



Planning and Community  
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# DEVIATION REQUEST AND DECISION FORM

Updated: 6/26/2019

## PROJECT INFORMATION

Project Name : Mountain's Edge  
 Schedule No.(s) : 3200000740  
 Legal Description : N2N2SW4 EX THAT PT CONVEYED BY REC # 219060197 SEC 13-12-63

## APPLICANT INFORMATION

Company : M.V.E., Inc.  
 Name : David Gorman  
 Owner  Consultant  Contractor  
 Mailing Address : 1903 Lelaray Street, Suite 200  
 Colorado Springs, CO 80909  
 Phone Number : 719-635-5736  
 FAX Number :  
 Email Address : Daveg@mvecivil.com

## ENGINEER INFORMATION

Company : M.V.E., Inc.  
 Name : David Gorman Colorado P.E. Number : 31672  
 Mailing Address : 1903 Lelaray Street, Suite 200  
 Colorado Springs, CO 80909  
 Phone Number : 719-635-5736  
 FAX Number :  
 Email Address : Daveg@mvecivil.com

## OWNER, APPLICANT, AND ENGINEER DECLARATION

To the best of my knowledge, the information on this application and all additional or supplemental documentation is true, factual and complete. I am fully aware that any misrepresentation of any information on this application may be grounds for denial. I have familiarized myself with the rules, regulations and procedures with respect to preparing and filing this application. I also understand that an incorrect submittal will be cause to have the project removed from the agenda of the Planning Commission, Board of County Commissioners and/or Board of Adjustment or delay review until corrections are made, and that any approval of this application is based on the representations made in the application and may be revoked on any breach of representation or condition(s) of approval.

    *Bill the Manager*         *June 3, 20*      
 Signature of owner (or authorized representative) Date

Engineer's Seal, Signature  
 And Date of Signature



**DEVIATION REQUEST** (Attach diagrams, figures, and other documentation to clarify request)

A deviation from the standards of or in Section **4.3.6.A.3** of the Engineering Criteria Manual (ECM) is requested.

Identify the specific ECM standard which a deviation is requested:

- Storm Sewer Lines: **At no time shall storm sewer lines be placed less than 2 feet in** depth measured perpendicularly to the finished road surface. When placed outside the road, at no time shall the storm sewer lines be placed less than 1 foot in depth from the ground surface.
- Storm Sewer Lines: Include pipe culverts, box culverts, and manholes, excluding the risers

State the reason for the requested deviation:

The culvert's proximity to McClelland Road and existing topographical conditions of the McClelland Road east roadside ditch do not allow for installation of the culvert with 2 ft. of cover.

Explain the proposed alternative and compare to the ECM standards (May provide applicable regional or national standards used as basis):

ECM Section 3.3.2.1.7 states "Minimum and maximum cover for culverts shall be determined based on loading, type and class of pipe, manufacturer's recommendation, and soil bedding conditions....."

Standard Practice Reinforced Concrete Pipe allows for installation of pipe cover as low as 1 foot.

The proposed 14"x23" elliptical pipe is equivalent to an 18" circular pipe. The Concrete Pipe Association has issued a design aid titled Concrete Pipe Association Fill Height Table indicates 21" or 24" Class III pipe with Type 4 bedding is adequate for 1 ft of cover for AASHTO HL-93 loading (approximately equivalent to the old HS-20 designation). The referenced CPA document is attached.

We have specified Class IV pipe for this culvert for added reliability with 1 ft. of cover.

**LIMITS OF CONSIDERATION**

(At least one of the conditions listed below must be met for this deviation request to be considered.)

- The ECM standard is inapplicable to the particular situation.
- Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.
- A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

Provide justification:

The location of the proposed reinforced concrete pipe (RCP) is at the intersection of existing McClelland Road and proposed Farmhouse Court. The topography of the existing shallow roadside ditch of McClelland Road extending far to the north and south of the site, coupled with the topography of the site east of McClelland Road which slopes down to the east, creates a condition that prevents use of RCP culvert with more than 1 foot of cover from the road surface. As a partial solution, an elliptical pipe is specified at this location to decrease the cross-sectional height but maintain pipe capacity equivalent to an 18" round RCP.

