

**LEGEND**

**H** = ALLOWABLE HEIGHT OF COVER OVER THE TOP OF THE PIPE, EXCLUDING PAVEMENT THICKNESS.

THE MINIMUM COVER SHALL BE THE DIMENSIONS SHOWN IN THE TABLE BELOW OR THE ENTIRE PAVEMENT STRUCTURE THICKNESS AS DEFINED IN SPECIFICATION 101.02, WHICHEVER IS GREATER.

THE MINIMUM COVER IN THE TABLE BELOW IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT: HMA OR PCCP

FILL HEIGHTS AND DESIGN ASSUMPTIONS ARE BASED ON AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION, SECTION 12, FOR 900 PSI LONG TERM STRENGTH OF HDPE, AND AASHTO T180 MINIMUM RELATIVE COMPACTION OF 95%.

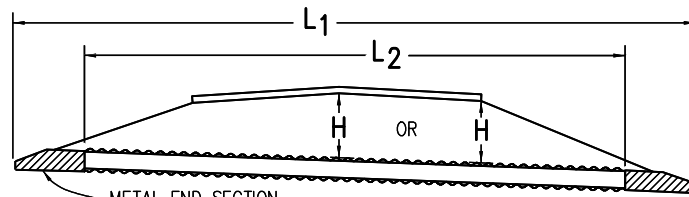
FILL HEIGHTS ARE BASED ON AASHTO M294 FOR POLYETHYLENE TYPE S PIPES WITH OUTER, CORRUGATED WALLS AND SMOOTH INNER LINEARS.

**L<sub>1</sub>** = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 624.

**L<sub>2</sub>** = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.

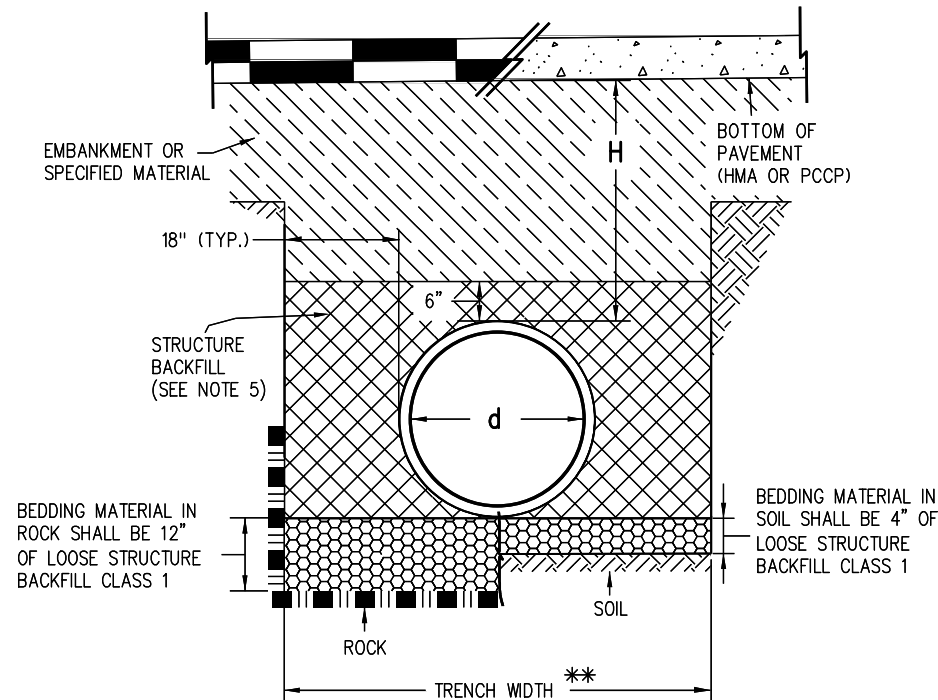
**M** = THE MINIMUM SPACING BETWEEN THE OUTSIDE WALLS OF MULTIPLE PIPES OR END SECTIONS IS 18" OR 1/2(d), WHICHEVER IS GREATER.

