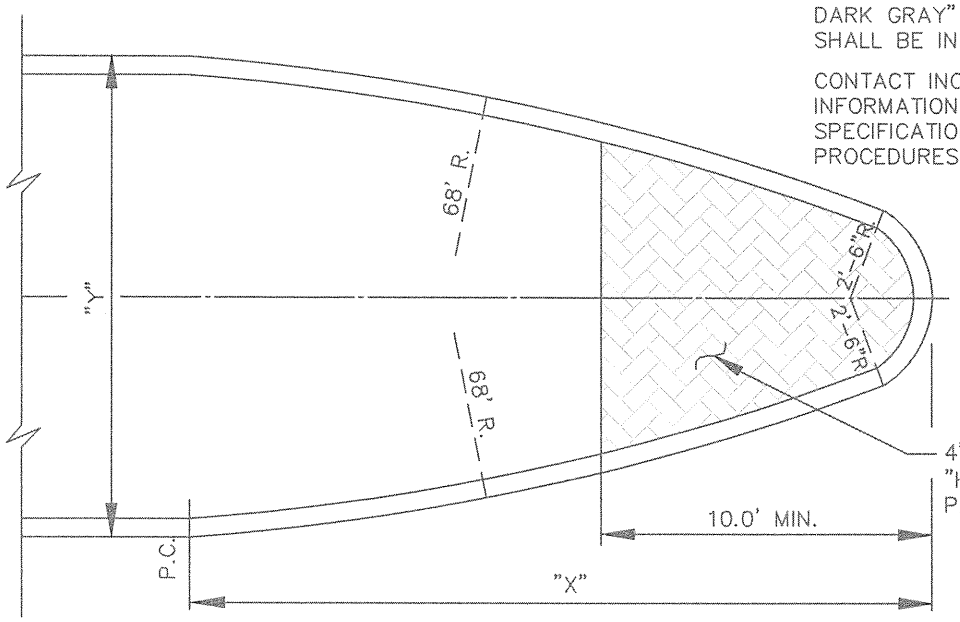
1. REINFORCEMENT SHALL BE NO. 4 BARS.
2. CONCRETE SHALL BE CLASS "C".
3. "CF" IS 6" UNLESS OTHERWISE SPECIFIED.
4. ALL CURBS ARE CONSTRUCTED OF PORTLAND CEMENT CONCRETE UNLESS OTHERWISE SHOWN.
5. GRADE SHALL BE MEASURED AT BACK OF CURB.

	CONCRETE CURBS & CURB WITH GUTTER	
	INTEGRAL, SEPARATE & DOWELED	STANDARD DRAWING NO. PAV-04

NOTE:

STAMPED CONCRETE SHALL BE INTEGRAL STAINED INCRETE COLOR "REDWOOD W/ DARK GRAY" OR APPROVED EQUAL AND SHALL BE INSTALLED PER CITY STANDARDS.

CONTACT INCRETE SYSTEMS FOR ADDITIONAL INFORMATION OR ASSISTANCE WITH SPECIFICATIONS AND INSTALLATION PROCEDURES AT 1-800-752-4626



DIMENSIONS OF MEDIAN NOSE

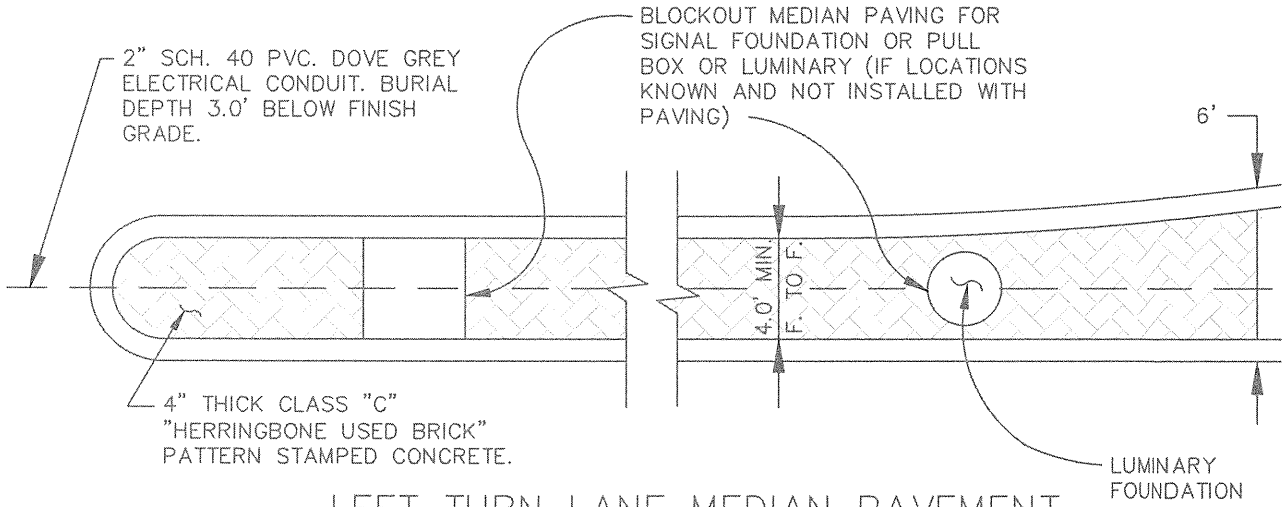
Y = 15'	X = 27.6'
Y = 16'	X = 28.8'
Y = 17'	X = 29.9'
Y = 18'	X = 30.9'

CONCRETE NOSE FOR MEDIAN ISLAND

N.T.S.

NOTE:

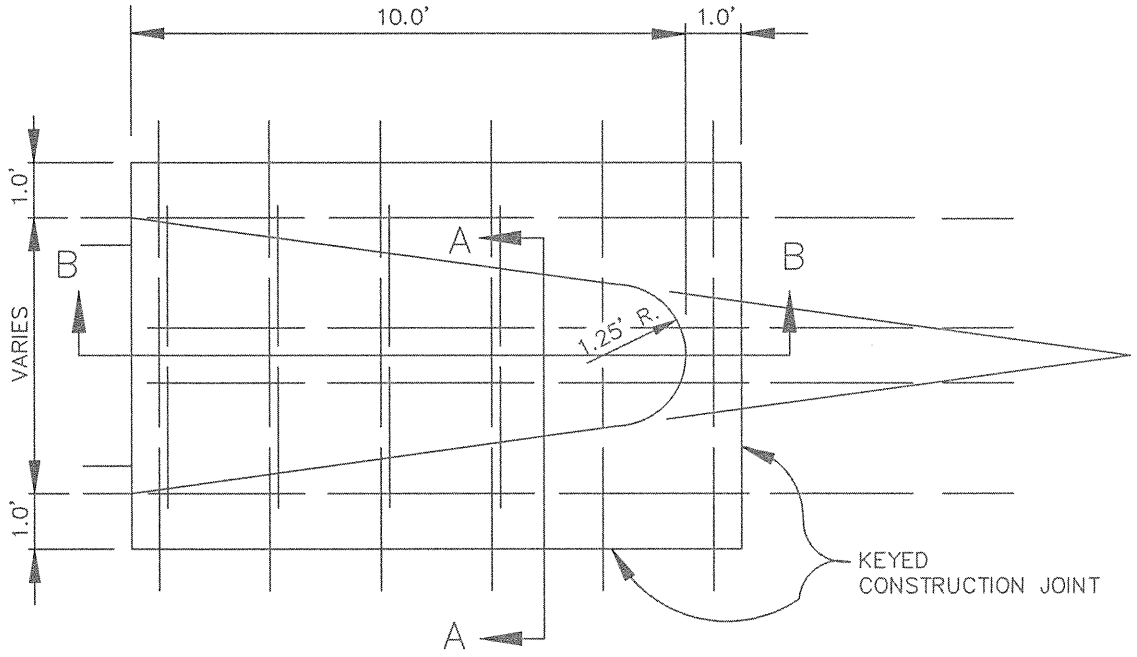
MEDIAN PAVING SHALL EXTEND TO POINT WHERE MEDIAN IS 6' WIDE. IF MEDIAN IS 6' WIDE, PAVING SHALL EXTEND 15' FROM NOSE. FOR MEDIANS WIDER THAN 6' PAVING SHALL EXTEND 10' FROM NOSE. ALL DISTANCES ARE MINIMUM.



LEFT TURN LANE MEDIAN PAVEMENT

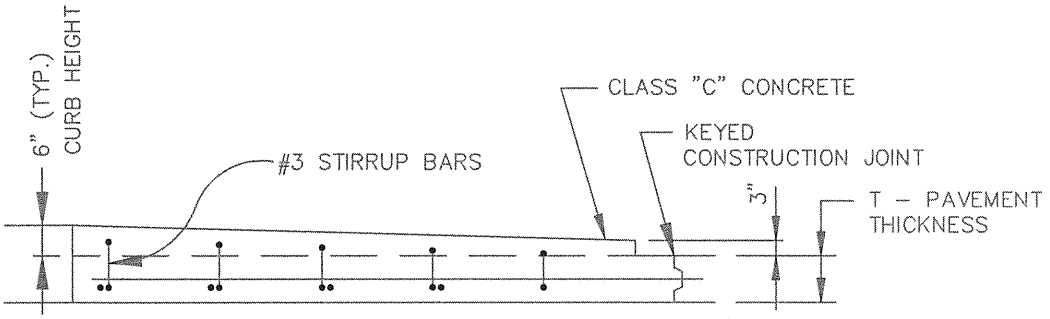
N.T.S.

	MEDIAN ISLAND PAVEMENT	
	NOSE & LEFT TURN LANE	STANDARD DRAWING NO. PAV-05



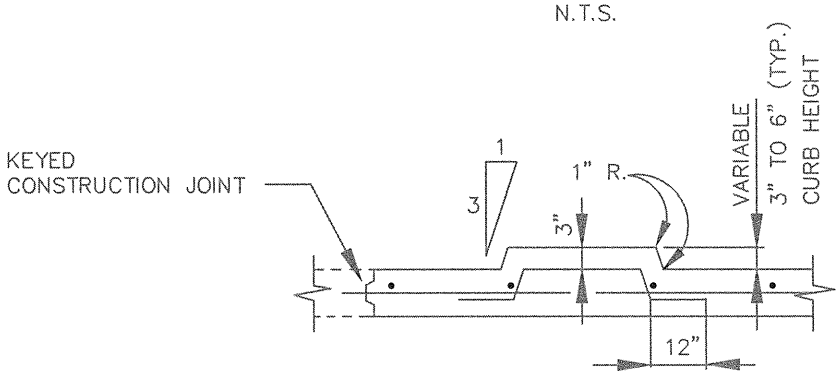
MONOLITHIC CONCRETE MEDIAN NOSE

N.T.S.



SECTION B–B

N.T.S.



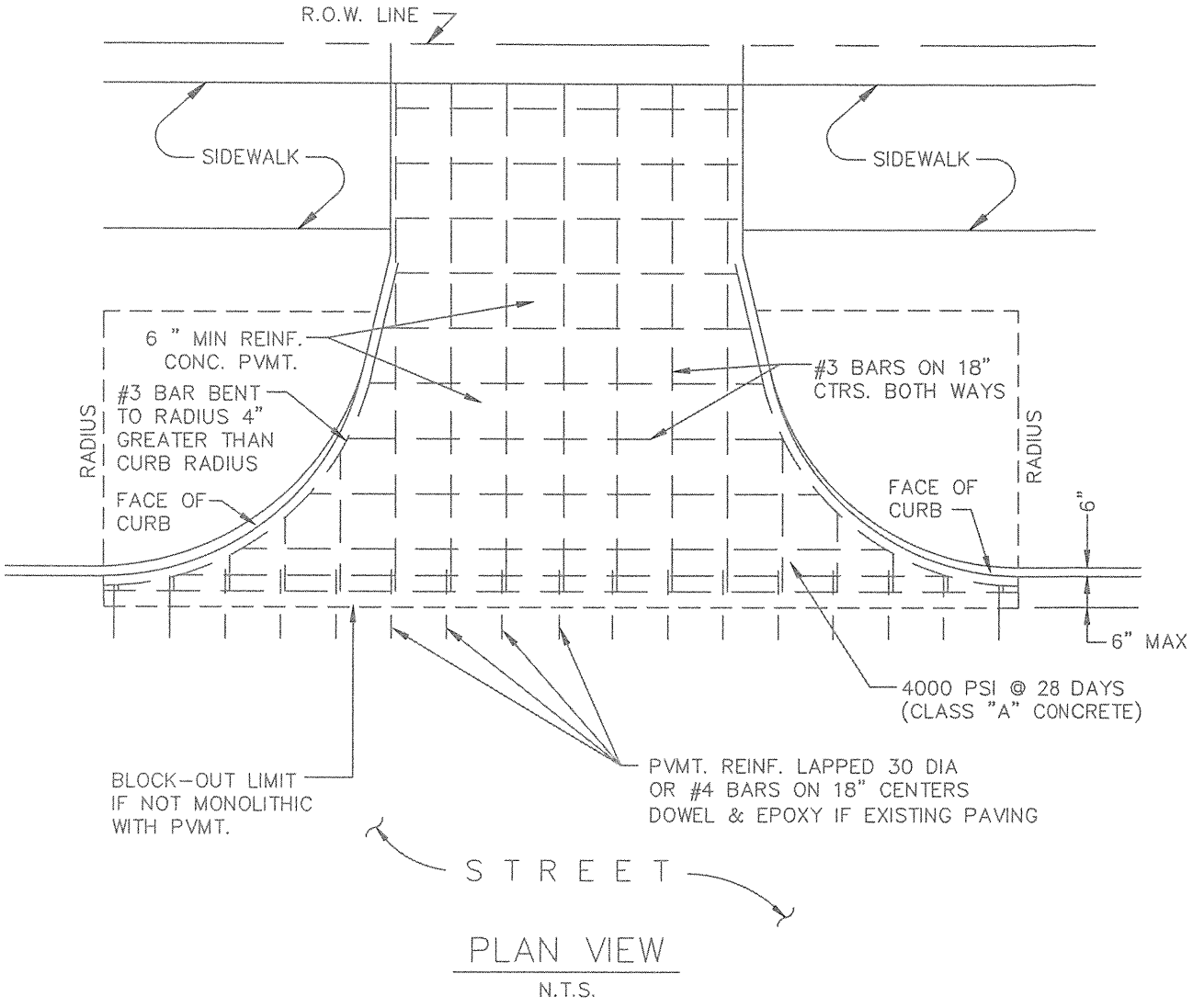
SECTION A–A

N.T.S.

NOTE:

REINFORCEMENT BARS SHALL MATCH THOSE IN PAVEMENT.

	MEDIAN ISLAND PAVEMENT	
	MONOLITHIC CONCRETE NOSE	STANDARD DRAWING NO. PAV-06

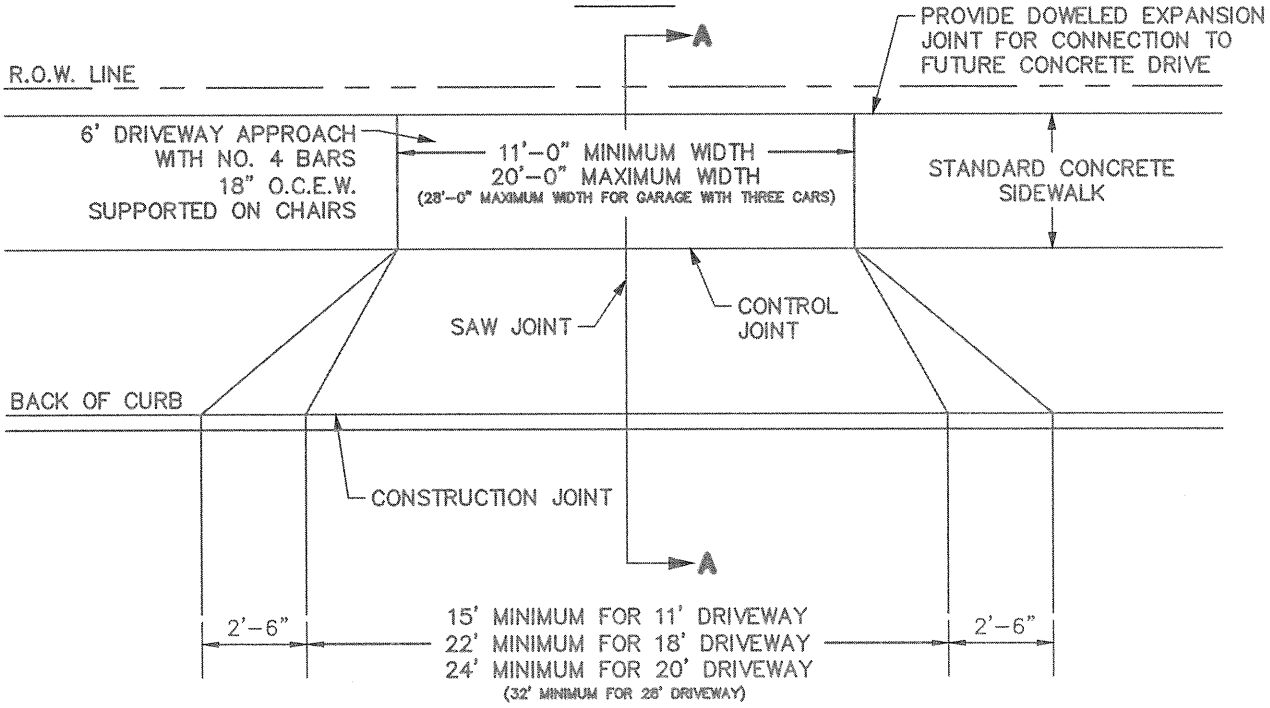


PLAN VIEW

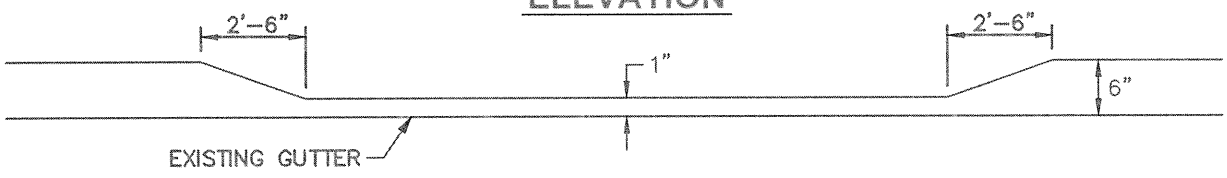
N.T.S.

	CONCRETE DRIVEWAY APPROACH	
	RADIUS RETURN	STANDARD DRAWING NO. PAV-07

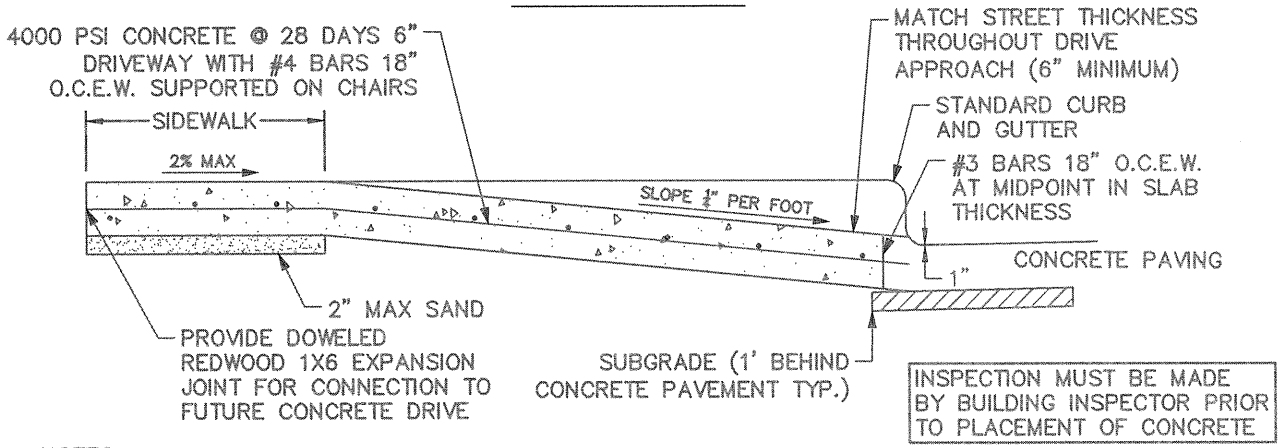
PLAN



ELEVATION



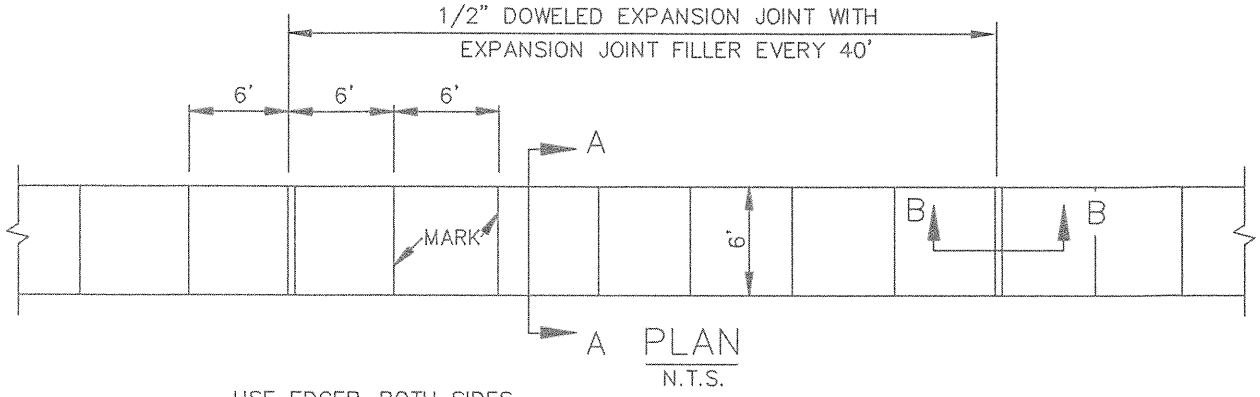
SECTION A-A



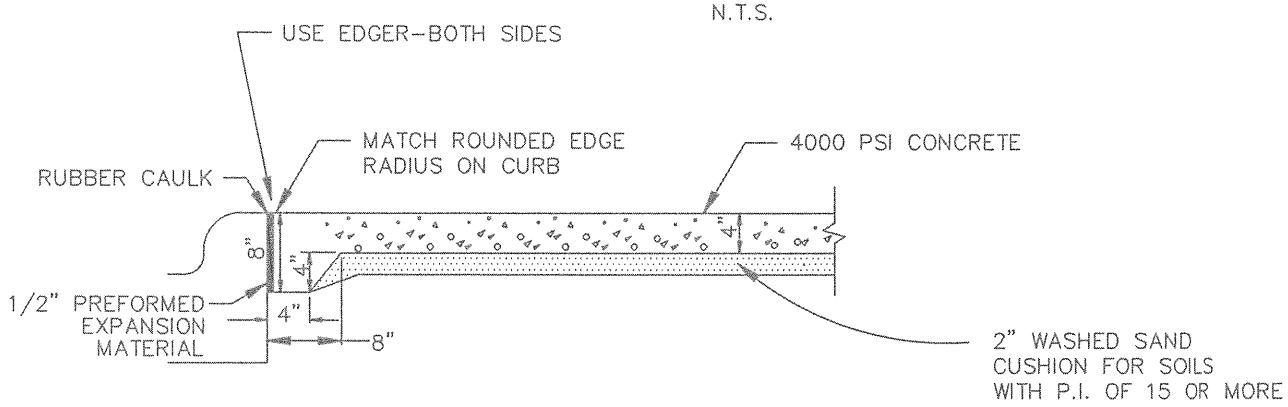
NOTES:

1. EXISTING CURB AND GUTTER, IF ANY MUST BE SAWED AS DIRECTED BY THE CITY ENGINEER, HORIZONTAL CURB CUT SHALL BE AT AN ELEVATION OF 1" ABOVE THE EXISTING GUTTER WITH A MINIMUM LENGTH AS SHOWN. THE TRADITIONAL SAW CUT SHALL HAVE A RUN OF 2'-6" AND SHALL RISE TO MEET THE EXISTING TOP OF CURB. ALL EXPOSED EDGES SHALL BE GROUND TO A 1/4" RADIUS. SAW CUTTING SHALL BE PERFORMED WITH A RIDE-ON SAW EQUIPPED WITH A DIAMOND BLADE.
2. SIDEWALK SECTION THRU DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH. (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED.)
3. THIS WORK SHALL NOT DISRUPT THE DESIGN FLOWLINE OF THE EXISTING GUTTER.

	CONCRETE DRIVEWAY APPROACH	STANDARD DRAWING NO.
	RESIDENTIAL	PAV-08

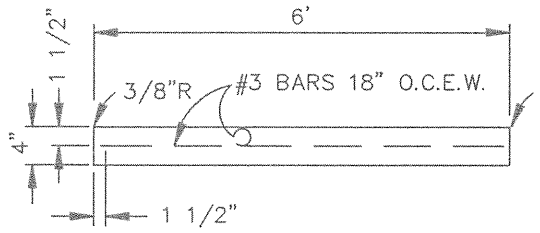


PLAN
N.T.S.

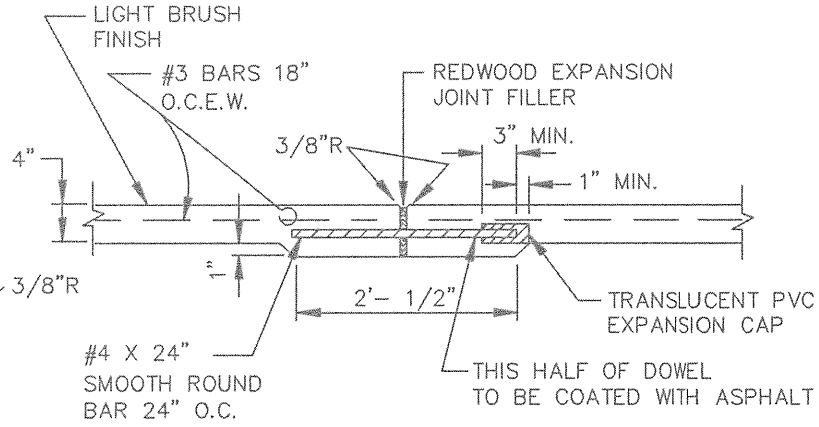


JOINT LUG DETAIL FOR MEDIAN PAVEMENT OR SIDEWALK ADJACENT TO CURB

N.T.S.



SECTION "A-A"
N.T.S.



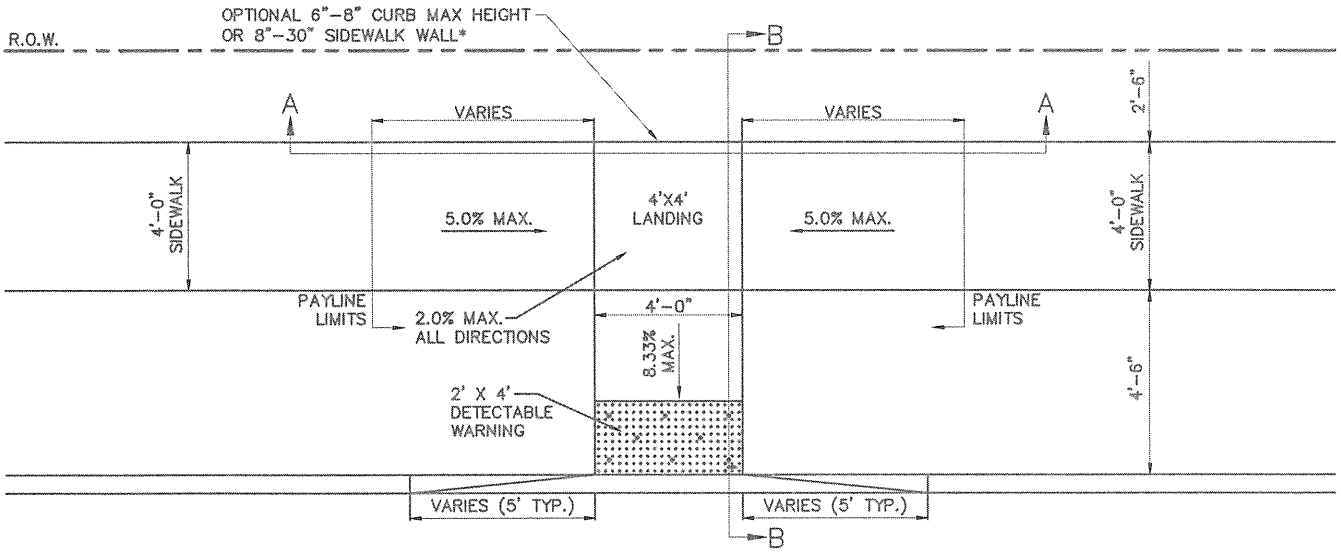
SECTION "B-B"
N.T.S.

NOTE:

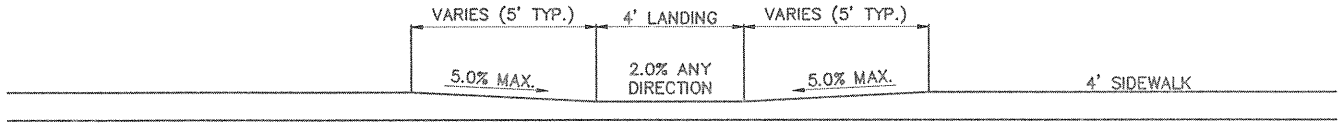
1. REFER TO STANDARD SPECIFICATION ITEM 8.3. FOR ALTERNATE REINFORCEMENT.
2. CROSS SLOPE OF SIDEWALK SHALL BE ± 1/4" PER FT. MIN. TO ± 3/8" PER FT. MAX.
3. OTHER THAN 6'-0" SIDEWALK WIDTH MAY BE SPECIFIED BY OWNER.
4. ALL HONEYCOMB IN BACK OF CURB TO BE TROWEL-PLASTERED BEFORE POURING SIDEWALK.
5. LUG MAY BE FORMED BY SHAPING SUBGRADE TO APPROXIMATE DIMENSIONS SHOWN.

	REINFORCED CONCRETE SIDEWALK	
		STANDARD DRAWING NO.
	JOINTS & SPACING	PAV-09

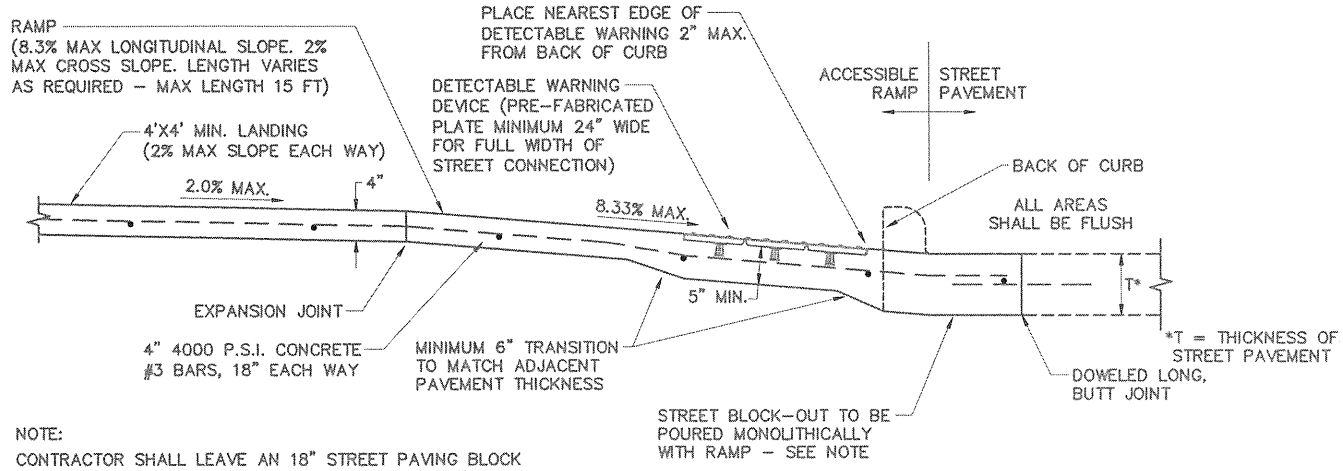
*SIDEWALK MUST BE 5' WIDE AT LANDING IF 6" CURB OR SIDEWALK WALL IS REQUIRED



MID–BLOCK CURB RAMP



SECTION A–A



NOTE:
CONTRACTOR SHALL LEAVE AN 18" STREET PAVING BLOCK OUT, MEASURED FROM BACK OF CURB, ADJACENT TO CURB RAMPS. BLOCK OUT SHALL BE POURED MONOLITHICALLY WITH CURB RAMP, DOWELED INTO STREET PAVEMENT (18" SMOOTH #3 DOWELS PLACED 18" O.C.)

SECTION B–B

MID-BLOCK BARRIER FREE RAMP

OPPOSITE "T" INTERSECTION

STANDARD DRAWING NO.

PAV-10

PEDESTRIAN ACCESSIBILITY (WITHIN PUBLIC R.O.W.)

ALL NEWLY CONSTRUCTED SIDEWALKS, CURB RAMPS AND CROSSWALKS INSTALLED WITHIN CITY PUBLIC RIGHTS-OF-WAY SHALL BE CONSIDERED A PEDESTRIAN ACCESS ROUTE AND SHALL CONFORM TO THE MOST CURRENT 'DRAFT' GUIDELINES FOR PUBLIC RIGHTS-OF-WAY CREATED BY THE UNITED STATES ACCESS BOARD.

CURB RAMPS

1. ALL SLOPES SHOWN ARE MAXIMUM ALLOWABLE. LESSER SLOPES THAT WILL STILL DRAIN PROPERLY SHOULD BE USED. ADJUST CURB RAMP LENGTH OR GRADE OF APPROACH SIDEWALKS AS DIRECTED.
2. LANDINGS SHALL BE 5'X 5' MINIMUM WITH A MAXIMUM 2% SLOPE IN EACH DIRECTION.
3. CLEAR SPACE AT THE BOTTOM OF CURB RAMPS SHALL BE A MINIMUM OF 4'X 4' WHOLLY CONTAINED WITHIN THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICULAR TRAVEL PATH.
4. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2%.
5. ADDITIONAL INFORMATION ON CURB RAMP LOCATION, DESIGN, LIGHT REFLECTIVE VALUE AND TEXTURE MAY BE FOUND IN THE MOST CURRENT EDITION OF THE TEXAS ACCESSIBILITY STANDARDS (TAS) AND 16 TAC 68.102. FEDERAL GUIDELINES SHALL SUPERSEDE ANY CONFLICTS.
6. CROSSWALK DIMENSIONS, CROSSWALK MARKINGS AND STOP BAR LOCATIONS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS. AT INTERSECTIONS WHERE CROSSWALK MARKINGS ARE NOT REQUIRED, CURB RAMPS AND ACCESSIBLE ROUTES SHALL ALIGN WITH THEORETICAL CROSSWALKS UNLESS OTHERWISE DIRECTED.
7. HANDRAILS ARE NOT REQUIRED ON CURB RAMPS.
8. PROVIDE A FLUSH TRANSITION WHERE THE CURB RAMPS CONNECT TO THE STREET.
9. ACCESSIBLE ROUTES ARE CONSIDERED "RAMPS" WHEN LONGITUDINAL SLOPES ARE BETWEEN 5% AND 8.3% (MAXIMUM ALLOWABLE). SIDEWALKS UNDER 5% LONGITUDINAL SLOPE ARE DEEMED ACCESSIBLE ROUTES AND MUST FOLLOW ALL APPLICABLE GUIDELINES.

EJ – EXPANSION JOINT

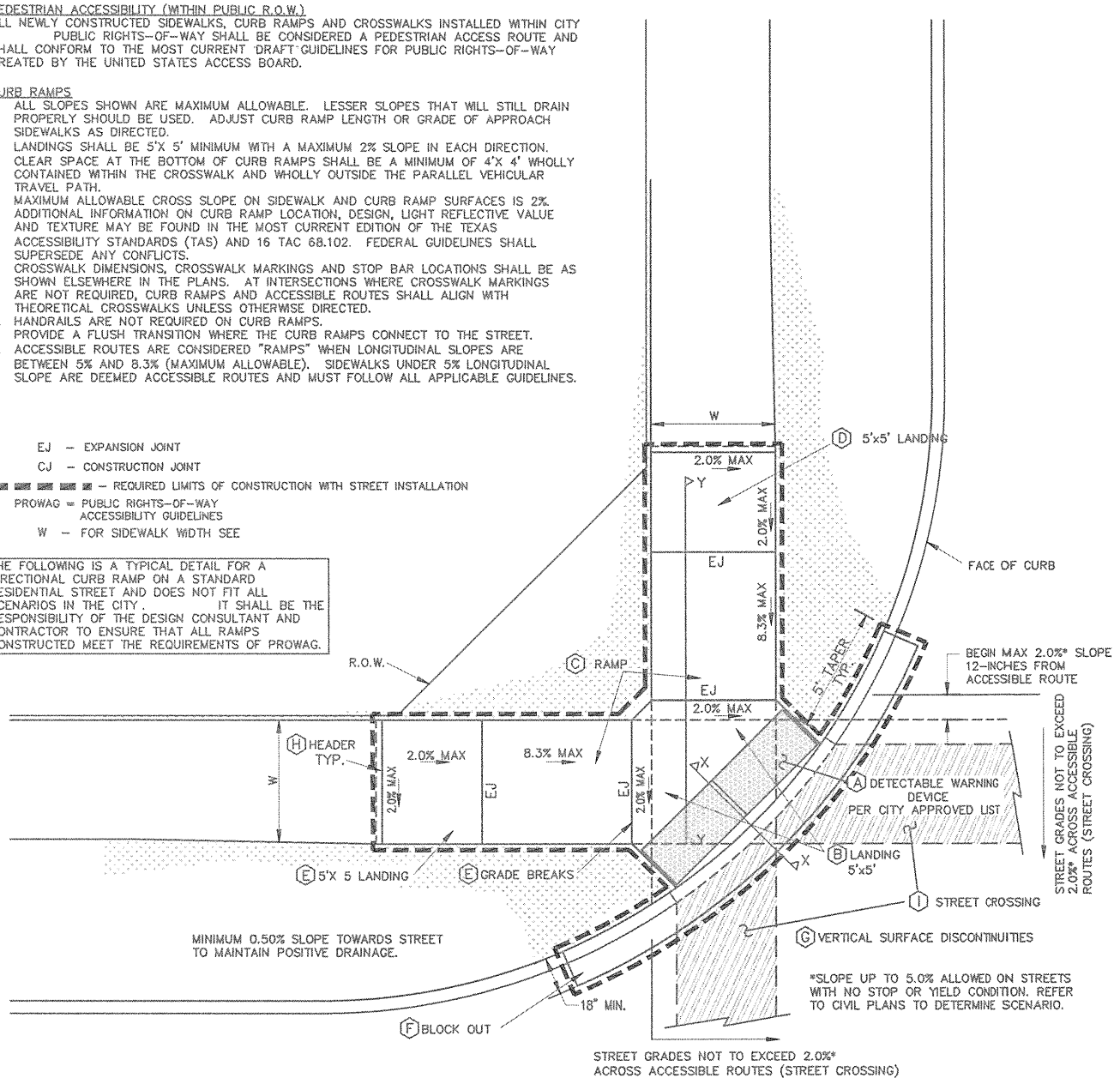
CJ – CONSTRUCTION JOINT

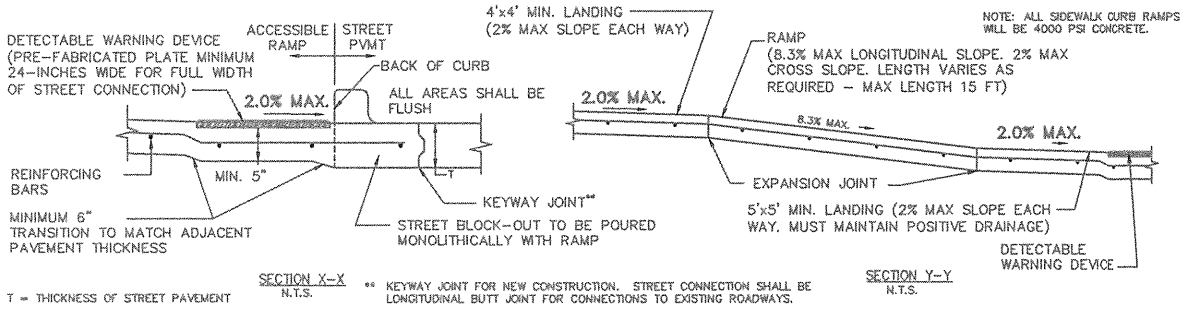
– REQUIRED LIMITS OF CONSTRUCTION WITH STREET INSTALLATION

PROWAG = PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES

W – FOR SIDEWALK WIDTH SEE

THE FOLLOWING IS A TYPICAL DETAIL FOR A DIRECTIONAL CURB RAMP ON A STANDARD RESIDENTIAL STREET AND DOES NOT FIT ALL SCENARIOS IN THE CITY. IT SHALL BE THE RESPONSIBILITY OF THE DESIGN CONSULTANT AND CONTRACTOR TO ENSURE THAT ALL RAMPS CONSTRUCTED MEET THE REQUIREMENTS OF PROWAG.





** KEYWAY JOINT FOR NEW CONSTRUCTION. STREET CONNECTION SHALL BE LONGITUDINAL BUTT JOINT FOR CONNECTIONS TO EXISTING ROADWAYS.

BARRIER FREE RAMP

TYPE 'B' (1 OF 2)

STANDARD DRAWING NO.

PAV-11

(A) DETECTABLE WARNING DEVICES (DWD) SHALL BE PRE-MANUFACTURED CAST-IN-PLACE PLATES FROM THE CITY OF ANNA APPROVED VENDOR LIST INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS, AND SHALL MEET ALL ADA REQUIREMENTS. NO BRICK PAVERS ALLOWED. COLOR TO BE BRICK RED OR SIMILAR. DWD SHALL BE 24 INCHES IN LENGTH FOR THE FULL WIDTH OF THE STREET CONNECTION STARTING AT THE BACK OF CURB. A MAXIMUM 2-INCH BORDER SHALL BE ALLOWED ON THE SIDES OF THE DWD FOR PROPER INSTALLATION.

(B) ALSO KNOWN AS "CLEAR SPACE" PER ADA PROWAG, THE CITY REQUIRES A MINIMUM LANDING SPACE OF 4-FOOT BY 4-FOOT AT THE BOTTOM OF EVERY RAMP. THIS LANDING SPACE SHALL HAVE A CROSS SLOPE IN BOTH DIRECTIONS THAT DOES NOT EXCEED 2.0%. AND SHALL BE WHOLLY OUTSIDE THE PARALLEL VEHICULAR TRAVEL PATH.

(C) THE RAMP COMPONENT OF THE DIRECTIONAL CURB RAMP SHALL HAVE A CONTINUOUS LONGITUDINAL SLOPE MORE THAN 5% AND LESS THAN 8.3%. THE RAMP SHALL ALSO HAVE A CROSS SLOPE OF NO MORE THAN 2.0%. LENGTH OF RAMP CAN VARY, BUT SHALL NOT EXCEED 15 FEET TO ACHIEVE DESIRED ELEVATION CHANGE.