The proposed 14"x23" elliptical pipe is shown by the Concrete Pipe Association's Fill Height Table to be adequate with Class III pipe, Type 4 bedding and 1 ft of cover for AASHTO HL-93 loading (approximately equivalent to the old HS-20 designation). The referenced CPA document is attached. Additionally, we have specified Class IV pipe for this culvert for added reliability.

**CRITERIA FOR APPROVAL**

Per ECM section 5.8.7 the request for a deviation may be considered if the request is **not based exclusively on financial considerations**. The deviation must not be detrimental to public safety or surrounding property. The applicant must include supporting information demonstrating compliance with **all of the following criteria**:

The deviation will achieve the intended result with a comparable or superior design and quality of improvement.

The proposed 14"x23" elliptical pipe is shown by the Concrete Pipe Association's Fill Height Table to be adequate with Class III pipe, Type 4 bedding and 1 ft of cover for AASHTO HL-93 loading (approximately equivalent to the old HS-20 designation). Additionally, we have specified Class IV pipe for this culvert for added reliability. Based on these findings, The deviation will achieve the intended result with a comparable or superior design and quality of improvement.

The deviation will not adversely affect safety or operations.

The proposed culvert meets applicable loading standards and will not affect safety. The proposed culvert will be installed in the roadside ditch in the same manner as the typical culvert installations in the County and will not affect normal operations of the road or road maintenance.

The deviation will not adversely affect maintenance and its associated cost.

The proposed Reinforced Concrete Pipe culvert will be structurally sound at the depth of cover specified and service life for the culvert will meet or exceed County requirements based on manufacturer design recommendations and literature. The deviation will not adversely affect maintenance and its associated cost.

The deviation will not adversely affect aesthetic appearance.

The deviation concerning depth of cover for a proposed Reinforced Concrete Pipe culvert will not be noticeably different than other culvert installations in the area and will not adversely affect aesthetic appearance of the road or roadside ditches.

The deviation meets the design intent and purpose of the ECM standards.

The deviation concerning depth of cover for a proposed Reinforced Concrete Pipe culvert meets the design intent and purpose of the ECM standards because the design fulfills the purpose of the adequately draining flows under the proposed roadway, does not adversely affect health, safety and welfare of the public, nor does it adversely impact the ability of the county to maintain the road and culvert or increase the costs of maintenance.

The deviation meets the control measure requirements of Part I.E.3 and Part I.E.4 of the County's MS4 permit, as applicable.

The deviation concerning depth of cover for a proposed Reinforced Concrete Pipe culvert does not interfere with or affect control measures or control measure requirements and therefore meets all control measure requirements of El Paso County's MS4 permit.

**REVIEW AND RECOMMENDATION:**

**Approved by the ECM Administrator**

This request has been determined to have met the criteria for approval. A deviation from Section 4.3.6.A.3 of the ECM is hereby granted based on the justification provided.

**APPROVED**  
**Engineering Department**

*11/16/2021 4:07:18 PM*

*dsdnijkamp*

**EPC Planning & Community  
Development Department**

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**Denied by the ECM Administrator**

This request has been determined not to have met criteria for approval. A deviation from Section \_\_\_\_\_ of the ECM is hereby denied.

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**ECM ADMINISTRATOR COMMENTS/CONDITIONS:**

## **1.1. PURPOSE**

The purpose of this resource is to provide a form for documenting the findings and decision by the ECM Administrator concerning a deviation request. The form is used to document the review and decision concerning a requested deviation. The request and decision concerning each deviation from a specific section of the ECM shall be recorded on a separate form.

