



United States Department of Agriculture

NRCS Updates



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Drainage Field Day
Davis Purdue Ag
Center
June 26, 2021



Natural
Resources
Conservation
Service

nrcs.usda.gov/



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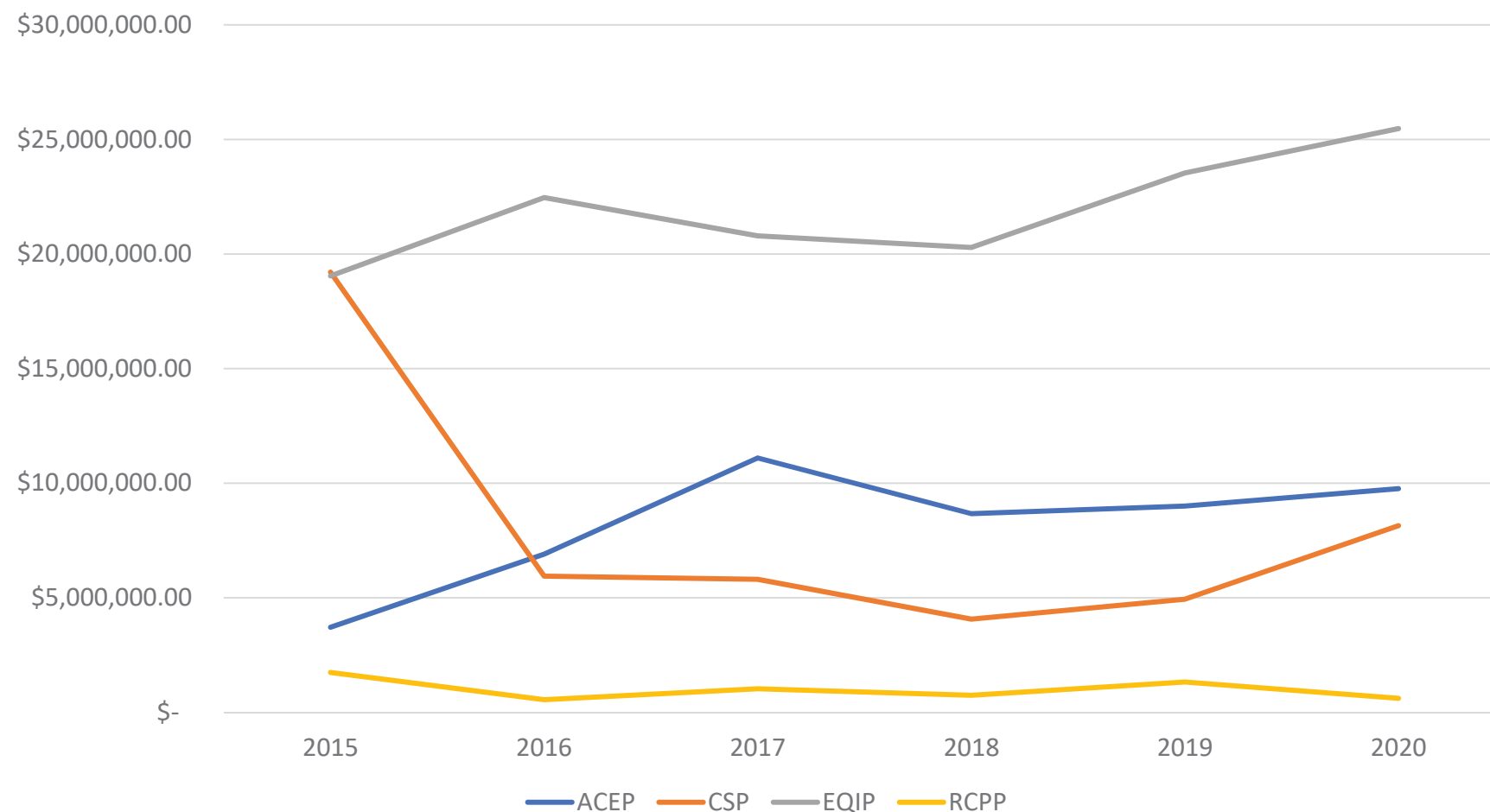