(D) ALSO KNOWN AS "TURNING SPACE" PER ADA PROWAG, A MINIMUM LANDING SPACE OF 4-FOOT BY 4-FOOT SHALL BE AT THE TOP OF EVERY RAMP. THIS LANDING (TURNING) SPACE SHALL HAVE A CROSS SLOPE IN BOTH DIRECTIONS THAT DOES NOT EXCEED 2.0%. LANDING MUST MATCH WIDTH OF SIDEWALK AND LENGTH SHALL BE THE SAME DISTANCE ("SQUARED" LANDING).

(E) ALL CURB RAMPS SHALL HAVE GRADE BREAKS AT THE TOP AND BOTTOM THAT ARE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE LESS THAN OR EQUAL TO 5 FEET, THE DWD SHALL BE PLACED WITHIN THE RAMP AT THE BOTTOM GRADE BREAK. WHERE EITHER END OF THE BOTTOM GRADE BREAK IS GREATER THAN 5 FEET, THE DWD SHALL BE PLACED BEHIND THE BACK OF THE CURB.

(F) PAVING CONTRACTOR SHALL LEAVE BLOCK OUT WITH A KEYWAY JOINT INSTALLED, MINIMUM OF 18 INCHES MEASURED FROM BACK OF CURB. BLOCK OUT SHALL BE POURED MONOLITHICALLY WITH CURB RAMP. CONCRETE SHALL TIE TO STREET PAVING WITH A KEYWAY JOINT PER CITY DETAIL 2050M. NO CURB SHALL BE CONSTRUCTED WHERE A DWD IS PROVIDED. THE CURB ON EITHER SIDE SHALL HAVE A TYPICAL 5 FOOT TAPER TO TRANSITION FROM THE STANDARD 6-INCH CURB HEIGHT TO BE FLUSH WITH RAMP.

(G) ALL WORK ASSOCIATED WITH ACCESSIBLE ROUTES SHALL BE INSTALLED FLUSH WITH ALL FEATURES TO MINIMIZE VERTICAL SURFACE DISCONTINUITIES. EACH SEGMENT ALONG ACCESSIBLE ROUTE SHALL BE FLUSH WITH NO MORE (ZERO TOLERANCE) THAN A ¼-INCH GRADE SEPARATION (ELEVATION DIFFERENCE), OR ½-INCH GRADE SEPARATION IF BEVELED (BEVEL SLOPE SHALL NOT BE STEEPER THAN 50%).

(H) A SIDEWALK HEADER SHALL BE CONSTRUCTED AT ENDS OF ALL WORK PERFORMED.

(I) STREET CROSSINGS SHALL ADHERE TO SAME GUIDELINES AS OTHER ACCESSIBLE ROUTES WITHIN PUBLIC RIGHT-OF-WAY, AND SHALL BE FOR THE FULL WIDTH OF THE IN-LINE ACCESSIBLE ROUTE. CROSS SLOPE SHALL NOT EXCEED 2%*. NEW STREET CONSTRUCTION SHALL INCORPORATE ALL ADA DESIGN REQUIREMENTS. IT SHALL BE THE RESPONSIBILITY OF THE DESIGN PROFESSIONAL AND CONTRACTOR TO ENSURE ALL STREET CROSSINGS MEET THE REQUIREMENTS OF PROWAG. STREET ALTERATIONS ON EXISTING STREETS TO BRING TO COMPLIANCE SHALL BE AT THE CITY ENGINEER'S DISCRETION.

(J) ALL CURBS CONSTRUCTED AS PART OF AN ADA RAMP SHALL MATCH CITY CURB STANDARDS.

** SEE PROWAG SPECIAL DESIGN CONSIDERATIONS WHEN STREET CROSSING HAS NO STOP OR YIELD CONDITION.*

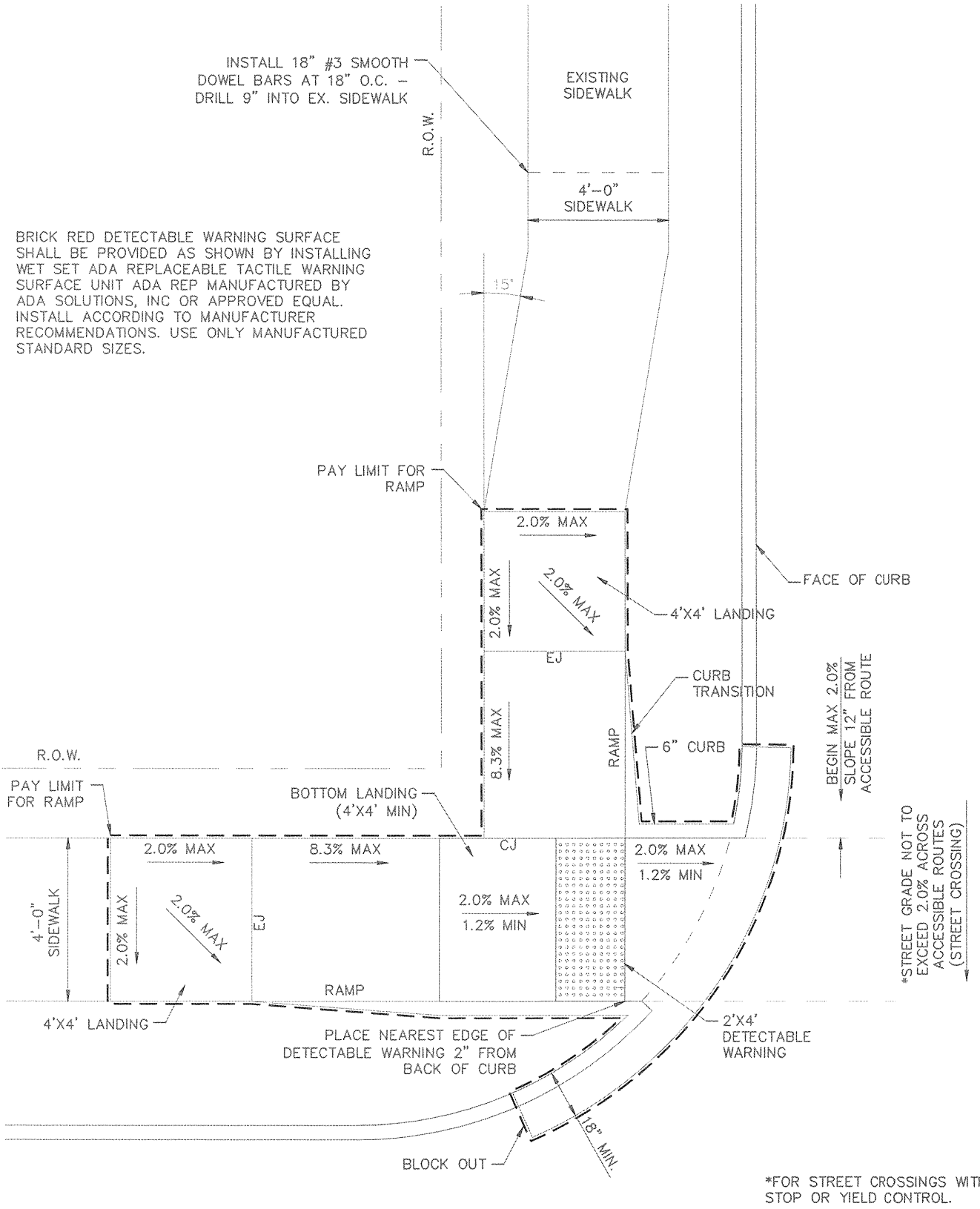
DETECTABLE WARNING DEVICE

1. CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES COMPLYING WITH SECTION 705 OF THE TAS. THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACES. FURNISH AND INSTALL AN APPROVED CAST-IN-PLACE DARK RED DETECTABLE WARNING SURFACE MATERIAL ADJACENT TO UNCOLORED CONCRETE, UNLESS SPECIFIED ELSEWHERE IN THE PLANS.
2. DETECTABLE WARNING MATERIALS MUST MEET CITY OF ANNA MATERIAL SPECIFICATION (REFER TO TXDOT APPROVED VENDOR LIST) AND BE LISTED ON THE MATERIAL PRODUCER LIST. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.
4. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL, AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR LANDING WHERE THE PEDESTRIAN ACCESS ROUTE ENTERS THE STREET.
5. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS AT THE BACK OF CURB. WHEN PLACED ON THE RAMP, ALIGN THE ROWS OF DOMES TO BE PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET. WHERE DETECTABLE WARNING SURFACES ARE PROVIDED ON A SURFACE WITH A SLOPE THAT IS LESS THAN 5 PERCENT, DOME ORIENTATION IS LESS CRITICAL. DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.

SIDEWALKS

6. PROVIDE CLEAR GROUND SPACE AT OPERABLE PARTS, INCLUDING PEDESTRIAN PUSH BUTTONS. OPERABLE PARTS SHALL BE PLACED WITHIN ONE OR MORE REACH RANGES SPECIFIED IN TAS 308.
7. PLACE TRAFFIC SIGNAL OR ILLUMINATION POLES, GROUND BOXES, CONTROLLER BOXES, SIGNS, DRAINAGE FACILITIES AND OTHER ITEMS SO AS NOT TO OBSTRUCT THE PEDESTRIAN ACCESS ROUTE OR CLEAR GROUND SPACE.
8. STREET GRADES AND CROSS SLOPES SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
9. CHANGES IN LEVEL GREATER THAN 1/4 INCH ARE NOT PERMITTED (1/2 INCH WITH BEVEL).
10. WHERE A 4' SIDEWALK IS PROVIDED, A 5'X 5' PASSING AREAS ARE REQUIRED AT INTERVALS NOT TO EXCEED 200'.
11. THE LEAST POSSIBLE GRADE SHOULD BE USED TO MAXIMIZE ACCESSIBILITY. THE RUNNING SLOPE OF SIDEWALKS AND CROSSWALKS WITHIN THE PUBLIC RIGHT OF WAY MAY FOLLOW THE GRADE OF THE PARALLEL ROADWAY. WHERE A CONTINUOUS GRADE GREATER THAN 5% MUST BE PROVIDED, HANDRAILS MAY BE DESIRABLE TO IMPROVE ACCESSIBILITY. HANDRAILS MAY ALSO BE NEEDED TO PROTECT PEDESTRIANS FROM POTENTIALLY HAZARDOUS CONDITIONS. IF PROVIDED, HANDRAILS SHALL COMPLY WITH TAS 505.
12. HANDRAIL EXTENSIONS SHALL NOT PROTRUDE INTO THE USABLE LANDING AREA OR INTO INTERSECTING PEDESTRIAN ROUTES.

	BARRIER FREE RAMP	
	TYPE 'B' (2 OF 2)	STANDARD DRAWING NO. PAV-11A

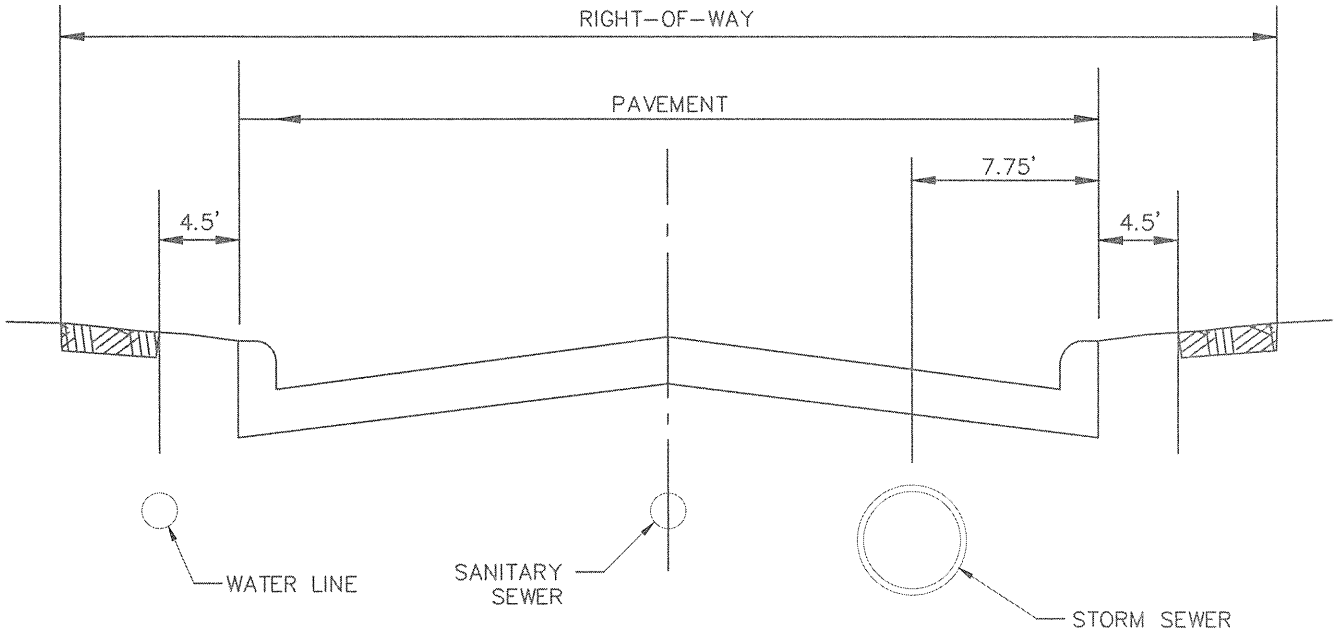


BARRIER FREE RAMP

TYPE 'C'

STANDARD DRAWING NO.

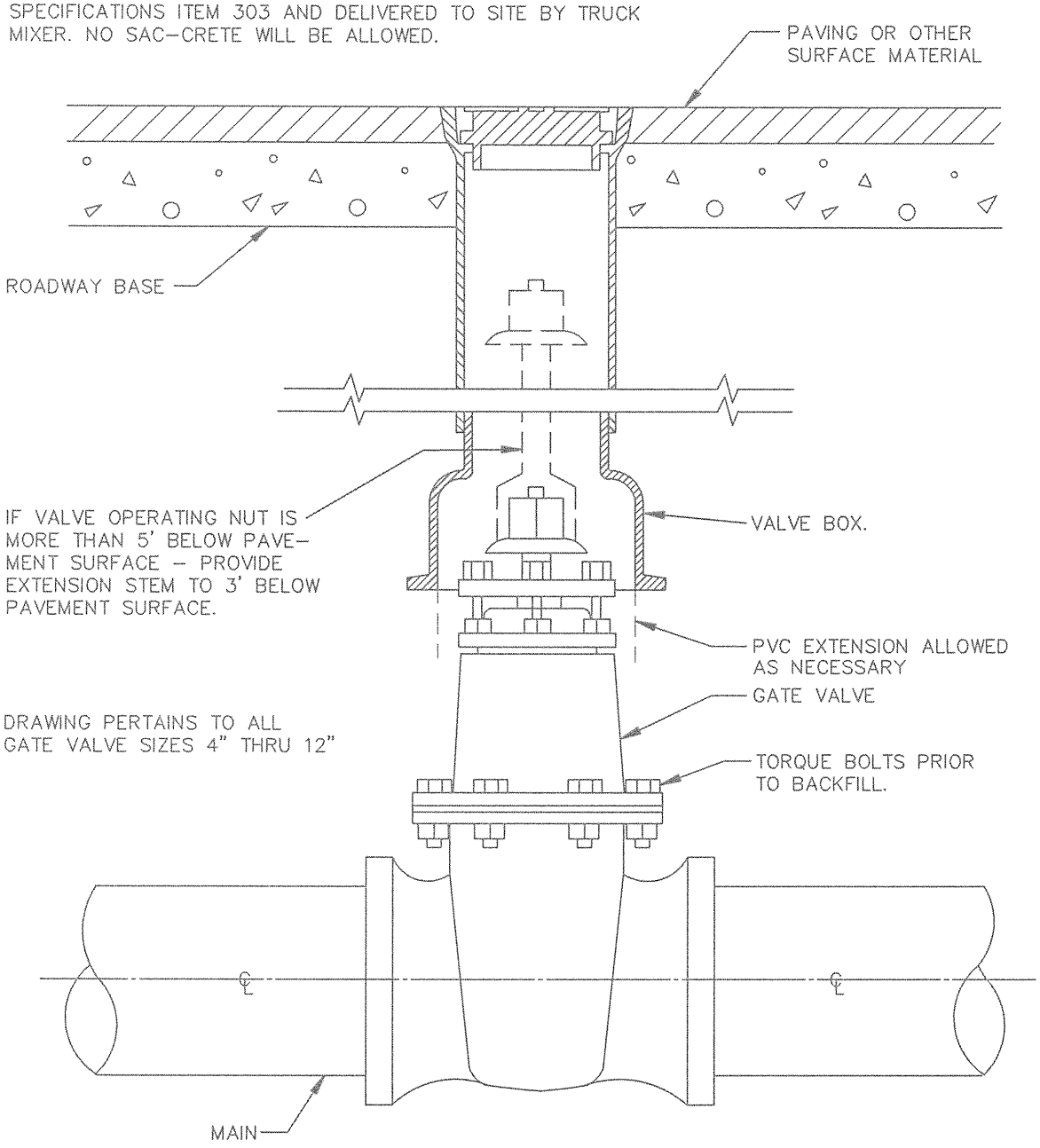
PAV-12



	TYPICAL UTILITY LOCATION	
	IN PAVEMENT	STANDARD DRAWING NO. PAV-13

NOTE:

IN UNPAVED AREAS, INSTALL 2' x 2' x 6" CONCRETE VALVE PAD FLUSH WITH THE TOP OF VALVE BOX. REINFORCE WITH #3 BARS ON 6" CENTERS BOTH WAYS. CONCRETE SHALL BE IN ACCORDANCE WITH 5TH EDITION NCTCOG STANDARD SPECIFICATIONS ITEM 303 AND DELIVERED TO SITE BY TRUCK MIXER. NO SAC-CRETE WILL BE ALLOWED.



GATE VALVE BOX AND EXTENSION STEM

N.T.S.

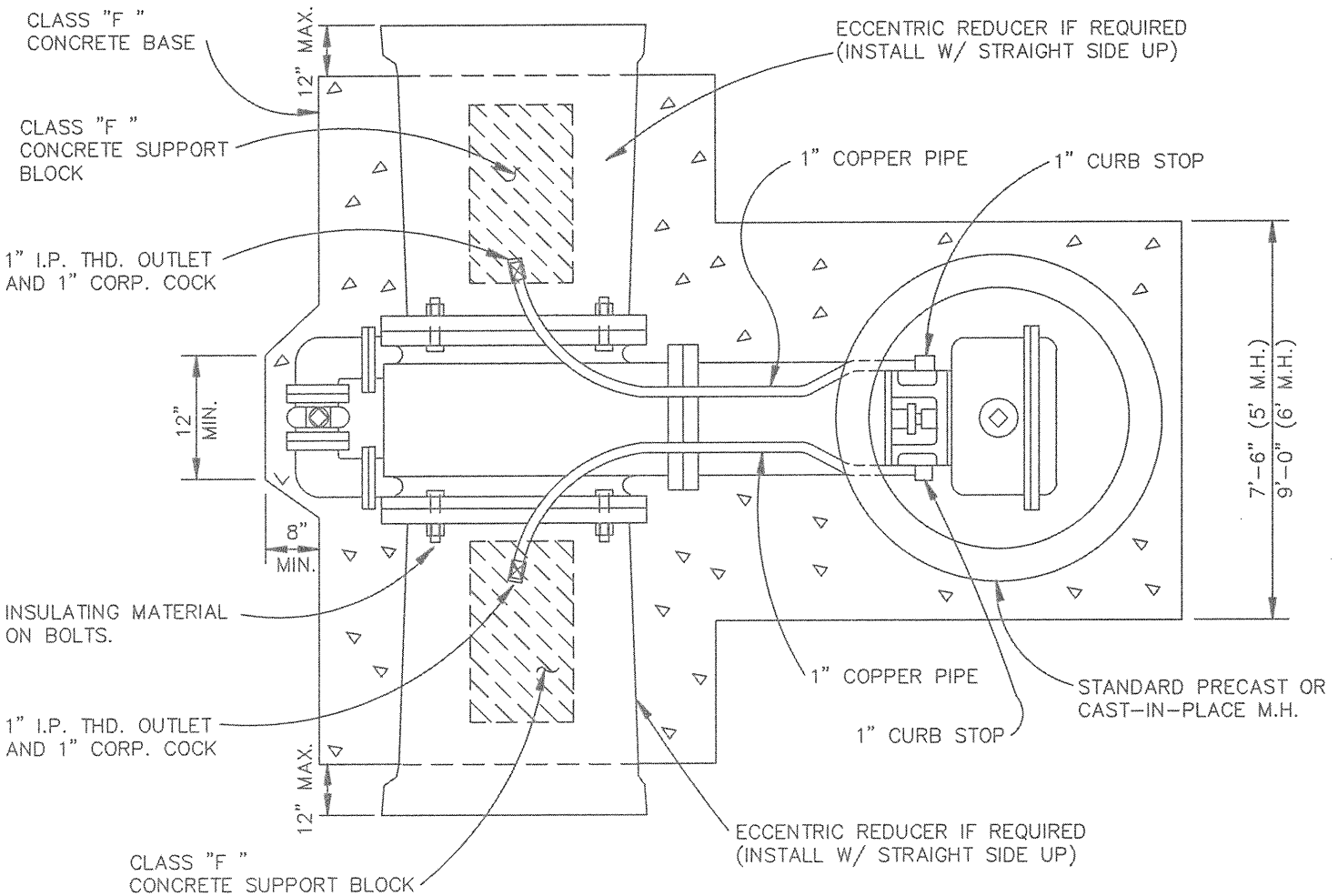
	GATE VALVE 4" TO 12"	
	BOX & EXTENSION STEM	STANDARD DRAWING NO. WAT-01

VAULT CONSTRUCTION PLAN

HORIZONTAL GATE VALVE ≥ 16"

STANDARD DRAWING NO.

WAT-02



PLAN

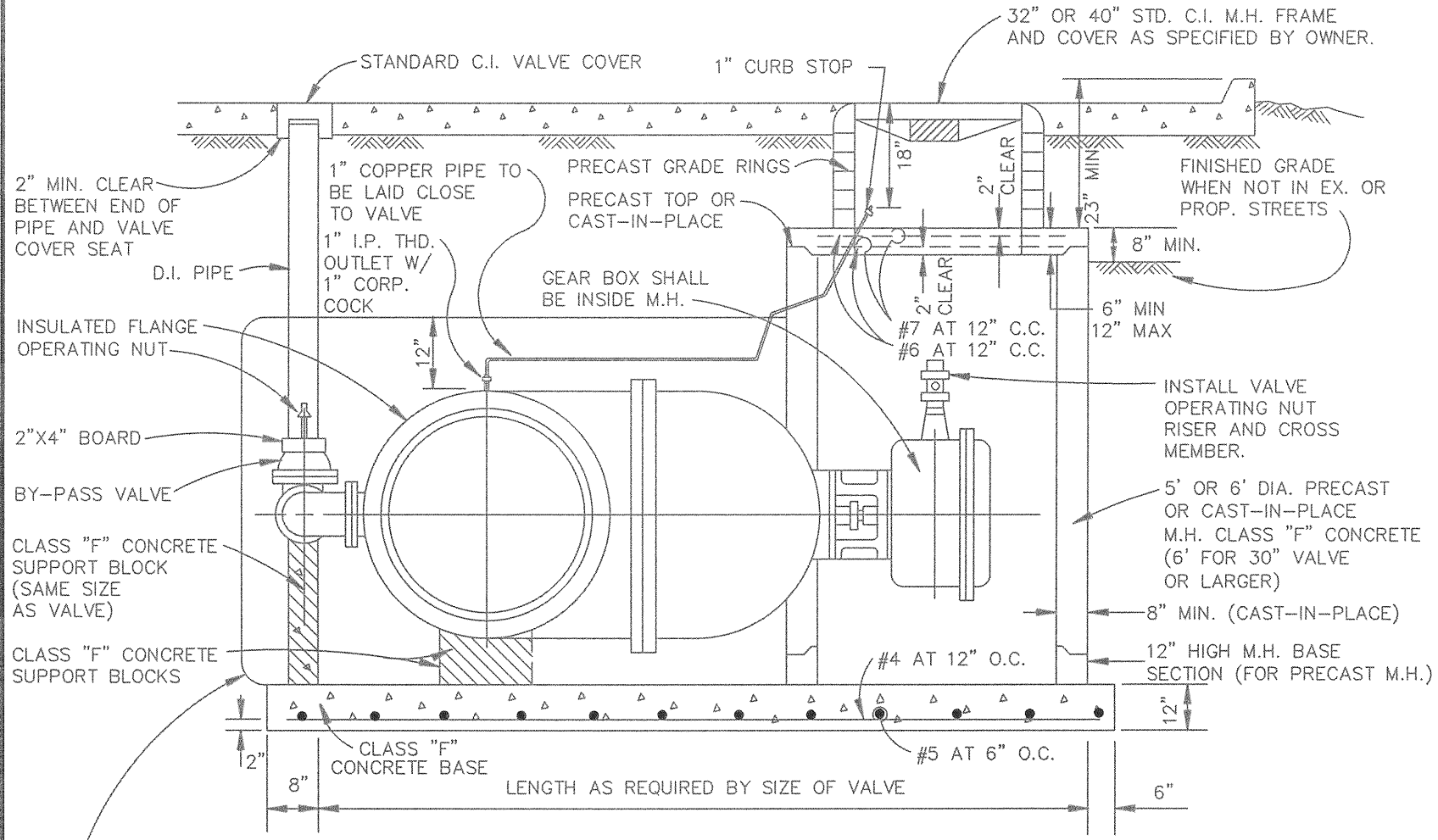
N.T.S.

VAULT CONSTRUCTION PROFILE

HORIZONTAL GATE VALVE ≥ 16"

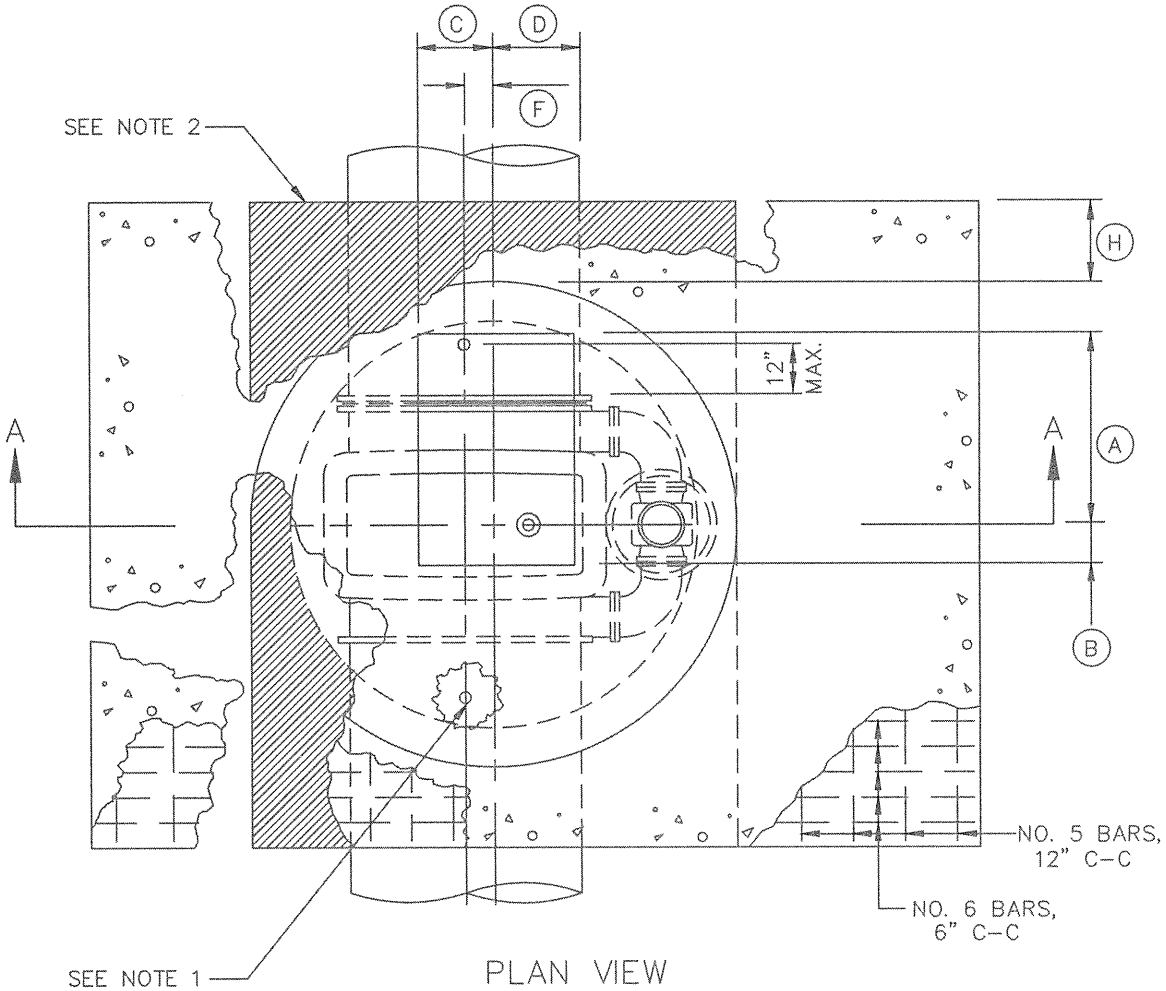
STANDARD DRAWING NO.

WAT-03



PROFILE

N.T.S.



PLAN VIEW

(LESS MANHOLE FRAME & COVER INSTALLATION)
N.T.S.

GATE VALVE SIZE	DIMENSION TABLE											
	A	B	C	D	E	F	G	H	J	K	L	M
16"	20"	20"	12"	12"	44 1/2"	1"	48"	12"	10"	24"	12"	16"
18"	20"	20"	12"	12"	51 3/8"	2"	48"	12"	12"	24"	12"	18"
20"	22"	18"	12"	12"	56 5/8"	1"	54"	12"	12"	24"	16"	20"
24"	26"	14"	12"	12"	64 3/8"	1"	60"	18"	14"	30"	18"	24"
30"	28"	12"	12"	12"	80 5/8"	3"	66"	18"	18"	30"	20"	30"
36"	32"	8"	12"	12"	90 1/16"	4"	72"	18"	18"	36"	24"	36"
42"	34"	6"	15"	9"	107 3/4"	5"	78"	24"	20"	36"	30"	42"
48"	36"	4"	14"	10"	121 5/8"	4"	90"	24"	26"	42"	36"	48"
54"	36"	4"	9"	15"	142 1/2"	3"	102"	24"	32"	46"	40"	54"

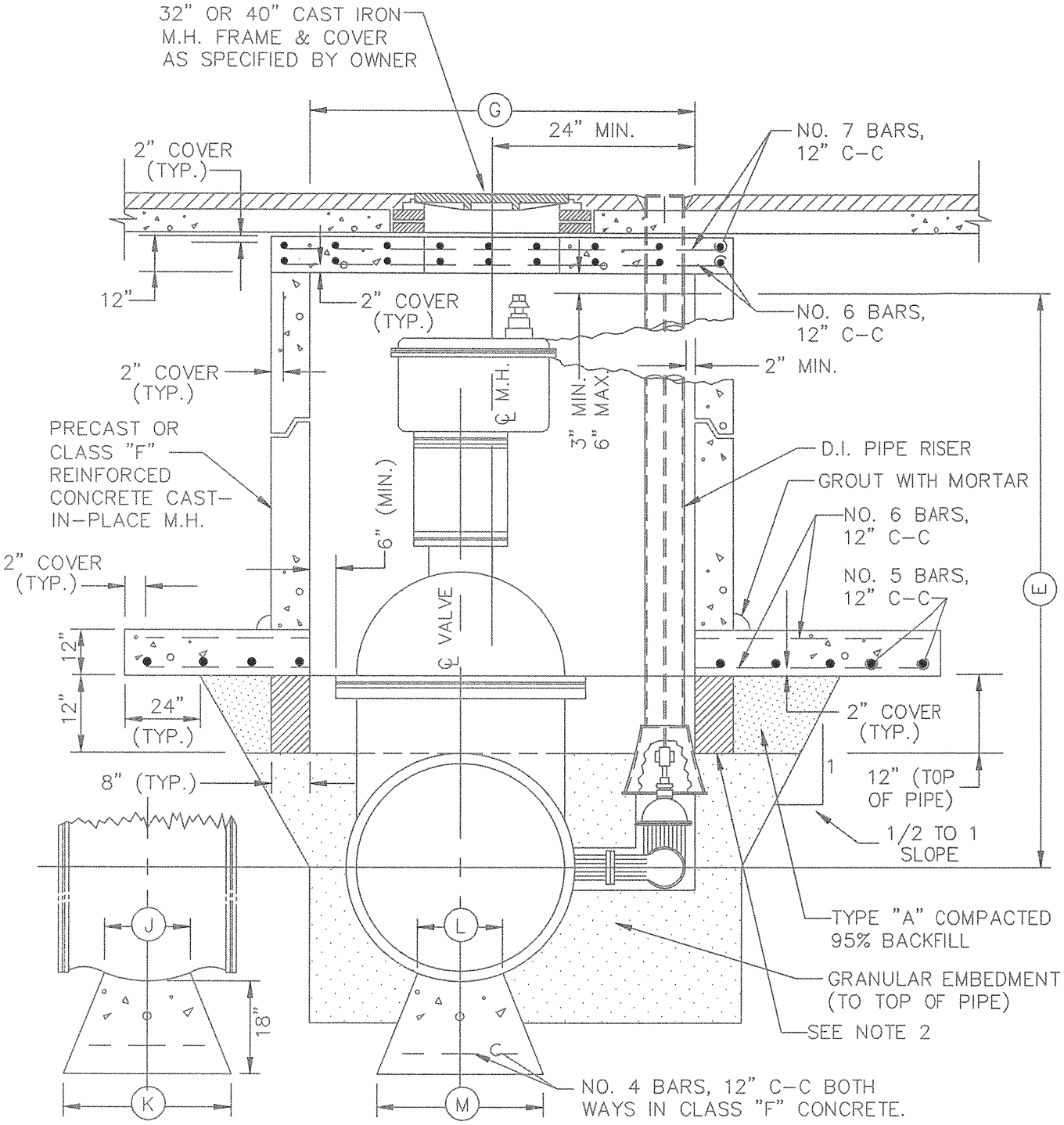
NOTES:
1. PROVIDE CORPORATION AND CURB STOPS A MAXIMUM OF 12" FROM EACH END OF GATE VALVE, AS SHOWN. CORPORATION AND CURB STOP SIZES SHALL BE 1" FOR 16", 20", AND 24" NOMINAL PIPE DIAMETERS; 2" FOR 30" AND LARGER DIAMETERS. 2" TAPS SHALL BE MADE AS A 2" FLANGED OUTLET WITH INSULATED ADAPTOR KIT. COPPER RISERS SHALL BE PROVIDED BETWEEN THE CORPORATION AND CURB STOPS. CURB STOPS SHALL BE INSTALLED AT AN ELEVATION 12" ABOVE THE TOP SURFACE OF VAULT BOTTOM SLAB.
2. POLYURETHANE CUSHION PAD.

VAULT CONSTRUCTION DIMENSIONS

VERTICAL GATE VALVE ≥ 16"

STANDARD DRAWING NO.

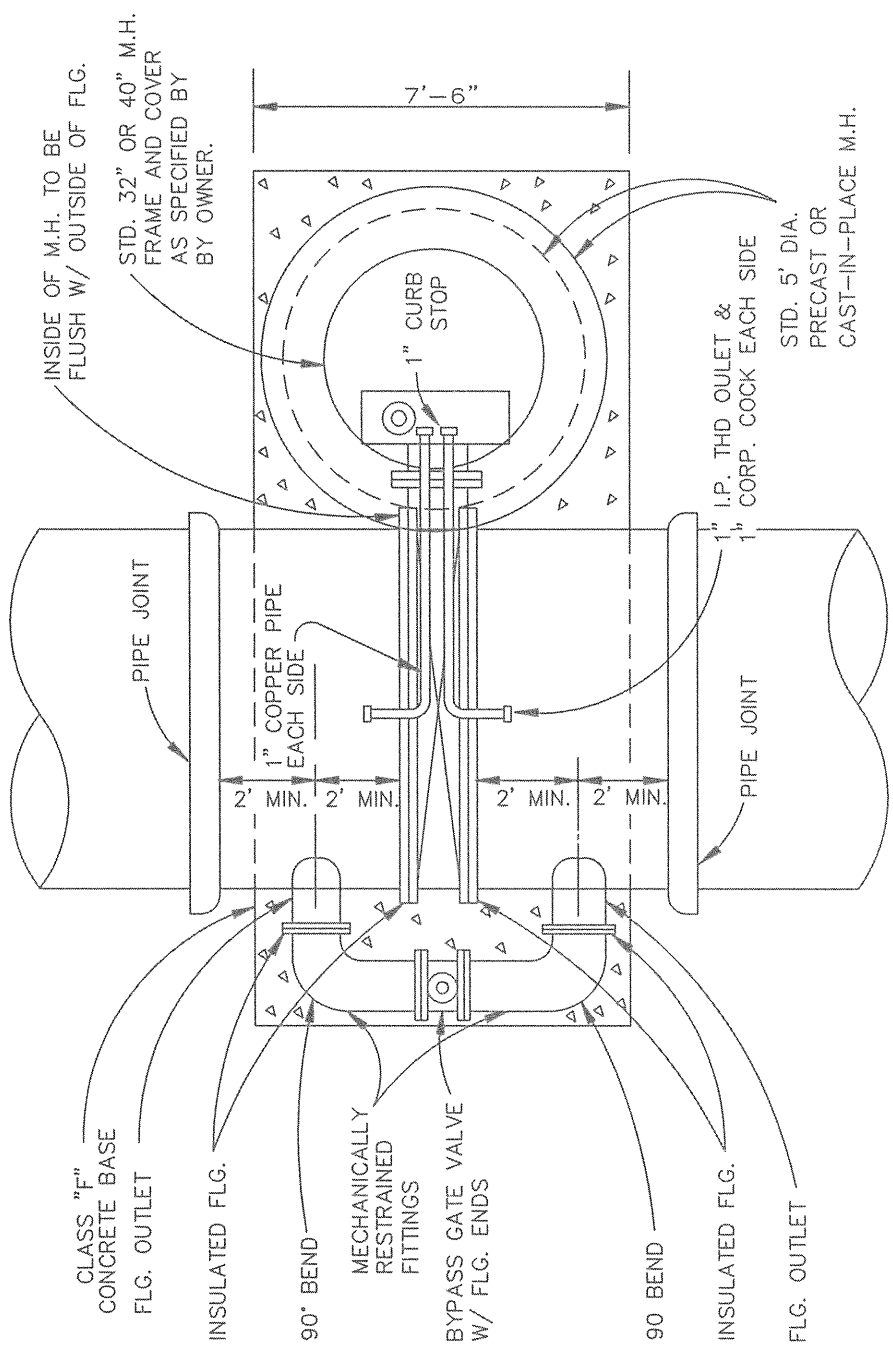
WAT-04



SECTION "A–A"

REFER TO STD. DWG. WAT–04 FOR DIMENSION TABLE AND GENERAL NOTES.

	VAULT CONSTRUCTION SECTION	STANDARD DRAWING NO.
	VERTICAL GATE VALVE ≥ 16"	WAT-05



PLAN

N.T.S.

VAULT CONSTRUCTION PLAN

BUTTERFLY VALVE ≥ 16"

STANDARD DRAWING NO.

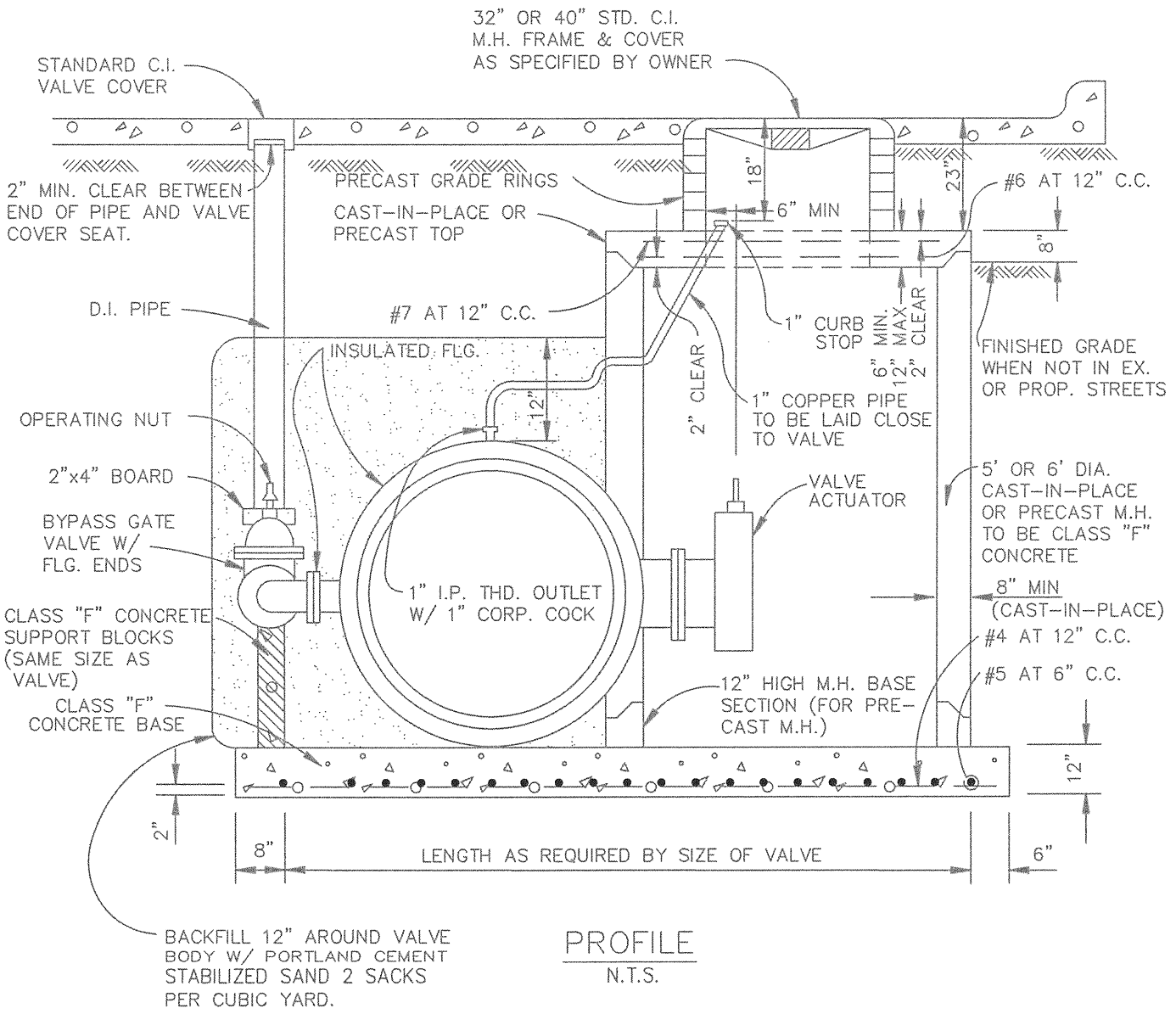
WAT-06

VAULT CONSTRUCTION PROFILE

BUTTERFLY VALVE ≥ 16"

STANDARD DRAWING NO.