## **1.2. BACKGROUND**

A deviation is a critical aspect of the review process and needs to be documented to ensure that the deviations granted are applied to a specific development application in conformance with the criteria for approval and that the action is documented as such requests can point to potential needed revisions to the ECM.

## **1.3. APPLICABLE STATUTES AND REGULATIONS**

Section 5.8 of the ECM establishes a mechanism whereby an engineering design standard can be modified when if strictly adhered to, would cause unnecessary hardship or unsafe design because of topographical or other conditions particular to the site, and that a departure may be made without destroying the intent of such provision.

## **1.4. APPLICABILITY**

All provisions of the ECM are subject to deviation by the ECM Administrator provided that one of the following conditions is met:

- The ECM standard is inapplicable to a particular situation.
- Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship on the applicant, and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.
- A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

## **1.5. TECHNICAL GUIDANCE**

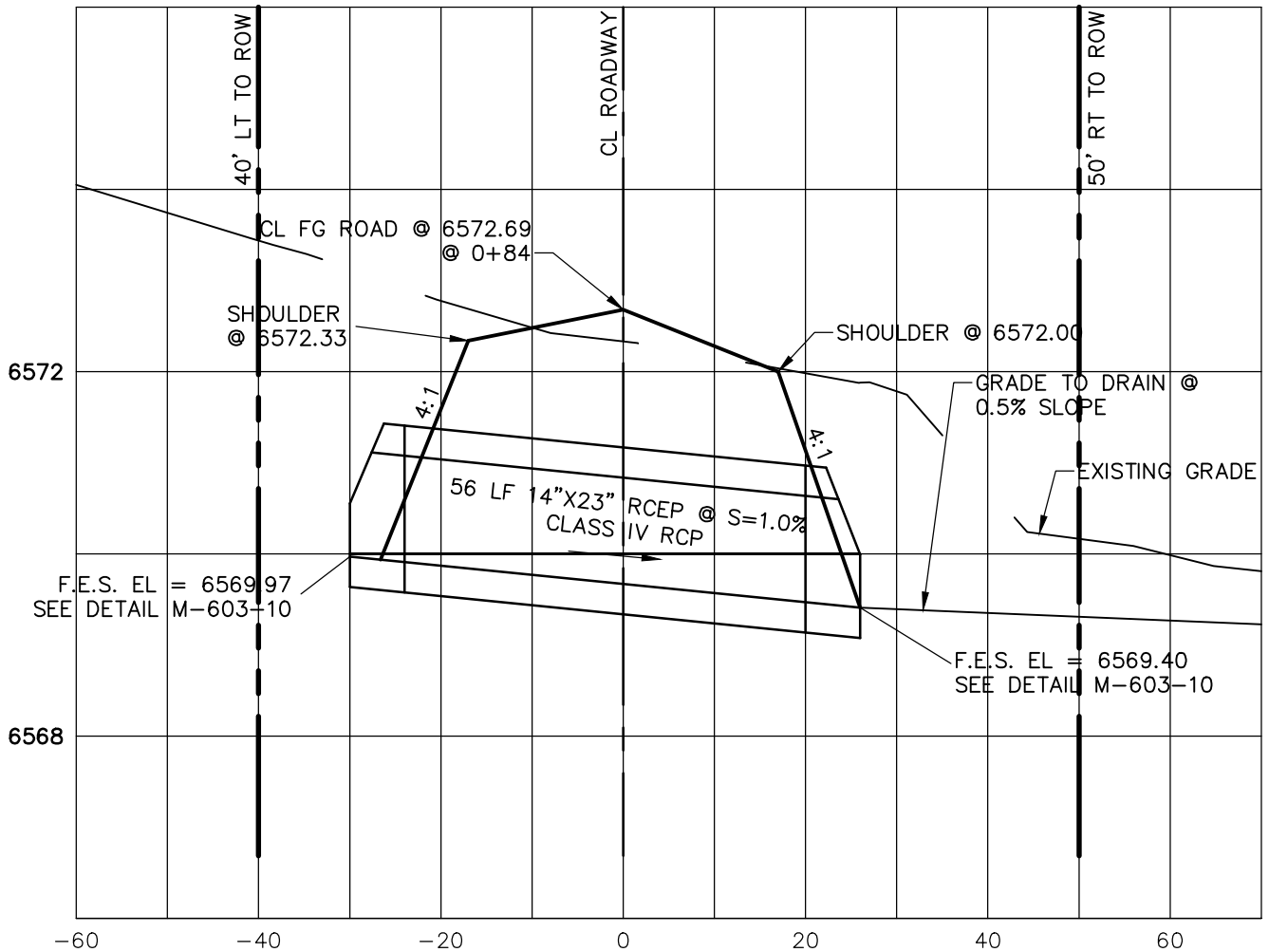
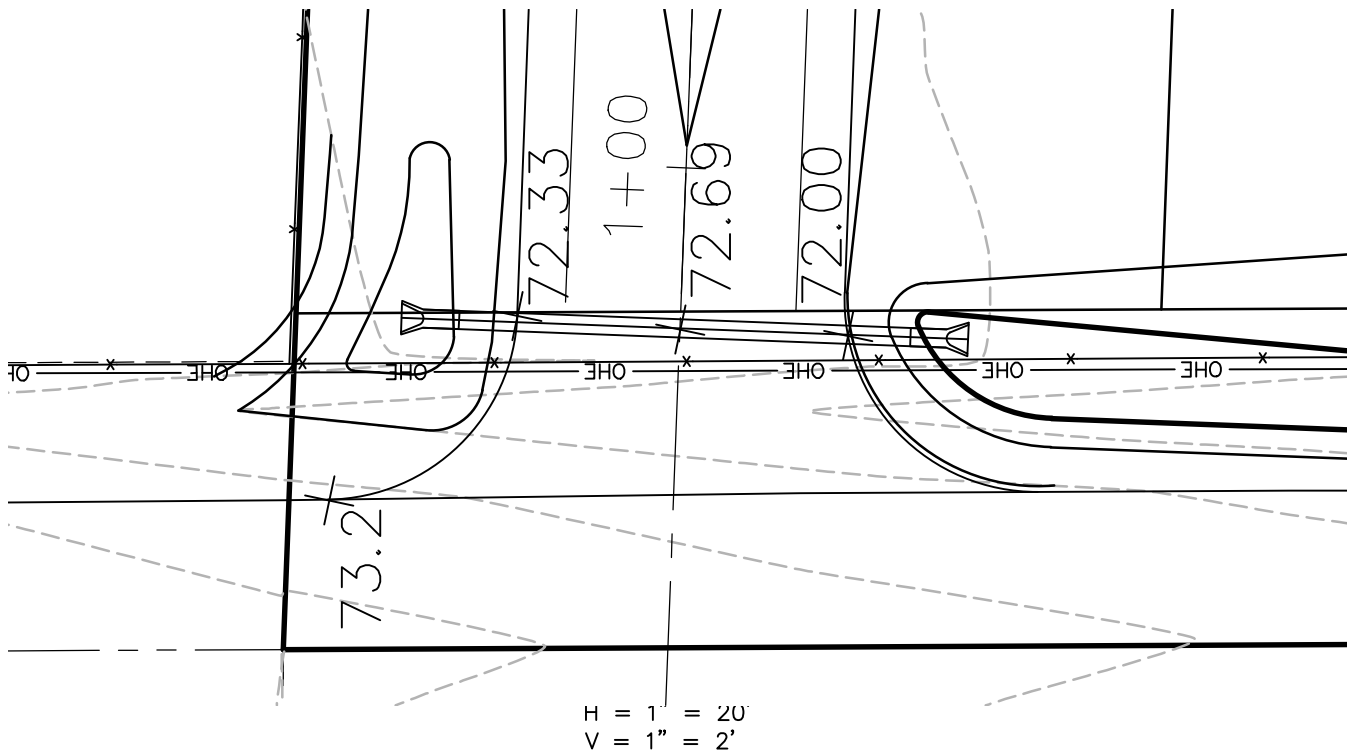
The review shall ensure all criteria for approval are adequately considered and that justification for the deviation is properly documented.