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Farm Bill Dollars Obligated: 2015-2020



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FY20 Farm Bill Programs

Dollars Obligated and Acres Applied

Farm Bill Program	Acres	Dollars Obligated
Agricultural Conservation Easement Program (ACEP)	2,231	\$9,762,353
Conservation Stewardship Program (CSP)	74,117	\$8,145,884
Environmental Quality Incentives Program (EQIP)	146,607	\$25,476,808
Regional Conservation Partnership Program (RCPP)	5,531	\$609, 435
TOTAL	228,486	\$43,994,480

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Top 10 Applied FY20 Conservation Practices

Conservation Practices	Applied Amount	Applied Count	% of Total Applied Count
Cover Crops (ac)	270,623	9,909	32.6%
Conservation Crop Rotation (ac)	149,212	5,702	18.8%
No-Till (ac)	119,682	4,767	15.7%
Nutrient Management (ac)	77,092	2,543	8.4%
Reduced Till (ac)	61,369	1,890	6.2%
Pest Management (ac)	51,633	1,765	5.8%
Early Successional Habitat Development (ac)	3,261	1,117	3.7%
Conservation Cover (ac)	5,252	1,026	3.4%
Brush Management (ac)	18,864	1,021	3.4%
Grassed Waterway (ac)	671	652	2.1%
TOTAL	757,659	30,392	100%

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Top 20 Obligated FY20 Structural Conservation Practices

Conservation Practice	Dollars Obligated	Amount
Roofs and Covers (sq ft)	\$1,748,526	4,856
Water and Sediment Control Basin (no)	\$1,552,591	431
Waste Storage Facility (cu/ft or sq/ft)	\$1,529,052	36,590
Underground Outlet (ft)	\$650,949	174,539
Animal Mortality Facility (no)	\$457,792	17
Fence (ft)	\$430,430	293,327
Heavy Use Area Protection (sq ft)	\$351,952	365,956
Grade Stabilization Structure (no)	\$344,859	61
Subsurface Drain (ft)	\$280,924	113,041
Grassed Waterway (ac)	\$232,202	92
Waste Transfer (sq ft)	\$205,738	1,042
Wetland Restoration (ac)	\$180,206	81
Livestock Pipeline (ft)	\$152,564	85,780
Watering Facility (no)	\$150,310	796
Lined Waterway or Outlet (ft)	\$132,196	2,798
Roof Runoff Structure (ft)	\$123,950	1,197
Waste Facility Closure (no)	\$110,482	16
Pond Sealing or Lining (sq ft)	\$70,253	51,796
Access Road (ft)	\$57,489	7,268
Energy Efficient Building Envelope (no)	\$36,240	4

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Lined Flexible Corrugated Polyethylene Pipe for Land Drainage Applications

- ASTM F3390-20
 - Applies to 3" to 24" diameters

- NRCS Material Specification 584
 - Applies to Corrugated Polyethylene Pipe
 - Revised - June 2020
 - Now Includes ASTM F3390-20



Lined Flexible Corrugated Polyethylene Pipe for Land Drainage Applications

- ASTM F3390-20
 - Table 2
 - Minimum pipe stiffness (50 lbs/inch -12" dia.)
 - Minimum inside liner thickness (0.03 inch 12" dia.)



TABLE 2 Pipe Stiffness and Pipe Dimensions

Pipe Inside Diameter		Minimum Inside Diameter		Minimum Pipe Stiffness at 5% Deflection		Minimum Inner Liner Thickness	
in.	mm	in.	mm	lb/in./in.	kPa	in.	mm
3	75	2.97	75	50	345	0.020	0.5
4	100	3.96	101	50	345	0.020	0.5
5	125	4.95	126	50	345	0.020	0.5
6	150	5.94	151	50	345	0.020	0.5
8	200	7.92	201	50	345	0.024	0.6
10	250	9.9	251	50	345	0.024	0.6
12	300	11.88	302	50	345	0.030	0.8
15	375	14.85	377	42	290	0.035	0.9
18	450	17.82	453	40	275	0.040	1.0
24	600	23.76	604	34	235	0.048	1.2



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Lined Flexible PE Pipe

- NRCS Material Specification 584
 - Revised - June 2020
 - Now Includes ASTM F3390-20

Chapter 3

National Standard Material
Specifications

Part 642
National Engineering Handbook

Material Specification 548—Corrugated Polyethylene Pipe

1. Scope

The specification covers the quality of corrugated polyethylene pipe and fittings.