WAT-07



PROFILE

N.T.S.

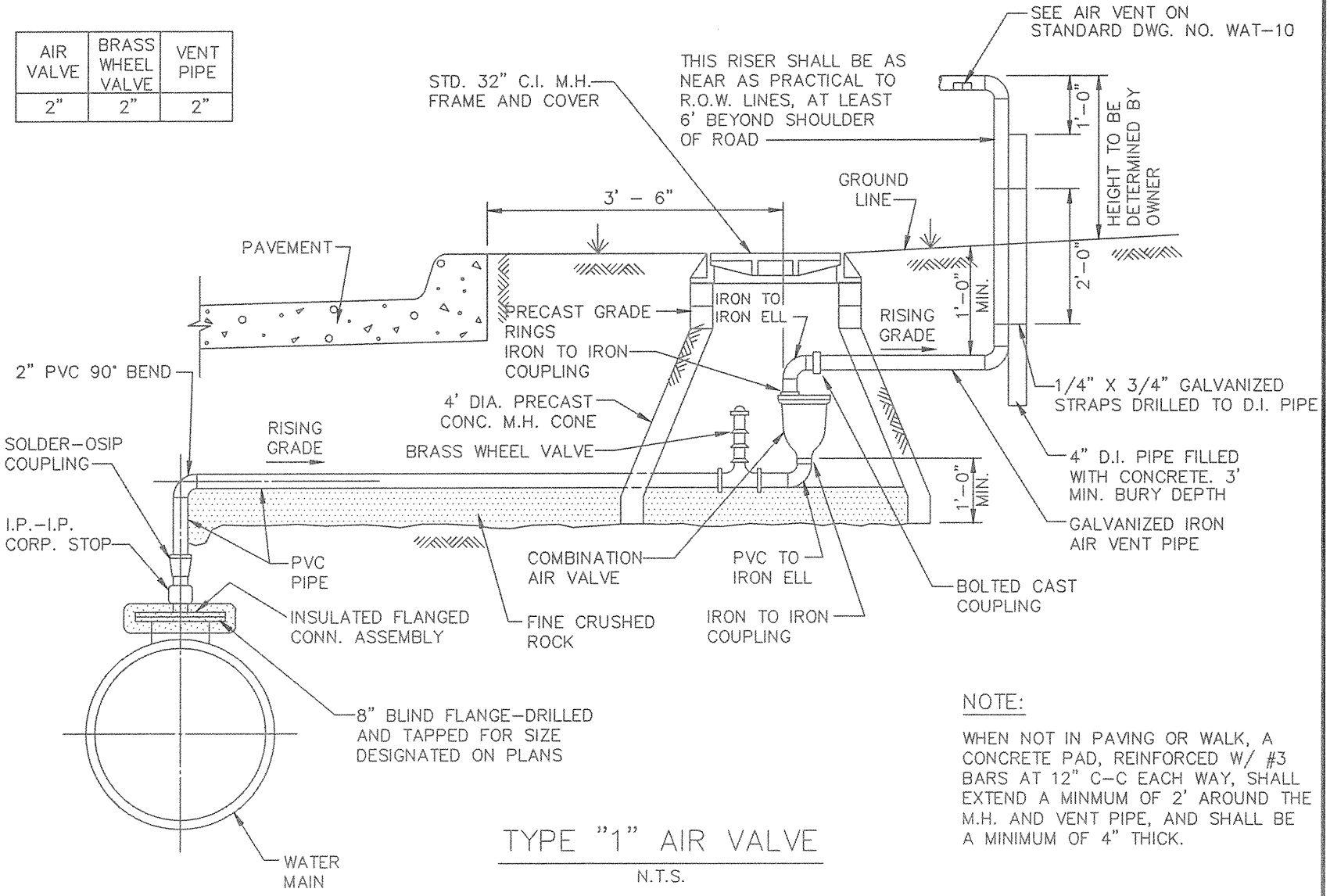
COMBINATION AIR VACUUM VALVE

TYPE "1"

WAT-08

STANDARD DRAWING NO.

AIR VALVE	BRASS WHEEL VALVE	VENT PIPE
2"	2"	2"



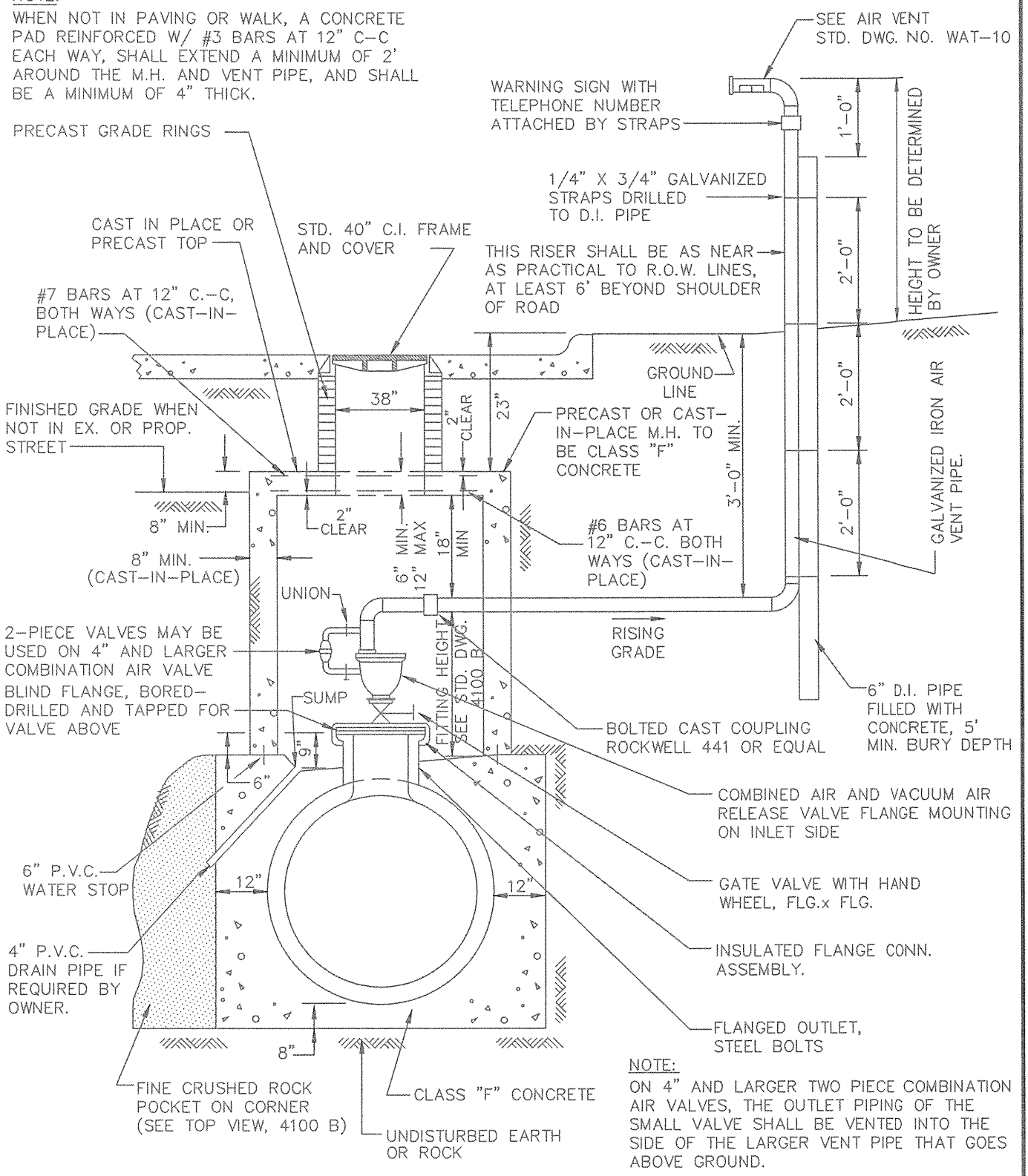
TYPE "1" AIR VALVE

N.T.S.

NOTE:

WHEN NOT IN PAVING OR WALK, A CONCRETE PAD, REINFORCED W/ #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINMUM OF 2' AROUND THE M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

NOTE:
WHEN NOT IN PAVING OR WALK, A CONCRETE PAD REINFORCED W/ #3 BARS AT 12" C–C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.



NOTE:
ON 4" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED INTO THE SIDE OF THE LARGER VENT PIPE THAT GOES ABOVE GROUND.

TYPE "2" AIR VALVE

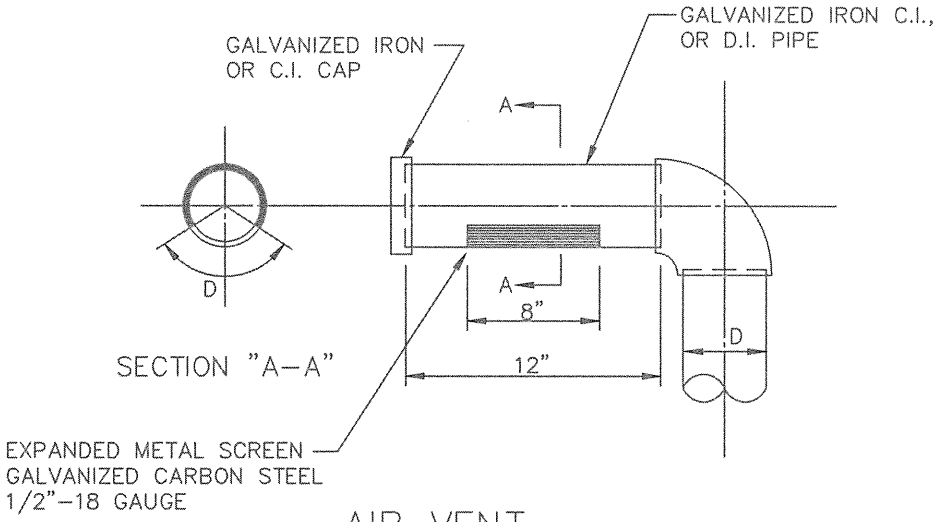
N.T.S.

COMBINATION AIR VACUUM VALVE

TYPE "2" SECTION

STANDARD DRAWING NO.

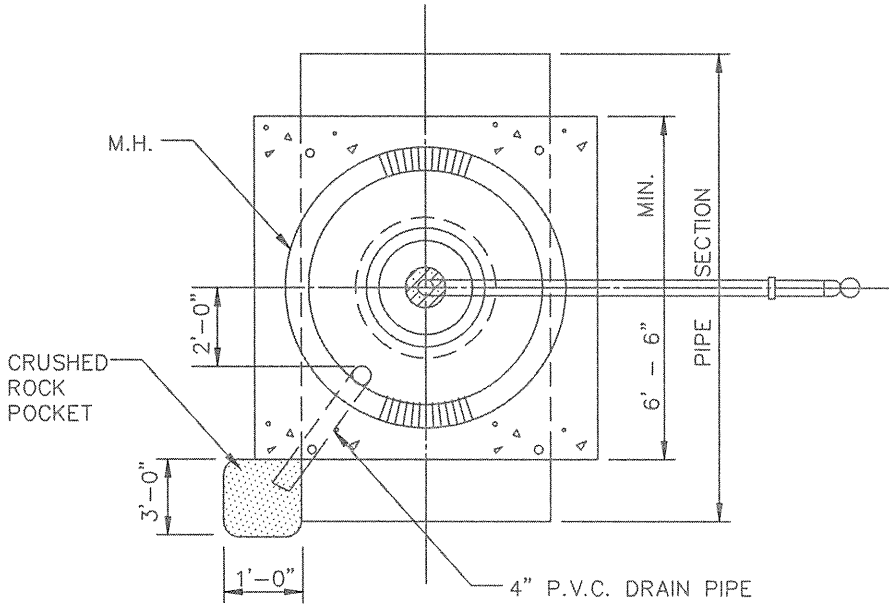
WAT-09



AIR VENT

N.T.S.

AIR VALVE	GATE VALVE	FLG. OUTLET	MIN. FITTING HEIGHT	VENT PIPE D	M.H. DIA.
2"	2"	8"	26"	2"	5'
3"	3"	18"	31"	3"	5'
4"	4"	18"	38"	4"	5'
6"	6"	18"	46"	6"	5'
8"	8"	18"	53"	8"	6'
10"	10"	20"	62"	10"	6'
12"	12"	24"	72"	12"	6'



PLAN VIEW

N.T.S.

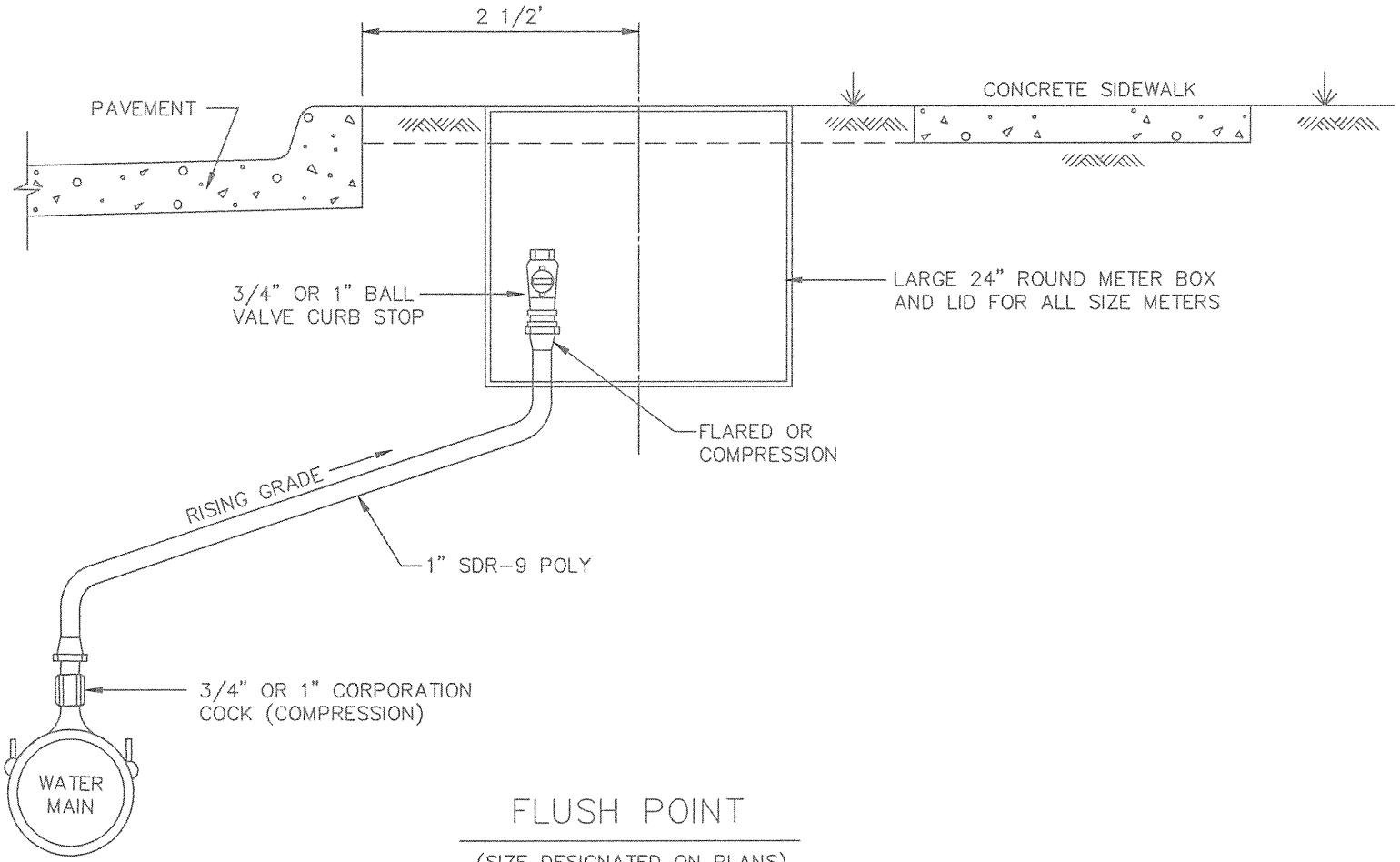
	AIR RELEASE VALVE AIR VENT	
	TYPE "2"	STANDARD DRAWING NO. WAT-10

FLUSH POINT INSTALLATION

TYPE "1"

STANDARD DRAWING NO.

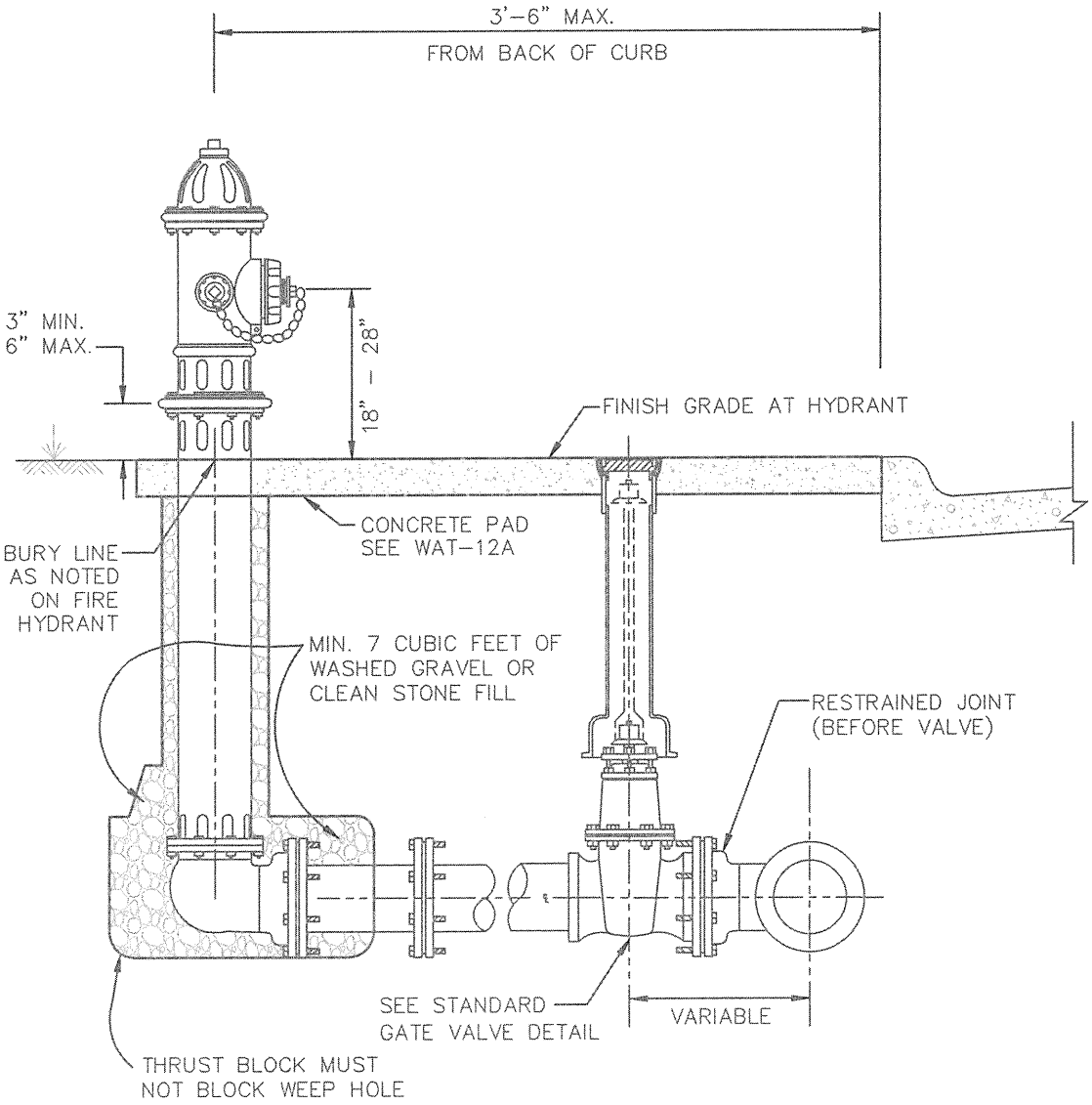
WAT-11



FLUSH POINT

(SIZE DESIGNATED ON PLANS)
N.T.S.

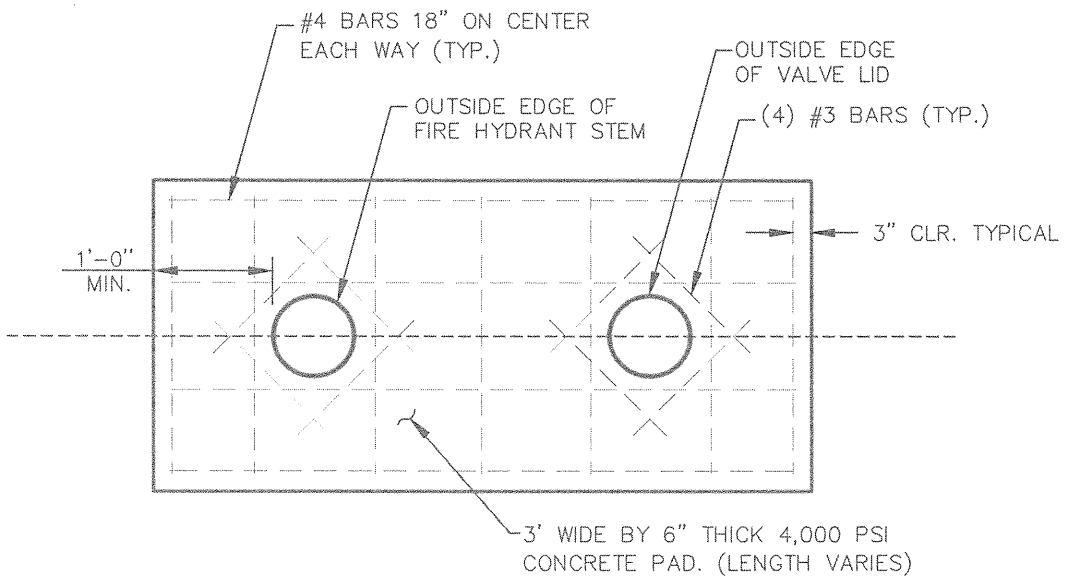
FIRE HYDRANT INSTALLATION



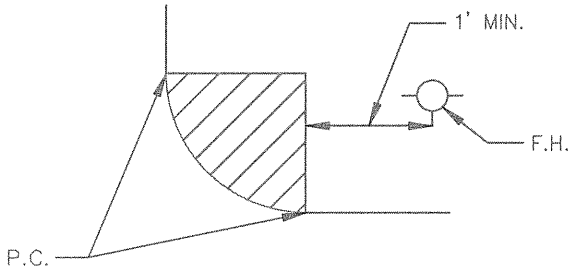
NOTES:

1. IN GENERAL, ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE, C-502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN. VALVE OPENING AND A BARREL APPROXIMATELY 7" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. ALL JOINTS SHALL BE MECHANICAL JOINTS.
3. TYPICAL VALVE: ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF WATER MAIN.
4. F.H. NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (USUAL)
5. STANDARD BURY DEPTH 5' FEET.
6. SET FIRE HYDRANT ON THE LOT LINE EXTENDED WHEN POSSIBLE.
7. F.H. SHALL BE LOCATED MINIMUM 1 FT. OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADII AT INTERSECTIONS. (SEE PLAN VIEW ON WAT-12A)
8. NO MORE THAN 2 EXTENSIONS SHALL BE PERMITTED.

STANDARD DRAWING NO.
WAT-12



PLAN VIEW – REBAR
N.T.S.



PLAN VIEW – PLACEMENT
N.T.S.

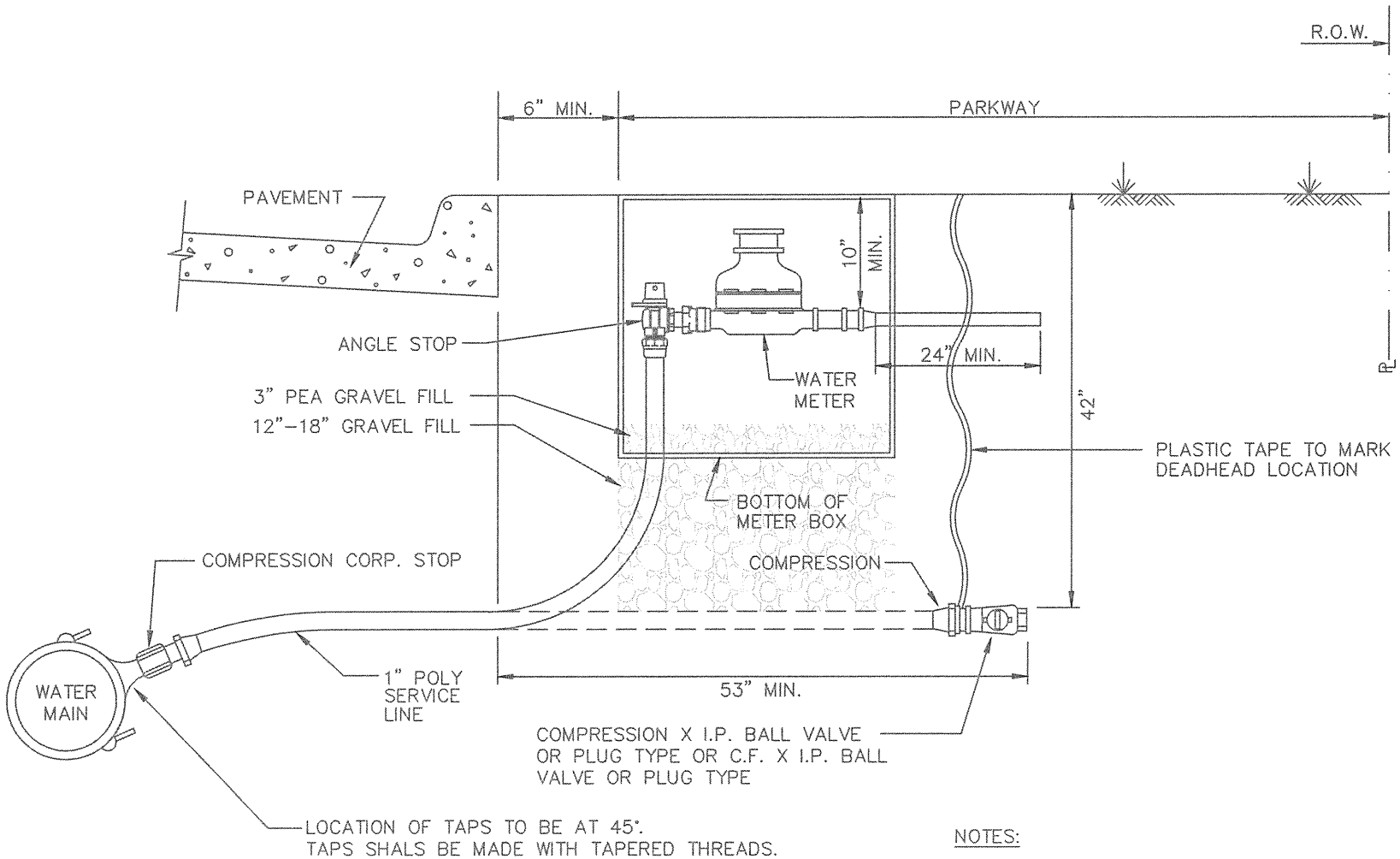
	FIRE HYDRANT	
	REBAR & PLACEMENT	STANDARD DRAWING NO. WAT-12A

WATER SERVICE INSTALLATION

1" LINE

WAT-13

STANDARD DRAWING NO.



NOTES:

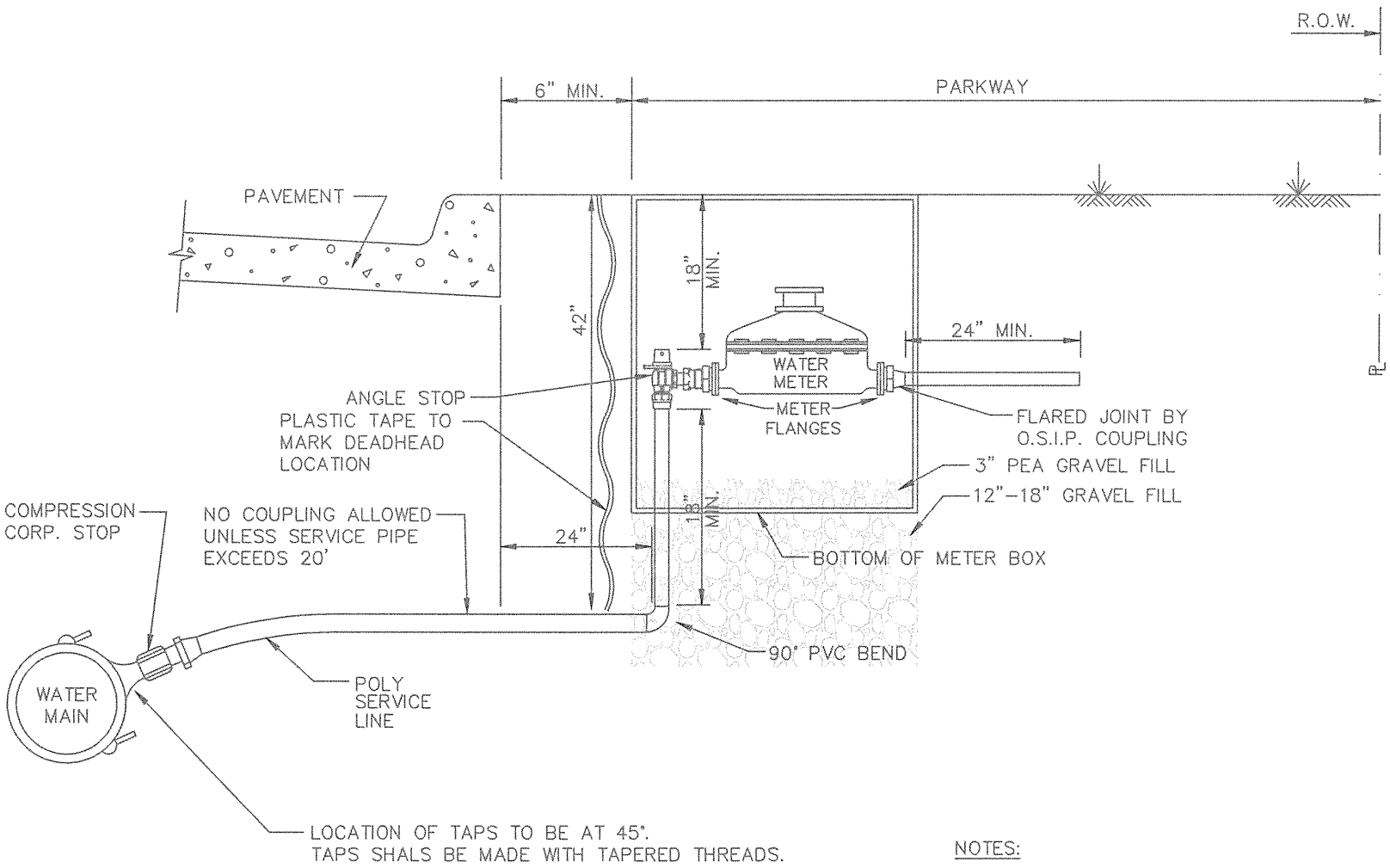
1. LOCATION OF METER BOX SHALL BE SPECIFIED BY THE CITY.
2. WATER SERVICES CROSSING THE STREET SHALL BE ENCASED IN EITHER SDR21 OR SCHEDULE 40 PVC. THE ENDS SHALL BE SEALED WITH EITHER TAPE OR SILICONE. ENCASEMENT PIPE SHALL BE 2" AND SHALL ALLOW FOR ONLY ONE WATER SERVICE TO RUN THROUGH IT.

WATER SERVICE INSTALLATION

1-1/2" OR 2" LINE

STANDARD DRAWING NO.

WAT-14



NOTES:

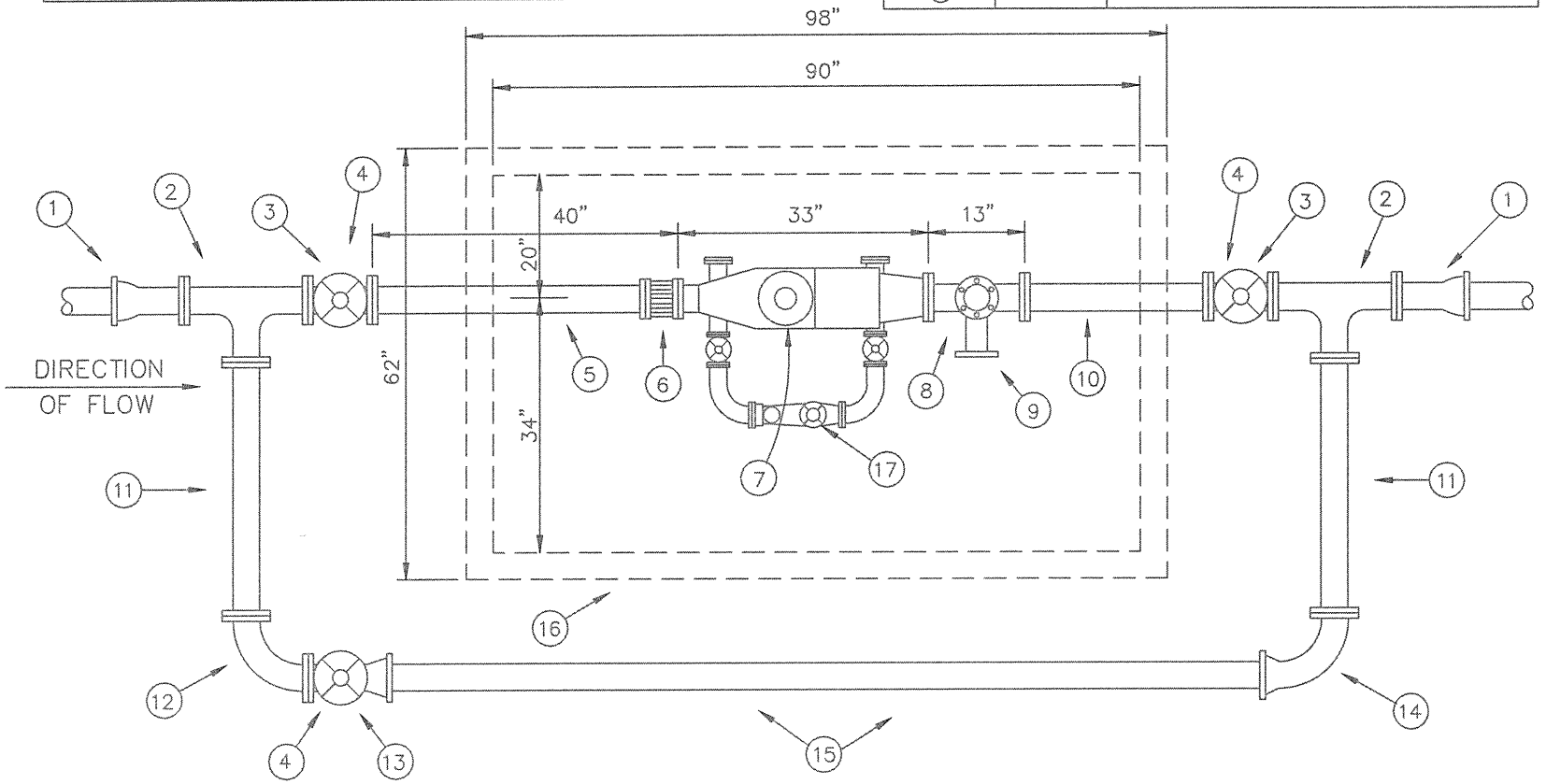
1. LOCATION OF METER BOX SHALL BE SPECIFIED BY THE CITY.
2. WATER SERVICES CROSSING THE STREET SHALL BE ENCASED IN EITHER SDR21 OR SCHEDULE 40 PVC. THE ENDS SHALL BE SEALED WITH EITHER TAPE OR SILICONE. ENCASEMENT PIPE SHALL BE 2" AND SHALL ALLOW FOR ONLY ONE WATER SERVICE TO RUN THROUGH IT.

4" COMBINATION WATER SERVICE WITH 4" METER

STANDARD DRAWING NO. WAT-15

MATERIALS LIST		
PART NO.	QUANTITY	DESCRIPTION
①	2 EA.	4" X 12" D.I. NIPPLE M.J. X F.
②	2 EA.	4" X 4" D.I. TEE F. X F.
③	2 EA.	4" GATE VALVE F. X F.
④	3 EA.	VALVE STACK RISER COVER & LID
⑤	1 EA.	4" X 40" D.I. NIPPLE F. X SLEEVE
⑥	1 EA.	4" FLANGED COUPLING ADAPTER
⑦	1 EA.	4" METER AS SPECIFIED (TYPE F.M. SHOWN)
⑧	1 EA.	4" X 4" D.I. TEE F. X F. (TEST POINT)
⑨	1 EA.	4" BLIND FLG.

MATERIALS LIST		
PART NO.	QUANTITY	DESCRIPTION
⑩	1 EA.	4" X 24" D.I. NIPPLE F. X F.
⑪	2 EA.	4" X 36" D.I. NIPPLE F. X F.
⑫	1 EA.	4" D.I. 90° BEND F. X F.
⑬	1 EA.	4" GATE VALVE F. X M.J.
⑭	1 EA.	4" D.I. 90° BEND M.J. X F.
⑮	1 EA.	4" D.I. PIPE, CLASS 52, APPROX. 10'
⑯	1 EA.	PRECAST METER VAULT
	1 EA.	VAULT FLOOR (NOT SHOWN)
	1 EA.	ACCESS HATCH (NOT SHOWN)
⑰	1 EA.	BY-PASS METER



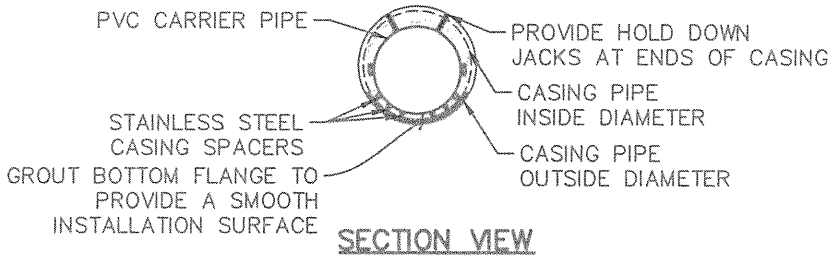
WATER LINE BY BORE

ENCASEMENT PIPE

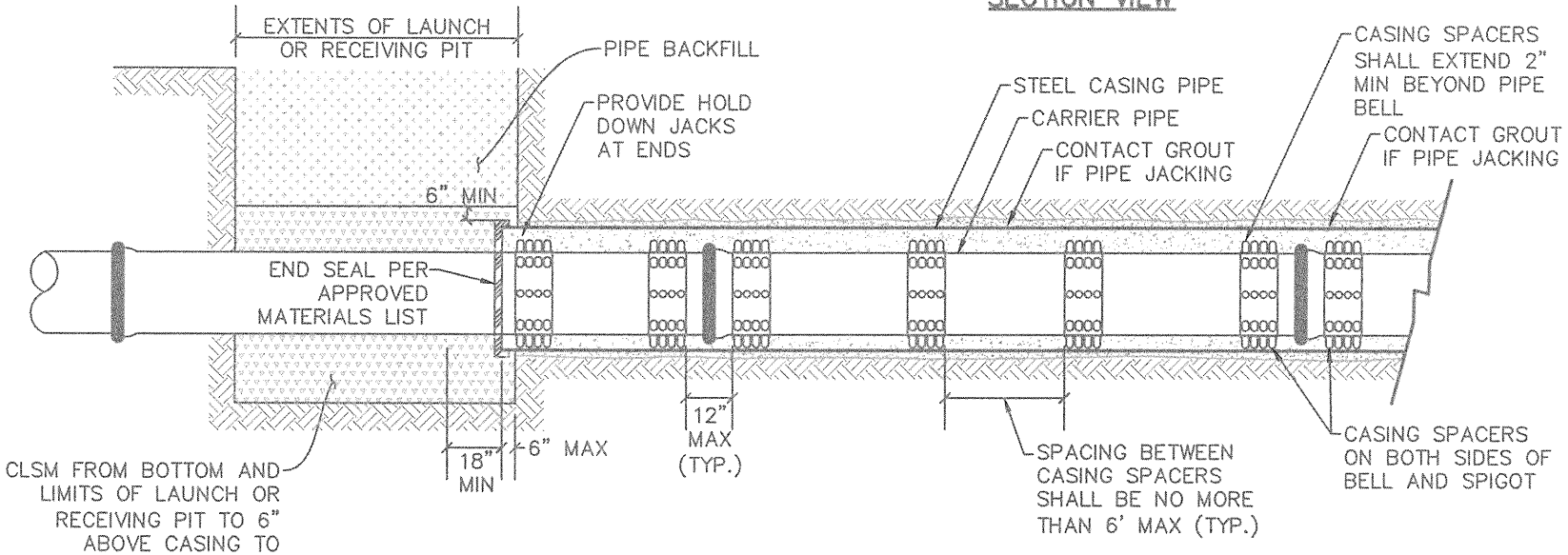
STANDARD DRAWING NO.

