

HP Storm Drain & ALDOT



The Most **Advanced** Name in Drainage Systems®



Jenn Christman, PE

Bachelor's Degree in Civil Engineering from the University of Florida (Go Gators!). I have been a professional engineer since 2001. I have my PE license in FL, GA, NC, SC, AL, MS, and TN. I worked as a consulting engineer for almost 15 years before joining ADS. I am ADS' Zone Engineer for the Southeast region (Florida to Texas). My role is to build rapport with all the DOTs in the southeast and work to get ADS pipe approved on DOT roadways. My role is also to try my best to keep Brian out of trouble...now that's a full time job...

Bragg Knott- Sales

- Bachelor's Degree from University of Alabama
- State Champion quarterback for the Homewood Patriots
- Played college football at Troy where he got “lit up” at practice by future NFL stars Osi Umenyiora and Demarcus Ware
- ADS salesman for Central AL (Auburn, Birmingham, Tuscaloosa) and expecting first baby on “labor day”

Agenda

- Introduction To ADS
- ALDOT & ADS
- HP Product Overview
 - General Design/Application
- HP Pipe Value Prop
 - Specific ALDOT example
- Questions



Company Background

Worlds Largest Producer of
HDPE/PP Water Conveyance
Products

Founded 1966

53 Plants Internationally

Over 250 Field Professionals

Over 50 Field Engineers

2 Engineering Offices and 2
Test Labs

Public IPO 2014

NYSE: "WMS"



Pipe Product Overview

HDPE Pipe Products

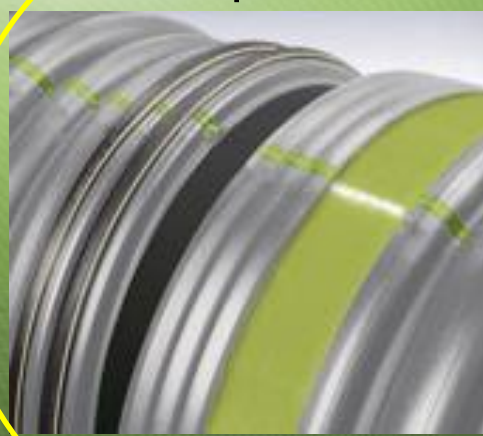
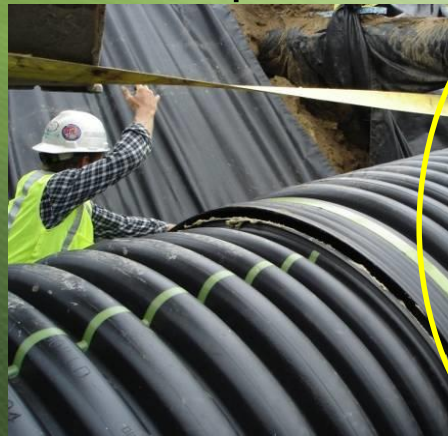
PP Pipe Products

Group 1

Group 2

Group 3

Group 4



Mega Green
ASTM F2648

N-12
AASHTO M294

HP Storm
ASTM F2736/F2881
AASHTO M330

SaniTite HP
ASTM F2736/F2764

ALDOT & ADS

Polypropylene Pipe Approved For Use Storm Drain | Side Drain | Sanitary Sewer

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 30, 2015

Special Provision No. 12-1263

EFFECTIVE DATE: June 1, 2015

SUBJECT: Storm Sewers.

Alabama Standard Specifications, 2012 Edition, SECTION 533 and SECTION 854 shall be revised as follows:

SECTION 533 STORM SEWERS

Diameters greater than 24 inches {600 mm} - Class 2 R.C.; Class 2 C.S.L.C.M.; 14 gage {2.0 mm} C.S.F.C.M.; 14 gage {2.0 mm} C.C.L.C.S.; P.V.C. or HDPE, or PP (HDPE and PP up to 36 inches {900 mm} diameter) with a minimum of 24 inches {600 mm} of cover, and a maximum of 25 feet {7.5 m} fill height. Any storm sewer pipe to be placed under a roadway or subject to continuous traffic shall be not less than a Class 3 R.C., or equivalent strength C.S.L.C.M., C.S.F.C.M., or C.C.L.C.S. Pipe. The fill height charts on the plans for roadway pipe shall be used to determine strengths or equivalent strengths for storm sewer pipe.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 4, 2015

Special Provision No. 12-1264

EFFECTIVE DATE: June 1, 2015

SUBJECT: Side Drain Pipe.

