Chapter amendments approved:	OMPC	Owensboro	Daviess Co.	Whitesville
Re-adoption of Public Improvement Specifications	24-Mar-77	01-Apr-77	20-Apr-77	?
Revised Public Improvement Specifications	18-Apr-81	22-May-81	26-May-81	06-Jul-81
2002 Revised Public Improvement Specifications	08-Aug-02	No action required by legislative bodies		

7.0 PURPOSE. The purpose of this chapter is to outline the requirements for proper storm sewer pipe sizing, construction, and inspection.

7.1 DESIGN REQUIREMENTS. Storm water facilities shall be designed in accordance with the procedures of the KTC Specifications. A complete set of design calculations for the storm drainage facilities will be provided for all construction activities that require a preliminary subdivision plat or final development plan to be considered by the OMPC. At the request of the Engineer, a complete set of design calculations for the storm drainage facilities will be provided for any other construction activities. Design calculations shall be submitted upon depths of flow, velocities and sizes for the 10-year and 25-year return periods. Calculations shall be provided in tabular form, and the system shall be designed upon the 10-year return period. However, if the structure is part of the trunk system as defined in the "Storm Water Master Plan", the system shall be designed upon a return period to be determined by the Engineer.

7.2 PIPE AND JOINTS. Pipe for storm sewers shall be reinforced concrete pipe (RCP). For other pipe types, refer to Chapter 2 (Materials).

7.3 TRENCH EXCAVATION - shall be accomplished as outlined in Chapter 5 " Sanitary Sewers", Section 5.2.

Trenches shall be kept free of water during the laying of the pipe and until the pipeline has been backfilled. Removal of water shall be at the Contractor's expense.

7.4 PIPE BEDDING.

7.4.1 Reinforced Concrete Pipe (Normal Bedding). See Exhibits 7-1 and 7-2, "RCP Bedding Detail."

7.4.2 High Density Polyethylene Pipe (Improved Bedding). See Exhibit 7-3, "HDPE Pipe Bedding Detail."

7.4.3 Polyvinyl Chloride Pipe. See Exhibit 7-4, "PVC Pipe Bedding Detail."

7.5 OBSTRUCTIONS. See Chapter 5 "Sanitary Sewers", Section 5.6.

7.6 SHORING, SHEETING, & BRACING OF EXCAVATION. See Chapter 5 "Sanitary Sewers", Section 5.7.

7.7 LAYING OF PIPE - shall be accomplished as outlined in Chapter 5 "Sanitary Sewers", Section 5.4.

7.8 BACKFILLING PIPELINE TRENCHES - shall be accomplished as outlined in Chapter 5 "Sanitary Sewers", Section 5.8.

7.9 CONCRETE CRADLE, ANCHORS OR ENCASEMENT. Concrete cradle, anchors or encasement of sewer lines shall be placed where shown on the plans, required by the specifications, or as directed by the Engineer. Concrete shall be Class "B" and shall be mixed sufficiently wet to permit it to flow under the pipe to form a continuous bed. In tamping concrete, care shall be taken not to disturb the grade or line of the pipe or injure the joints.

7.10 MANHOLES. Manholes of the form and dimensions shown on the plans and in Standard Drawing, Chapter 5 "Sanitary Sewers", Exhibits 5-1 through 5-9 shall be built as directed. At the option of the Contractor, the manhole may be constructed of precast concrete rings. They shall be constructed on 3000-psi concrete foundations.

7.10.1 Standard Manholes. The standard manhole shall be six feet or less in depth, measured from the base of the cover frame to the top of the concrete footing and shall be of cone type, top construction as shown on the plans. Manholes shall be sufficiently large to accommodate all pipe entering such manhole with a minimum of one-foot separations in all directions.

7.10.2 Shallow Manholes. The shallow manholes shall be five feet or less in depth, measured from the base of the cover frame to the top of the concrete footing and shall be of flat top construction as shown on the plans.

7.10.3 Special Manholes. Nonstandard or oversized manholes may be precast or cast in place concrete, and shall be designed by a Professional Engineer licensed in the State of Kentucky.

7.10.4 Precast Concrete Rings. Precast concrete rings for manholes shall conform to ASTM C-478. See Exhibit 5-9, "Grade Ring Detail Sheet."

7.10.5 Precast Concrete Cones. Precast concrete cones shall be of the size and shape shown on the plans and shall conform to the ASTM C-478. See Exhibit 5-8.

7.10.6 Manhole Steps. Cast iron manhole steps shall be of pattern shown on the plans, 10-3/4 inches by 8-1/2 inches, weighing not less than 10 pounds each, having corrugated treads. The steps shall be made of ASTM A-48 cast iron minimum Class 30. Steel steps coated with plastic may be used as approved by the Engineer. See Exhibit 5-6.

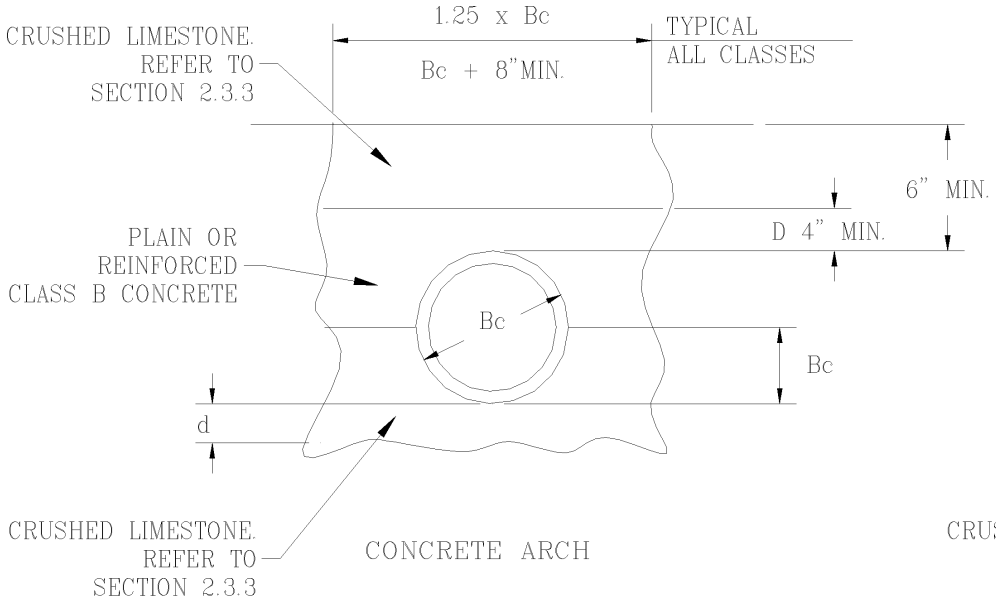
7.10.7 Manhole Frames and Covers. Manhole casting shall consist of cast iron frames and 22-3/4 inch diameter covers, weighing not less than 300 pounds per frame and cover, dimensioned as shown on the plans. Manhole covers must sit neatly in the rings, with contact edges machined for even bearing and tops flush with ring edge. They shall have sufficient corrugations to prevent slipperiness. The lids shall have two pick holes about 1-1/4 inches wide and 1/2 inch deep with 3/8 inch undercut all around. The words "storm sewer" shall be cast in each manhole cover. Heavy-duty manhole lids shall be used under traffic conditions.

