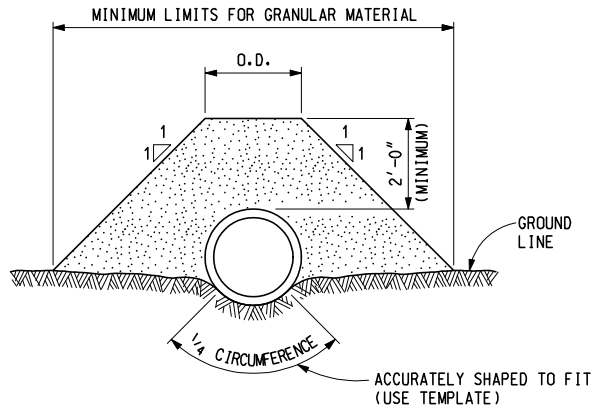


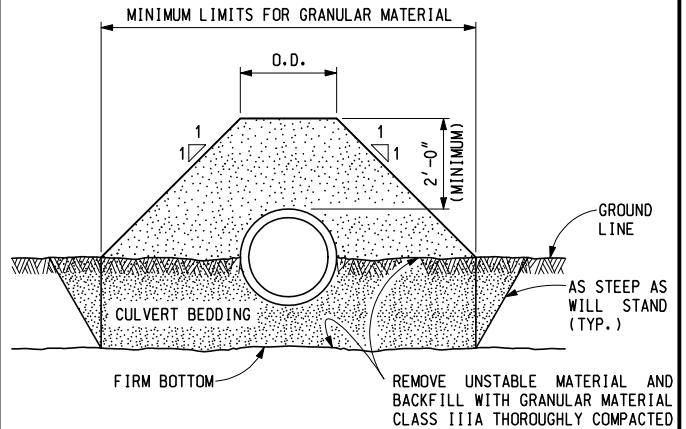
EMBANKMENT BETWEEN GROUND LINE AND 2'-0" MINIMUM ABOVE TOP OF PIPE CULVERT SHALL CONSIST OF GRANULAR MATERIAL CLASS IIIA COMPACTED TO 95% OF ITS MAXIMUM UNIT WEIGHT. THE MATERIAL SHALL BE DEPOSITED AND COMPACTED IN LAYERS NOT MORE THAN 10" IN THICKNESS.



NOTE:
TRENCH MAY BE UNDERCUT BELOW CULVERT AND THE UNDERCUT MATERIAL REPLACED WITH GRANULAR MATERIAL.

CROSS-SECTION SHOWING CULVERT INSTALLATION IN STABLE SOIL

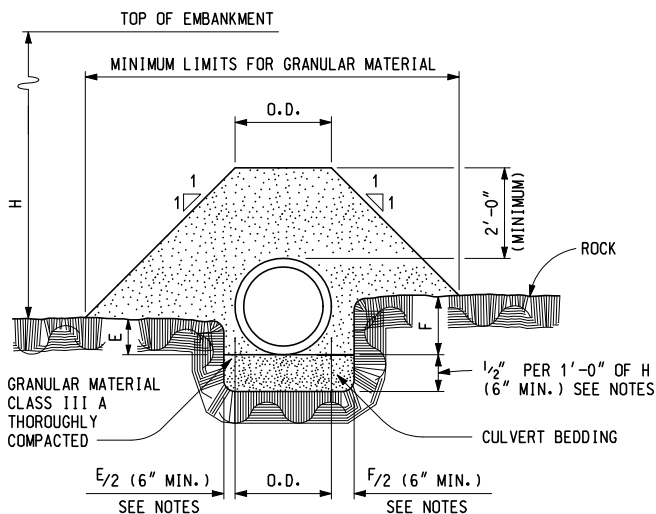
EMBANKMENT BETWEEN GROUND LINE AND 2'-0" MINIMUM ABOVE TOP OF PIPE CULVERT SHALL CONSIST OF GRANULAR MATERIAL CLASS IIIA COMPACTED TO 95% OF ITS MAXIMUM UNIT WEIGHT. THE MATERIAL SHALL BE DEPOSITED AND COMPACTED IN LAYERS NOT MORE THAN 10" IN THICKNESS.



NOTE:
PLACE AND COMPACT CULVERT BEDDING TO THE LEVEL OF $\frac{1}{4}$ THE DIAMETER OF THE PIPE CULVERT AND THEN EXCAVATE AND SHAPE A TRENCH TO FIT THE PIPE. AFTER PLACING CULVERT, CONTINUE FILLING WITH CULVERT BEDDING TO GROUND LINE.

CROSS-SECTION SHOWING CULVERT INSTALLATION IN UNSTABLE SOIL

EMBANKMENT BETWEEN GROUND LINE AND 2'-0" MINIMUM ABOVE TOP OF PIPE CULVERT SHALL CONSIST OF GRANULAR MATERIAL CLASS IIIA COMPACTED TO 95% OF ITS MAXIMUM UNIT WEIGHT. THE MATERIAL SHALL BE DEPOSITED AND COMPACTED IN LAYERS NOT MORE THAN 10" IN THICKNESS.



NOTE:
PLACE AND COMPACT GRANULAR MATERIAL CLASS IIIA TO THE LEVEL OF $\frac{1}{4}$ THE DIAMETER OF THE PIPE CULVERT AND THEN EXCAVATE AND SHAPE A TRENCH TO FIT THE PIPE.