2. Pipe

Corrugated polyethylene pipe must conform to the requirements of ASTM F405, ASTM F667, ASTM F894, ASTM F3390, AASHTO M252, or AASHTO M294 for the appropriate pipe sizes and fittings.

3. Fittings

ASTM F667, or F3390	3- to 24-inch diameter pipe and fittings
ASTM F894	10- to 132-inch diameter pipe and fittings
AASHTO M252	3- to 10-inch diameter pipe and fittings
AASHTO M294	12- to 36-inch diameter pipe and fittings





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Lined Flexible PE Pipe

Lined Flexible Corrugated Polyethylene Pipe for Land Drainage Applications

- Currently 4 or 5 Providers (alphabetical order)

- ADS

- FRATCO (8" to 15")

- <https://fratco.com/flexcorr/>

- Haviland (6" to 15")

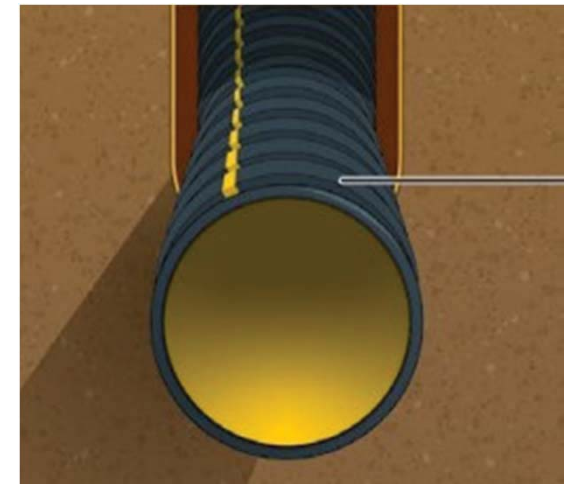
- <https://haviland-drainage.com/products/pipe/smooth-flex/>

- PRINSCO (8" to 15")

- [GOLDFLEX®G2 « Prinsco, Inc](#)

- Timewell (8" to 15")

- <http://www.timewellpipe.com/maxflex/>



Drainage Water Management

- Drainage Water Management Conservation Activity Plan (CAP 130)
- Structure for Water Control (587)*
 - Automated Water Control Structure

Practice Code	Scenario	Unit Type	Payment Rate
587	Inline Stoplog WCS, Surface Water Control 6-10 in Diameter Pipe*	EA	\$2,443.79
587	Inline Stoplog WCS, Surface Water Control 12-18 in Diameter Pipe*	EA	\$3,880.27
587	Inline Stoplog WCS, Surface Water Control >18 in Diameter Pipe*	EA	\$6,782.99
587	Inline WCS, Subsurface Drainage Control, Float Activated Head Pressure Valve*	EA	\$886.93
587	Automated DWM Structure*	EA	\$4,044.57



- Drainage Water Management (554)*
 - Payment Rate = \$11.65 per Acre Managed

*High Priority Practice



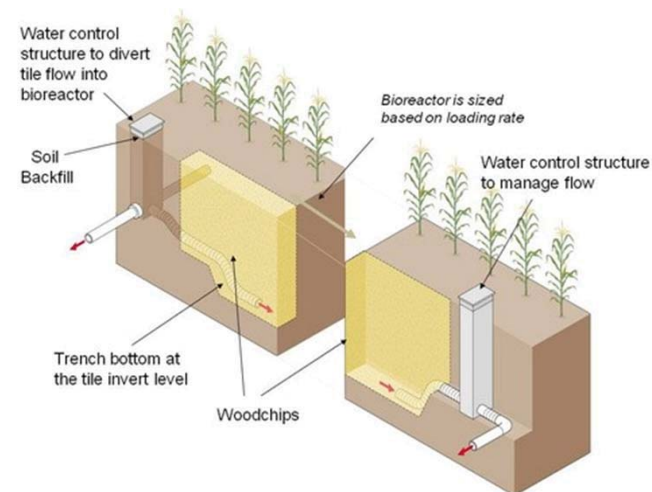
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Conservation Practices