7.11 CURB INLETS, GRATE INLETS, AND HEADWALLS - shall be constructed to forms and dimension shown on Exhibit 7-5, "Inlet Box and Casting Details" or as shown on plans approved by the Engineer. Headwalls shall be required on all storm drains that terminate in an existing or proposed opened waterway. See Exhibits 7-6 through 7-8. All concrete for reinforced walls and slabs shall be Class "A" concrete. Reinforcing steel shall be ASTM A-615, Grade 60 and the size and layout approved by the Engineer. At the option of the Contractor, precast or cast in place curb inlet boxes and headwalls may be used.

7.12 TIDE GATES. Whenever storm sewers drain into existing channels and there is a chance of backflow into the drainage system or whenever specified by the Engineer, tide gates may be used.

7.13 WATER STOPS. All pipes shall have water stops when tied to precast inlet, manhole or other precast structures. See Chapter 2 "Materials" for details.

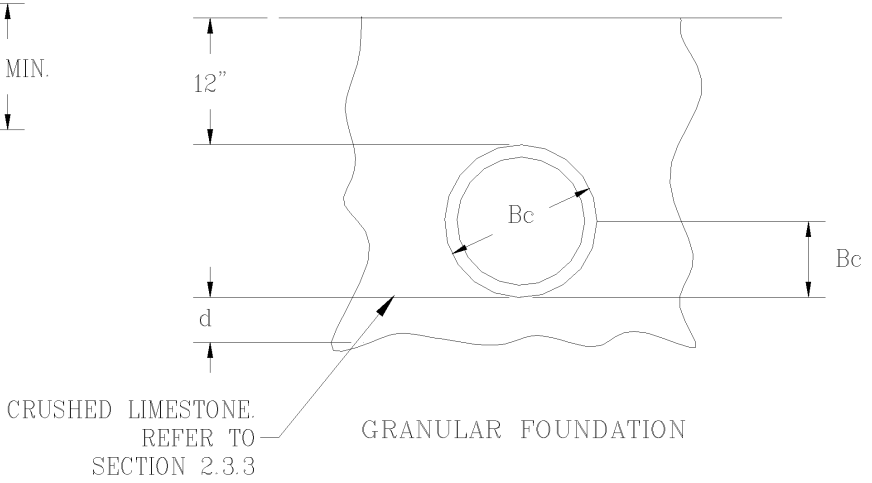
7.14 CLEAN-UP. Upon completion of the installation of the storm sewers and appurtenances, the contractor shall remove all debris and surplus construction materials resulting from the work. The Contractor/Developer shall grade the ground along each side of the pipe trench in a uniform and neat manner leaving the construction area in shape as near as possible to the original ground line and in as good or better condition than that prior to construction.



CONCRETE ARCH

CLASS A

REINFORCED As = 1.0% Bf = 4.8
REINFORCED As = 0.4% Bf = 3.4
PLAIN Bf = 2.8

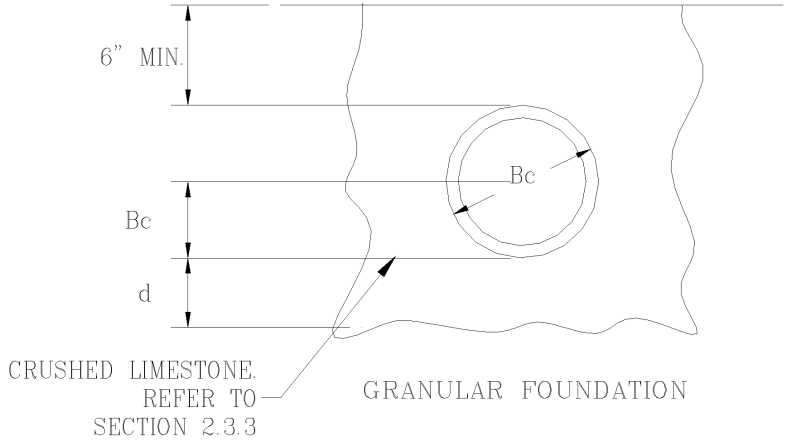


GRANULAR FOUNDATION

CLASS B

Bf = 1.9

R OPEN TERRAIN CUTS.



GRANULAR FOUNDATION

CLASS C

Bf = 1.5

DEPTH OF BEDDING
MATERIAL BELOW PIPE

D	d (MIN.)
27" & SMALLER	4"
30" TO 60"	4"
66" & LARGER	6"-12"

AREA OF
Bc CONCRETE AT INVERT OF CROWN.
H = EARTH LOAD BEDDING FACTOR

D
d

As

Bf

OWENSBORO METROPOLITAN
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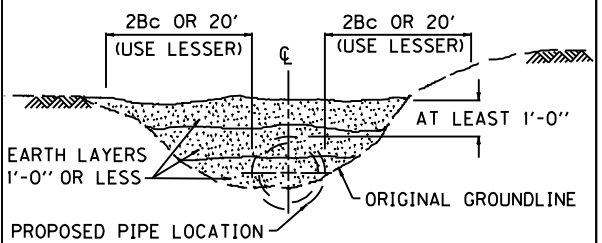
CHAPTER 7
STORM SEWERS

RCP BEDDING
DETAIL

EXHIBIT NO. 7-1
NOT TO SCALE

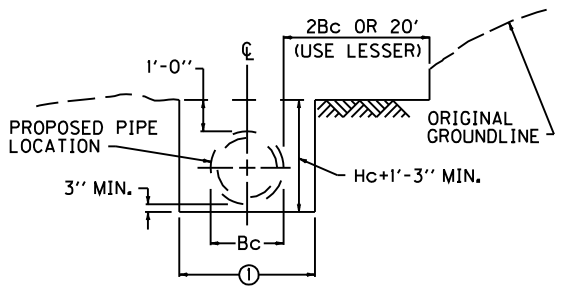
STEP 1



a. IF THE ORIGINAL GROUNDLINE IS AT LEAST 1'-0" ABOVE TOP OF PROPOSED PIPE FOR WIDTH OF 2Bc OR 20' (WHICHEVER IS LESS) ON EACH SIDE OF THE PIPE, GO DIRECTLY TO "STEP 2".

b. IF ORIGINAL GROUNDLINE IS NOT AT LEAST 1'-0" ABOVE TOP OF PROPOSED PIPE, COMPACT EMBANKMENT IN LAYERS 1'-0" OR LESS TO ELEVATION AND WIDTH SHOWN. ▭ MEET DENSITY REQUIREMENTS FOR PROPOSED EMBANKMENT .