Alabama Standard Specifications, 2012 Edition, SECTION 535 and SECTION 851 shall be revised as follows:

SECTION 535 SIDE DRAIN PIPE

- Diameters less than or equal to 24 inches {600 mm} - P.C.; V.C.; 16 gage {1.6 mm} C.M. with greater than or equal to 24 inches {600 mm} of cover, 14 gage {2.0 mm} CM with less than 24 inches {600 mm} cover; or P.V.C., A.B.S. or HDPE, or PP pipe (HDPE and PP up to 36 inches {900 mm} diameter) with minimum of 24 inches {600 mm} of cover, and maximum of 25 feet {7.5 m} fill height.
- Diameters greater than 24 inches {600 mm} - Class 2 R.C.; V.C.; 14 gage {2.0 mm} C.M.; P.V.C. or HDPE and PP (HDPE and PP up to 36 inch {900 mm} diameter) with a minimum of 24 inches {600 mm} of cover, and a maximum of 25 feet {7.5 m} fill height.

HDPE vs. PP - Material Properties

HDPE Pipe
Products

PP Pipe
Products

Material Property	High Density Polyethylene (HDPE)	Polypropylene (PP)
Density	0.95 g/ccm	0.90 g/ccm
Tensile Strength	3000 psi	4000 psi
Short Term Modulus	110,000 PSI	175,000 PSI
75 Yr Modulus	21,000 PSI	28,000 PSI
Avg. Stiffness	30 pii	48 pii



HP Product Overview

PP Based High Performance
Corrugated Profile Wall Design

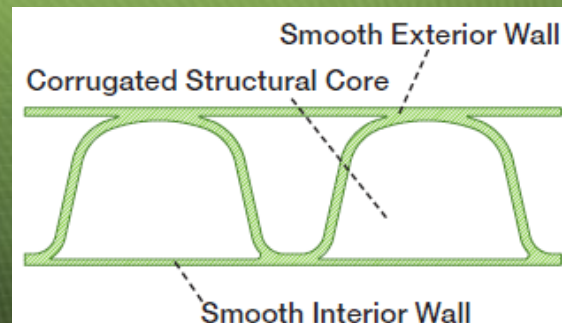
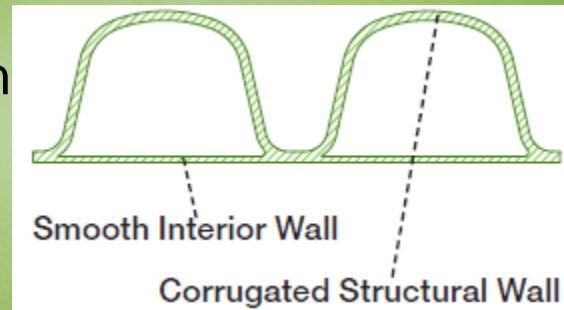
Dual Wall 12"- 60" Storm &
SaniTite (12"-30")

