

# Chapter 15

## Public Works Construction Details

Printed June 08, 00

### Section 15.1 Purpose of This Chapter

The purpose of this Chapter is to establish construction details for all public facility improvements.

### Section 15.2 Authorization for Adoption of This Chapter

The regulations contained in this Chapter have been adopted under the following authority:

1. *Chapter 212 – Municipal Regulation of Subdivisions and Property Development of the Texas Local Government Code*, which authorizes a municipality to adopt rules governing plats and subdivisions of land within the municipality's jurisdiction.
2. *Chapter 51 – General Powers of Municipalities of the Texas Local Government Code*, which authorizes a municipality to adopt ordinances, rules, or police regulations that are for the good government, peace, or the trade and commerce of the municipality.
3. *The Home Rule Charter of the City of Colleyville*, which authorizes the City Council to exercise all powers granted to municipalities by the Constitution or the laws of the State of Texas.

### Section 15.3 Applicability of This Chapter

The provisions of this Chapter shall be applicable to all public improvements owned and maintained by the City of Colleyville and to any semi-public improvements owned and maintained by a property owner's association that are intended to serve and function as a public improvement.

### Section 15.4 Variances and Appeals

The Director of Public Services may consider a waiver of a regulation or to substitute an alternative proposal of a regulation contained in this Chapter in order to achieve the best overall design. When considering such a request, the Director of Public Services shall determine that the approval, disapproval or modification will not be detrimental to the public safety, health, or welfare or injurious to other property. The applicant shall provide information to support a claim that there are extraordinary hardships or practical difficulties which may result from strict compliance with the regulation or that the public interest may be better served by an alternative proposal.

Any person seeking approval of a development as required by this Land Development Code may appeal a decision of the Director of Public Services using the procedures described in *Chapter 1 – General Provisions* of this Land Development Code.

### Section 15.5 Construction Standards

The construction standards and details contained in the drawings in this Chapter and listed in the following tables are adopted as a part of this Land Development Code.

All drawings and details contained in this Chapter which include references to "item numbers", "specs" and "types" shall be governed by the latest version of "Standard Specifications for Public Works Construction, North Central Texas" of the North Central Texas Council of Governments ("COG"), with all amendments thereto, and shall constitute the technical specifications, except as amended by this Land Development Code.

**15.5.A PAVING DETAILS**

Detail Title	Detail Number	Revision Date
Concrete Street Sections	P-1A	April 2000
Asphalt Street Sections	P-1B	April 2000
Steel Layout Plan	P-2	April 2000
Intersection Joint Spacing	P-3A	April 2000
Concrete Pavement Joints	P-3B	April 2000
Concrete Pavement Joints	P-3C	April 2000
Standard Curb and Gutter	P-4A	April 2000
Mountable Curb and Gutter	P-4B	April 2000
Laydown Curb and Driveway	P-5	April 2000
Street Header	P-6	April 2000
Wheelchair Ramp	P-7	April 2000
Sidewalk & Pathway Standards	P-8A	April 2000
Concrete Sidewalks	P-8B	April 2000
Concrete Sidewalk	P-8C	April 2000
Manhole and Water Valve Boxout	P-9A	April 2000
Water Valve Boxout - Asphalt	P-9B	April 2000
Curb and Gutter, Sidewalk, and Driveway Typical Joint Layout	P-10	April 2000
Median Nose	P-11	April 2000
Left Turn Lane in Median	P-12	April 2000
Right Turn Lane without Channelization	P-13	April 2000
Right Turn Lane with Channelization	P-14	April 2000
Concrete Valley	P-15	April 2000
Dead End Barricade	P-16	April 2000
Metal Beam Guardrail	P-17	April 2000
Standard Wooden Fence	P-18	April 2000
Standard Masonry Fence	P-19	April 2000

**15.5.B WATER DETAILS**

Detail Title	Detail Number	Revision Date
Standard Water Line Embedment & Backfill	W-1A	April 2000
Standard Water Line Embedment & Backfill	W-1B	April 2000
Fire Hydrant Installation	W-2	April 2000
Gate Valve Installation	W-3	April 2000
Air Release Valve Assembly (Type 1)	W-4A	April 2000
Air Release Valve Assembly (Type 2)	W-4B	April 2000
Water Service Assembly	W-5A	April 2000
Meter Boxes	W-5B	April 2000
Flushing Valve Installation	W-6	April 2000
Horizontal Blocking	W-7	April 2000
Vertical Thrust Block	W-8	April 2000
Concrete Cradle at Vertical Bends	W-9	April 2000
Typical Ring Connection	W-10	April 2000
Water Line Installation Bore Detail	W-11	April 2000
3 inch and Larger Meter Vault	W-12	April 2000
Blow-off Installation	W-13	April 2000
Service Line Encasement	W-14	April 2000

**15.5.C SANITARY SEWER DETAILS**

Detail Title	Detail Number	Revision Date
Standard Sanitary Sewer Embedment & Backfill	S-1A	April 2000
Standard Sanitary Sewer Embedment & Backfill	S-1B	April 2000
Precast Sanitary Sewer Manhole	S-2	April 2000
Cast-in-place Sanitary Sewer Manhole	S-3	April 2000
Drop Sanitary Sewer Manhole	S-4	April 2000
Manhole Frame and Cover	S-5	April 2000
Extension Ring Installation	S-6	April 2000
4 inch Sanitary Sewer Service	S-7	April 2000
Sanitary Sewer Main Line Cleanout	S-8	April 2000
Abandonment of Existing Manhole	S-9	April 2000
		April 2000

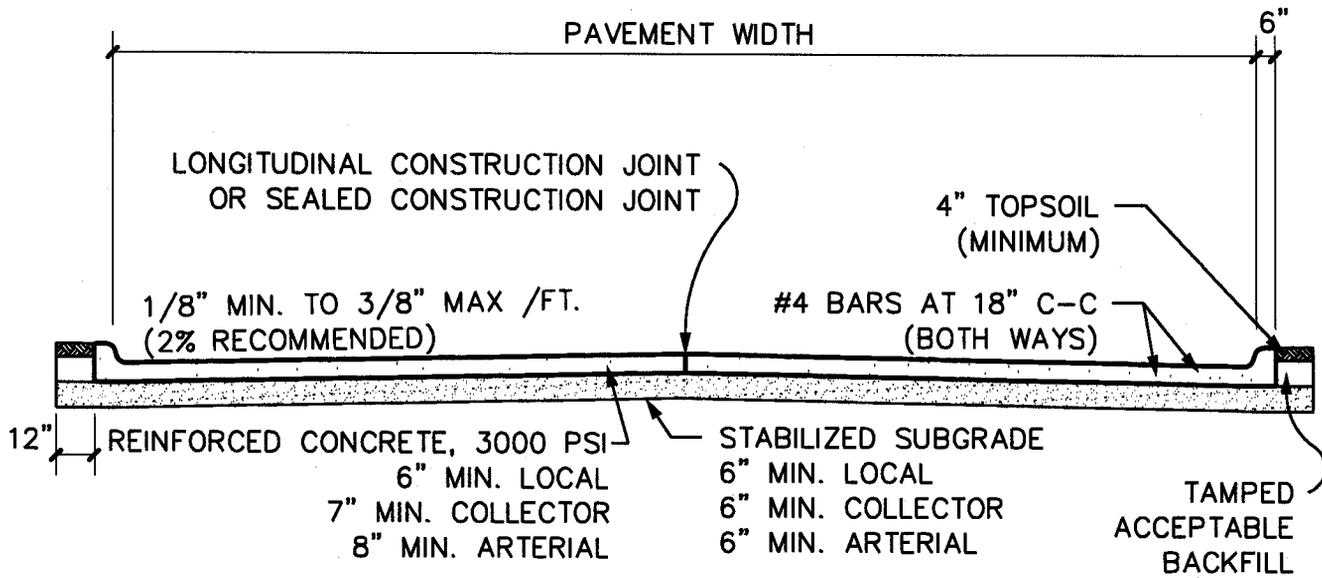
**15.5.D STORM SEWER DETAILS**

Detail Title	Detail Number	Revision Date
Storm Sewer Embedment and Backfill	D-1A	April 2000
Storm Sewer Embedment and Backfill	D-1B	April 2000
Storm Sewer Embedment and Backfill	D-1C	April 2000
Storm Sewer Subsurface Drain	D-2	April 2000
Storm Sewer Inlet General Notes	D-3	April 2000
Storm Sewer Curb Inlet	D-4	April 2000
Storm Sewer Recessed Curb Inlet	D-5	April 2000
Storm Sewer Curb Inlet	D-6	April 2000
Storm Sewer Drop Inlet	D-7	April 2000
Storm Sewer Manhole	D-8	April 2000
Storm Sewer Reinforced Concrete Collar	D-9	April 2000
Storm Sewer Curbed Flume and Pilot Channels	D-10	April 2000
Storm Sewer Concrete Riprap	D-11	April 2000
Storm Sewer Sloping Headwall	D-12	April 2000
Storm Sewer Vertical Headwall	D-13	April 2000
Storm Sewer Culvert	D-14A	April 2000
Safety End Treatments	D-14B	April 2000
Erosion Control Plan	D-15A	April 2000
Erosion Control Barriers	D-15B	April 2000
Erosion Control Barrier	D-15C	April 2000

**Section 15.6 Amendments to This Chapter**

*Reserved for listing of amendments to this Chapter.*

Ord. Number	Date	Subject



## TYPICAL CONCRETE SECTION (CURB AND GUTTER)

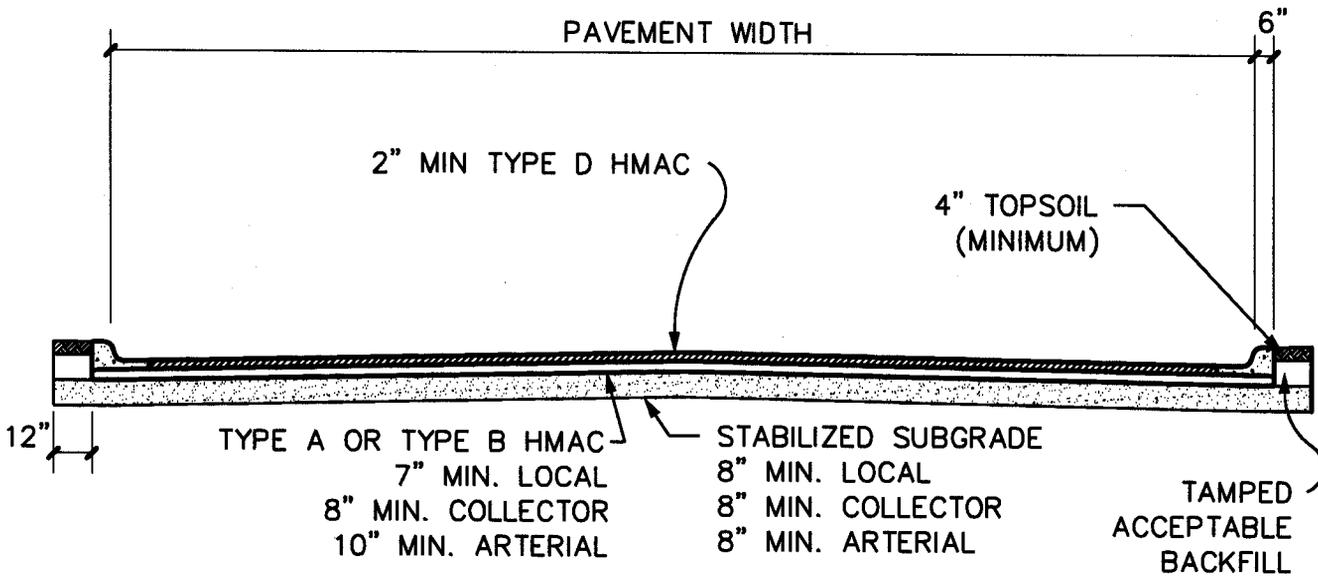
NOTE: LOCAL - #3 BARS ON 18" C-C  
COLLECTOR/ARTERIAL - #4 BARS ON 18" C-C



PAVING CONSTRUCTION DETAILS  
CONCRETE STREET SECTIONS

REVISION DATE:  
APRIL 14, 2000

SHEET: P-1A



## TYPICAL ASPHALT SECTION (CURB AND GUTTER)

<u>STREET CLASSIFICATION</u>	<u>PARABOLIC CROWN HEIGHT</u>
LOCAL	6"
CUL-DE-SAC	6"
MINOR COLLECTOR	7"
MAJOR COLLECTOR (2-LANE)	7"
MAJOR COLLECTOR (4-LANE)	7"
MINOR ARTERIAL	7"
MAJOR ARTERIAL	7"
PRIMARY ARTERIAL	8"

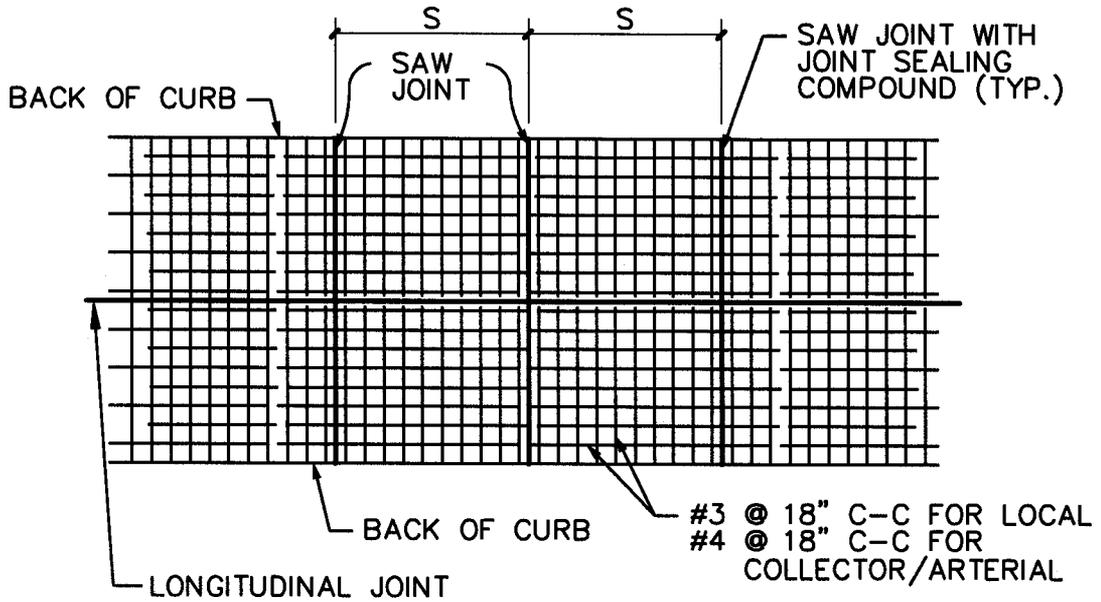


### PAVING CONSTRUCTION DETAILS ASPHALT STREET SECTIONS

REVISION DATE:  
APRIL 14, 2000

SHEET: **P-1B**

PAVEMENT THICKNESS	MAX JOINT SPACING (S)	JOINT DEPTH
6"	15'	1.5"
8"	20'	2.0"



## PLAN

### NOTES:

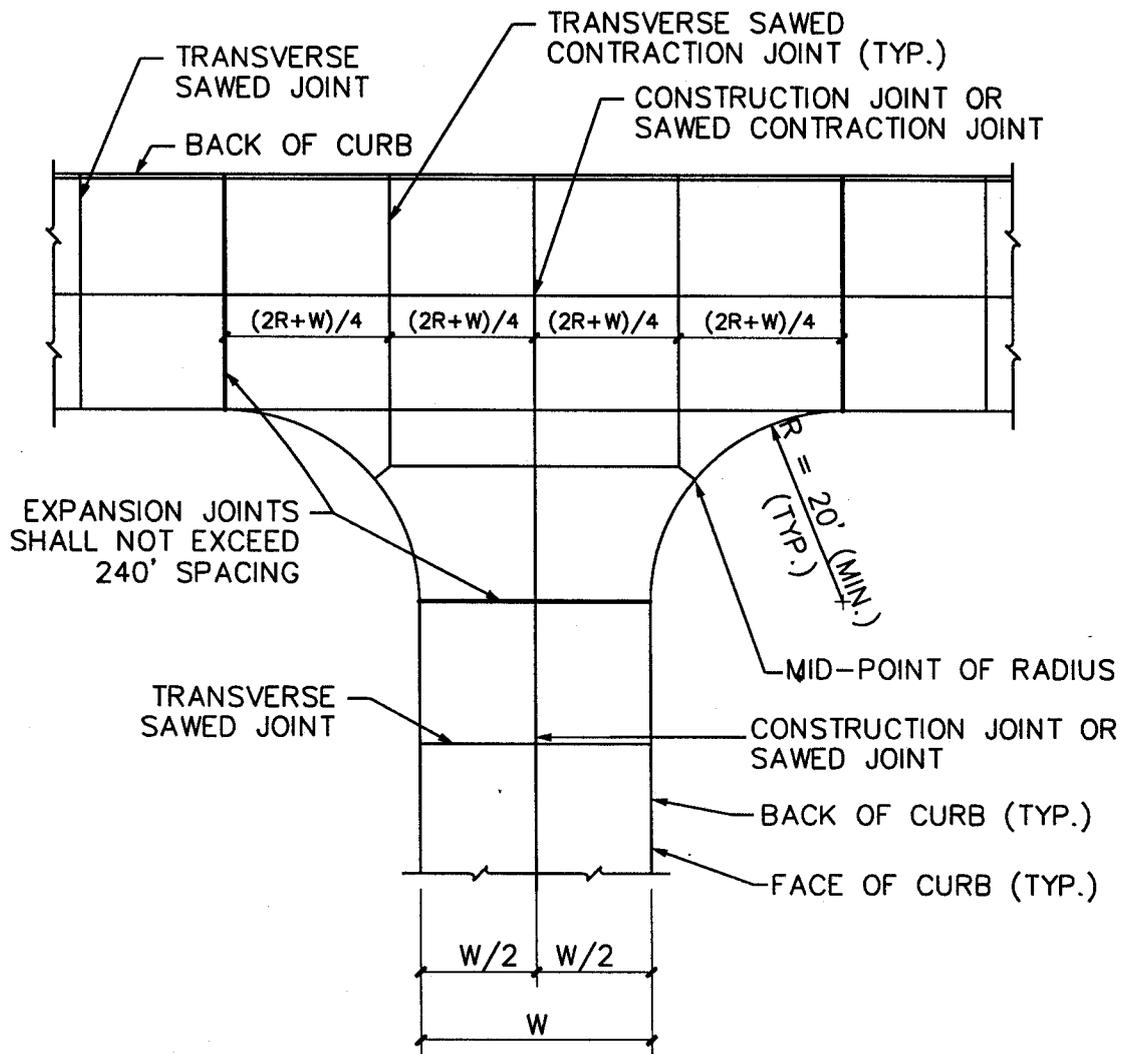
1. CONSTRUCT SAW JOINTS PER TABLE
2. EXPANSION JOINTS TO BE AT INTERSECTIONS, BRIDGES AND OTHER STRUCTURES.
3. EXPANSION JOINT SPACING SHALL NOT EXCEED 240'.
4. ALL JOINTS TO BE PROPERLY SEALED WITH JOINT SEALING COMPOUND CONSISTING OF HOT POURED RUBBER PER SPEC. ITEM 2.2.10, OR APPROVED EQUAL.
5. MONOLITHIC CURB SHALL BE USED WITH THIS TYPE OF PAVING.
6. LONGITUDINAL SAW JOINT REQUIRED FOR EACH LANE SEPARATION.



### PAVING CONSTRUCTION DETAILS STEEL LAYOUT PLAN

REVISION DATE:  
APRIL 14, 2000

SHEET: **P-2**



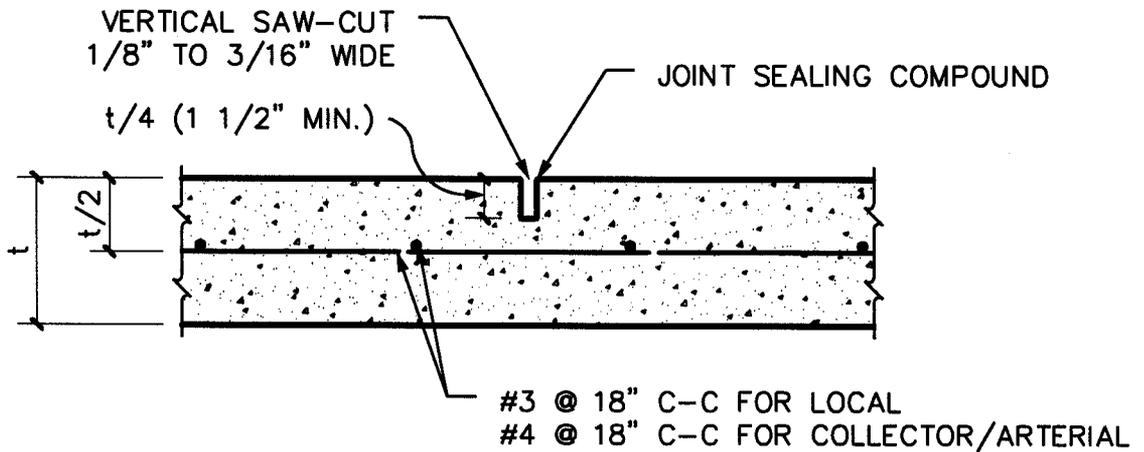
**NOTE:** TRANSVERSE SAWED JOINTS SHALL BE PLACED SO AS NOT TO EXCEED THE ALLOWED MAXIMUM JOINT SPACING. SEE DETAIL P-2 FOR JOINT SPACING REQUIREMENTS.



PAVING CONSTRUCTION DETAILS  
INTERSECTION JOINT SPACING

REVISION DATE:  
APRIL 14, 2000

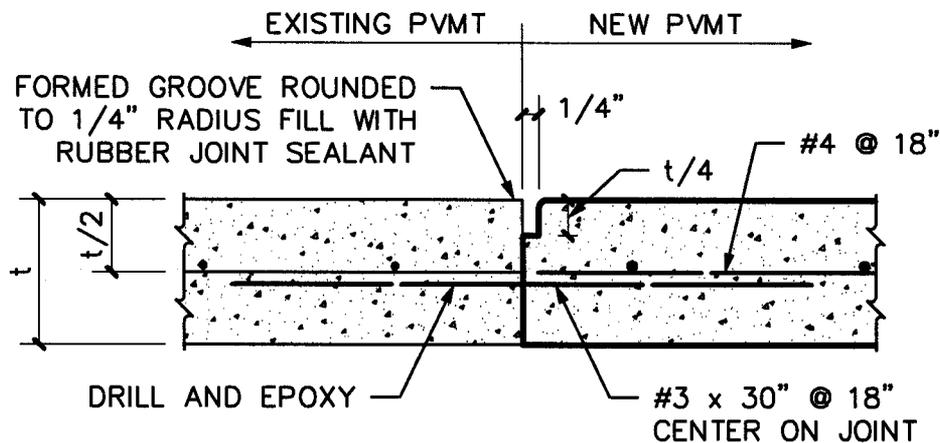
SHEET: P-3A



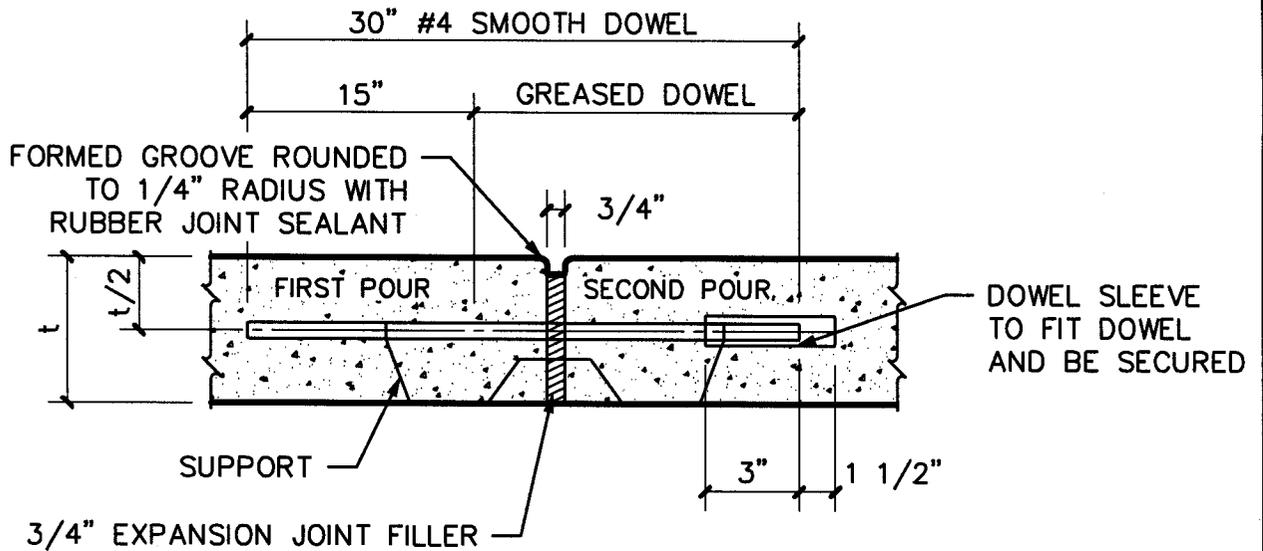
## SAW JOINT

### NOTE:

1. ALL DOWEL BARS SHALL BE INSTALLED PERPENDICULAR TO JOINT @ 18" SPACING.
2. ALL JOINTS TO BE PROPERLY SEALED WITH JOINT SEALING COMPOUND CONSISTING OF HOT POURED RUBBER PER SPEC. ITEM 2.2.10, OR APPROVED EQUAL.



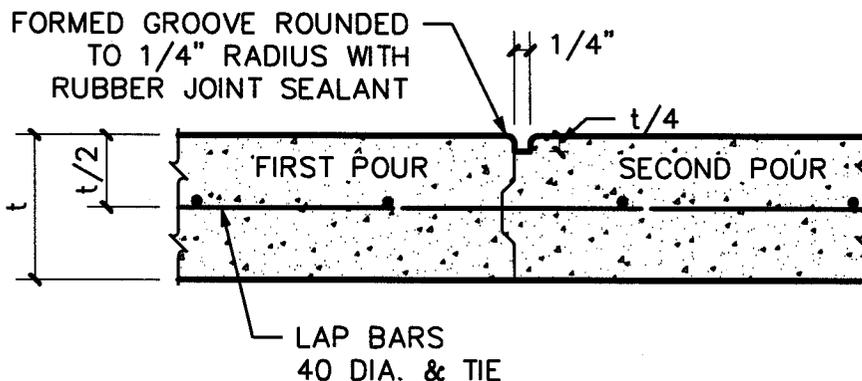
## SAWED CONSTRUCTION JOINT



## EXPANSION JOINT

### NOTE:

1. ALL #4 SMOOTH DOWEL BARS SHALL BE INSTALLED PERPENDICULAR TO JOINT @ 18" SPACING.
2. ALL JOINTS TO BE PROPERLY SEALED WITH JOINT SEALING COMPOUND CONSISTING OF HOT POURED RUBBER PER SPEC. ITEM 2.2.10, OR APPROVED EQUAL.



## CONSTRUCTION JOINT



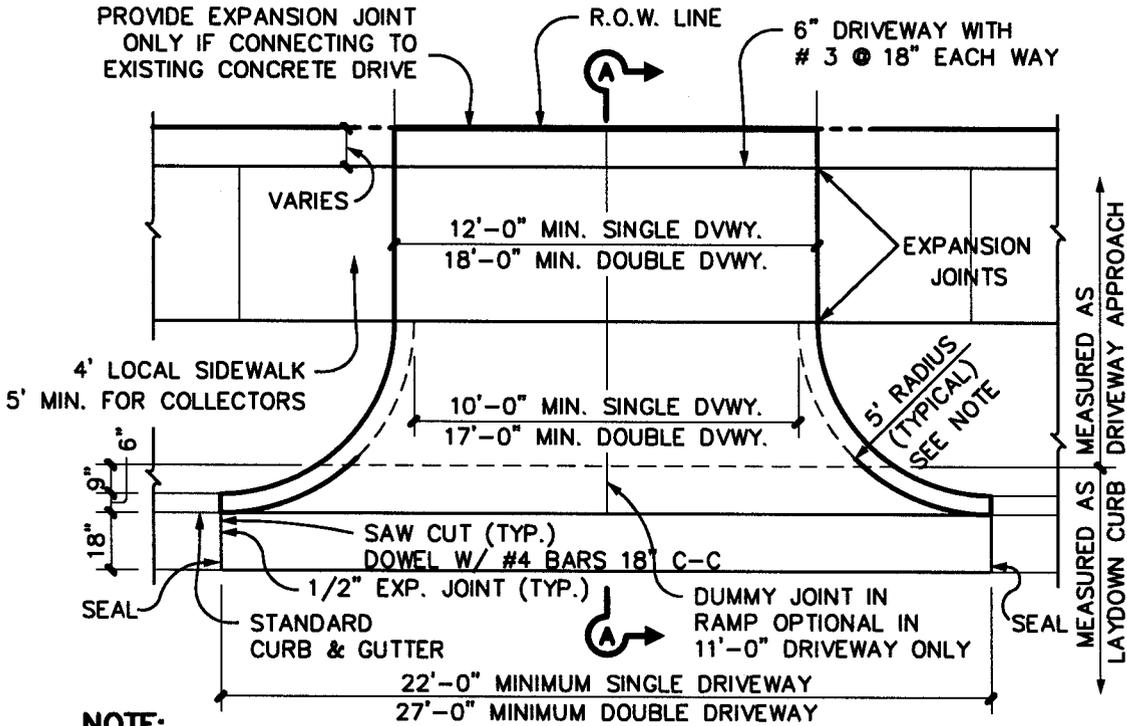
PAVING CONSTRUCTION DETAILS  
CONCRETE PAVEMENT JOINTS

REVISION DATE:  
APRIL 14, 2000

SHEET: P-3C

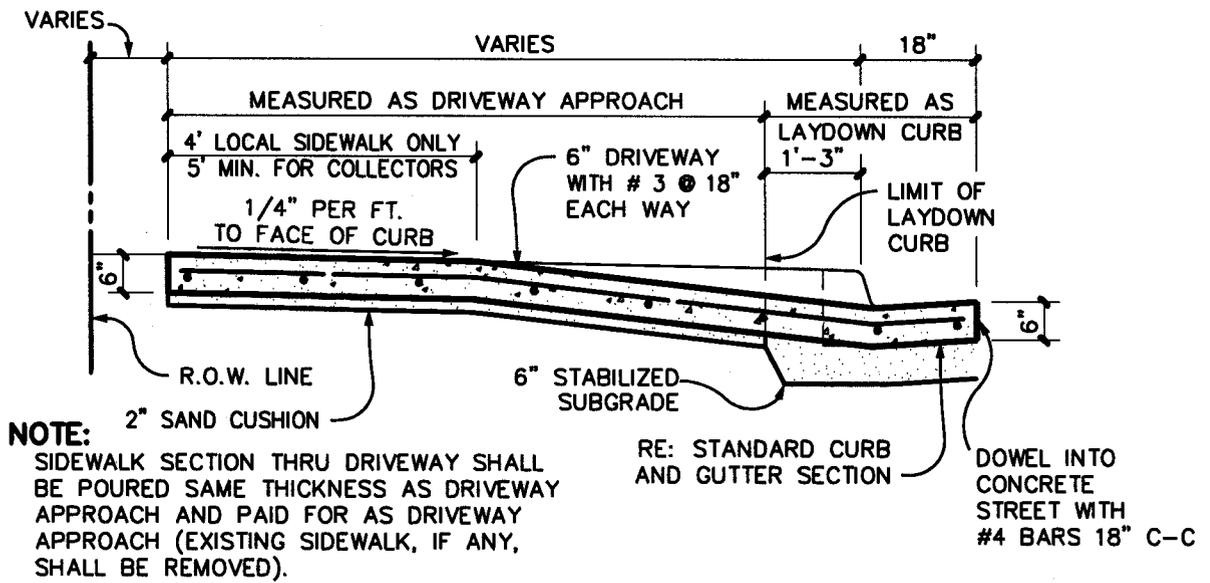






**NOTE:**  
 EXISTING CURB AND GUTTER, IF ANY, MUST BE SAW CUT AT THE CURB RETURN.  
 5' RADIUS FOR LOCAL  
 5'-10' RADIUS FOR COLLECTOR  
 15' RADIUS FOR ARTERIAL

**PLAN**



**NOTE:**  
 SIDEWALK SECTION THRU DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH AND PAID FOR AS DRIVEWAY APPROACH (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED).  
 RE: STANDARD CURB AND GUTTER SECTION  
 DOWEL INTO CONCRETE STREET WITH #4 BARS 18" C-C

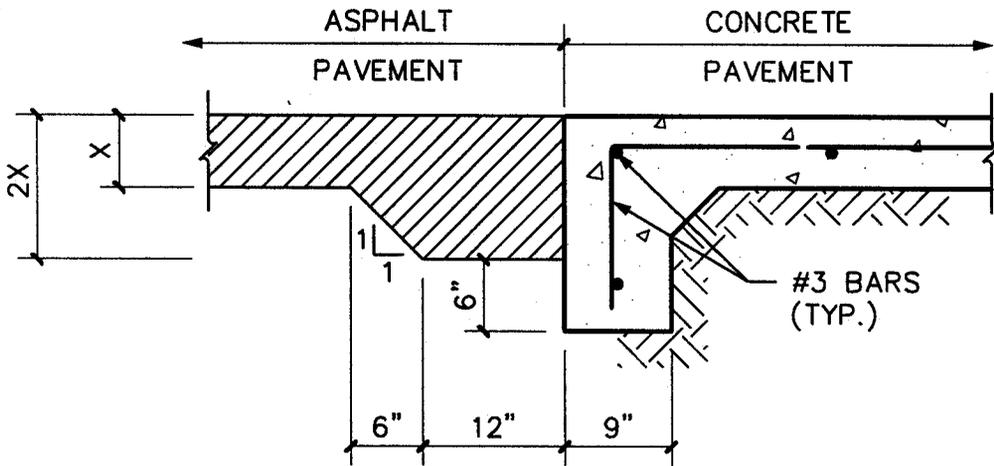
**SECTION A-A**



PAVING CONSTRUCTION DETAILS  
 LAYDOWN CURB AND DRIVEWAY

REVISION DATE:  
 APRIL 14, 2000

SHEET: P-5



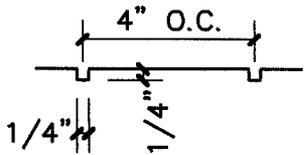
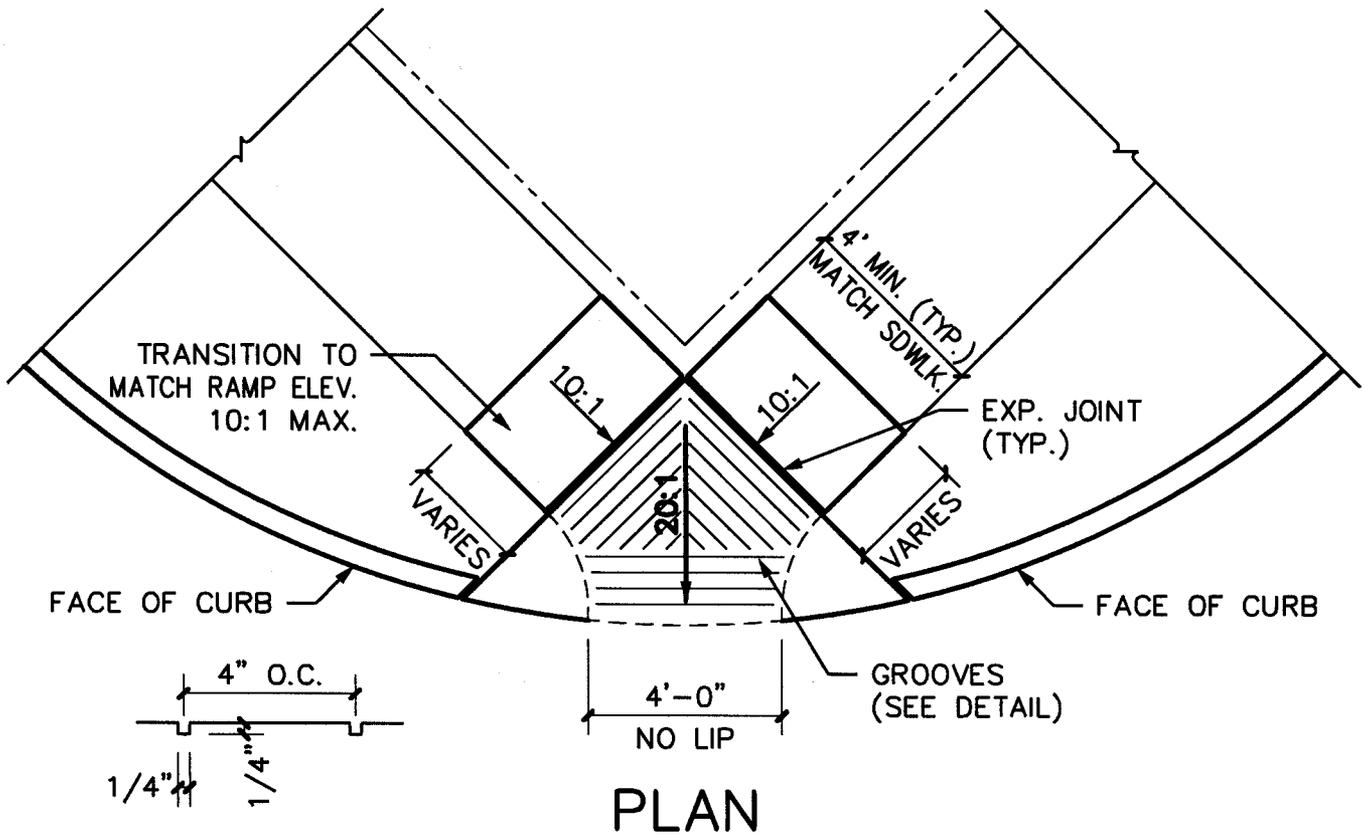
ASPHALT TO CONCRETE HEADER



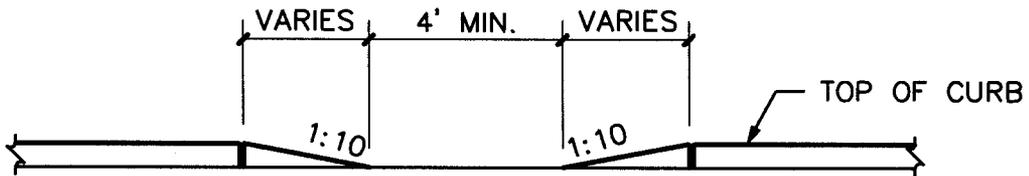
PAVING CONSTRUCTION DETAILS  
STREET HEADER

REVISION DATE:  
APRIL 14, 2000

SHEET: P-6



GROOVES SECTION



ELEVATION

**NOTES:**

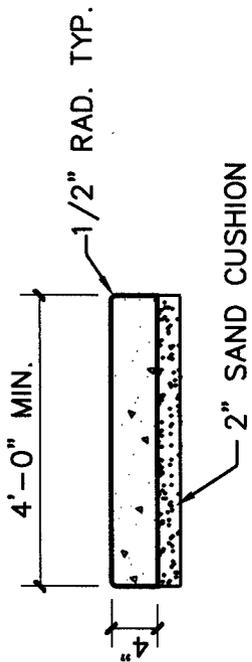
1. CONSTRUCT RAMP OF CLASS A CONCRETE.
2. REINFORCE WITH #3 BARS ON 18" CENTERS.
3. INSTALL 1/2"  $\phi$  X 18" SMOOTH DOWELS @ 18"  
(GREASE ON ONE SIDE) THROUGH EXPANSION JOINTS.
4. 1:20 SLOPE ON WHEELCHAIR RAMP AND 1:10 SLOPE ON RAMP WINGS.
5. RAMPS SHALL HAVE A HEAVY BROOM FINISH WITH GROOVES  
ALIGNED PERPENDICULAR TO THE DIRECTION OF TRAVEL.
6. ALL RAMPS SHALL COMPLY WITH THE REQUIREMENTS OF THE  
ARCHITECTURAL BARRIERS ACT.



