

① CONCRETE PIPE CLASS B BEDDING				
Diameter of Pipe, D (mm)	(H) Maximum allowable cover (meters)			
	75 D	100 D	150 D	175 D
450	3.4	4.0	6.1	7.6
600	3.7	4.3	6.4	7.9
900	4.0	4.9	7.0	8.5
1200	4.3	4.9	7.3	8.8
1500	4.3	5.2	7.3	8.8
1800	4.3	5.2	7.3	9.1
2100	4.6	5.2	7.6	9.1
2400	4.6	5.5	7.6	9.4
2700	4.6	5.5	7.9	9.8

② CONCRETE PIPE CLASS C BEDDING				
Diameter of Pipe, D (mm)	(H) Maximum allowable cover (meters)			
	75 D	100 D	150 D	175 D
450	2.7	3.7	5.5	6.7
600	3.0	4.0	5.8	7.0
900	3.4	4.3	6.1	7.3
1200	3.4	4.6	6.4	7.6
1500	3.7	4.6	6.4	7.9
1800	3.7	4.9	6.7	7.9
2100	4.0	4.9	6.7	8.2
2400	4.0	4.9	7.0	8.2
2700	4.0	5.2	7.0	8.5

#### GENERAL NOTES:

The maximum allowable cover values indicated hereon for the various kind of pipe culvert installations are design values based on current Standard and Supplemental Specifications and other normal conditions.

When unclassified pipe is specified, it is the contractor's responsibility to furnish and install a class of pipe meeting the requirements on the chart.

Minimum allowable cover for roadway culverts is 600 millimeters and for entrance culverts is 300 millimeters.

Refer to tabulation of culvert installations and other details project plans as well as appropriate other Standard Road Plans for additional information regarding individual culvert installations.

#### NOTE:

Where a pipe size not listed in the table is required, the 'H' indicated for the next smaller size shown shall apply.

#### DESIGN CRITERIA

The height of cover table have been prepared from data in the "Concrete Pipe Design Manual" published by the American Concrete Pipe Association using the values listed below:

#### FOR EMBANKMENT CONDITIONS

Fill material density =  $w = 1920$  kilograms per cubic meter

Settlement Ratio =  $rsd = +0.5$

\* =  $ku = 0.13$

Project Ratio =  $p = 0.9$  (Class C Bedding)

=  $p = 0.7$  (Class B Bedding)

Factor of Safety =  $F.S. = 1.33$  on Ultimate Strength

\*Using a ratio of lateral to vertical earth pressure ( $k$ ) of 0.37 (saturated yellow clay) and a coefficient of internal friction ( $u$ ) of 0.34.

#### NOTE:

The data shown hereon has been calculated for concrete pipe placed under embankment conditions. The values shown hereon for 'H' do not apply to design and installation of sanitary sewer except where sanitary sewer would be placed under embankment condition.


#### SPECIAL NOTES:

Special installations may be designed to exceed indicated maximum allowable cover by specific modification of one or more of the following conditions:

1. Bedding Class
2. Pipe Strength (including special design pipe)
3. Type of backfill or cover material
4. Compaction requirements for backfill or cover material
5. Controlled trench width

Where site conditions favor such modifications significant economy may result from special design installations and these should be considered. Special designs shall specify particular modification of construction requirements or design criteria as applicable. Necessary modifications of normal requirements will not ordinarily be paid for separately but will be included in the price bid for that culvert pipe.

All dimensions given in millimeters unless noted.

<b>METRIC VERSION</b>	 <b>Iowa Department of Transportation</b> Project Development Division	
	<b>STANDARD ROAD PLAN</b>	<b>RF-31</b>
	REVISION: Change reference from Class "C" to Class "B" Bedding in General Notes.	REVISION NO. 1
	<i>David P. Smith</i> 06-23-97 APPROVED BY DESIGN METHODS ENGINEER	REVISION DATE 10-28-97
	DEPTH OF COVER TABLES FOR CONCRETE PIPE	