Triple Wall 30"- 60" SaniTite

Available in 13', 16.3', and 20'
Lengths

Works with Standard Fittings

Custom Fabricated Fittings
Available

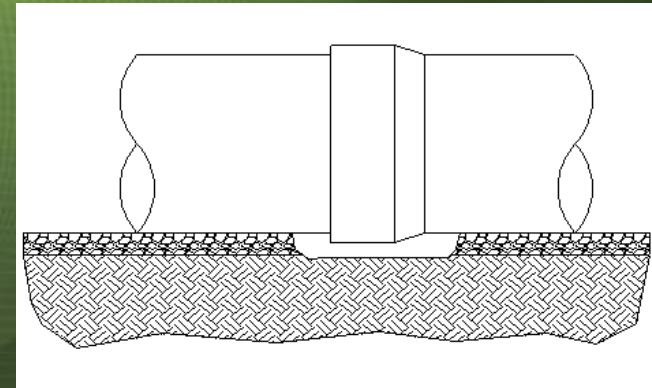
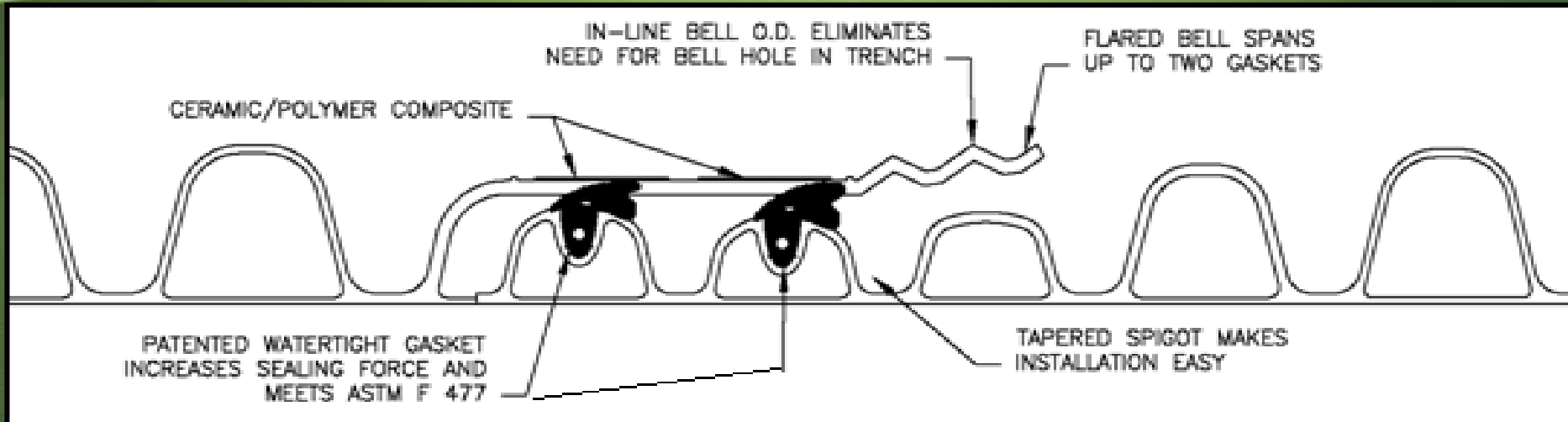


What You GET

- Higher Grade Material
 - Stiffer Pipe
 - Increased Beam Strength
 - Impact Resistant
- Sanitary Grade Joint
 - Double Gasket
 - Fiberglass Band
- Corrosion and Abrasion Resistant
- Ease of Construction
- Backfill Flexibility
- Ease of Inspection