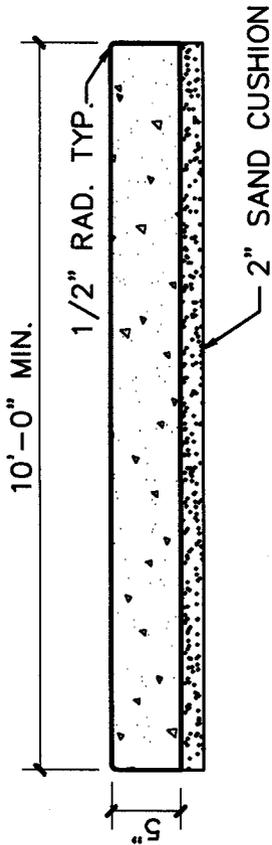
PAVING CONSTRUCTION DETAILS  
WHEELCHAIR RAMP

REVISION DATE:  
APRIL 14, 2000

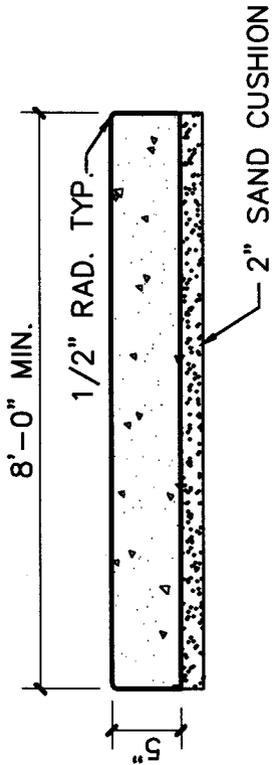
SHEET: P-7



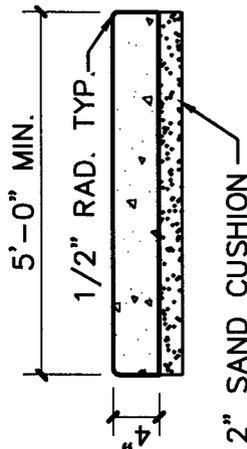
**TYPE "A"**



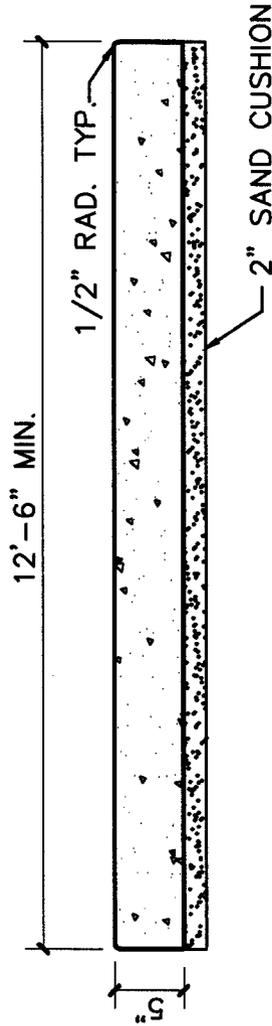
**TYPE "D"**



**TYPE "C"**



**TYPE "B"**



**TYPE "E"**

**NOTES:**

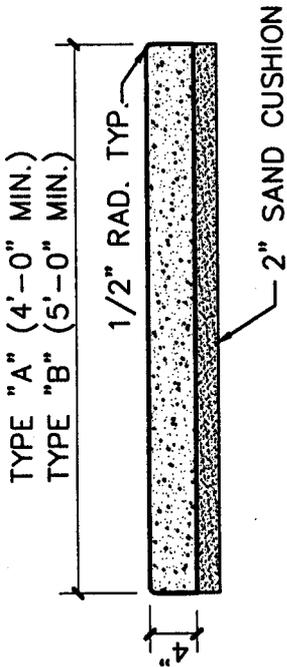
1. REFER TO THE COLLEYVILLE PATHWAYS PLAN FOR LOCATIONS OF TYPE "C" AND "D" PATHWAYS.
2. A 12' MINIMUM EASEMENT IS REQUIRED FOR TYPE "C" PATHWAYS WHEN NOT LOCATED WITHIN A RIGHT-OF-WAY.
3. A 12' MINIMUM EASEMENT IS REQUIRED FOR TYPE "C" PATHWAYS WHEN NOT LOCATED WITHIN A RIGHT-OF-WAY.
4. WHEN A TYPE "A" OR "B" SIDEWALK ABUTS A CURB, THE SIDEWALK SHALL BE A MIN. 6' WIDTH.
5. REINFORCEMENT TO BE #3 BARS @ 18" C-C OR WELDED WIRE FABRIC 6X6 - W4.0 X 4.0.



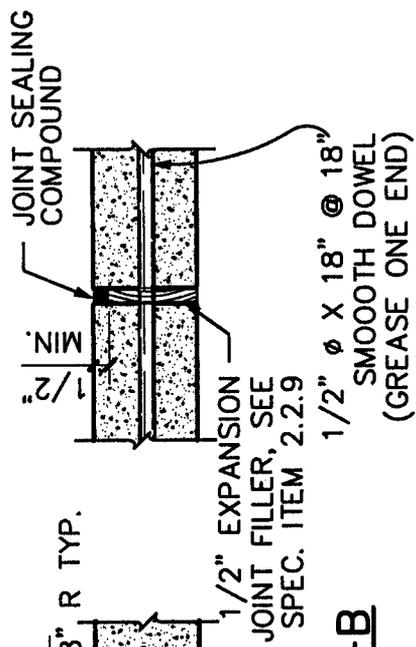
PAVING CONSTRUCTION DETAILS  
SIDEWALK AND PATHWAY STANDARDS

REVISION DATE:  
APRIL 14, 2000

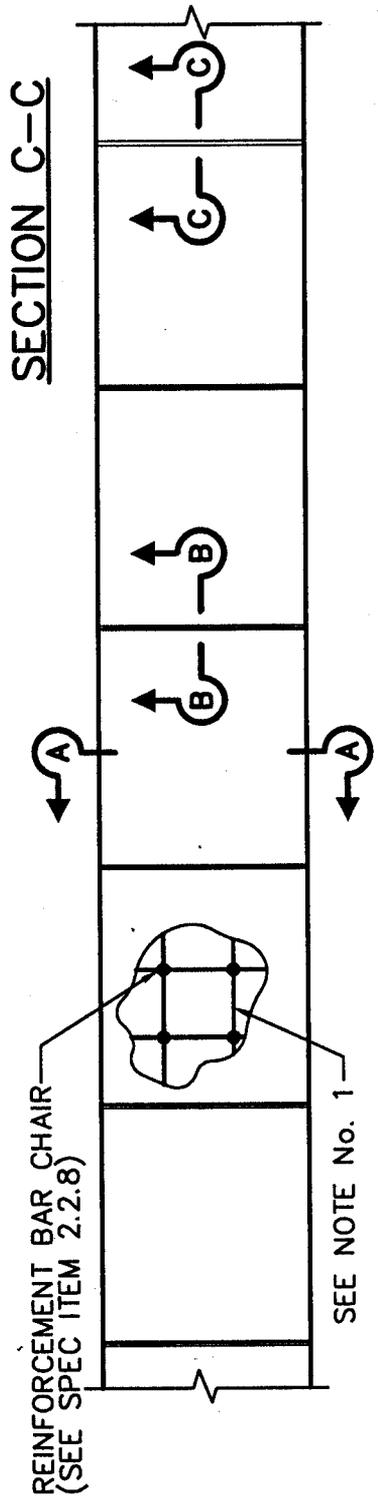
SHEET: **P-8A**



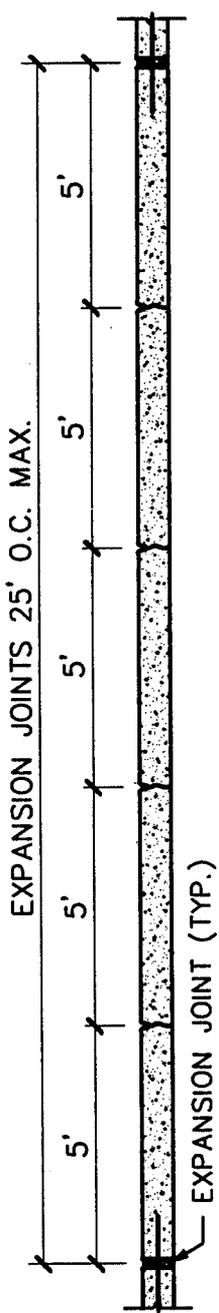
**SECTION A-A**



**SECTION B-B**



**SECTION C-C**



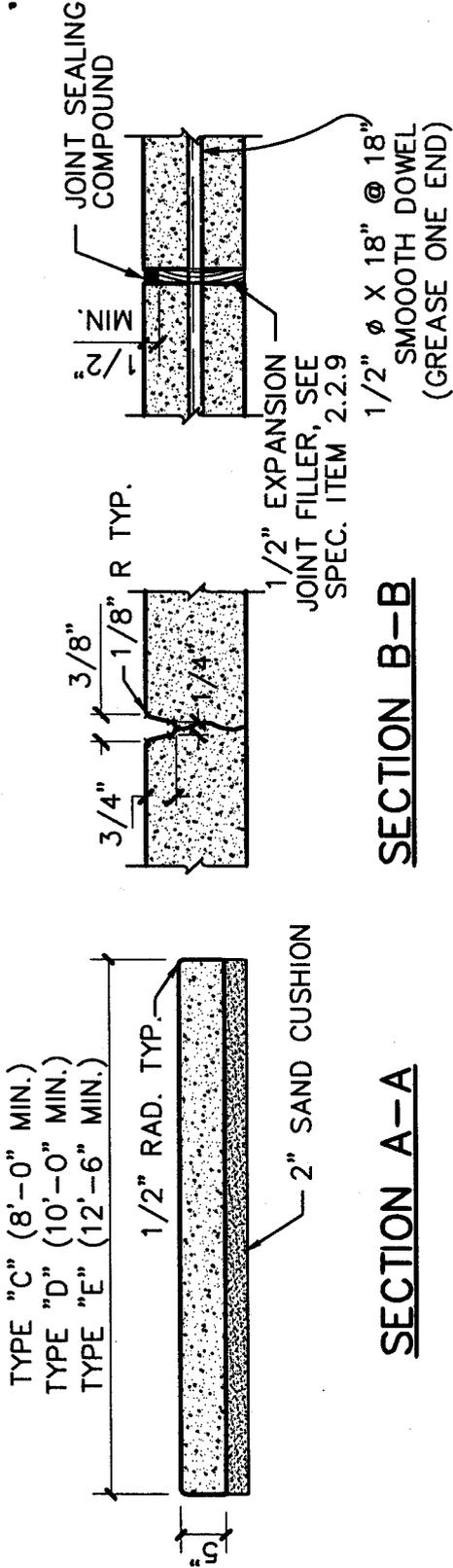
**NOTE:**

1. REINFORCEMENT TO BE #3 BARS AT 18" C-C
2. DOWEL WITH #4 BARS AT 18" C-C WHEN CONNECTING TO EXISTING SIDEWALKS, DRIVEWAYS, CURBS AND GUTTER.
3. INSTALL 1/2" Ø X 18" SMOOTH DOWELS @ 18" (GREASE ONE END) THROUGH EXPANSION JOINTS.



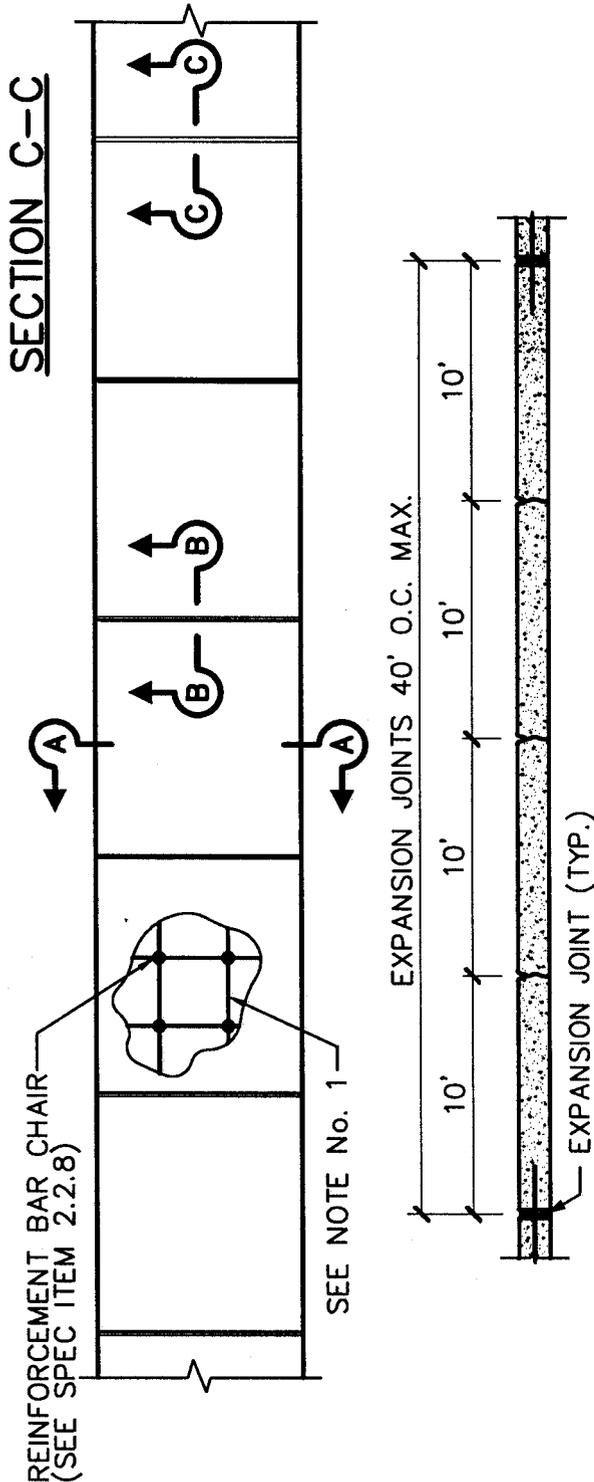
PAVING CONSTRUCTION DETAILS  
CONCRETE SIDEWALKS

REVISION DATE:  
APRIL 14, 2000  
SHEET: **P-8B**



**SECTION B-B**

**SECTION A-A**



**NOTE:**

1. REINFORCEMENT TO BE #3 BARS AT 18" C-C OR WELDED WIRE FABRIC 6X6 - W4.0 X W4.0
2. DOWEL WITH #4 BARS AT 18" C-C WHEN CONNECTING TO EXISTING SIDEWALKS, DRIVEWAYS, CURBS AND GUTTER.
3. INSTALL 1/2"  $\phi$  X 18" SMOOTH DOWELS @ 18" (GREASE ONE END) THROUGH EXPANSION JOINTS.

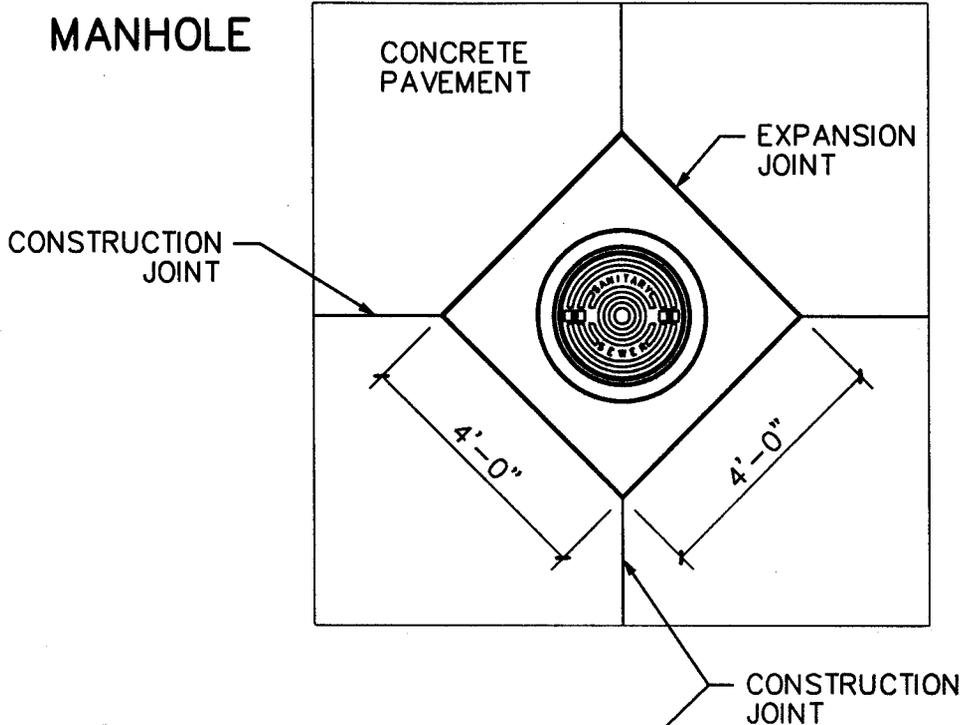


PAVING CONSTRUCTION DETAILS  
 CONCRETE SIDEWALK

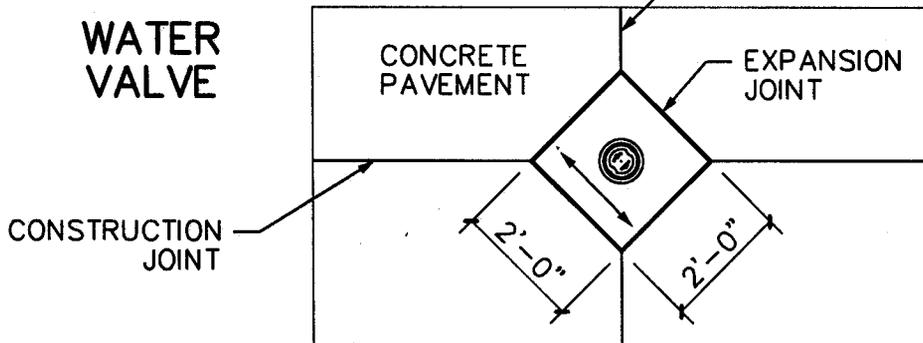
REVISION DATE:  
 APRIL 14, 2000

SHEET: P-8C

# MANHOLE



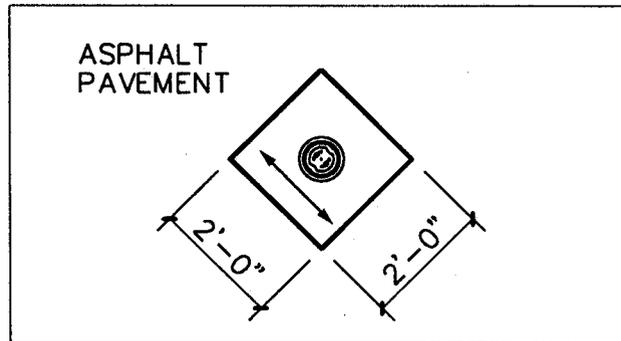
# WATER VALVE



## NOTES:

1. ALL CONCRETE PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES.
2. MANHOLE BOXOUT REQUIRED FOR ALL MANHOLES (STORM AND SANITARY) AND CLEANOUTS LOCATED IN THE STREET.
3. SEE SHEET P-3 FOR JOINT DETAILS.
4. SEE SHEET W-3 FOR WATER VALVE DETAIL.

# WATER VALVE



## NOTES:

1. ALL ASPHALT PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES.
2. SEE SHEET W-3 FOR WATER VALVE DETAIL.

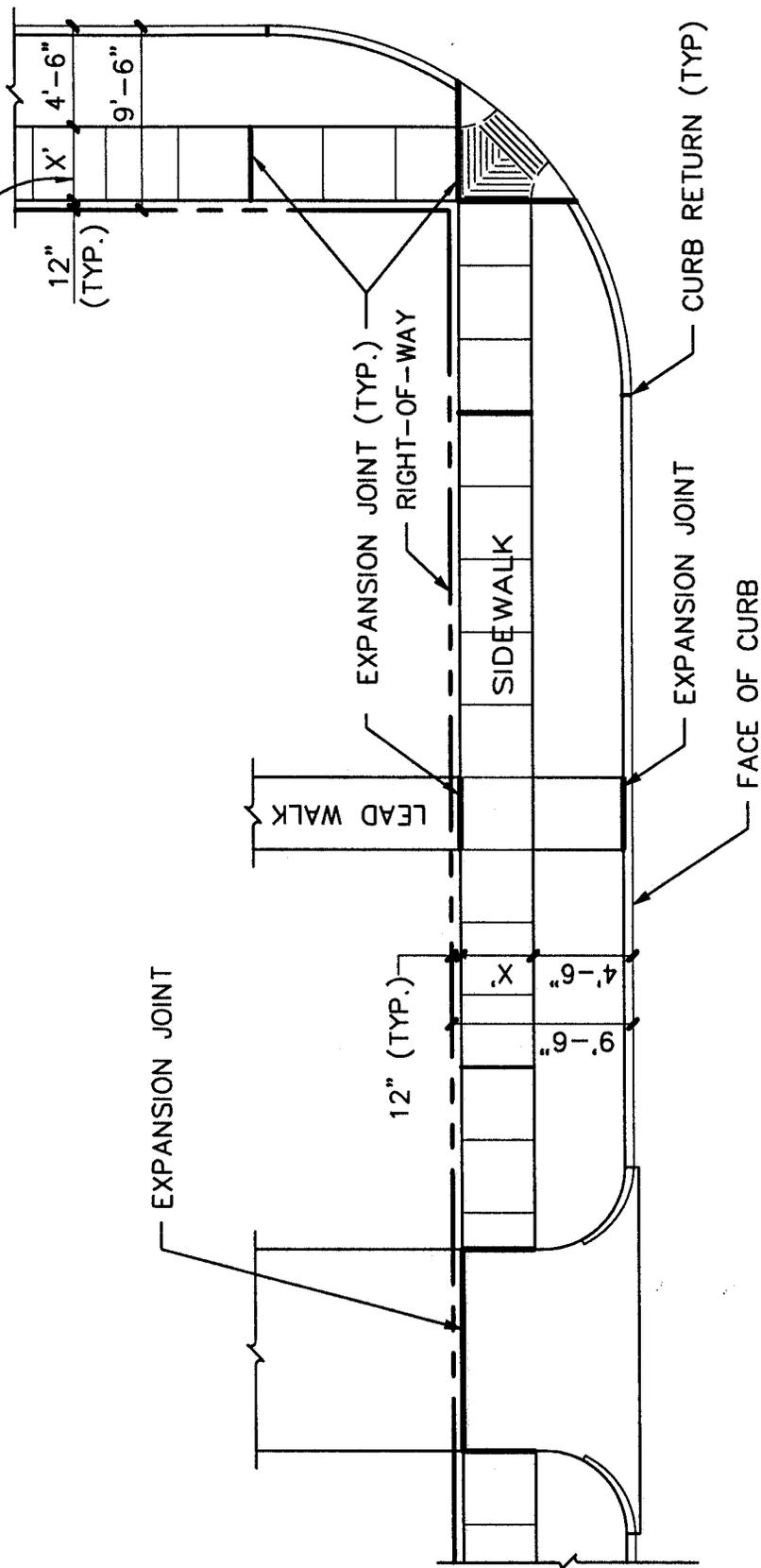


## PAVING CONSTRUCTION DETAILS WATER VALVE BOXOUT - ASPHALT

REVISION DATE:  
APRIL 14, 2000

SHEET: **P-9B**

SEE NOTE 5.



**NOTES:**

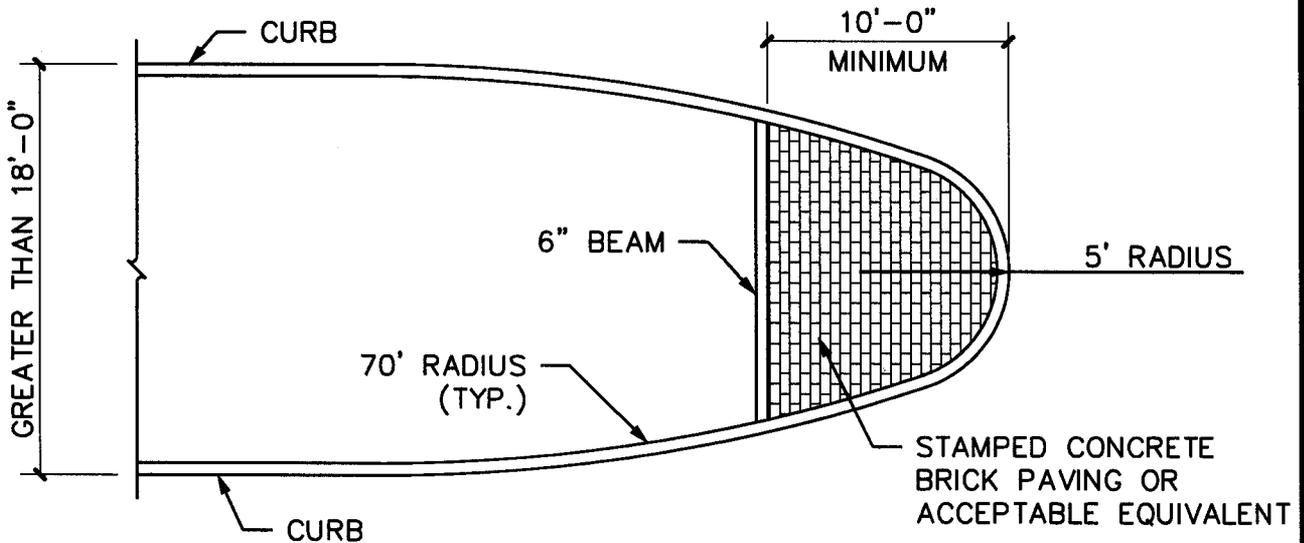
1. REINFORCE ALL SIDEWALKS WITH #3 BARS @ 18" C-C OR WELDED WIRE FABRIC 6 X 6 - W4.0 X W4.0
2. INSTALL #4 X 18" DOWELS @ 18" WHEN CONNECTING TO EXISTING CONCRETE.
3. INSTALL 1/2" Ø X 18" SMOOTH DOWELS @ 18" (GREASE ONE END) THROUGH EXPANSION JOINTS.
4. CURB AND GUTTER PLACED MONOLITHICALLY WITH PAVEMENT SHALL BE REINFORCED AND JOINTED IN ACCORDANCE WITH PAVEMENT DETAILS.
5. MINIMUM SIDEWALK WIDTH FOR LOCAL STREETS IS 4'. 5' MINIMUM SIDEWALK WIDTH FOR COLLECTORS. REFER TO COLLEYVILLE PATHWAY PLAN AND DETAILS 8A-8C.



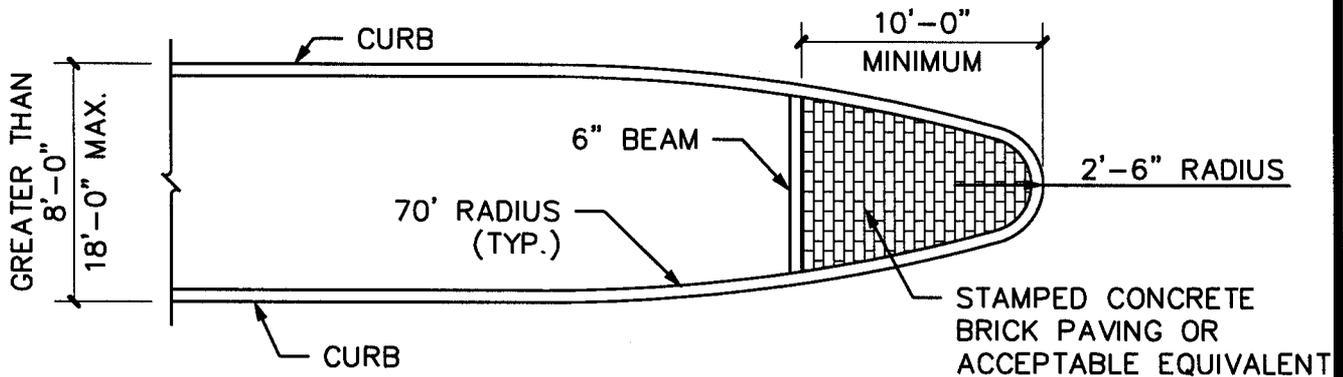
PAVING CONSTRUCTION DETAILS  
 CURB AND GUTTER, SIDEWALK, AND  
 DRIVEWAY TYPICAL JOINT LAYOUT

REVISION DATE:  
 APRIL 14, 2000

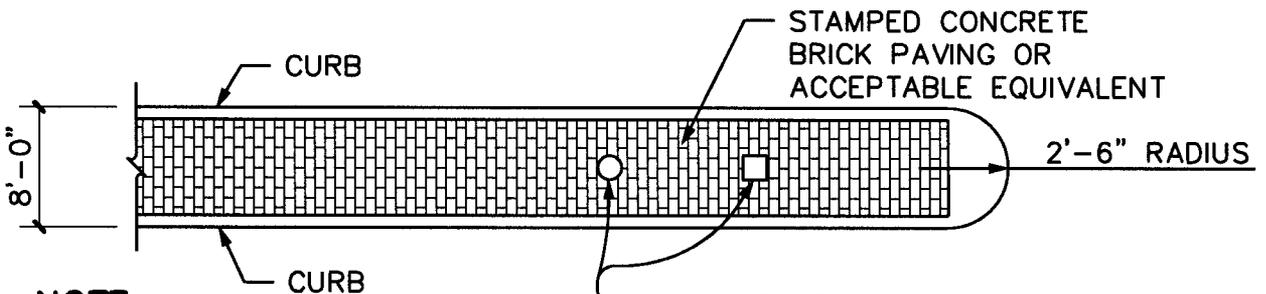
SHEET: P-10



### MEDIAN NOSE TYPE "C"



### MEDIAN NOSE TYPE "B"



**NOTE:**

- PAVING IS TO BE EXTENDED TO THE P.R.C. OF THE MEDIAN IN LEFT TURN LANES.

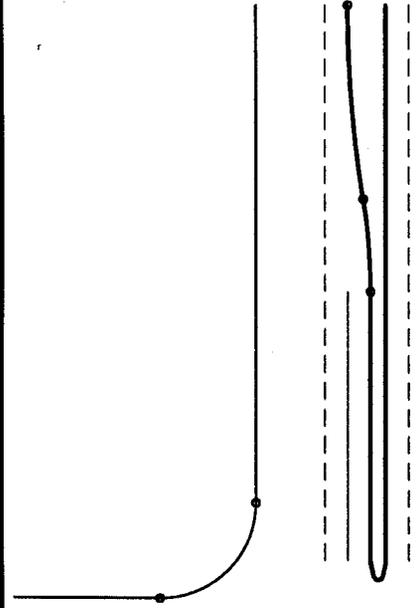
BLOCKOUT MEDIAN PAVING FOR TRAFFIC SIGNAL BASE/FOUNDATION, PULL BOX, OR LUMINARY BASE (IF LOCATIONS ARE KNOWN AND NOT INSTALLED WITH PAVING)

## MEDIAN NOSE TYPE "A" (STANDARD LEFT TURN LANE MEDIAN)

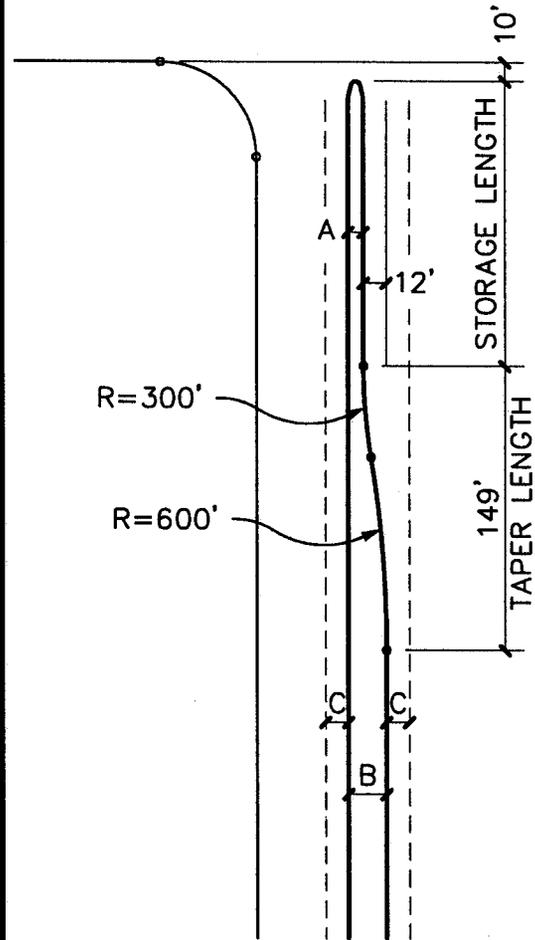


**NOTES:**

1. ONLY ARTERIAL STREETS AND COLLECTORS WITH CENTER MEDIANS MAY USE MEDIANS FOR LEFT TURN LANES.
2. THE NUMBER OF LANES VARIES BY STREET CLASSIFICATION.
3. MINIMUM REQUIRED STORAGE LENGTH IS BASED ON CROSS STREET CLASSIFICATION.
4. MEDIAN NOSE SHALL BE IN ACCORDANCE WITH MEDIAN NOSE DETAIL SHEET P-12.
5. VARIANCES AS PROVIDED BY CITY APPROVED TRAFFIC IMPACT ANALYSIS.



CROSS STREET



CROSS STREET

MAJOR ARTERIAL  
 MINOR ARTERIAL  
 COLLECTOR  
 LOCAL

MINIMUM STORAGE LENGTH

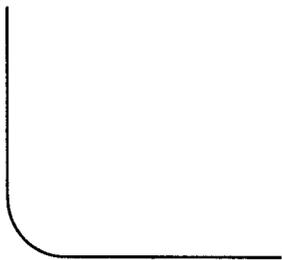
200'  
 150'  
 100'  
 60'



PAVING CONSTRUCTION DETAILS  
 LEFT TURN LANE IN MEDIAN

REVISION DATE:  
 APRIL 14, 2000

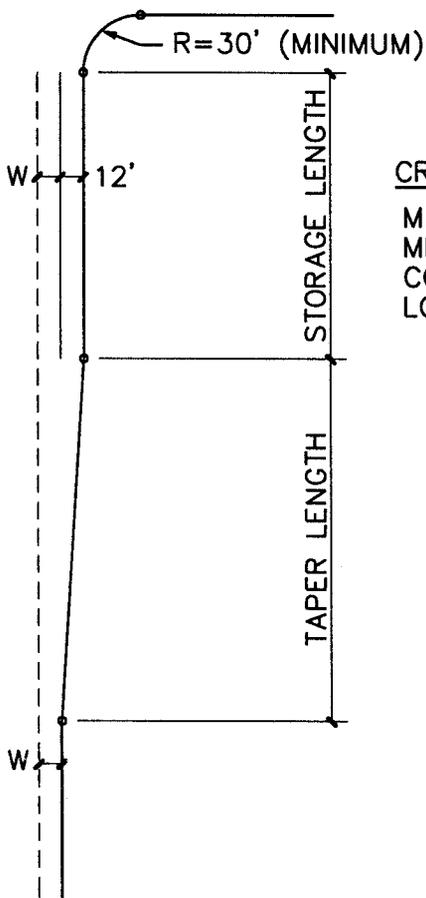
SHEET: P-12



← CROSS STREET →

**NOTES:**

1. ONLY ARTERIAL STREETS AND COLLECTORS MAY UTILIZE UNCHANNELIZED RIGHT TURN LANES.
2. THE NUMBER OF ADJACENT LANES VARIES WITH STREET CLASSIFICATION.
3. MINIMUM REQUIRED STORAGE LENGTH IS BASED ON CROSS STREET CLASSIFICATION.
4. VARIANCES AS PROVIDED BY CITY APPROVED TRAFFIC IMPACT ANALYSIS.

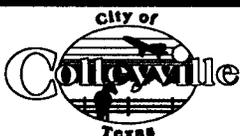


CROSS STREET

MIN. STORAGE LENGTH

MAJOR ARTERIAL  
 MINOR ARTERIAL  
 COLLECTOR  
 LOCAL

200'  
 150'  
 100'  
 60'



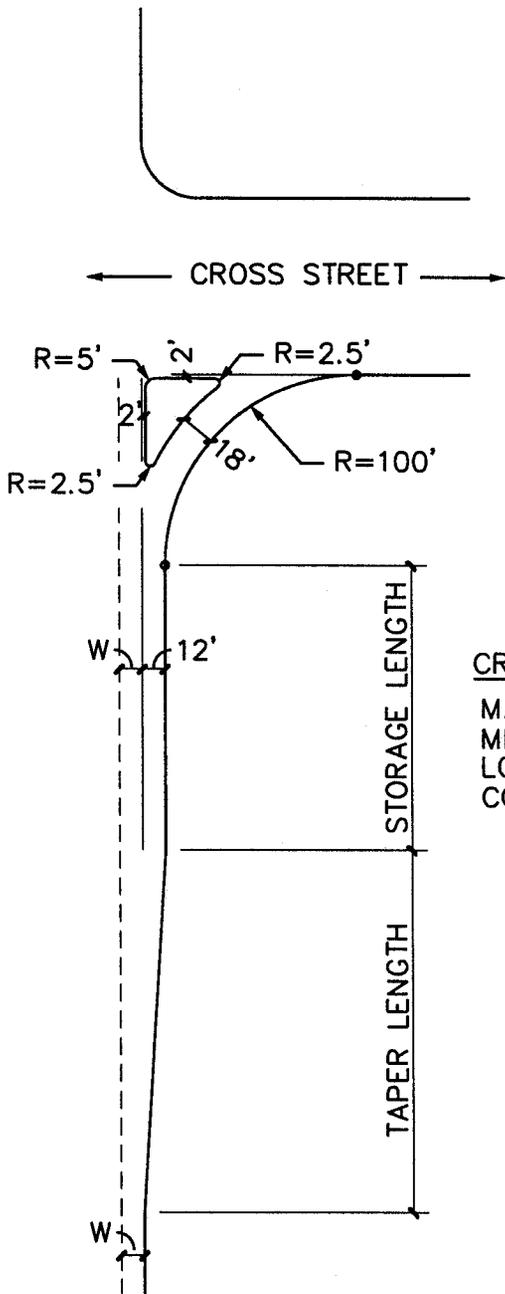
PAVING CONSTRUCTION DETAILS  
 RIGHT TURN LANE WITHOUT  
 CHANNELIZATION

REVISION DATE:  
 APRIL 14, 2000

SHEET: **P-13**

**NOTES:**

1. ONLY ARTERIAL STREETS AND COLLECTORS MAY UTILIZE CHANNELIZED RIGHT TURN LANES.
2. THE NUMBER OF ADJACENT LANES VARIES WITH STREET CLASSIFICATION.
3. MINIMUM REQUIRED STORAGE LENGTH IS BASED ON CROSS STREET CLASSIFICATION.
4. VARIANCES AS PROVIDED BY CITY APPROVED TRAFFIC IMPACT ANALYSIS.