Denitrifying Bioreactor (605)*

- (New) Advanced System with Automated Water Control Structure

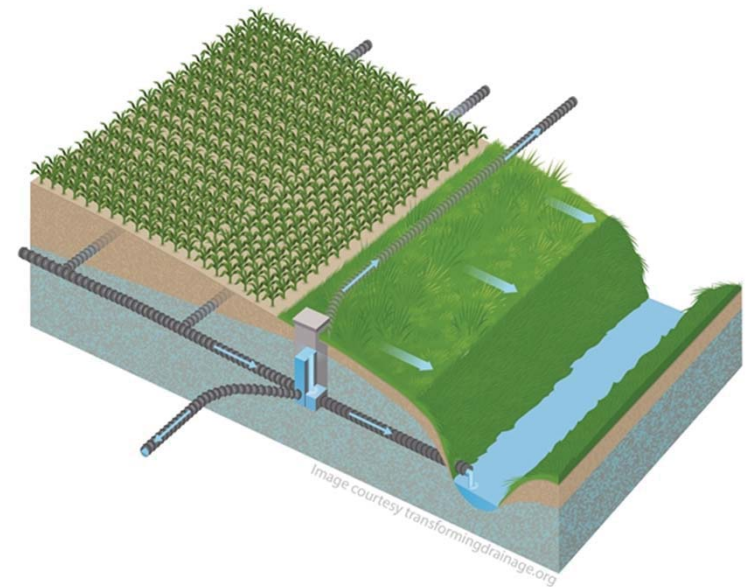
Practice Code	Scenario	Unit Type	Payment Rate
605	Denitrifying Bioreactor, with liner, no soil cover*	CU YD	\$61.42
605	Denitrifying Bioreactor, with liner, soil cover*	CU YD	\$71.14
605	Denitrifying Bioreactor Recharge*	CU YD	\$54.03
605	Denitrifying Bioreactor with Automated Water Control Structures*	CU YD	\$73.91



*High Priority Practice

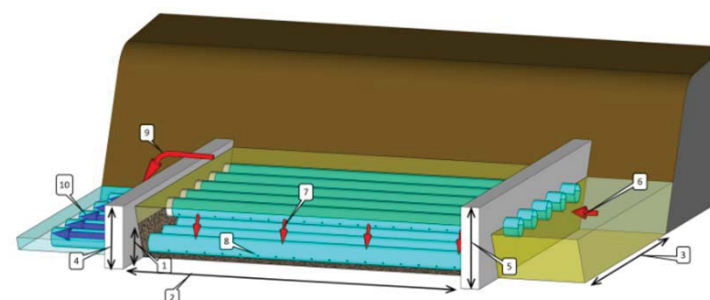
Saturated Buffers (604)

- Typical System
 - Payment Rate = \$6.03 per foot
- (New) Advanced System with Automated Water Control Structure
 - Payment Rate = \$10.70 per foot
- No limitation on footage



Phosphorous Removal System (782)

- No EQIP payments...yet!
- Cost Share may be available through local SWCD



Items in ditch design drawing

- 1 PSM Thickness
- 2 Structure Length
- 3 Ditch bottom width (structure width)
- 4 Overflow dam height
- 5 Inflow dam height
- 6 Inflow
- 7 Inflow distribution pipe for untreated water: top-down flow
- 8 Collection distribution drainage pipe for treated water
- 9 Overflow
- 10 Treated outflow



Subsurface Drainage (606)

Purpose: Improve the soil environment for vegetative growth by intercepting and preventing water movement into a wet area.

Primarily used for drainage whole fields and grassed waterways in Indiana.