**d** = INNER DIAMETER OF PIPE.

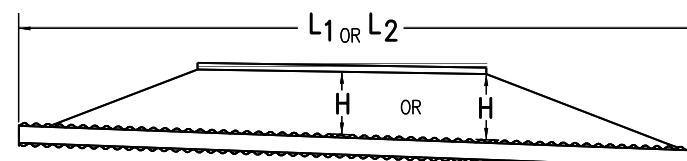


NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

**PIPE WITH END SECTIONS**



**INSTALLATION OF PIPE**

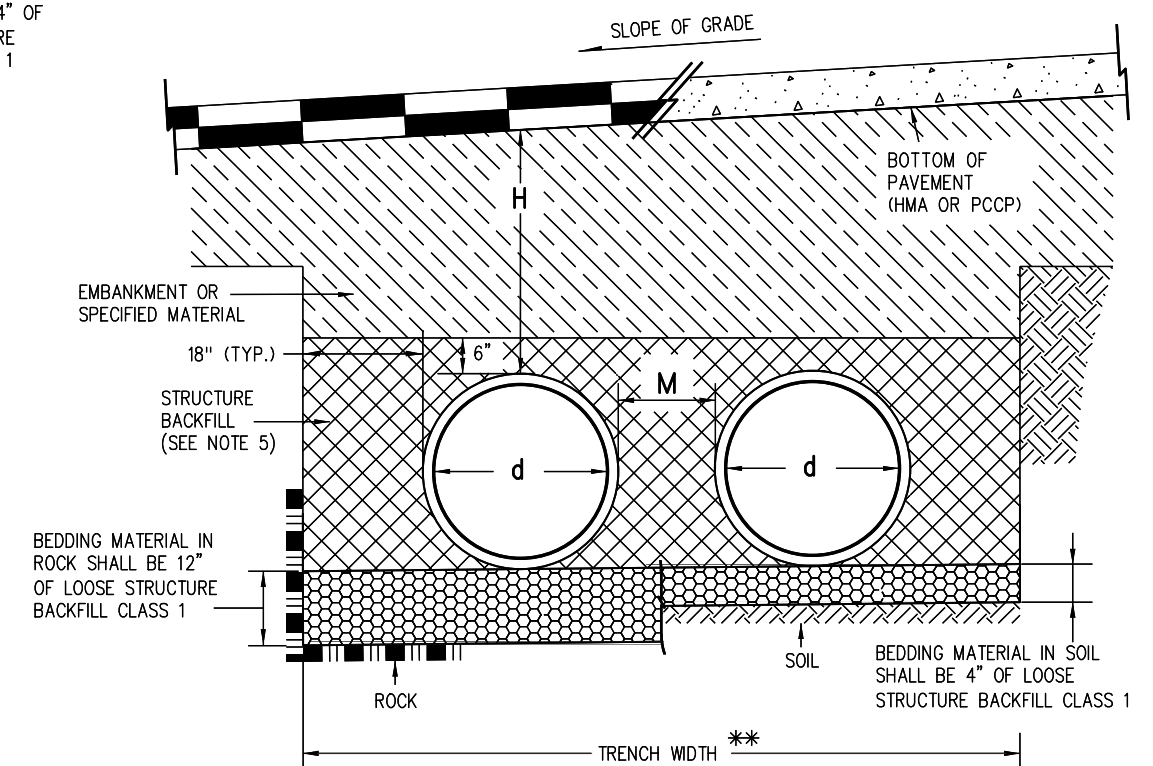


NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

**PIPE WITHOUT END SECTIONS**

**GENERAL NOTES**

1. ALL PIPES SHALL MEET THE REQUIREMENTS OF AASHTO M294 FOR POLYETHYLENE TYPE S WITH SMOOTH INNER SURFACE.
2. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL INSTALLATION SHALL BE USED.
3. MINIMUM COVER FOR TEMPORARY/CONSTRUCTION LOADS SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE PIPE FROM DAMAGE AS SHOWN IN THE TABLE. FINAL MAXIMUM COVER HEIGHTS (H) SHALL NOT BE EXCEEDED DURING CONSTRUCTION.
4. WHEN INSTALLING A GUARDRAIL OR A SIGN POST DIRECTLY ABOVE A PIPE, THE POST'S BOTTOM MUST BE AT LEAST 1 FOOT ABOVE THE TOP OF THE PIPE. THE HOLE FOR THE POST SHALL BE DRILLED INTO THE SOIL.
5. STRUCTURE BACKFILL MATERIAL SHALL BE CLASS 1.
6. FOR PIPES 24 INCHES OR LESS IN DIAMETER, H MIN. MAY BE REDUCED TO ONE FOOT FOR LOW VOLUME APPROACH ROADS NOT ON STATE HIGHWAYS.
7. FOR FLOWABLE FILL INSTALLATIONS, REFER TO SECTION 206.02(A). CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN PROPER PIPE ALIGNMENT AND PREVENT DISPLACEMENT DUE TO PIPE BUOYANCY.