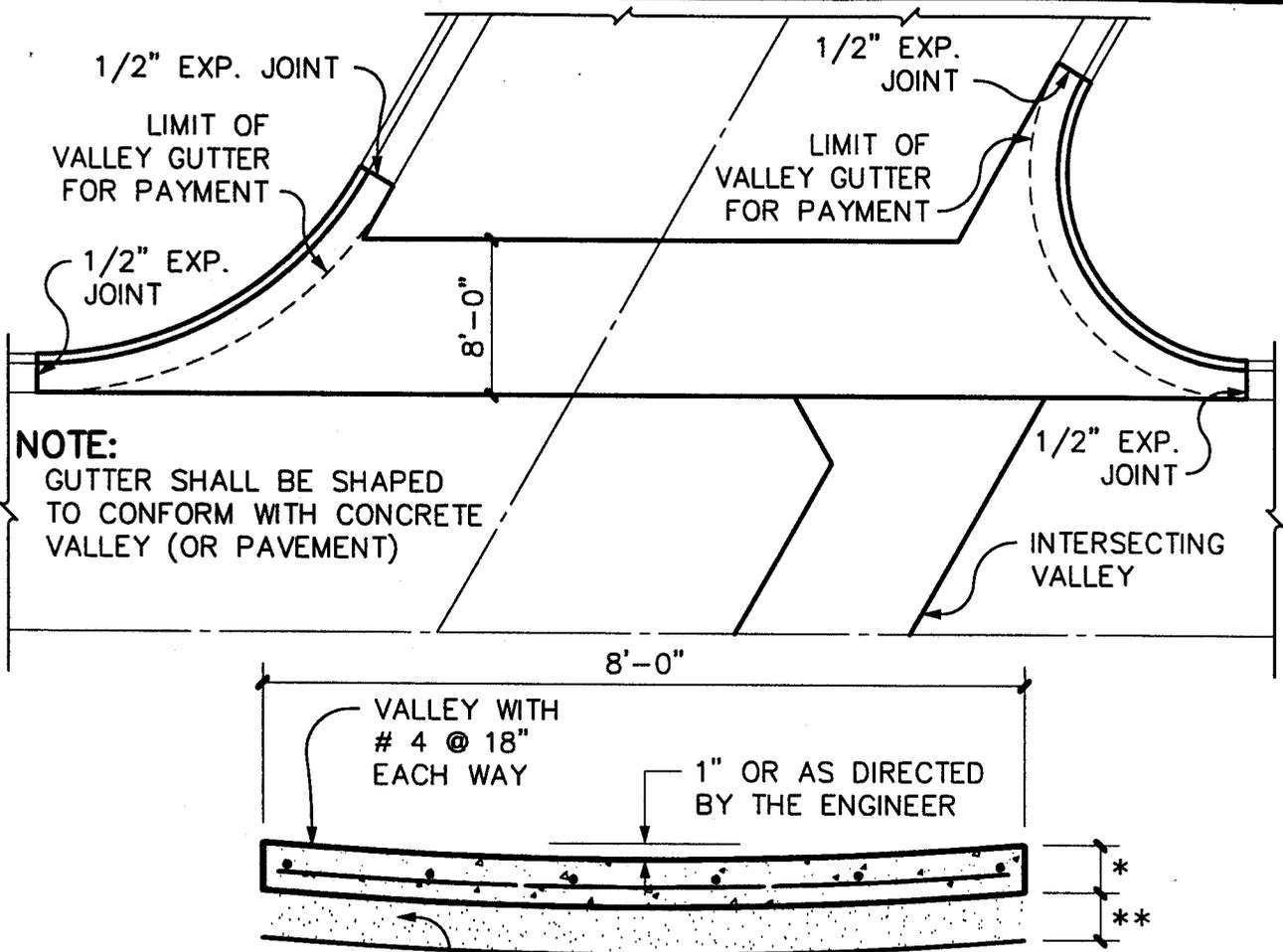
<u>CROSS STREET</u>	<u>MINIMUM STORAGE LENGTH</u>
MAJOR ARTERIAL	200'
MINOR ARTERIAL	150'
LOCAL	100'
COLLECTOR	60'



PAVING CONSTRUCTION DETAILS  
RIGHT TURN LANE WITH CHANNELIZATION

REVISION DATE:  
APRIL 14, 2000

SHEET: **P-14**



THE REINFORCED CONCRETE VALLEY SHALL REPLACE THE TOP OF THE PAVEMENT WITH THE REMAINING PORTION OF THE PAVEMENT TO BE CONSTRUCTED INCLUDING SUBGRADE TREATMENT, IN ACCORDANCE WITH THE TYPICAL PAVING SECTION. THE CONCRETE VALLEY WILL BE GOVERNED ACCORDING TO CITY STANDARDS FOR CONCRETE CURB AND GUTTER.

TRANSITION SECTION FOR VALLEYS CROSSING MAJOR STREETS	
DIST. FROM $\phi$ OF DIP	CROWN
0 FT	0.000 FT
5 FT	0.041 FT
10 FT	0.083 FT
20 FT	0.208 FT
30 FT	0.333 FT
40 FT	0.458 FT
50 FT	0.500 FT

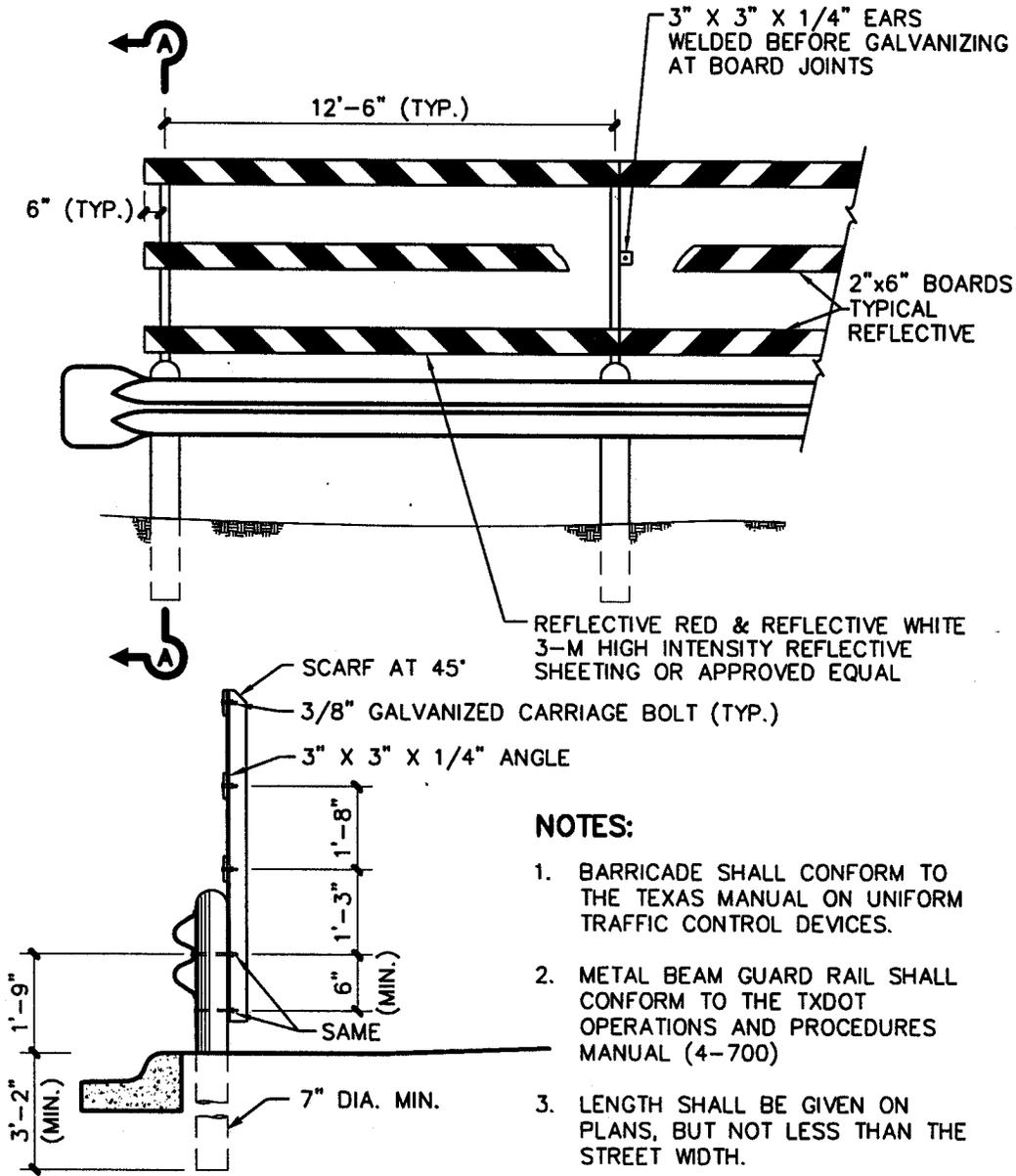
- \* 6" FOR LOCAL STREETS
- 7" FOR COLLECTOR STREETS
- 8" FOR ARTERIAL STREETS
  
- \*\* 8" FOR LOCAL STREETS
- 10" FOR COLLECTOR STREETS
- 10" FOR ARTERIAL STREETS



PAVING CONSTRUCTION DETAILS  
CONCRETE VALLEY

REVISION DATE:  
APRIL 14, 2000

SHEET: P-15



- NOTES:**
1. BARRICADE SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
  2. METAL BEAM GUARD RAIL SHALL CONFORM TO THE TXDOT OPERATIONS AND PROCEDURES MANUAL (4-700)
  3. LENGTH SHALL BE GIVEN ON PLANS, BUT NOT LESS THAN THE STREET WIDTH.
  4. VERTICAL SUPPORTS MAY BE OF EQUAL ALTERNATE DESIGN APPROVED BY THE CITY ENGINEER.

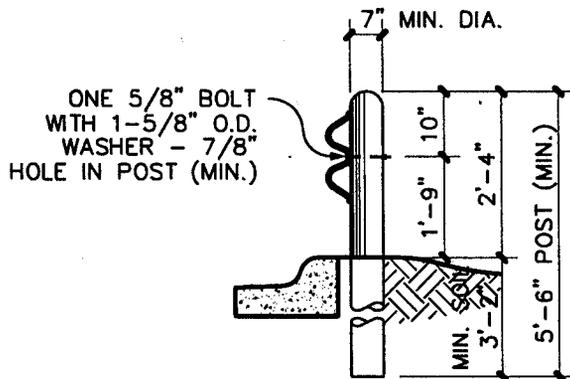
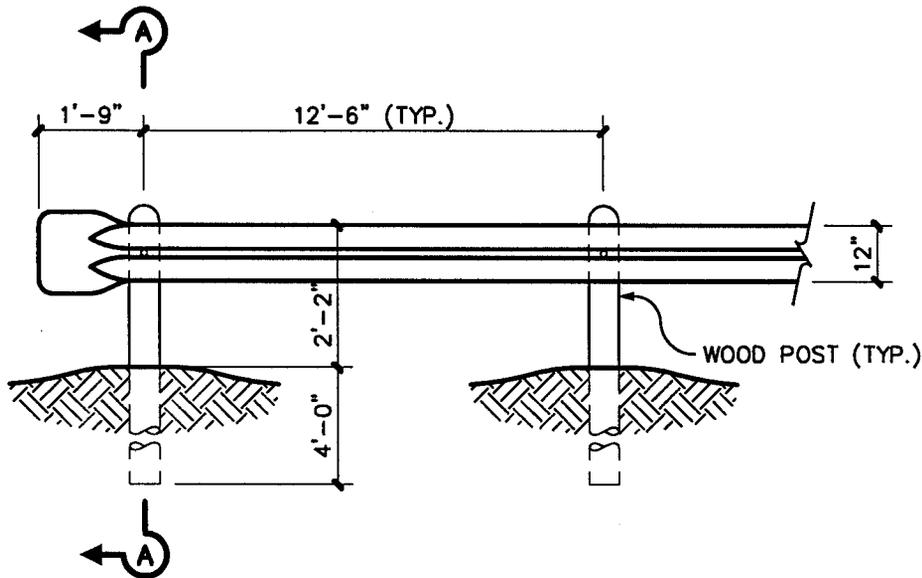
**SECTION A-A**



**PAVING CONSTRUCTION DETAILS  
DEAD END BARRICADE**

REVISION DATE:  
APRIL 14, 2000

SHEET: **P-16**



**SECTION A-A**

**NOTES:**

1. METAL BEAM GUARD RAIL SHALL CONFORM TO THE TxDOT OPERATIONS AND PROCEDURES MANUAL (4-700).
2. VERTICAL SUPPORTS MAY BE OF EQUAL ALTERNATE DESIGN APPROVED BY THE CITY ENGINEER.
3. END POST SHALL BE 8" DIA. INTERMEDIATE POST ARE 7" DIA.

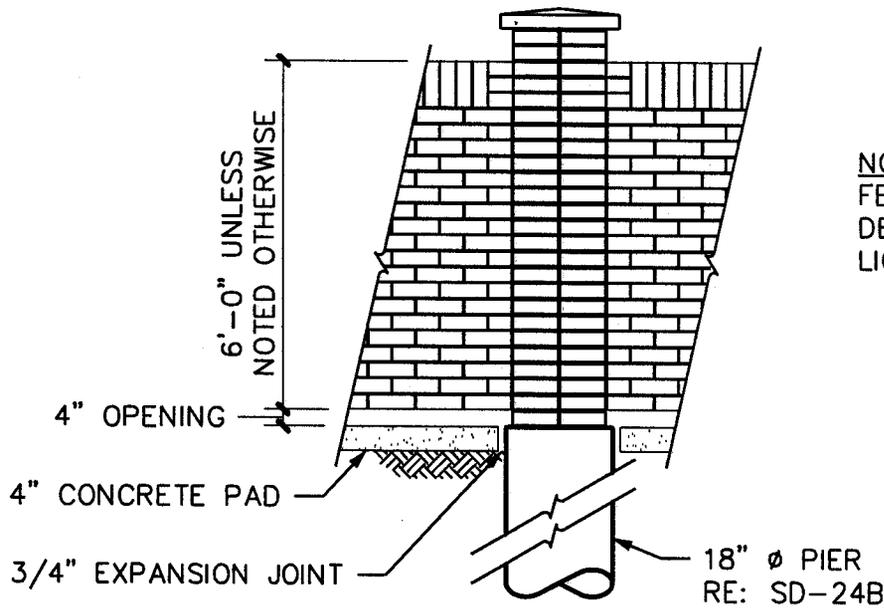
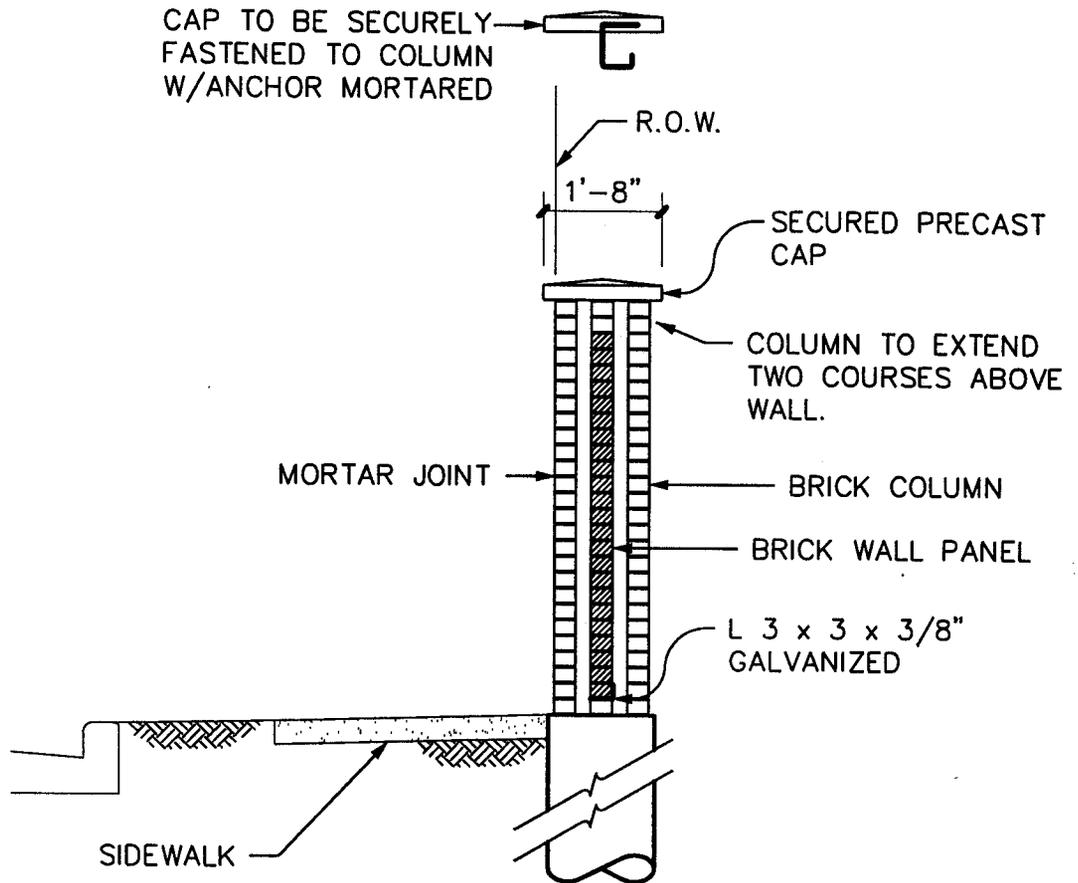


PAVING CONSTRUCTION DETAILS  
METAL BEAM GUARD RAIL

REVISION DATE:  
APRIL 14, 2000

SHEET: P-17





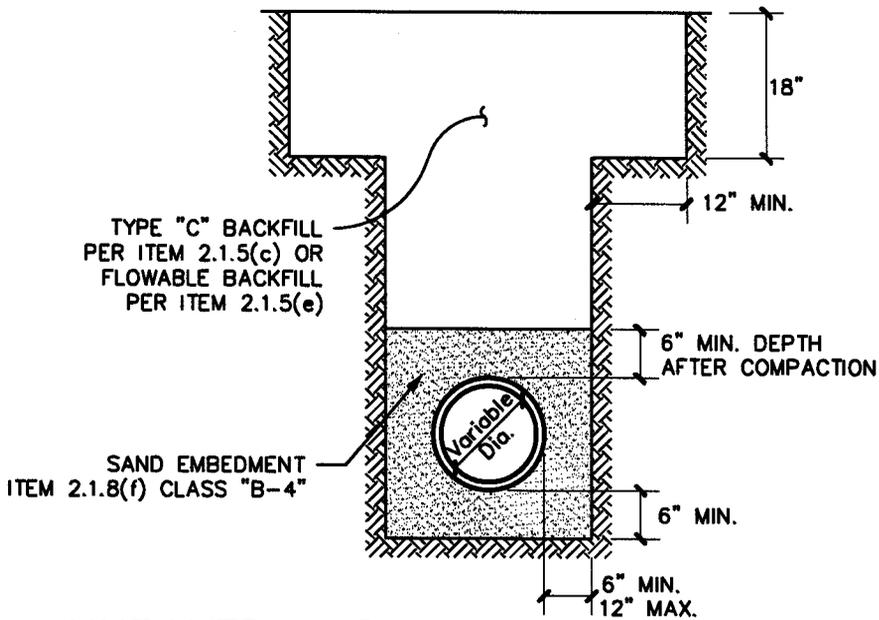
NOTE: ALL MASONRY FENCES SHALL BE DESIGNED BY A LICENSED ENGINEER.



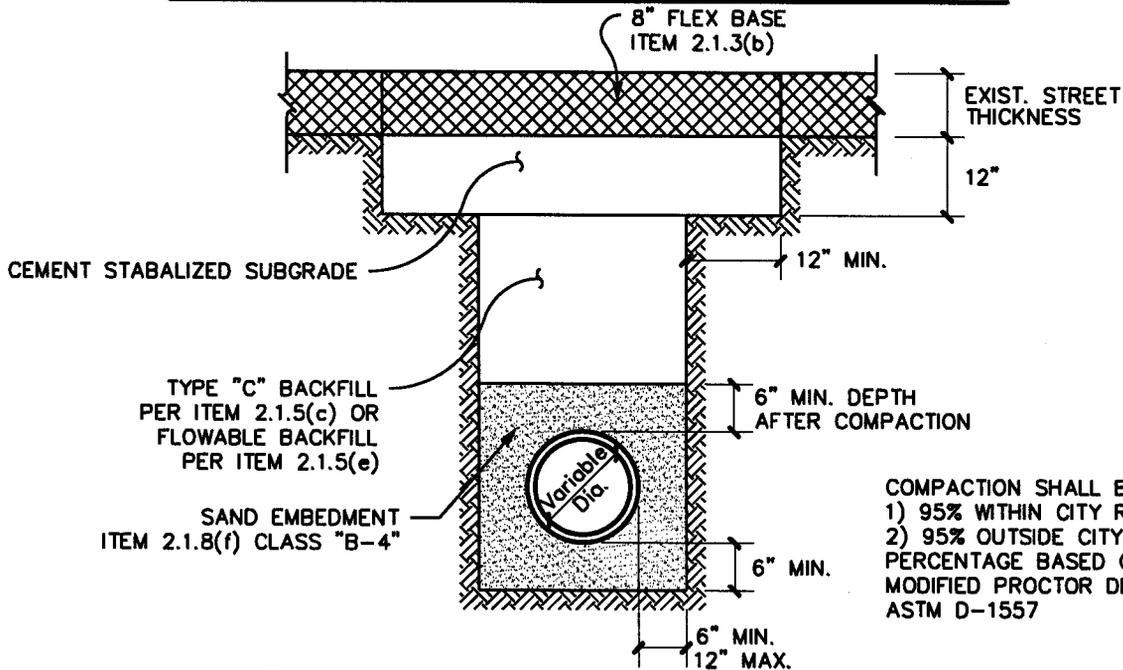
PAVING CONSTRUCTION DETAILS  
STANDARD MASONRY FENCE

REVISION DATE:  
APRIL 14, 2000

SHEET: P-19



## UNPAVED AND FUTURE PAVED AREAS



COMPACTION SHALL BE:  
1) 95% WITHIN CITY R.O.W.  
2) 95% OUTSIDE CITY R.O.W.  
PERCENTAGE BASED ON 95%  
MODIFIED PROCTOR DENSITY  
ASTM D-1557

### NOTES:

## EXISTING FLEXBASE SURFACE

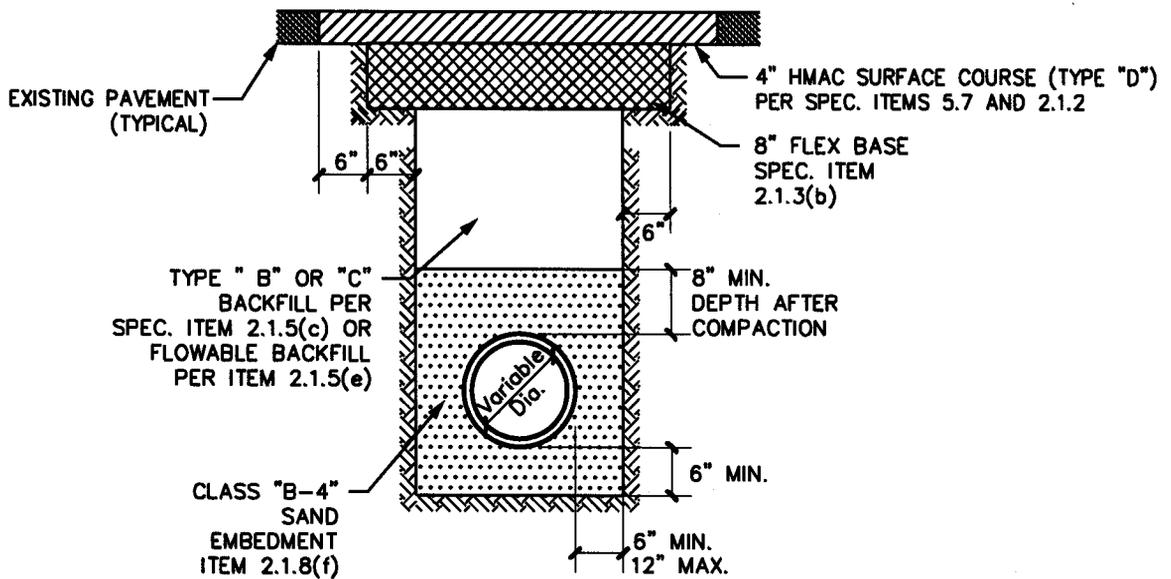
1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY AND TxDOT ROW UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9(b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW-CUT LINES PER SPEC ITEM 8.8.
4. COATED TRACER WIRE SHALL BE INSTALLED IN THE EMBEDMENT MATERIAL ABOVE THE PVC PIPE WITH THE TRACER WIRE TERMINATING IN IN-LINE GATE VALVE BOXES ACCESSIBLE BY CITY STAFF. BLUE UNDERGROUND WATER LINE WARNING TAPE OF MIN. 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
5. A MAXIMUM OF 300 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
6. THE CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING.



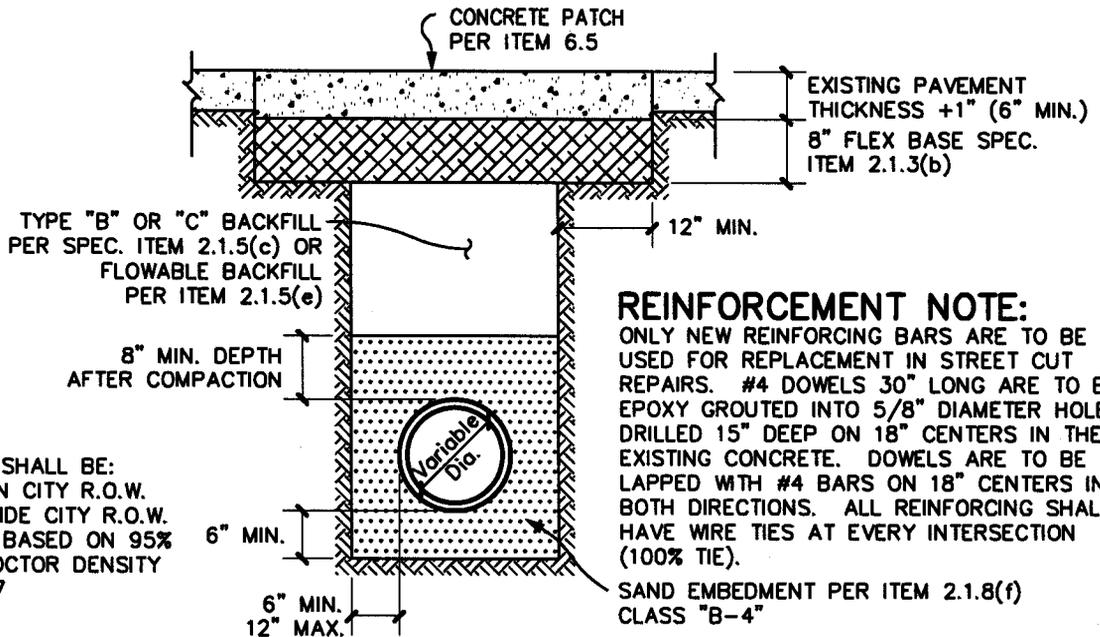
WATER SYSTEM CONSTRUCTION DETAILS  
STANDARD WATER LINE  
EMBEDMENT AND BACKFILL

REVISION DATE:  
APRIL 14, 2000

SHEET: **W-1A**



## EXISTING ASPHALT PAVEMENT



**REINFORCEMENT NOTE:**  
 ONLY NEW REINFORCING BARS ARE TO BE USED FOR REPLACEMENT IN STREET CUT REPAIRS. #4 DOWELS 30" LONG ARE TO BE EPOXY GROUTED INTO 5/8" DIAMETER HOLES DRILLED 15" DEEP ON 18" CENTERS IN THE EXISTING CONCRETE. DOWELS ARE TO BE LAPPED WITH #4 BARS ON 18" CENTERS IN BOTH DIRECTIONS. ALL REINFORCING SHALL HAVE WIRE TIES AT EVERY INTERSECTION (100% TIE).

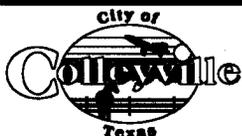
COMPACTION SHALL BE:  
 1) 95% WITHIN CITY R.O.W.  
 2) 95% OUTSIDE CITY R.O.W.  
 PERCENTAGE BASED ON 95% MODIFIED PROCTOR DENSITY ASTM D-1557

SAND EMBEDMENT PER ITEM 2.1.8(f)  
 CLASS "B-4"

**NOTES:**

## EXISTING CONCRETE PAVEMENT

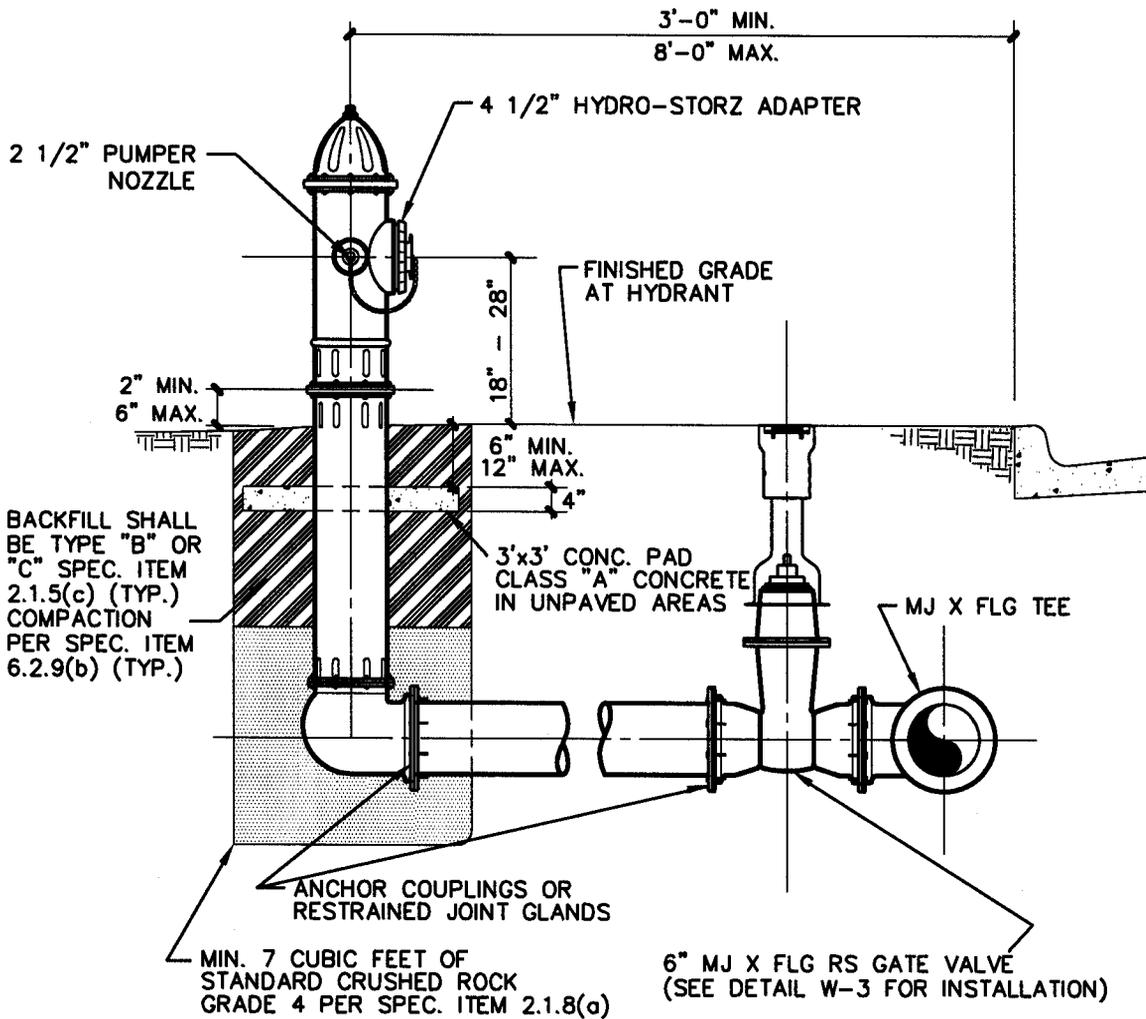
1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY AND TxDOT ROW UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9(b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW-CUT LINES PER SPEC ITEM 8.8.
4. COATED TRACER WIRE SHALL BE INSTALLED IN THE EMBEDMENT MATERIAL ABOVE THE PVC PIPE WITH THE TRACER WIRE TERMINATING IN IN-LINE GATE VALVE BOXES ACCESSIBLE BY CITY STAFF. BLUE UNDERGROUND WATER LINE WARNING TAPE OF MIN. 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
5. A MAXIMUM OF 300 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
6. THE CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING.



## WATER SYSTEM CONSTRUCTION DETAILS STANDARD WATER LINE EMBEDMENT AND BACKFILL

REVISION DATE:  
 APRIL 14, 2000

SHEET: **W-1B**



**NOTES:**

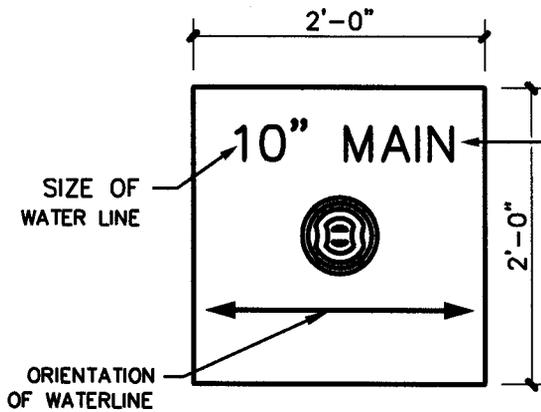
1. ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARD SPECIFICATIONS FOR FIRE HYDRANTS, C-502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN VALVE OPENING AND AN INSIDE BARREL DIAMETER OF APPROXIMATELY 7". ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF WATER MAIN.
3. FIRE HYDRANT NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (TYPICAL)
4. BURY DEPTH SHALL NOT EXCEED 7- FEET.
5. FIRE HYDRANT SHALL BE PLACED ON THE EXTENDED LOT LINE WHEN POSSIBLE.
6. ALL BELOW GROUND IRON ASSEMBLES SHALL BE WRAPPED IN POLYETHYLENE ACCORDING TO AWWA C105.
7. FIRE HYDRANT SHALL BE LOCATED A MINIMUM OF 1 FOOT OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADIUS AT THE INTERSECTIONS.
8. FIRE HYDRANT SHALL BE AT LEAST 42-INCHES FROM ANY ABOVE GROUND OBSTRUCTIONS, SUCH AS GUARDRAILS, RETAINING WALLS, BOLLARDS, ETC.
9. FIRE HYDRANTS SHALL BE MANUFACTURED BY MUELLER (CENTURION MUELLER A-423), WATROUS (PACER-100) OR CLOW.
10. ALL HYDRANTS SHALL OPEN BY TURNING THE OPERATING-STEM NUT TO THE LEFT (CCW) W/PENTAGONAL NUT. A CLEARLY VISIBLE CURVED ARROW AND THE WORD "OPEN" SHALL BE CAST IN RELIEF ON TOP OF THE HYDRANT TO INDICATE THE DIRECTION OF OPENING.
11. HYDRO-STORZ ADAPTER SHALL BE INSTALLED ON THE MAIN NOZZLE FOR ALL FIRE HYDRANTS.



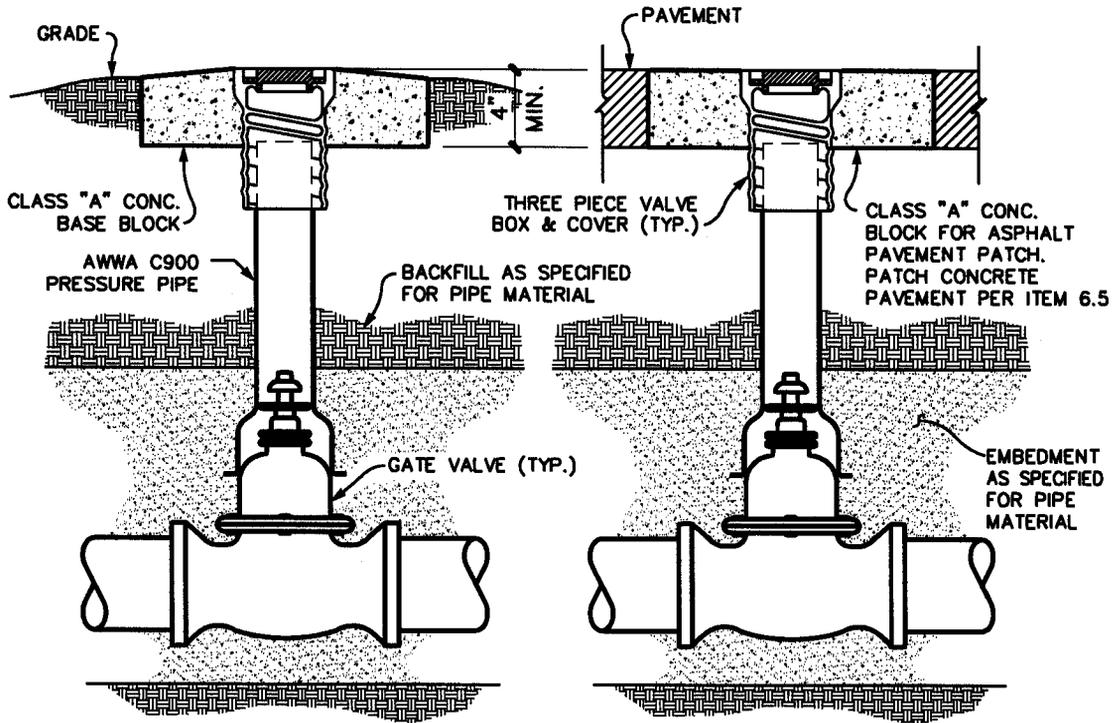
WATER SYSTEM CONSTRUCTION DETAILS  
**FIRE HYDRANT  
INSTALLATION**

REVISION DATE:  
APRIL 14, 2000

SHEET: **W-2**



LETTERS TO BE 3" HIGH, 2" WIDE, AND IMPRESSED 1/4" INTO CONCRETE. STROKE WIDTH SHALL BE 3/8". (TYPICAL ALL VALVE BLOCKS) (NO SEPARATE PAY). IF VALVE IS ON FIRE HYDRANT LEAD, INSERT F.H. INSTEAD OF MAIN.