American Society of Testing Materials (ASTM) **Standards-Drainage Tile**

- **ASTM F667/667M-16 - Standard Specification for 3 through 24 in. Corrugated PE Pipe and Fittings**
- **ASTM F2648/2648M-13 - Standard Specification for 2 to 60 inch [50 to 1500 mm] Annular Corrugated Profile Wall PE Pipe and Fittings for Land Drainage Applications (Dual Wall)**
- **ASTM F449-16 - Standard Practice for Subsurface Installation of Corrugated Polyethylene Pipe for Agricultural Drainage or Water Table Control**
- **ASTM F3390-20 – Standard Specifications for 3 to 24 inch Lined Flexible Corrugated PE Pipe for Land Drainage Applications**



Minimum Depth

- **2.0 feet in mineral soils**
- **2.5-3.0 feet in organic soils**





Installation Requirements

- **Negative or reverse grades (ASTM F449-16) –
Negative grade that would fill the pipe more than
10% (4" diameter = 0.4")**
- **Grade within 0.1'**
- **Stretch (ASTM F449-16) –
Should not exceed 5%
during installation**





Installation Requirements (606) for 8" or less

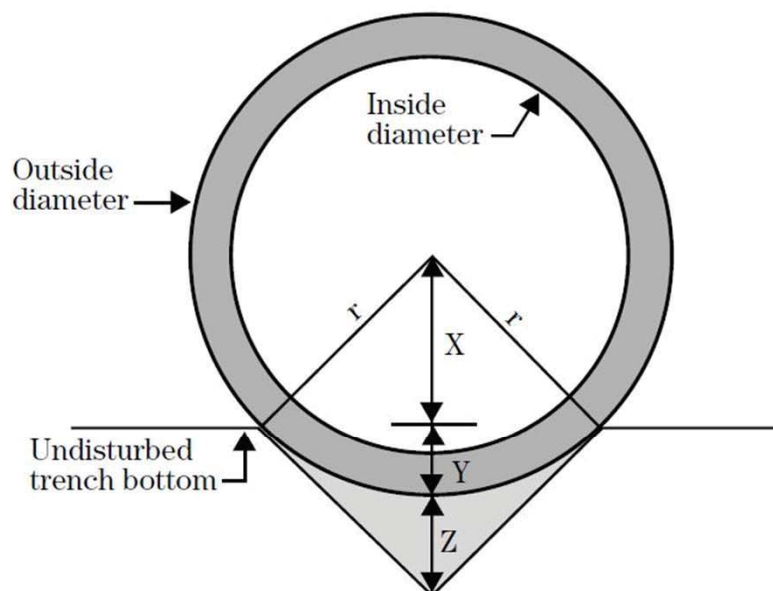
- **Shaped groove providing an angle of support of 90 degrees or greater in the bottom of the trench (1/4 of pipe)**
- **Sand & Gravel envelope-at least 3 inches**
- **Compacted bedding beside and to 3 inches above the tile**

Installation Requirements-8" or less

Figure 14-47 Dimensions for a 90 degree V groove for corrugated plastic pipe

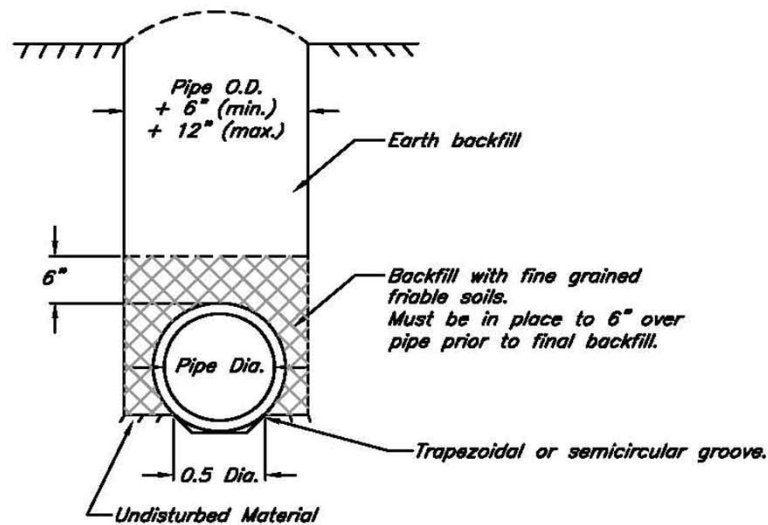
Diameter (D)	r (D/2)	X (0.707r)	Y (0.293r)	Z (0.414r)
3	1.5	1.060	0.439	0.621
4	2.0	1.414	0.586	0.828
5	2.5	1.768	0.732	1.036
6	3.0	2.121	0.879	1.242
8	4.0	2.828	1.171	1.657