WAT-16

NOTE:
PROVIDE THREE (3) CASING SPACERS PER JOINT OF PIPE

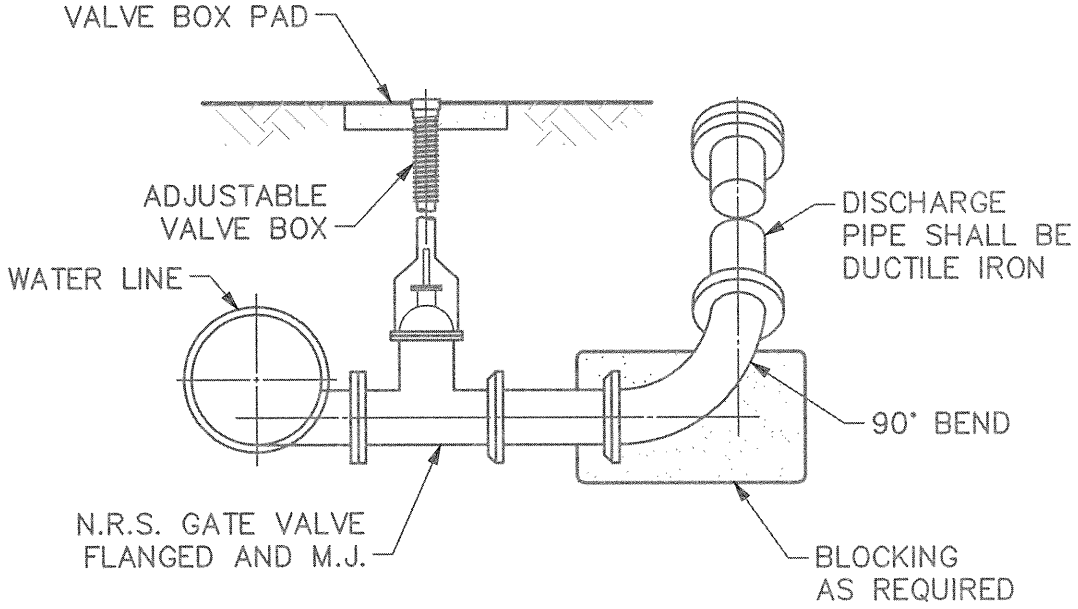


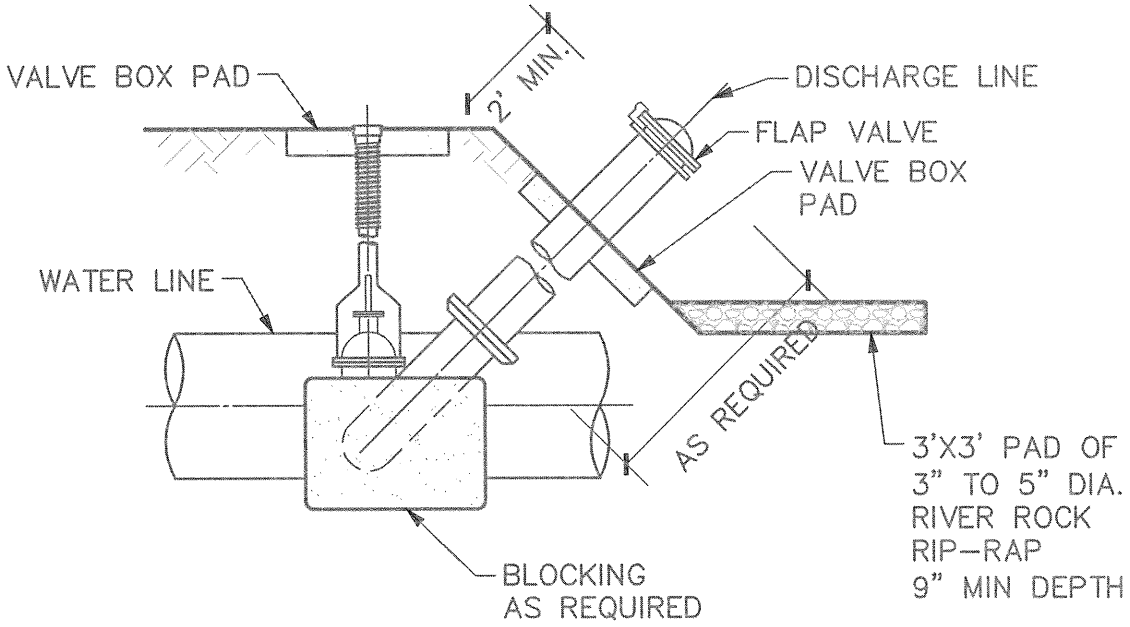
SECTION VIEW



NOTES:

1. PIPE SHALL HAVE UNIFORM ALIGNMENT AND BEARING WHEN INSTALLED AS A CARRIER PIPE IN CASING PIPE. TO PROVIDE STRAIGHT ALIGNMENT AND GRADE, CONCRETE PAVING MAY BE REQUIRED.
2. PRESSURE GROUT SPACE OUTSIDE OF CASING PIPE AFTER TUNNEL IS INSTALLED.
3. WHERE A BORE PIT EXCEEDS 5 FEET IN DEPTH, THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY OSHA.
4. FOR BELL AND SPIGOT PIPE, REMOVE ALL SLACK IN LINE PRIOR TO BACKFILL AND PRESSURE TESTING.
5. CASING SPACERS SHALL FIT SNUG OVER THE CARRIER PIPE AND POSITION THE CARRIER PIPE APPROXIMATELY IN THE CENTER OF THE CASING PIPE TO PROVIDE ADEQUATE CLEARANCE BETWEEN THE CARRIER PIPE BELL AND THE CASING PIPE. CASING SPACERS SHALL BE STAINLESS STEEL FOR WATER PIPE.
6. CASING PIPE SHALL BE 1.5 TIMES LARGER THAN THE CARRIER PIPE.

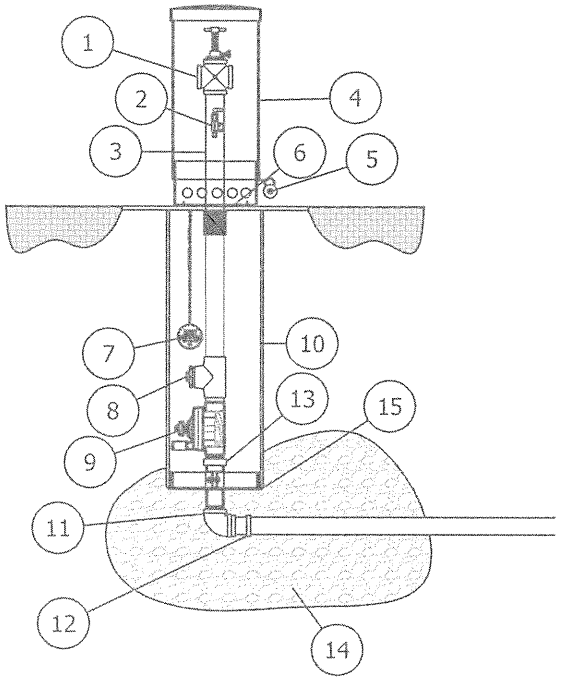




NOTE:

1. MUST BE DISCHARGED INTO STORM SEWER, BRIDGE OR CULVERT.

	BLOW OFF VALVE	
	INSTALLATION	STANDARD DRAWING NO. WAT-17



ITEM	ITEM / DESCRIPTION	OPTIONAL	BY OTHERS
1	2" WATER FLOW RESTRICTOR		
2	SAMPLING POINT		
3	2" PVC PIPE		
4	UV RESISTANT LOCKABLE DOME ENCLOSURE		
5	LOCKING POINT		
6	REMOVABLE ACCESS PLATE		
7	CONTROLLER		
8	AUTOMATIC DRAIN		
9	2" AUTOMATIC VALVE		
10	SDR 35 SEWER PIPE		
11	2" SS MIP INLET	X	X
12	2" MIP x COMPRESSION ADAPTER		X
13	O-RING CONNECTOR		
14	1" CLEAN ROCK		X
15	DEBRIS PLATE		

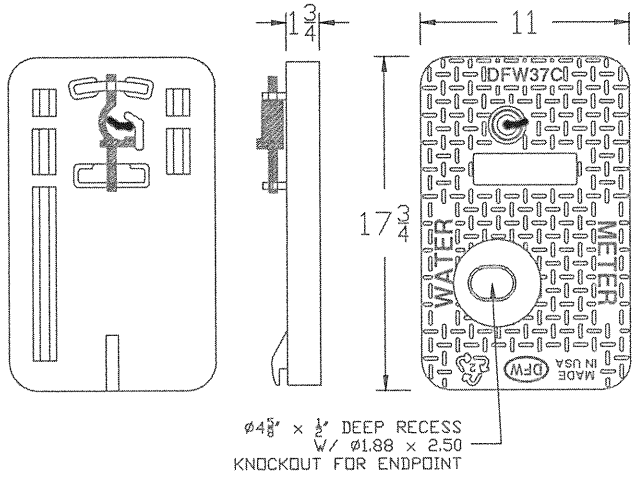
NOTES:

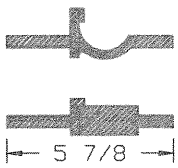
1. AUTOMATIC FLUSHING DEVICE SHALL HAVE A 2" STAINLESS STEEL MIP INLET, THAT WILL LEAD VERTICALLY TO THE BOTTOM INTO A 2" AUTOMATIC FLUSHING VALVE.
2. THE FLUSHING VALVE SHALL CONTROL THE FLOW OF WATER THROUGH THE HYDRANT AND ITS DIAPHRAGM WITH THE EXTENSION AND RETRACTION OF A DC LATCHING SOLENOID AND HAVE A 220 PSI RATING.
3. EACH UNIT SHALL BE FURNISHED WITH A STAND-ALONE VALVE CONTROLLER. VALVE CONTROLLER WILL NOT REQUIRE A SECOND HAND-HELD DEVICE FOR PROGRAMMING. CONTROLLER MUST HAVE MINIMUM OF 12 POSSIBLE FLUSHING CYCLES PER DAY.
4. SHALL BE SUBMERSIBLE TO 12 FEET, OPERATE WITH A 9 VOLT BATTERY AND HAVE RESIN-SEATED ELECTRICAL COMPONENTS.
5. SOLENOID SHALL HAVE NO LOOSE PARTS WHEN REMOVED FROM VALVE. REMOVAL OF 2" SOLENOID VALVE SHALL BE POSSIBLE VIA AN O-RING CONNECTOR LOCATED UNDER THE VALVE AFTER REMOVAL OF STAINLESS STEEL ACCESS PLATE.
6. VALVE ASSEMBLY SHALL BE CONTAINED WITHIN A UV-RESISTANT LOCKING COVER.
7. UNIT MODEL # SHALL BE 9400 AS MANUFACTURED BY KUPFERLE FOUNDRY COMPANY. MODEL #9400 ST. LOUIS, MO. 1-800-231-3990, OR APPROVED EQUAL.
8. FLUSH WATER LINES FREE OF DEBRIS BEFORE INSTALLATION

AUTOMATIC FLUSHING DEVICE

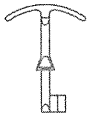
N.T.S.

	AUTOMATIC FLUSH VALVE	STANDARD DRAWING NO. WAT-18





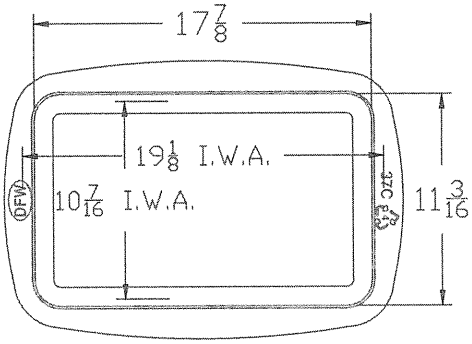
DFW-PLOCK

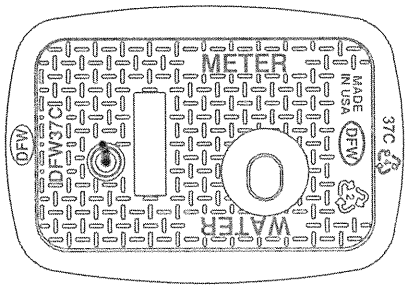


DFW-KEY

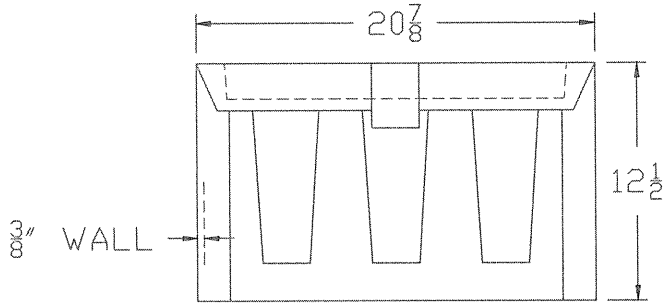
LID KEY	
1	BLACK COLOR
K	PLASTIC LOCK
F	KNOCKOUT
DEEP	DEEP RECESS

DFW37C-1KFDEEP -LID

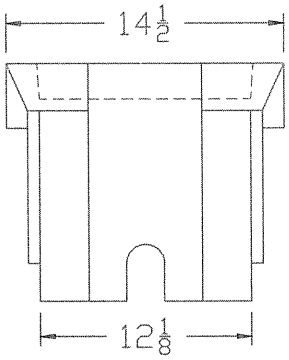




DFW37C-12-1KFDEEP



DFW37C-12-BODY



NOTES
1) DIM'S ± 1/8" U.N.O.
2) LID MATERIAL: HDPE
3) BODY MATERIAL: LLDPE
4) WALL THICKNESS: 3/8" MINIMUM
5) I.W.A. = INSIDE WORK AREA

DFW PLASTICS, INC. ENGAGES IN ONGOING RESEARCH AND DEVELOPMENT TO IMPROVE AND ENHANCE ITS PRODUCTS. THEREFORE, DFW PLASTICS, INC. RESERVES THE RIGHT TO CHANGE PRODUCT OR SYSTEM SPECIFICATIONS WITHOUT NOTICE.

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BEDFORD, TEXAS 76095
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(817) 439-3700 (f)
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DFW37C-12-1KFDEEP

THIS DRAWING IS THE PROPERTY OF DFW PLASTICS, INC.

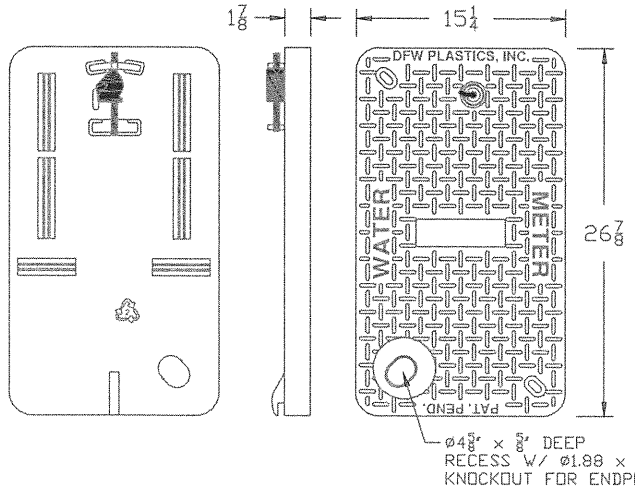
CREATED:	
UPDATED:	
ACCEPTED:	
DRAWN BY:	
PLOT SCALE: NTS	

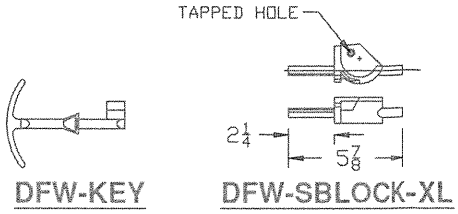
WATER METER LID

METERS UP TO 1"

STANDARD DRAWING NO.

WAT-19





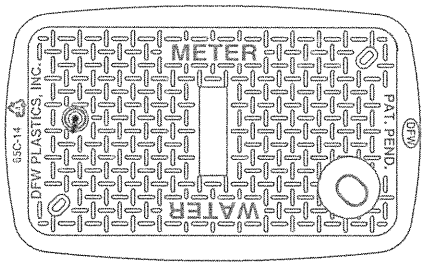
DFW-KEY

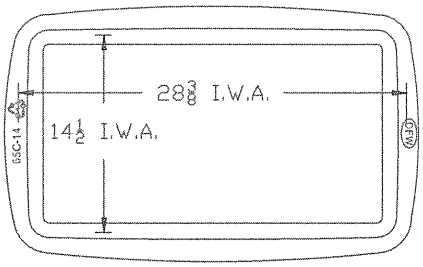
DFW-SBLOCK-XL

LID KEY	
1	BLACK COLOR
S	SECURITY BRASS LOCK
F	KNOCKOUT
DEEP	DEEP RECESS

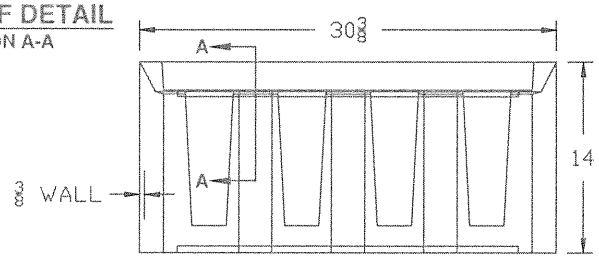
DFW65C-1SFDEEP ANNA-LID

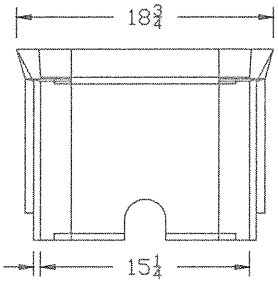
KISS OFF DETAIL
SECTION A-A



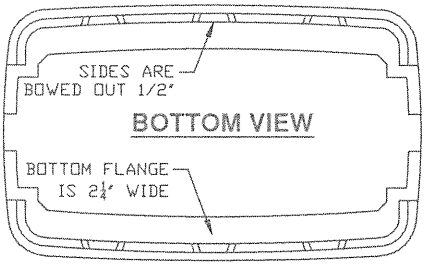


DFW65C-14-1SFDEEP





DFW65C-14-BODY



NOTES
1) DIM'S ± 1/8" U.N.O.
2) LID MATERIAL: HDPE
3) BODY MATERIAL: LLDPE
4) WALL THICKNESS: 3/8" MINIMUM
5) I.W.A. = INSIDE WORK AREA

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DFW65C-14-1SFDEEP

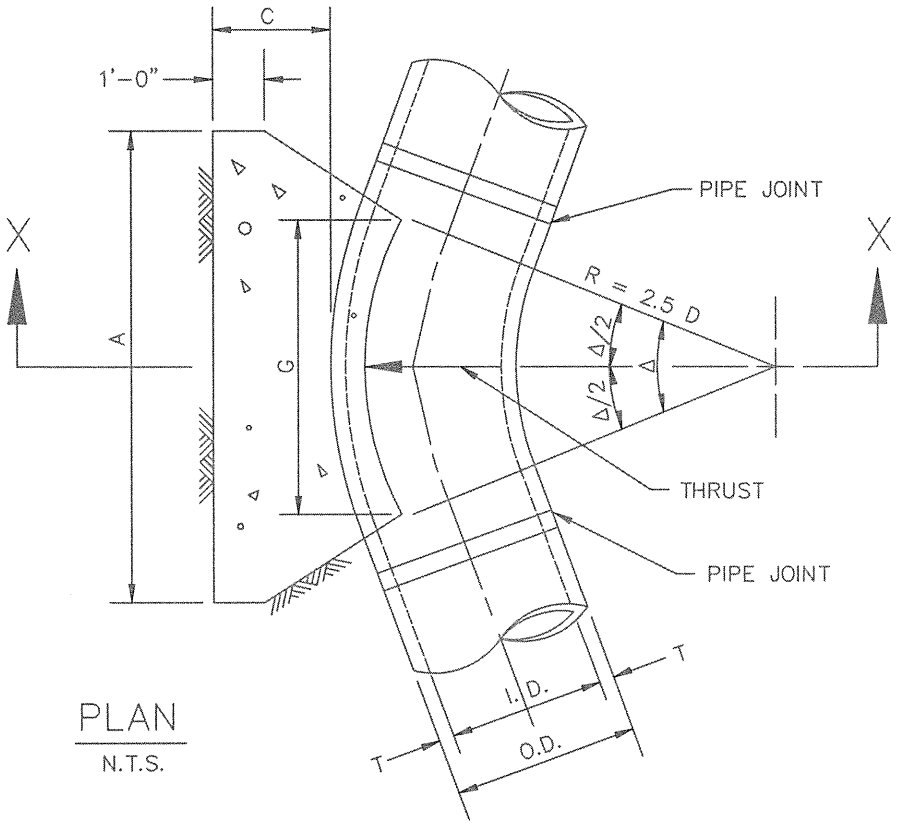
CREATED:	
UPDATED:	
ACCEPTED:	
DRAWN BY	
PLOT SCAL	

WATER METER LID

METERS FROM 1.5" TO 2"

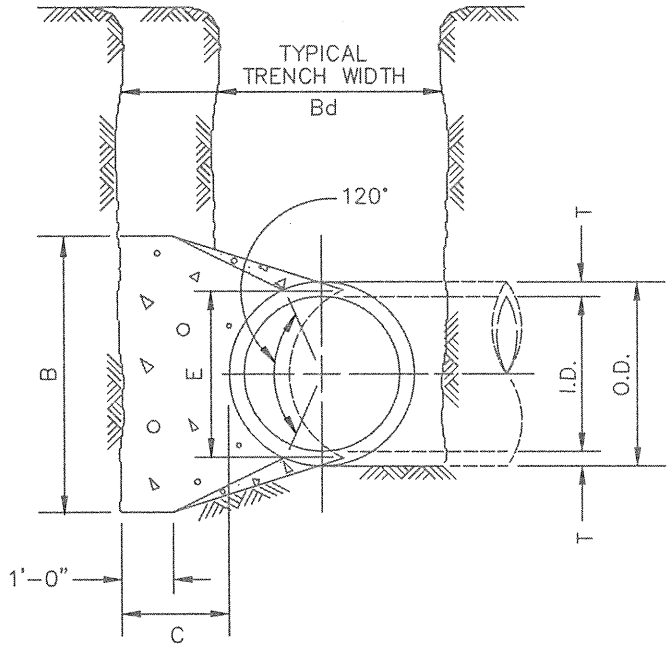
STANDARD DRAWING NO.

WAT-19A



PLAN

N.T.S.



SECTION X–X

N.T.S.

	HORIZONTAL THRUST BLOCK	
	AT PIPE BEND (1 OF 3)	STANDARD DRAWING NO. WAT-20

I.D. (IN.)	T (IN.)	Δ = 11.25° (FT.)	Δ ≥ 22.50° (FT.)	E (FT.)
4,6,8	0.4	1.5	1.5	0.9
10,12	0.5	1.5	1.5	1.2
16,18	0.6	1.5	1.5	1.6
20	0.7	1.5	1.5	1.8
24	0.9	1.5	1.5	2.1
30	2.9	1.5	1.9	2.6
36	4.5	1.5	2.3	3.3
42	5.0	1.8	2.6	3.8
48	5.5	2.0	3.0	4.3
54	6.0	2.3	3.4	4.8
60	6.5	2.5	3.8	5.3
66	6.8	2.8	4.1	5.7
72	7.5	3.0	4.5	6.3
78	7.5	3.3	4.9	6.7
84	8.0	3.5	5.3	7.2
90	8.5	3.8	5.6	7.7
96	9.0	4.0	6.0	8.2

	Δ = 11.25°									Δ= 22.50°							
			EARTH			ROCK						EARTH			ROCK		
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.0	0.4
24	1.1	8.9	3.0	3.5	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.5	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3
66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

TABLES OF DIMENSIONS AND QUANTITIES

HORIZONTAL THRUST BLOCK

AT PIPE BEND (2 OF 3)

STANDARD DRAWING NO.

WAT-20A

I.D. (IN.)	Δ = 30° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 45° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1
30	3.6	27.5	6.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6
36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6
42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2
48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3
54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9
60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0
66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2
72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7
78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9
84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6
90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6
96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5

I.D. (IN.)	Δ = 67.50° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 90° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2
10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.5	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5
24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1
30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3
36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3
42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7
48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4
54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1
60	15.6	235.8	24.0	10.0	35.6	16.0	7.5	17.6	60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0
66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66	21.8	362.8	33.0	11.0	66.2	22.0	8.5	32.5
72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8	431.8	36.0	12.0	85.6	24.0	9.0	41.0
78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78	25.7	506.7	39.0	13.0	108.2	26.0	10.0	53.2
84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	64.8
90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90	29.0	674.6	45.0	15.0	164.9	30.0	11.5	81.2
96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1

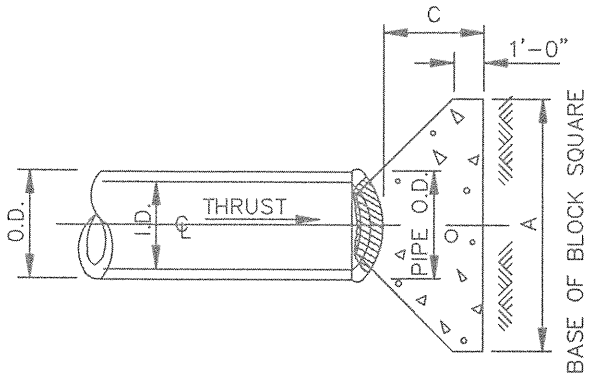
TABLES OF DIMENSIONS AND QUANTITIES

HORIZONTAL THRUST BLOCK

AT PIPE BEND (3 OF 3)

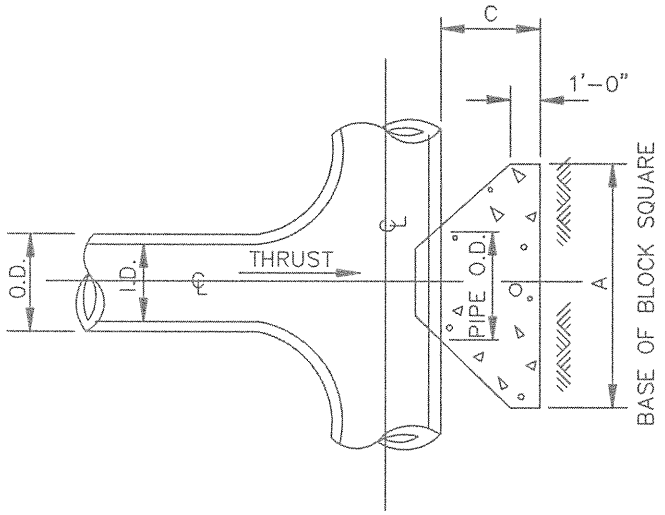
STANDARD DRAWING NO.

WAT-20B



PLAN OF PLUG THRUST BLOCK

N.T.S.



PLAN OF TEE THRUST BLOCK

N.T.S.

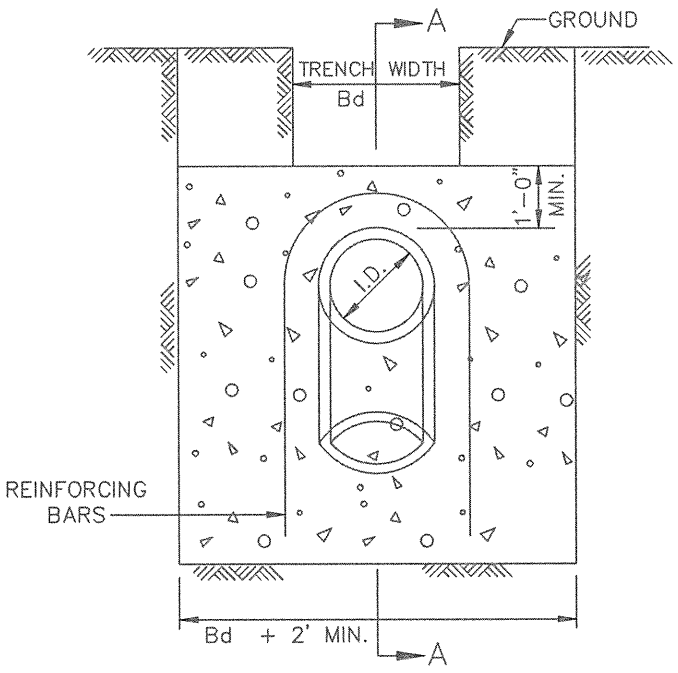
			EARTH		ROCK	
I.D. (IN.)	THRUST (TONS)	C (FT.)	A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (C.Y.)
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	76.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	10.5	11.0	7.5	6.2
48	136.0	5.0	12.0	15.6	8.5	8.7
54	172.0	5.5	13.5	21.4	9.5	11.9
60	212.0	6.0	15.0	28.4	10.5	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	305.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	33.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0

HORIZONTAL THRUST BLOCK

AT TEES & PLUGS

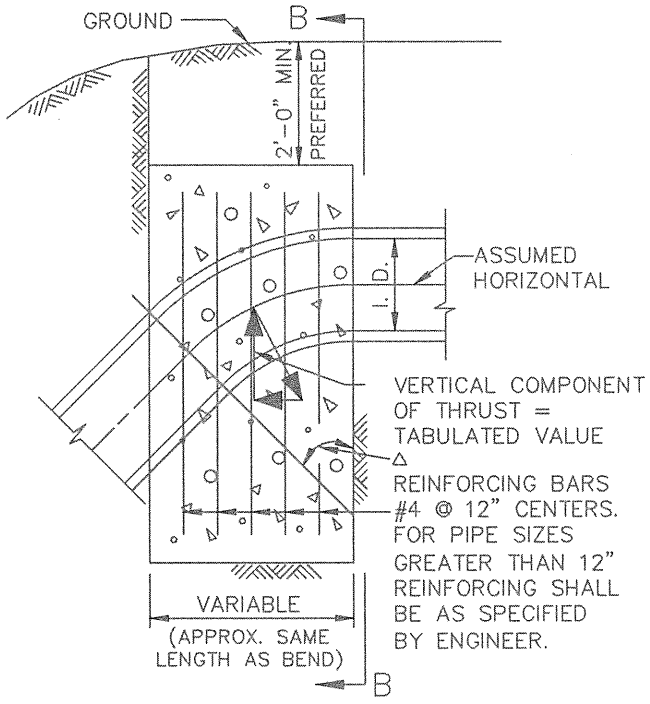
STANDARD DRAWING NO.

WAT-21



ELEVATION "B–B"

N.T.S.



SECTION "A–A"

N.T.S.

Δ →	11.25°		22.50°		30°		45°		67.50°		90°		← Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	I.D. (IN.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96

VERTICAL THRUST BLOCK

AT PIPE BEND

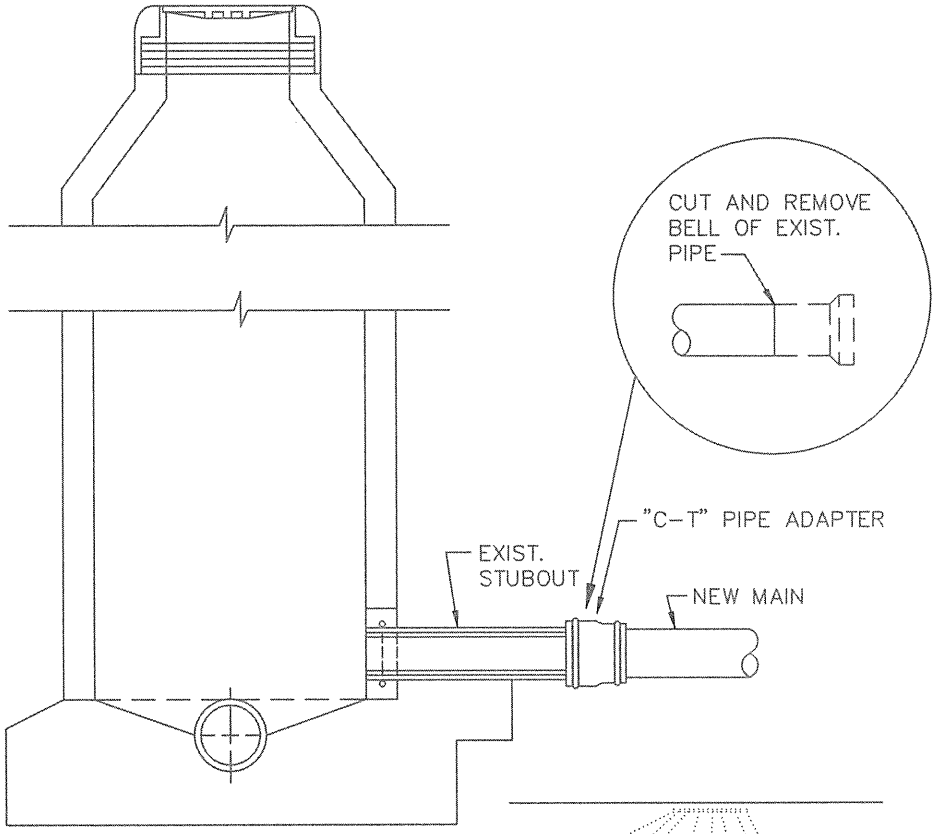
STANDARD DRAWING NO.

WAT-22

GENERAL NOTES FOR ALL THRUST BLOCKS:

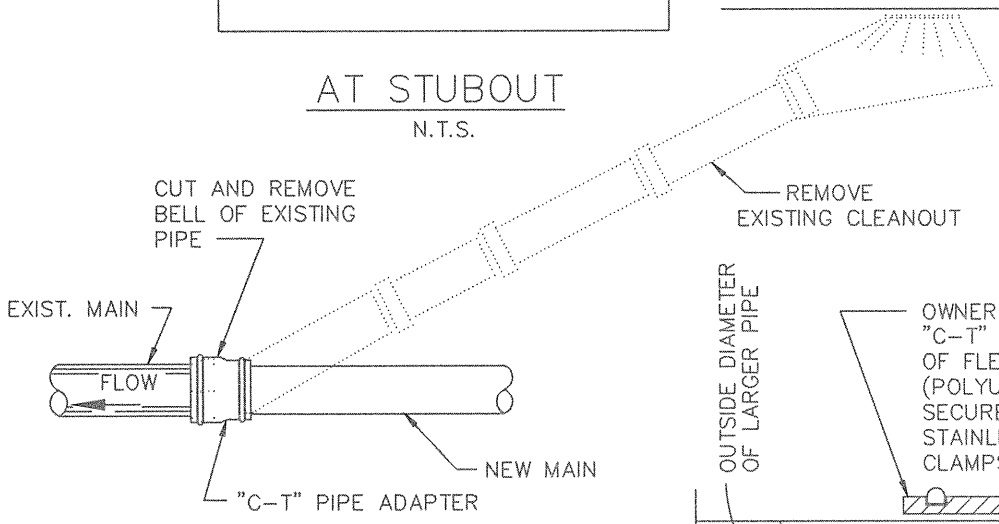
1. CONCRETE FOR BLOCKING SHALL BE CLASS "B".
2. ALL CALCULATIONS ARE BASED ON INTERNAL PRESSURE OF 200 PSI FOR DUCTILE IRON, P.V.C., AND 150 PSI FOR CONCRETE PIPE.
3. VOLUMES OF THRUST BLOCKS ARE NET VOLUMES OF CONCRETE TO BE FURNISHED. THE CORRESPONDING WEIGHT OF THE CONCRETE (CLASS "B") IS EQUAL TO OR GREATER THAN THE VERTICAL COMPONENT OF THE THRUST ON THE VERTICAL BEND.
4. WALL THICKNESS (T) ASSUMED HERE FOR ESTIMATING PURPOSES ONLY.
5. POUR CONCRETE FOR BLOCK AGAINST UNDISTURBED EARTH.
6. DIMENSIONS MAY BE VARIED AS REQUIRED BY FIELD CONDITIONS WHERE AND AS DIRECTED BY THE ENGINEER. THE VOLUME OF CONCRETE BLOCKING SHALL NOT BE LESS THAN SHOWN HERE.
7. THE SOIL BEARING PRESSURES ARE BASED ON 1000 LBS./S.F. IN SOIL AND 2000 LBS./S.F. IN ROCK.
8. USE POLYETHYLENE WRAP OR EQUAL BETWEEN CONCRETE AND BEND, TEE, OR PLUG TO PREVENT THE CONCRETE FROM STICKING TO IT.
9. CONCRETE SHALL NOT EXTEND BEYOND JOINTS.

	THRUST BLOCK	
	GENERAL NOTES	STANDARD DRAWING NO. WAT-23



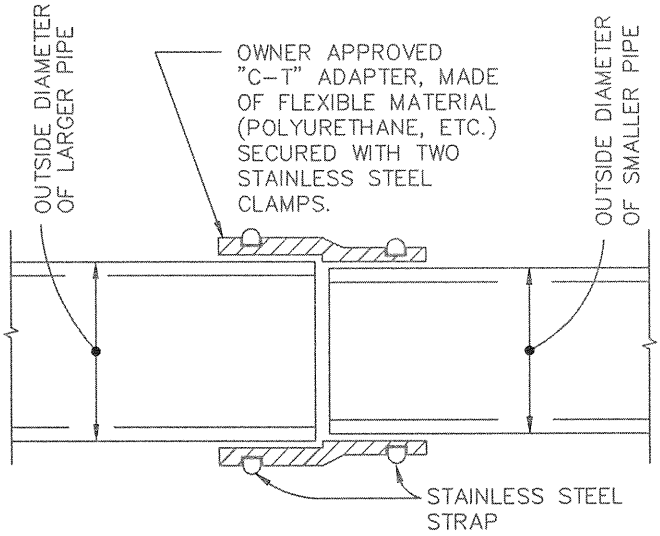
AT STUBOUT

N.T.S.



AT CLEANOUT

N.T.S.



"C-T" PIPE ADAPTER

N.T.S.

NOTE:

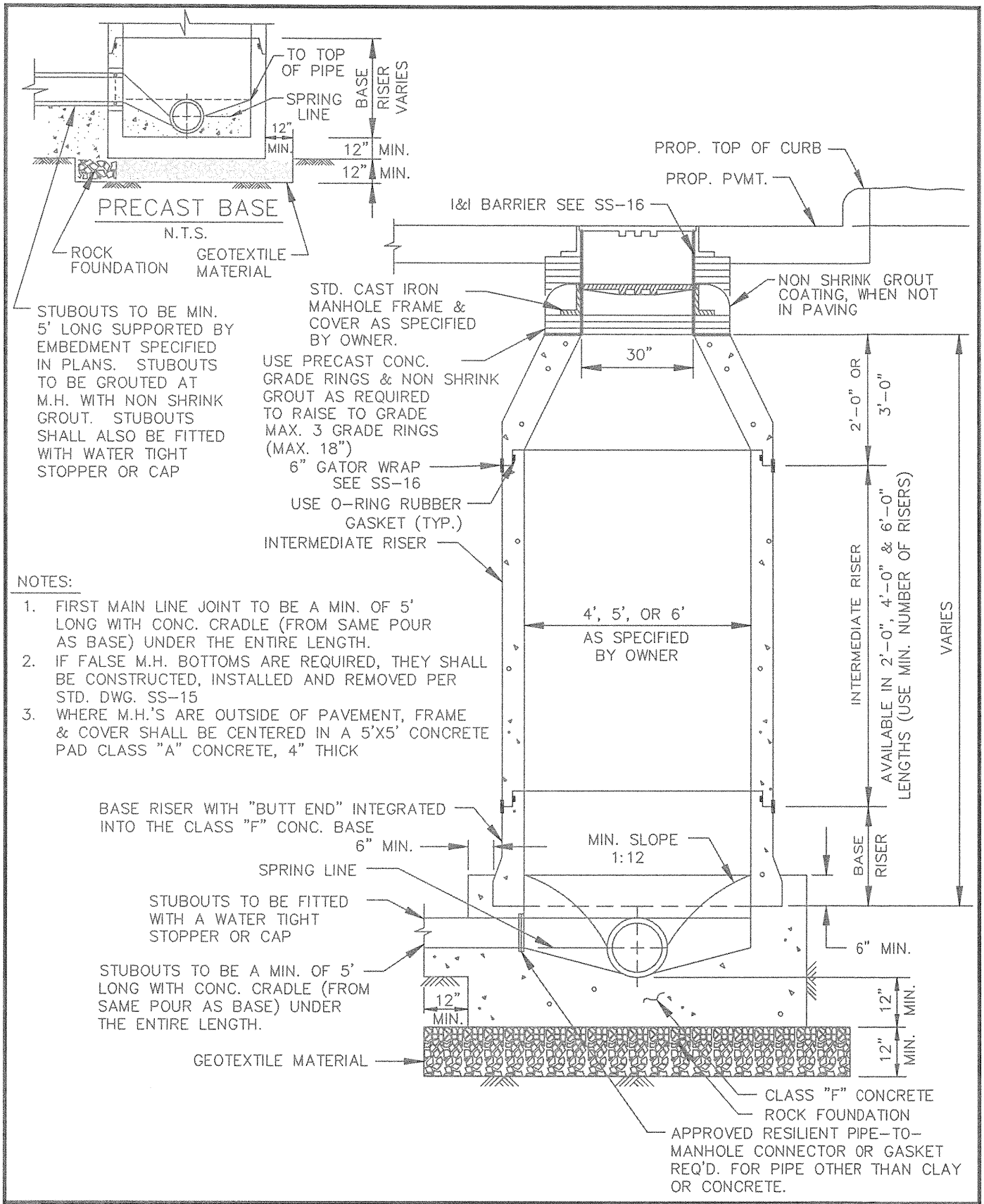
THIS DETAIL FOR USE ONLY WHEN NEW MAIN WILL NOT MATE WITH EXISTING MAIN JOINT DUE TO DIFFERENT DIMENSIONS OR MATERIALS AND A MANHOLE IS NOT REQUIRED.

WASTEWATER MAIN TIE-IN

AT CLEANOUT OR MANHOLE STUBOUT

STANDARD DRAWING NO.

SS-01



WASTEWATER MANHOLE

PRECAST

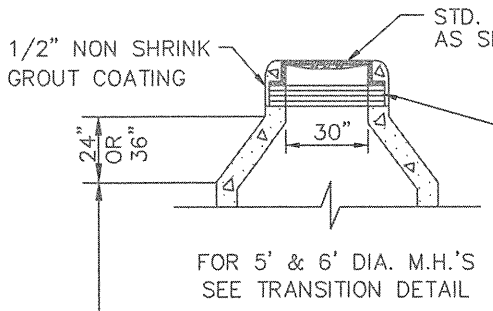
STANDARD DRAWING NO.

SS-02

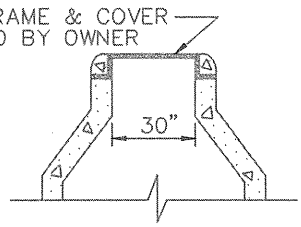
ROOF OPTIONS

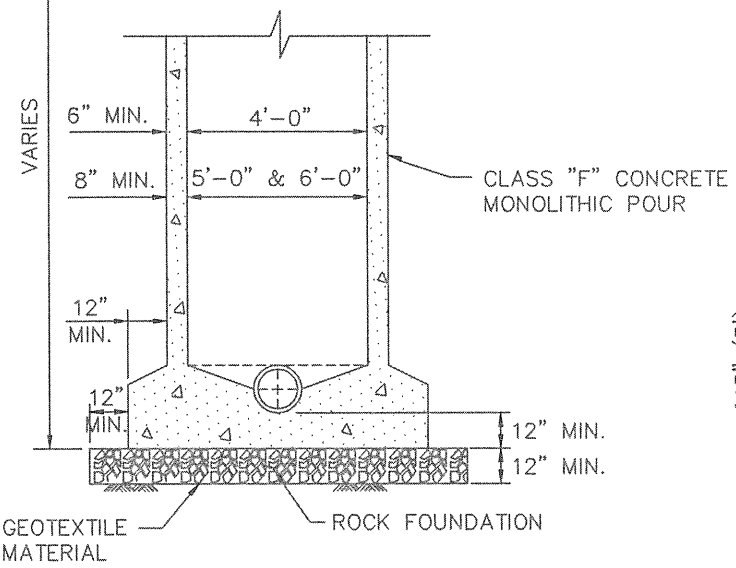
N.T.S.

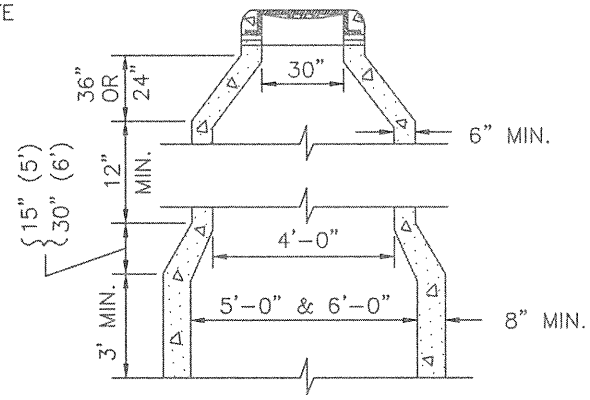
ADJUSTABLE FRAME



FRAME CAST IN CONC.