**UNPAVED AREAS**

**PAVED AREAS**

**NOTES:**

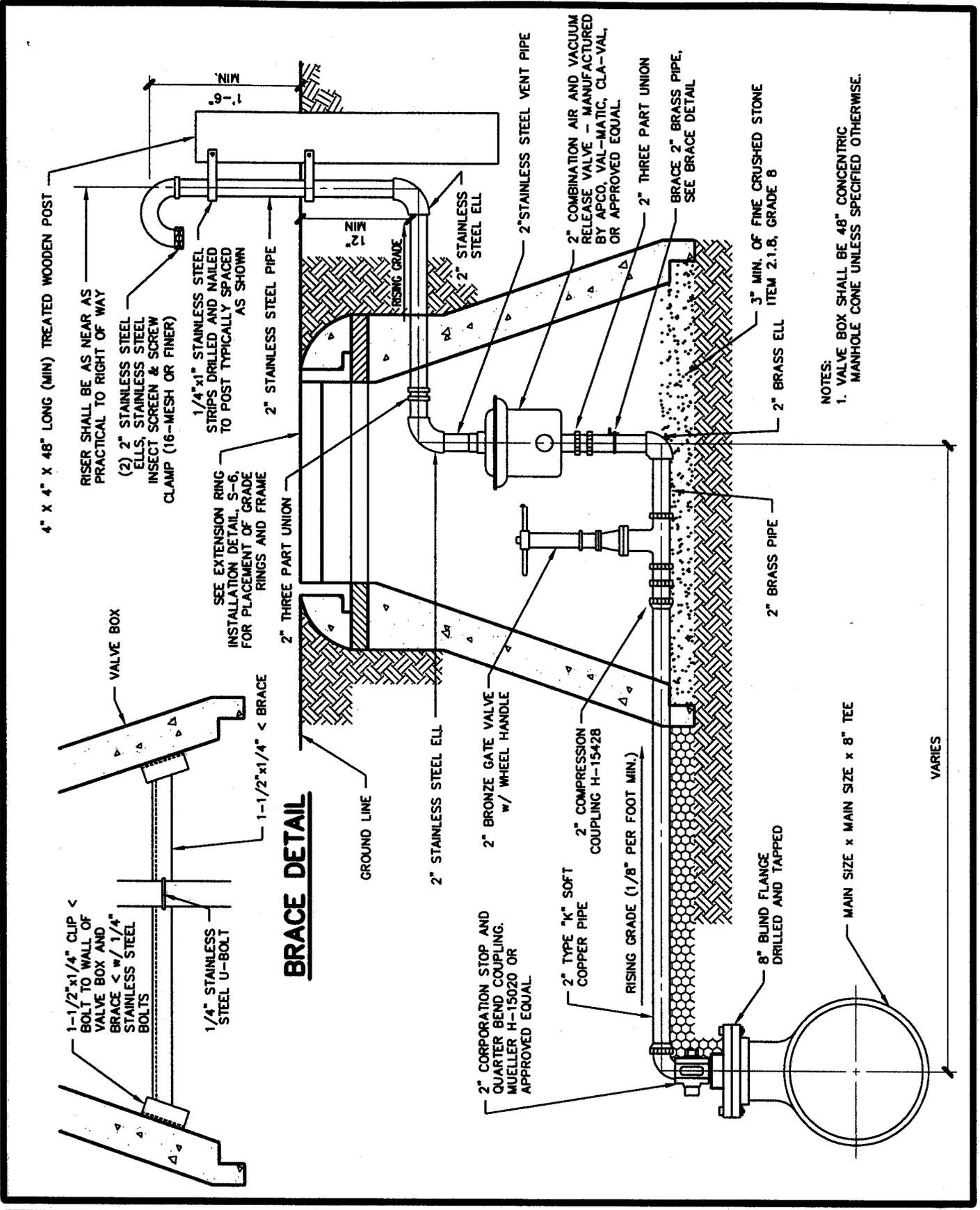
1. THE VALVE AND JOINT ASSEMBLIES SHALL BE WRAPPED IN POLYETHYLENE ACCORDING TO AWWA C105.
2. THE JOINT TYPE SHALL BE MECHANICAL JOINT UNLESS OTHERWISE SPECIFIED IN THE PLANS.
3. VALVE BOX SHALL BE TYLER PIPE 6850 SERIES OR APPROVED EQUAL.
4. GATE VALVE SHALL BE RESILIENT SEAT TYPE WITH A NON RISING STEM AND A 2-INCH SQUARE OPERATOR. RESILIENT SEAT GATE VALVE SHALL CONFORM TO AWWA C509.
5. A PERMANENTLY ATTACHED VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WITH AN OPERATING NUT LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE SUFFICIENT LENGTH TO ENSURE THAT ITS TOP IS WITHIN 4 FEET OF VALVE BOX LID.
6. 16" AND LARGER GATE VALVES REQUIRE CONCRETE BLOCK UNDER THE VALVE BODY.
7. ALL VALVE COVERS SHALL BE PAINTED BLUE.
8. A "V" SHALL BE SAW CUT IN THE CURB AT ALL VALVE LOCATIONS.
9. ALL GATE VALVES SHALL BE MANUFACTURED BY MUELLER, WATEROUS OR CLOW.
10. ALL VALVES SHALL OPEN LEFT.



**WATER SYSTEM CONSTRUCTION DETAILS  
GATE VALVE  
INSTALLATION**

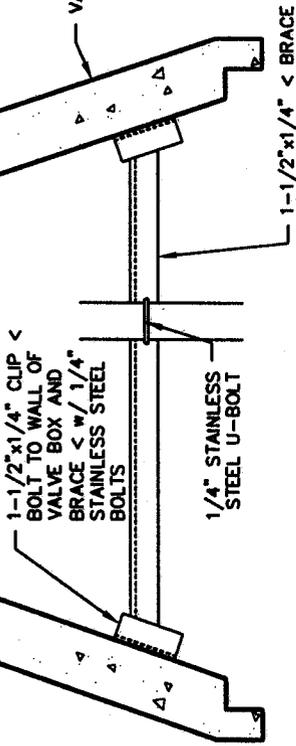
REVISION DATE:  
APRIL 14, 2000

SHEET: **W-3**



NOTES:  
 1. VALVE BOX SHALL BE 48" CONCENTRIC MANHOLE CONE UNLESS SPECIFIED OTHERWISE.

**BRACE DETAIL**

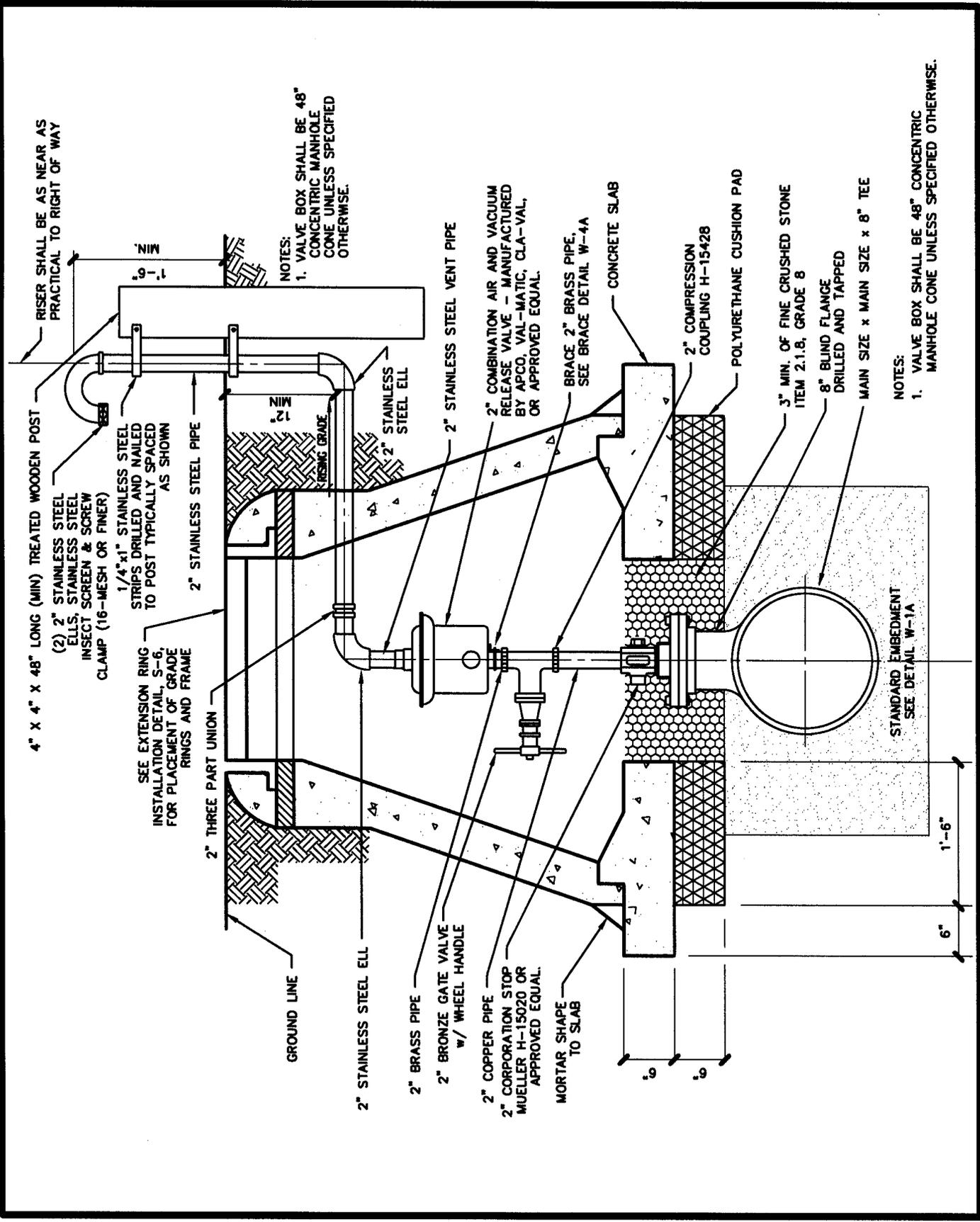


**WATER SYSTEM CONSTRUCTION DETAILS  
 AIR RELEASE VALVE ASSEMBLY  
 TYPE 1**

REVISION DATE:  
 APRIL 14, 2000

SHEET: **W-4A**

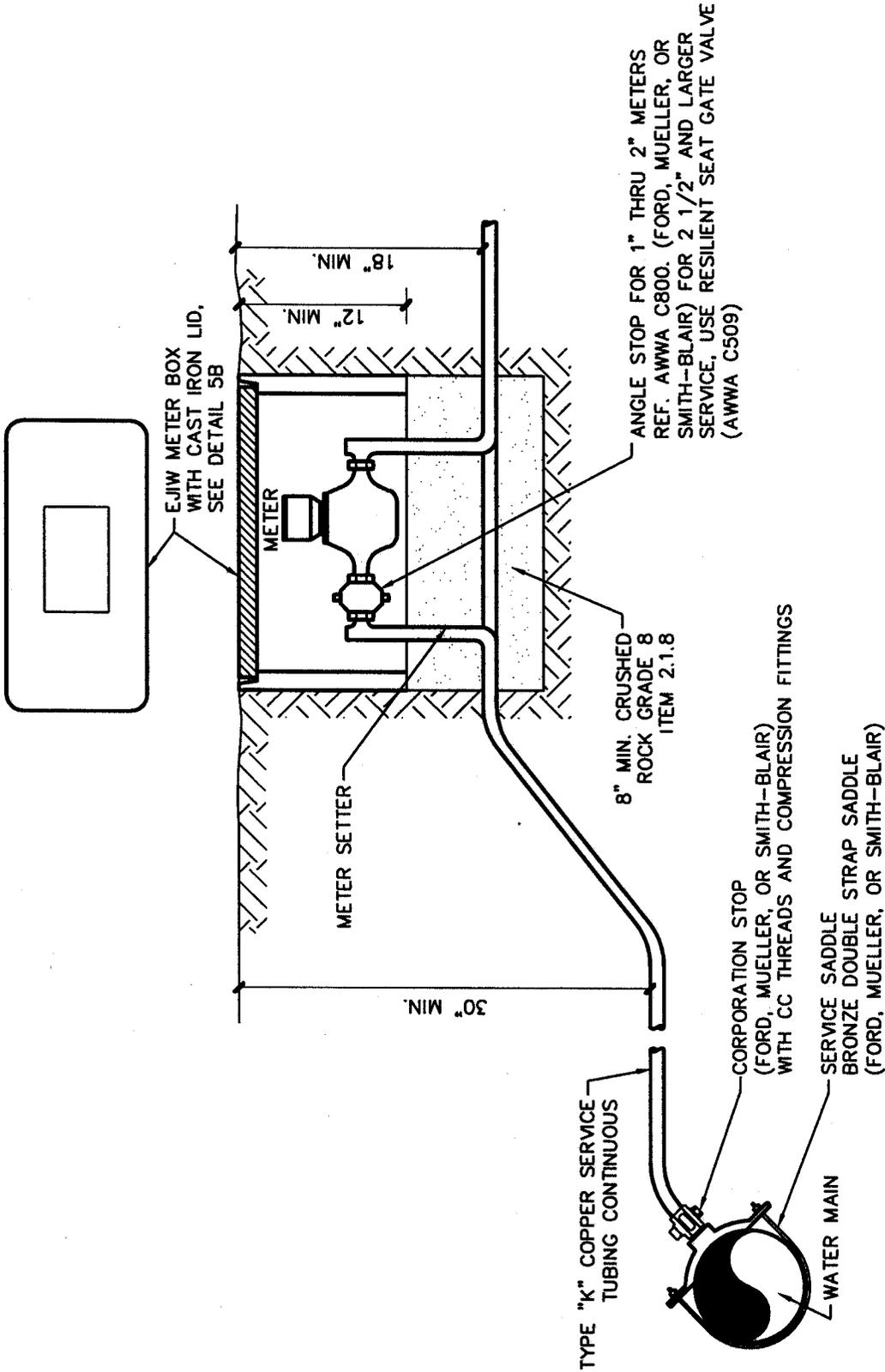




WATER SYSTEM CONSTRUCTION DETAILS  
 AIR RELEASE VALVE ASSEMBLY  
 TYPE 2

REVISION DATE:  
 APRIL 14, 2000

SHEET: **W-4B**



- NOTES:**
1. INSTALL ANGLE STOP FOR 1" THRU 2" METERS (AWWA C800) w/ LOCKING MECHANISM AND COMPRESSION FITTINGS. FOR 2.5" AND LARGER SERVICES, INSTALL RESILIENT-SEAT GATE VALVE (AWWA C509).
  2. METER BOX SHALL BE A MINIMUM OF 24" BEHIND THE BACK OF CURB WITH THE WATER SERVICE NOT LESS THAN 18" BELOW GRADE.
  3. SERVICES ALONG ROADWAYS WITHOUT CURB AND GUTTER SHALL BE LOCATED A MINIMUM OF 30" BELOW GRADE AND BE ENCASED (SEE DETAIL W-14).
  4. ALL WATER METERS SHALL BE SUPPLIED BY THE CITY.
  5. METER AND CUSTOMER LINE SHALL BE INSTALLED PRIOR TO CONSTRUCTION OF FACILITY BEING SERVED.



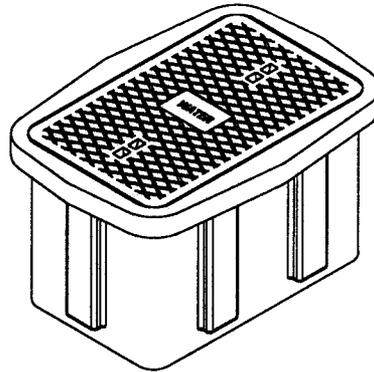
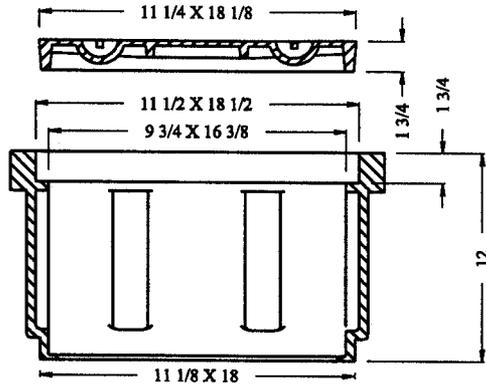
WATER SYSTEM CONSTRUCTION DETAILS

WATER SERVICE ASSEMBLY

REVISION DATE:  
APRIL 14, 2000

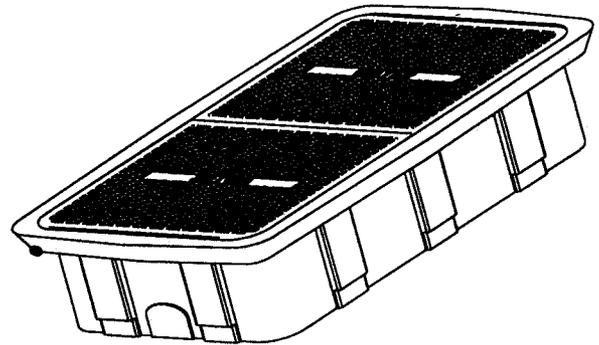
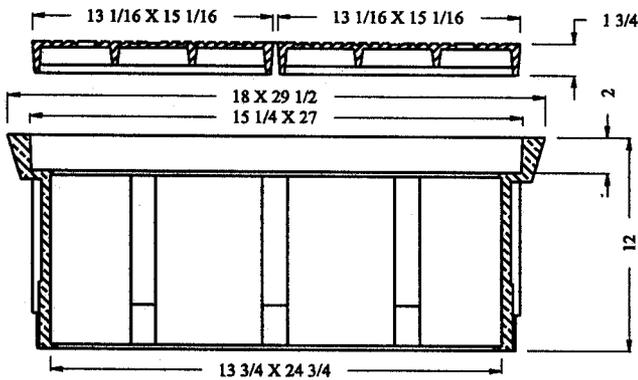
SHEET: **W-5A**

EAST JORDAN IRON WORKS #37-S PLASTIC BOX WITH CAST IRON LID  
 PRODUCT NO. - 32513702



SINGLE (1") METER BOX

EAST JORDAN IRON WORKS 15 X 27 PLASTIC BOX WITH 2 65T DUAL LIDS  
 PRODUCT NO. - 32513801



DOUBLE (1.5"-2") METER BOX

NOTES:

1. ALL DIMENSIONS IN INCHES.



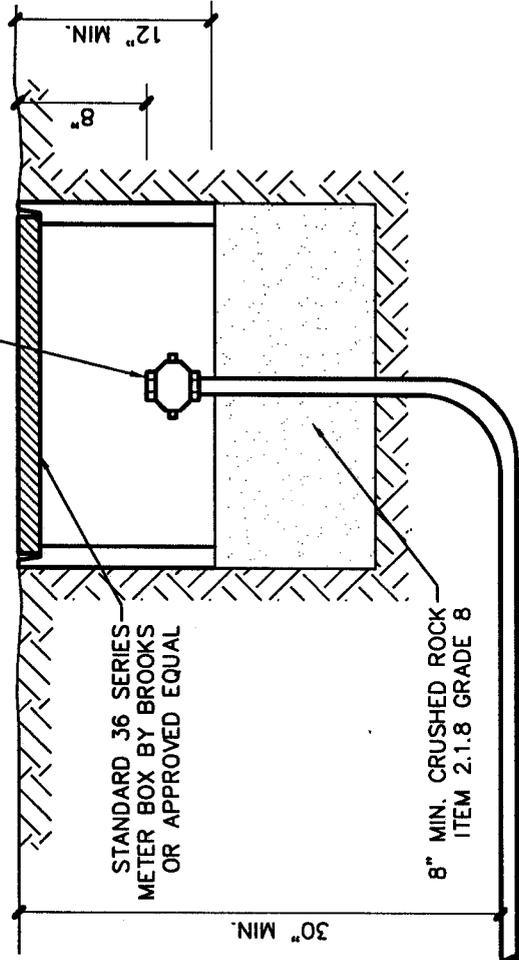
WATER SYSTEM CONSTRUCTION DETAILS

METER BOXES

REVISION DATE:  
 APRIL 14, 2000

SHEET: W-5B

CURB STOP FOR 3/4" THRU 2" METERS  
 REF. AWWA C800. (FORD B41-233H OR EQUAL)  
 FOR 2 1/2" AND LARGER SERVICE, USE  
 RESILIENT SEAT GATE VALVE (AWWA C509)



TYPE "K" COPPER SERVICE TUBING CONTINUOUS

STANDARD 36 SERIES METER BOX BY BROOKS OR APPROVED EQUAL

8" MIN. CRUSHED ROCK ITEM 2.1.8 GRADE 8

30" MIN.

12" MIN.

8"

CORPORATION STOP (FORD F-1000 OR EQUAL) WITH CC THREADS AND COMPRESSION FITTINGS

SERVICE SADDLE BRONZE DOUBLE STRAP SADDLE (FORD F-202B SERIES OR EQUAL)

WATER MAIN

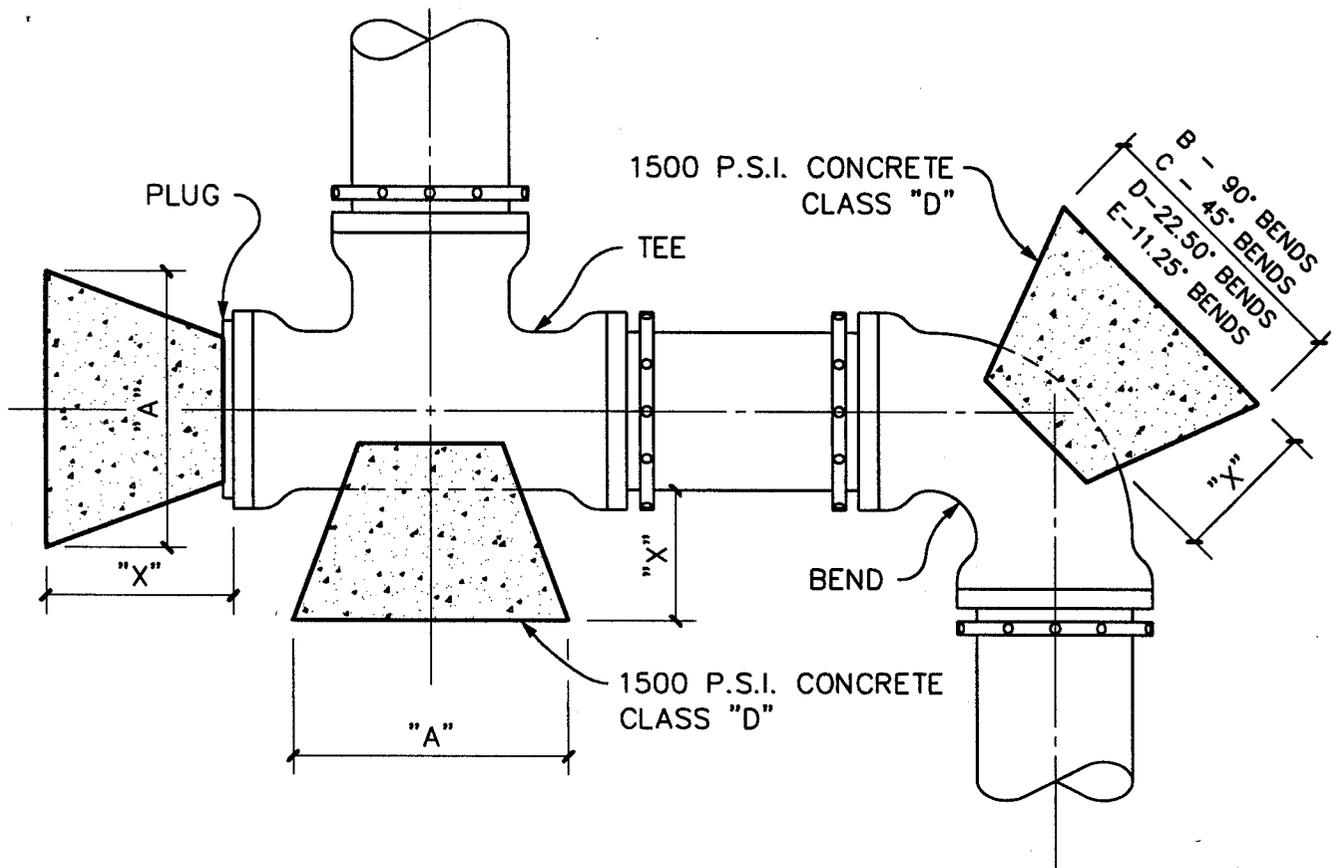
**NOTES:**  
 1. SERVICE SADDLE AND CORPORATION STOP SHALL BE PER WATER SERVICE ASSEMBLY.



WATER SYSTEM CONSTRUCTION DETAILS  
 FLUSHING VALVE  
 INSTALLATION

REVISION DATE:  
 APRIL 14, 2000

SHEET: **W-6**



### HORIZONTAL BLOCKING TABLE

DIMENSION "X" TO BE A MINIMUM OF (1) FOOT, BUT IS TO BE INCREASED WHERE NECESSARY TO PROVIDE BEARING AGAINST UNDISTURBED TRENCH WALL.

PIPE SIZE	"X" DIM.	PLUGS & TEES		90° BENDS		45° BENDS		22.50° BENDS		11.25° BENDS	
		"A"	MIN. AREA sf	"B"	MIN. AREA sf	"C"	MIN. AREA sf	"D"	MIN. AREA sf	"E"	MIN. AREA sf
6"	1'-6"	1'-0"	1.06	1'-2"	1.50	1'-0"	.83	1'-0"	.83	1'-0"	.83
8"	1'-6"	1'-3"	1.89	1'-6"	2.66	1'-3"	1.44	1'-0"	.83	1'-0"	.83
10"	1'-6"	1'-9"	2.95	2'-0"	4.17	1'-6"	2.26	1'-3"	1.15	1'-0"	.83
12"	1'-6"	2'-0"	4.25	2'-3"	6.00	1'-9"	3.25	1'-3"	1.65	1'-0"	.83
16"	2'-0"	2'-7"	7.54	3'-0"	10.65	2'-3"	5.76	1'-8"	2.94	1'-2"	1.48

#### NOTES:

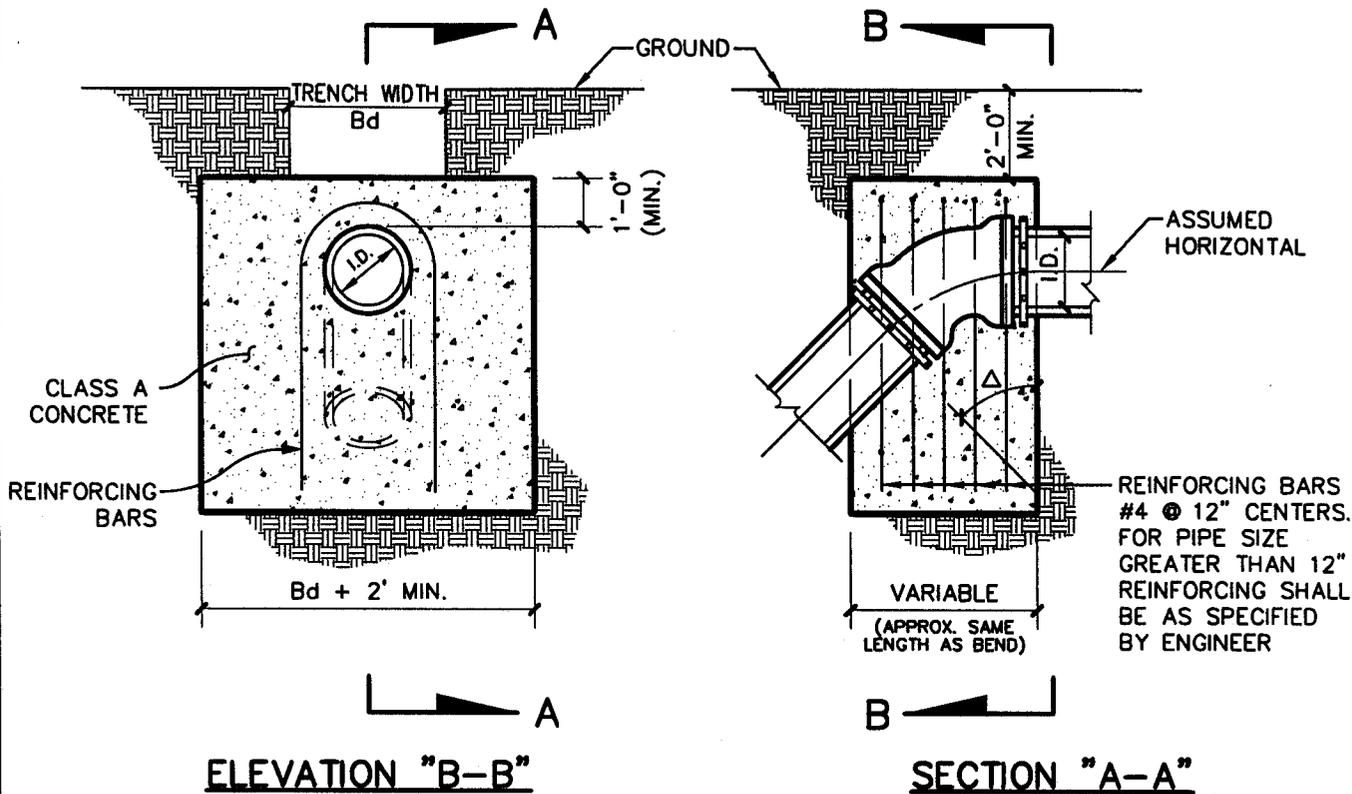
1. BEARING AREAS SHOWN ARE BASED ON 150 PSI TEST PRESSURE AND 3000 PSF ALLOWABLE SOIL BEARING PRESSURE.
2. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
3. ALL TEES, BENDS, PLUGS, ETC. SHALL BE MECHANICALLY RESTRAINED BY MEGALUG OR APPROVED EQUAL.



WATER SYSTEM CONSTRUCTION DETAILS  
HORIZONTAL BLOCKING

REVISION DATE:  
APRIL 14, 2000

SHEET: **W-7**



**VERTICAL THRUST BLOCK TABLE**

Δ →	11.25'		22.50'		30.00'		45.00'		67.50'		90.00'		← Δ
I.D. (IN.)	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

**NOTES:**

1. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
2. ALL TEES, BENDS, PLUGS, ETC. SHALL BE MECHANICALLY RESTRAINED BY MEGALUG OR APPROVED EQUAL.



WATER SYSTEM CONSTRUCTION DETAILS

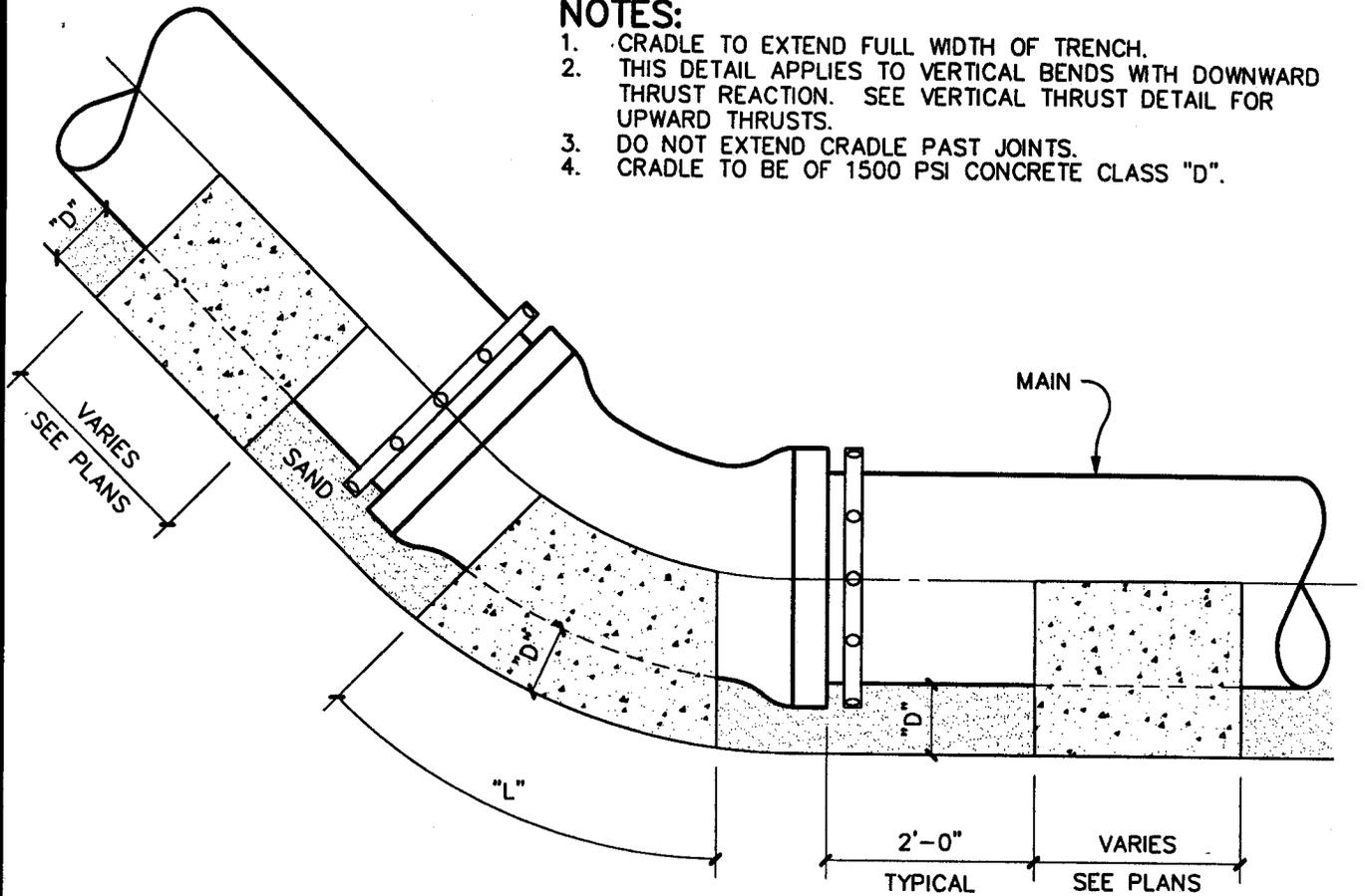
VERTICAL THRUST BLOCK

REVISION DATE:  
APRIL 14, 2000

SHEET: **W-8**

**NOTES:**

1. CRADLE TO EXTEND FULL WIDTH OF TRENCH.
2. THIS DETAIL APPLIES TO VERTICAL BENDS WITH DOWNWARD THRUST REACTION. SEE VERTICAL THRUST DETAIL FOR UPWARD THRUSTS.
3. DO NOT EXTEND CRADLE PAST JOINTS.
4. CRADLE TO BE OF 1500 PSI CONCRETE CLASS "D".



**CONCRETE CRADLE TABLE**

"D" = 6" MINIMUM OR TO UNDISTURBED SOIL

PIPE SIZE	90° BENDS		45° BENDS		22.50° BENDS		11.25° BENDS	
	"L"	MIN. AREA sf	"L"	MIN. AREA sf	"L"	MIN. AREA sf	"L"	MIN. AREA sf
6"	6"	1.50	1'-0"	.83	1'-0"	.83	1'-0"	.83
8"	1'-6"	2.66	1'-3"	1.44	1'-0"	.83	1'-0"	.83
10"	2'-0"	4.17	1'-6"	2.26	1'-3"	1.15	1'-0"	.83
12"	2'-3"	6.00	1'-9"	3.25	1'-3"	1.65	1'-0"	.83
16"	3'-0"	10.65	2'-3"	5.76	1'-8"	2.94	1'-2"	1.48

**NOTES:**

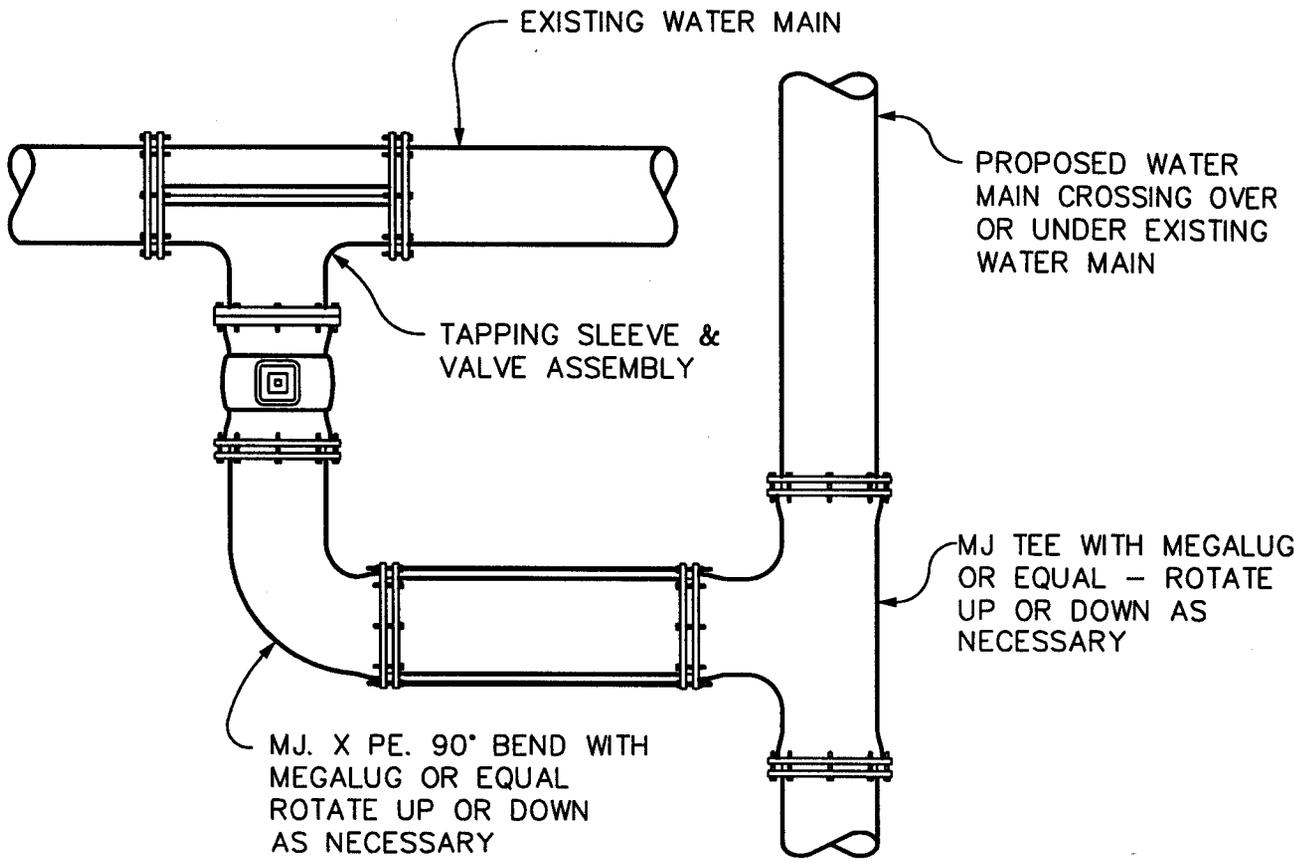
1. BEARING AREAS SHOWN ARE BASED ON 150 PSI TEST PRESSURE AND 3000 PSF ALLOWABLE SOIL BEARING PRESSURE.
2. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
3. ALL TEES, BENDS, PLUGS, ETC. SHALL BE MECHANICALLY RESTRAINED BY MEGALUG OR APPROVED EQUAL.