**INSTALLATION OF MULTIPLE PIPES**

NOTE: M IS 12 INCHES FOR DIAMETERS (d) UP TO AND INCLUDING 24 INCHES AND d/2 FOR GREATER DIAMETERS.

\*\* TRENCH WIDTH ASSUMES STABLE IN-SITU SIDE WALL

HIGH DENSITY POLYETHYLENE (HDPE) FINAL FILL HEIGHTS				
PIPE DIA. d (IN.)	H MIN. COVER (FT.)	H MAXIMUM COVER (FT.)		
		FLOWABLE FILL COMP.	CDOT CLASS 3 AND A-1, A-3 95%	CDOT CLASS 1, 2, AND A-2-4, A-2-5 95%
12	1	35	24	17
15	1	38	25	18
18	1	36	24	17
24	1	28	20	14
30	1	28	20	14
36	1	26	18	13
42	1	23	16	11
48	1	25	17	12
54	1	22	16	11
60	2	25	17	12

**MINIMUM AND MAXIMUM COVER**

NOMINAL PIPE DIAMETER (IN.)	MINIMUM COVER (IN.) FOR INDICATED AXLE LOADS (KIPS)			
	18.0-50.0	50.0-75.0	75.0-110.0	110.0-150.0
24 - 36	24.0	30.0	36.0	36.0
42 - 48	36.0	36.0	42.0	48.0
54 - 60	36.0	36.0	42.0	48.0

**MINIMUM COVER FOR CONSTRUCTION LOADS**

<b>Computer File Information</b>		<b>Sheet Revisions</b>		<b>Colorado Department of Transportation</b> 2829 West Howard Place CDOT HQ, 3rd Floor Denver, CO 80204 Phone: 303-757-9021 FAX: 303-757-9868 <b>Construction Engineering Services JBK</b>	<b>CORRUGATED POLYETHYLENE PIPE (AASHTO M294)</b>	<b>STANDARD PLAN NO.</b>
Creation Date: 07/31/19	Designer Initials: JBK	Date: 03/07/22	Comments: Separated the previous M-603-4, Corrugated Polyethylene Pipe (AASHTO M294) and Polypropylene Pipe (AASHTO M330) sheet into 2 sheets. Revised the Legend and Gen. Notes. Deleted the "Construction Minimum Cover for Pipe" detail and incorporated its dimensions in to the tables and Installation of Pipes details.			M-603-4 <b>Standard Sheet No. 1 of 2</b>
Last Modification Date: 03/07/22	Detailer Initials: LTA			Issued by the Project Development Branch: July 31, 2019		Project Sheet Number:
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English						

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FILL HEIGHTS AND DESIGN ASSUMPTIONS ARE BASED ON AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION, SECTION 12, AND AASHTO T180 MINIMUM RELATIVE COMPACTION OF 95%.

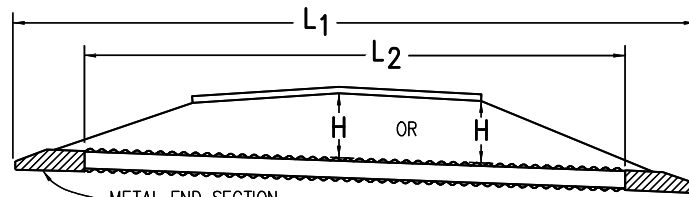
FILL HEIGHTS ARE BASED ON AASHTO M330 FOR POLYPROPYLENE TYPE S PIPES WITH OUTER, CORRUGATED WALLS AND SMOOTH INNER LINES.

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**L<sub>2</sub>** = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.