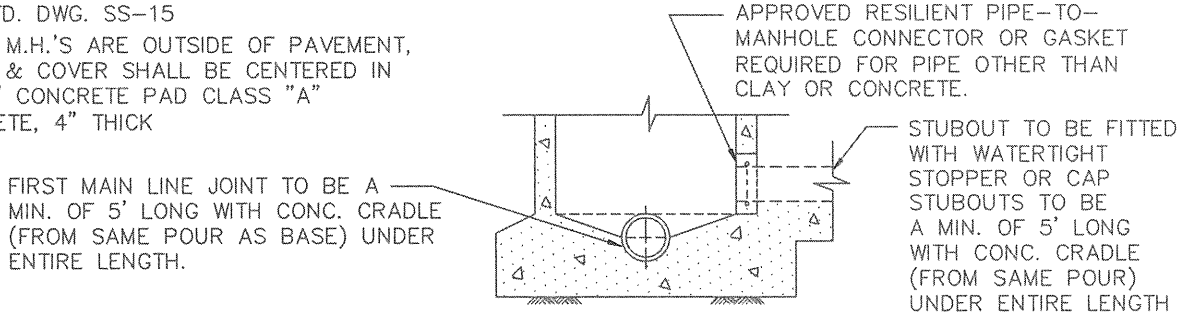


TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

N.T.S.

NOTES

1. WHERE M.H.'S ARE IN "PROPOSED" PAVING, FRAME & COVER SHALL BE SET 23" BELOW THE PROPOSED PAVEMENT GRADE.
2. IF FALSE M.H. BOTTOMS ARE REQUIRED THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED. PER STD. DWG. SS-15
3. WHERE M.H.'S ARE OUTSIDE OF PAVEMENT, FRAME & COVER SHALL BE CENTERED IN A 5'X5' CONCRETE PAD CLASS "A" CONCRETE, 4" THICK



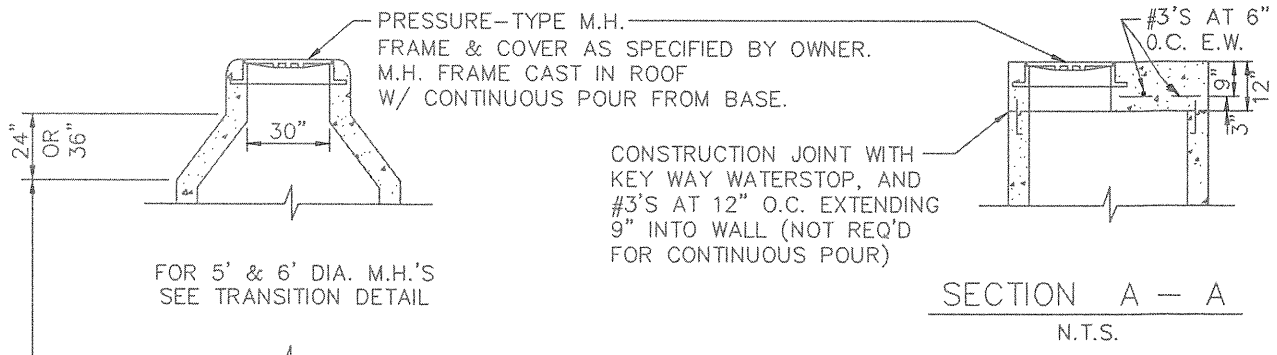
STUBOUT CONNECTION

N.T.S.

	WASTEWATER MANHOLE	
	CAST-IN-PLACE	STANDARD DRAWING NO. SS-03

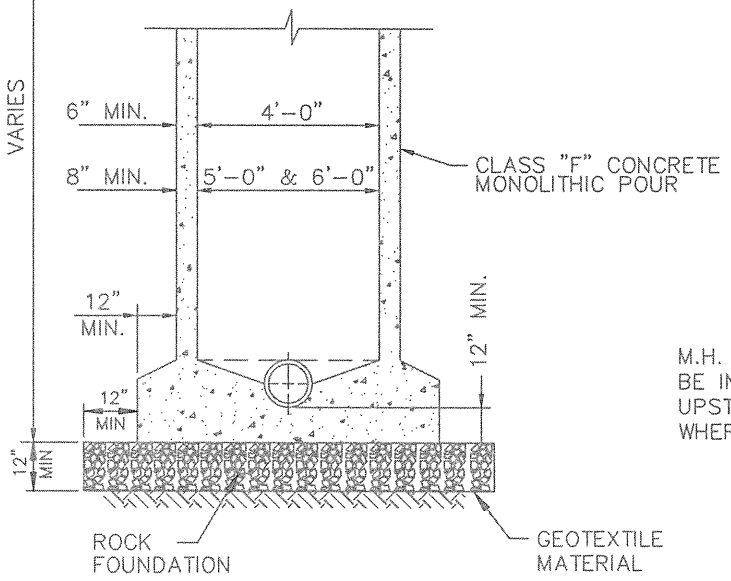
CONCRETE CONE ⇦ ROOF OPTIONS ⇨ REINFORCED CONCRETE SLAB

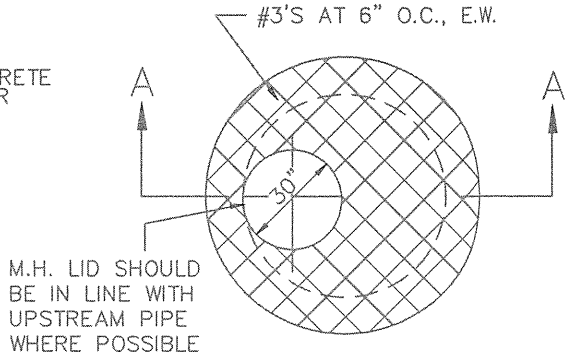
N.T.S.



SECTION A – A

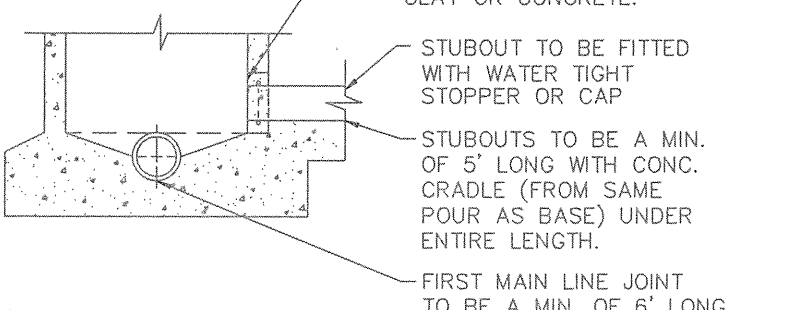
N.T.S.





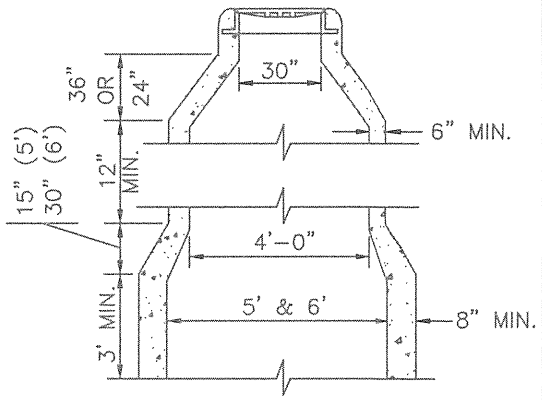
ROOF STEEL LAYOUT

N.T.S.



STUBOUT CONNECTION

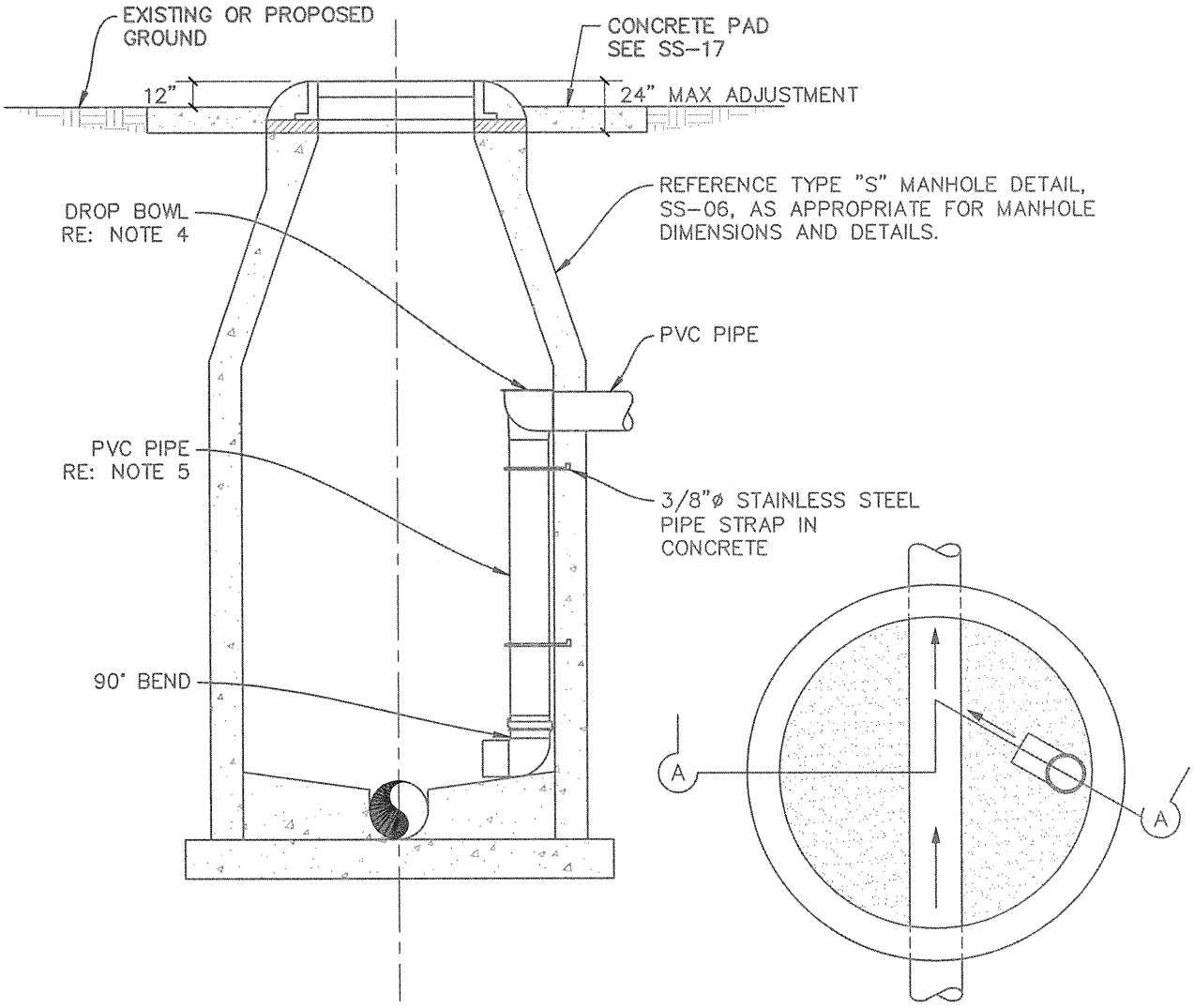
N.T.S.



TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

N.T.S.

	WASTEWATER MANHOLE	
	PRESSURE MANHOLE	STANDARD DRAWING NO. SS-04



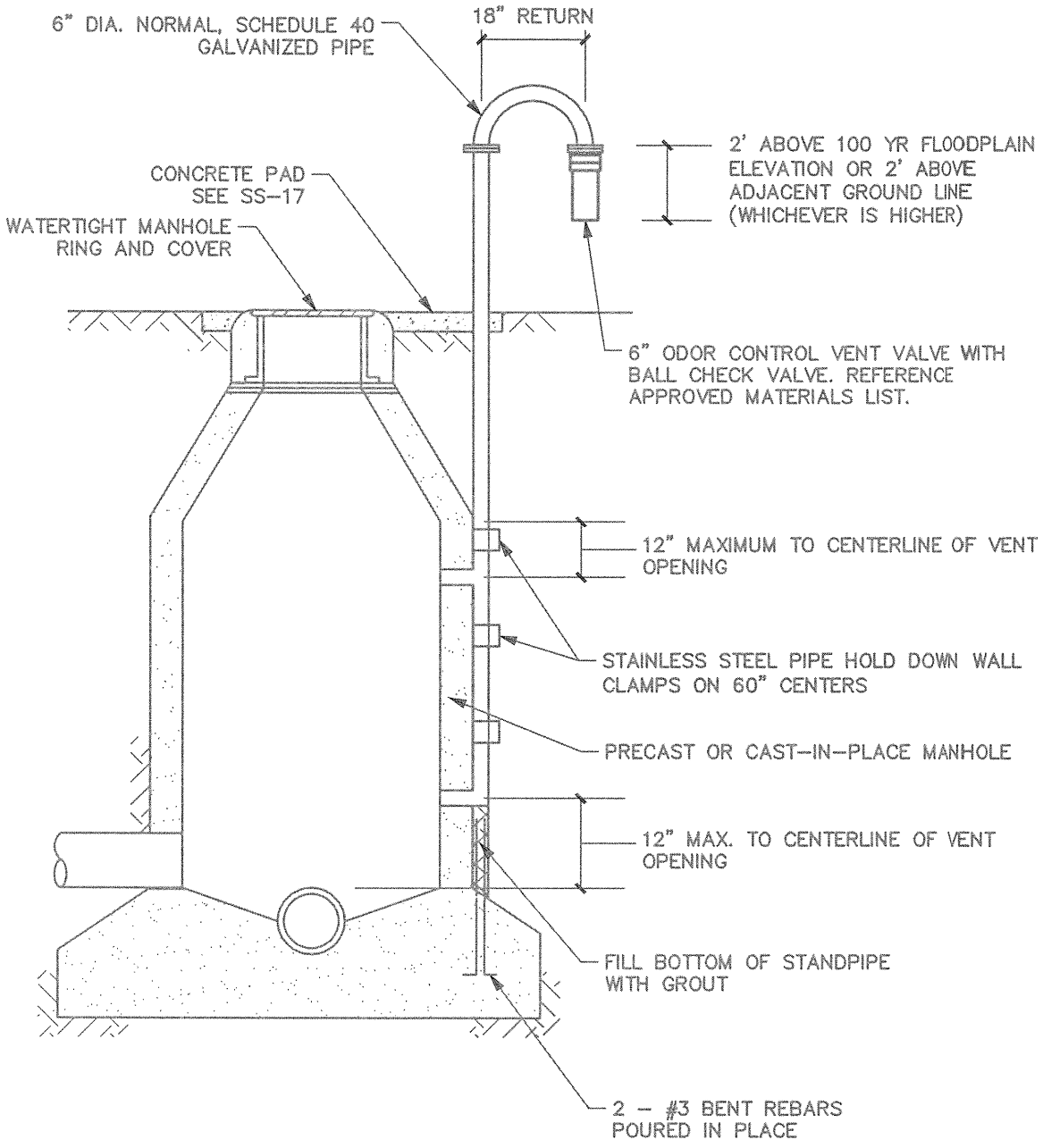
ELEVATION A

PLAN

NOTES:

1. PVC PIPE WITHIN MANHOLE SHALL BE SDR-35 FOR DEPTHS LESS THAN 10 FEET.
2. PVC PIPE WITHIN MANHOLE SHALL BE SDR-26 FOR DEPTHS 10 FEET AND GREATER.
3. INSIDE PIPE SHALL NOT BE PLACED IN CONE AREA.
4. DROP BOWL SHALL BE RELINER PRODUCT AS MANUFACTURED BY DURAN INC., OR APPROVED EQUAL.
5. DROP PIPE SIZE SHALL MATCH INCOMING SEWER LINE SIZE.

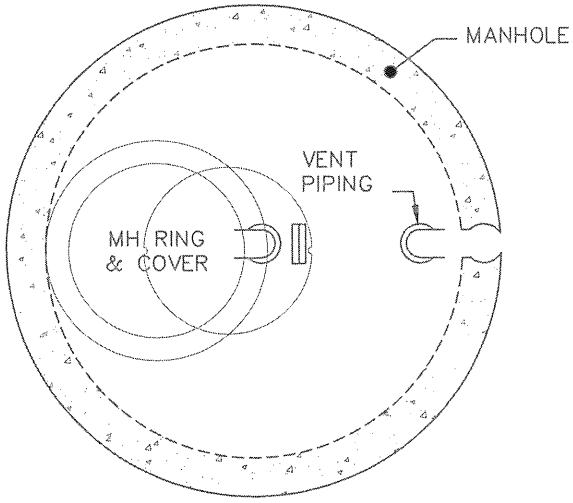
	WASTEWATER MANHOLE	
	INTERNAL DROP CONNECTION	STANDARD DRAWING NO. SS-05



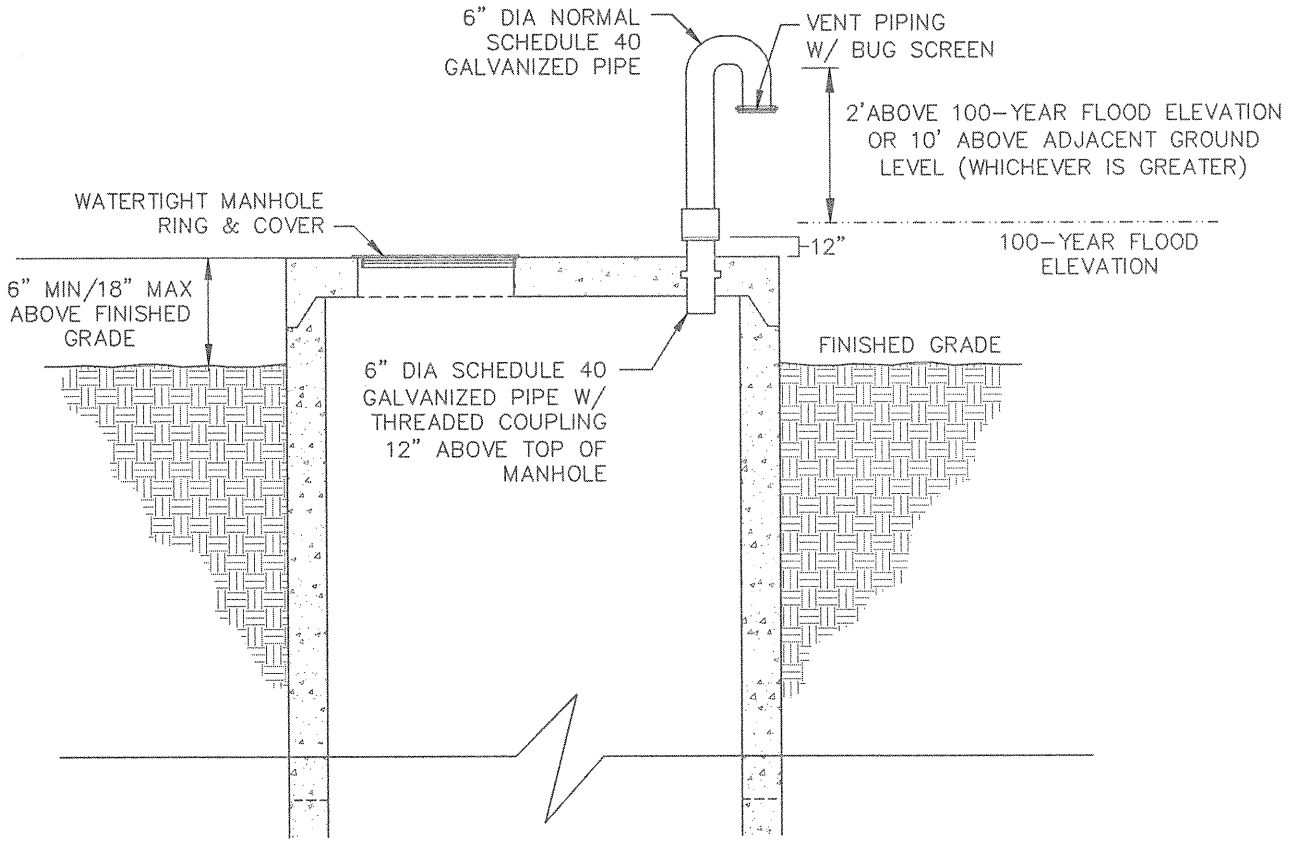
	WASTEWATER MANHOLE	
	VENTED TYPE 'S'	STANDARD DRAWING NO. SS-06

NOTES:

1. VENT PIPE OPENING IN PRECAST POLYMER CONCRETE MANHOLE WALL SHALL BE PRECAST BY MANHOLE MANUFACTURER.
2. LOCATION OF VENT PIPE SHALL BE OPPOSITE THE MANHOLE OPENING WITH WATERTIGHT RING AND COVER VENT TOP TO BE ELEVATED AT LEAST 24 INCHES ABOVE THE 100 YEAR FLOOD PLAIN ELEVATION OR 10' ABOVE ADJACENT GROUND LEVEL (WHICHEVER IS GREATER).

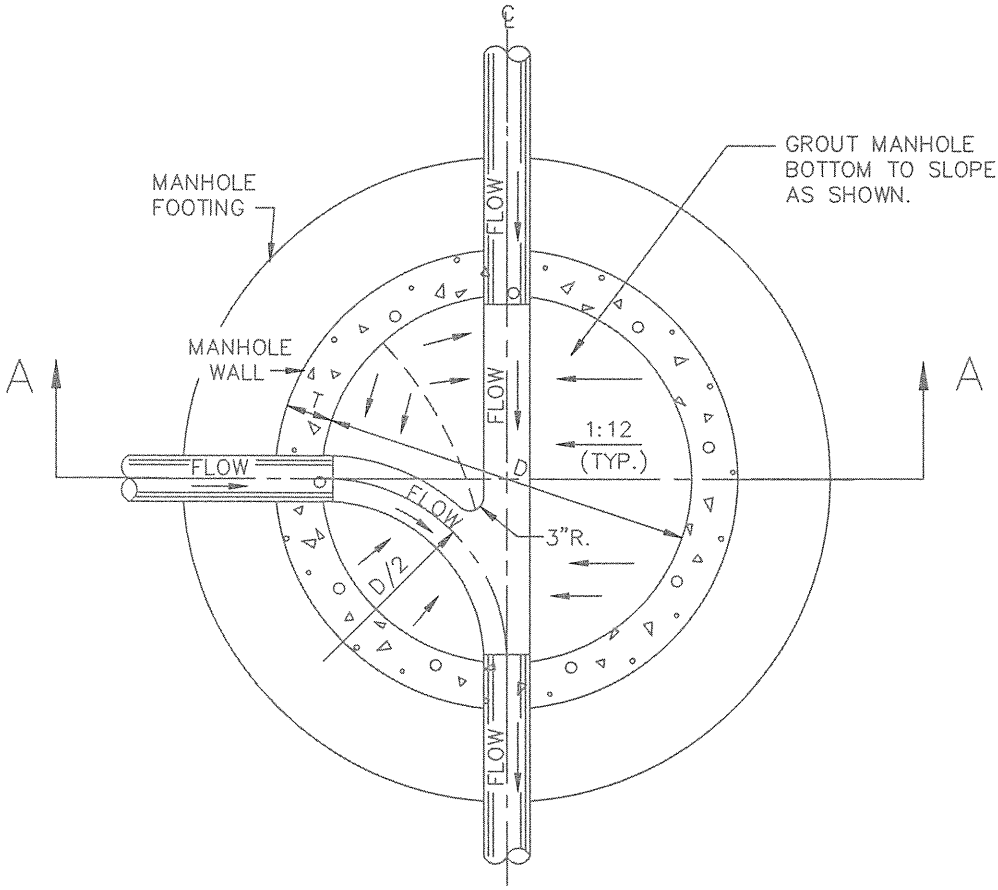


PLAN VIEW



ELEVATION VIEW

	WASTEWATER MANHOLE	
	VENTED FLAT TOP	STANDARD DRAWING NO. SS-06A

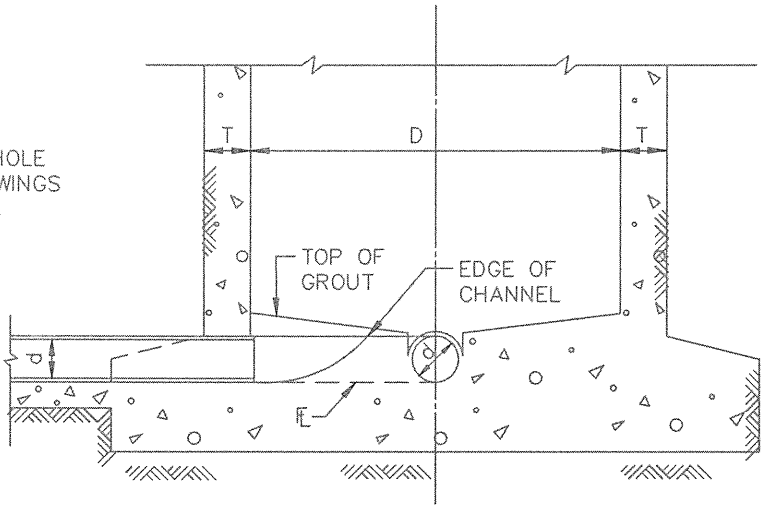


PLAN

N.T.S.

T = WALL THICKNESS
D = MANHOLE DIAMETER
d = PIPE DIAMETER

NOTE:
REFER TO MANHOLE STANDARD DRAWINGS FOR ADDITIONAL DETAIL OF M.H.



SECTION A–A

N.T.S.

	WASTEWATER MANHOLE	STANDARD DRAWING NO.
	LINE INTERSECTION	SS-07

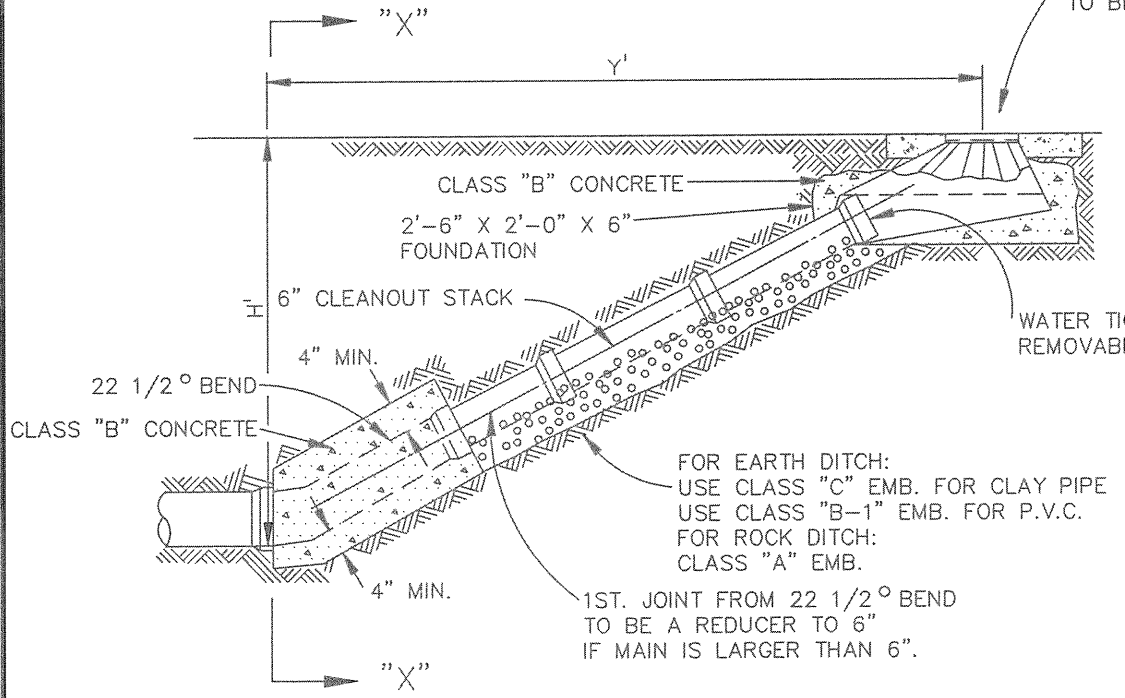
WASTEWATER MAIN

CLEANOUT

SS-08

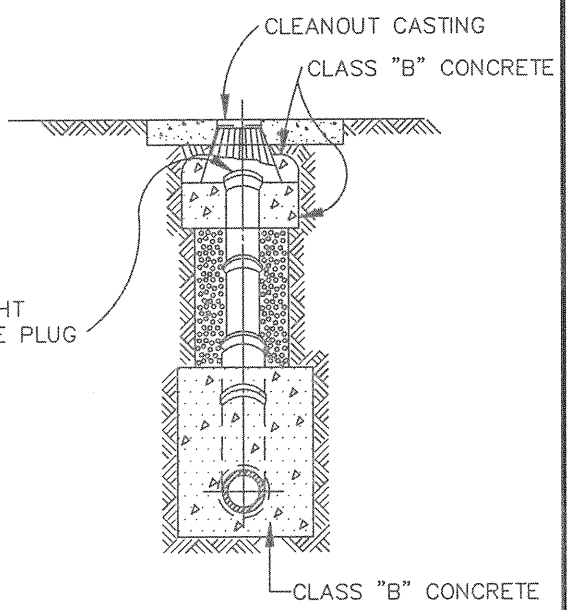
STANDARD DRAWING NO.

H'	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	H'
Y'	10	12	14	17	19	22	24	27	29	31	34	36	39	41	43	46	48	Y'



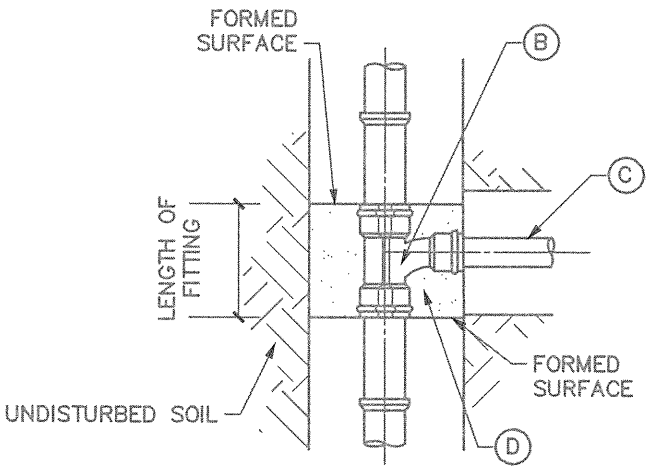
PROFILE VIEW

N.T.S.

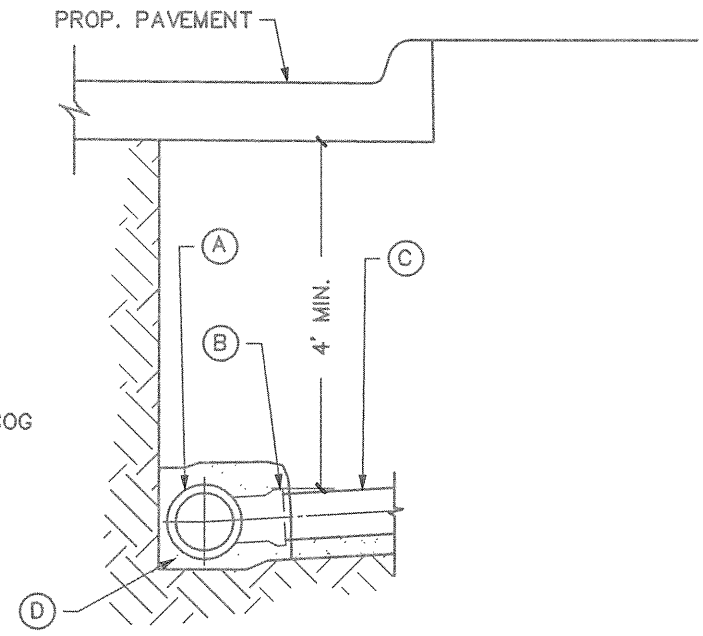


SECTION "X - X"

N.T.S.



PLAN VIEW



SECTION VIEW

KEY:

(A) WASTEWATER MAIN

(B) 4" WYE

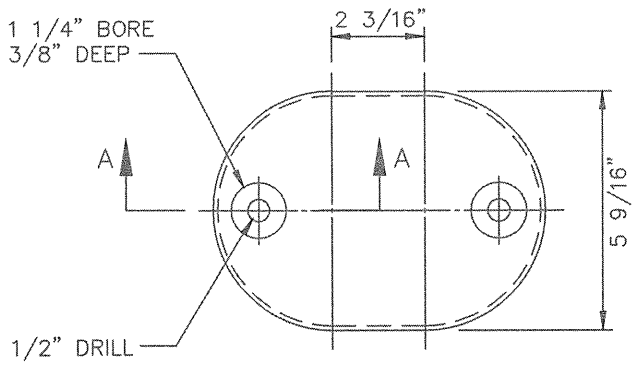
(C) 4" WASTEWATER LAT. (LENGTH VARIES)

(D) CLASS B CONCRETE 2,000 PSI CONCRETE PER NCTCOG 702.2.4.2

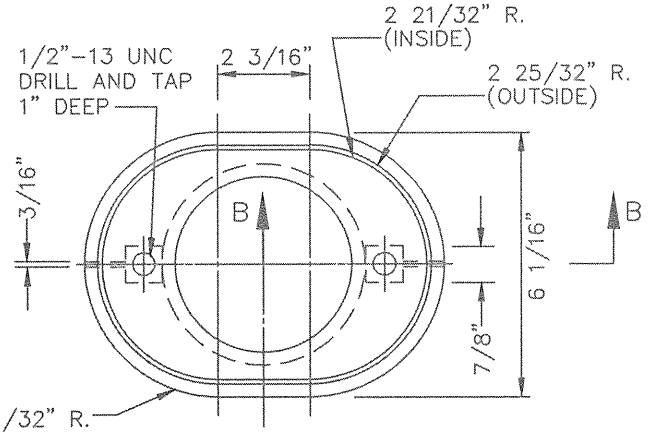
NOTES:

1. THE CLEANOUT MAY BE PLACED IN THE PARKWAY OR SIDEWALK, IF NECESSARY.
2. REFERENCE TECHNICAL SPECIFICATION 333109.

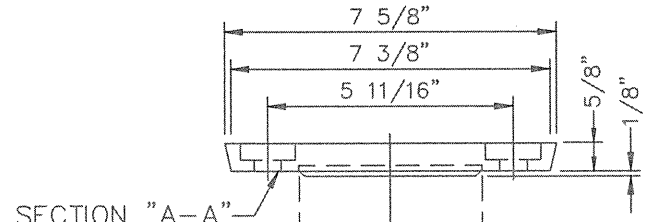
	WASTEWATER SERVICES	STANDARD DRAWING NO.
	LATERAL CONNECTION	SS-09



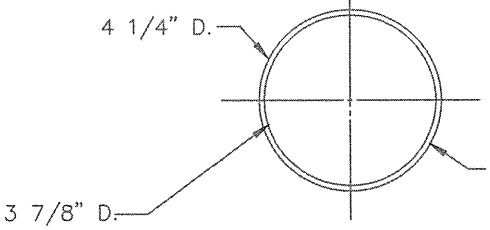
COVER
N.T.S.

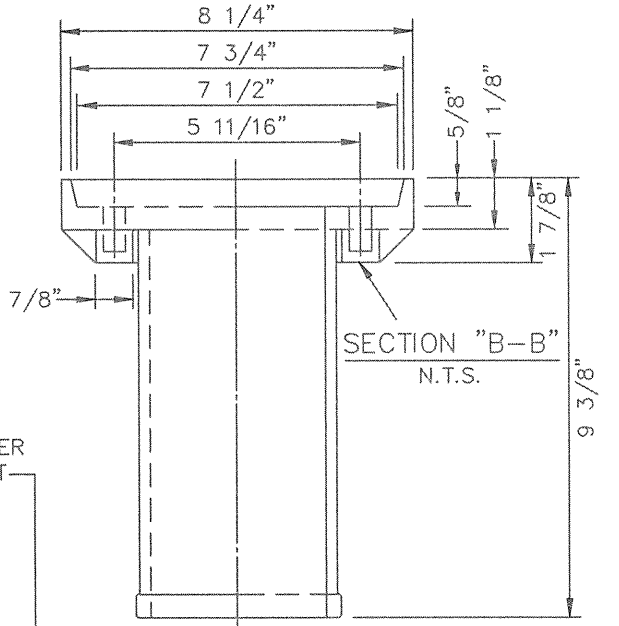


CLEANOUT FRAME TOP
N.T.S.



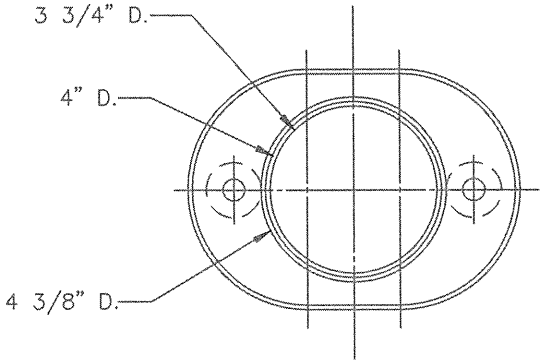
SECTION "A-A"
N.T.S.



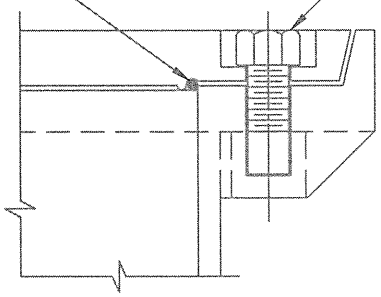


SECTION "B-B"
N.T.S.

3/16" DIA. RUBBER
"O-RING" GASKET



CLEANOUT FRAME BOTTOM
N.T.S.



ASSEMBLY VIEW
N.T.S.

NOTES:

1. THE WORDS "WASTEWATER LATERAL CLEANOUT" SHALL BE CAST INTO TOP OF COVER.
2. MATERIALS TO BE CAST IRON, P.V.C. OR ABS PLASTIC.

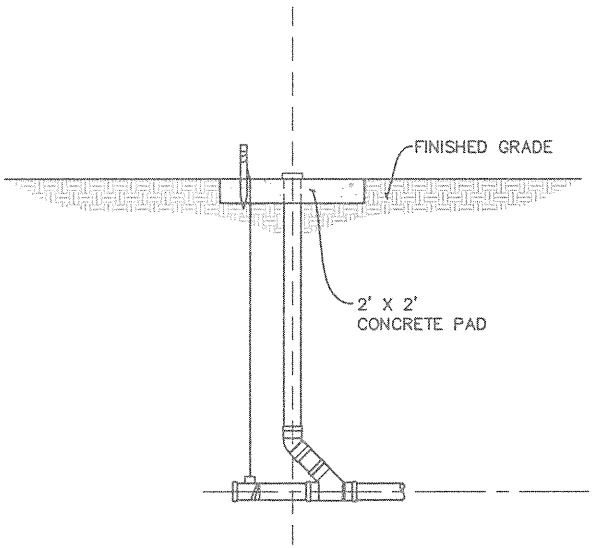
	WASTEWATER SERVICES	
	CLEANOUT FRAME & COVER	STANDARD DRAWING NO. SS-10

WASTEWATER SERVICES

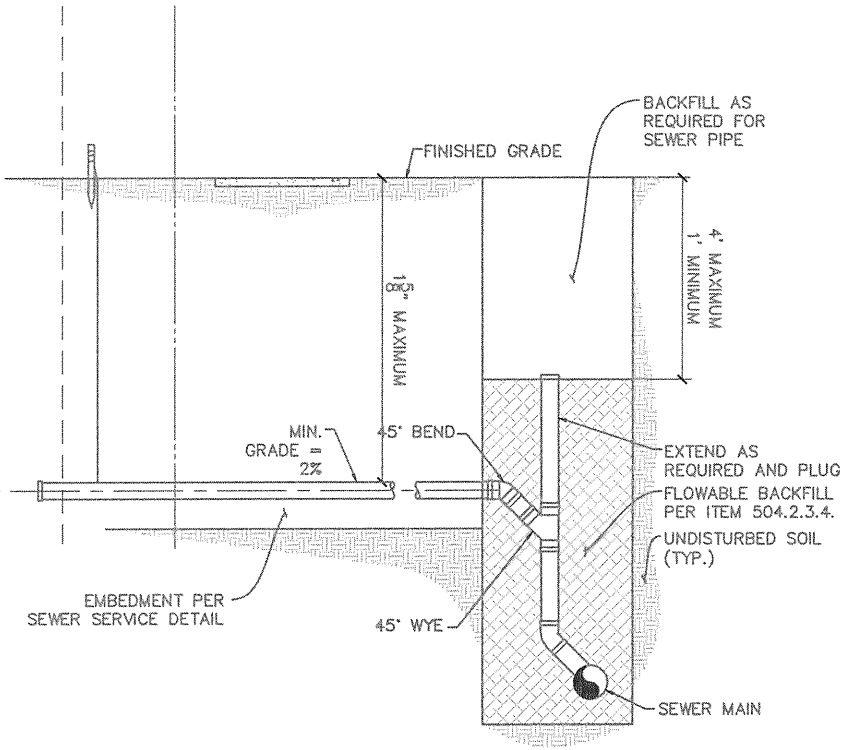
DEEP LATERAL CONNECTION

SS-11

STANDARD DRAWING NO.



