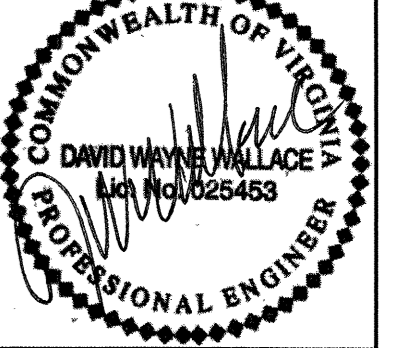


PLAN REVISIONS -

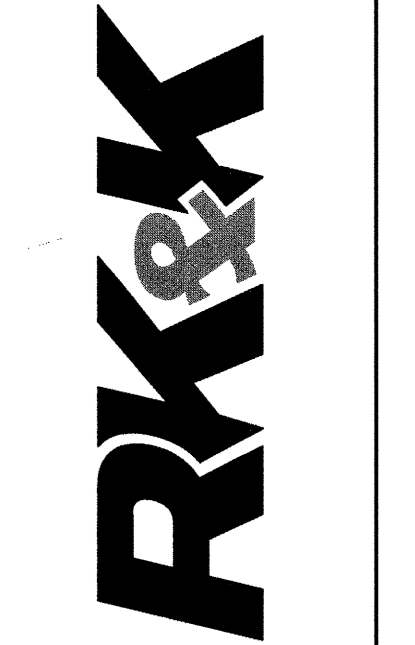
SHEET C4.23 20 OF 80

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DATE: 01/14/11 ENGINEER: LCG CAD: KAB CHECKED: WBS JOB#: 09-084



10306 EATON PLACE WILLOWOOD II, SUITE 240 FAIRFAX, VA 22030 (P) 703 246-0028 (F) 703 246-0123 NLSGW@kk.com



AYER'S SAINT GROSS ARCHITECTS + PLANNERS

### N-12 HP STORM TRENCH INSTALLATION DETAIL

**TABLE 1. RECOMMENDED MINIMUM TRENCH WIDTHS**

PIPE DIAM.	MIN TRENCH WIDTH
12" (300mm)	36" (910mm)
18" (450mm)	36" (910mm)
24" (600mm)	48" (1200mm)
30" (750mm)	60" (1500mm)
36" (900mm)	60" (1500mm)
48" (1200mm)	84" (2100mm)
60" (1500mm)	84" (2100mm)

**TABLE 2. MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS**

PIPE DIAM.	H-20	HEAVY CONSTRUCTION (75T AXLE LOAD)
12" - 48" (300mm - 1200mm)	4" (100mm)	4" (100mm)
60" (1500mm)	24" (600mm)	60" (1500mm)

**TABLE 3. MAXIMUM COVER FOR ADS N-12 HP PIPE**

PIPE DIA. COMPACTED	CLASS I	CLASS II	CLASS III	CLASS IV
12" (300mm)	28" (710mm)	21" (530mm)	16" (400mm)	14" (350mm)
18" (450mm)	28" (710mm)	21" (530mm)	16" (400mm)	14" (350mm)
24" (600mm)	37" (940mm)	28" (710mm)	21" (530mm)	16" (400mm)
30" (750mm)	32" (810mm)	23" (580mm)	17" (430mm)	13" (330mm)
36" (900mm)	32" (810mm)	23" (580mm)	17" (430mm)	13" (330mm)
48" (1200mm)	29" (730mm)	21" (530mm)	15" (380mm)	11" (280mm)
60" (1500mm)	24" (610mm)	18" (450mm)	14" (350mm)	10" (250mm)