^aValues are based on typical outside diameter, which is assumed to be 20 percent greater than inside diameter.



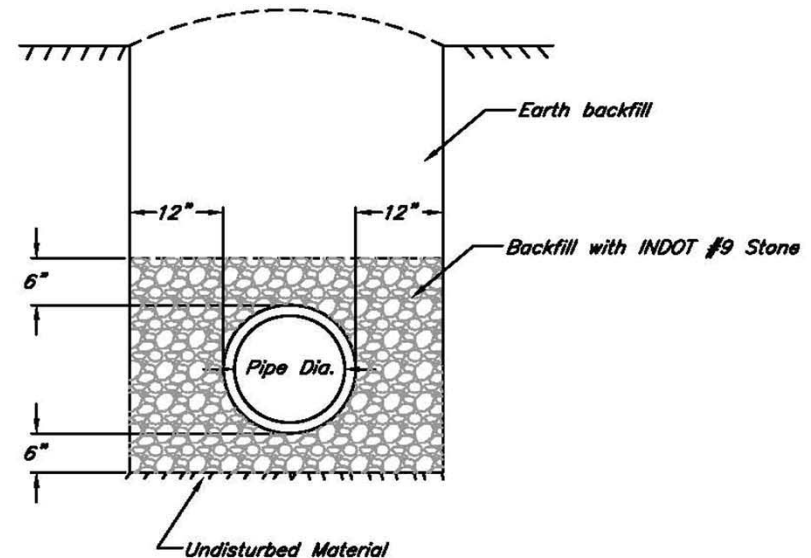
TILE INSTALLATION GUIDELINES

TYPICAL SUBSURFACE DRAIN INSTALLATION



Wheel Machine Installation

"V" groove may be used for 6" diameter and smaller pipe.



Excavator Installation

- Groove or Bed
- Pay attention to initial backfill
- For 24" & bigger, check with pipe manufacturer for installation requirements.

Poor Tile Installation





Installation Requirements (606)- larger than 8"

- **Semi-circular or trapezoidal shaped groove shaped to fit the conduit with an angle of support of 120 degrees (1/3 of pipe)**
- **Sand & Gravel envelope-at least 3 inches**
- **Compacted bedding beside and to 3 inches above the tile**



Installation Requirements-larger than 8"

Figure 2
Rounded Trench Installation

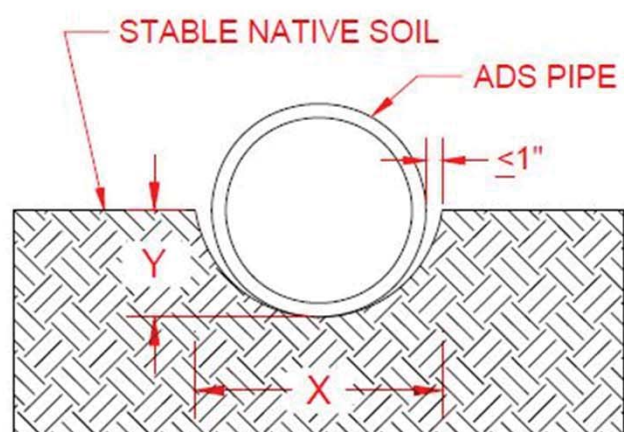


Table 2
Rounded Trench Dimensions

Pipe Diameter in (mm)	Maximum* Width "X" in (mm)	Depth "Y" in (mm)
10 (250)	13.5 (343)	5.7 (145)
12 (300)	16.5 (419)	7.3 (185)
15 (375)	19.6 (498)	8.8 (224)
18 (450)	23.3 (592)	10.6 (269)
24 (600)	29.9 (759)	14.0 (356)
30 (750)	37.2 (945)	17.6 (447)
36 (900)	43.2 (1097)	20.6 (523)
42 (1050)	49.8 (1265)	23.9 (607)
48 (1200)	55.7 (1415)	26.9 (683)
60 (1500)	68.6 (1742)	33.3 (846)