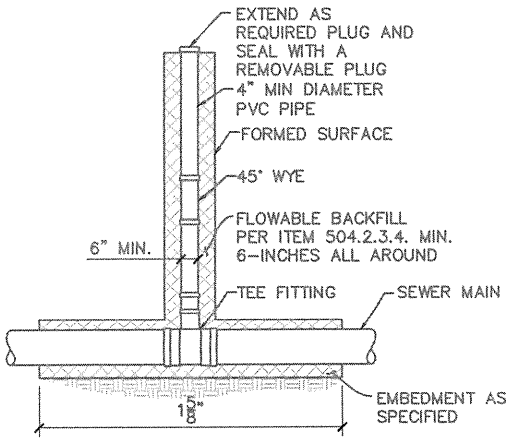
AT SERVICE CONNECTION

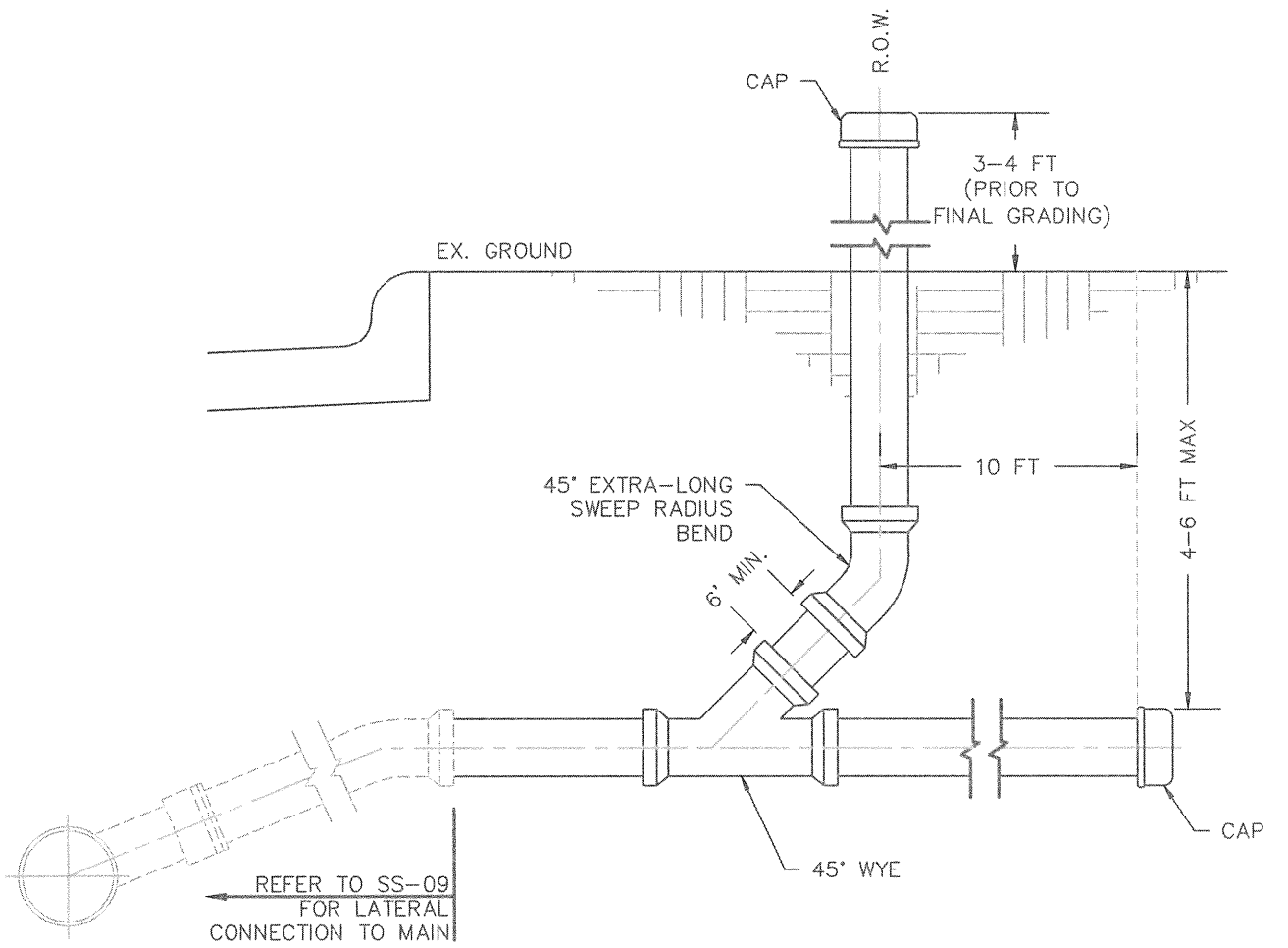


AT SUBDIVISION FINAL

NOTES:

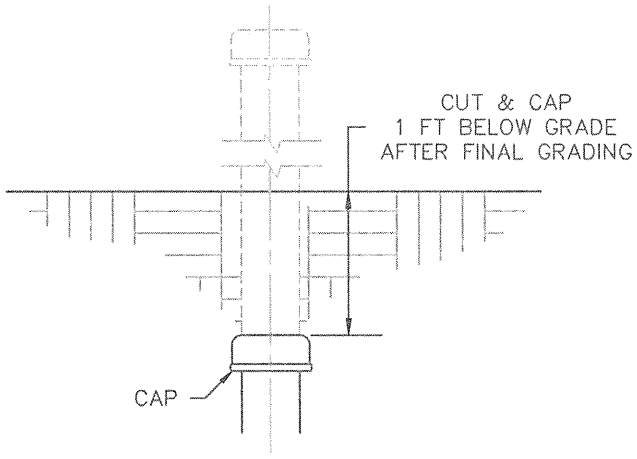
1. FOR SEWER MAINS DEEPER THAN 9 FEET, A DEEP SEWER SERVICE SHALL BE USED.
2. SERVICE LINE SHALL BE 4-INCH WHEN SEWER MAIN IS DEEPER THAN 12 FEET.
3. SANITARY SEWER SERVICE SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARD SANITARY SEWER EMBEDMENT AND BACKFILL DETAIL.
4. WHERE THE CLEAN-OUT HOUSING IS LOCATED INSIDE THE SIDEWALK, THE HOUSING SHALL BE LOCATED FLUSH WITH THE FINISHED SURFACE.
5. WHERE THE CLEAN-OUT HOUSING IS LOCATED OUTSIDE OF THE SIDEWALK, THE HOUSING SHALL BE AT FINISHED GRADE.
6. AT SUBDIVISION FINAL, THE SEWER SERVICE SHALL BE EXTENDED TO THE OUTSIDE OF THE UTILITY EASEMENT, IF ONE EXISTS ADJACENT TO THE RIGHT-OF-WAY; IF NOT TO THE OUTSIDE OF THE RIGHT-OF-WAY, AND A LINE AND STAKE LOCATOR INSTALLED AS SHOWN.
7. THE RESIDENTIAL BUILDING CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING THE CLEAN-OUT AT THE EASEMENT LINE, OR RIGHT-OF-WAY LINE IF NO EASEMENT EXISTS, WHEN EXTENDING THE SERVICE TO THE STRUCTURE, AND SETTING CLEAN-OUT AT FINAL GRADE, INSTALLING 2' X 2' PAD WITH CAST IRON CLEAN OUT BOX AND RUBBER GEM CAP ON STAND PIPE.





NOTES:

1. RESIDENTIAL SEWER LATERAL SHALL BE MINIMUM 4" PVC SDR 35 AT A 2% MINIMUM GRADE.
2. SEWER LATERALS SHALL EXTEND TO A POINT 10 FT BEYOND RIGHT–OF–WAY LINE AND SHALL BE A MAXIMUM OF 5 FT DEEP.
3. SEWER LATERALS SHALL BE PLACED AT THE CENTERLINE OF EACH LOT.
4. DURING INITIAL LATERAL INSTALLATION, A 4" CLEANOUT SHALL BE BROUGHT 3–4 FT ABOVE GRADE AT THE R.O.W. LINE.
5. PRIOR TO FINAL GRADING, LATERAL LOCATION SHALL BE MARKED ON CURB AND CLEANOUT TO BE CUT 1 FOOT BELOW GRADE.
6. CONNECTION TO THE MAIN SHALL BE MADE WITH A COMBO WYE & EXTRA–LONG SWEEP $\frac{1}{8}$ BEND.



RESIDENTIAL LATERAL

WITH CLEANOUT AT PROPERTY LINE

STANDARD DRAWING NO.

SS-12

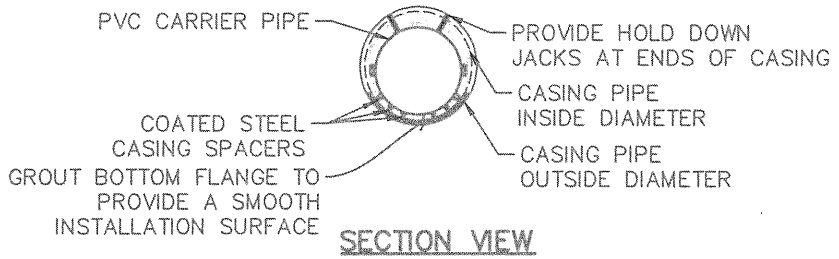
WASTEWATER LINE BY BORE

ENCASEMENT PIPE

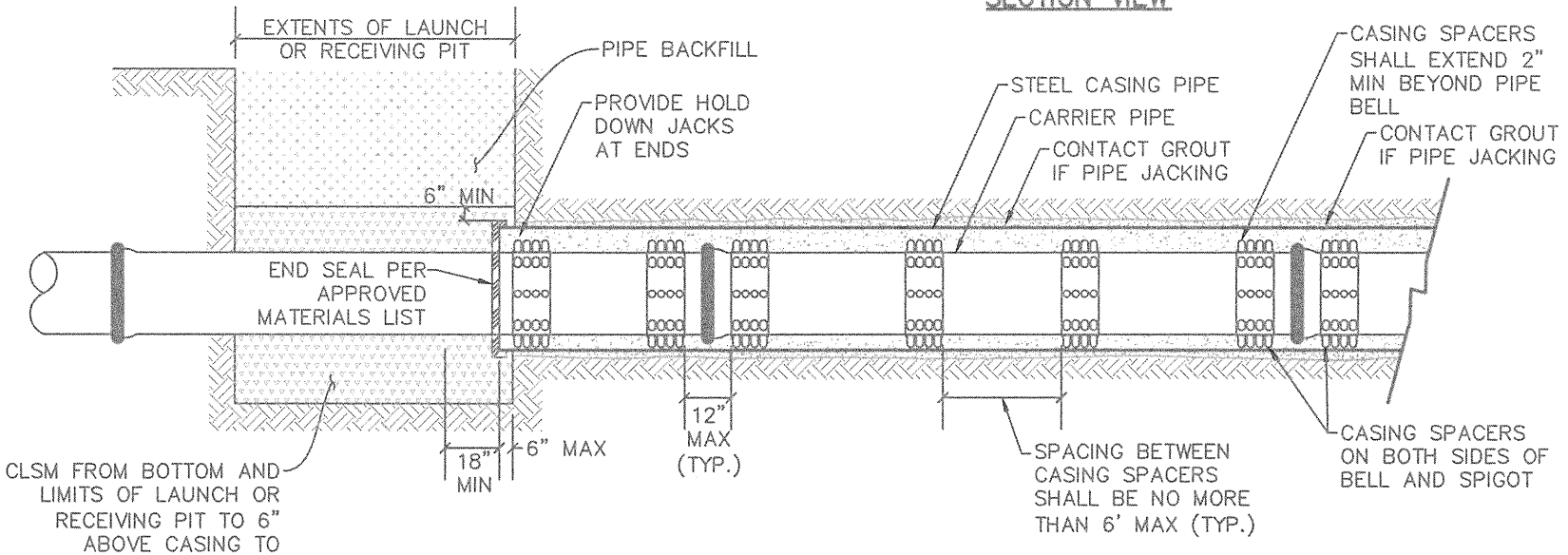
STANDARD DRAWING NO.

SS-13

NOTE:
PROVIDE THREE (3) CASING SPACERS PER JOINT OF PIPE



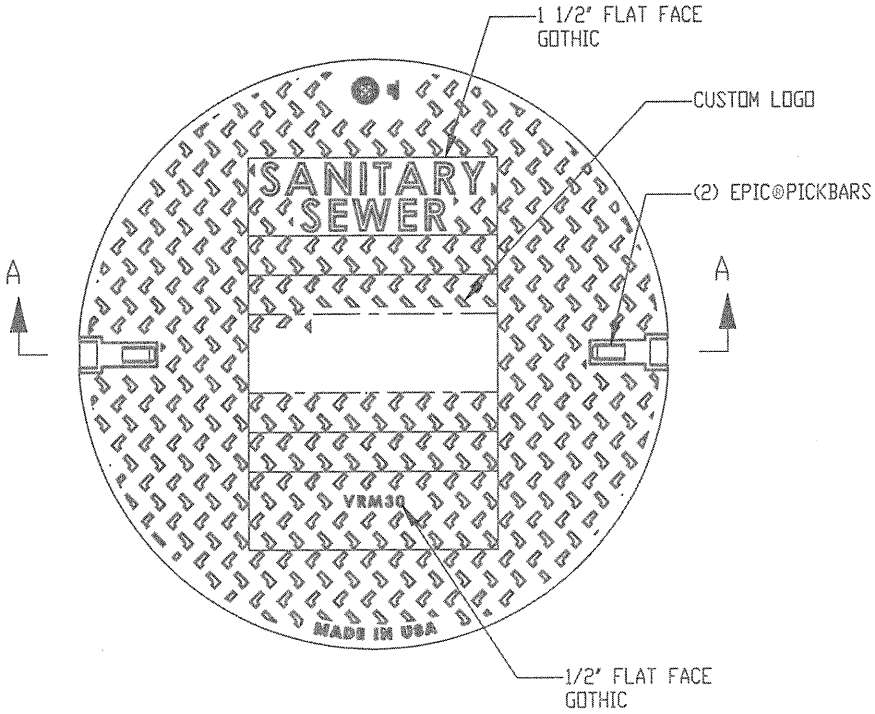
SECTION VIEW

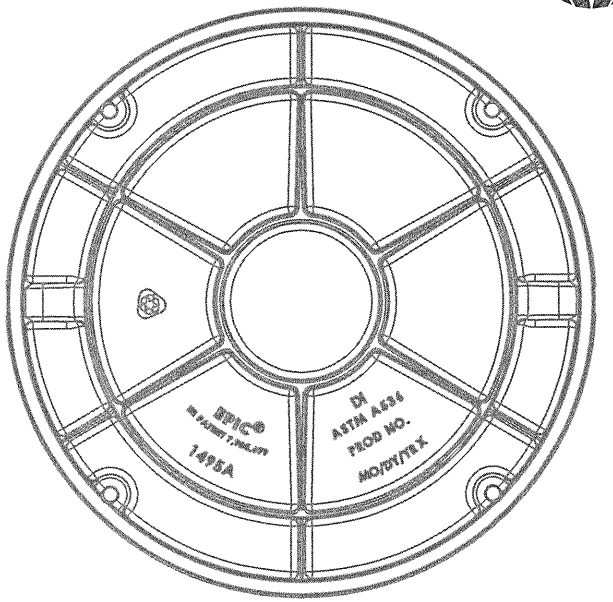


NOTES:

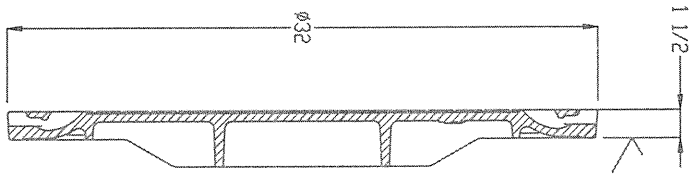
1. PIPE SHALL HAVE UNIFORM ALIGNMENT AND BEARING WHEN INSTALLED AS A CARRIER PIPE IN CASING PIPE. TO PROVIDE STRAIGHT ALIGNMENT AND GRADE, CONCRETE PAVING MAY BE REQUIRED.
2. PRESSURE GROUT SPACE OUTSIDE OF CASING PIPE AFTER TUNNEL IS INSTALLED.
3. WHERE A BORE PIT EXCEEDS 5 FEET IN DEPTH, THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY OSHA.
4. FOR BELL AND SPIGOT PIPE, REMOVE ALL SLACK IN LINE PRIOR TO BACKFILL AND PRESSURE TESTING.
5. CASING SPACERS SHALL FIT SNUG OVER THE CARRIER PIPE AND POSITION THE CARRIER PIPE APPROXIMATELY IN THE CENTER OF THE CASING PIPE TO PROVIDE ADEQUATE CLEARANCE BETWEEN THE CARRIER PIPE BELL AND THE CASING PIPE. CASING SPACERS SHALL BE COATED STEEL FOR SANITARY SEWER PIPE.
6. CASING PIPE SHALL BE 1.5 TIMES LARGER THAN THE CARRIER PIPE.

1495A Cover





BOTTOM VIEW



SECTION A-A

Product Number

001495024

Design Features

-Materials
  Ductile Iron (70-50-05)
-Design Load
  Heavy Duty
-Open Area
  n/a
-Coating
  Undipped
-√ Designates Machined Surface

Certification
-ASTM A536
-Country of Origin: USA

Disclaimer

Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

Contact

800 626 4653
ejco.com

Drawing Revision

8/26/2019 Designer: MAH
9/5/2019 Revised By: MAH

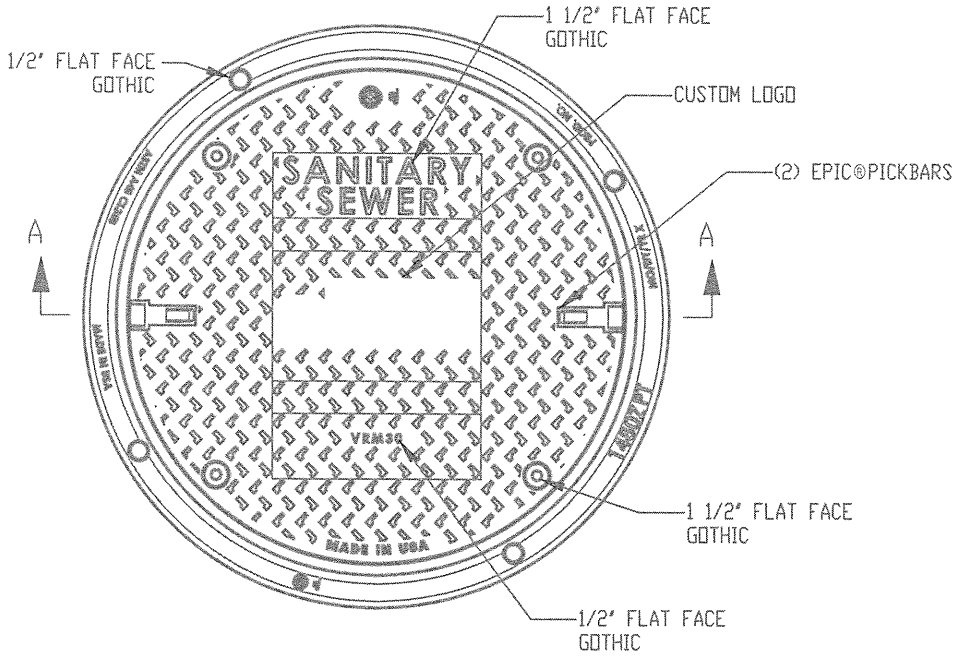
WASTEWATER MANHOLE

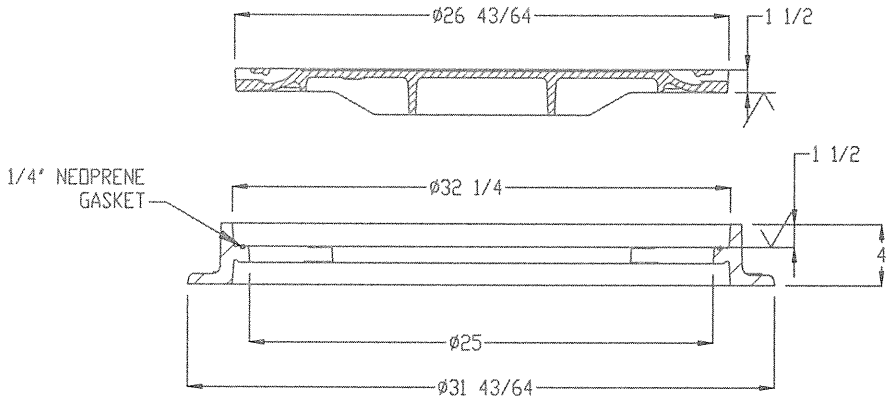
STANDARD COVER

STANDARD DRAWING NO.

SS-14

1480ZPT 1495APT Assembly





SECTION A-A

Product Number

001495023W01

Design Features

-Materials
  Frame
    Gray Iron (CL35B)
  Cover
    Ductile Iron (70-50-05)
-Design Load
  Heavy Duty
-Open Area
  n/a
-Coating
  Undipped
-✓ Designates Machined Surface

Major Components

00148019
001495023

Certification

-ASTM A536
-Country of Origin: USA

Disclaimer

Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

Contact

800 626 4653
ejco.com

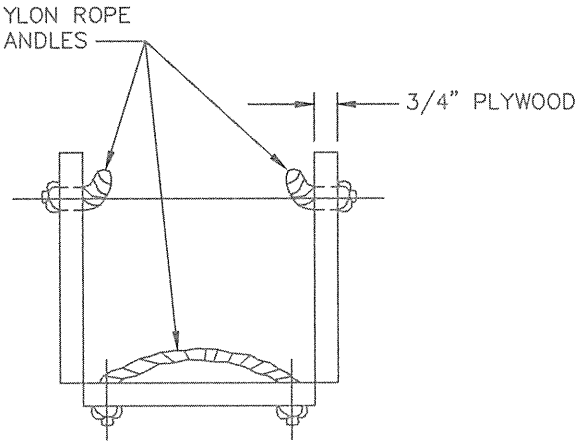
	WASTEWATER MANHOLE	
	BOLTED COVER	STANDARD DRAWING NO. SS-14A

INSTALLATION

FALSE MANHOLE BOTTOM SHALL BE FURNISHED AND INSTALLED IN ALL MANHOLES CONSTRUCTED IN ADVANCE OF PAVING. THESE FALSE MANHOLE BOTTOMS WILL BE INSTALLED AT A TIME DIRECTED BY THE ENGINEER BUT WILL USUALLY BE AFTER ALL WORK IS COMPLETED ON THE WASTEWATER SYSTEM INCLUDING THE AIR TEST, BUT PRIOR TO THE FINAL INSPECTION.

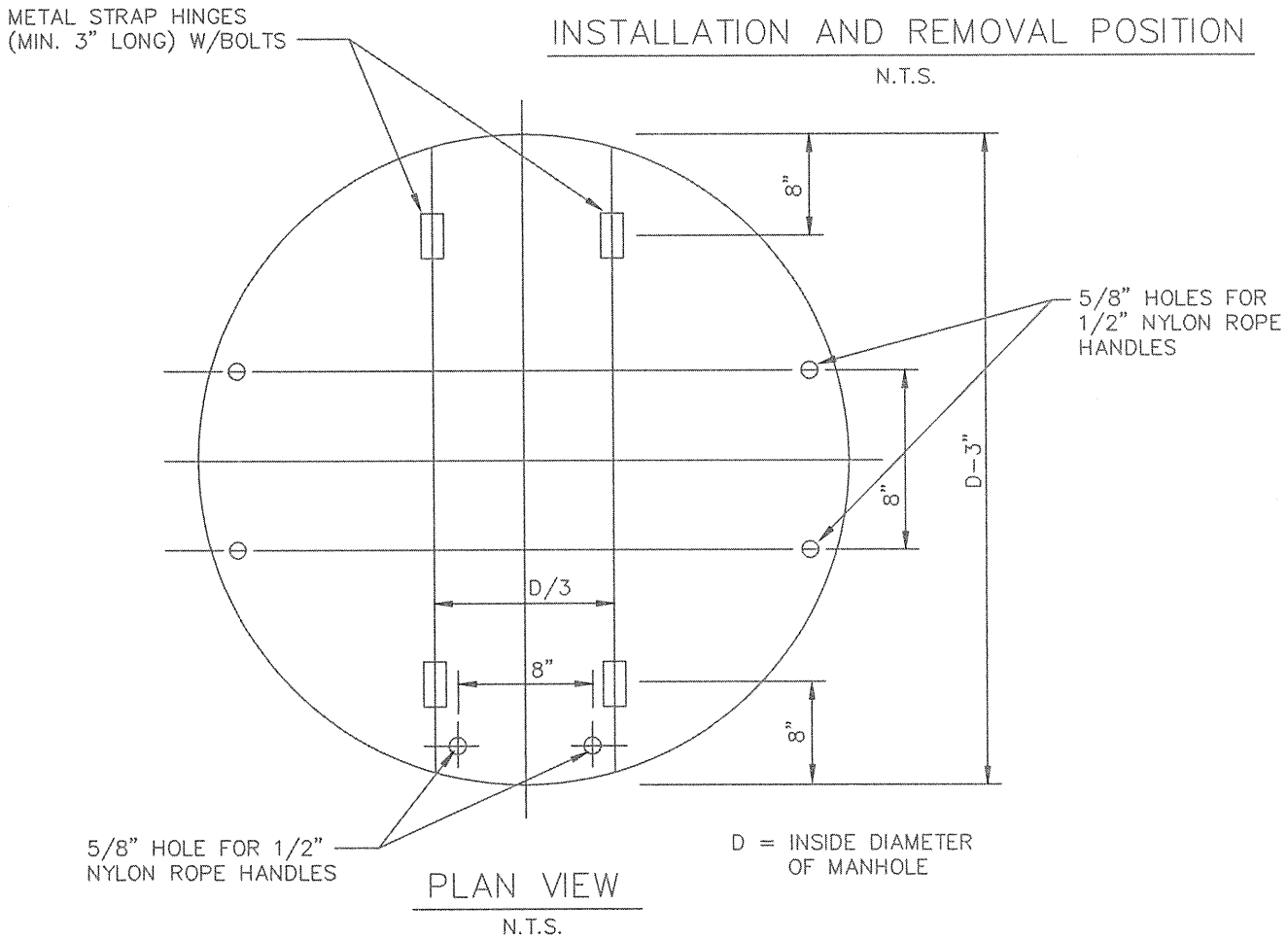
REMOVAL

FALSE MANHOLE BOTTOM SHALL BE REMOVED AFTER THE FINAL APPURTENANCE ADJUSTMENT INSPECTION. THE PAVING CONTRACTOR AND OWNER'S REPRESENTATIVE WILL COORDINATE THE REMOVAL OF THE FALSE MANHOLE BOTTOMS.



INSTALLATION AND REMOVAL POSITION

N.T.S.



PLAN VIEW

N.T.S.

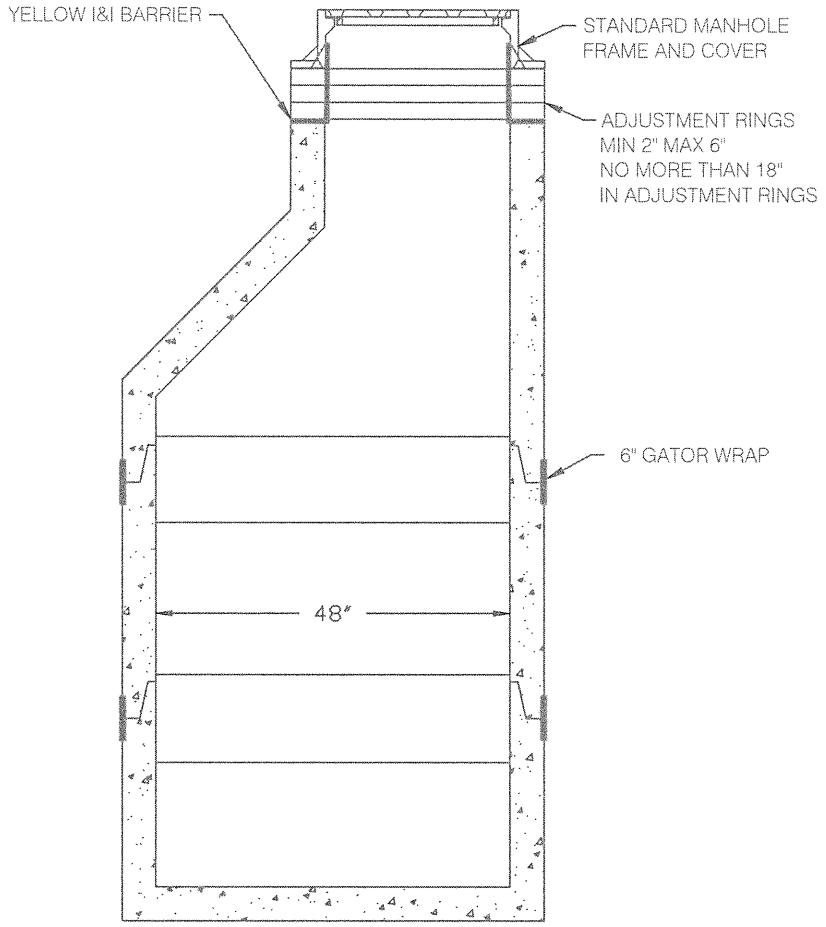
	WASTEWATER MANHOLE	STANDARD DRAWING NO.
	FALSE MANHOLE BOTTOM	SS-15

I&I BARRIER & GATOR WRAP

6" GATOR WRAP

STANDARD DRAWING NO.

SS-16



INFI-SHIELD
6" GATOR WRAP SPECIFICATION

Each manhole, catch basin or pipe joint shall be sealed with external rubber sleeve similar to the Infi-Shield Gator Wrap as manufactured by Sealing Systems, Inc. (763-478-2057). The seal shall be made of a Stretchable, Self-Shrinking, Intra-Curing Halogenated Based Rubber with a minimum thickness of 30 mils. The back side of each until shall be coated with a cross-linked re-enforced butyl adhesive. The butyl adhesive shall be non-hardening sealant, with a minimum thickness of 30 mils. The seal shall be designed to stretch around the substrate then overlapped creating a cross-link and fused bond between the rubber and butyl adhesive. The application shall form a continuous rubber seal that applies inward pressure on the protected area for the life of application. The butyl adhesive and the inward pressure exerted on the substrate will prevent the intrusion of water and soil through the joint sections of a manhole, catch basin or concrete pipe.

Gator Wrap 6"

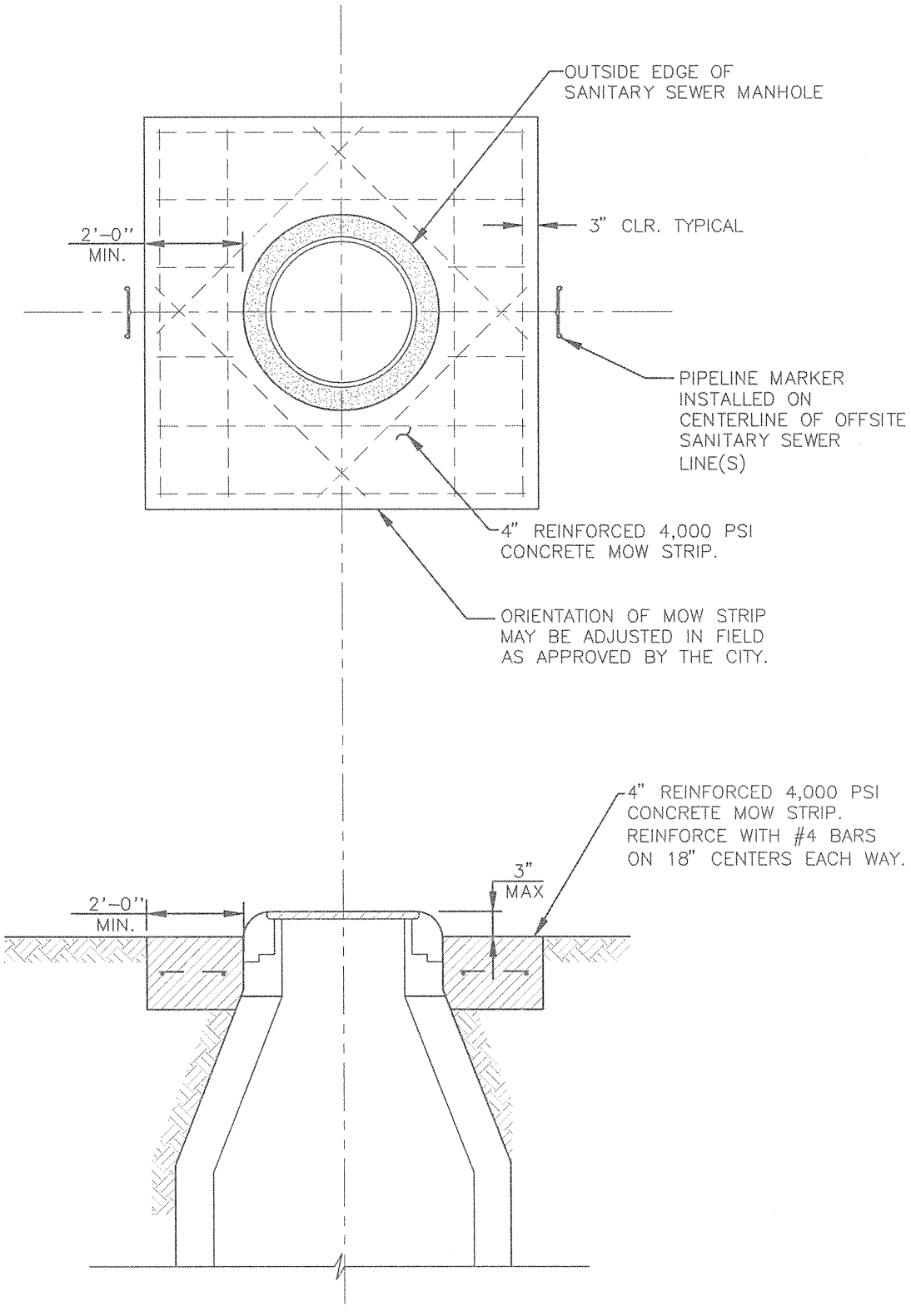
Height	6 inches
Length	16 or 50 foot rolls
Thickness	60 mils
Height tolerance	6 inches +/- .188"
Length tolerance	+/- 3"
Rubber Thickness tolerance	30 mils
Butyl Adhesive Thickness	30 mils

I&I BARRIER

SPECIFICATION
Patent Pending

The bottom surface of the I/I BARRIER flange shall be sealed to the manhole cone top surface using a butyl sealant as specified by the manufacture of the I/I BARRIER. The sealant shall be applied to the top surface of the manhole cone section only. Sufficient sealant must be used to accommodate flaws in the cone surface and "out-of-flat" conditions. The amount of sealant and its placement will be determined by the condition of the cone. This determination will be the responsibility of the contractor installing the I/I BARRIER. The I/I BARRIER is then centrally seated on the cone against the sealant. The bottom adjustment ring is then centrally placed on the top surface of the I/I BARRIER flange using no sealant. If plastic adjustment rings with a vertical tongue are being used, the tongue must be cut off to allow the bottom ring to set flush on the I/I BARRIER flange. This removal should be done per instructions from the adjustment ring manufacturer. The chimney section is then completed based on the type of adjustment rings being utilized.

MMG, 120 E 15TH AVE, N. KANSAS CITY,
MO 64116, PH 816-746-6669



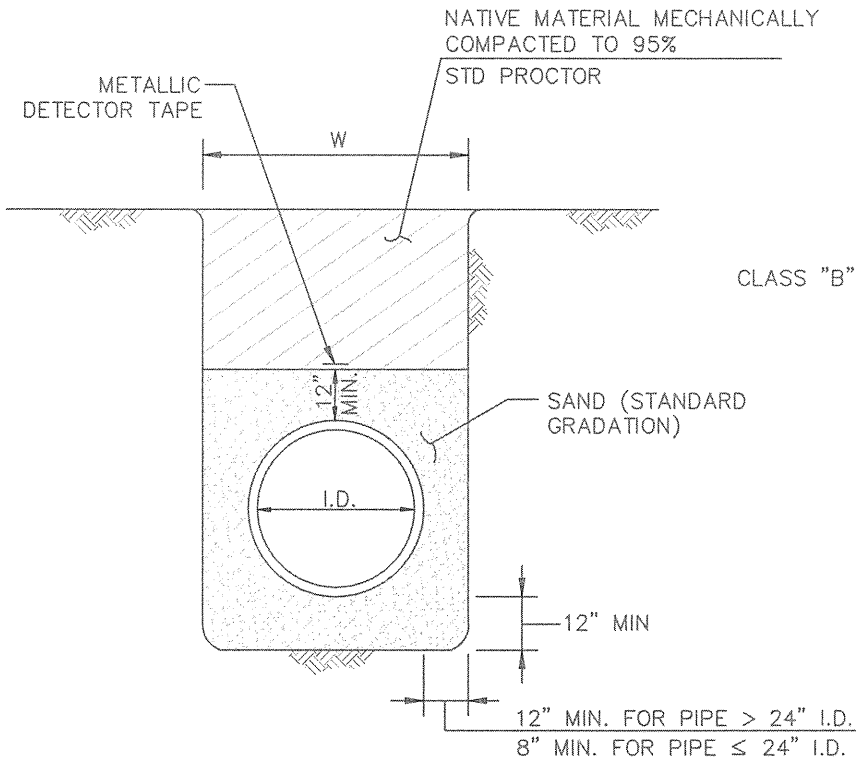
	MANHOLE & VALVE VAULT	
	MOW STRIP	STANDARD DRAWING NO. SS-17

CLASS "B+" & CLASS "G"

EMBEDMENT

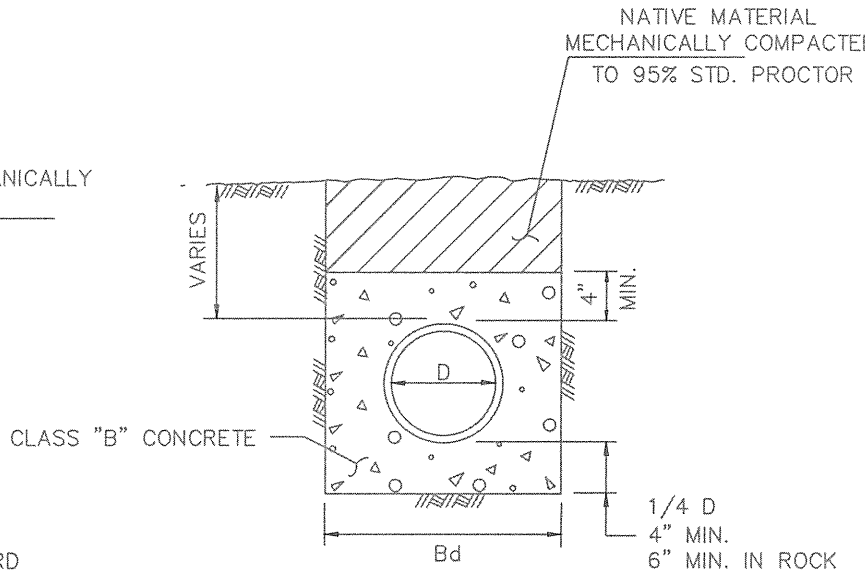
STANDARD DRAWING NO.

EMB-01



WATER LINE EMBEDMENT

NO SCALE



CLASS "G"

N.T.S.

NOTES:

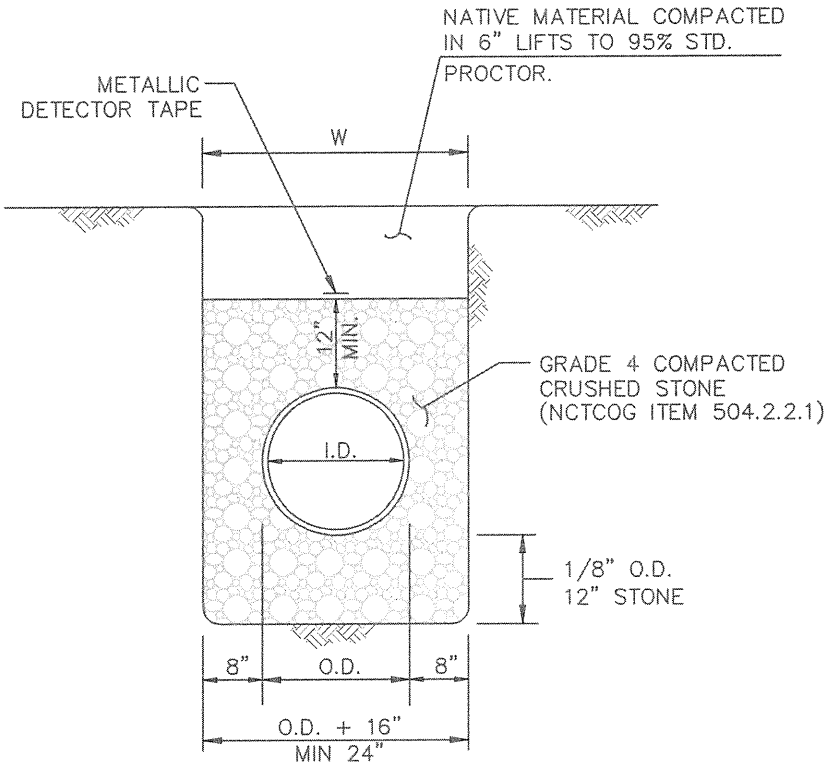
1. D = INSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH

CLASS "H" & STORM SEWER

EMBEDMENT

EMB-02

STANDARD DRAWING NO.