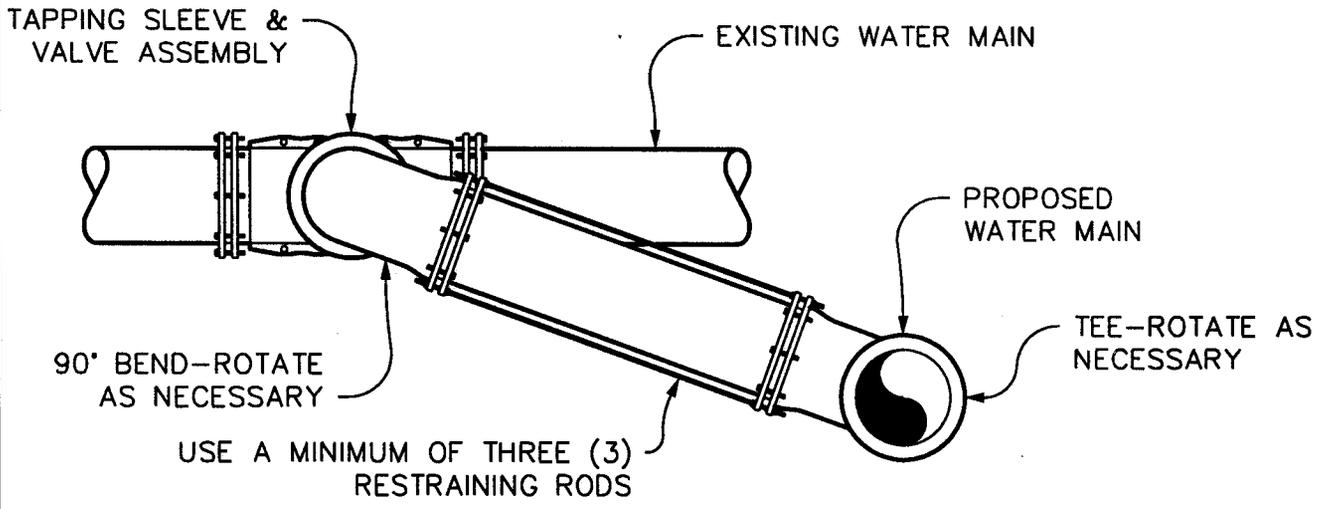
WATER SYSTEM CONSTRUCTION DETAILS  
**CONCRETE CRADLE AT  
 VERTICAL BENDS**

REVISION DATE:  
 APRIL 14, 2000

SHEET: **W-9**



**PLAN**



**SECTION**

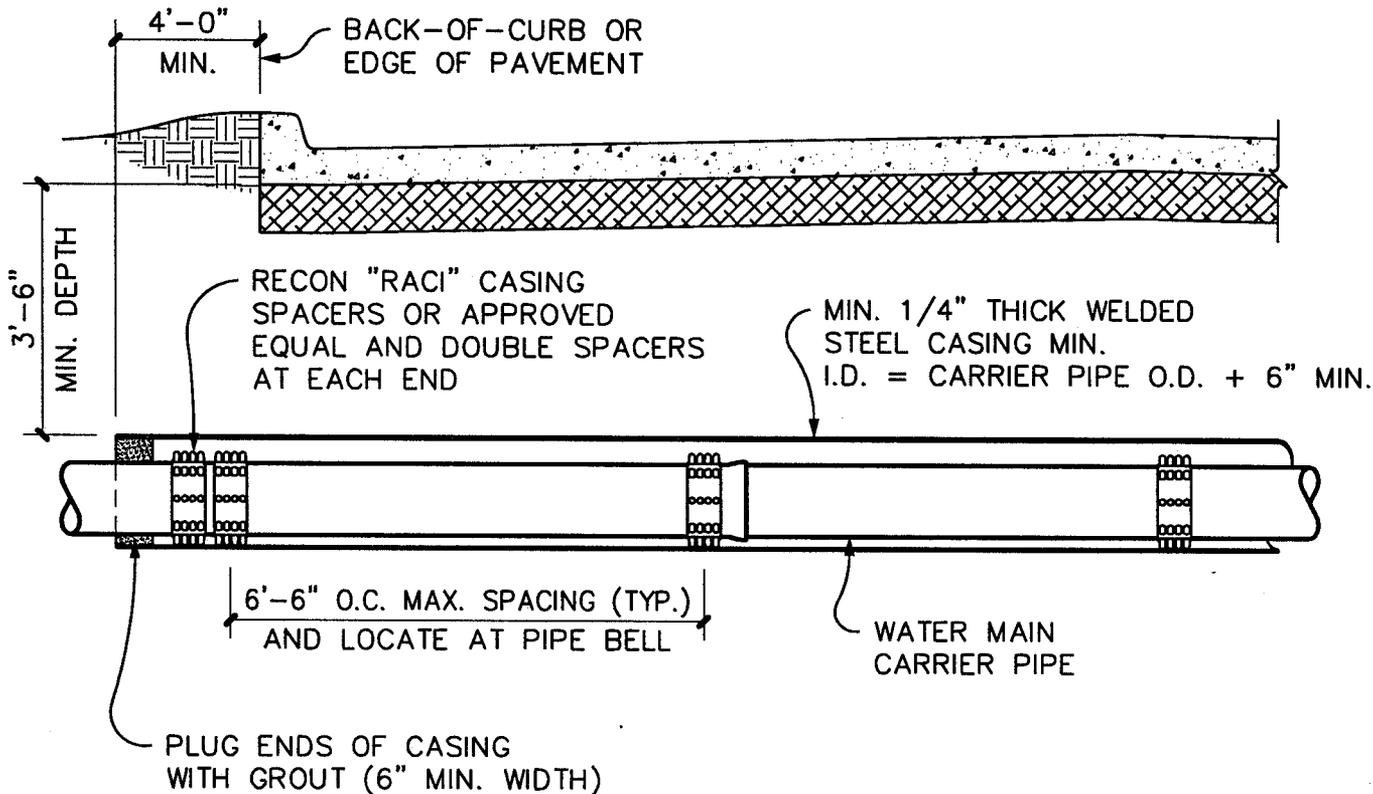
**NOTES:**

- 1. WRAP ALL BELOW GROUND ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.



WATER SYSTEM CONSTRUCTION DETAILS  
**TYPICAL RING CONNECTION**

REVISION DATE:  
 APRIL 14, 2000  
 SHEET: **W-10**



**NOTES:**

1. WHERE A BORE PIT EXCEEDS 5 FEET IN DEPTH THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY OSHA.
2. WHERE A BORE IS TO BE PARTIALLY OR COMPLETELY ABANDONED, SAID BORE SHALL BE COMPLETELY FILLED WITH HYDRAULICALLY PLACED CEMENT GROUT.
3. CASING SHALL BE EXTENDED TO THE RIGHT-OF-WAY LINE FOR STATE HIGHWAY AND RAILROAD CROSSINGS.
4. THE EDGE OF BORE PIT SHALL BE A MINIMUM OF 4' BEHIND THE BACK OF CURB OR EDGE OF PAVEMENT.



WATER SYSTEM CONSTRUCTION DETAILS  
**WATER LINE INSTALLATION**  
**BORE DETAIL**

REVISION DATE:  
 APRIL 14, 2000

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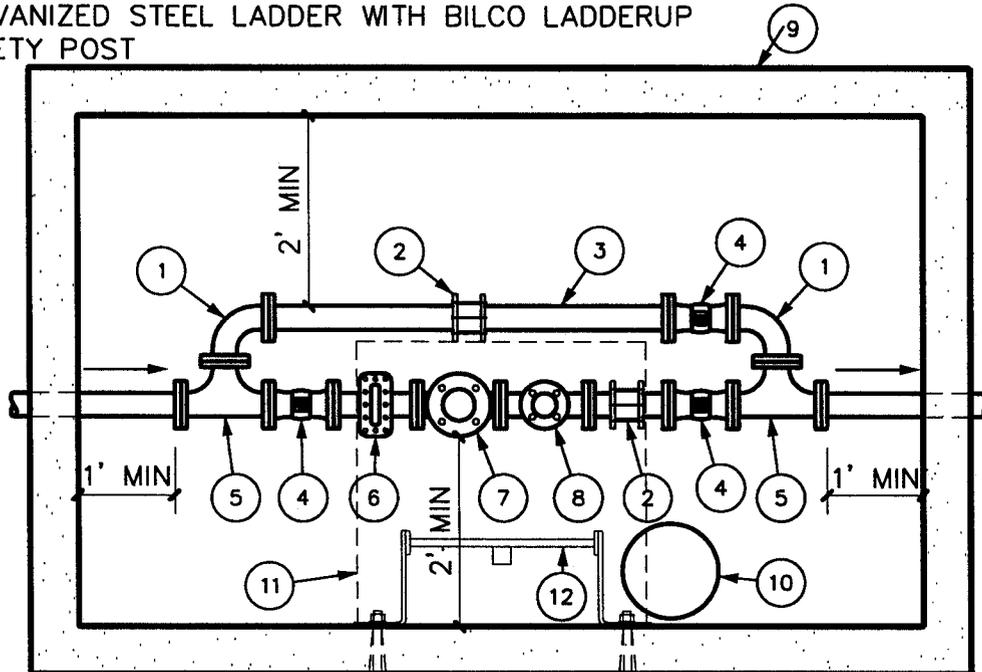
SHEET: **W-11**

# MATERIALS LIST:

- 1 - D.I. 90° BEND FLG. x FLG.
- 2 - RESTRAINED COUPLING OR EXPANSION JOINT
- 3 - BYPASS LINE
- 4 - GATE VALVE OS&Y W/ CHAIN & LOCK FLG. X FLG.
- 5 - D.I. TEE FLG. X FLG.
- 6 - STRAINER
- 7 - COMPOUND OR TURBINE METER
- 8 - TESTING TEE FLG. X FLG. WITH 2" GATE VALVE AND FLG. X THREADED END DISCHARGE PIPE
- 9 - PRECAST METER VAULT
- 10 - 12" SUMP x 24" DEEP (12" R.C.P. OR EQUAL)
- 11 - ACCESS DOOR
- 12 - GALVANIZED STEEL LADDER WITH BILCO LADDERUP SAFETY POST

# MINIMUM VAULT SIZE

METER	VAULT
3 INCH	6'X8'
4 INCH	6'X8'
6 INCH	8'X10'



## NOTES:

1. A J-4AL BILCO DOOR (3'x3') SHALL BE SPECIFIED FOR 3" AND 4" METER VAULTS. A JD-2AL BILCO DOOR (4'x4') SHALL BE SPECIFIED FOR 6" AND 8" METER VAULTS OR APPROVED EQUAL. DOOR SHALL BE DESIGNED FOR AASHTO H-20 WHERE APPLICABLE.
2. ALL VAULTS SHALL BE BROOKS, AMERICAN OR APPROVED EQUAL AND DESIGNED FOR AASHTO H-20 OR H-20-44 LIVE LOADS.
3. DOOR DRAIN SHALL BE PLUMBED TO OUTSIDE OF VAULT.
4. ALL WALL PENETRATIONS SHALL BE SEALED WITH LINK SEAL OR APPROVED EQUAL.
5. PIPE AND FITTINGS SHALL BE CONSTRUCTED A MIN. OF 1' ABOVE THE VAULT FLOOR. A CONCRETE PEDESTAL SHALL BE INSTALLED AT THE MID POINT OF THE PIPING ASSEMBLY FOR HORIZONTAL SUPPORT.
6. BYPASS LINE SHALL BE SAME SIZE AS MAIN LINE.
7. METERS SHALL BE CITY SPECIFIED



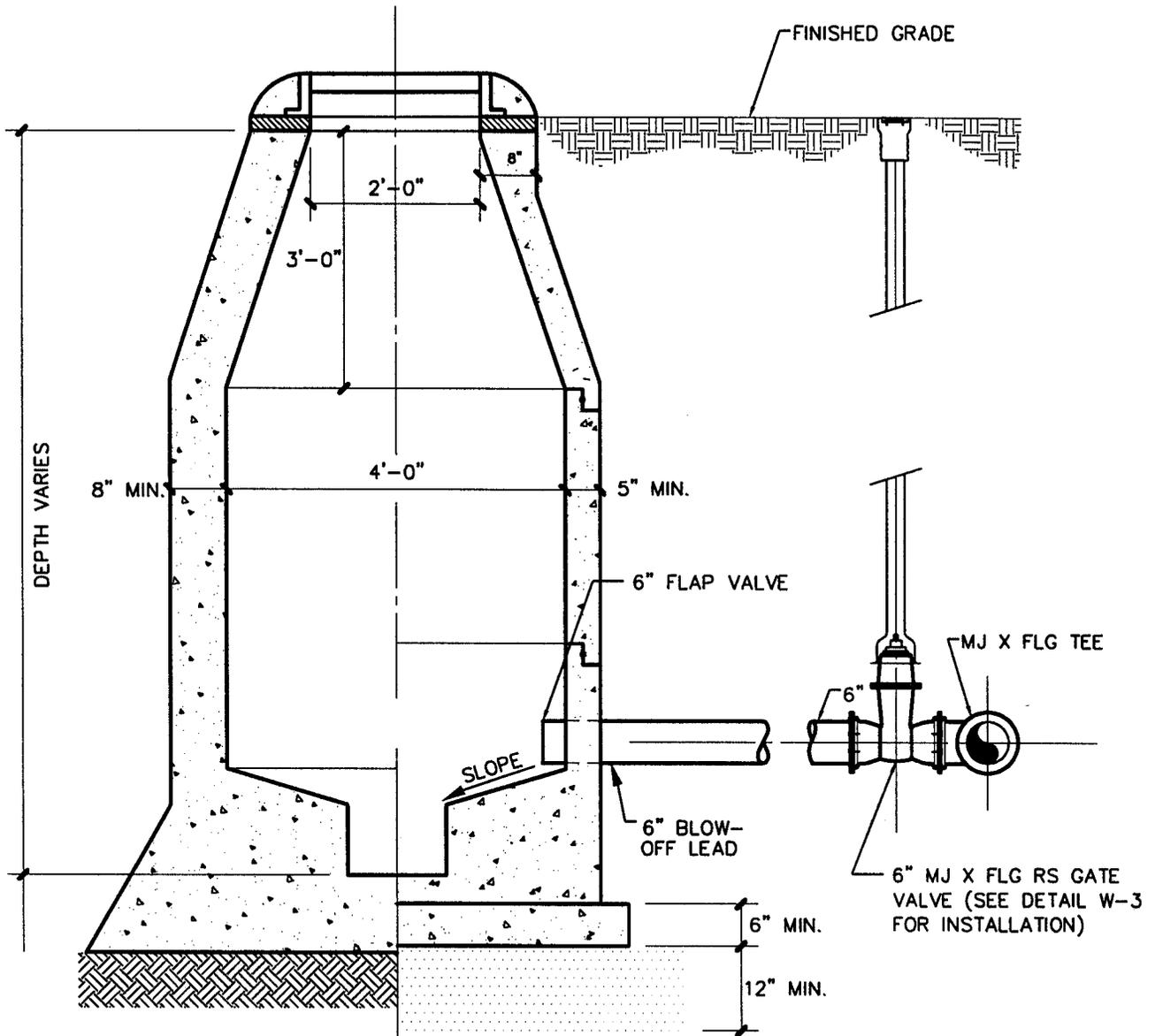
WATER SYSTEM CONSTRUCTION DETAILS

3" AND LARGER METER VAULT

REVISION DATE:  
APRIL 14, 2000

SHEET: W-12

MANHOLE MAY BE EITHER CAST-IN-PLACE OR PRECAST



CAST-IN-PLACE

PRECAST

1/2 SECTION

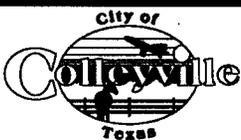
1/2 SECTION

SEE DETAIL S-3, CAST-IN-PLACE  
SANITARY SEWER MANHOLE

SEE DETAIL S-2, PRECAST  
SANITARY SEWER MANHOLE

NOTES:

1. LOCATE THE BLOW-OFF SUMP MANHOLE NEAR PROPERTY LINE WITHOUT DISRUPTION TO SERVICE LINES.
2. ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF THE WATER MAIN.
3. WATER STOP GASKETS SHALL BE PLACED ON ALL PENETRATIONS OF CONCRETE.

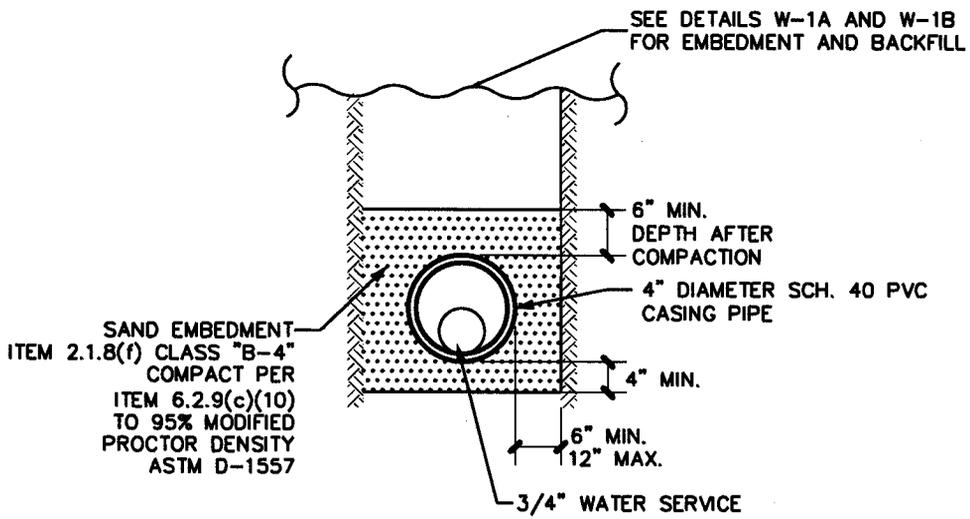


WATER SYSTEM CONSTRUCTION DETAILS

BLOW-OFF INSTALLATION

REVISION DATE:  
APRIL 14, 2000

SHEET: **W-13**

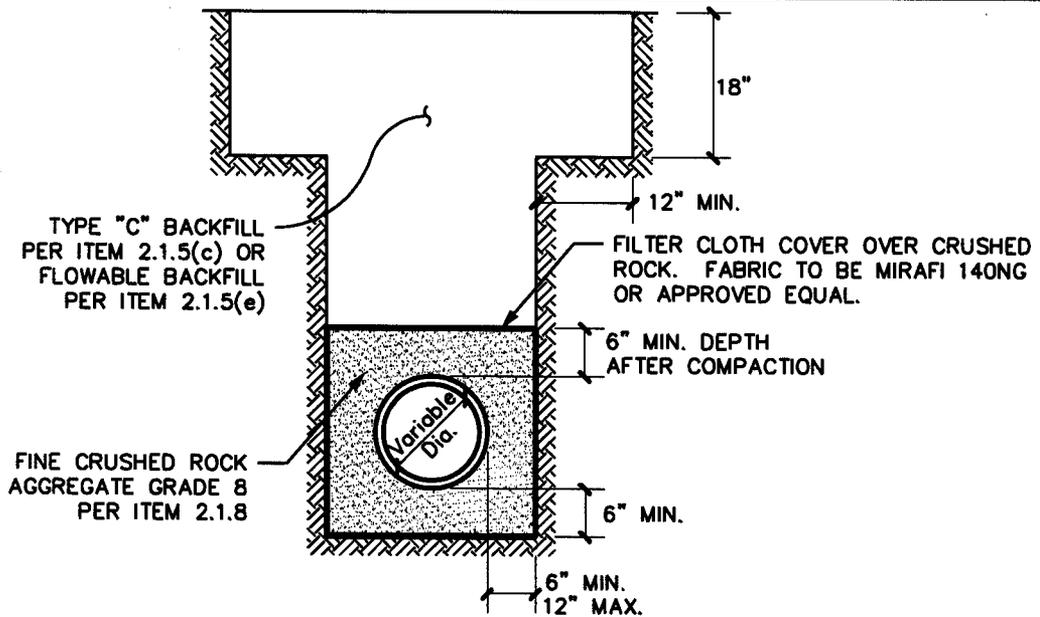


WATER SYSTEM CONSTRUCTION DETAILS

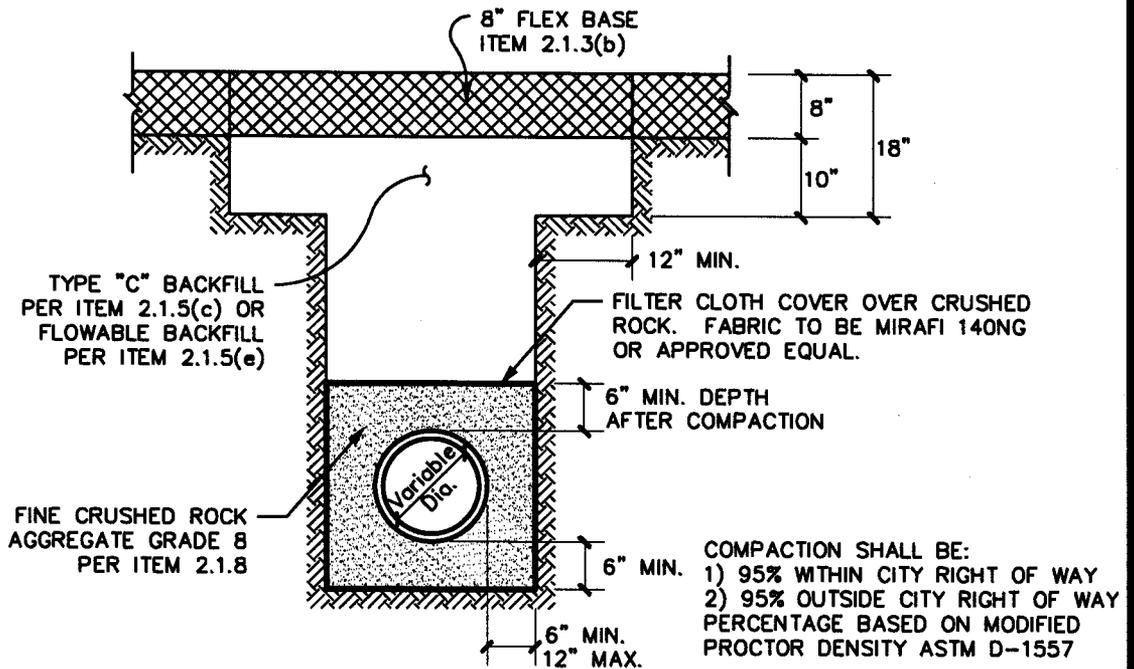
SERVICE LINE ENCASEMENT

REVISION DATE:  
APRIL 14, 2000

SHEET: **W-14**



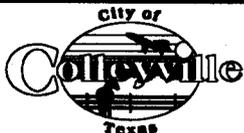
## UNPAVED AND FUTURE PAVED AREAS



### NOTES:

## EXISTING FLEXBASE SURFACE

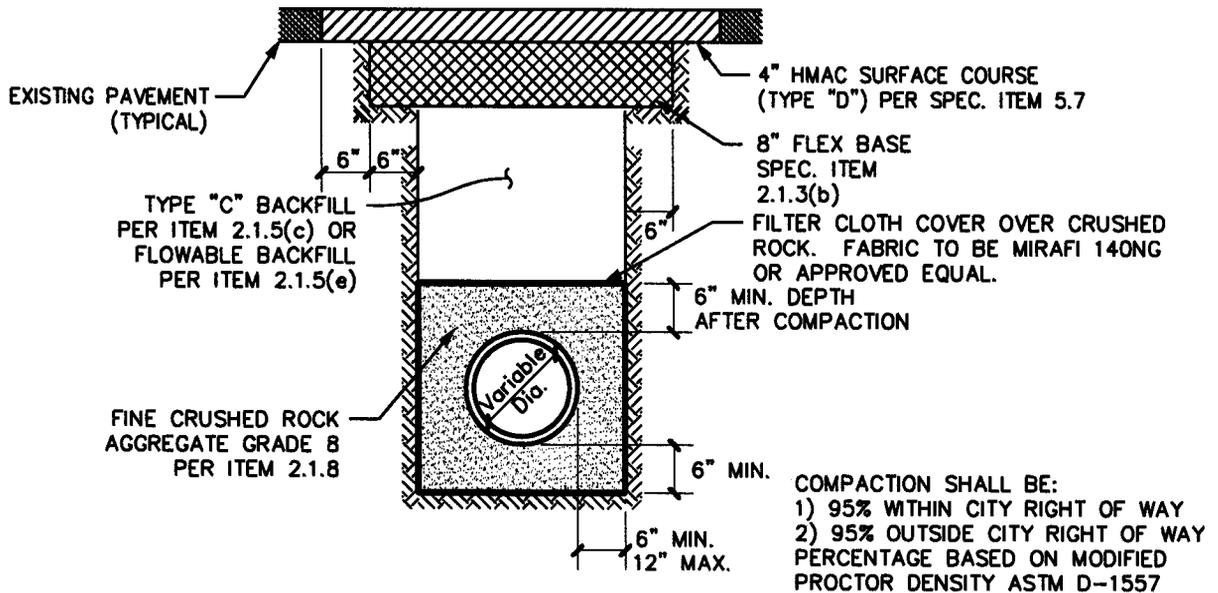
1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY AND TxDOT ROW UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9(b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW-CUT LINES PER SPEC ITEM 8.8.
4. COATED TRACER WIRE SHALL BE INSTALLED IN THE EMBEDMENT MATERIAL ABOVE ALL PVC PIPE.
5. A MAXIMUM OF 300 FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
6. THE CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING.
7. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.



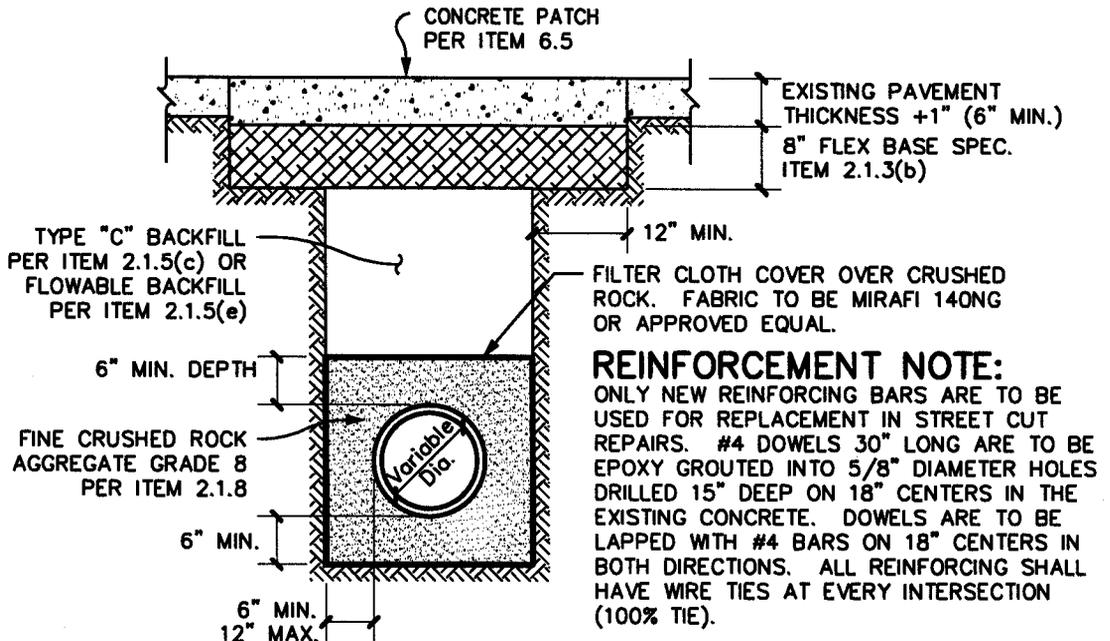
## SEWER SYSTEM CONSTRUCTION DETAILS STANDARD SANITARY SEWER EMBEDMENT AND BACKFILL

REVISION DATE:  
APRIL 14, 2000

SHEET: S-1A



## EXISTING ASPHALT PAVEMENT



### NOTES:

## EXISTING CONCRETE PAVEMENT

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY AND TxDOT ROW UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
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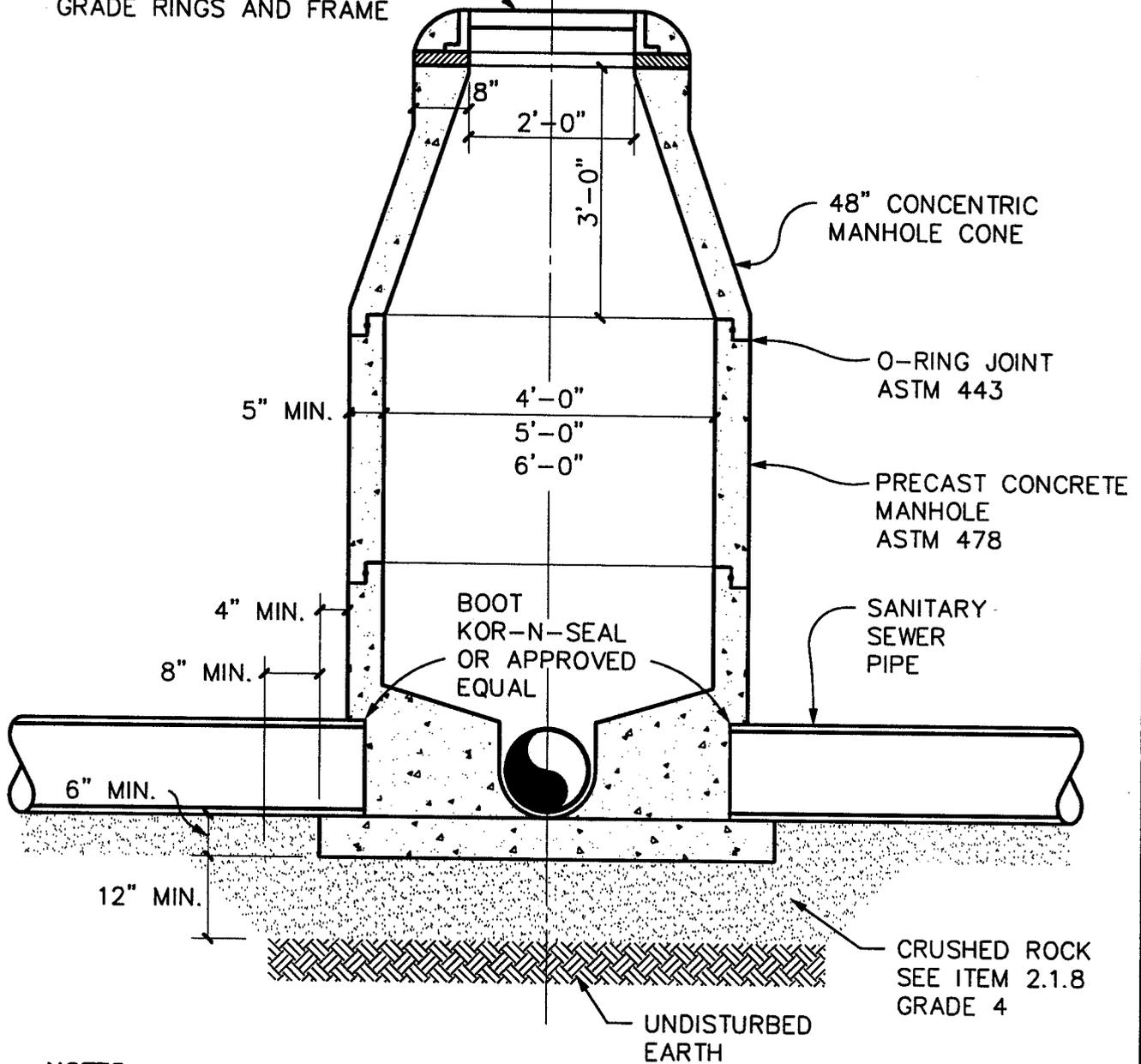


## SEWER SYSTEM CONSTRUCTION DETAILS STANDARD SANITARY SEWER EMBEDMENT AND BACKFILL

REVISION DATE:  
 APRIL 14, 2000

SHEET: S-1B

SEE EXTENSION RING  
INSTALLATION DETAIL  
FOR PLACEMENT OF  
GRADE RINGS AND FRAME



**NOTES:**

1. MAXIMUM CHIMNEY HEIGHT SHALL BE 12".
2. MANHOLES SHALL BE CONCENTRIC UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. TRANSITIONS TO 5' AND 6' BARREL DIAMETERS SHALL OCCUR JUST BELOW THE CONE SECTION.
4. INVERTS SHALL BE EQUAL TO OR GREATER THAN THE PIPE DIAMETER.
5. WATERSTOP GASKETS SHALL BE PLACED ON ALL PENETRATIONS OF CONCRETE.

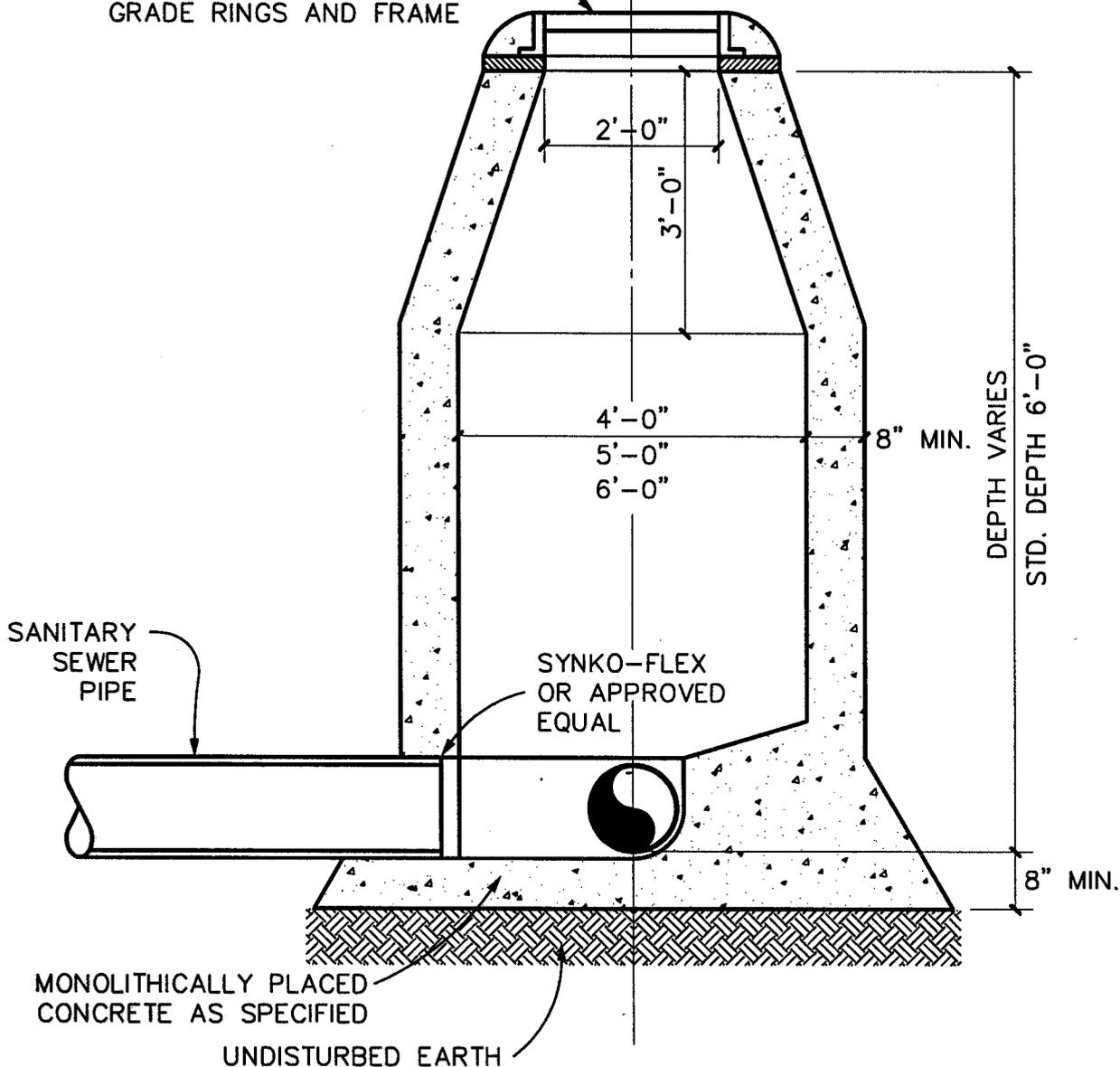


SEWER SYSTEM CONSTRUCTION DETAILS  
PRECAST SANITARY SEWER  
MANHOLE

REVISION DATE:  
APRIL 14, 2000

SHEET: S-2

SEE EXTENSION RING  
INSTALLATION DETAIL  
FOR PLACEMENT OF  
GRADE RINGS AND FRAME



**NOTES:**

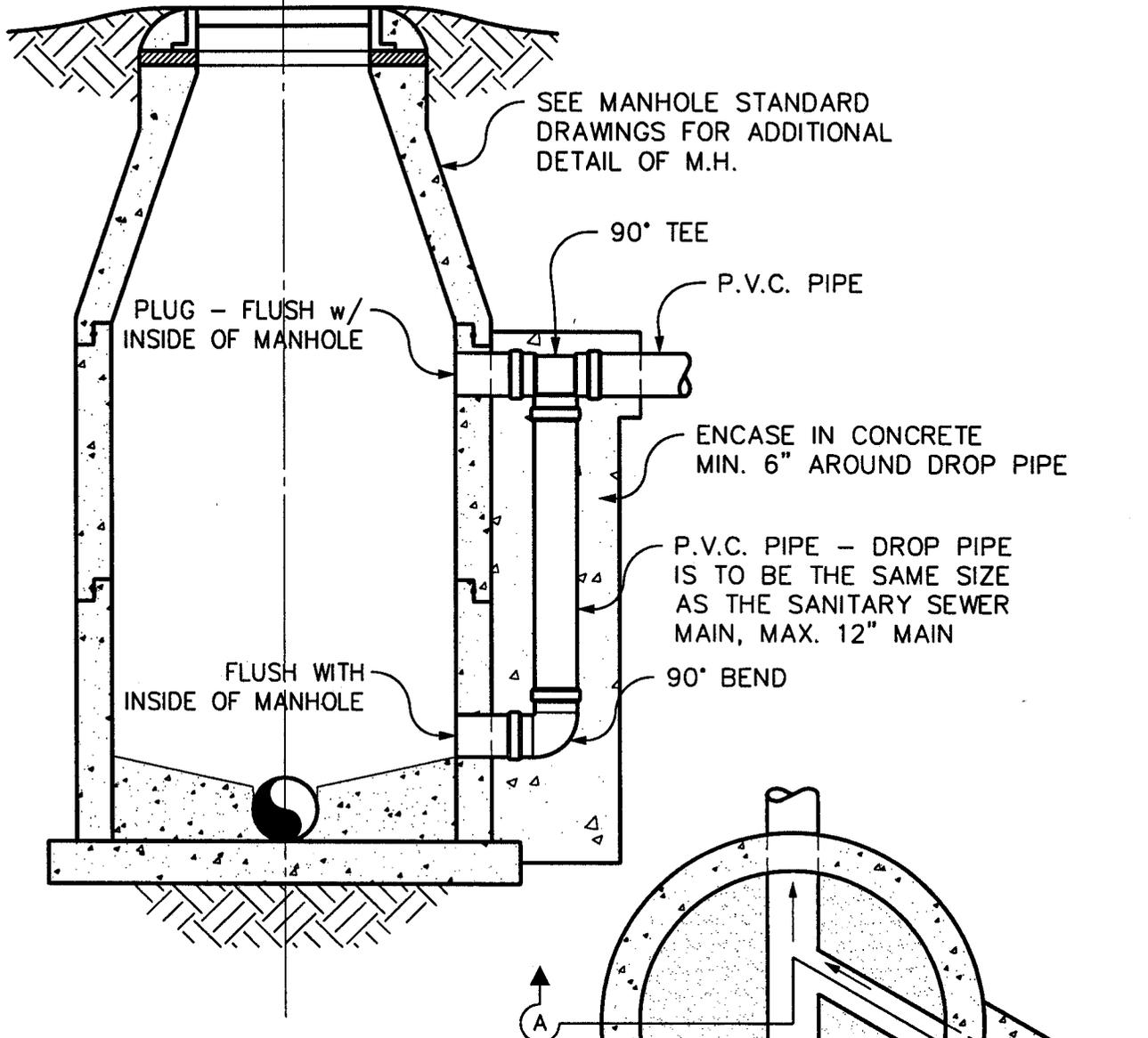
1. MAXIMUM CHIMNEY HEIGHT SHALL BE 12".
2. MANHOLES SHALL BE CONCENTRIC UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. INVERTS SHALL BE EQUAL TO OR GREATER THAN THE PIPE DIAMETER.
4. FOR MANHOLE DEPTHS GREATER THAN 12 FEET ADD AN ADDITIONAL 4" INCHES OF CONCRETE TO THE WALL THICKNESS FOR EACH ADDITIONAL 6 FEET OF DEPTH.
5. WATERSTOP GASKETS SHALL BE PLACED ON ALL PENETRATIONS OF CONCRETE.