STEP 2



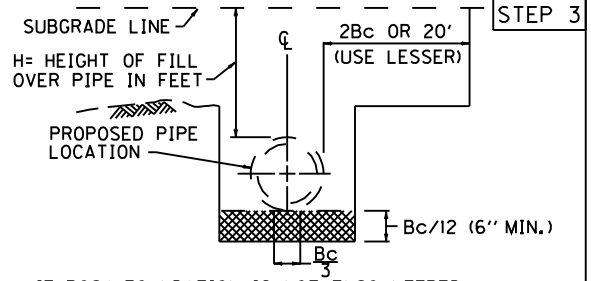
a. EXCAVATE TO WITHIN 1'-0" ABOVE TOP OF PROPOSED PIPE A WIDTH OF 2Bc OR 20' (USE LESSER) ON EACH SIDE OF PIPE.

b. EXCAVATE TRENCH TO WIDTH AND DEPTH SHOWN.

① Bc + 24" FOR PIPE 36" DIA. OR LESS.
Bc + 48" FOR PIPE GREATER THAN 36" DIA.

ROCK FOUNDATION DETAILS

STEP 3

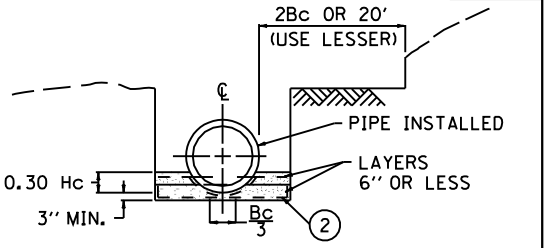


a. IF ROCK FOUNDATION IS NOT ENCOUNTERED, GO DIRECTLY TO "STEP 4".

b. IF ROCK FOUNDATION IS ENCOUNTERED, EXCAVATE TRENCH DEPTH USING FORMULA GIVEN. THIS DEPTH ▩ SHALL BE A MIN. OF 6" AND SHALL NOT EXCEED 24".

c. BACKFILL WITH COMPACTED BEDDING MATERIAL IN LAYERS 6" OR LESS LEAVING Bc/3 UNCOMPACTED IN THE FINAL LAYER.

STEP 4



a. UNCOMPACTED 4" BEDDING IN SUBTRENCH. FOR TYPE I INSTALLATION COMPACT BEDDING IN LAYERS 6" OR LESS TO AN ELEVATION 0.30 Hc. ▭ LEAVE CENTER THIRD OF OUTSIDE PIPE DIA. (Bc/3) BEDDING UNCOMPACTED.

b. EXCAVATE A GROOVE IN THE COMPACTED BEDDING TO CONFORM TO THE OUTSIDE OF THE PIPE. AFTER EXCAVATION OF THE GROOVE, A MINIMUM 3" OF BEDDING SHOULD REMAIN BELOW THE OUTSIDE INVERT OF THE PIPE. THE CRADLE SHALL BE GAGED FOR SHAPE AND SLOPE BY STRIKING OR DRAWING A TEMPLATE THROUGH THE GROOVE IMMEDIATELY BEFORE PLACING EACH SECTION OF PIPE.

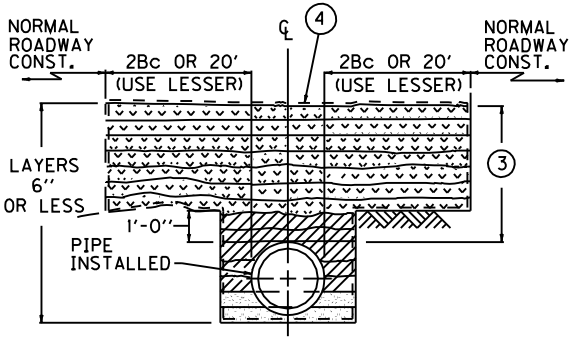
c. INSTALL PIPE AT CORRECT ALIGNMENT AND ELEVATION. RECOMPACT ANY LOOSE BEDDING DISTURBED DURING INSTALLATION.

② WRAP BEDDING MATERIAL IN GEOTEXTILE FABRIC WHEN THE STANDARD SPECIFICATIONS SPECIFIES.

STEP 5

NOTE: IN ROADWAY APPLICATIONS USE D.G.A. FOR BACKFILL UP TO BASE ASPHALT.

OUTSIDE ROADWAY APPLICATIONS, USE TABLE 3, EXHIBIT _____.



③ 4'-0" REQUIRED FOR CONSTRUCTION LOADING.

a. COMPACT REQUIRED BACKFILL MATERIAL IN LAYERS 6" OR LESS TO 1'-0" ABOVE TOP OF PIPE. ▨

b. COMPACT REQUIRED BACKFILL MATERIAL TO ELEV. ③ ABOVE TOP OF PIPE IN LAYERS OF 6" OR LESS. ▭

c. PROCEED WITH NORMAL ROADWAY CONSTRUCTION.

④ WRAP BEDDING MATERIAL IN GEOTEXTILE FABRIC WHEN THE STANDARD SPECIFICATIONS SPECIFIES.

MAX. COVER HEIGHT		
CLASS	TYPE 1	TYPE 4
III	25'	9'
IV	38'	15'
V	57'	23'

2' OF COVER OR LESS	
CLASS	PIPE DIA.
V	12"-15"-18"
IV	21"-24"
III	27" & LARGER

~ PIPE SHAPES ~

NOTE:

10' MAXIMUM COVER HEIGHT FOR HORIZONTAL ELLIPTICAL CLASS HE III PIPE.

COVER HEIGHTS EXCEEDING THOSE SHOWN IN TABLES REQUIRE SPECIAL DESIGNS.

FOR TYPE 4 INSTALLATION PLACE EMBANKMENT MATERIAL ACCORDING TO SECTION 701.03.06A OF THE CURRENT KTC SPEC. BOOK.

FOR TYPE I INSTALLATION, WHEN THE TOP OF PIPE IS NOT WITHIN ONE PIPE DIAMETER OF THE SUBGRADE, INSTALL ACCORDING TO SECTION 701.03.06A OF THE CURRENT KTC SPEC. BOOK.