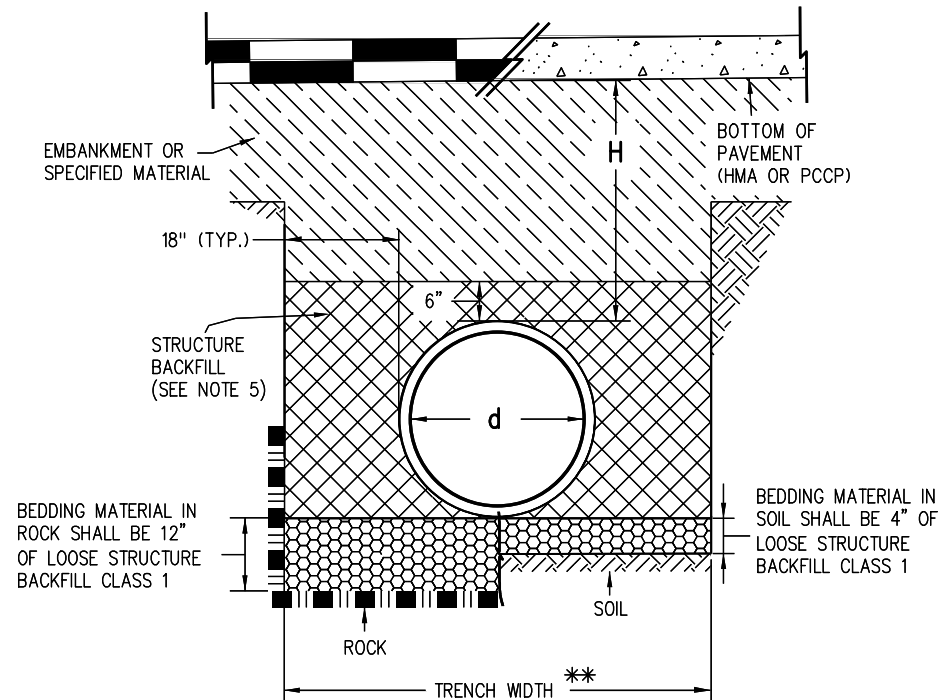
**M** = THE MINIMUM SPACING BETWEEN THE OUTSIDE WALLS OF MULTIPLE PIPES OR END SECTIONS IS 18" OR 1/2(d), WHICHEVER IS GREATER.