**NOTES:**

- ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS." LATEST EDITION, WITH THE EXCEPTION THAT THE INITIAL BACKFILL MAY EXTEND TO THE CROWN OF THE PIPE. SOIL CLASSIFICATIONS ARE PER THE LATEST VERSION OF ASTM D2321, CLASS I/II MATERIALS (MH, CH) AS DEFINED IN PREVIOUS VERSIONS OF ASTM D2321 ARE NOT APPROPRIATE BACKFILL MATERIALS.
- MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
- FOUNDATION:** WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER, AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
- BEDDING:** SUITABLE MATERIAL SHALL BE CLASS I, II, III, OR IV, THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. COMPACTION SHALL BE SPECIFIED BY THE ENGINEER IN ACCORDANCE WITH TABLE 3 FOR THE APPLICABLE FILL HEIGHTS LISTED, UNLESS OTHERWISE NOTED BY THE ENGINEER. MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 12"-24" (300mm-600mm) DIAMETER PIPE, 6" (150mm) FOR 30"-48" (750mm-900mm) DIAMETER PIPE, THE MIDDLE 1/3 BENEATH THE PIPE INVERT SHALL BE LOOSELY PLACED. PLEASE NOTE: CLASS IV MATERIAL HAS LIMITED APPLICATION AND CAN BE DIFFICULT TO PLACE AND COMPACT; USE ONLY WITH THE APPROVAL OF A SOIL EXPERT.
- INITIAL BACKFILL:** SUITABLE MATERIAL SHALL BE CLASS I, II, III, OR IV IN THE PIPE ZONE EXTENDING TO THE CROWN OF THE PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION. COMPACTION SHALL BE SPECIFIED BY THE ENGINEER IN ACCORDANCE WITH TABLE 3 FOR THE APPLICABLE FILL HEIGHTS LISTED. PLEASE NOTE: CLASS IV MATERIAL HAS LIMITED APPLICATION AND CAN BE DIFFICULT TO PLACE AND COMPACT; USE ONLY WITH THE APPROVAL OF A SOIL EXPERT.
- MINIMUM COVER:** MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" (300mm) FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, CLASS I OR II MATERIAL COMPACTED TO 90% SPD AND CLASS III COMPACTED TO 80% SPD IS REQUIRED. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" (300mm) UP TO 48" (1200mm) DIAMETER PIPE AND 24" (600mm) OF COVER FOR 60" (1500mm) DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. CLASS IV MATERIALS ARE NOT RECOMMENDED AS BACKFILL. FOR TRAFFIC APPLICATIONS WITH LESS THAN 72" (1800mm) OF COVER MEASURED FROM TOP OF PIPE TO TOP OF SURFACE.

**FILL HEIGHT TABLE GENERATED USING AASHTO SECTION 12, LOAD RESISTANCE FACTOR DESIGN (LRFD) PROCEDURE WITH THE FOLLOWING ASSUMPTIONS:**  
 HEIGHT OF WATER (HW) = CROWN + 1'  
 UNIT WEIGHT OF SOIL (γs) = 120 PCF

**TYPICAL STORM TRENCH DETAIL**  
N-12 HP 18" IRII PERFORMANCE (RP)

DRAWING NUMBER: STD-105

ADS, Inc. Drainage Handbook Specifications • 1-41

#### ADS FLARED END SECTION SPECIFICATION

**Scope**  
This specification describes 12- through 36-inch (300 to 900mm) ADS Flared End Sections for use in culvert and drainage outlet applications.

**Requirements**  
The invert of the pipe and the end section shall be at the same elevation. The ADS Flared End Section shall be high density polyethylene meeting ASTM D3250 minimum cell classification 215320C, contact manufacturer for additional cell classification information. When provided, the metal threaded fastening rod shall be stainless steel.

**Installation**  
Installation shall be in accordance with ADS installation instructions and with those issued by state or local authorities. Contact your local ADS representative or visit [www.ads-pipe.com](http://www.ads-pipe.com) for the latest installation instructions.

Diameter	PIPE DIAMETER, in (mm)				
	12	15	18	24	30
In (mm)	300	375	450	600	750
A	6.5	6.5	7.5	7.5	7.5
In (mm)	165	165	191	191	191
B (max)	10.0	10.0	10.0	10.0	10.0
In (mm)	254	254	254	254	254
H	6.5	6.5	6.5	6.5	6.5
In (mm)	165	165	165	165	165
L	25.0	25.0	25.0	25.0	25.0
In (mm)	635	635	635	635	635
W	29.0	29.0	35.0	45.0	63.0
In (mm)	737	737	889	1143	1600

Product detail may differ slightly from actual product appearance.

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**FLARED END SECTION**  
12" - 60" CONCRETE PIPE CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

DRAWING NUMBER: STD-403

**FLARED END SECTION**  
12" - 60" CONCRETE PIPE CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

DRAWING NUMBER: STD-105

**CULVERT OUTLET PROTECTION**

VIRGINIA DEPARTMENT OF TRANSPORTATION

DRAWING NUMBER: STD-105

H:\projects\2009\09084\_GV&K\CADD\DWG\Current Sheets\C4.23 STORM DRAIN PROFILES, DETAILS, AND COMPUTATIONS Plot Scale 1" = 40'cm RKK, STC,CTB Plot By: abensal Tab:DETAILS