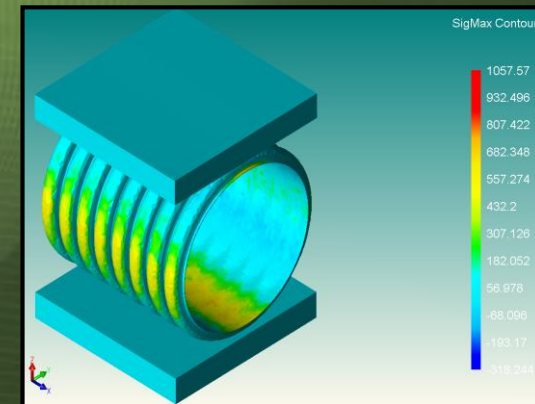
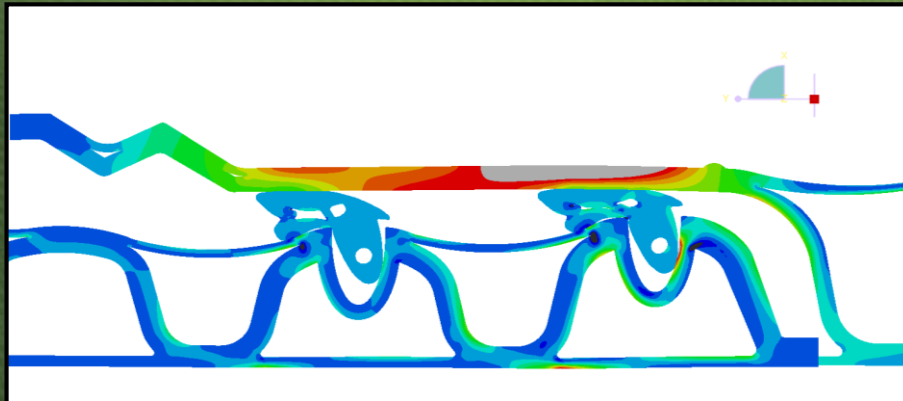
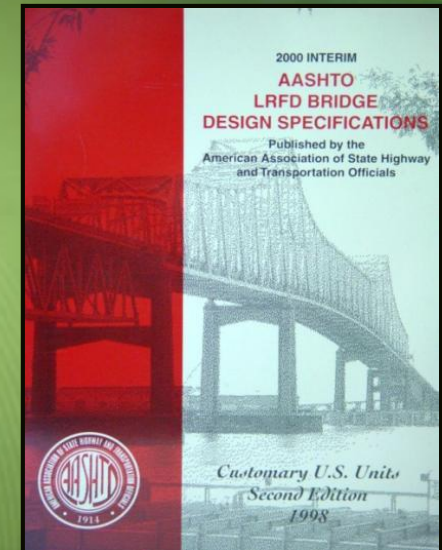


HP Watertight / Inline Joint



Structural Integrity

- ▣ Designed per AASHTO LRFD Bridge Design
 - ▣ Section & Material Properties
 - ▣ Pipe/Soil Properties
 - ▣ Loading Conditions
- ▣ Researched & Tested
 - ▣ Utah State University & Ohio University Load Cell
 - ▣ Dr. McGrath, PhD at Simpson, Gumpertz & Heger



Impact Resistance

<http://www.youtube.com/watch?v=DN58Vx21jBw&feature=youtu.be>

HP Storm Pipe – Design Standards

DS Pipe

- DS ASTM F2736 12"-30" Dual Wall PP Pipe
- DS ASTM F2881 36"-60" Dual Wall PP Pipe
- DS AASHTO M330 12"-60" PP Pipe
- DS ASTM D4101 Resin

DS Watertight Joints

- DS ASTM D3212 Lab Test
- DS ASTM F1417 / ASTM F2487 Field Testing
- DS ASTM F477 Gaskets