**d** = INNER DIAMETER OF PIPE.

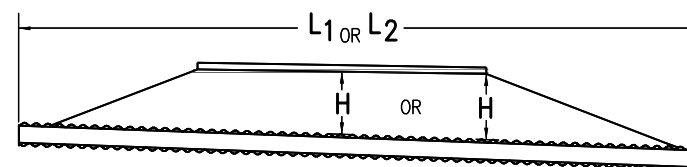


NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

**PIPE WITH END SECTIONS**



**INSTALLATION OF PIPE**

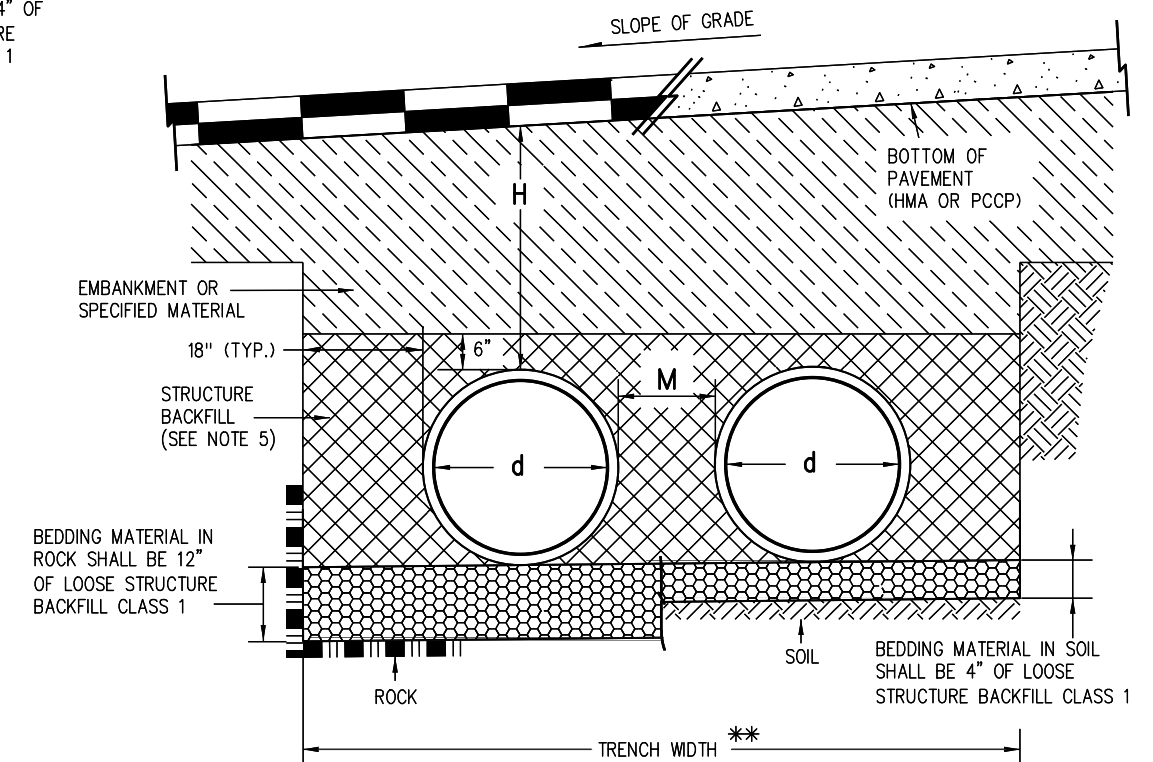


NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

**PIPE WITHOUT END SECTIONS**

**GENERAL NOTES**

1. ALL PIPES SHALL MEET THE REQUIREMENTS OF AASHTO M330 FOR POLYPROPYLENE TYPE S FOR POLYPROPYLENE PIPE (PP) WITH SMOOTH INNER SURFACE.
2. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL INSTALLATION SHALL BE USED.
3. MINIMUM COVER FOR TEMPORARY/CONSTRUCTION LOADS SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE PIPE FROM DAMAGE AS SHOWN THE IN TABLE. FINAL MAXIMUM COVER HEIGHTS (H) SHALL NOT BE EXCEEDED DURING CONSTRUCTION.
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**INSTALLATION OF MULTIPLE PIPES**

NOTE: M IS 12 INCHES FOR DIAMETERS (d) UP TO AND INCLUDING 24 INCHES AND d/2 FOR GREATER DIAMETERS.

\*\* TRENCH WIDTH ASSUMES STABLE IN-SITU SIDE WALL

POLYPROPYLENE (PP) FINAL FILL HEIGHTS				
PIPE DIA. d (IN.)	H MIN. COVER (FT.)	H MAXIMUM COVER (FT.)		
		FLOWABLE FILL COMP.	CDOT CLASS 3 AND A-1, A-3 95%	CDOT CLASS 1, 2, AND A-2-4, A-2-5 95%
12	1	41	28	20
15	1	42	29	21
18	1	44	30	22
24	1	30	21	16
30	1	39	27	19
36	1	28	20	14
42	1	30	21	15
48	1	29	20	14
60	2	29	20	14

**MINIMUM AND MAXIMUM COVER**

NOMINAL PIPE DIAMETER (IN.)	MINIMUM COVER (IN.) FOR INDICATED AXLE LOADS (KIPS)			
	18.0-50.0	50.0-75.0	75.0-110.0	110.0-150.0
24 - 36	24.0	30.0	36.0	36.0
42 - 48	36.0	36.0	42.0	48.0
54 - 60	36.0	36.0	42.0	48.0

**MINIMUM COVER FOR CONSTRUCTION LOADS**

<b>Computer File Information</b>		<b>Sheet Revisions</b>		<b>Colorado Department of Transportation</b>		<b>CORRUGATED POLYPROPYLENE PIPE (AASHTO M330)</b>		<b>STANDARD PLAN NO. M-603-4</b>	
Creation Date: 07/31/19		Date: 03/07/22		2829 West Howard Place		Issued by the Project Development Branch: July 31, 2019		Standard Sheet No. 2 of 2	
Designer Initials: JBK		Comments: Separated the previous M-603-4, Corrugated Polyethylene Pipe (AASHTO M294) and Polypropylene Pipe (AASHTO M330) sheet into 2 sheets. Revised the Legend and Gen. Notes. Deleted the "Construction Minimum Cover for Pipe" detail and incorporated its dimensions in to the tables and Installation of Pipes details.		CDOT HQ, 3rd Floor					
Last Modification Date: 03/07/22				Denver, CO 80204					
Detailer Initials: LTA				Phone: 303-757-9021 FAX: 303-757-9868					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English				<b>Construction Engineering Services JBK</b>				Project Sheet Number:	