## **1.6. LIMITS OF APPROVAL**

Whether a request for deviation is approved as proposed or with conditions, the approval is for project-specific use and shall not constitute a precedent or general deviation from these Standards.

## **1.7. REVIEW FEES**

A Deviation Review Fee shall be paid in full at the time of submission of a request for deviation. The fee for Deviation Review shall be as determined by resolution of the BoCC.



**FOR CONCRETE PIPE**

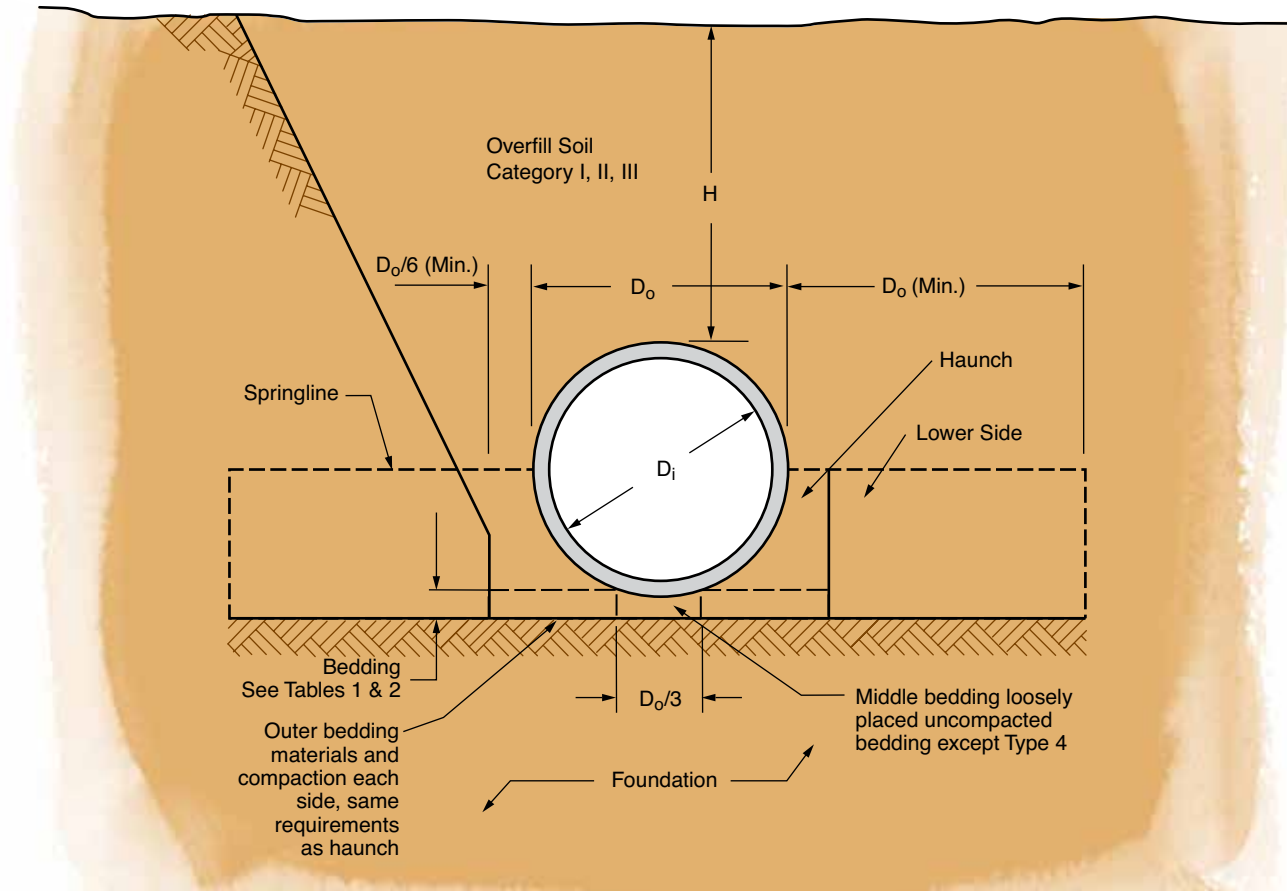
**LRFD FILL HEIGHT TABLES**





## Standard Trench/Embankment Installation

Concrete pipe should be installed in accordance with the AASHTO LRFD Bridge Construction Specifications, Section 27 or ASTM C1479. Figure 1 shows the basic pipe and soil terminology.



There are four types of Standard Installations, each with its own soil and compaction requirements. Type 1 bedding provides the most support using highly compacted granular material, while Type 4 provides for less support allowing the use of silts and clay soils with little or no compaction. These four choices provide flexibility and versatility for the designer and contractor, as well as performance and economy for the owner that are not available with other types of pipe.

The soil and compaction requirements are provided in Table 1. Table 2 shows the equivalent soil designations per the Unified Soil Classification System (USCS) and AASHTO.

To facilitate your selection of the proper reinforced concrete pipe using the most beneficial Standard Installation for the conditions at the site, fill height tables are provided on the following pages. The required 0.01 inch crack D-Loads in units of lbs per linear foot per foot of diameter are provided numerically and the class of pipe per ASTM C76 (AASHTO M 170) meeting this requirement is designated by color of the cell.

**Table 1: Standard Installation Soils and Minimum Compaction Requirements**

Installation Type	Bedding Thickness	Haunch and Outer Bedding	Lower Side