SEWER SYSTEM CONSTRUCTION DETAILS  
**CAST-IN-PLACE**  
**SANITARY SEWER MANHOLE**

REVISION DATE:  
APRIL 14, 2000

SHEET: **S-3**



SEE MANHOLE STANDARD DRAWINGS FOR ADDITIONAL DETAIL OF M.H.

90° TEE

P.V.C. PIPE

PLUG - FLUSH w/ INSIDE OF MANHOLE

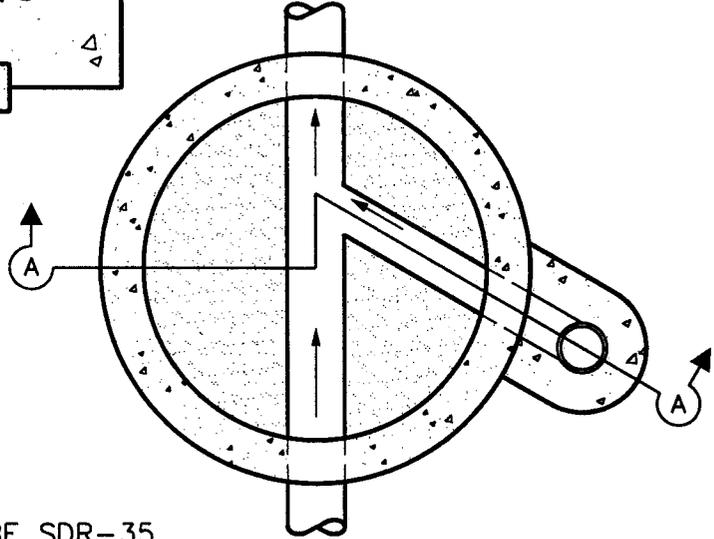
ENCASE IN CONCRETE MIN. 6" AROUND DROP PIPE

P.V.C. PIPE - DROP PIPE IS TO BE THE SAME SIZE AS THE SANITARY SEWER MAIN, MAX. 12" MAIN

FLUSH WITH INSIDE OF MANHOLE

90° BEND

**ELEVATION A**



**PLAN**

**NOTES:**

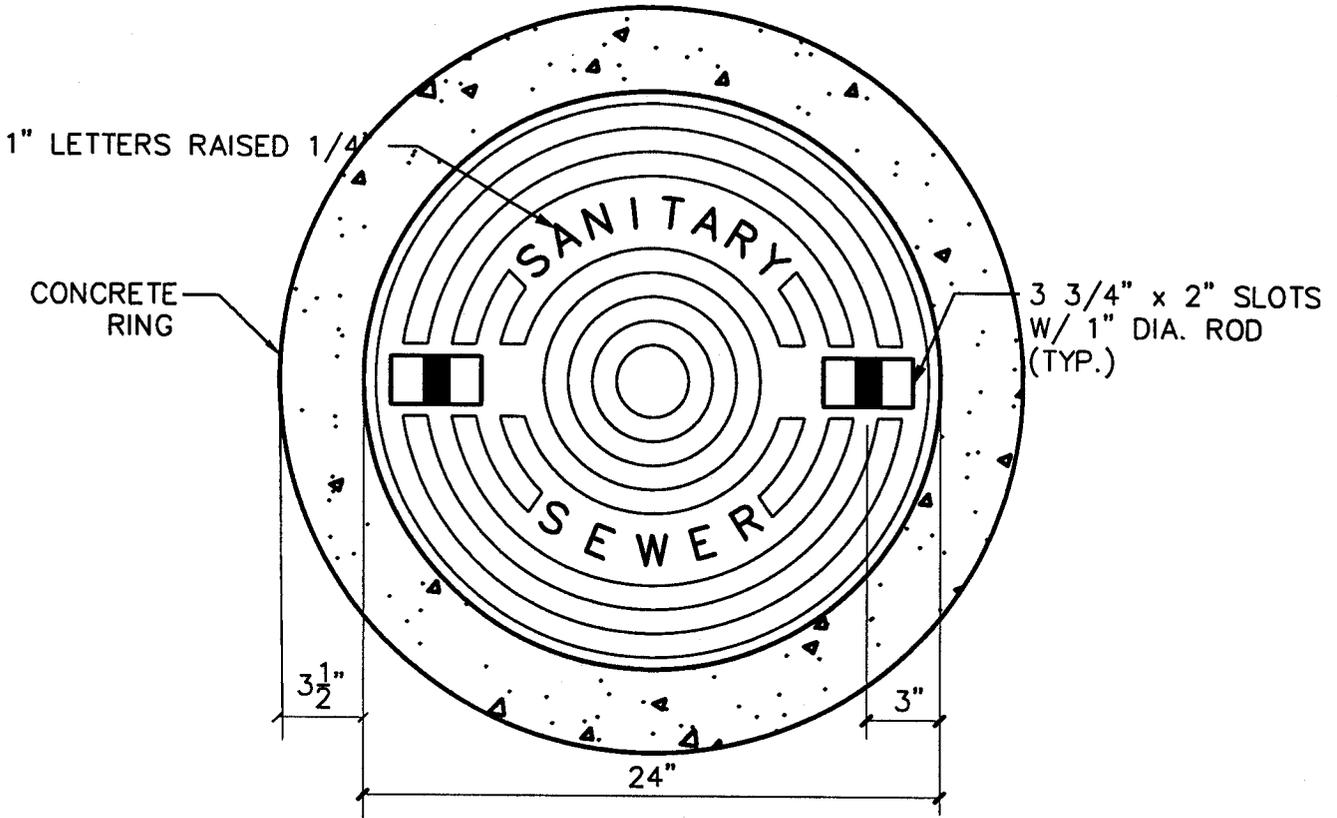
1. P.V.C. PIPE WITHIN MANHOLE SHALL BE SDR-35.
2. MANHOLE MAY BE EITHER PRECAST OR MONOLITHIC TYPE.
3.  $\frac{1}{2}$ " OF SURCHARGE LINE NORMALLY PLACED AT TOP OF EXISTING WASTEWATER LINE UNLESS NOTED OTHERWISE ON PLANS.



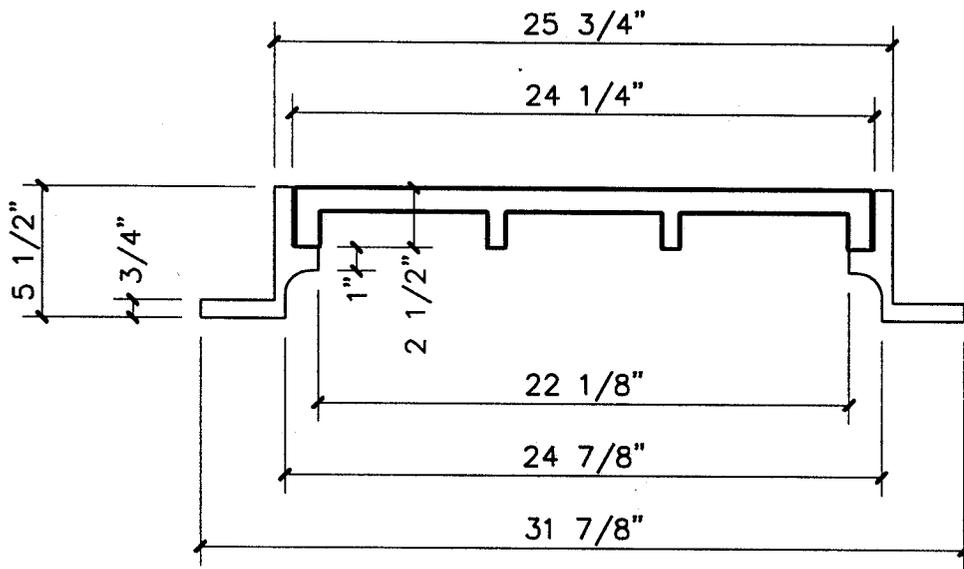
SEWER SYSTEM CONSTRUCTION DETAILS  
**DROP SANITARY SEWER  
 MANHOLE**

REVISION DATE:  
 APRIL 14, 2000

SHEET: **S-4**



COVER FACE



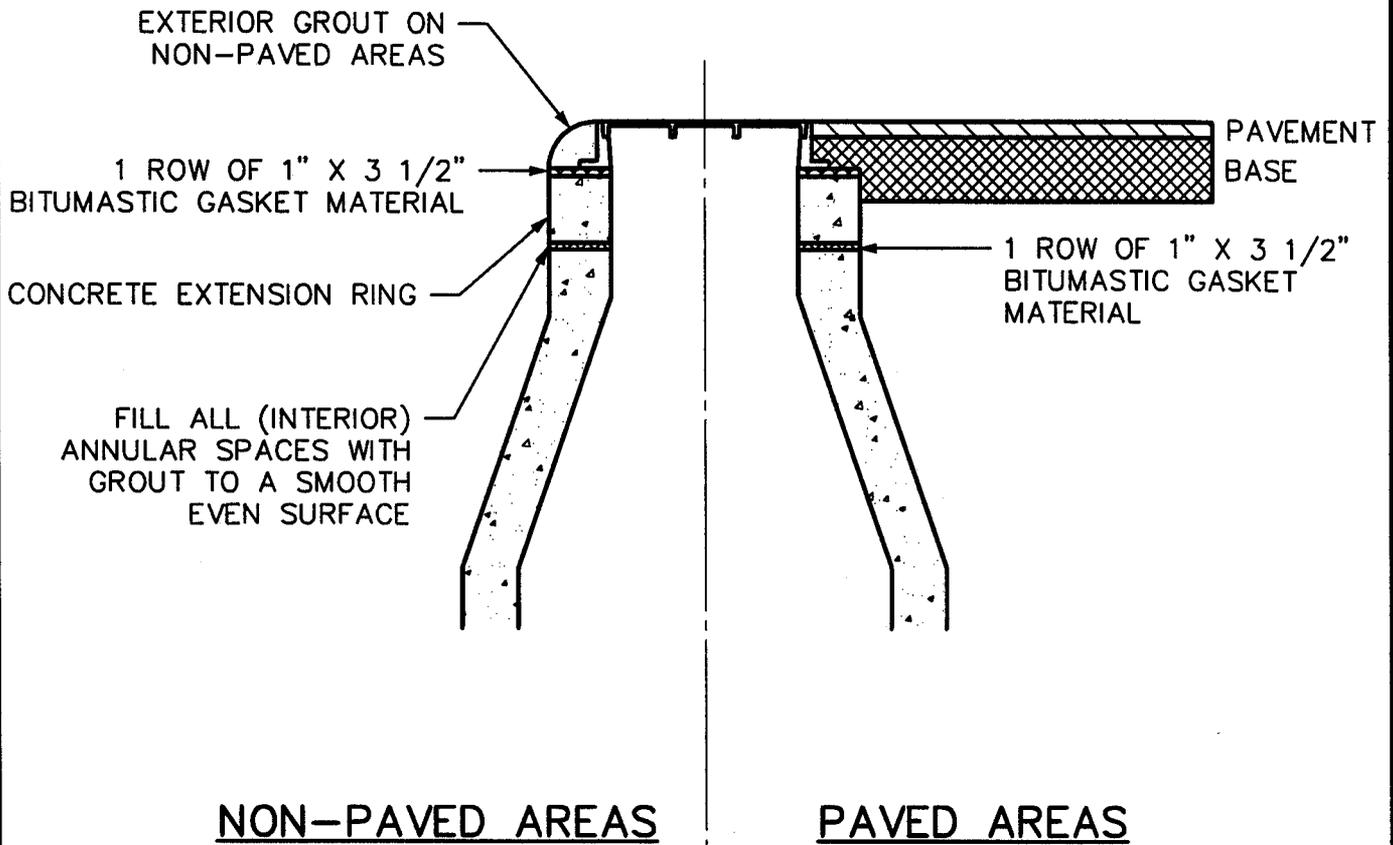
300 LB. X 24"  
FRAME AND COVER



SEWER SYSTEM CONSTRUCTION DETAILS  
MANHOLE FRAME AND COVER

REVISION DATE:  
APRIL 14, 2000

SHEET: S-5



**NOTES:**

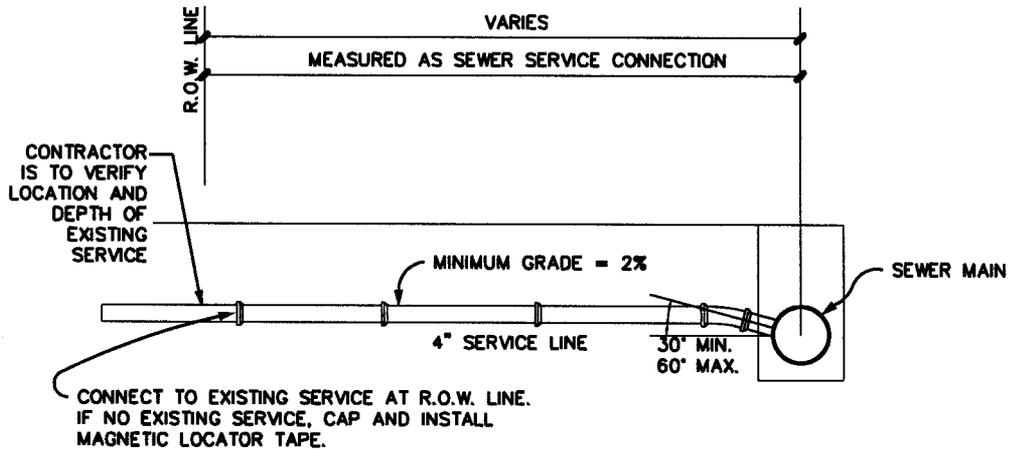
1. NO GAPS WILL BE ALLOWED IN BITUMASTIC GASKET.
2. THERE SHALL BE SMOOTH TRANSITION BETWEEN THE FRAME AND CONE OR GRADE RING, OR THE GRADE RING AND THE CONE.
3. CONCRETE EXTENSION RINGS MAY BE PRECAST OR CAST-IN-PLACE. BRICK EXTENSION RINGS WILL NOT BE ALLOWED.
4. STANDARD EXTENSIONS SHALL BE 2", 3", 4", 6", AND 12". EXTENSIONS SHALL BE SIZED TO MINIMIZE THE NUMBER REQUIRED TO RAISE THE MANHOLE. NO MORE THAN 1-2" EXTENSION WILL BE ALLOWED ON ANY MANHOLE.



SEWER SYSTEM CONSTRUCTION DETAILS  
EXTENSION RING INSTALLATION

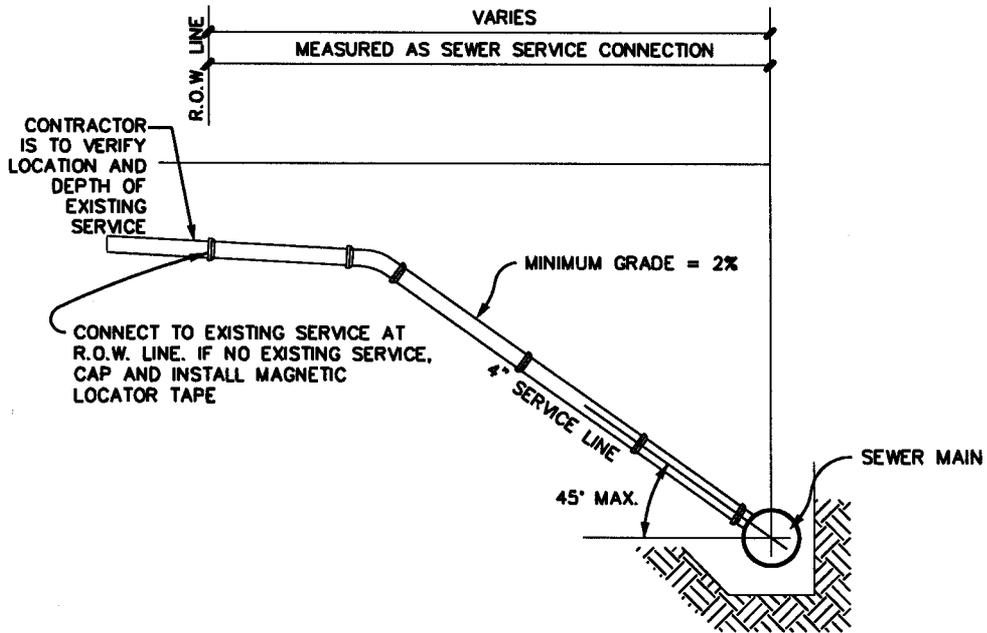
REVISION DATE:  
APRIL 14, 2000

SHEET: **S-6**



**STANDARD SEWER CONNECTION DETAIL**

NOTE: EITHER WYE FITTING OR WYE SADDLE MAY BE USED FOR CONNECTION. NO TEES WILL BE ALLOWED. ALL PIPE AND FITTINGS REQUIRED SHALL BE CONSIDERED SUBSIDIARY TO THE ITEM "SEWER SERVICE CONNECTIONS". NO DEDUCTION FROM THE LENGTH OF SEWER MAIN WILL BE MADE FOR THE LENGTH OF WYE, IF INSTALLED. CONNECTIONS TO SEWER MAINS FROM 0' TO 7' DEEP SHALL CONFORM TO THE STANDARD SEWER CONNECTION DETAIL. CONNECTIONS TO SEWER MAINS DEEPER THAN 7' SHALL CONFORM TO THE DEEP SEWER CONNECTION DETAIL. ALL CONNECTIONS SHALL BE COUNTED AS "SEWER SERVICE CONNECTIONS" REGARDLESS OF DEPTH.



**DEEP SEWER CONNECTION DETAIL**



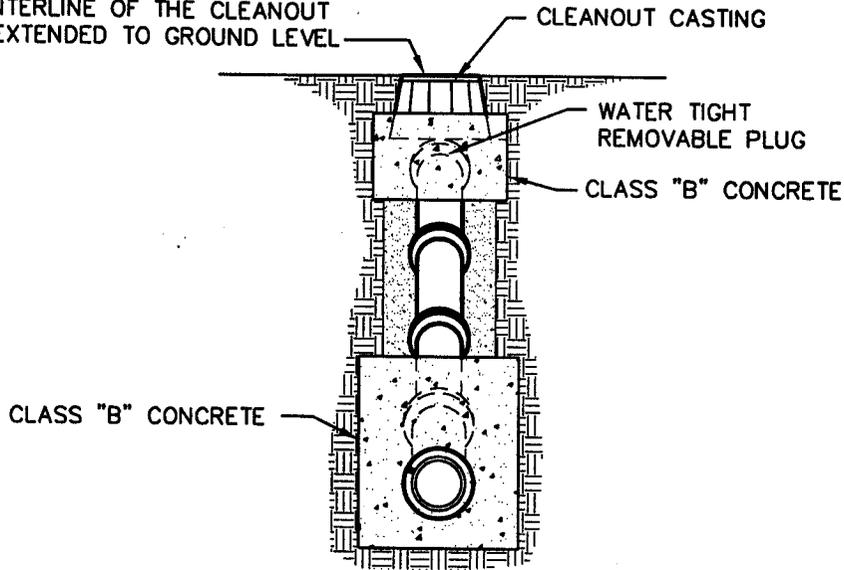
SEWER SYSTEM CONSTRUCTION DETAILS

**4" SANITARY SEWER SERVICE**

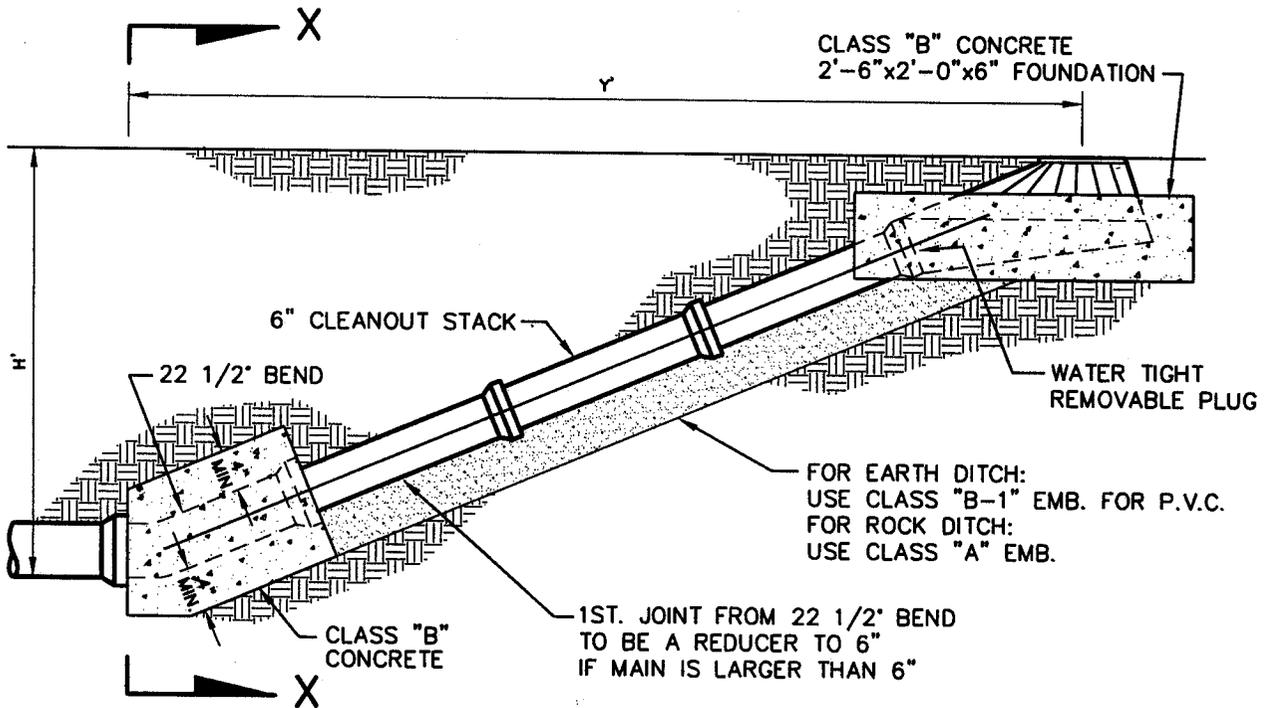
REVISION DATE:  
APRIL 14, 2000

SHEET: **S-7**

CLEANOUT CASTING OPENING TO BE INSTALLED CENTERED OVER THE CENTERLINE OF THE CLEANOUT STACK EXTENDED TO GROUND LEVEL



**SECTION "X-X"**



**PROFILE VIEW**

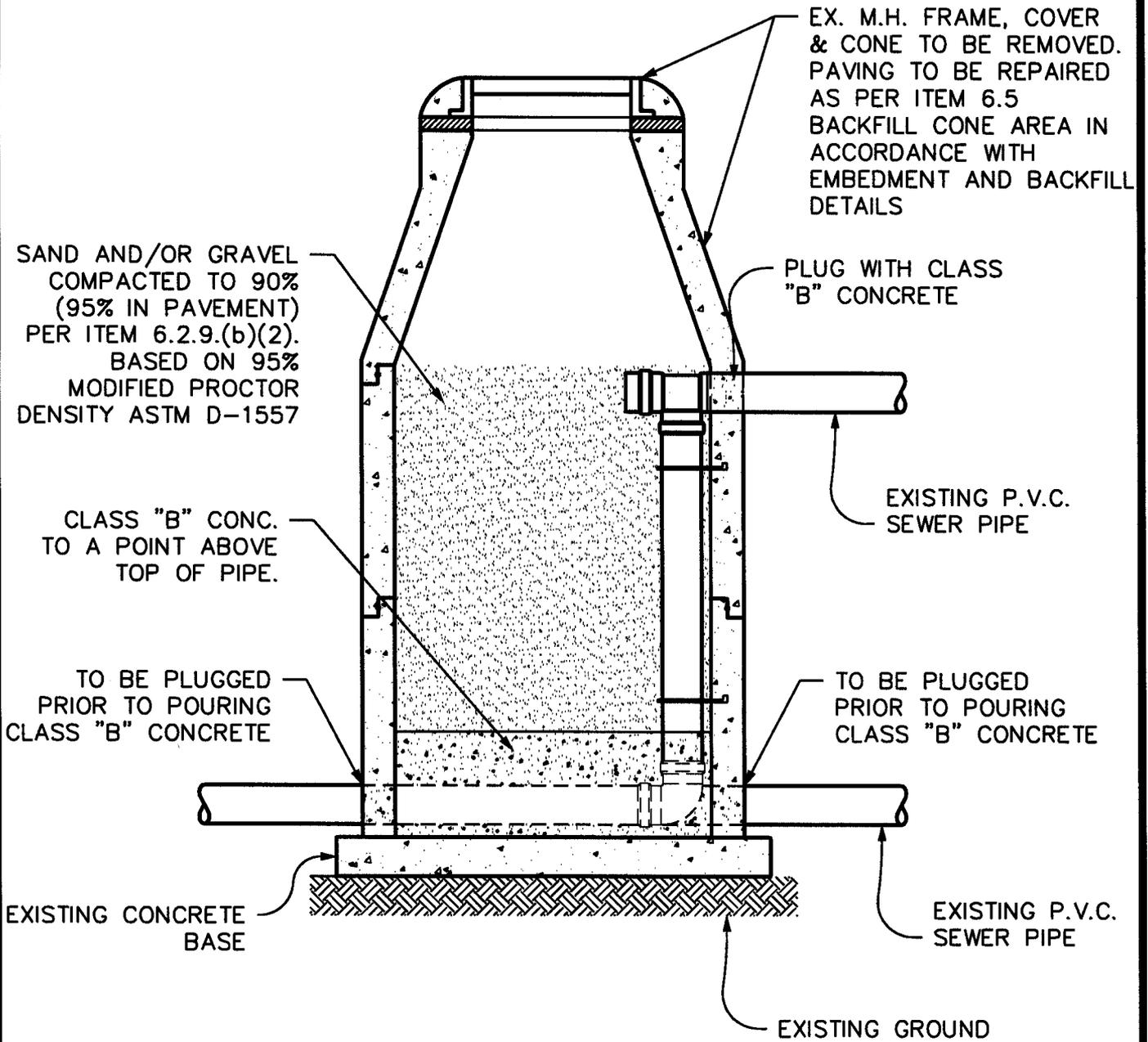
H'	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	H'
Y'	10	12	14	17	19	22	24	27	29	31	34	36	39	41	43	46	48	Y'



SEWER SYSTEM CONSTRUCTION DETAILS  
**SANITARY SEWER MAIN LINE  
 CLEANOUT**

REVISION DATE:  
 APRIL 14, 2000

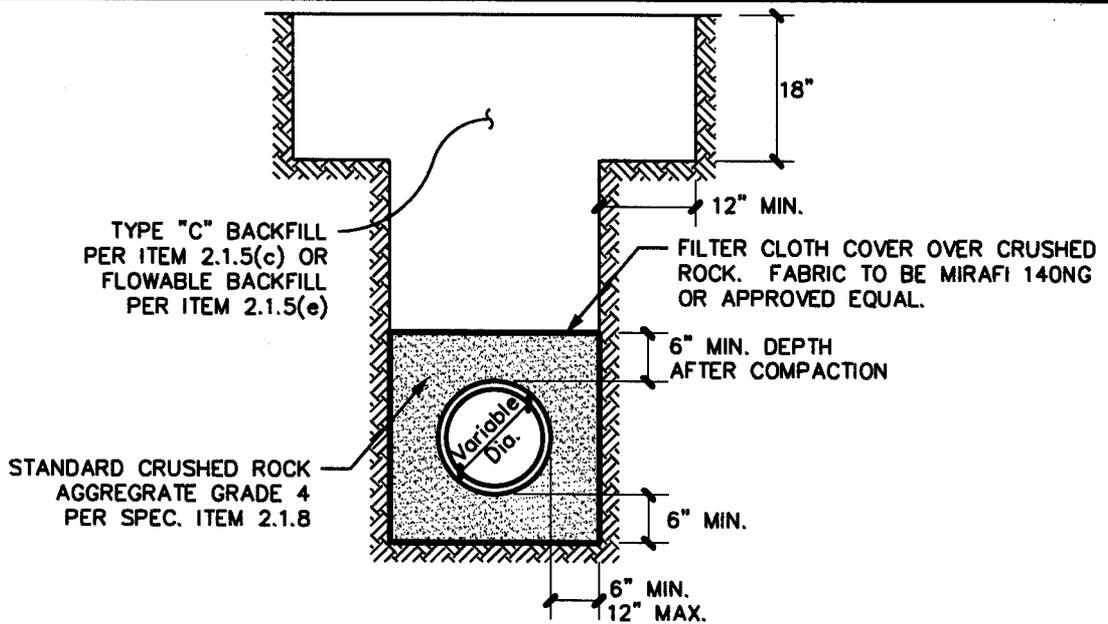
SHEET: **S-8**



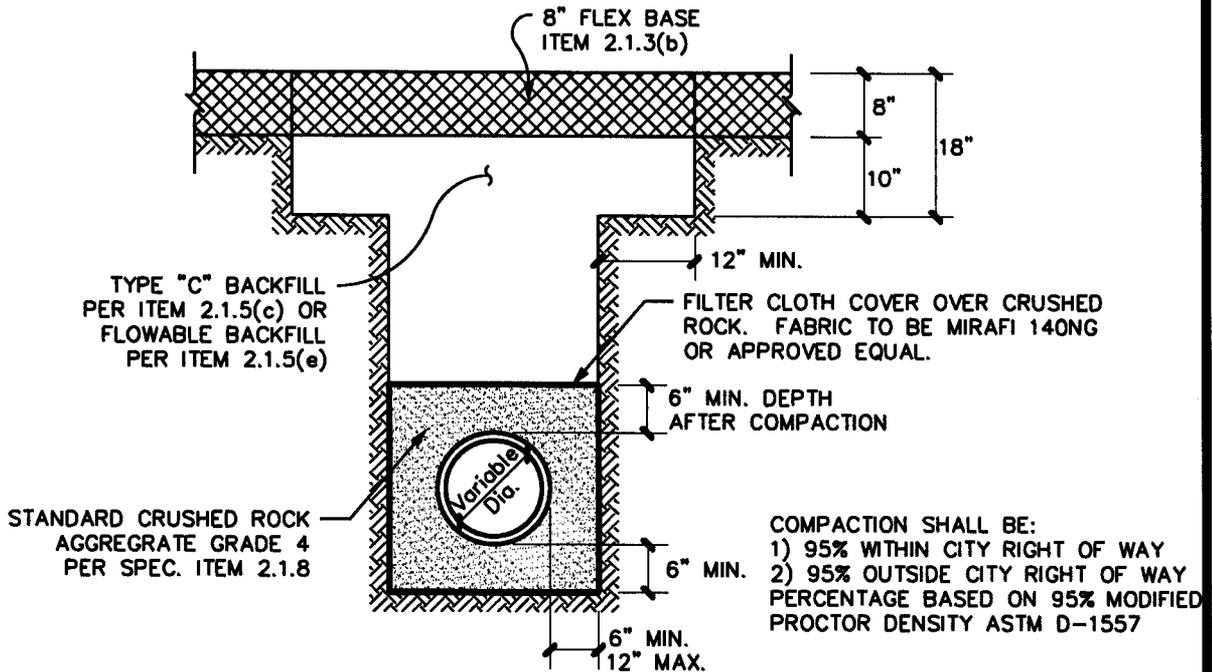
SEWER SYSTEM CONSTRUCTION DETAILS  
 ABANDONMENT OF EXISTING  
 MANHOLE

REVISION DATE:  
 APRIL 14, 2000

SHEET: S-9



## UNPAVED AND FUTURE PAVED AREAS



### NOTES:

## EXISTING FLEXBASE SURFACE

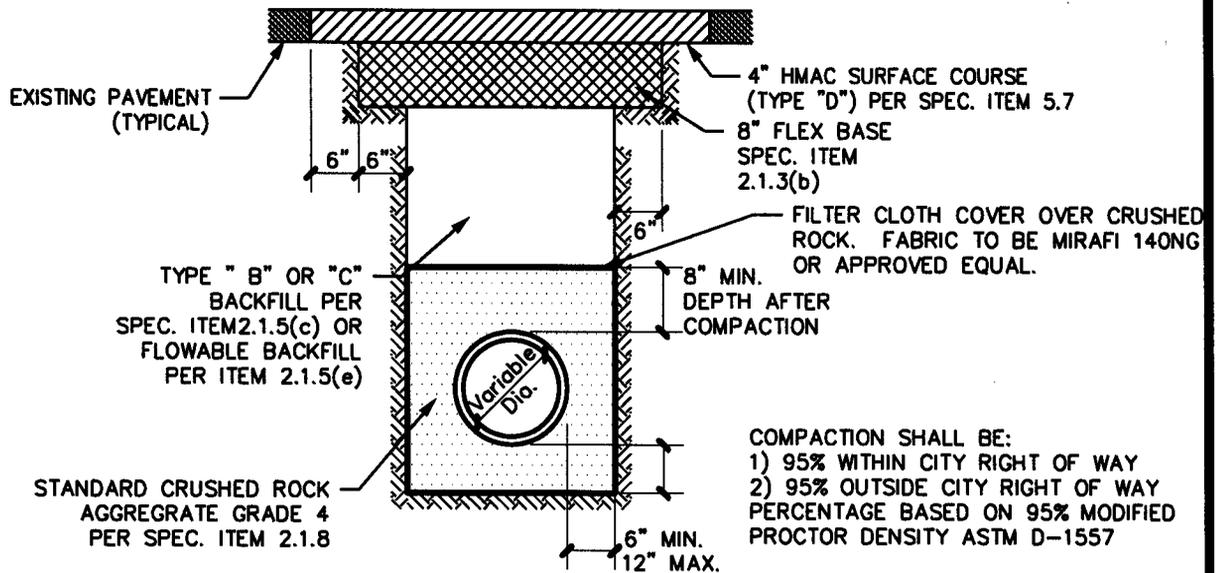
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2. ALL BACKFILL SHALL BE PER SPEC. ITEM 6.2 AND SHALL BE COMPACTED PER SPEC. ITEM 6.2.9 (b). ROCKS GREATER THAN 4" IN DIA. SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW-CUT LINES PER SPEC. ITEM 8.8.
4. A MAXIMUM OF 300 FT. OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
5. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.
6. THE CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND TEXAS LAWS CONCERNING EXCAVATION, TRENCHING, AND SHORING.



## DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER EMBEDMENT & BACKFILL

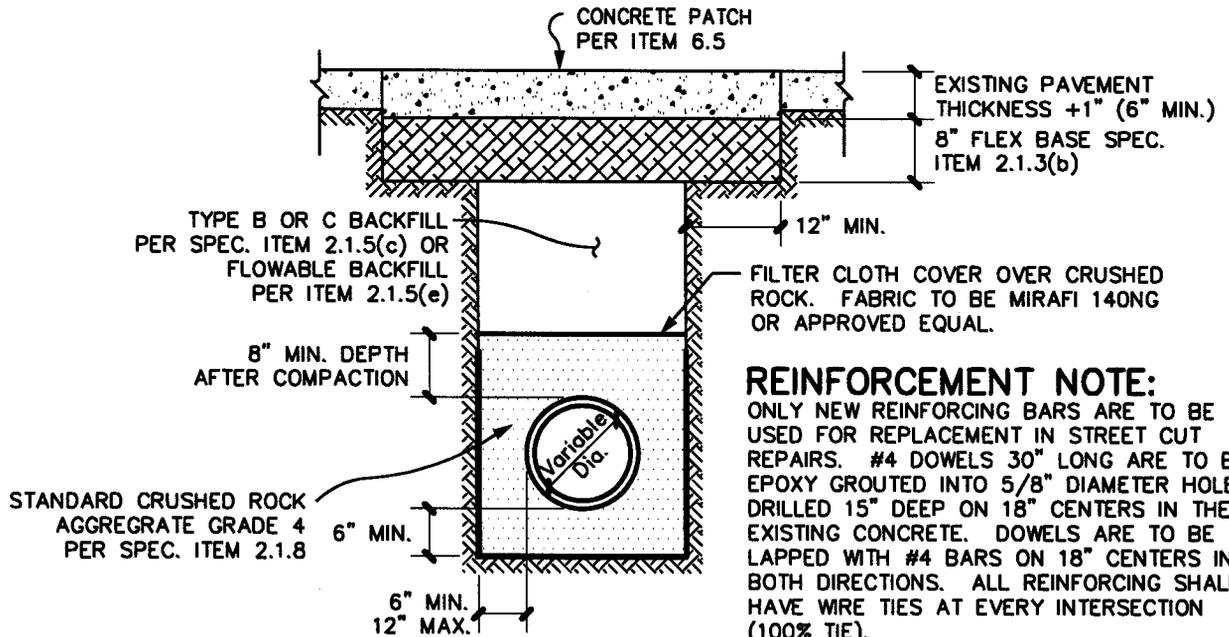
REVISION DATE:  
APRIL 14, 2000

SHEET: **D-1A**



COMPACTION SHALL BE:  
 1) 95% WITHIN CITY RIGHT OF WAY  
 2) 95% OUTSIDE CITY RIGHT OF WAY  
 PERCENTAGE BASED ON 95% MODIFIED  
 PROCTOR DENSITY ASTM D-1557

## EXISTING ASPHALT PAVEMENT



**REINFORCEMENT NOTE:**  
 ONLY NEW REINFORCING BARS ARE TO BE USED FOR REPLACEMENT IN STREET CUT REPAIRS. #4 DOWELS 30" LONG ARE TO BE EPOXY GROUTED INTO 5/8" DIAMETER HOLES DRILLED 15" DEEP ON 18" CENTERS IN THE EXISTING CONCRETE. DOWELS ARE TO BE LAPPED WITH #4 BARS ON 18" CENTERS IN BOTH DIRECTIONS. ALL REINFORCING SHALL HAVE WIRE TIES AT EVERY INTERSECTION (100% TIE).