DS Installation

- DS ASTM D2321



HP Storm Pipe – Installation

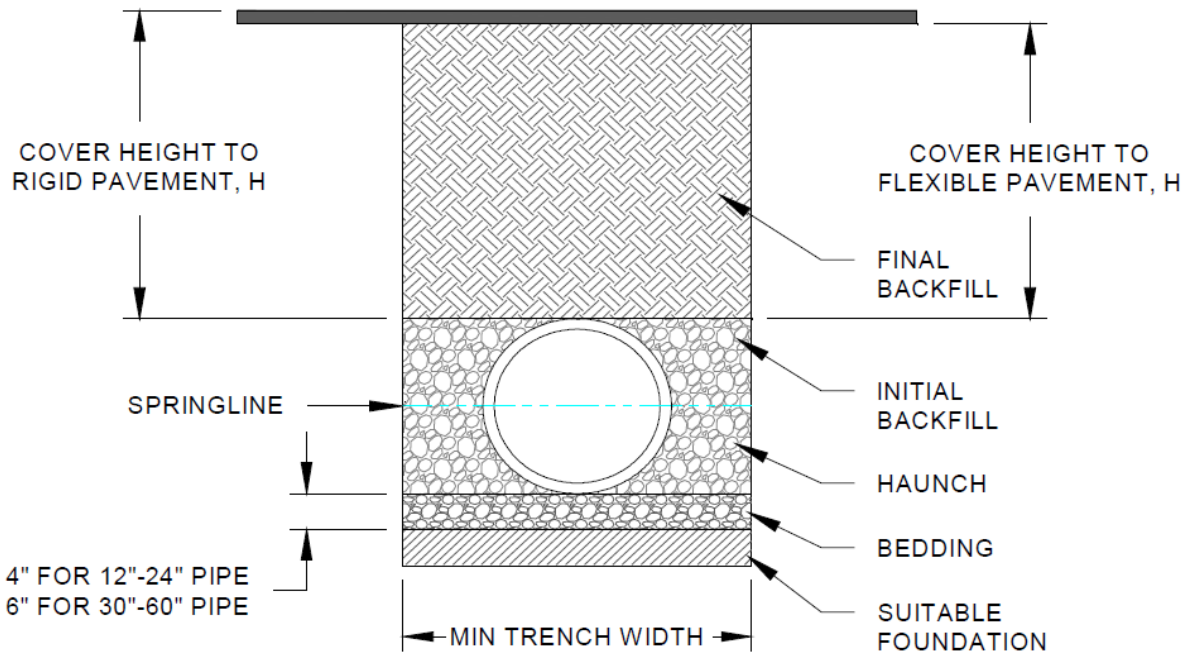


TABLE 1, RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN TRENCH WIDTH
12" (300mm)	30" (750mm)
15" (375mm)	34" (860mm)
18" (450mm)	39" (990mm)
24" (600mm)	48" (1200mm)
30" (750mm)	56" (1420mm)
36" (900mm)	64" (1620mm)
42" (1050mm)	72" (1830mm)
48" (1200mm)	80" (2030mm)
60" (1500mm)	96" (2440mm)

HP Storm Pipe – Installation

Table 3
Maximum Cover for ADS HP Storm Pipe Under Pavement (Storm Drainage), ft (m)

Diameter in (mm)	Class 1	Class 2			Class 3		Class 4
	Compacted	95%	90%	85%	95%	90%	95%
12 (300)	39 (11.9)	27 (8.2)	20 (6.1)	9 (2.7)	21 (6.4)	12 (3.7)	11 (3.4)
15 (375)	42 (12.8)	29 (8.8)	21 (6.4)	10 (3.0)	22 (6.7)	12 (3.7)	11 (3.4)
18 (450)	36 (11.0)	25 (7.6)	18 (5.5)	9 (2.7)	19 (5.8)	12 (3.7)	11 (3.4)
24 (600)	31 (9.5)	22 (6.7)	16 (4.9)	7 (2.1)	16 (4.9)	11 (3.4)	10 (3.0)
30 (750)	33 (10.1)	23 (6.7)	17 (5.2)	9 (2.7)	17 (5.2)	11 (3.4)	10 (3.0)
36 (900)	32 (9.8)	22 (6.7)	16 (4.9)	7 (2.1)	16 (4.9)	11 (3.4)	10 (3.0)
42 (1050)	32 (9.8)	22 (6.7)	15 (4.6)	7 (2.1)	16 (4.9)	11 (3.4)	10 (3.0)
48 (1200)	31 (9.5)	21 (6.4)	15 (4.6)	6 (1.8)	15 (4.6)	10 (3.1)	9 (2.7)
60 (1500)	34 (10.4)	23 (6.7)	16 (4.9)	6 (1.8)	16 (4.9)	11 (3.4)	10 (3.0)

HP Storm Pipe - Installation

ALDOT Inspection Requirements

(e) Testing For Excessive Deformation in P.V.C., HDPE, and PP Pipe.

P.V.C., HDPE, and PP pipe shall be tested for excessive deformation. The test shall be performed by the Contractor in the presence of the Engineer. Testing shall be conducted no fewer than 30 days after the completion of the compaction of all fill over the pipe.

The Contractor shall conduct the test by pulling a nine point mandrel through the entire length of the pipe by hand.