Type 1	D <sub>o</sub> /24 minimum, not less than 3" (75 mm) If rock foundation, use D <sub>o</sub> /12 minimum, not less than 6" (150 mm)	95% Category I	90% Category I, 95% Category II, or 100% Category III
Type 2	D <sub>o</sub> /24 minimum, not less than 3" (75 mm) If rock foundation, use D <sub>o</sub> /12 minimum, not less than 6" (150 mm)	90% Category I or 95% Category II	85% Category I, 90% Category II, or 95% Category III
Type 3	D <sub>o</sub> /24 minimum, not less than 3" (75 mm) If rock foundation, use D <sub>o</sub> /12 minimum, not less than 6" (150 mm)	85% Category I, 90% Category II, or 95% Category III	85% Category I, 90% Category II, or 95% Category III
Type 4	No bedding required except if rock foundation, use D <sub>o</sub> /12 minimum, not less than 6" (150 mm)	No compaction required, except if Category III, use 85%	No compaction required, except if Category III, use 85%

Reference: ASCE 15-98, "Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD)", 1998.

**Table 3: Reinforced Pipe Classes for 0.01 inch Crack Per ASTM C 76 (lbs/ft/ft)**

Class I	≤ 800
Class II	≤ 1000
Class III	≤ 1350
Class IV	≤ 2000
Class V	≤ 3000
Special Design	> 3000

**Table 2: Equivalent USCS and AASHTO Soil Classifications for Standard Installation Soil Designations**

Representative Soil Types			Percent Compaction	
SIDD	USCS	AASHTO	Standard Proctor	Modified Proctor
Gravelly Sand (Category I)	SW, SP, GW, GP	A1, A3	100	95
			95	90
			90	85
			85	80
			80	75
Sandy Silt (Category II)	GM, SM, ML, Also GC, SC with less than 20% passing #200 sieve	A2, A4	100	95
			95	90
			90	85
			85	80
			80	75
Silty Clay (Category III)	CL, MH, GC, SC	A5, A6	100	90
			95	85
			90	80
			85	75
			80	70
Not Allowed for Haunch or Bedding	CH	A7	100	90
			95	85
			90	80
			85	75
			80	70

Reference: ASCE 15-98, "Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD)", 1998.