SEE SHEET 2 OF 2 FOR TRENCH CONDITIONS

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

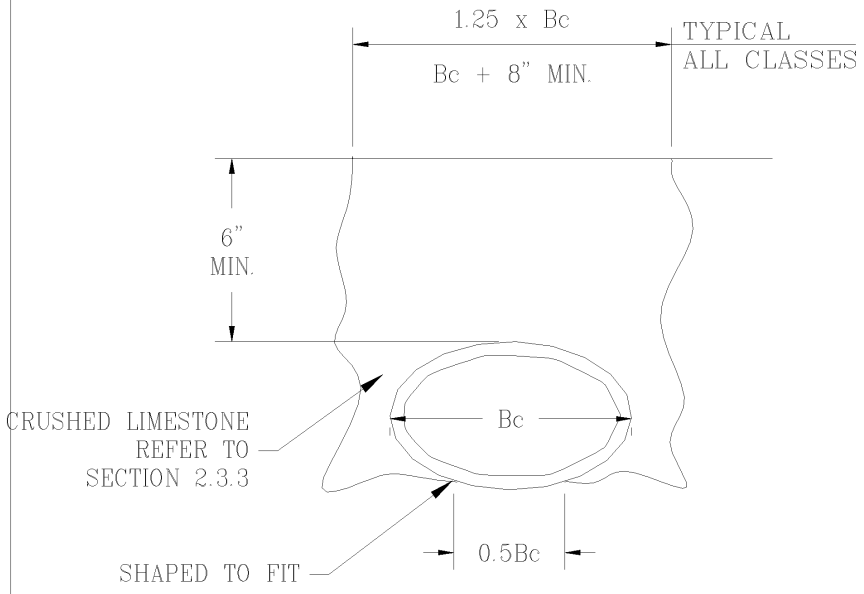
CHAPTER 7
STORM SEWERS

PIPE BEDDING FOR CULVERTS, ENTRANCE, AND STORM SEWER REINFORCED CONC. PIPE

EXHIBIT NO. 7-1-A

NOT TO SCALE

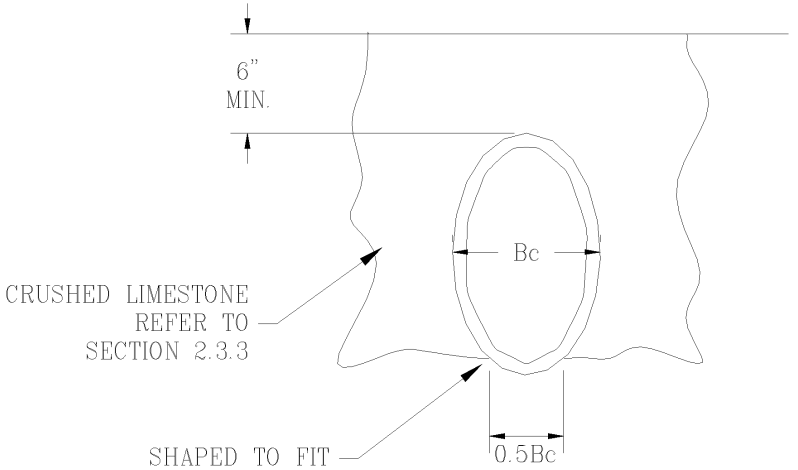
NOTE: SHEET REVISED NOVEMBER 27, 2006



HORIZONTAL ELLIPTICAL PIPE

CLASS C

Bf = 1.5

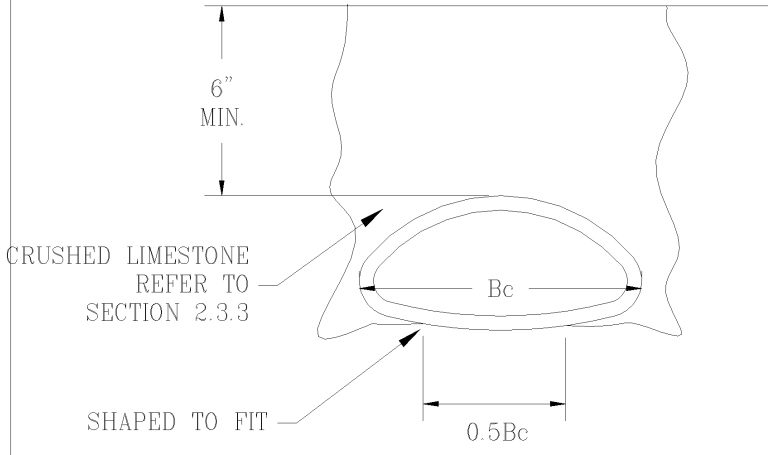


VERTICAL ELLIPTICAL PIPE

CLASS C

Bf = 1.5

R OPEN TERRAIN CUTS.



ARCH PIPE

CLASS C

Bf = 1.5

DEPTH OF BEDDING
MATERIAL BELOW PIPE

D	d (MIN.)
27" & SMALLER	4"
30" TO 60"	4"
66" & LARGER	6"

AREA OF
Bc CONCRETE AT INVERT OF CROWN.
H = EARTH LOAD BEDDING FACTOR

D
d

As

Bf

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

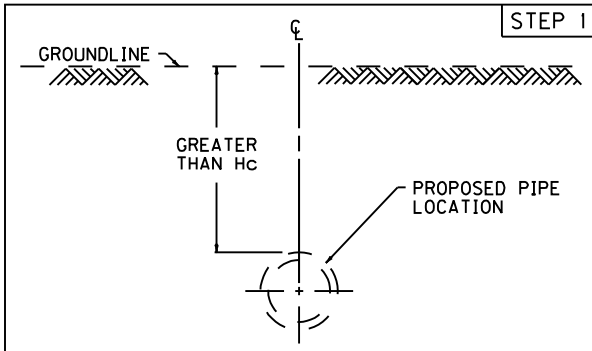
CHAPTER 7
STORM SEWERS

RCP BEDDING
DETAIL

EXHIBIT NO. 7-2

NOT TO SCALE

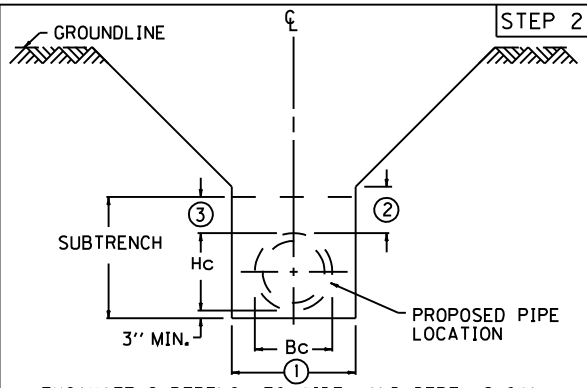
STEP 1



a. TRENCH CONDITION IS WHEN GROUNDLINE ELEVATION IS GREATER THAN Hc ABOVE TOP OF PROPOSED PIPE.

NOTE:
GROUNDLINE MAY BE (a) EXISTING OR ORIGINAL
(b) EXCAVATED SURFACE OR
(c) EMBANKMENT SURFACE.