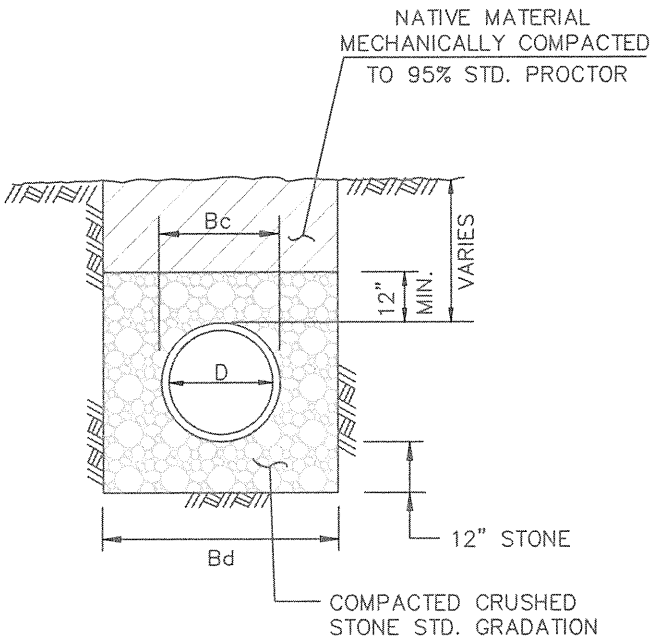


CLASS H EMBEDMENT

P.V.C. PIPE ONLY
STD. P.V.C. SEWER

NOTES:

1. UTILIZE CLASS "H" EMBEDMENT FOR PVC (SDR 35) WASTEWATER LINE.
2. BEDDING DEPTH MEASURED FROM OUTSIDE OF PIPE BELL.

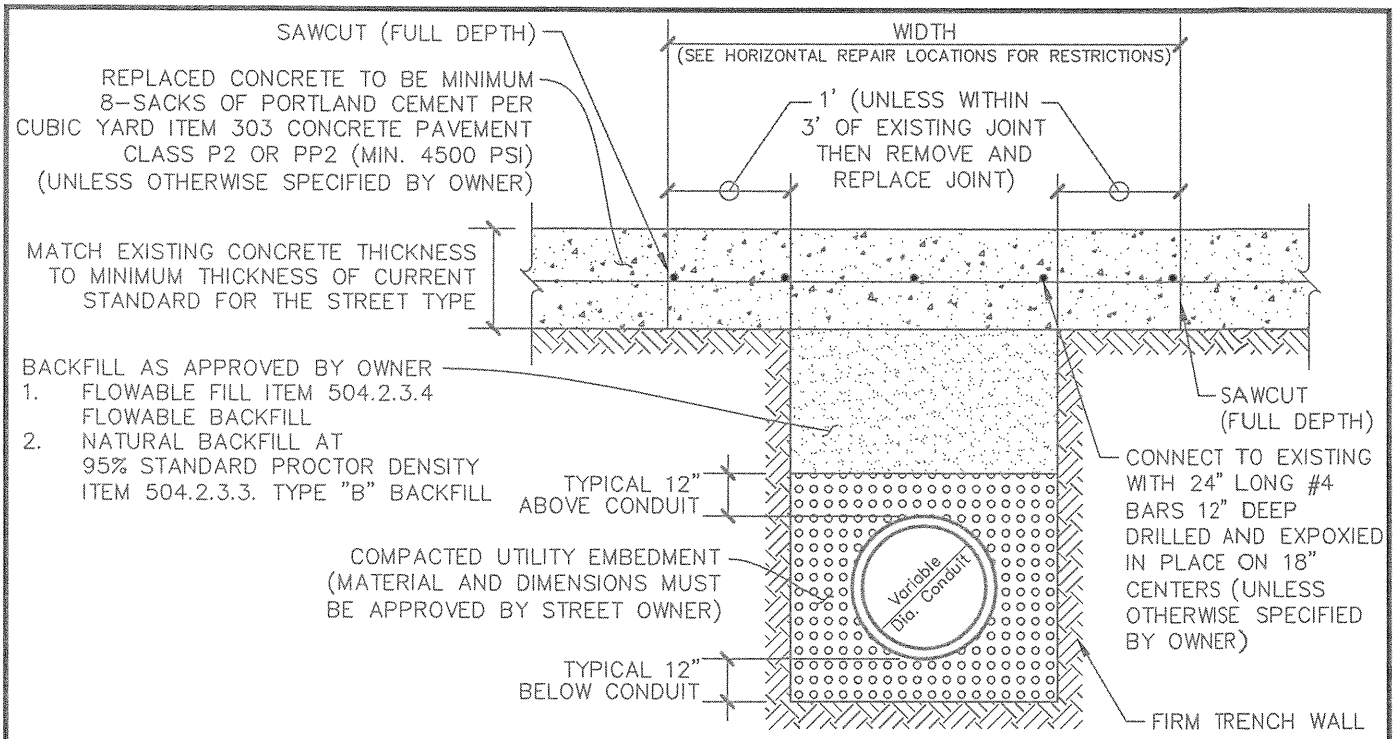


STORM SEWER EMBEDMENT

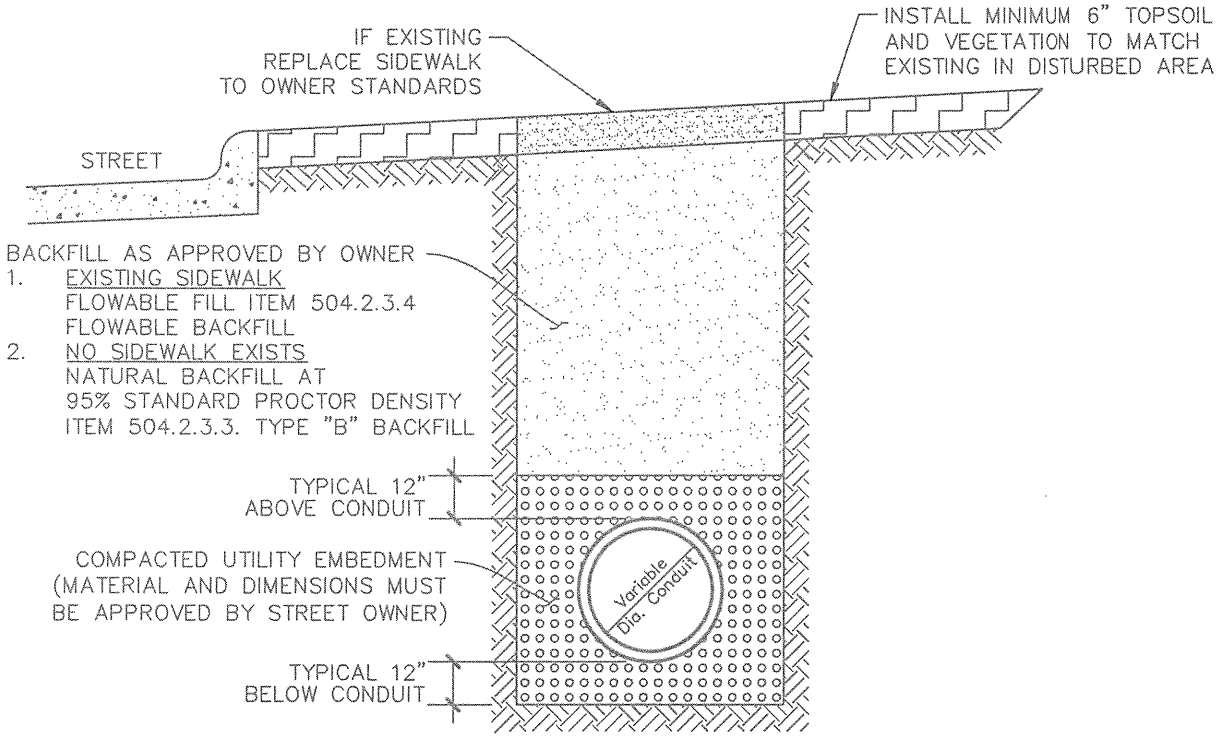
N.T.S.

NOTES:

1. D = INSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. Bc = OUTSIDE DIAMETER OF PIPE

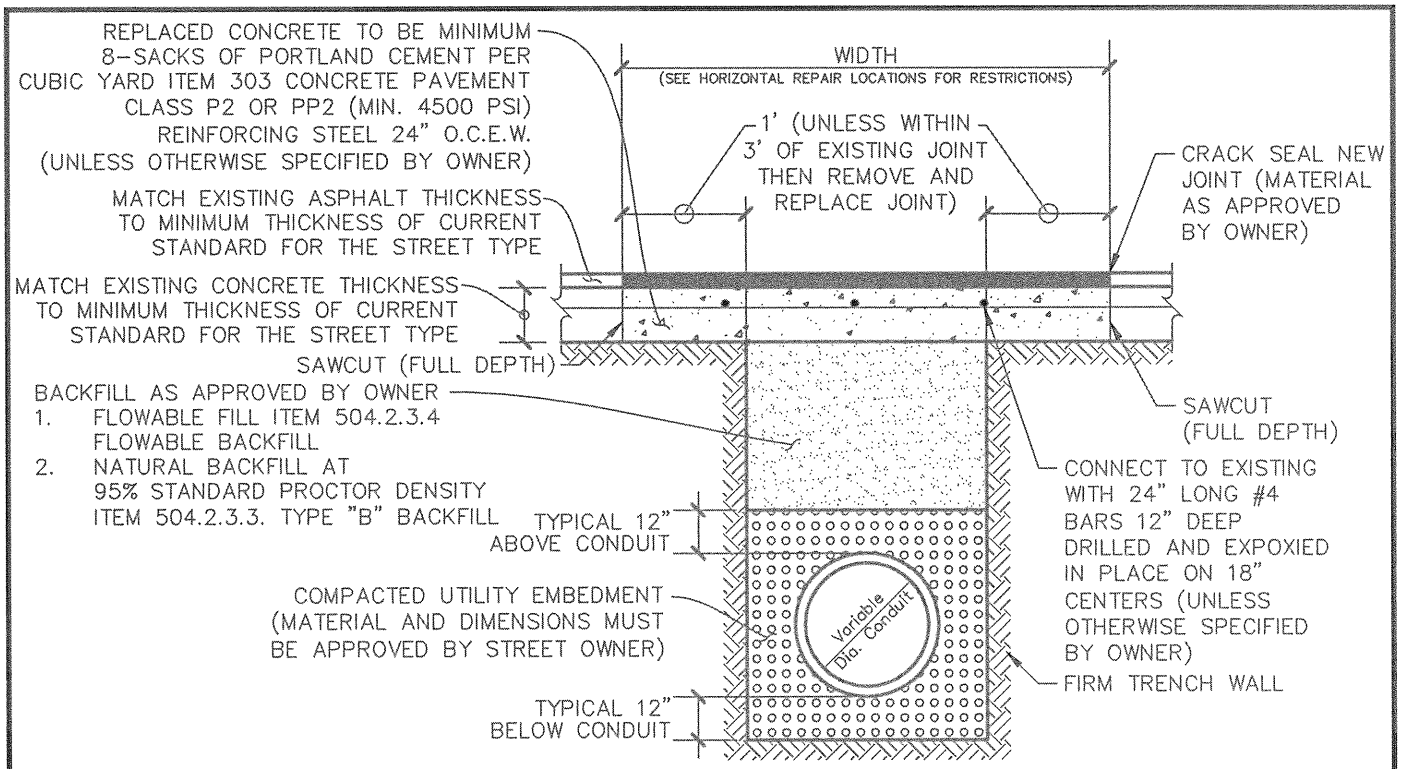


CONCRETE PAVEMENT
N.T.S.



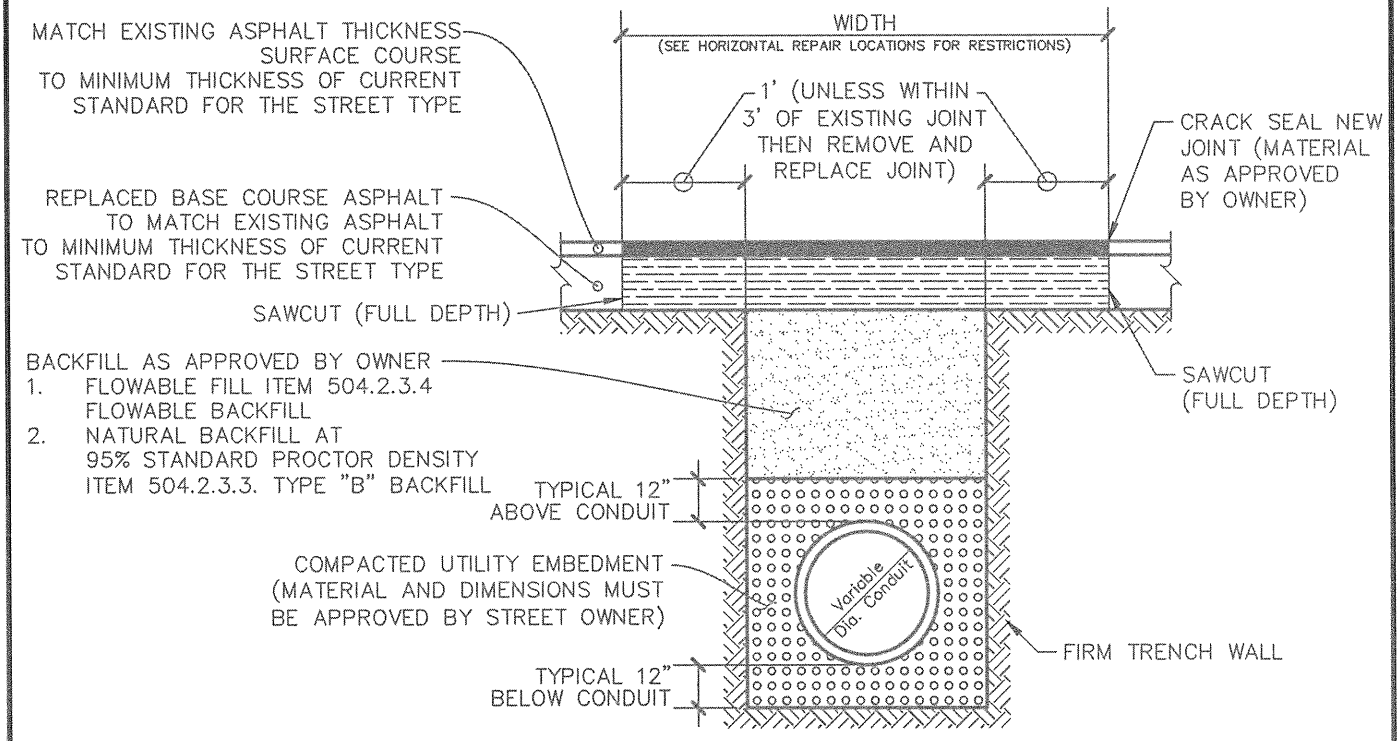
STREET PARKWAY
N.T.S.

	PAVEMENT CUT & REPAIR	
	CONCRETE & PARKWAY	STANDARD DRAWING NO. EMB-03



CONCRETE PAVEMENT WITH ASPHALT OVERLAY

N.T.S.



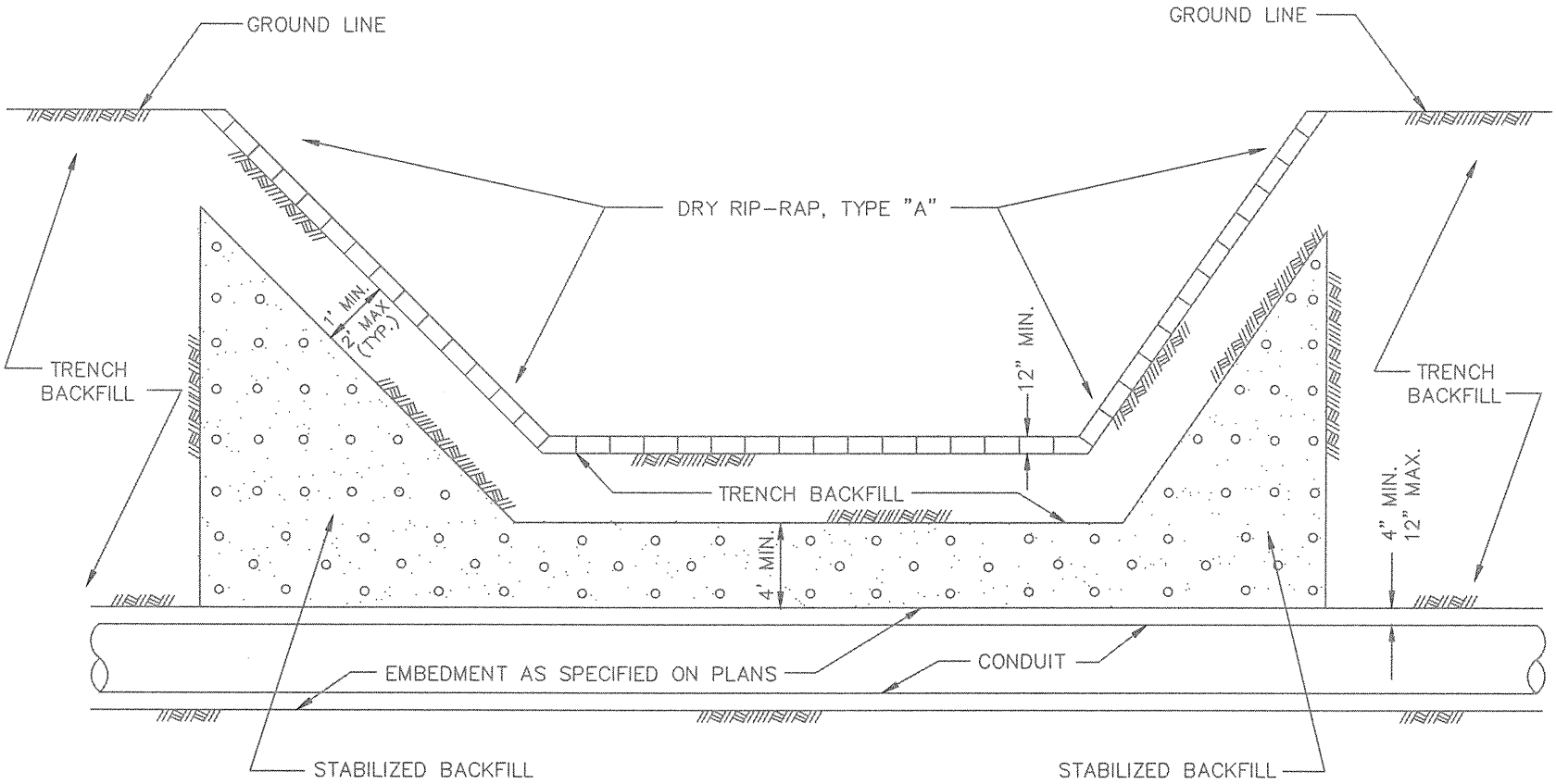
FULL DEPTH ASPHALT PAVEMENT

N.T.S.

	PAVEMENT CUT & REPAIR	
	ASPHALT	STANDARD DRAWING NO. EMB-04

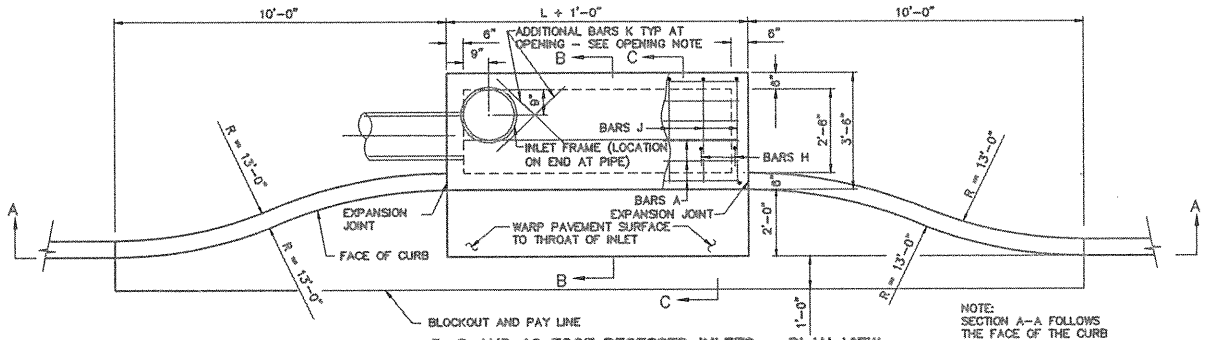
INFILTRATION PROTECTION

CONDUIT UNDER CHANNEL

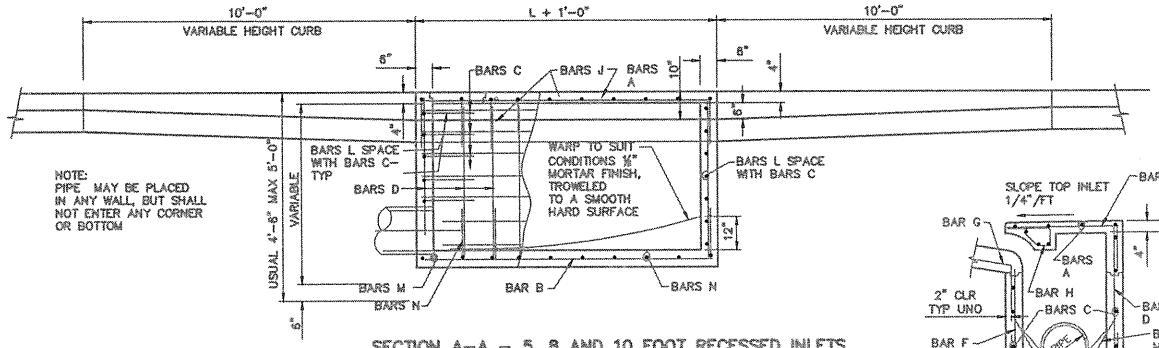


STANDARD DRAWING NO.

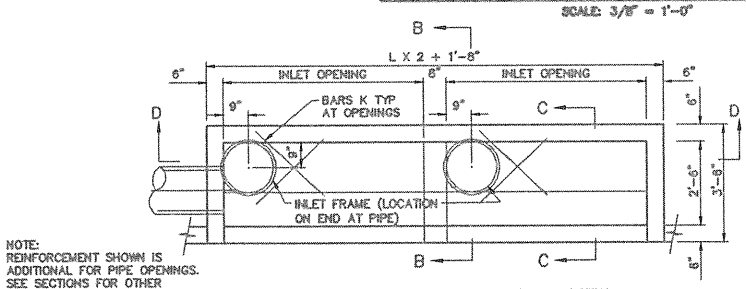
EMB-05



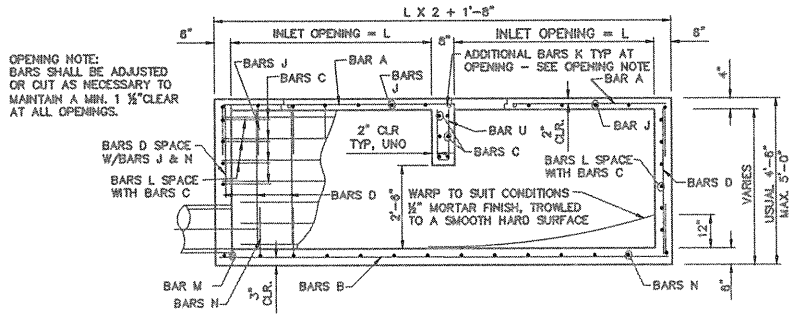
5, 8 AND 10 FOOT RECESSED INLETS - PLAN VIEW
SCALE: 3/8" = 1'-0"



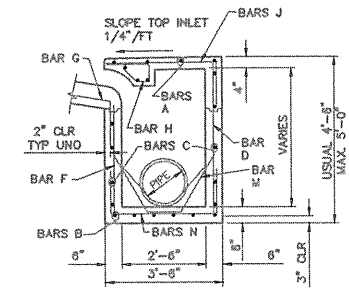
SECTION A-A - 5, 8 AND 10 FOOT RECESSED INLETS
SCALE: 3/8" = 1'-0"



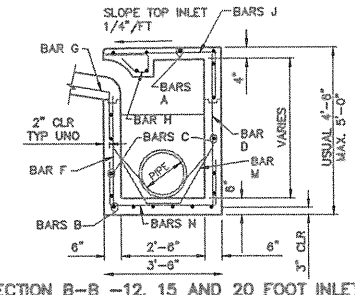
12, 15 AND 20 FOOT INLETS - PLAN VIEW
SCALE: 3/8" = 1'-0"



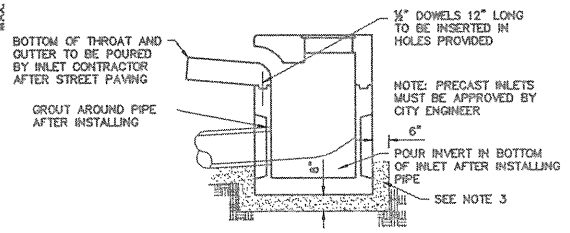
SECTION D-D - 12, 15 AND 20 INLETS
SCALE: 3/8" = 1'-0"



SECTION B-B - 5, 8 AND 10 FOOT INLETS
SCALE: 3/8" = 1'-0"



SECTION B-B - 12, 15 AND 20 FOOT INLETS
SCALE: 3/8" = 1'-0"



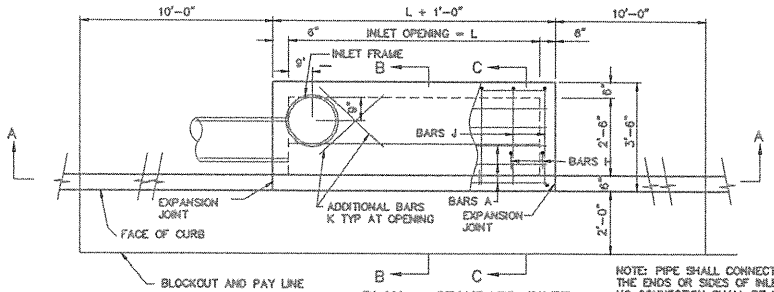
INSTALLATION DRAWING FOR PRECAST 5 AND 10 FOOT CURB INLETS
SCALE: 3/8" = 1'-0"

STORMWATER CURB INLET

STANDARD (1 OF 2)

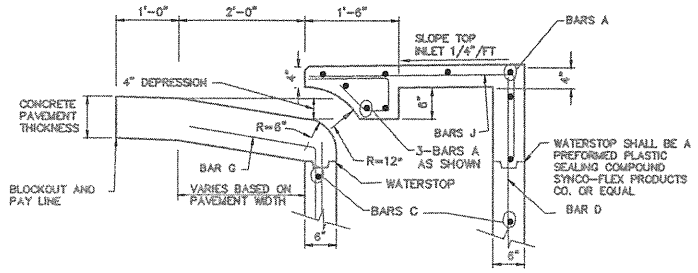
STANDARD DRAWING NO.

STM-01

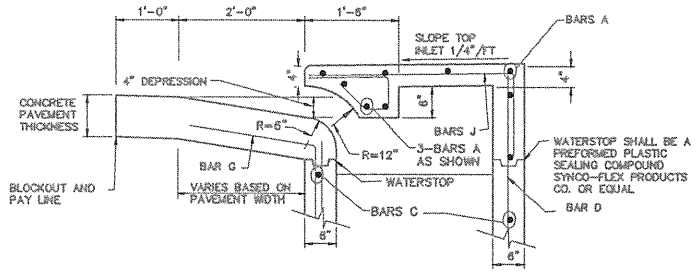


PLAN – STANDARD INLET
SCALE: 3/8" = 1'-0"

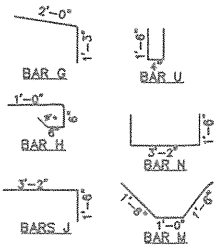
NOTE: PIPE SHALL CONNECT TO THE ENDS OR SIDES OF INLETS. NO CONNECTION SHALL BE MADE AT CORNER OR BOTTOM.



SECTION C–C –5, 8 AND 10 FOOT INLETS
SCALE: 3/4" = 1'-0"



SECTION C–C –12, 15 AND 20 FOOT INLETS
SCALE: 3/4" = 1'-0"



REINFORCING STEEL SCHEDULE DOUBLE INLETS					REINFORCING STEEL SCHEDULE				
INLET OPENING "L"	BAR	BAR SIZE	NO.* REQ'D	BAR* LENGTH	INLET OPENING "L"	BAR	BAR SIZE	NO.* REQ'D	BAR* LENGTH
6'-0"	A	#4	11	13'-4"	5'-0"	A	#4	9	5'-0"
	B	#4	6	13'-4"		B	#4	6	5'-0"
	C	#4	18	13'-4"		C	#4	12	5'-0"
	D	#5	1	5 4'-0"		D	#5	7	4'-0"
	F	#5	1	5 3'-3"		F	#5	7	3'-3"
	G	#4	15	3'-6"		G	#4	7	3'-6"
	H	#4	15	2'-6"		H	#4	9	2'-6"
	J	#5	15	4'-8"		J	#5	7	4'-8"
	K**	#4	4	3'-0"		K**	#4	4	3'-0"
	L	#5	24	3'-0"		L	#4	24	3'-0"
	M**	#4	2	4'-0"		M**	#4	2	4'-0"
	N	#5	15	6'-2"		N	#5	7	6'-2"
	U	#4	4	3'-4"					
7'-6"	A	#4	11	18'-4"	8'-0"	A	#4	9	7'-0"
	B	#4	6	16'-6"		B	#4	6	7'-0"
	C	#4	18	16'-4"		C	#4	12	7'-0"
	D	#5	18	4'-0"		D	#5	10	4'-0"
	F	#5	18	3'-3"		F	#5	10	3'-3"
	G	#4	18	3'-6"		G	#4	10	3'-6"
	H	#4	18	2'-6"		H	#4	14	2'-6"
	J	#5	18	4'-8"		J	#5	10	4'-8"
	K**	#4	4	3'-0"		K**	#4	4	3'-0"
	L	#4	24	3'-0"		L	#4	24	3'-0"
	M**	#4	2	4'-0"		M**	#4	2	4'-0"
	N	#5	18	6'-2"		N	#5	10	6'-2"
	U	#4	4	3'-4"					
10'-0"	A	#4	11	21'-4"	10'-0"	A	#4	9	9'-0"
	B	#4	6	21'-4"		B	#4	6	9'-0"
	C	#4	18	21'-4"		C	#4	12	9'-0"
	D	#5	23	4'-0"		D	#5	12	4'-0"
	F	#5	23	3'-3"		F	#5	12	3'-3"
	G	#4	23	3'-6"		G	#4	12	3'-6"
	H	#4	23	2'-6"		H	#4	17	2'-6"
	J	#5	23	4'-8"		J	#5	12	4'-8"
	K**	#4	4	3'-0"		K**	#4	4	3'-0"
	L	#4	24	3'-0"		L	#4	24	3'-0"
	M**	#4	2	4'-0"		M**	#4	2	4'-0"
	N	#5	23	6'-2"		N	#5	12	6'-2"
	U	#4	4	3'-4"					

* BAR QUANTITIES AND LENGTHS SHOWN ARE FOR MAX HEIGHT INLETS. VALUES SHALL BE ADJUSTED FOR USUAL HEIGHT INLETS
** NUMBER AND DIMENSIONS SHOWN FOR TOP SLAB OPENINGS AS SHOWN IN THE DETAILS. ADDITIONAL BARS SHALL BE PROVIDED AT ALL PIPE OPENINGS AS SHOWN IN THE DETAILS, NUMBER AND DIMENSIONS TO BE MODIFIED AS NEEDED.

NOTES FOR PRECAST INLET

1. PRECAST INLETS MUST BE APPROVED BY ENGINEER.
2. THE FLOOR OF THE EXCAVATION MUST PROVIDE A FIRM, LEVEL BED FOR THE BASE SECTION TO REST UPON.
3. A MINIMUM OF 6 INCHES OF 1" DIAMETER (MAXIMUM ROCK OR GRAVEL SHALL BE USED TO PREPARE THE BEDDING TO FINAL GRADE OR IN LIEU OF THIS, AT LEAST 6 INCHES OF 2–SACK CEMENT STABILIZED SAND SHALL BE USED TO PREPARE THE BEDDING TO GRADE. CEMENT STABILIZED–SAND SHALL BE ALLOWED TO SET BY KEEPING HOLE PUMPED DRY.
4. AFTER CASTING HAS BEEN INSTALLED ON THE PROPER BEDDING, THE BACKFILL MATERIAL, WHICH IS FREE FLOWING AND CLEAR OF ROCKS, IN EXCESS OF 4" DIAMETER AND OTHER LUMPS WHICH WOULD PROHIBITED PROPER COMPACTION, SHALL BE COMMENCED IN LIFTS OF NO MORE THAN 18". THE MATERIAL USED FOR BACKFILL SHOULD BE OF TYPE A SUITABLE TO OBTAIN THE DENSITY REQUIREMENTS FOR THE SPECIFIC JOB.
5. CONCRETE TO BE 4000 PSI.
6. LOCKING DEVICE IS REQUIRED ON ALL STORM SEWER LIDS.
7. "NO DUMPING" WARNING PLAQUE TO BE INSTALLED ON ALL STANDARD AND RECESSED INLETS.

STORMWATER CURB INLET

STANDARD (2 OF 2)

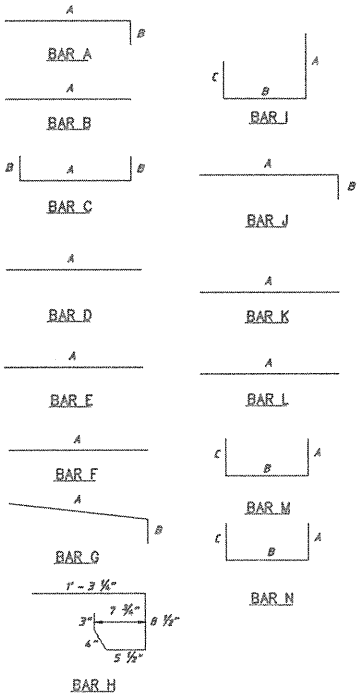
STANDARD DRAWING NO.

STM-01A

DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS

INLET LENGTH	BAR TYPE	BAR DIA. (⅛ IN.)	NO. REQ'D	BAR DIMENSIONS		
				A	B	C
4	A	3	6	3'-2"	0'-3"	-
	B	3	1	2'-10"	-	-
	C	4	15	4'-8"	0'-6"	-
	D	4	5	4'-8"	-	-
	F	4	1	3'-2"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	3	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
6	A	3	9	3'-2"	0'-3"	-
	B	3	1	4'-10"	-	-
	C	4	15	6'-8"	0'-6"	-
	D	4	5	4'-8"	-	-
	F	4	1	3'-2"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	3	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
8	A	3	12	3'-2"	0'-3"	-
	B	3	1	6'-10"	-	-
	C	4	15	8'-8"	0'-6"	-
	D	4	5	4'-8"	-	-
	F	4	1	3'-2"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	4	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
10	A	3	10	3'-2"	0'-3"	-
	B	3	2	8'-10"	-	-
	C	4	16	10'-8"	0'-6"	-
	D	4	4	4'-8"	-	-
	E	5	6	10'-8"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	15	*	*	*
	I	4	8	4'-8"	3'-2"	3'-2"
	L	4	5	4'-3"	-	-
12	A	3	12	3'-2"	0'-3"	-
	B	3	2	10'-10"	-	-
	C	4	16	12'-8"	0'-6"	-
	D	4	4	4'-8"	-	-
	E	5	6	12'-8"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	18	*	*	*
	I	4	10	4'-8"	3'-2"	3'-2"
	J	5	9	3'-2"	1'-3"	-
	K	4	5	2'-3"	-	-
	L	4	5	4'-3"	-	-
	M	5	9	4'-3"	3'-2"	3'-9"
14	A	3	14	3'-2"	0'-3"	-
	B	3	2	10'-10"	-	-
	C	4	16	14'-8"	0'-6"	-
	D	4	4	4'-8"	-	-
	E	5	6	14'-8"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	21	*	*	*
	I	4	12	4'-8"	3'-2"	3'-2"
	J	5	9	3'-2"	1'-3"	-
	K	4	5	2'-3"	-	-
	L	4	5	4'-3"	-	-
	M	5	9	4'-3"	3'-2"	3'-9"

*SEE DIAGRAM FOR DIMENSIONS. 4', 6', 8', 12' AND 14' INLETS.

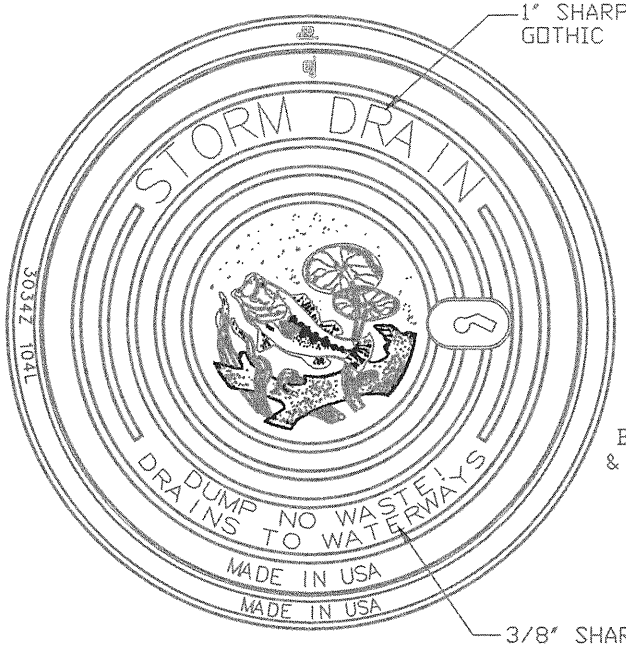


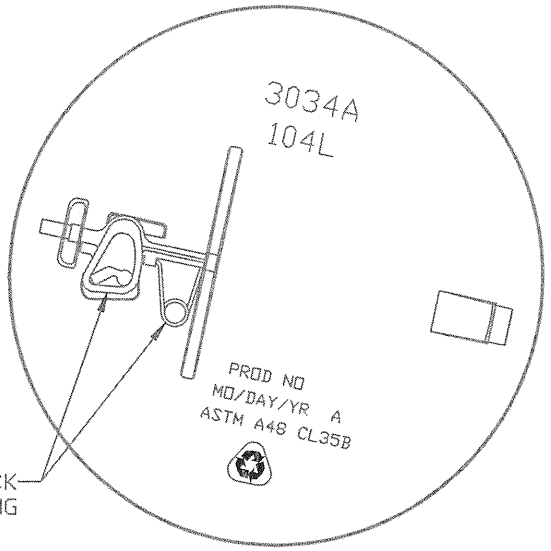
BAR DIAGRAMS

REINFORCING STEEL SCHEDULE

	STORMWATER CURB INLET	
	REINFORCING STEEL	STANDARD DRAWING NO. STM-02

3034Z 3034A Assembly





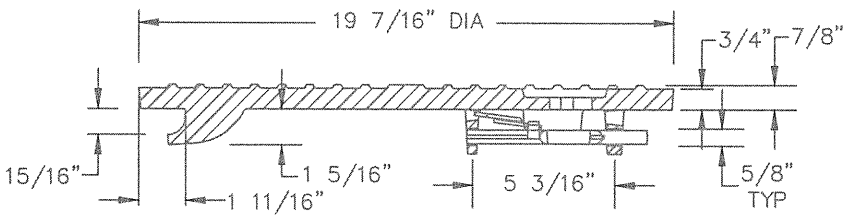
BOTTOM VIEW

Product Number
00303461

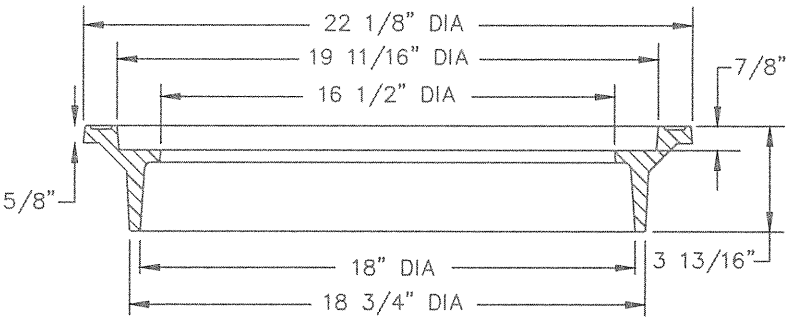
Design Features
- Materials
  - Frame
    - Gray Iron (CL35B)
  - Cover
    - Gray Iron (CL35B)
- Design Load
  - Light Duty
- Coating
  - Dipped
- √ Designates Machined Surface

Certification
- ASTM A48
- Country of Origin: USA

Major Components
00303410
00303427



COVER SECTION



FRAME SECTION

Disclaimer

Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

Drawing Revision
01/19/2007 Designer: DEV
12/22/2014 Revised By: DVB

Contact
800 626 4653
ejco.com

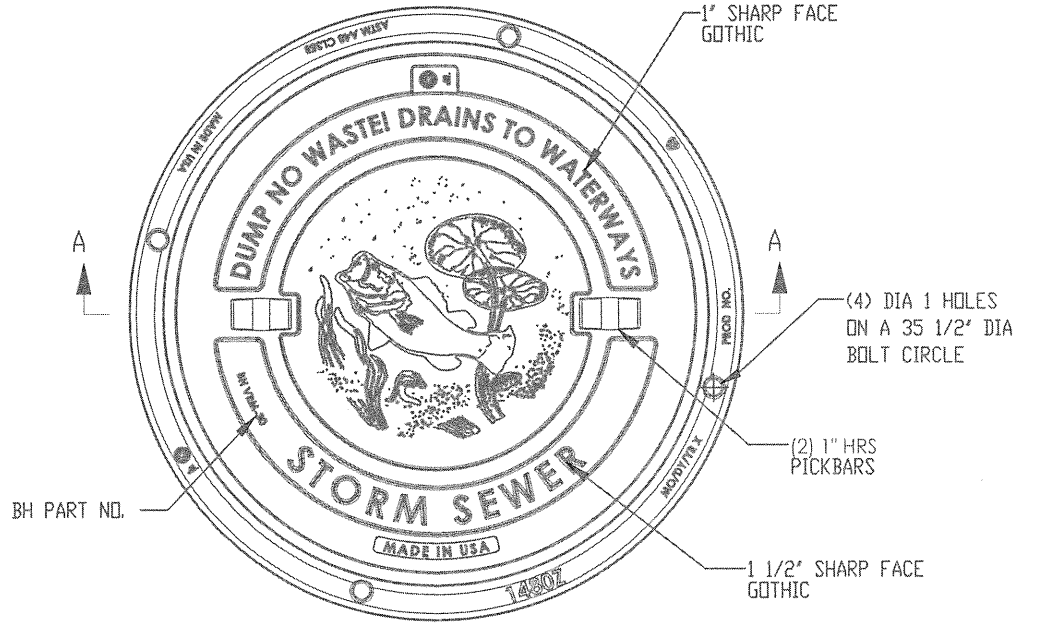
STANDARD INLET COVER

STORM SEWER

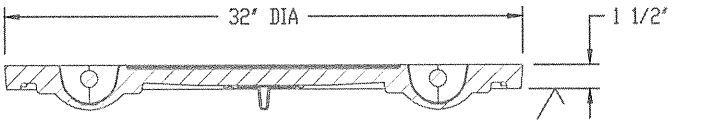
STANDARD DRAWING NO.