### NOTES:

## EXISTING CONCRETE PAVEMENT

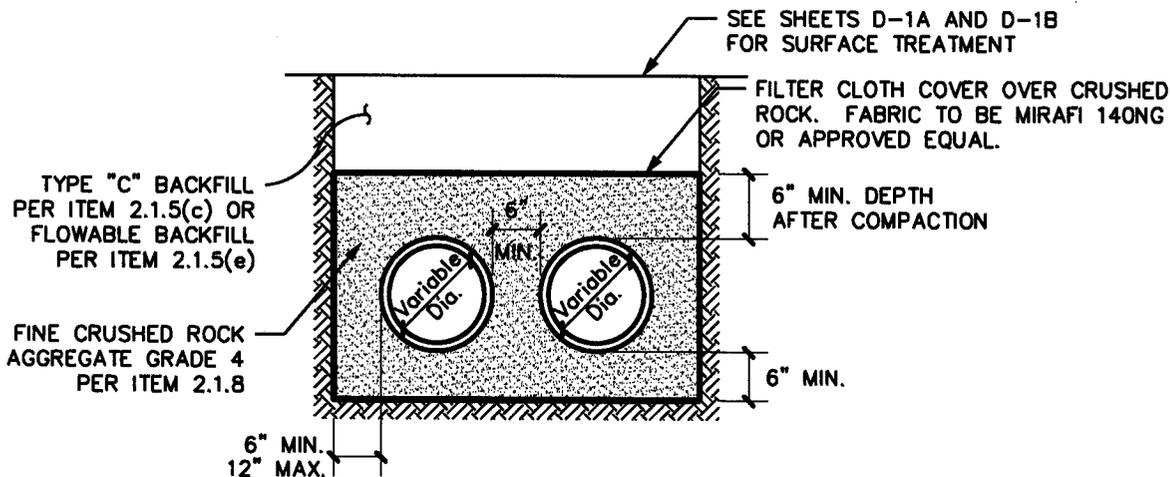
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## DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER EMBEDMENT & BACKFILL

REVISION DATE:  
 APRIL 14, 2000

SHEET: D-1B

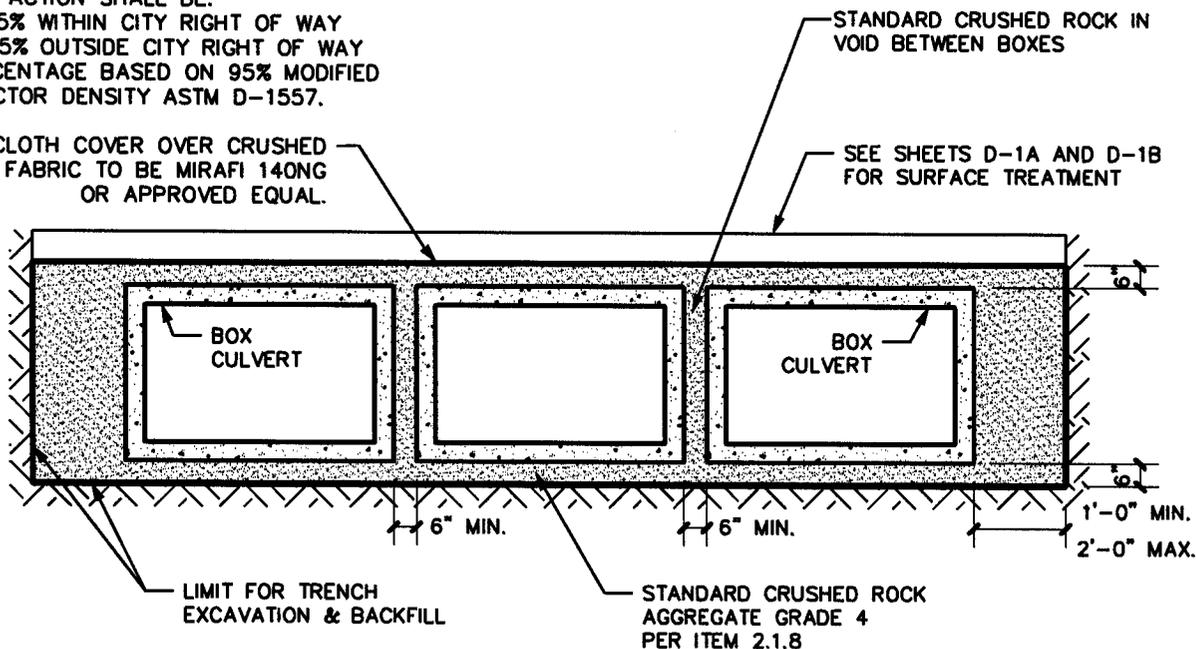


## MULTIPLE PIPE EMBEDMENT

COMPACTION SHALL BE:

- 1) 95% WITHIN CITY RIGHT OF WAY
  - 2) 95% OUTSIDE CITY RIGHT OF WAY
- PERCENTAGE BASED ON 95% MODIFIED PROCTOR DENSITY ASTM D-1557.

FILTER CLOTH COVER OVER CRUSHED ROCK. FABRIC TO BE MIRAFI 140NG OR APPROVED EQUAL.



## MULTIPLE BOX EMBEDMENT

### NOTES:

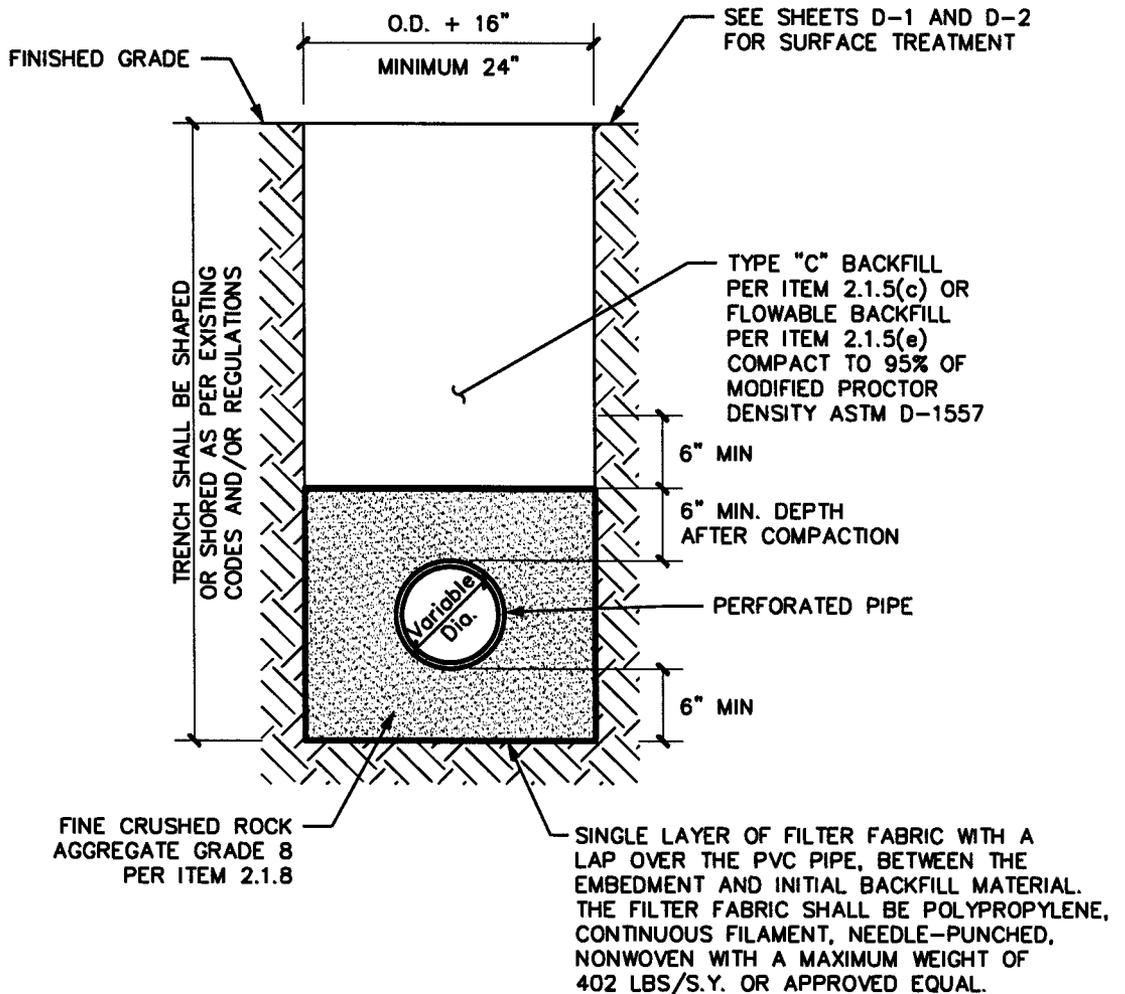
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## DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER EMBEDMENT & BACKFILL

REVISION DATE:  
APRIL 14, 2000

SHEET: **D-1C**



## NOTES:

1. WHERE THE CONTRACTOR ENCOUNTERS UNDERGROUND WATER, A SUBSURFACE DRAINAGE SYSTEM SHALL BE INSTALLED, WITH THE DISCHARGE OF SAID SYSTEM BEING CARRIED TO THE NEAREST STORM DRAIN SYSTEM OR NATURAL WATER SHED SYSTEM.
2. THE SUBSURFACE DRAINAGE SYSTEM SHALL BE CONSTRUCTED WITH A MINIMUM SIZE OF SIX (6) INCH DIAMETER TYPE PS-46 PVC PIPE, OR APPROVED EQUAL. THE PIPE SHALL MEET ALL CURRENT ASTM F758 REQUIREMENTS, AND SHALL HAVE GASKET TYPE JOINTS. THE PERFORATED AND CONDUCTING PIPES SHALL BE WHITE IN COLOR.
3. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.
4. CLEANOUTS SHALL BE INSTALLED AT THE END OF EACH PIPING SYSTEM.
5. FRENCH DRAINS SHALL BE SHOWN ON ALL RECORD DRAWINGS.
6. THE CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND TEXAS LAWS CONCERNING EXCAVATION, TRENCHING, AND SHORING.



## DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER SUBSURFACE DRAIN

REVISION DATE:  
APRIL 14, 2000

SHEET: D-2

## GENERAL NOTES:

1. IN GENERAL, INLET REINFORCING STEEL SHALL BE #4 BARS ON 12" CENTERS BOTH WAYS FOR GUTTER, BOTTOM SLAB ENDS, FRONT AND BACK WALLS, AND #4 BARS ON 6" CENTERS BOTH WAYS FOR TOP SLAB. AN ADDITIONAL #6 BAR SHALL BE PLACED IN THE FRONT EDGE OF THE TOP SLAB IN THE INLETS AND ADDITIONAL REINFORCING STEEL SHALL BE PLACED AROUND MANHOLES AS SHOWN.
2. ALL REINFORCING STEEL SHALL BE GRADE 60.
3. ALL CONCRETE SHALL BE CLASS "A". ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
4. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 2" TO THE CENTERS OF THE BARS.
5. WHEN AN INLET IS PLACED IN AN EXISTING STREET, 10 FEET OF CURB UPSTREAM AND DOWNSTREAM FROM THE INLET SHALL BE REMOVED AND REPOURED INTEGRALLY WITH THE INLET.
6. ALL BACK FILLING SHALL BE IN ACCORDANCE WITH ITEM 6.2.9 TO 95% MODIFIED PROCTOR DENSITY ASTM D-1557.
7. CENTER BEAM IS REQUIRED FOR ALL INLET OPENINGS GREATER THAN 10'-0".
8. TWO MANHOLE FRAMES AND COVERS ARE REQUIRED WHEN INLET OPENING IS GREATER THAN 10'-0".
9. ALL INLET FLOORS ARE TO HAVE A 2% SLOPE TOWARDS THE OUTLET PIPE.
10. MINIMUM INLET OPENING SIZE IS 8'-0".
11. MAXIMUM INLET OPENING SIZE IS 20'-0".
12. OUTLET PIPE TO BE PLACED AT LOWEST END OF FLOOR INLET. MANHOLE COVER TO BE PLACED ABOVE OUTLET END OF INLET.
13. MANHOLE FRAME AND COVER SHALL BE CAST IRON, VULCAN V-1874 OR BASS AND HAYES PATTERN 103 OR APPROVED EQUAL.
14. MANHOLE COVERS SHALL HAVE CHAINS ATTACHED TO PREVENT COVERS FROM BEING WASHED AWAY DURING FLOOD CONDITIONS.



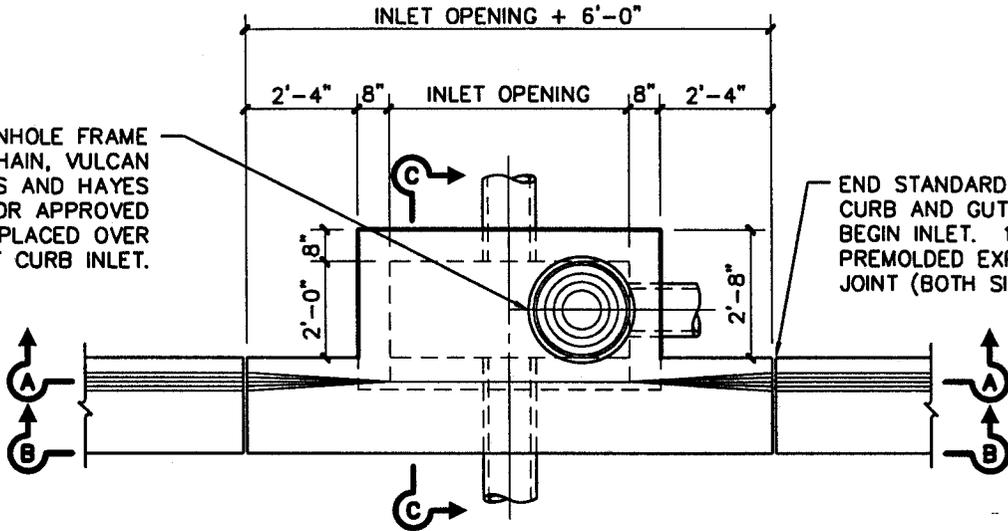
### DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER INLET GENERAL NOTES

REVISION DATE:  
APRIL 14, 2000

SHEET: **D-3**

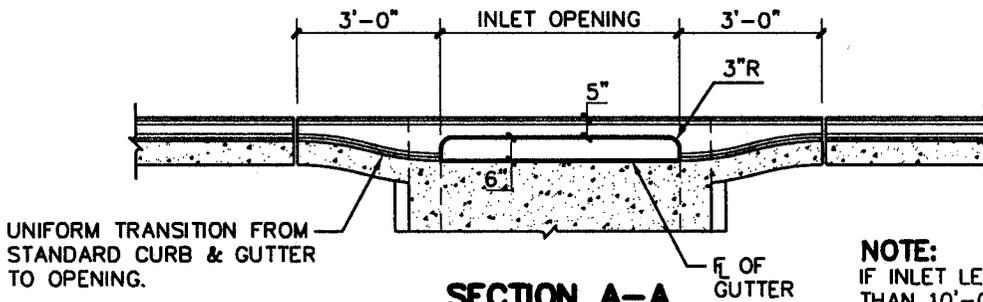
CAST IRON MANHOLE FRAME & COVER WITH CHAIN, VULCAN V-1874 OR BASS AND HAYES PATTERN 103 OR APPROVED EQUAL, TO BE PLACED OVER OUTLET END OF CURB INLET.

END STANDARD CURB AND GUTTER. BEGIN INLET. 1/2" PREMOLDED EXPANSION JOINT (BOTH SIDES).



SEE SHEET D-5 FOR SECTION C-C

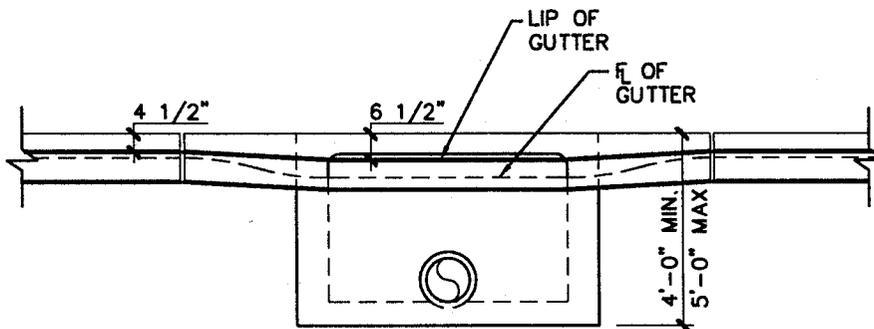
**PLAN VIEW**



UNIFORM TRANSITION FROM STANDARD CURB & GUTTER TO OPENING.

**SECTION A-A**

**NOTE:**  
IF INLET LENGTH IS GREATER THAN 10'-0", PLACE TWO (2) MANHOLE FRAMES AND COVERS ON TOP OF INLET BOX.



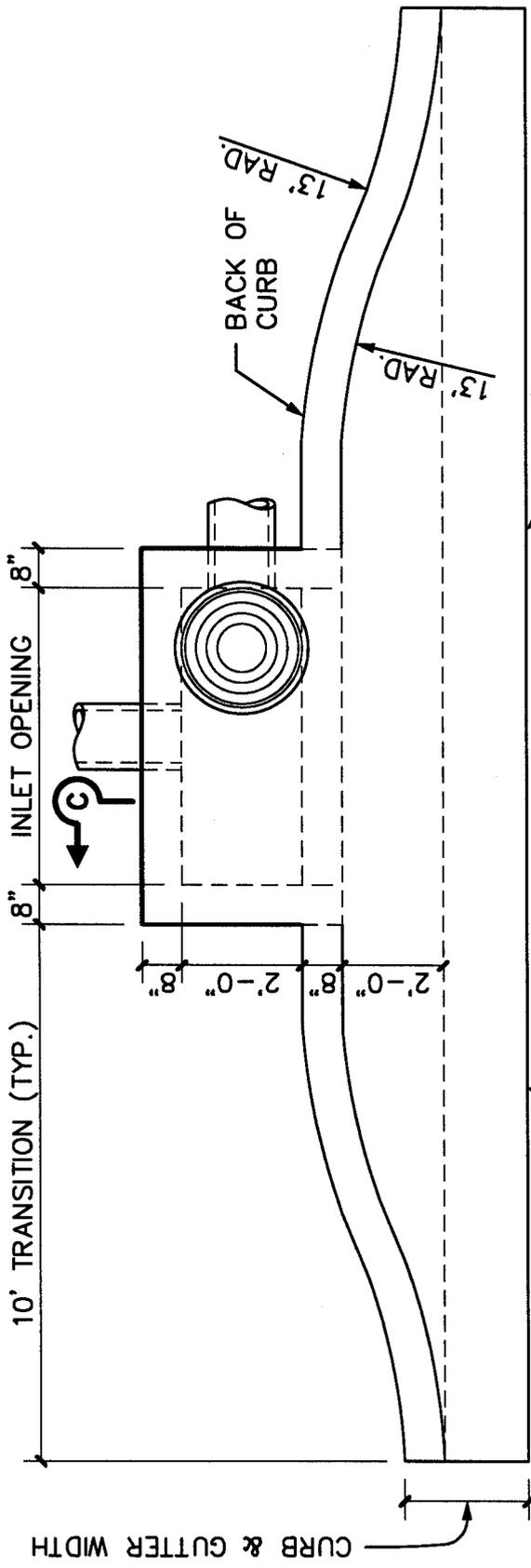
**SECTION B-B**



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER CURB INLET

REVISION DATE:  
APRIL 14, 2000

SHEET: **D-4**

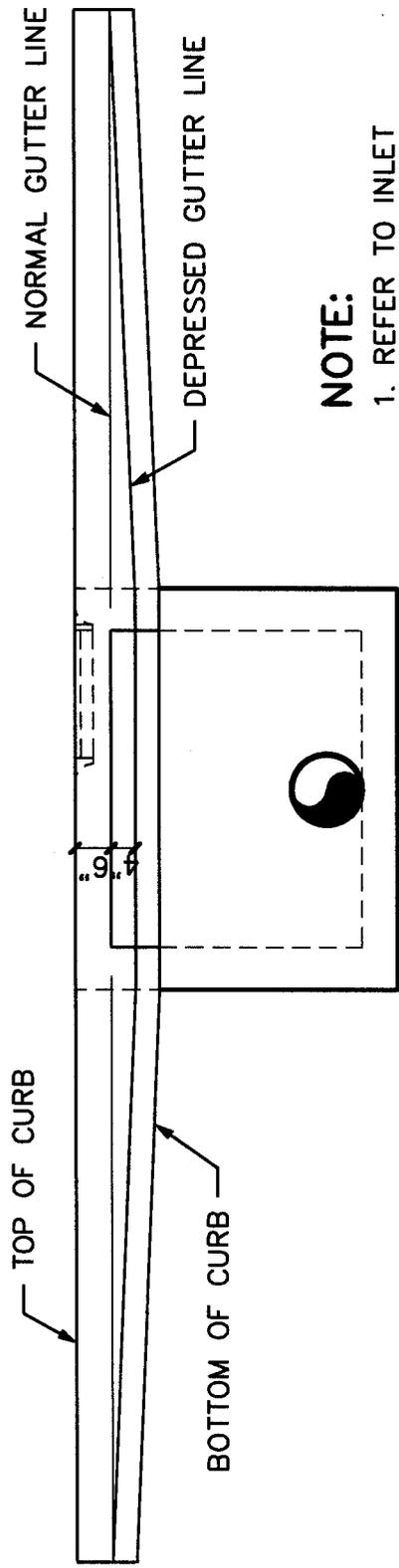


CONSTRUCTION JOINT ON  
CONCRETE PAVEMENT W/  
DOWELS #5 AT 2' C-C



**SECTION C-C**

LIP OF GUTTER  
SEE SHEET D-4 FOR PLAN VIEW



**ELEVATION**

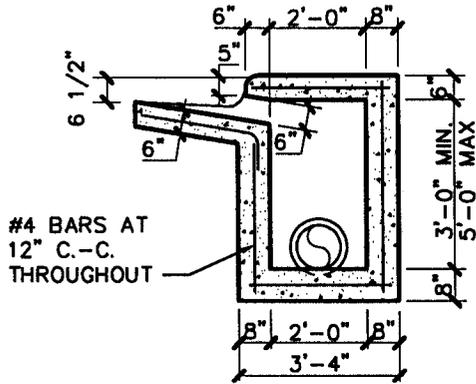
**NOTE:**  
1. REFER TO INLET  
GENERAL NOTES



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER RECESSED CURB INLET

REVISION DATE:  
APRIL 14, 2000

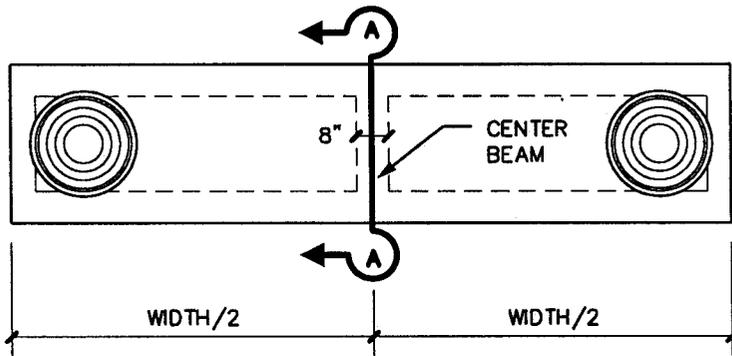
SHEET: **D-5**



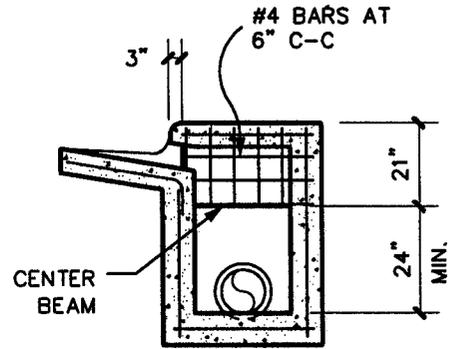
**SECTION C-C**

**NOTE**

SEE SHEET D-3 FOR GENERAL INLET INFORMATION



**PLAN VIEW**



**SECTION A-A**

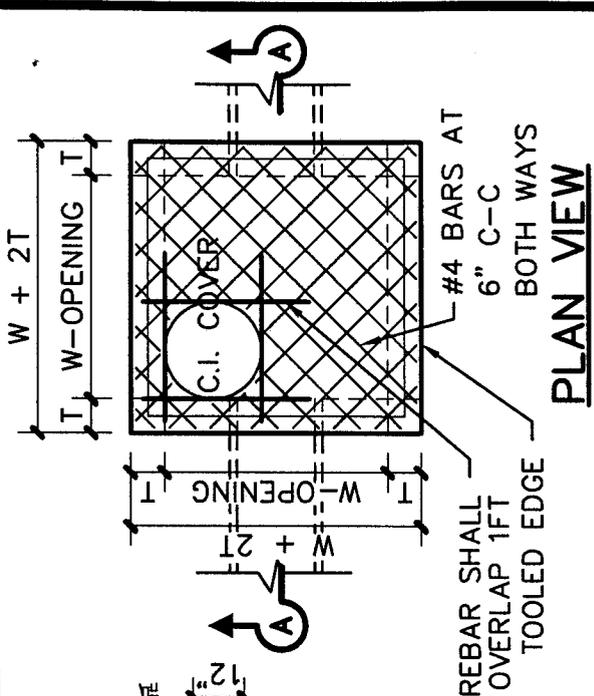
**CENTER BEAM DETAIL**



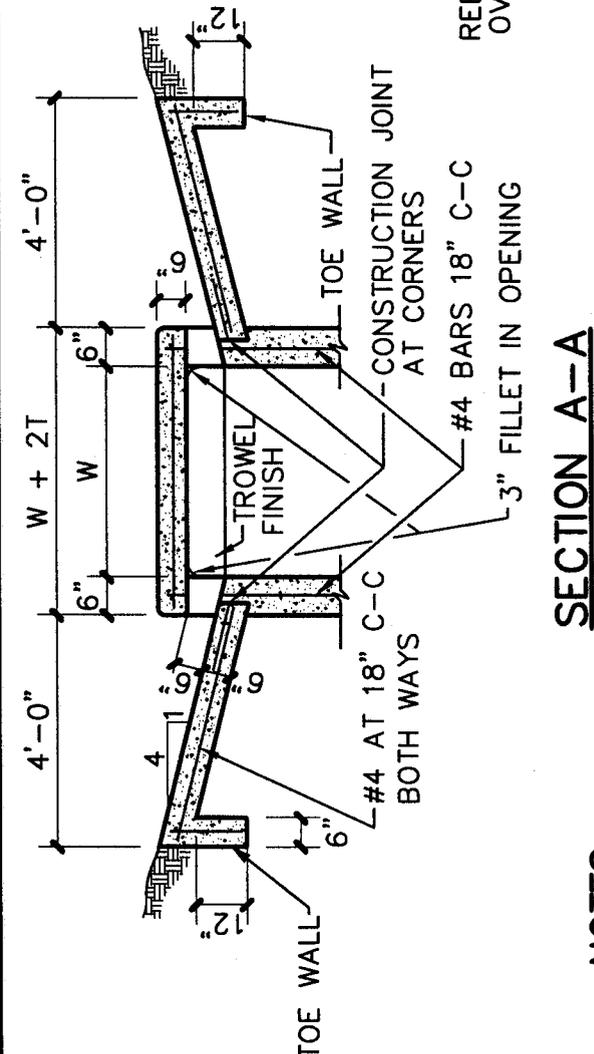
DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER CURB INLET

REVISION DATE:  
APRIL 14, 2000

SHEET: **D-6**



**PLAN VIEW**



**SECTION A-A**

**NOTES:**

1. MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF STANDARD SPECIFICATIONS FOR STANDARD CONCRETE MANHOLES.
2. LAYERS OF REINFORCED STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. EXCAVATION FOR DROP INLET TO BE INCLUDED IN THE PRICE BID FOR DROP INLET.
4. FOR DETAILS OF REINFORCING TO LOWER PORTIONS OF INLET SEE APPROPRIATE SQUARE STORM DRAIN MANHOLE DETAILS.
5. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH WILL BE SHOWN ON PLANS AT LOCATION OF INLET.
6. ALL STANDARD DROP INLETS SHALL HAVE ONE OPENING ON EACH SIDE UNLESS SHOWN ON PLANS.
7. DECK MAY BE REINFORCED SAME AS STANDARD SQUARE STORM DRAIN MANHOLE.
8. CAST IRON FRAME AND COVER WITH CHAIN. VULCAN V-1874 OR BASS AND HAYES PATTERN NO. 103, OR APPROVED EQUAL.
9. TOE WALLS TO BE 18" IN DEPTH AND 6" IND WIDTH WITH REINFORCING BARS.

INLET SIZE	T	W
2' SQUARE	7"	2'-0"
4' SQUARE	7"	4'-0"
5' SQUARE	8"	5'-0"
6' SQUARE	9"	6'-0"
7' SQUARE	9"	7'-0"
8' SQUARE	9"	8'-0"

FOR LOWER PORTION OF 2' SQUARE DROP INLET USE REINF. STEEL DETAILS OF 4' SQUARE MANHOLE AND ELIMINATE INLET RING AND COVER.



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
**STORM SEWER DROP INLET**

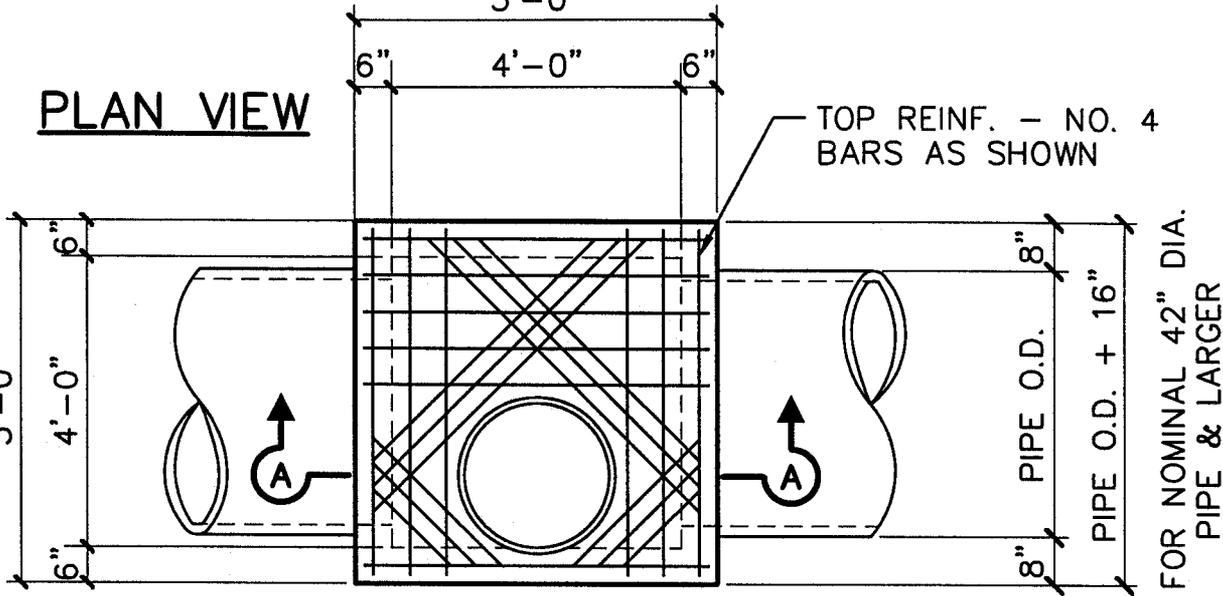
REVISION DATE:  
 APRIL 14, 2000

SHEET: **D-7**

FOR NORMAL 39" DIA.  
PIPE & SMALLER  
5'-0"

**PLAN VIEW**

FOR NORMAL 39" DIA.  
PIPE & SMALLER  
5'-0"



TOP REINF. - NO. 4  
BARS AS SHOWN

8"  
PIPE O.D.  
PIPE O.D. + 16"  
FOR NOMINAL 42" DIA.  
PIPE & LARGER

MANHOLE FRAME AND COVER  
SHALL BE CAST IRON VULCAN  
V-1874 OR BASS AND HAYES  
PATTERN 103 OR APPROVED  
EQUAL.

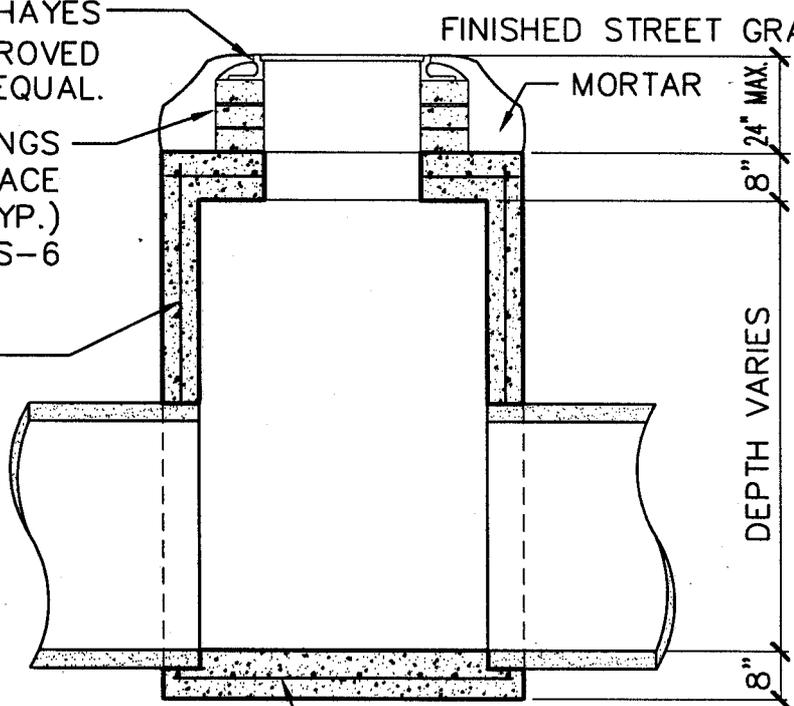
CONCRETE EXTENSION RINGS  
PRECAST OR CAST IN PLACE  
(8" WIDTH TYP.)  
SEE SHEET S-6

#4 BARS @ 9" C-C  
BOTH WAYS

FINISHED STREET GRADE

MORTAR

8" 24" MAX.  
DEPTH VARIES  
8"



**NOTES:**

- LARGER JUNCTION BOXES SHALL BE DESIGNED BY THE ENGINEER AND SUBMITTED TO THE CITY ENGINEER FOR REVIEW.

#4 BARS @ 9" C-C  
BOTH WAYS

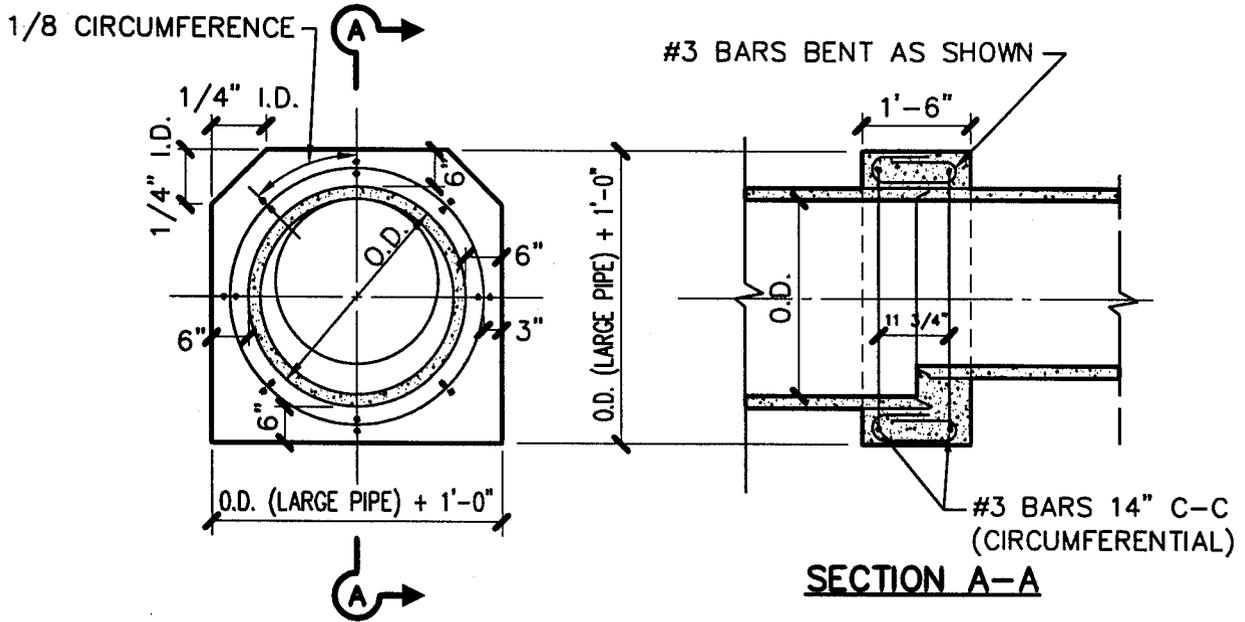
**SECTION A-A**



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER MANHOLE

REVISION DATE:  
APRIL 14, 2000

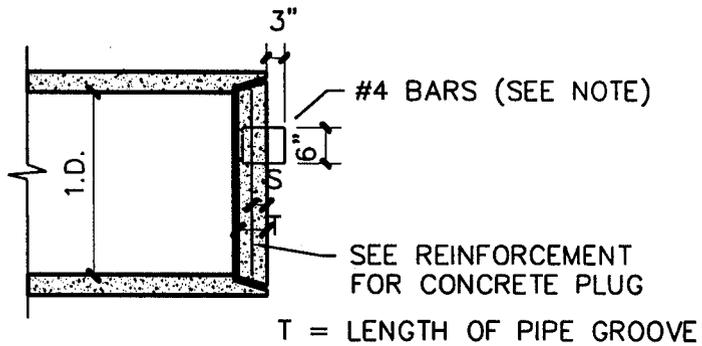
SHEET: D-8



**REINFORCED CONCRETE COLLAR**

**NOTE:**

COLLARS MAY ONLY BE USED TO REDUCE THE DIAMETER ONE PIPE SIZE. A JUNCTION BOX IS REQUIRED FOR REDUCING MORE THAN ONE PIPE SIZE.