STEP 2



a. EXCAVATE SUBTRENCH TO WIDTH AND DEPTH SHOWN.
b. TRENCH WALLS MAY BE CONSTRUCTED VERTICAL. FOR ILLUSTRATION PURPOSES THE DETAIL DEPICTS A SLOPING WALL TRENCH. WHICHEVER METHOD IS USED, THE TRENCH WALLS SHALL REMAIN SYMMETRICAL ABOUT THE CENTERLINE OF THE PIPE.

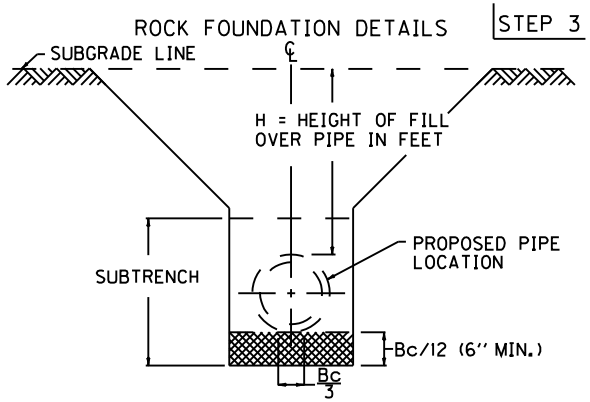
① Bc + 24" FOR PIPE 36" DIA. OR LESS.
Bc + 48" FOR PIPE GREATER THAN 36" DIA.

② SLOPING OF TRENCH WALLS MAY BEGIN AT ANY ELEVATION GREATER THAN 1'-0" ABOVE TOP OF PIPE. THE SUBTRENCH SHALL ALWAYS BE REQUIRED.

③ 1'-0" MINIMUM TO Hc MAXIMUM.

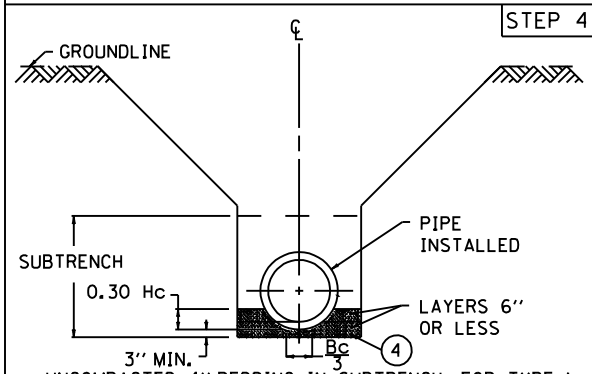
ROCK FOUNDATION DETAILS

STEP 3



a. IF ROCK FOUNDATION IS NOT ENCOUNTERED, GO DIRECTLY TO "STEP 4".
b. IF ROCK FOUNDATION IS ENCOUNTERED, EXCAVATE TRENCH DEPTH USING FORMULA GIVEN. THIS DEPTH ▩ SHALL BE A MIN. OF 6" AND SHALL NOT EXCEED 24"
c. BACKFILL WITH COMPACTED BEDDING MATERIAL IN LAYERS 6" OR LESS LEAVING Bc/3 UNCOMPACTED IN THE FINAL LAYER.

STEP 4



a. UNCOMPACTED 4" BEDDING IN SUBTRENCH. FOR TYPE 1 INSTALLATION COMPACT BEDDING IN LAYERS 6" OR LESS TO AN ELEVATION 0.30 Hc. ▩ LEAVE CENTER THIRD OF OUTSIDE PIPE DIA. (Bc/3) BEDDING UNCOMPACTED.

EXCAVATE A GROOVE IN THE BEDDING TO CONFORM TO THE OUTSIDE OF THE PIPE. AFTER EXCAVATION OF THE GROOVE, A MINIMUM 3" OF BEDDING SHOULD REMAIN BELOW THE OUTSIDE INVERT OF THE PIPE. THE CRADLE SHALL BE GAGED FOR SHAPE AND SLOPE BY STRIKING OR DRAWING A TEMPLATE THROUGH THE GROOVE IMMEDIATELY BEFORE PLACING EACH SECTION OF PIPE.

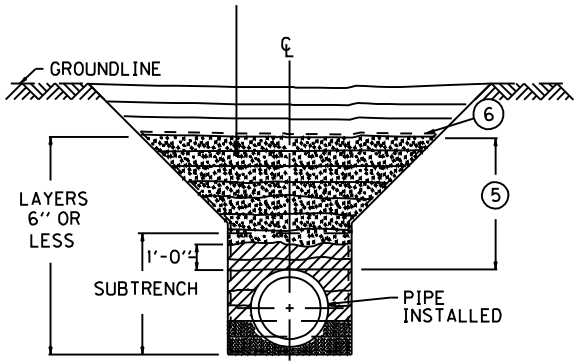
c. INSTALL PIPE AT CORRECT ALIGNMENT AND ELEVATION. RECOMPACT ANY LOOSE BEDDING DISTURBED DURING INSTALLATION.

④ WRAP BEDDING MATERIAL IN GEOTEXTILE FABRIC WHEN THE STANDARD SPECIFICATIONS SPECIFIES.

STEP 5

NOTE: IN ROADWAY APPLICATIONS USE D.G.A. FOR BACKFILL UP TO BASE ASPHALT.

OUTSIDE ROAWAY APPLICATIONS USE TABLE 2, EXHIBIT ___.



⑤ 4'-0" REQUIRED FOR CONSTRUCTION LOADING.

a. COMPACT REQUIRED BACKFILL MATERIAL IN LAYERS 6" OR LESS TO 1'-0" ABOVE TOP OF PIPE. ▨
b. IN A UNIFORM SYMMETRICAL MANNER COMPACT REQUIRED BACKFILL MATERIAL TO ELEVATION ⑤ ABOVE TOP OF PIPE IN LAYERS OF 6" OR LESS. ▩
c. PROCEED WITH TRENCH BACKFILL IN A SYMMETRICAL MANNER IN LAYERS 1'-0" OR LESS TO THE ORIGINAL GROUND AS DEFINED IN STEP 1.

⑥ WRAP BEDDING MATERIAL IN GEOTEXTILE FABRIC WHEN THE STANDARD SPECIFICATIONS SPECIFIES.

MAX. COVER HEIGHT		
CLASS	TYPE 1	TYPE 4
III	25'	9'
IV	38'	15'
V	57'	23'

2' OF COVER OR LESS	
CLASS	PIPE DIA.
V	12"-15"-18"
IV	21"-24"
III	27" & LARGER

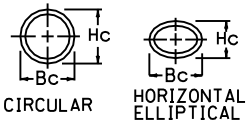
NOTE:
10' MAXIMUM COVER HEIGHT FOR HORIZONTAL ELLIPTICAL CLASS HE III PIPE.