## NOTES:

1. Compaction and soil symbols – i.e. "95% Category I" refers to Category I soil material with a minimum Standard Proctor compaction of 95%. See Table 2 for equivalent Modified Proctor values.
2. Soil in the outer bedding, haunch, and lower side zones shall be compacted to at least the same compaction as the majority of soil in the overfill zone.

**Fill Height Tables are based on:**

1.  $s = 120$  pcf

2. AASHTO HL-93 live load

3. Positive Projecting Embankment Condition -

this gives conservative results in comparison to trench conditions

**D-Load (lb/ft/ft) for Type 4 Bedding**

Class I	Class IV
Class II	Class V
Class III	Special Design

Fill Height in Feet														
Pipe Size (in)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
12	1579	1481	1111	1032	1071	1154	1264	1383	1372	1521	1671	1820	1969	2119
15	1519	1426	1073	998	1036	1116	1221	1336	1326	1616	1612	1756	1899	2042
18	1443	1391	1050	978	1015	1093	1195	1307	1297	1580	1576	1715	1854	1994
21	1306	1366	1035	966	1002	1079	1179	1288	1279	1557	1552	1688	1825	1961
24	1288	1349	1025	959	994	1070	1168	1276	1267	1541	1535	1670	1804	1938
27	1431	1352	1025	960	993	1068	1165	1271	1259	1531	1524	1657	1790	1922
30	1560	1360	1029	965	995	1070	1166	1270	1254	1524	1517	1648	1780	1911
33	1437	1316	1010	955	988	1064	1160	1264	1252	1520	1512	1642	1773	1903
36	1336	1285	993	947	982	1060	1157	1260	1251	1518	1509	1639	1768	1898
42	1181	1211	966	935	976	1057	1153	1256	1252	1518	1508	1636	1764	1892
48	1068	1090	941	927	973	1056	1152	1255	1257	1522	1511	1638	1765	1892
54	1029	1058	925	921	973	1058	1154	1257	1264	1529	1516	1642	1768	1894
60	1059	1038	912	918	975	1062	1158	1261	1273	1538	1523	1649	1774	1899
66	1021	1022	906	917	978	1066	1163	1266	1282	1548	1532	1657	1781	1906
72	969	1008	902	917	984	1072	1169	1272	1292	1559	1541	1666	1790	1914
78	927	996	899	920	990	1079	1176	1280	1303	1570	1551	1675	1799	1923
84	893	986	898	925	997	1086	1184	1288	1315	1582	1562	1686	1810	1933
90	866	978	898	931	1004	1094	1192	1296	1408	1595	1574	1697	1820	1944
96	844	948	899	936	1012	1102	1201	1305	1417	1608	1585	1708	1831	1955
102	826	932	911	949	1024	1115	1214	1318	1429	1685	1597	1720	1843	1966
108	812	927	923	962	1037	1128	1226	1330	1441	1698	1609	1732	1855	1978
114	801	938	935	975	1050	1141	1239	1343	1454	1712	1682	1745	1867	1990
120	793	949	947	986	1063	1154	1252	1356	1467	1726	1694	1757	1879	2002
126	786	960	959	999	1076	1167	1265	1369	1480	1740	1707	1823	1892	2014
132	782	971	967	1013	1090	1180	1278	1382	1493	1754	1720	1836	1952	2027
138	779	982	968	1026	1103	1194	1292	1395	1506	1769	1733	1848	1965	2040
144	778	994	980	1039	1116	1207	1305	1409	1519	1783	1746	1861	1978	2095

Note: Class IV pipe is specified due to 1' cover and EPC ECM criteria for 2'

The preceding fill height tables are based on a concrete pipe installed in a positive projecting embankment installation with a soil unit weight of 120 lbs/ft<sup>3</sup> and HL-93 live load per the AASHTO LRFD Bridge Design specifications at the surface. Pipe outside diameters were based on a wall C thickness since the larger outside diameters would represent the highest soil overburden load on the pipe. The required classes of pipe do not account for construction loads or any other load induced on the pipe prior to its completed installation, or live load in excess of HL-93.