Maximum width based on $\leq 1"$ gap on either side of the pipe at the springline. Wider trench widths may adversely affect pipe performance

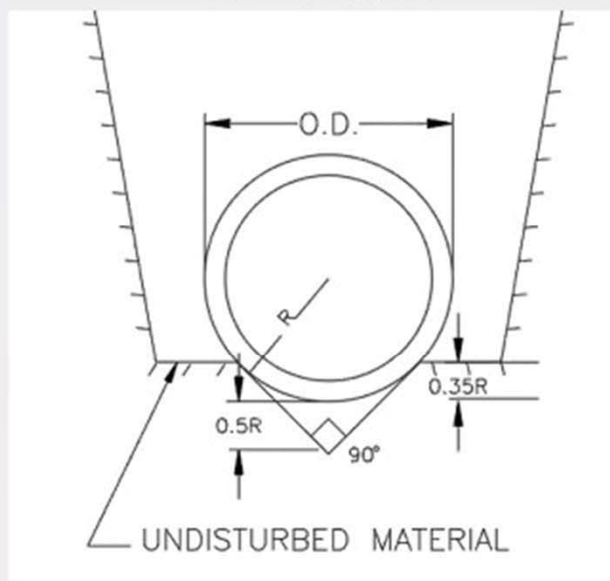


Installation Requirements-larger than 8"



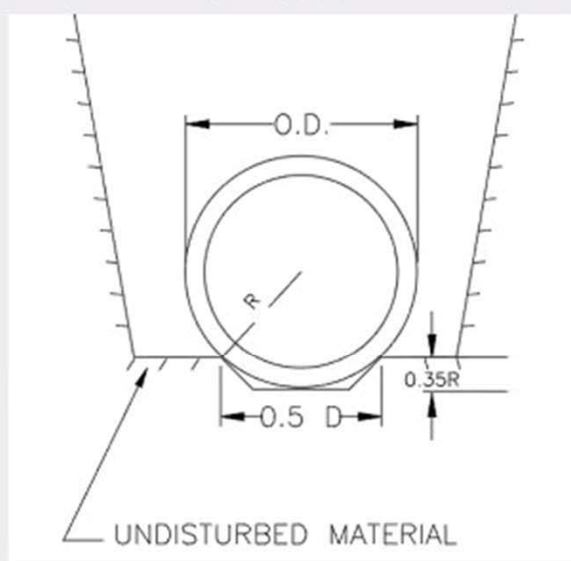
Bottom Groove Requirement

3" – 6" CPT



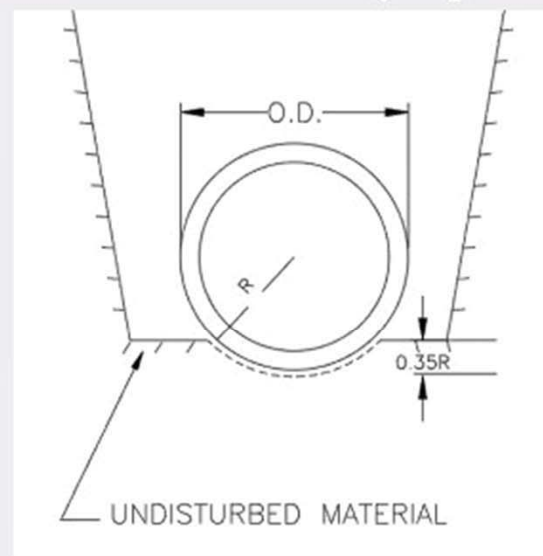
Triangular Groove

> 6" CPT



Trapezoidal Groove

**> 6" CPT
AND
All Concrete/Clay Pipe**



Circular Groove



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