COVER HEIGHTS EXCEEDING THOSE SHOWN IN TABLES REQUIRE SPECIAL DESIGNS.

FOR TYPE 4 INSTALLATION PLACE EMBANKMENT MATERIAL ACCORDING TO SECTION 701.03.06A OF CURRENT SPEC. BOOK.

FOR TYPE 1 INSTALLATION, WHEN THE TOP OF PIPE IS NOT WITHIN ONE PIPE DIAMETER OF THE SUBGRADE, INSTALL ACCORDING TO SECTION 701.03.06A OF THE CURRENT SPEC. BOOK.

~ PIPE SHAPES ~



NOTE: SHEET REVISED NOVEMBER 27, 2006

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

CHAPTER 7
STORM SEWERS

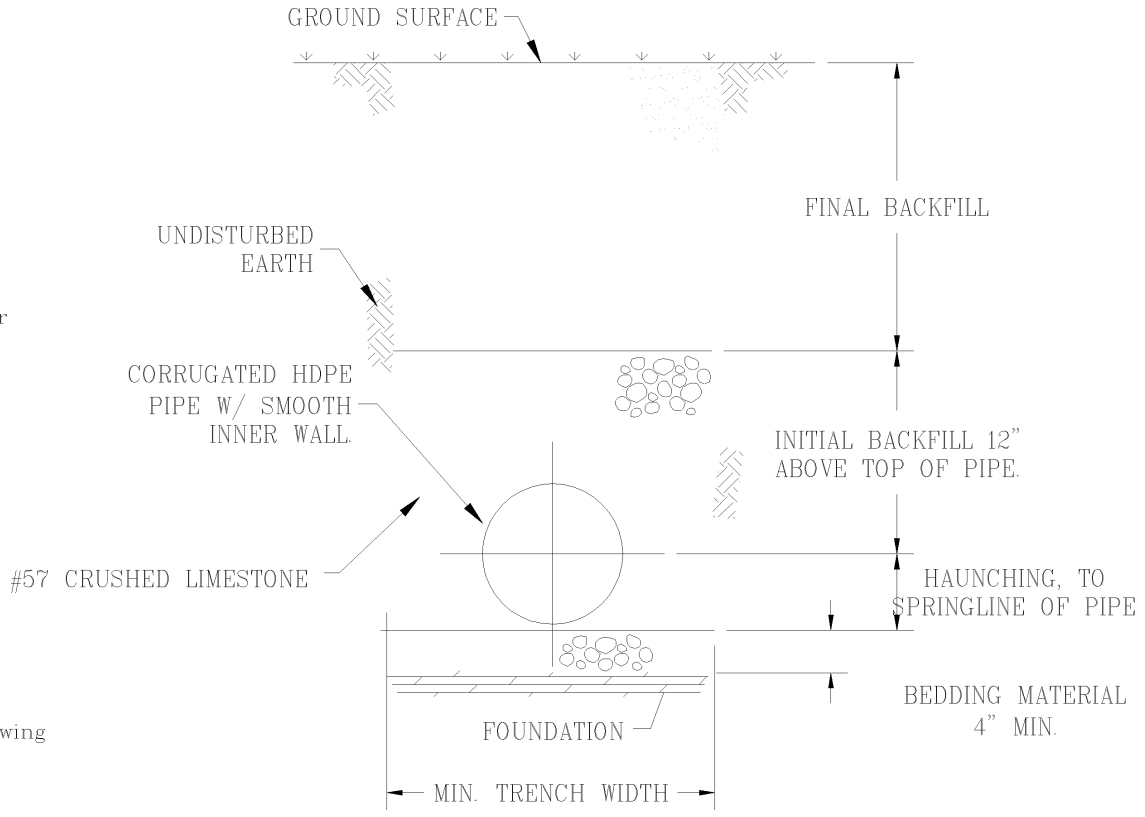
PIPE BEDDING FOR CULVERTS, ENTRANCE, AND STORM SEWER REINFORCED CONC. PIPE

EXHIBIT NO. 7-2-A

NOT TO SCALE

NOTES:

1. #57 crushed stone encasement. Place #57 crushed stone or equal in 8" maximum layers and work in around pipe by hand within the haunching zone.
2. For pipes with bells larger than the O.D. of the pipe barrel, provide bell holes in pipe bedding, no larger than necessary to ensure uniform pipe support. Fill all voids under bell by hand with bedding material.
3. To prevent migration of fines and loss of pipe support for installations where significant groundwater flow is anticipated, such as if pumping methods are required to dewater the trench excavation below the water table, or if after construction, the permeable encasement will act as a french drain under high ground water levels, the entire perimeter of the #57 crushed stone encasement shall be wrapped with an approved geotextile fabric, or the pipe is to be bedded and backfilled with dense grade, brought up in 6" maximum layers and compacted to 90% standard density.
4. For installations where the trench bottom is unstable, undercut to a depth as required by the engineer, and replace with a foundation of #57 crushed stone or dense grade compacted in maximum six inch layers.
5. To prevent damage to pipe and disturbance of the pipe encasement, provide a minimum depth of cover of 24" above the top of the pipe before allowing construction equipment to traffic the trench surface.
6. Pipe joints to be bell and spigot with O'ring gasket meeting ASTM F477.
7. Pipe sizes 30" through 48" are for information only. These pipe sizes are only to be used in special circumstances, and at the approval of the Engineer.



TYPICAL TRENCH CROSS-SECTION
(N.T.S.)

Unless otherwise specified by the Engineer, Minimum trench widths shall be as follows:

NOMINAL DIAMETER, (IN)	MIN. RECOMMENDED TRENCH WIDTH, (IN)
4	21
6	23
8	25
10	28
12	31
15	34
18	39
24	48

SEE NOTE 7

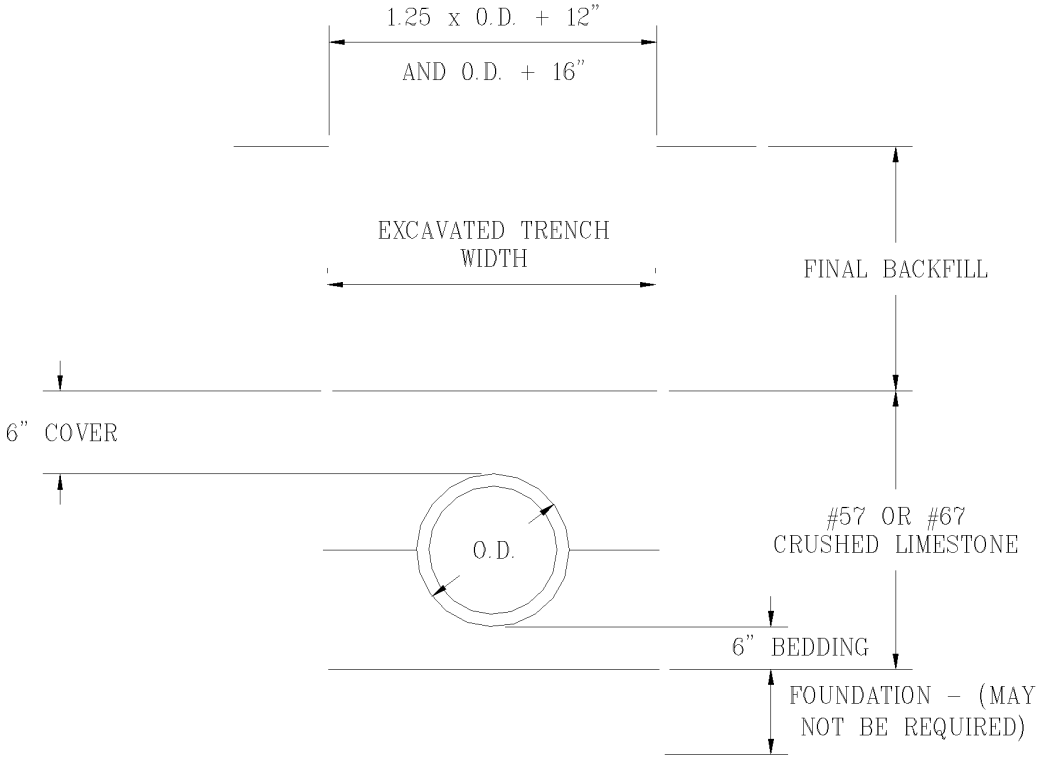
30	66
36	78
42	83
48	89

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

CHAPTER 7
STORM SEWERS

HDPE PIPE BEDDING
DETAIL

EXHIBIT NO. 7-3
NOT TO SCALE



PVC PIPE BEDDING DETAIL

NOTES:

MINIMUM BENDING RADIUS = 300 x O.D.

WHEN COVER FROM STREET GRADE TO TOP OF PIPE IS 2'-0" OR LESS, PIPE SHALL BE BEDDED IN DRY MIX, OR SHALL HAVE A 6" CONCRETE ARCH.

WHEN COVER IS GREATER THAN 2'-0", ABOVE DETAIL SHALL BE USED.

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

CHAPTER 7
STORM SEWERS

PVC PIPE
BEDDING DETAIL

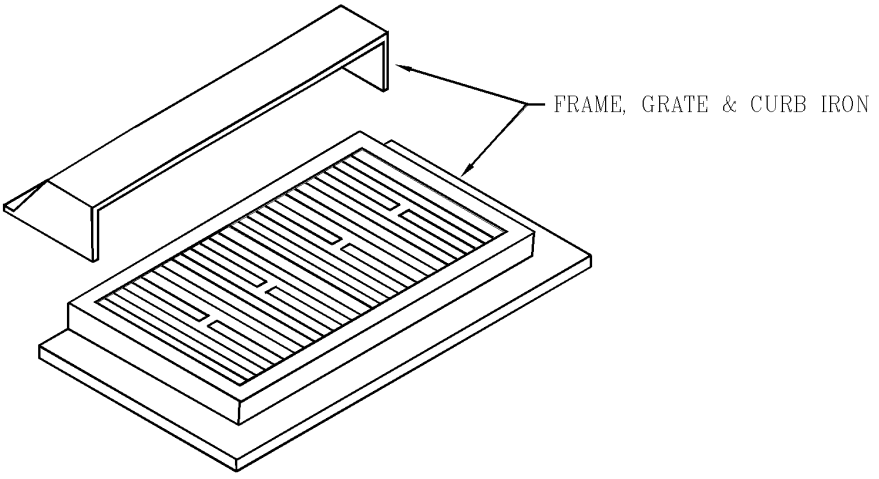
EXHIBIT NO. 7-4
NOT TO SCALE

ACCEPTABLE CASTINGS
FOR CURB INLETS

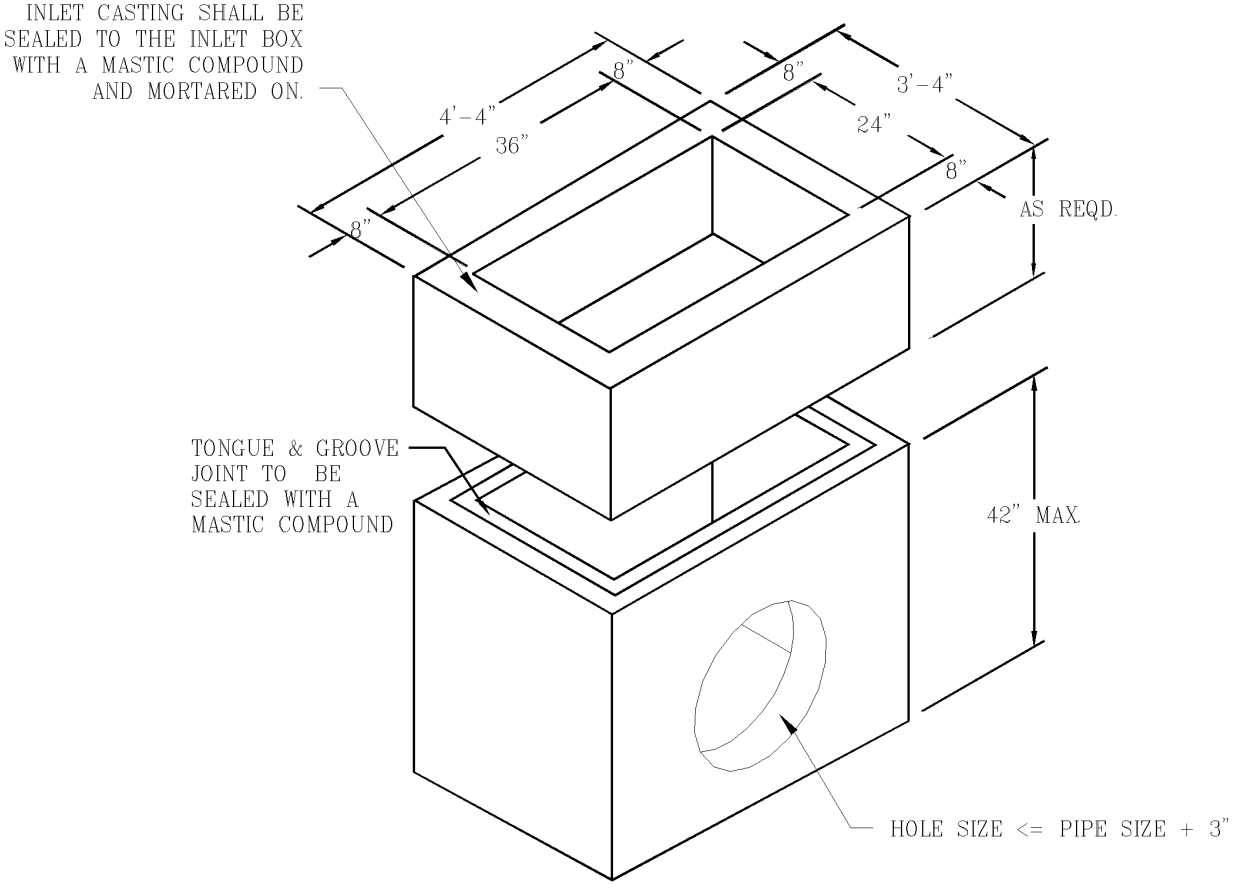
- NEENAH R-3246
- EAST JORDAN 7030 M-4
- JOHN BOUCHARD & SONS 3080

ACCEPTABLE CASTINGS
FOR VALLEY INLETS
(IN DRIVEWAYS)