STM-03

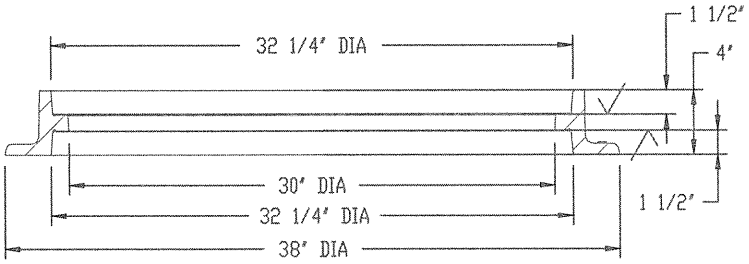
1480A 1480Z Assembly



PLAN VIEW



COVER SECTION



SECTION A-A

Product Number

00147987A01

Design Features

-Materials
  Cover
    Gray Iron (CL35B)
  Frame
    Gray Iron (CL35B)
-Design Load
  Heavy Duty
-Open Area
  n/a
-Coating
  Undipped
-√ Designates Machined Surface

Certification

-ASTM A48
-Country of Origin:USA

Major Components

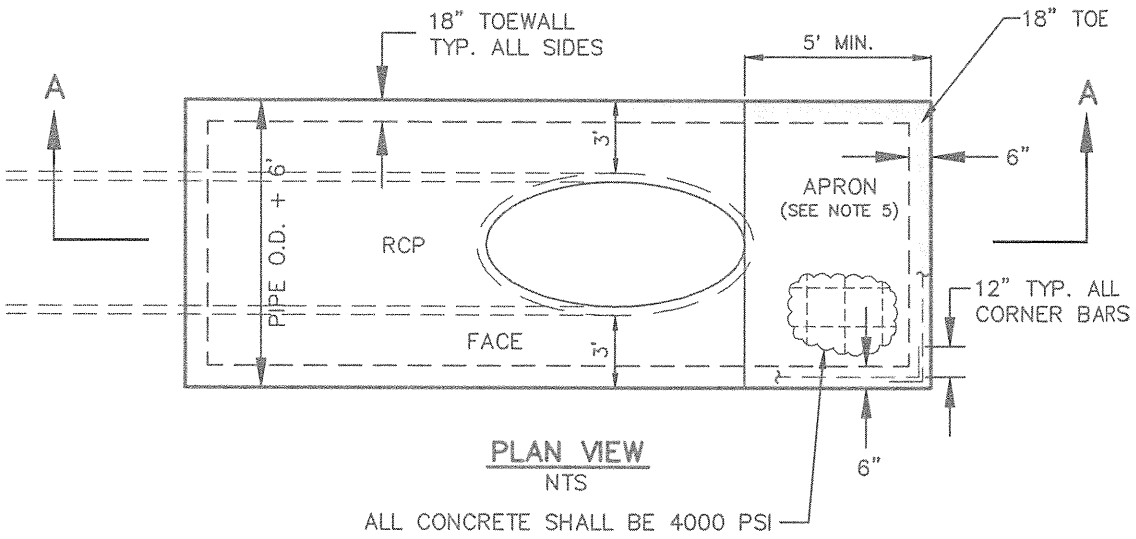
00147987
00148015

Contact

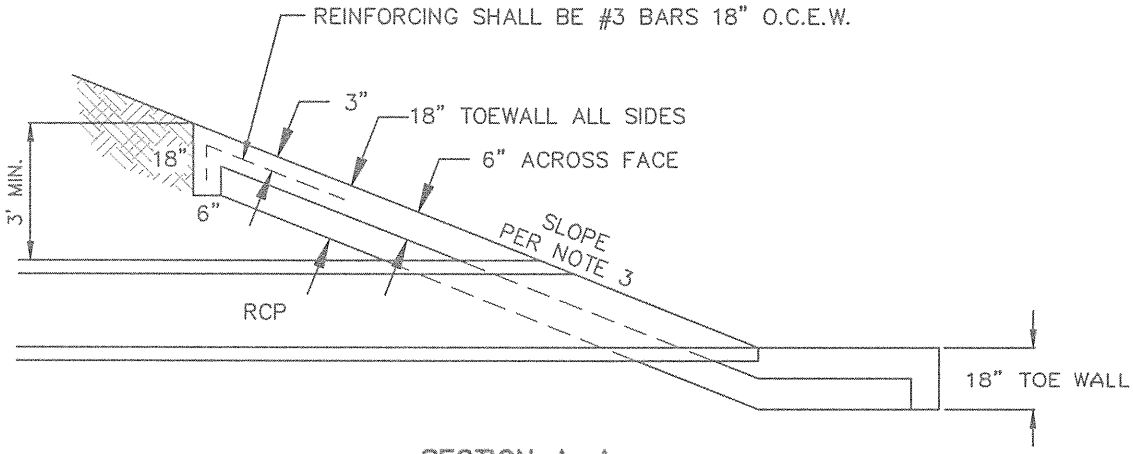
800 626 4653

ejco.com

	STORM SEWER	
	BOLTED INLET COVER	STANDARD DRAWING NO. STM-03A



PLAN VIEW
NTS



SECTION A–A
NTS

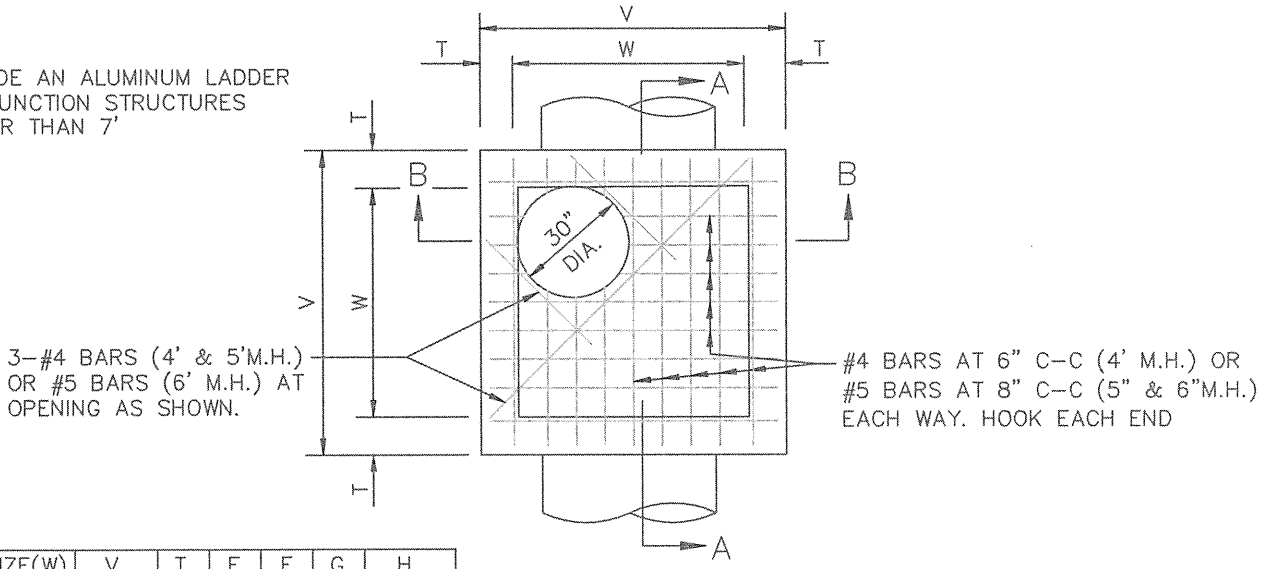
NOTES:

1. ROCK RIPRAP PROVIDED BEYOND APRON SHALL BE AS SPECIFIED IN PLANS BY DESIGN ENGINEER.
2. POSITIVE DRAINAGE MUST BE PROVIDED BEYOND CONCRETE APRON.
3. HEADWALL SLOPE SHALL BE SPECIFIED IN PLANS BY DESIGN ENGINEER (MAX. 3:1)
4. CONCRETE SHALL BE 4000 PSI.
5. CONCRETE APRON OR APPROVED EQUAL.

	STORMWATER HEADWALL	
	TYPE "C"	STANDARD DRAWING NO. STM-04

NOTE:

PROVIDE AN ALUMINUM LADDER FOR JUNCTION STRUCTURES DEEPER THAN 7'



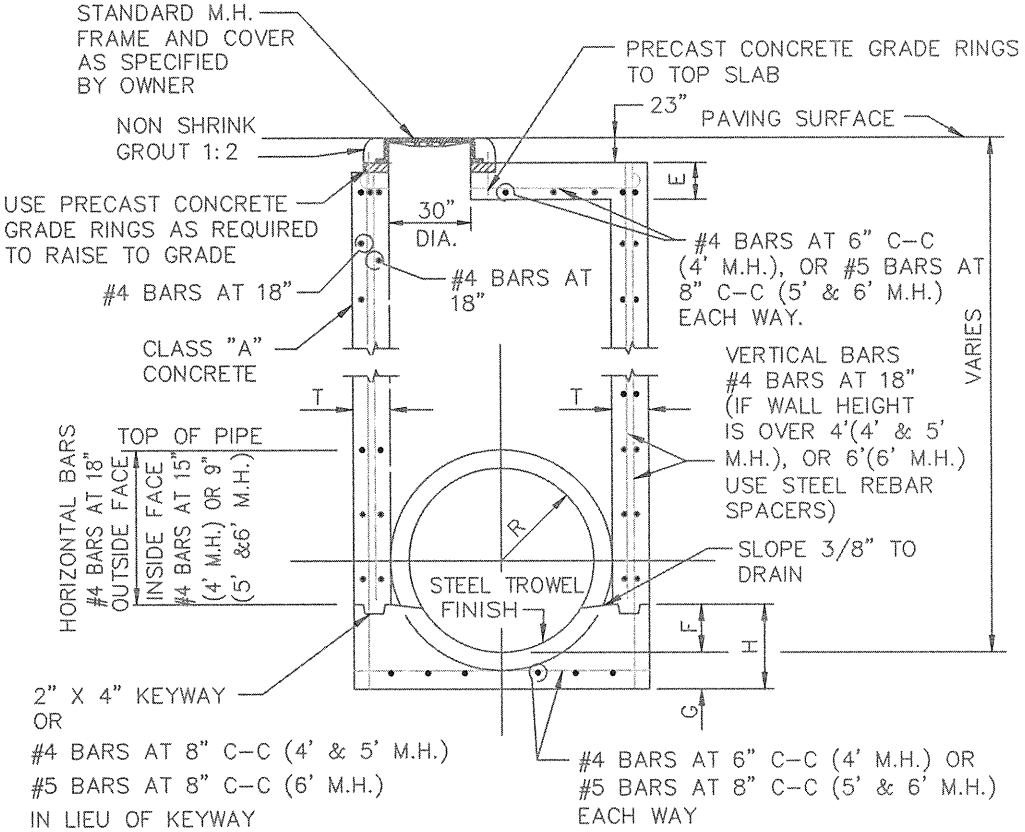
PLAN

N.T.S.

M.H. SIZE(W)	V	T	E	F	G	H
4'	5'–4"	8"	6"	9"	6"	1'–3"
5'	6'–4"	8"	6"	12"	8"	1'–8"
6'	7'–6"	9"	9"	16"	10"	2'–2"

TABLE OF DIMENSIONS

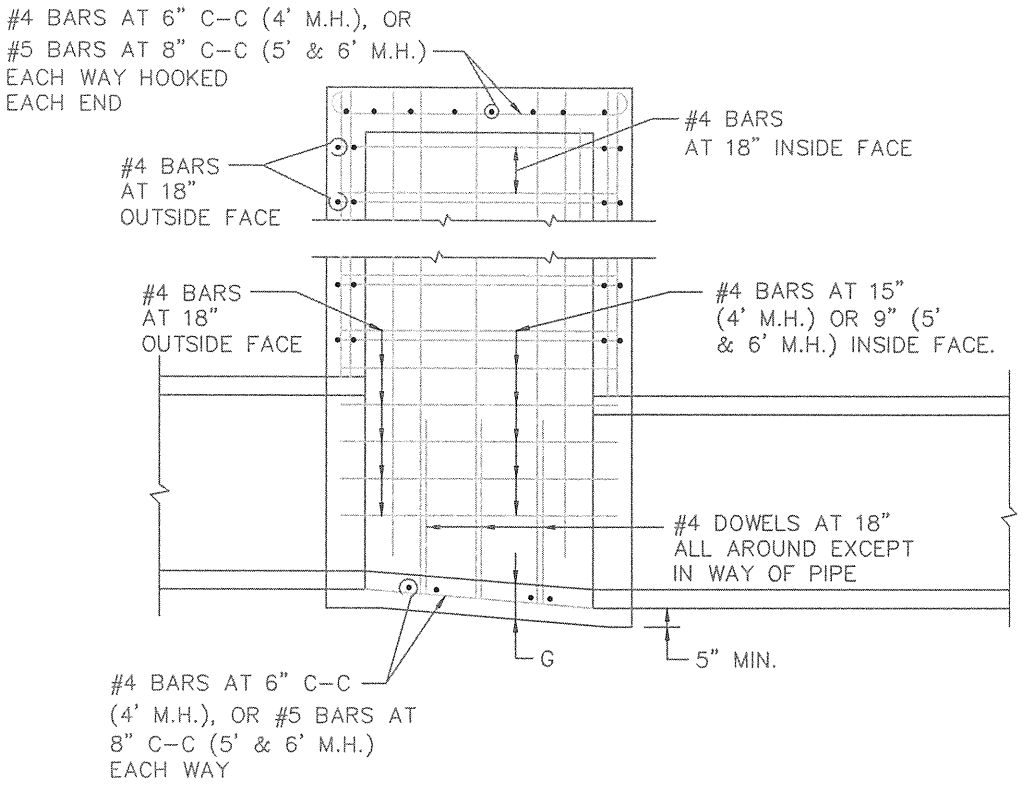
N.T.S.



SECTION B–B

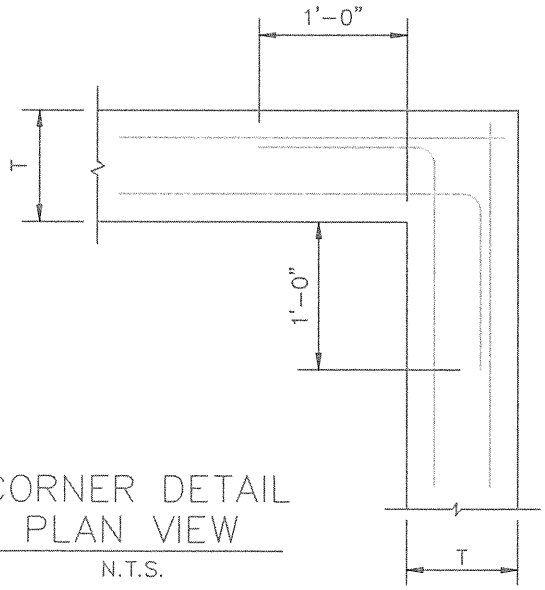
N.T.S.

	JUNCTION BOX	STANDARD DRAWING NO.
	4', 5', OR 6' SQUARE (1 OF 2)	STM-05



SECTION A-A

N.T.S.



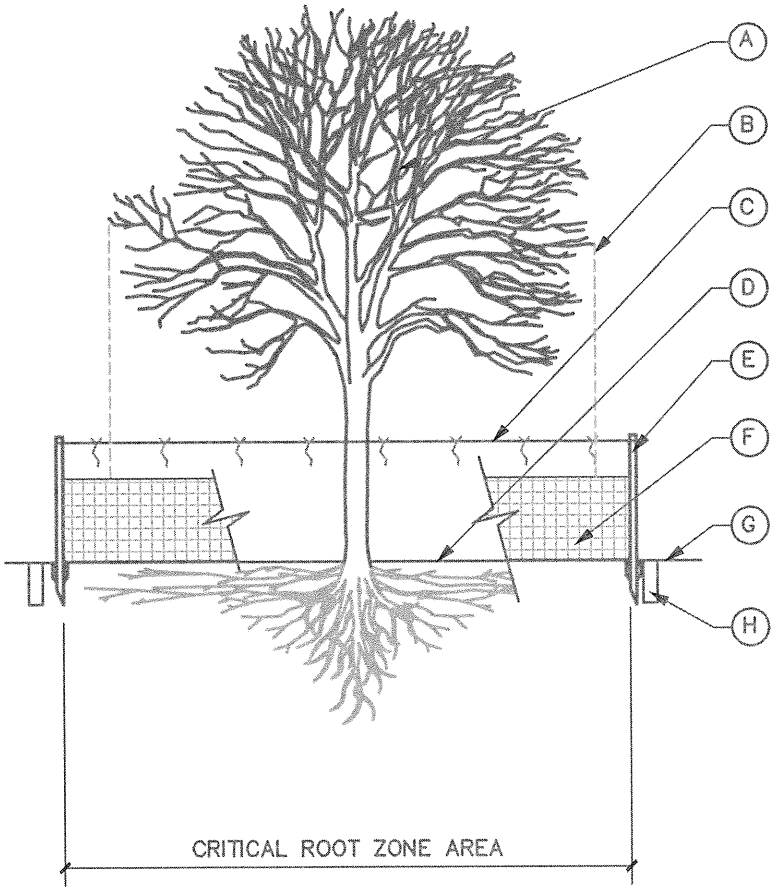
CORNER DETAIL
PLAN VIEW

N.T.S.

NOTES:

1. SLOPE INVERT OF MANHOLE AS INDICATED ON PLAN-PROFILE SHEET.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACE SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. CONCRETE SHALL BE CLASS "A".

	JUNCTION BOX	STANDARD DRAWING NO.
	4', 5', OR 6' SQUARE (2 OF 2)	STM-05A



LEGEND:

(A) EXISTING TREE(S) TO REMAIN

(B) DRIP LINE OF EXISTING TREE (TYP.)

(C) CONTINUOUS NYLON TIE STRING TIED TO STAKE TOPS W/ 2' TUNDRA WEIGHT ORANGE STREAMERS AT 3' O.C.

(D) EXISTING GRADE TO REMAIN

(E) 2"x2"x8' STEEL POST T-STAKES, 8' O.C. MIN., DRIVEN 2' INTO GROUND AT (OR OUTSIDE) TREE DRIP LINE

(F) 4' MIN HEIGHT ORANGE PLASTIC FENCING INSTALLED PER CITY-APPROVED MANUFACTURER'S SPECIFICATIONS

(G) EXISTING GRADE TO BE DISTURBED

(H) ROOT PRUNING TRENCH 12" OUTSIDE FENCE

NOTES:

1. PERFORM ROOT PRUNING ON ALL EXISTING TREES TO REMAIN WHERE CONSTRUCTION ACTIVITY FALLS WITHIN DRIP LINE OF EXISTING TREES.
2. NO GRADING, PARKING, STORAGE OR ANY OTHER CONSTRUCTION ACTIVITY WITHIN FENCED AREA.
3. REFER TO TECHNICAL SPECIFICATION 329600.
4. TREE PRUNING BY CERTIFIED TREE TRIMMER OR ARBORIST.

	TREE PROTECTION	
	PLAN DETAIL	STANDARD DRAWING NO. L-01

Section 9. GENERAL CONSTRUCTION NOTES

(See following page)

GENERAL ITEMS

1. Prior to any construction the Contractor shall be familiar with the Contract Documents and Specifications, the Plans (including all notes), The City of Johnson City Specifications and any other applicable standards or specifications relevant to the proper completion of the work specified. Failure on the part of the Contractor to be familiar with all Standards and Specifications pertaining to this work shall in no way relieve the Contractor's responsibility for performing the work in accordance with all such applicable Standards and Specifications.
2. Construction may not start earlier than 7:00 am nor continue after 7:00 pm on Monday-Saturday without prior permission from the city of Johnson City. Construction work on Sunday is prohibited without special permission. A fee of $150 must be paid to the city by Thursday noon prior to Saturday work, if city inspection is required.
3. Prior to construction, Contractor shall have in their possession all necessary permits, plans, licenses, etc. Contractor shall have at least one set of approved Engineering Plans and Specifications on-site at all times.
4. All work shall conform to the City of Johnson City Standard Design and Specification Manual. In the event an item is not covered in the plans or the City of Johnson City Standard Design and Specification Manual, the most current Capital Area Council of Governments (CAPCOG) Standard Specifications for Public Works Construction shall apply with concurring notification to the City and Project Engineer. The City shall have the final decision on all construction materials, methods, and procedures.
5. Construction inspection will be performed by representatives of the Owner, Engineer, City, Geotechnical Engineer, and reviewing authorities and agencies. Unrestricted access shall be provided to them at all times. Contractor is responsible for understanding and scheduling required inspections. Testing samples shall be collected and processed by certified technicians.
6. All contractors must confine their activities to the work area. No encroachments onto developed or undeveloped areas will be allowed. Any damage resulting therefrom shall be Contractor's responsibility to repair.
7. Developer shall be responsible for obtaining all off-site easements prior to commencement of offsite and relevant on-site construction activities.
8. It will be the responsibility of each contractor to protect all existing public and private utilities throughout the construction of this project. Contractor shall contact the appropriate utility companies for line locations prior to commencement of construction and shall assume full liability to those companies for any damages caused to their facilities.
9. Trench Safety Design will be the responsibility of the Utility Contractor. Contractor shall submit a trench safety design approved by a professional engineer to the City for their records prior to the start of any underground utility construction.
10. Work may not be backfilled or covered until it has been inspected by the City.
11. Continuous access for mail service shall be provided during construction.
12. If any conflict arises between these general notes and any other notes found in the plans, the City General Notes shall take precedence.

EROSION CONTROL & VEGETATION

1. Every soil disturbing activity shall have an accompanying Erosion Control Plan (ECP), Storm Water Pollution Prevention Plan (SWPPP) and either Construction Site Notice (CSN) for those activities disturbing more than 1 but less than 5 acres or Notice of Intent (NOI) for those activities disturbing 5 or more acres including those activities less than 5 acres but are part of a common plan of development totaling 5 or more acres. A copy of the appropriate SWPPP and CSN or NOI shall be provided to the City of Johnson City prior to issuance of a grading permit.
2. The CSN or NOI shall be posted in a location viewable to the public until construction is complete and Notice of Termination (NOT) submitted. The Storm Water Pollution Prevention Plan (SWPP) shall be readily available for review by Federal, State, or local officials.
3. No soil disturbing activities will occur prior to the SWPP, ECP, and associated Best Management Practices (BMP) being fully implemented, and then inspected by Johnson City's Public Works Department.
4. The contractor shall comply with the current CAPCOG ISWMTM Technical Manual for Construction, the TPDES General Construction Permit TXR150000 and any other State and/or Local regulations.
5. The contractor shall employ measures as necessary to prevent dirt, mud, debris from being tracked offsite. Any dirt, mud, debris tracked offsite shall be cleaned up by the contractor immediately.
6. The site shall be reviewed by the operator or his representative weekly, and after any major storm. Adjustments/repairs to the erosion control measures will be made as needed. The contractor shall notify Johnson City's Public Works Department of adjustments/repairs such that the adjustments/repairs may be inspected and approved by the City.
7. Along parkways and medians in the right-of-way, a four (4) foot strip of native sod shall be placed behind the curb on top of four (4) inches of topsoil. Contractor shall be responsible for any temporary irrigation or watering as needed. Areas adjacent to new residential lots, where the homebuilder will be disturbing this area, may be exempt from this requirement so long as adequate erosion control measures are installed and maintained behind the curb.
8. Contractor shall establish perennial vegetation on all other disturbed areas immediately upon completion of grading activities. An appropriate seed mix should be considered with respect to the season and the timing of final acceptance. A cool season seed mix should be used between September 15th and April 15th. Final acceptance of a site shall be contingent upon perennial vegetation being fully established in all disturbed areas.
9. A completed N.O.T. shall be submitted to the State and a copy of the N.O.T. shall be provided to the City of Johnson City prior to final acceptance.

GENERAL CONSTRUCTION NOTES

TREE PRESERVATION

1. Prior to construction, the contractor or subcontractor shall construct and maintain a protective fence at the drip line of all protected existing trees, bushes, landscaping plants, sprinklers, and lawns unless noted otherwise on the construction drawings. Any damage to the existing trees, bushes, landscaping plants, sprinklers, and lawns caused by construction shall be replaced to the satisfaction of the City of Johnson City at the contractor's expense.
2. All protective measures shall be in place prior to commencement of any site or grading work and remain in place until all exterior work has been completed.
3. The City's Public Works Department shall be contacted to approve the placement of the Tree Preservation Fencing, prior to beginning of site work on property.
4. The following activities shall be prohibited within the limits of the primary root zone: Material storage, equipment cleaning/liquid disposal, no tree attachments of signs or wires, and construction equipment/vehicular traffic is prohibited.
5. Unless specifically allowed, no grade changes shall be allowed within the limits of the primary root zone of any protected tree unless the City approves adequate construction methods.
6. No trimming of trees may occur within the Tree Preservation fencing limits without prior consent of the City.

TRAFFIC CONTROL

1. When the normal function of the roadway is suspended through closure of any portion of the right-of-way, temporary construction work zone traffic control devices shall be installed to effectively guide the motoring public through the area. Consideration for road user safety, worker safety, and the efficiency of road user flow shall be an integral element of every traffic control zone. All traffic control devices shall be in accordance with the latest T.M.U.T.C.D. Devices must contain either Type III Hi-Intensity sheeting or Type IV retroreflective Hi-Intensity sheeting.
2. Any traffic control plans not included in the engineering plan set must be submitted for review a minimum of seven (7) working days prior to the anticipated lane closure. Construction activity shall not begin until the traffic control plan is approved by the City of Johnson City. Traffic control plans may be required on other roadways as determined by the City or the designer. All traffic control plans must be prepared by an individual that is certified in their preparation. Any deviation from an approved traffic control plan must be reviewed by the City or their designated representative.
3. The contractor shall be responsible for maintaining all traffic control devices on an around-the-clock basis, whether or not work is active. Any deficiencies shall be corrected by the contractor immediately, regardless of time of day.
4. Lane closures will not be permitted on arterial roadways before 9:00 am or after 4:00 pm. Violations may result in suspension of all work at the job site for a minimum of 48-hours. The City reserves the right to deny a closure for a special event.
5. Lane closures will not be permitted on streets adjacent to private and/or public schools without written permission from the City.
6. All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time at the end of the workday, temporary traffic control devices that are no longer appropriate shall be removed or covered. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48-hours.
7. Existing permanent signs removed by the contractor for construction purposes, other than stop, yield and street name signs shall be returned to the City of Johnson City. All stop, yield and street name signs removed shall be temporarily erected at the appropriate locations (no less than 7 feet vertical from grade) until permanent signing can be installed. Any temporary stop or yield sign locations to be left in place overnight will require prior approval from the City.
8. Any permanent sign or existing pavement markings that conflict with the approved traffic control plan shall be covered, obliterated, or removed as directed by the City.
9. Access must be maintained to all drives and side streets or as indicated in the traffic control plan.

PEDESTRIAN ACCESSIBILITY (WITHIN PUBLIC R.O.W.)

1. All newly constructed sidewalks, curb ramps and crosswalks installed within City of Johnson City public right-of-way shall be considered a pedestrian access route and shall conform to the most current "Draft" Guidelines for Public Rights-of-Way created by the United States Access Board. [illegible]
2. Curb Ramps shall conform to all federal guidelines.
3. Detectable warning surface shall be pre-manufactured plates with truncated dome material built in. Only plates from TxDOT approved vendors shall be permitted and shall be installed per manufacturer's specifications. Brick pavers will not be allowed. Final color shall be approved by the City, but shall generally be in the "RED" color family.
4. The contractor shall provide a clear and safe route for pedestrians adjacent to the site for the duration of construction. A temporary pedestrian route shall be provided when any existing sidewalk is closed due to construction activity.
5. Construction material shall be kept off existing sidewalks and consolidated in areas within the City right-of-way, unless otherwise approved by the City.
6. Sidewalks shall conform to all federal guidelines, but shall generally adhere to the following:
   a. Generally, follow the street grade with a maximum 2.0% cross-slope.
   b. Shall be free of any overhangs by landscaping or other items to a height of 7.0-feet.
   c. Sidewalks shall maintain a continuous pedestrian access route elevation through residential and commercial driveways.

WATER

1. Line and grade stakes for construction of all water and sanitary sewer lines and services shall be furnished by the following:
   a. Private Development: Developer's engineer, surveyor or their designated representative.
   b. Capital Improvement Projects: The Contractor, unless specified otherwise in the contract.

   Property lines and corners must be properly staked to verify the water line alignment. The City shall not be liable for improper alignment or delay of any kind caused by improper or inadequate surveys.
2. All new water services shall be 1" minimum DR-9 (250 psi) HDPE poly pipe with PE4710 as specified in ASTM F714, from the service tap to the curb stop, 3/4-inch minimum compression fitting angle stop, and meter box, unless otherwise indicated on the plans. Curb stops will be located within the meter box and facing toward the lot. For single family residential services the minimum meter size is 3/4".
3. Each meter box shall be located adjacent to the curb and installed after street pavement has been completed and curbs backfilled. Meter boxes shall be Carson Valve and Meter Boxes. A 2" minimum metal locator plate shall be placed in the recess of the meters.
4. All water services shall be located along the lot lines. Single services shall be placed no more than 2-ft inside the service lot at the lot line.
5. Detector pads embedded in sand shall be installed above all service connections.
6. Each individual service location shall be saw cut into the face of the curb with a (4) inch high "I" painted by the Contractor. If no curb exists, a similar mark shall be placed in the pavement near the edge of the roadway. After cleaning the sawcut via compressed air or brush, apply one coat of APWA Blue spray paint to mark the sawcut symbol.
7. All water service lines shall be embedded with 12-inch sand below and around the pipe and 6-inches of sand over the top of the pipe; from the water main to the meter. Water service lines within City roadway right-of-way shall be compacted to a minimum of the 95% Standard Proctor density with a +/- 3% wet of optimum moisture content.
8. All 6", 8" and 12" water mains shall be AWWA C900 PVC pipe.
9. Minimum cover shall be 4 feet for 6-inch to 8-inch lines, 5 feet for 12-inch to 16-inch lines, and 6 feet for 20-inch and larger lines. Additional cover may be required in unpaved or un-developed areas.
10. Water mains in the right-of-way near storm inlets shall be constructed with a minimum clearance of 12 inches behind the inlet by pulling the pipe using longitudinal bending in accordance to 50% of the pipe manufacturer's requirements.
11. All blow-off (flush) valves shall be two (2) inch and shall be provided in accordance with City of Johnson City standards and/or CAPCOG standards.
12. Bolts and nuts for mechanical joints will be of a high-strength low-alloy corrosion resistant steel conforming to ASTM A325 (Type3).
13. All waterline fittings shall be ductile iron. All 6" - 12" valves shall be AWWA approved resilient wedge gate valves.
14. In addition to thrust blocking, all fittings must be restrained and shall be "Meg-a-lug".
15. Install 2' x 2' x 6" thick, concrete pad around all water valves outside of concrete pavement.
16. Valve extensions shall be provided on all valves with operating nuts greater than 5-ft below finished ground or paving grade.
17. All valves shall be marked with a "V" by sawcut on the curb or pavement. The "V" shall point to the location of the valve as follows: If the valve is in the paving, the "V" shall be marked upright; if the valve is outside the paving, the "V" shall be marked upside-down. After cleaning the sawcut via compressed air or brush, apply one coat of APWA Blue spray paint to mark the sawcut symbol.
18. HRS Resilient-Seated Gate Valves shall conform to AWWA C509 or AWWA C515. Rubber-Seated Butterfly Valves shall conform to AWWA C504. All valves shall have a 2" square operating nut and open to the left. All valves shall be Mueller, Clow or AVK.
19. Install water line marking at all offsite valves, vaults, air release valves, and blow-off valves.

STORM SEWER

1. When there is less than two feet of clearance between a water/sewer line and a storm sewer, the Contractor shall install concrete encasement around the sanitary sewer or waterline at the storm sewer crossing. The encasement shall be a minimum of 10 L.F. and 6" thick centered at the crossing.
2. Manhole lids on storm sewer inlets shall be centered over the outgoing storm lateral.
3. All bends and wyes for pipe less than 42" diameter must be factory manufactured bends and wyes.
4. Inlet block-outs shall be placed three (3') feet from the back of standard curbs for the distance of ten (10') feet upstream (both sides in sag conditions) and five (5') feet downstream from the inside face of inlet. Inlet block-outs shall be placed five (5') feet downstream from the inside face of inlet, unless otherwise noted.
5. Structural concrete used for storm water structures shall be in compliance with the latest version of the CAPCOG standards and specifications.
6. Prior to final acceptance, all storm sewers shall be television filmed and cleared of any sediment and debris.

RETAINING WALLS

1. Retaining walls greater than 4 feet in height must be an engineered design by an engineer licensed in the State of Texas.
2. Retaining walls (including the footing) shall not be constructed to encroach into a City Right-of-Way, public easements, or public utilities without the consent of the City.

FIRE HYDRANTS

1. Fire hydrants shall be placed 3 feet from back of curb unless otherwise indicated on the plans, or as required to clear sidewalks. Fire hydrants shall not be located within a sidewalk.
2. Fire hydrants shall be three-way breakaway type not less than 5¼ inches in size and must conform to AWWA specifications C-502. They shall be Mueller, Clow or approved equal with all bronze to bronze moving parts. Two 2½-inch NST hose connections are required. The 4.5-inch diameter steamer connection shall be 4.820 pitch with 4 threads per inch. The operating nut shall be 1½-inch Pt to F pentagon nut, open left. Mechanical joint connection is required. The steamer nozzle shall face the fire lane, adjacent roadway or as directed by the Fire Department.
3. A Blue Stimsonite, Fire-Lite reflector (or approved equal) shall be placed in the center of the street opposite each fire hydrant. The fire hydrant shall be painted with two coats of Tnemec Series 530 Omnithane paint or approved equal, and two coats of primer. Bonnet to flange and nozzle caps of Fire Hydrant to be painted with 2 coats of Tnemec Safety Paint Series 2H "Hi-Build". Fire hydrant color shall be according to flow.

SANITARY SEWER

1. Line and grade stakes for construction of all water and sanitary sewer lines and services shall be furnished by the following:
   a. Private Development: Developer's engineer, surveyor or their designated representative.
   b. Capital Improvement Projects: The Contractor, unless specified otherwise in the contract.

   Property lines and corners must be properly staked to verify the sewer line alignment. The City shall not be liable for improper alignment or delay of any kind caused by improper or inadequate surveys.
2. Unless otherwise noted on the plans, all sanitary sewer pipes shall be PVC ASTM Designation D3034 up through 15" in diameter. Pipes larger than 15" in diameter shall be designated PVC ASTM F679. Other pipe shall be subject to Approval by the City.
3. All residential sanitary sewer services shall include a 4" tee wye bend, pipe and stopper, and shall be installed downstream from the water service at the lot centerline and extended 10' beyond the property line onto private property. Sewer services shall be laid on a minimum slope of 2 1/8% from the main line to the street right-of-way.
4. After curb and paving has been completed, contractor shall cut a four (4) inch high "II" on the curb indicating the location of the cleanout. After cleaning the sawcut via compressed air or brush, apply one coat of APWA Green paint to mark the sawcut symbol.
5. All sanitary sewers and services shall be tested by pulling a mandrel, air pressure test, and television video. The television video shall be provided to the City Inspector in a USB drive format and shall be labeled accordingly for City record. Television survey will be completed with water being introduced into the sewer line.
6. All sanitary sewer manholes within flood plains or flood prone areas require Type "S" manhole lids and be properly vented per TCEQ requirements.
7. All manholes shall be vacuum tested where a 10" mercury vacuum is developed. The air vacuum shall then be monitored for a test period of 2 minutes. The allowance drop in air vacuum shall be no greater than 1" mercury over the test period.
8. The Contractor shall install City of Johnson City standard wastewater manhole lids on all manholes.
9. Unless otherwise noted, in open spaces, the top of the sanitary sewer manholes shall be installed a minimum of 3 inches above the surrounding ground.
10. Structural concrete used for wastewater structures shall be in compliance with the latest version of the CAPCOG standards and specifications.
11. Install sanitary sewer pipeline markers at all offsite manholes.

PAVING

1. All mix designs shall be sealed by a professional engineer and submitted to the City Inspector one week before a scheduled pour. Mix designs are subject to approval by the City.
2. All concrete paving shall have a minimum compressive strength of 4,000 psi, unless a higher compressive strength is specified.
3. All fill shall be compacted to 95% Standard Proctor Density in a maximum of 6" (post inch) lifts or per the approved Geotechnical Engineers Report. Subgrade shall extend 12" minimum behind the curb, be a minimum of 6" thick and shall be lime stabilized as recommended in the Geotechnical Report.
4. All streets, fire lanes and alleys shall be placed on lime stabilized subgrade with lime content of not less than 6%. Lime stabilized subgrade shall be compacted to 95% of maximum standard proctor density (ASTM D698) within minus 2 to plus 4 of optimum moisture.
5. A subgrade density report must be presented to the City Inspector prior to paving. Densities are only valid for 72 hours. Densities received on a Friday are valid until noon on the following Monday. Densities taken before inclement weather may be required to be retaken at the City Inspector's discretion. A minimum of four (4) test cylinders are required for breaks at 7 days, 2 at 28 days, and the last cylinder being an extra.
6. All City streets are required to be paved with the use of an approved slip form paving machine with mechanical vibration. Hand pours are only allowed at intersection returns or other non-standard areas as approved by the City Inspector. Hand pours shall be vibrated by an approved hand vibrator.
7. Construction joints, cold joints and curb returns shall have fabric installed to allow for expansion.
8. Sawed joints shall be every 15 feet for 6" thick concrete and every 20 feet for 8" thick
9. concrete; and shall be constructed within the first 12 hours of concrete placement.
10. Expansion joints shall be placed at a maximum every 400 feet.
11. All median noses shall be poured monolithically.
12. All Barrier Free Ramps shall comply with the current TDLR, ADA, PROWAG, and TxDOT regulations.

Section 10. APPROVED MATERIALS LIST

(See following page)

WATER

Overview Category	Basic Product Category	Use Specifications	Manufacturer	Model, Type, or Approved Style
Service Connections				
	Angle Meter Valve	1"		
	Angle Meter Valve	1"	Mueller	
	Angle Meter Valve	1" to 2"		
	Angle Meter Valve	1" to 2"	Mueller	
	Corporation Stop	1" to 1 1/2"		
	Corporation Stop	1" to 1 1/2"	Mueller	
	Curb Stop	1" to 2"		
	Curb Stop	1" to 2"	Mueller	
	Service Saddle	1" to 1.5"		Bronze Double Strap
	Service Saddle	1" to 1.5"	Mueller	Bronze Double Strap
	Service Saddle	1" to 1.5"	A.Y. McDonald	Bronze Double Strap
	Service Line	1" to 2"	Various Manufacturers	Poly Tubing
	Casing for Service Lines	2" to 4" Schudel 40 or SDR 21	Various Manufacturers	PVC Piping for service lines
	Inserts	1" to 2"	Various Manufacturers	Insert stiffeners for poly tubing
	Water Meters	1" to 2"	Master Meter	Harmony AMI 4G
	Water Meters	Larger than 2"	Master Meter	Octave AMI 4G
	Meter Box and Lid	Up to 1"	DFW Plastics	37A
	Meter Box and Lid	1 1/2" to 2"	DFW Plastics	65A
	Meter Box and Lid	Larger than 2" meters will require vault		
Distribution System				
	Tapping Sleeve	2" and larger	Smith-Blair	Stainless Steel
	Tapping Sleeve	2" and larger	Mueller	Stainless Steel
	Tapping Sleeve	2" and larger	U.S. Pipe	Stainless Steel
	Valve, Resilient Wedge Gate	2" and larger	Clow	Resilient Wedge Gate Valve
	Valve, Resilient Wedge Gate	2" and larger	Mueller	Resilient Wedge Gate Valve
	Valve, Resilient Wedge Gate	2" and larger	American Flow Control	Resilient Wedge Gate Valve
	Valve, Resilient Wedge Gate	2" and larger	East Jordan EJ Valve	Resilient Wedge Gate Valve
	Valve, Resilient Wedge Gate	2" and larger	M&H Valve	Resilient Wedge Gate Valve
	Valve, Butterfly	16" and larger	Clow	Butterfly Valve
	Valve, Butterfly	16" and larger	Mueller	Butterfly Valve
	Valve, Butterfly	16" and larger	M&H Valve	Butterfly Valve
	Valve, Butterfly	16" and larger	American Flow Control	Butterfly Valve
	Valve, Butterfly	16" and larger	ValMatic	Butterfly Valve
	Valve, Butterfly	16" and larger	Pratt	Butterfly Valve
	Valve, Butterfly	16" and larger	DeZurik	Butterfly Valve
	Valve, Check	2" and larger	ValMatic	Check Valve
	Valve, Air/Vacuum	2" and larger	Vent-O-Mat	RBX Series
	Valve, Air/Vacuum	2" and larger	A.R.I.	D-060
	Valve, Flap	Blow-Off Valve	Waterman	
	Valve Box & Lid		East Jordan	Adjustable
	Valve Box & Lid		Tyler Union	Adjustable
	Valve Box & Lid		Bass & Hays	Adjustable
	Fire Hydrants		East Jordan	WaterMaster 5CD250
	Flush Hydrant		The Kupferle Foundry	Mainguard #77
	Fire Hydrant Reflector	Blue Reflector	Centerline Supply	3M Raised
	Fire Hydrant Reflector	Blue Reflector	Econosigns	3M Raised
	Fire Hydrant	Integral Quick Connect	Mueller	Integral Storz Connection
	Automatic Flush Valve		Kupferle	Eclipse 9400
	[illegible]		[illegible]	[illegible]
	Casing Spacers		Raci	
	Casing Spacers		Power Seal	
	Casing Spacers		Pipeline Seal and Insulator	
	End Seal	Casing Pipe, Bore	LinkSeal	
	Coupling, Adapter		Ford	
	Coupling, Adapter		Power Seal	
	Coupling, Adapter		Hymax	
	Coupling, Adapter		JCM	
	Coupling, Adapter		Romac	
	Coupling, Adapter		Smith-Blair	
	Ductile Iron Fittings	Domestic	Tyler Union	AWWA C110/C153
	Ductile Iron Fittings	Domestic	Star	AWWA C110/C153
	Mechanical Restraints		EBAA	Megalug
	Water Meter Vault		Park	Precast Concrete
	Fire line valve box		Park	Precast Concrete
	Pipeline Marker	Blue	Rhino	Triview 400 66"
Other				
	Bolts			Stainless Steel
	Paint		Tnemec	
	Paint		Sherwin Williams	
	Polywrap	All DI Pipe and Fittings		

WASTEWATER

Overview Category	Basic Product Category	Use Specifications	Manufacturer	Model, Type, or Approved Style
Collection System				
	Cleanout Castings & Lids		Bass & Hays	
	Cleanout Castings & Lids		East Jordan	
	Cleanout Castings & Lids		Tyler Union	
	Corrosion Protection	Concrete Admixture	ConShield Technologies	
	Polymer Concrete Manhole		Armorock	
	Chimney Seal		Strike Products	
	Chimney Seal		Cretex	
	Rain Pans		Cretex	
	Manholes	Precast Manhole	Forterra	
	Manholes	Precast Manhole	Old Castle	
	Manhole Frame and Cover	Standard	EJ	NPR19-002876011628
	Manhole Frame and Cover	Bolted	EJ	NPR19-002876-11629
	Manholes	Pipe Connectors	A-Lok	
	Manholes	Pipe Connectors	Kor-N-Seal	
	Manholes	Pipe Connectors	Fernco	
	Manholes	Pipe Connectors	PSX	
	Manholes	I&I Barrier	Strike Products	
	End Seal	Casing Pipe, Bore	LinkSeal	
	Combination Air Valves	Force Main ARV's	Vent-O-Mat	Series RGX, Stainless Steel
	Combination Air Valves	Force Main ARV's	ARI	Stainless Steel
	Valve, Plug	2" and larger	Pratt	Plug Valve Internal coating to be lined with TnemecSeries 431 Permashield PL applied at a thickness of 40 mils DFT
	Valve, Plug	2" and larger	Dezurik	Plug Valve Internal coating to be lined with TnemecSeries 431 Permashield PL applied at a thickness of 40 mils DFT
	Pipeline Marker	Green Sewer Main Marker	Rhino	TriView 400
	Service Taps		Fernco	
Lift Station				
	Pump	Submersible Pump	Flygt	At least one Cutter Pump in Lift Station
	Pump	Submersible Pump	KSB	At least one Cutter Pump in Lift Station
	Air-Powered Mixer	Grease Control	Medora / GridBee	GridBee AP500 Mixer
	Pressure Transducer		Wika	
	Pressure Transducer		KPSI	
	Wet Well Piping			Stainless Steel
	Guide Rails			Stainless Steel
	Electromagnetic Meter	Force Main Flow Meter	Badger	
	Electromagnetic Meter	Force Main Flow Meter	Endress Hauser	
	Level Transmitter		Echo	Echo Plus 6R30
Other				
	Bolts			Stainless Steel
	Paint		Tnemec	
	Paint		Sherwin Williams	
	Ductile Iron Pipe & Fittings		Lined with Protecto 401	
	Polywrap	All DI Pipe and Fittings		
	Odor Control	Odor Control Vent Check Valve	Wager	Model 1850
	Odor Control		Purafil	
	Sump Pump		Hydromatic	

STORM

Overview Category	Basic Product Category	Use Specifications	Manufacturer	Model, Type, or Approved Style
Curb inlet				
	Inlet filters		Forterra	Bio Clean
	Grate inlet filters		Forterra	Bio Clean
	Inlet access lid		East Jordan Ironworks	
	Inlet access lid		Bass & Hays Foundry	
Manholes				
	Manhole frame and cover	Standard	EJ	303461
	Manhole frame and cover	Bolted	EJ	00147987A01
Pipe				
	Concrete Pipe		Forterra	RCP
	Concrete Box		Forterra	RCB