**REINFORCED CONCRETE PIPE PLUG**

PIPE SIZE	REINF. BAR	DISTANCE C-C BOTH WAYS	S
18" - 33"	# 2	12"	1/2 T
36" - 54"	# 3	12"	1/3 T
60"	# 4	12"	1/4 T

**NOTE:**

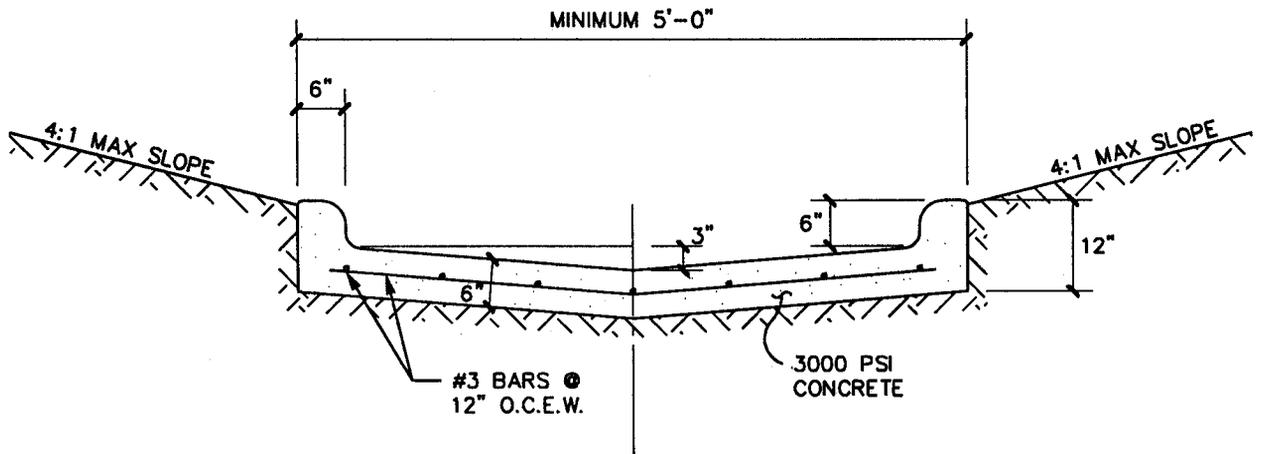
STEEL HANDLE FOR REINFORCED CONCRETE PIPE PLUG SHALL BE LOCATED 1/4 I.D. ABOVE CENTER POINT OF PLUG. TWO (2) STEEL HANDLES WILL BE REQUIRED ON PLUGS OF 36" DIA. PIPES OR LARGER AND SHALL BE PLACED 1/4 I.D. APART AND 1/4 I.D. ABOVE CENTER OF PLUG.



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
**STORM SEWER REINFORCED CONCRETE COLLAR**

REVISION DATE:  
 APRIL 14, 2000

SHEET: **D-9**



**NOTES:**

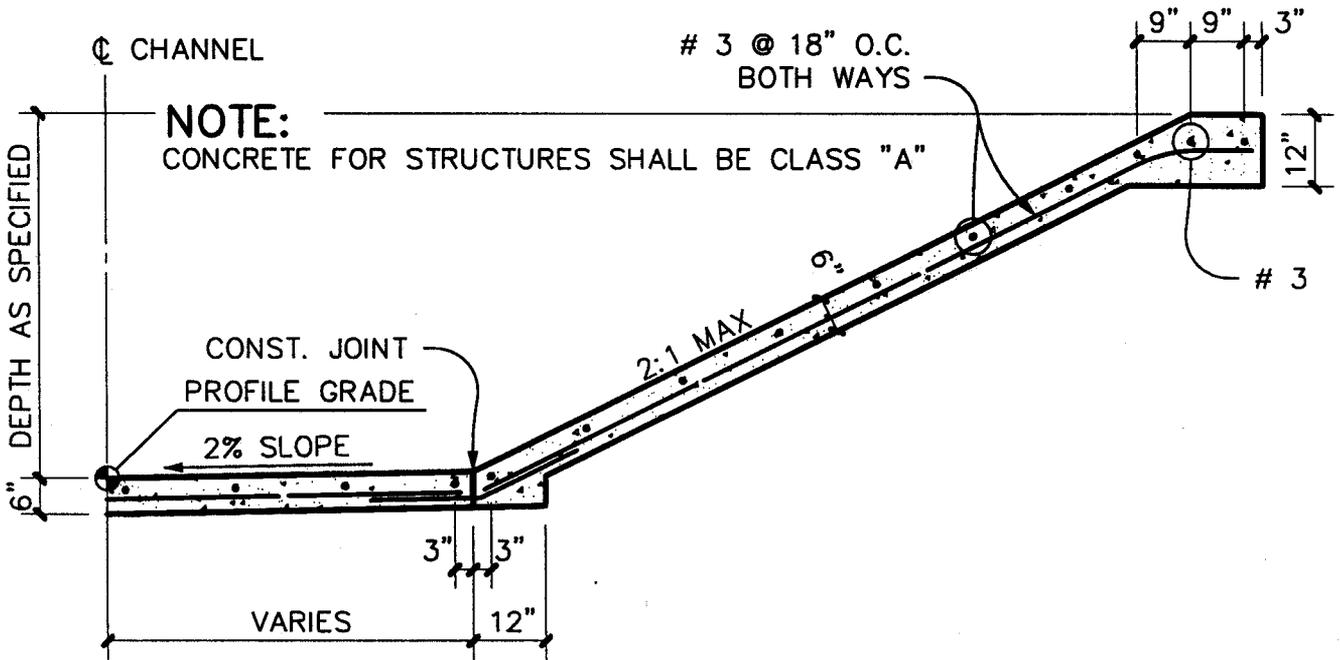
1. IF FLUME IS 7' OR WIDER, USE PIPE BOLLARDS 7' x 6" DIA., AND FILL WITH CONCRETE PLACE AT BOTH START AND END OF FLUME BURY TO 4' DEPTH
2. SIDE SLOPES TO BE HYDROMULCHED.



**DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER CURBED FLUME  
AND PILOT CHANNELS**

REVISION DATE:  
APRIL 14, 2000

SHEET: **D-10**



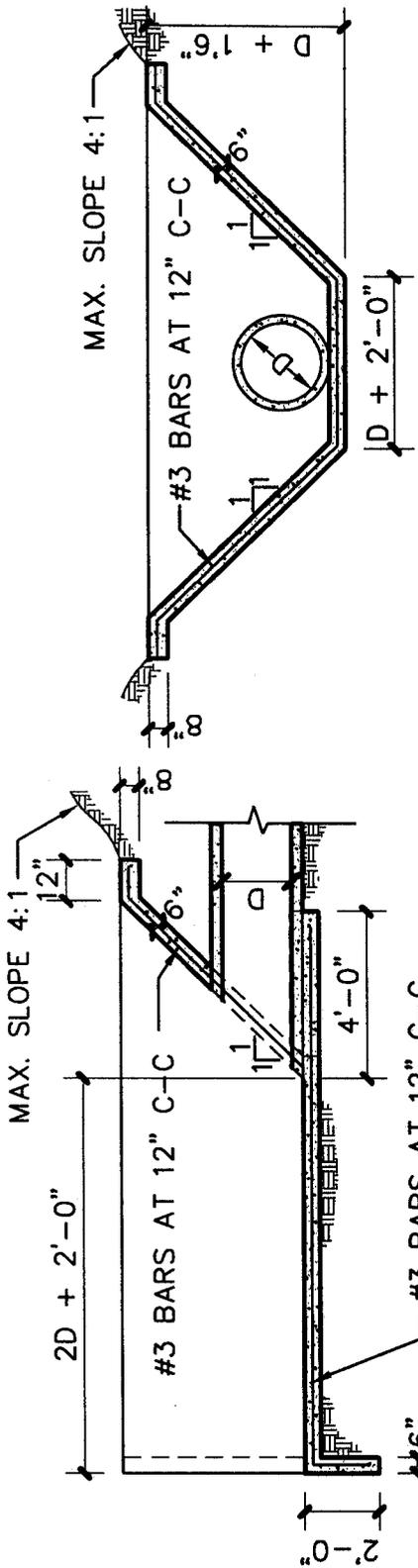
**NOTE:**  
RIPRAP TO BE FORMED ON UNDISTURBED SOIL CUT TO GRADE. IF TO BE PLACED ON FILL, ALL FILL SHALL BE PLACED ON BENCHES CUT IN UNDISTURBED SOIL AND FILLED IN 8" LOOSE LIFTS, EACH COMPACTED TO 95% STANDARD PROCTOR DENSITY. THE FILL SO COMPACTED SHALL THEN BE CUT TO GRADE. WEEP HOLES SHALL BE LOCATED BASED ON STRUCTURAL DESIGN AND HYDROLOGIC FLOW CHARACTERISTICS OF THE CHANNEL.



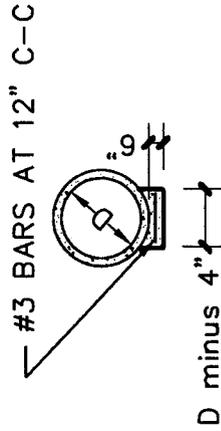
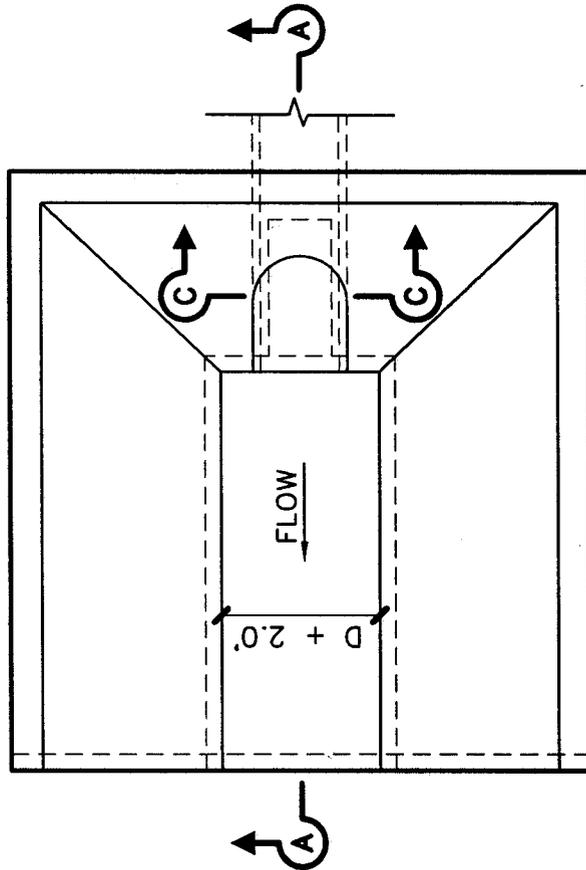
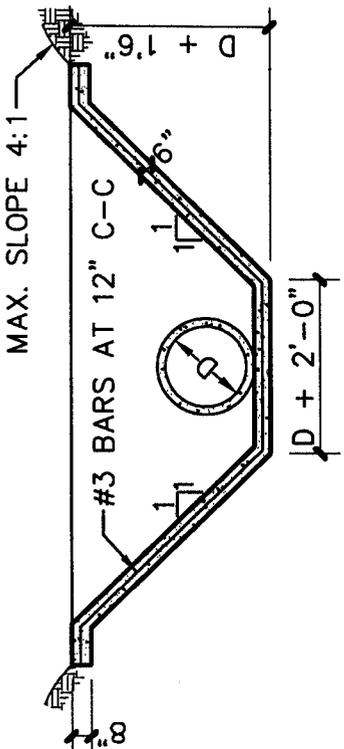
DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER CONCRETE RIPRAP

REVISION DATE:  
APRIL 14, 2000

SHEET: D-11



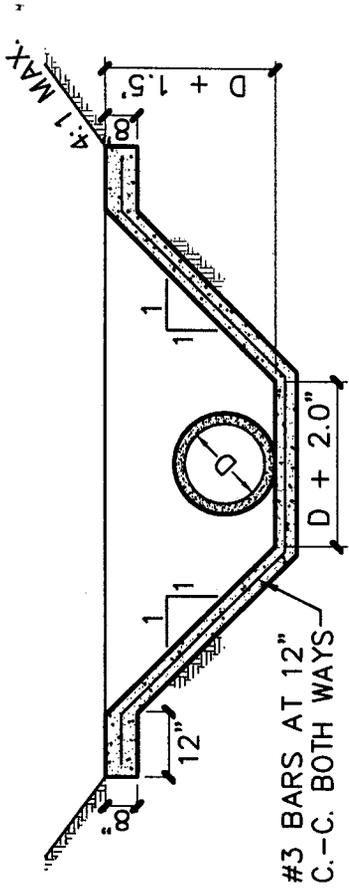
SECTION B-B  
N.T.S.



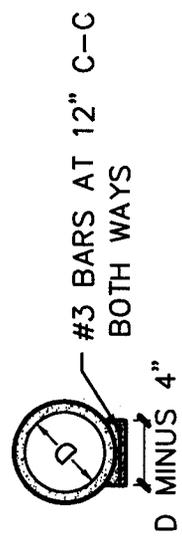
DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER SLOPING HEADWALL

REVISION DATE:  
APRIL 14, 2000

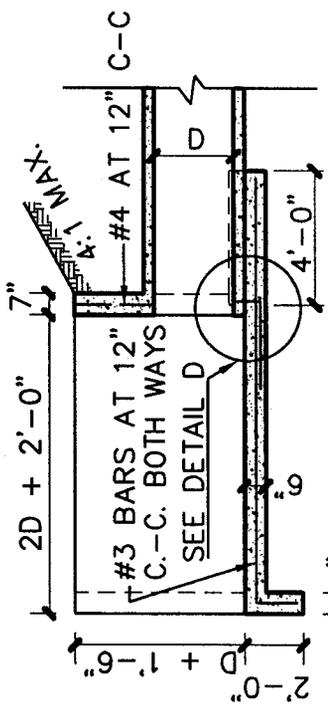
SHEET: D-12



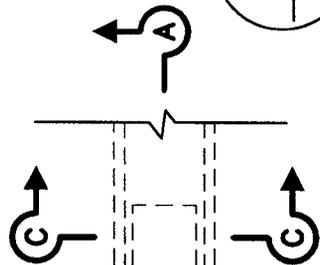
**SECTION B-B**  
N.T.S.



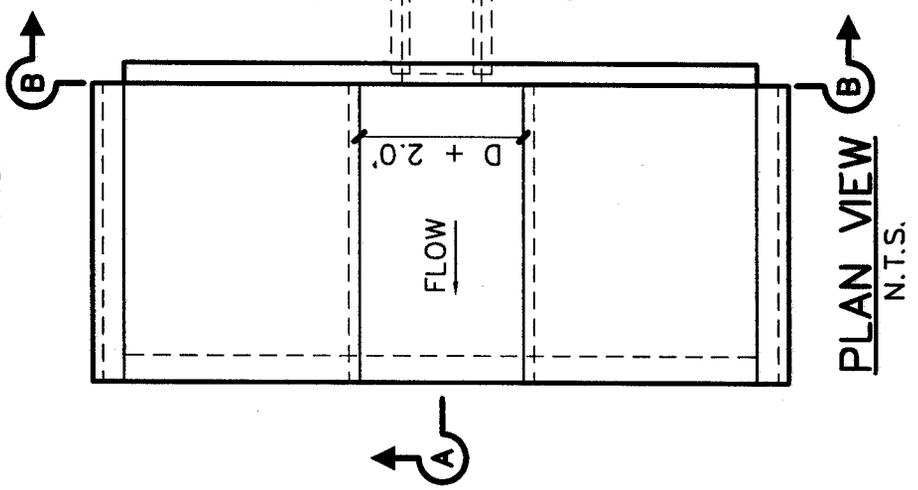
**SECTION C-C**  
N.T.S.



**SECTION A-A**  
N.T.S.



**DETAIL D**  
N.T.S.



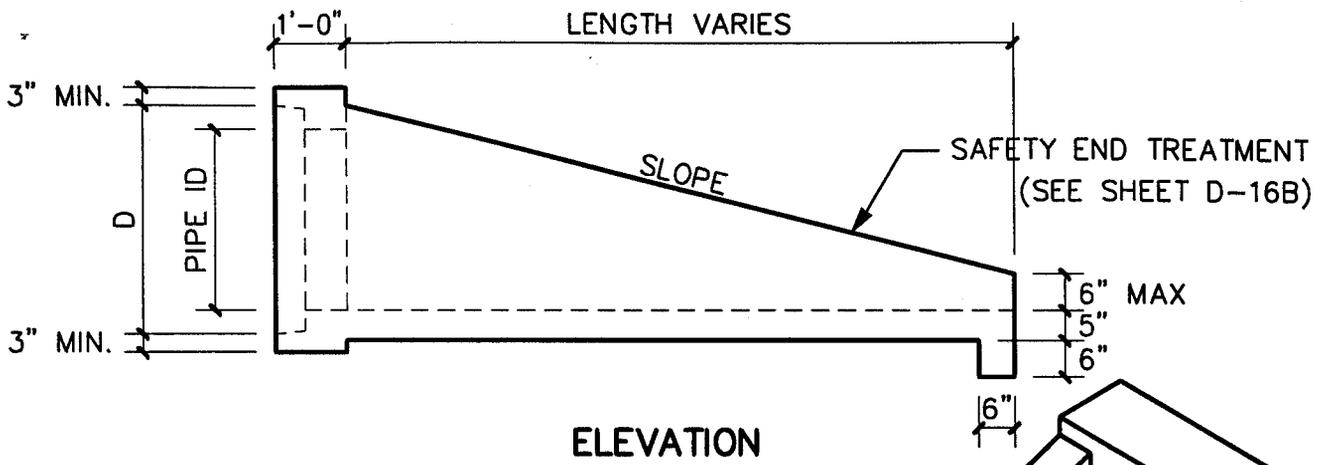
**PLAN VIEW**  
N.T.S.



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER VERTICAL HEADWALL

REVISION DATE:  
APRIL 14, 2000

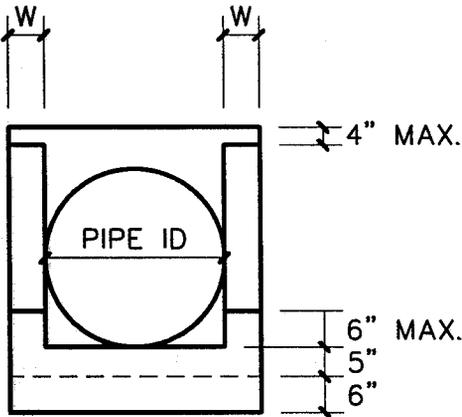
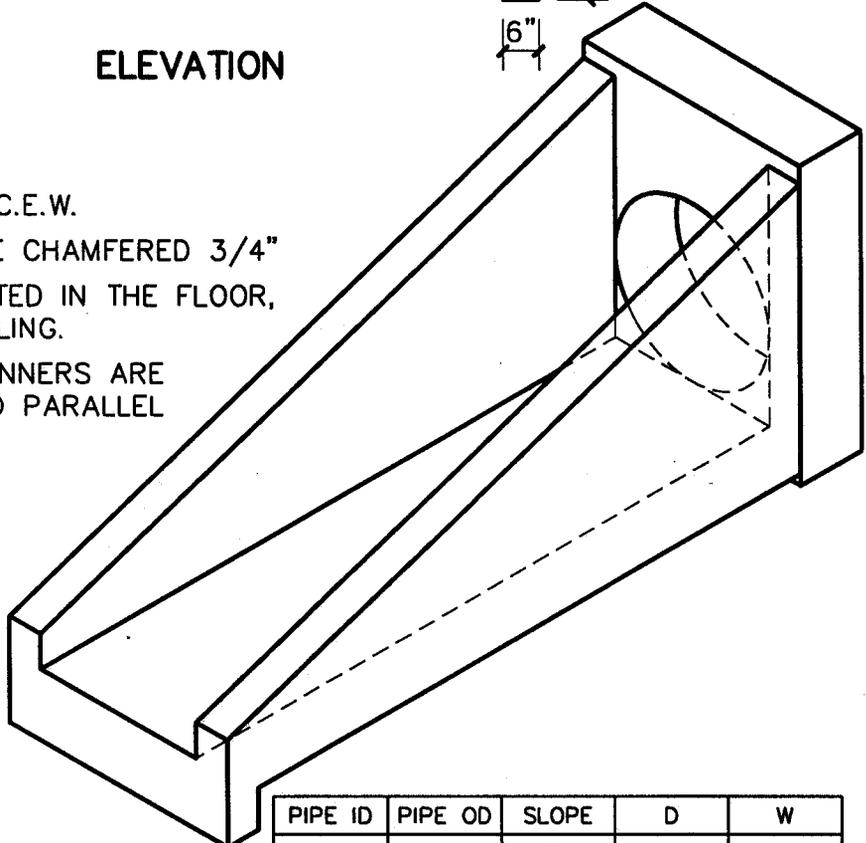
SHEET: **D-13**



ELEVATION

**NOTES:**

1. 4500 PSI CONCRETE
2. #4 GRADE 60 REBAR 9" O.C.E.W.
3. ALL EXPOSED CORNERS ARE CHAMFERED 3/4"
4. SWIFT LIFT ANCHORS, LOCATED IN THE FLOOR, SHALL BE USED FOR HANDLING.
5. GALVANIZED STEEL PIPE RUNNERS ARE AVAILABLE FOR CROSS AND PARALLEL DRAINAGE APPLICATIONS.



FRONT ELEVATION

PIPE ID	PIPE OD	SLOPE	D	W
30"	37"	3:1	38"	6"
		4:1		
		6:1		
36"	44"	3:1	45-1/2"	6"
		4:1		
		6:1		
42"	51"	3:1	52-3/4"	8"
		4:1		
		6:1		
48"	58"	3:1	60"	8"
		4:1		
		6:1		
54"	65"	3:1	67"	8"

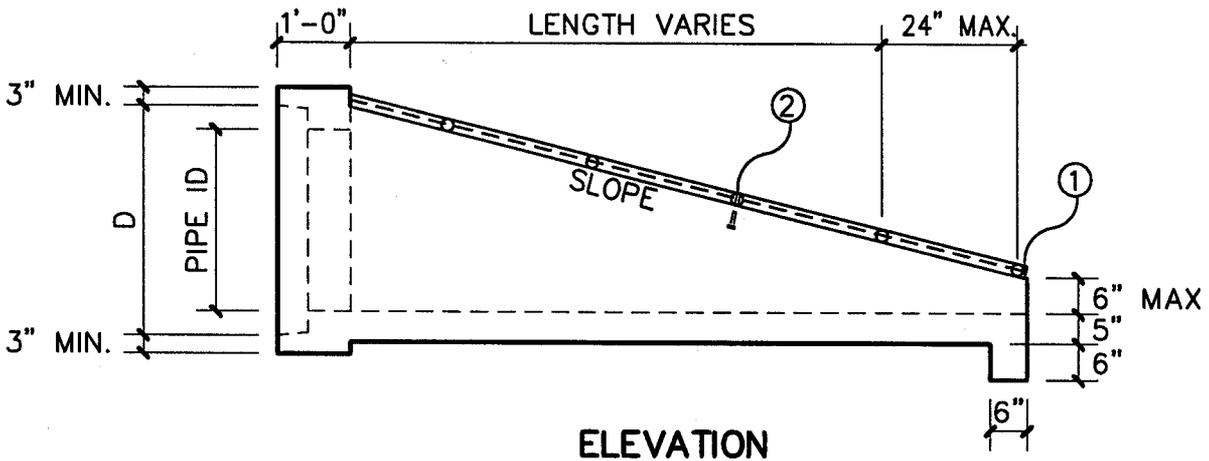
PIPE ID	PIPE OD	SLOPE	D	W
18"	23"	3:1	24"	5"
		4:1		
		6:1		
24"	30"	3:1	31"	5"
		4:1		
		6:1		



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
STORM SEWER CULVERT

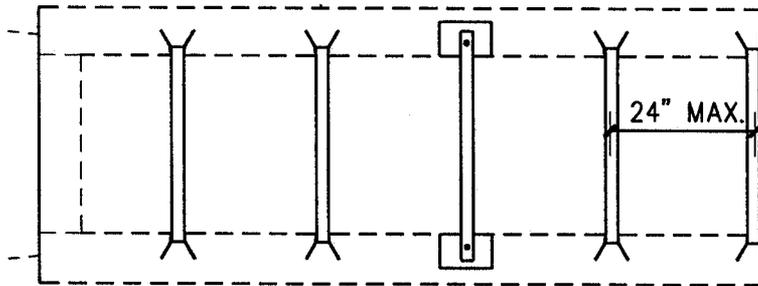
REVISION DATE:  
APRIL 14, 2000

SHEET: **D-14A**



ELEVATION

- ① TOP OF SAFETY PIPE RUNNER (TYP)
- ② THIRD PIPE RUNNER SHALL ALWAYS HAVE BOLTED CONNECTION FOR CLEAN OUT ACCESS



PLAN

NOTES:

1. SAFETY END PIPE SHALL BE 2" DIAMETER.
2. PIPE AND BOLTS SHALL BE GALVANIZED STEEL.



DRAINAGE SYSTEM CONSTRUCTION DETAILS  
SAFETY END TREATMENTS

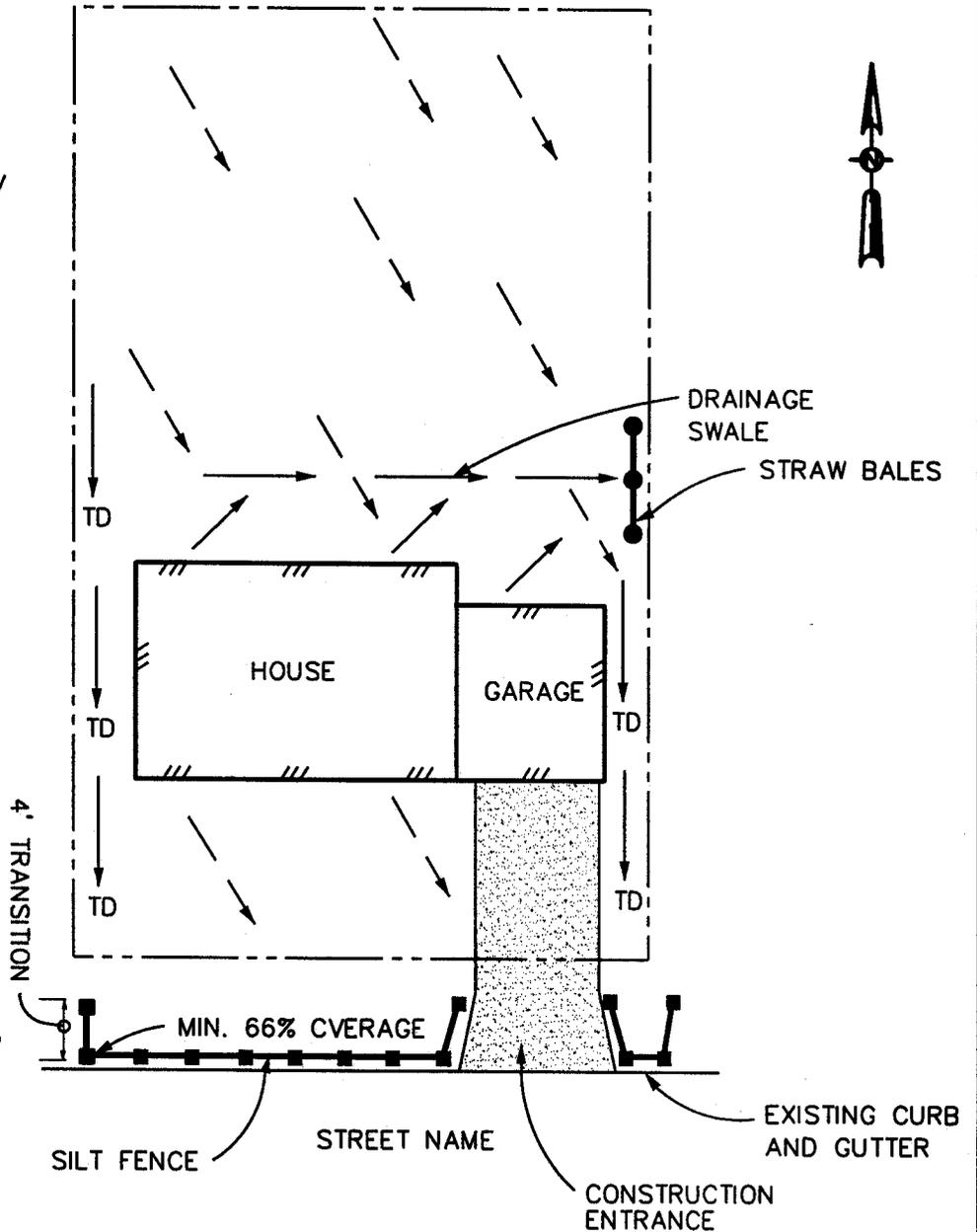
REVISION DATE:  
APRIL 14, 2000

SHEET: D-14B

An Erosion Control Plan shall at a minimum contain the following items:

1. A site plan drawn to the scale of the property where earthwork is proposed showing the property boundary, any street right-of-way and any drainage easment.
2. The existing drainage flow by using arrows to indicate the direction of slope.
3. The location of any existing or proposed building footprint, if applicable.
4. The location and type of erosion control method proposed.
5. The location where access is gained to the property.

There shall be at least one construction access point, a minimum of 10' and a maximum of 20' wide, comprised of a 4" gravel base extending 10' from the curb (or property line).

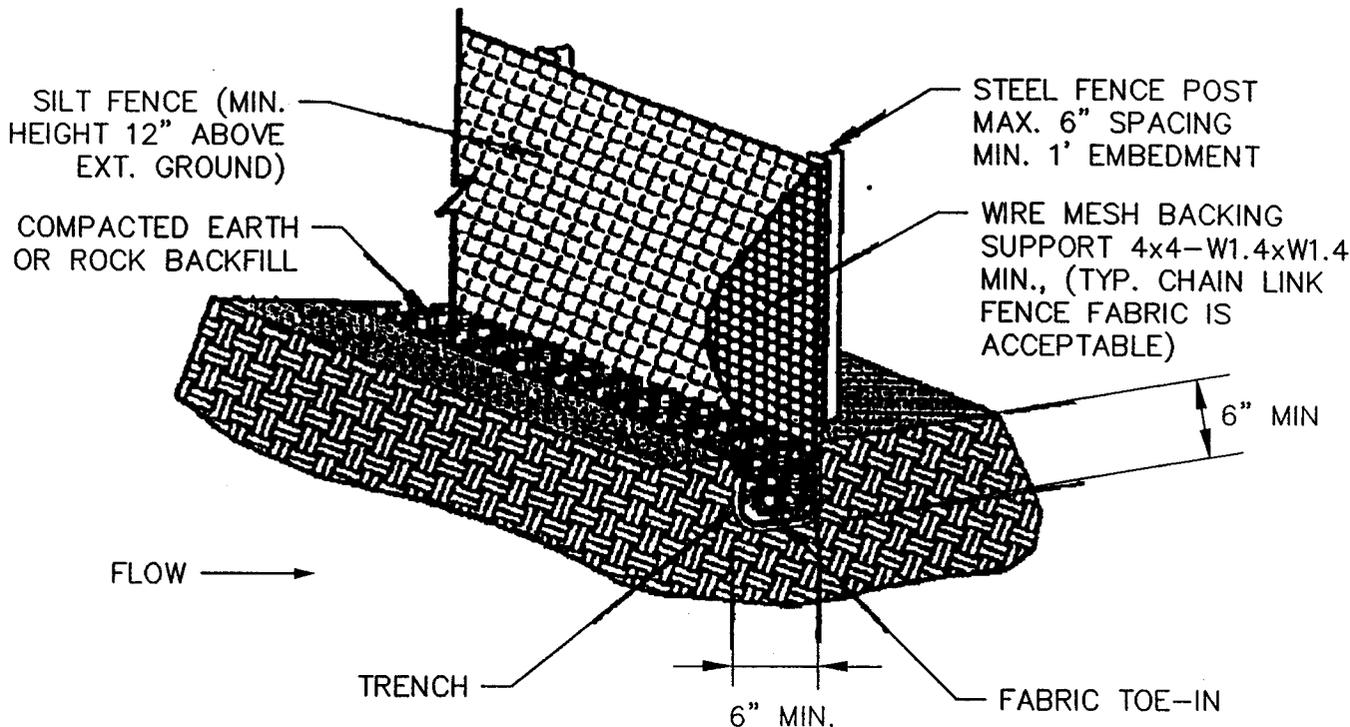


## EROSION CONTROL PLAN

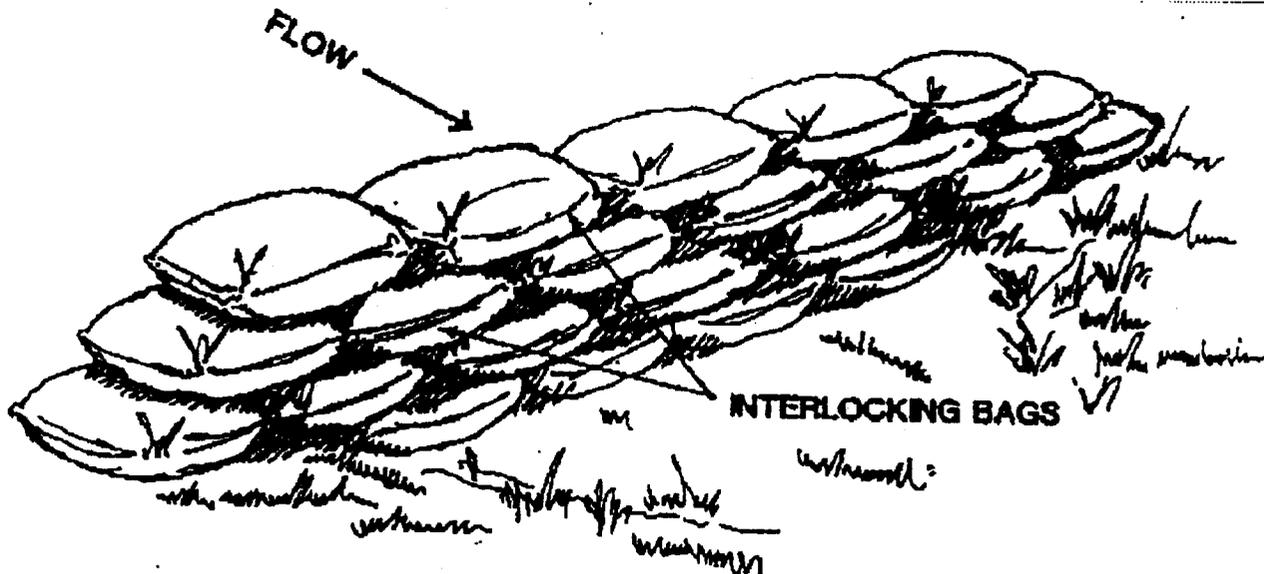
REVISION DATE:  
APRIL 14, 2000

SHEET: **D-15A**

At a minimum, an Erosion Control Barrier must: have the base buried to protect against washout, be installed to a minimum of 12" above the ground, be placed behind any curb, extend along 66% of the street frontage (additional barriers may be required by the City), a 4' transition is required at each end of the barrier, the construction access point must not be blocked, in the absence of any curb, the City Inspector shall determine the proper location for the barrier.



**TYPICAL SILT SCREENING FENCE**



**TYPICAL SAND BAG SCREENING**

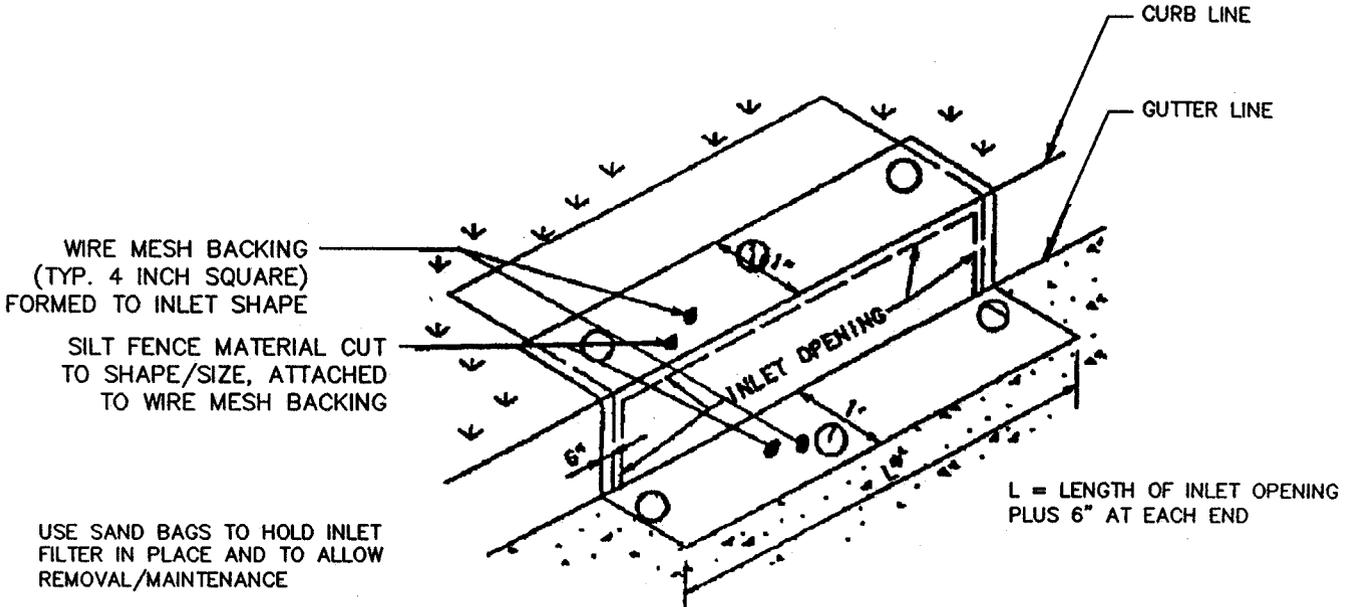


SILT FENCE AND SAND BAG SCREEN  
EROSION CONTROL BARRIERS

REVISION DATE:  
APRIL 14, 2000

SHEET: D-15B

At a minimum, an Erosion Control Barrier must: have the base buried to protect against washout, be installed to a minimum of 12" above the ground, be placed behind any curb, extend along 66% of the street frontage (additional barriers may be required by the City), a 4' transition is required at each end of the barrier, the construction access point must not be blocked, in the absence of any curb, the City Inspector shall determine the proper location for the barrier.



TYPICAL CURB INLET SCREENING



CURB INLET SCREEN  
EROSION CONTROL BARRIER

REVISION DATE:  
APRIL 14, 2000  
SHEET: D-15C