Dimensions of Circular Concrete Pipe - Metric Units					
Designated Internal Diameter mm	Actual Internal Diameter mm	Wall B		Wall C	
		Minimum Wall Thickness mm	Average Weight kg/m	Minimum Wall Thickness mm	Average Weight kg/m
300	305	50	162	69	197
375	381	57	216	75	262
450	457	63	253	82	335
525	533	69	327	88	417
600	610	75	430	94	505
675	686	82	500	100	602
750	762	88	598	107	708
825	838	94	695	113	821
900	914	100	832	119	940
975	991	113	923	125	1090
1050	1067	117	1057	132	1207
1200	1219	125	1324	144	1504
1350	1372	138	1589	157	1829
1500	1524	150	1927	169	2192
1650	1676	163	2295	182	2582
1800	1829	175	2695	194	2998
1950	1981	188	3125	207	3457
2100	2134	200	3585	219	3943
2250	2286	213	4078	232	4460
2400	2438	225	4598	244	5009
2550	2591	238	5179	257	5595
2700	2743	250	5752	269	6202
3000	3048	279	6344	298	7521
3600	3658	330	8104	349	10,540

Dimensions of Circular Concrete Pipe - Imperial Units						
Internal Diameter inches	Wall A		Wall B		Wall C	
	Minimum Wall Thickness inches	Average Weight pounds per foot	Minimum Wall Thickness inches	Average Weight pounds per foot	Minimum Wall Thickness inches	Average Weight pounds per foot
12	1-3/4	79	2	93	2-3/4	133
15	1-7/8	103	2-1/4	127	3	177
18	2	131	2-1/2	168	3-1/4	226
21	2-1/4	171	2-3/4	214	3-1/2	281
24	2-1/2	217	3	264	3-3/4	341
27	2-5/8	255	3-1/4	322	4	406
30	2-3/4	295	3-1/2	384	4-1/4	476
33	2-7/8	336	3-3/4	451	4-1/2	552
36	3	383	4	524	4-3/4	633
42	3-1/2	520	4-1/2	686	5-1/4	811
48	4	683	5	867	5-3/4	1011
54	4-1/2	864	5-1/2	1068	6-1/4	1232
60	5	1064	6	1295	6-3/4	1473
66	5-1/2	1287	6-1/2	1542	7-1/4	1735
72	6	1532	7	1811	7-3/4	2023
78	6-1/2	1797	7-1/2	2100	8-1/4	2329
84	7	2085	8	2409	8-3/4	2656
90	7-1/2	2395	8-1/2	2740	9-1/4	3004
96	8	2710	9	3090	9-3/4	3374
102	8-1/2	3078	9-1/2	3480	10-1/4	3765
108	9	3446	10	3865	10-3/4	4178
114	9-1/2	3840	10-1/2	4278	11-1/4	4611
120	10	4263	11	4716	11-3/4	5066
126	10-1/2	4690	11-1/2	5175	12-1/4	5542
132	11	5148	12	5655	12-3/4	6040
138	11-1/2	5627	12-1/2	6156	13-1/4	6558
144	12	6126	13	6679	13-3/4	7098
150	12-1/2	6647	13-1/2	7223	14-1/4	7659
156	13	7190	14	7789	14-3/4	8242
162	13-1/2	7754	14-1/2	8375	15-1/4	8846
168	14	8339	15	8983	15-3/4	9471
174	14-1/2	8945	15-1/2	9612	16-1/4	10,117
180	15	9572	16	10,263	16-3/4	10,785



American **Concrete Pipe** Association

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