- NEENAH R-3510
- EAST JORDAN 7370



INLET CASTING DETAIL



INLET BOX DETAIL

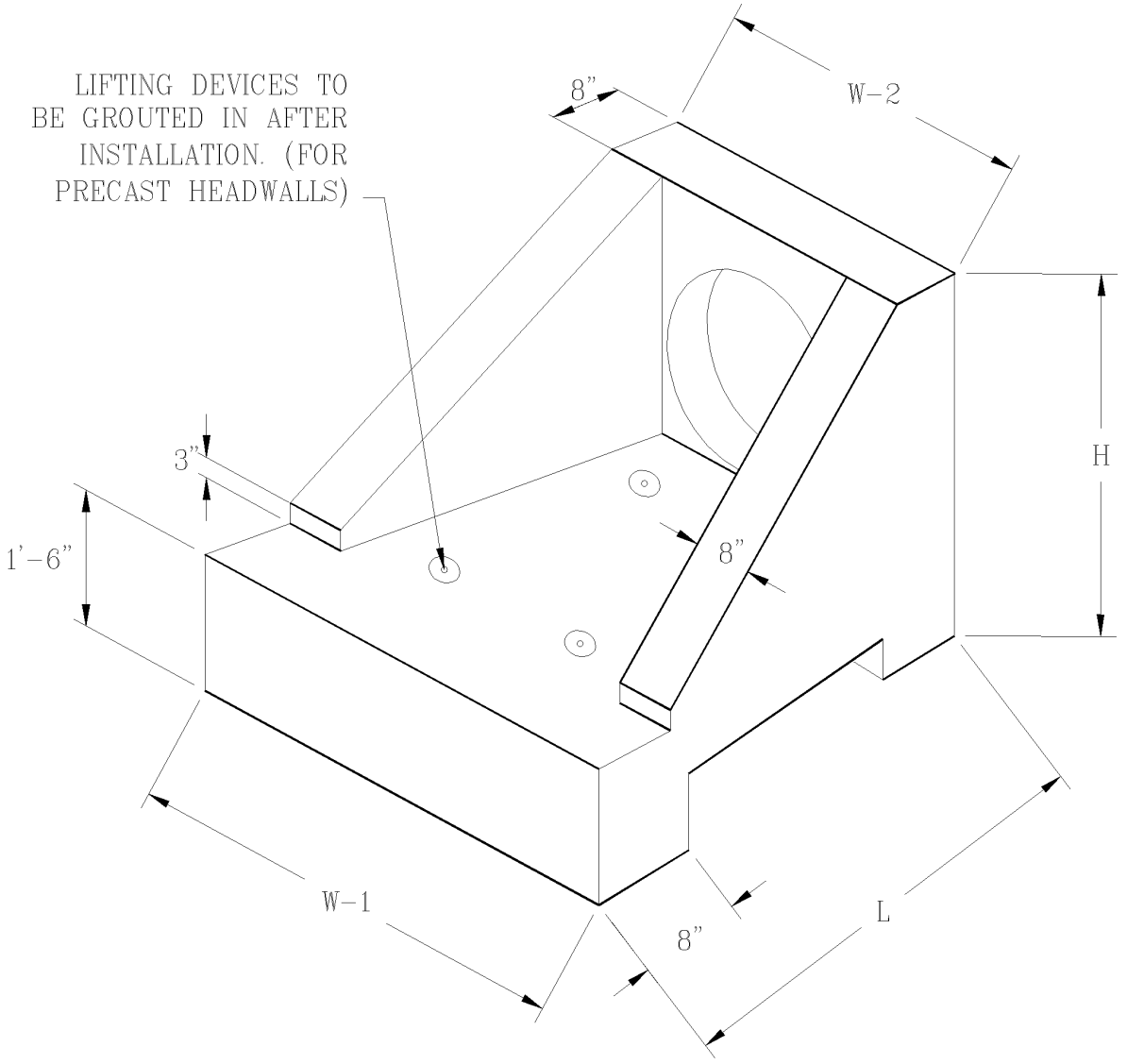
NOTES:
CLASS A CONCRETE
2"MIN. CONCRETE COVER
OPENINGS FOR PIPE AS REQD.
REINF.-#5 REBAR @ 12" C.C. EA. WAY
6" THICK BASE SLAB
WEIGHT: BASE - 3,600lbs.max
RISER - 900lbs./vert.ft.
FOR PIPES LARGER THAN 30", ADDITIONAL DESIGN IS REQUIRED

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

CHAPTER 7
STORM SEWERS

INLET BOX AND
CASTING DETAILS

EXHIBIT NO. 7-5
NOT TO SCALE



DIMENSIONS					
PIPE DIA.	H	L	W-1	W-2	WEIGHT
12"	2'-5"	3'-6"	4'-0"	2'-6"	2,349lbs.
15"	2'-8"	4'-0"	4'-9"	2'-9"	3,037lbs.
18"	2'-11"	4'-6"	5'-3"	3'-0"	3,766lbs.
21"	3'-2"	5'-0"	6'-0"	3'-3"	4,617lbs.
24"	3'-5"	5'-6"	6'-6"	3'-6"	5,467lbs.
27"	3'-8"	6'-0"	7'-0"	3'-9"	6,358lbs.

NOTES:
USE CLASS A CONCRETE
2"MIN. CONCRETE COVER
OPENINGS FOR PIPE AS REQD.
REINF.-#5 REBAR @ 12" C.C. EA. WAY
8" THICK BASE SLAB
WEIGHT: BASE - 3,600lbs.max
RISER - 900lbs./vert.ft.
WINGWALLS ARE FLARED 15°

OWENSBORO METROPOLITAN
PUBLIC IMPROVEMENT SPECIFICATIONS

CHAPTER 7
STORM SEWERS

SLOPE AND FLARED
HEADWALL (12"-27")

EXHIBIT NO. 7-6
NOT TO SCALE