CROSS-SECTION SHOWING CULVERT INSTALLATION IN ROCK

NOTES:

CORRUGATED STEEL PIPE, CORRUGATED POLYETHYLENE, AND ALUMINUM ALLOY PIPE SHALL HAVE A MINIMUM OF 12" OF GRANULAR MATERIAL CLASS IIIA PLACED COMPLETELY AROUND THE PIPE FOR ITS FULL LENGTH EXCEPT FOR BEDDING.

THE ENGINEER SHALL DESIGNATE THE REQUIRED DETAIL BASED ON SOIL CONDITIONS ENCOUNTERED.

UNSTABLE SOIL IS SOIL TOO SOFT OR SPONGY TO PROVIDE A FIRM BED FOR THE PIPE CULVERT.

NO REDUCTION SHALL BE MADE IN THE REGULAR EMBANKMENT QUANTITY FOR THE SPACE OCCUPIED BY THE CULVERT.

PIPE CULVERTS IN CUT SECTIONS SHALL BE PLACED ACCORDING TO THE DETAILS SPECIFIED ON STANDARD PLAN R-83-SERIES.

WHEN AN END SECTION IS USED IN LIEU OF A HEADWALL, A STABLE FOUNDATION SHALL BE PROVIDED FOR THE END SECTION COMPARABLE TO THAT PROVIDED BY THE CULVERT.

WHEN BELL AND SPIGOT PIPE IS USED IN A ROCK TRENCH, A MINIMUM OF 4" OF CULVERT BEDDING WILL BE REQUIRED UNDER THE BELL.



PREPARED BY
DESIGN
SUPPORT AREA

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

David D. Chin
ENGINEER OF CONSTRUCTION & TECHNOLOGY

Calvin Roberts
ENGINEER OF MAINTENANCE

James D. Culp
ENGINEER OF TRAFFIC AND SAFETY

Mark A. H. Smith
ENGINEER OF DESIGN SUPPORT AREA
DEPARTMENT DIRECTOR
Gloria J. Jeff

John L. Blum
ENGINEER OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

BEDDING AND FILLING AROUND PIPE CULVERTS

11-14-2003
F.H.W.A. APPROVAL

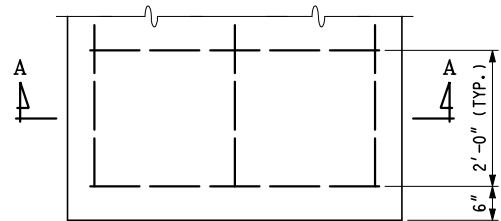
6-25-2002
PLAN DATE

R-82-D

SHEET
1 OF 2

The diagram illustrates a standard manhole structure with the following dimensions and components:

- Top Width:** O.D. (Outside Diameter)
- Slopes:** 1:1 (indicated by triangles on the side slopes)
- Height:** 2' - 0" (MINIMUM)
- Ground Line:** Indicated by a horizontal line with hatching above it.
- Manhole Opening:** O.D. / 2 (radius), with a note "DESIRABLE MIN." (Desirable Minimum).
- Base Dimensions:** 4" (width of the base slab on each side of the manhole opening), O.D. (width of the base slab), and 4" (width of the base slab on each side of the manhole opening).
- Full Bearing:** Indicated by a horizontal line with hatching below the base slab.



#6 BAR (TYP.)
LENGTH AS REQUIRED

#6 BAR
LENGTH = 1.5 OUTSIDE DIAMETER

O.D./12
(2" MIN.)

4"

O.D./2

O.D. + 8"

O.D./4

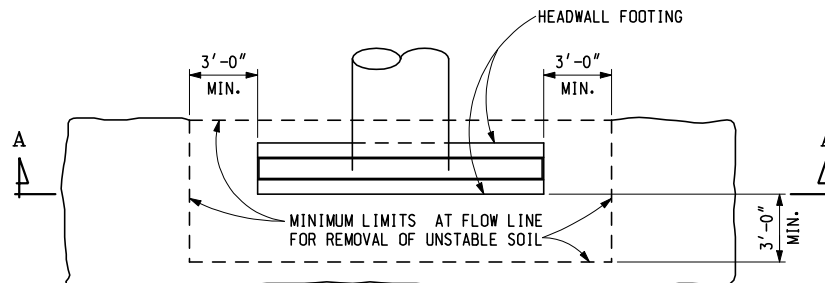
O.D./6

O.D./8

1.0 D.

TABLE OF QUANTITIES BASED ON THE OUTSIDE DIAMETER (O.D.) OF PIPE			
INSIDE DIAMETER OF PIPE	OUTSIDE DIAMETER OF PIPE	CYD CONCRETE PER LFT	LBS STEEL PER LFT
18"	1.916'	0.061	9.7
24"	2.500'	0.096	10.3
30"	3.083'	0.140	11.0
36"	3.667'	0.191	11.6
42"	4.250'	0.250	12.3

CULVERT INSTALLATION WITH CONCRETE CRADLE



NOTE:
THE TRENCH FOR THE CURTAIN WALL SHALL BE
EXCAVATED AFTER THE GRANULAR MATERIAL
CLASS II IS PLACED AND COMPACTED TO THE
ELEVATION OF THE TOP OF THE CURTAIN WALL.

CULVERT HEADWALL INSTALLATION IN UNSTABLE SOIL

BEDDING AND FILLING AROUND PIPE CULVERTS

SHEET
2 OF 2