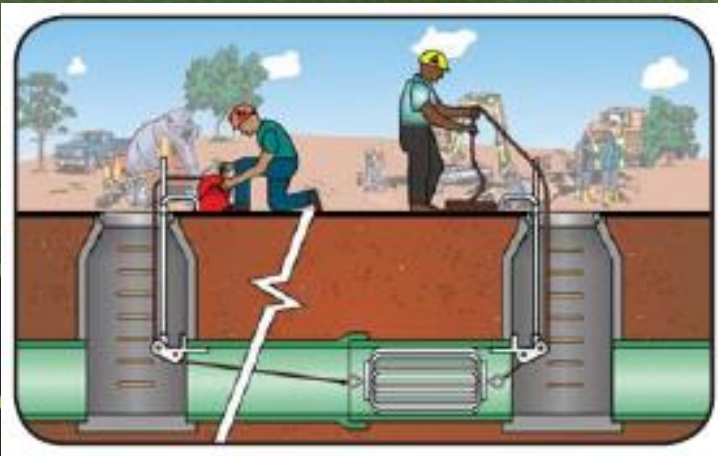
The mandrel shall meet the following requirements;

- It shall be made of steel or aluminum;
- It shall have an effective diameter of 95 % of the nominal inside diameter of the pipe;
- It shall be at least as long as the diameter of the pipe;
- It shall be fitted with pulling rings at each end;
- It shall be stamped or engraved on some segment other than a runner with the pipe size and mandrel outside diameter.

Prior to testing, the Contractor shall provide the Engineer with a proving ring to verify the mandrel size.

The deformation is unacceptably excessive if the mandrel cannot be pulled through the pipe by hand without damaging the pipe. If the deformation is unacceptably excessive, the pipe shall be replaced without extra compensation.

There will be no direct payment for testing.



Project Profile

Jackson–Evers International Airport Jackson, MS

Pipe: 15,000' of 24" – 60" HP Storm
Installed: 2015
Engineer: Waggoner Engineering
Contractor: Hemphill Construction



Project Profile

Elmore County, AL 60'- 36" HP for cross drain

- Installed Winter 2011
- Class III backfill
- Replaced old RCP
- Received written approval



Project Profile

Mountain Crest Drainage Improvements

- City Guntersville - Guntersville, AL
- 2630' of 30" HP Storm and HDPE fittings
- CDG Engineers- Albertville, AL
- TUW- Pinson, AL
- Fall 2014



The Most **Advanced** Name in Drainage Systems®



Project Profile

Etowah County, AL

- **36" HP Storm for Cross Drain
(County now bids HP annually)**

Location: Etowah County, AL

Installed: Spring 2011

Engineer: Etowah County

Contractor: Etowah County



Project Profile

*City of Ashland Drainage Improvements
Clay County, AL*

30" and 60" HP Storm Replacing CMP Cross Drains

Location: Ashland, AL

Installed: November 2015 by City of Ashland



Project Profile

Barbour County Cross Drain Replacements

24" HP Storm Replacing CMP Cross Drains

Location: County Road 67, AL (2 locations)

Installed: August 2014 by County



GDOT Approval – November 2015

- 7 Projects, over 9000 feet total (12-60” Diameter)
- All 9000 feet laser profiled at 30 days, 6 months and 1 year
- Led to approval comparable to RCP with native backfill

- 1) **SR 38, 39/91—Donalsonville** (JJE / Strack) - 2 laser profiles completed (July 2012, May 2013)
- 2) **GDOT CO 73—Thomaston** (CW Matthews) - 2 laser profiles completed (March 2013, June 2014)
- 3) **Oakley Industrial / SR 74—Fairburn** (CMES) - 2 laser profiles completed (December 2013, June 2014)
- 4) **SR 136 - Gordon County** (CW Matthews) - laser profile completed June 2014
- 5) **Bethelview Rd-Forsyth** (CW Matthews) - laser profile completed June 2014
- 6) **SR 141/Bethelview -Forsyth** (CW Matthews) - scheduled for week of July 7th
- 7) **SR 372—Fulton County** (Bartow Paving) - scheduled for week of July 7th

Slipline Applications

