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ENGINEERING DESIGN FILE

EDF-096- 016
Rev. No. _____

EDF Title: Project Stormwater/Drainage Design	
Project No.: 2000-096	Project Title: OU 1-10, Group 3

Problem Statement: Prior to start of soil removal at TSF-26, stormwater from the SE corner of TAN was routed through TSF-26 via an open ditch to a stormwater retention pond. When the TSF-26 cleanup started, the inlet to TSF-26 was plugged and flow to the retention pond was cut off. The purpose of this design is to re-establish flow to the retention pond while preventing surface water and sediment from TSF-26 from leaving the TSF-26 site. This design also provides a temporary stormwater control plan during construction.

Summary of Conclusions: A 2' diameter CPE pipe with watertight joints will be placed across TSF-26 at a slope of .00125 ft/ft. The site will be graded as shown in the attached drawings to provide sufficient volume to retain the design storm. The site shall be graded as shown in sheet 5 of the package for stormwater control during construction.

Review and Approval Signatures:

		Printed Name	Signature	Date
Prepared by:		Shaun Dustin		10-2-3
Checked by:		KEVIN SHABER		12/3/03
Approval:		GARY MECHAM		12/3/03

Distribution:

Professional Engineer's Stamp (if required)

PROFESSIONAL ENGINEER
REGISTERED
10712
10-2-3
STATE OF IDAHO
J. SHAUN DUSTIN

ENGINEERING DESIGN FILE

EDF Title Project Stormwater/Drainage Design			EDF- 096-016
Project No.: 2000-096			Rev No.:
Project Title: OU 1-10, Group 3			Page 2 of 2
Prepared by:	Date:	Checked by:	Date:

Problem Statement: Prior to start of soil removal at TSF-26, stormwater from the SE corner of TAN was routed through TSF-26 via an open ditch to a stormwater retention pond. When the TSF-26 cleanup started, the inlet to TSF-26 was plugged and flow to the retention pond was cut off. The purpose of this design is to re-establish flow to the retention pond while preventing surface water and sediment from TSF-26 from leaving the TSF-26 site. This design also provides a temporary stormwater control plan during construction.

Design Basis: Stormwater must be accounted for in the site design at TSF-26. The design storm is the 25-yr, 6 hr storm generating 1.4 inches of water over the area in question. The water draining through the site will be isolated from runoff generated on site by piping the water draining across the site along the flowline of the existing ditch. Permanent stormwater control for the site will be accomplished by grading the site to permit retention of all precipitation for the design storm. Stormwater generated on site during construction will be retained onsite in constructed ponds sized for the full 25-yr, 6-hr storm. For control of stormwater during construction, the 25-yr, 6-hr storm will be used but infiltration will be considered.

Assumptions: See calculation sheets

References: DOE-ID A&E Standards, Civil Design, Section 0200.2.8. Water Resources Engineering, Linsley, Et Al, McGraw Hill, 1992. Hydrology, Water Quantity and Quality Control, M wanielista, Et Al, John Wiley and Sons, 1997. Manufacturer data as incorporated in EDF. Drawings C-7, C-8, C-9.

Calculations / Analysis: See attached calculation sheets

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JOB PM 2A Stormwater
SHEET NO. 1 OF 5
CALCULATED BY S Dustin DATE 7/7/03
CHECKED BY DATE
SCALE

Problem Statement: The TSF-26 area served as the primary conduit for stormwater draining to the retention pond west of the TSF-26 site. The flow path was blocked at some point in the past, and there is currently no way for stormwater to get to the retention pond. Further, ~~the stormwater~~ runoff generated by the TSF-26 should be retained within the TSF-26 area. The purposes of this design are:

1) To restore the flow path to the retention pond
2) To demonstrate that the final grading plan provides adequate retention volume for stormwater generated on-site

Part 1: Restore Flow to Existing Retention Pond

The existing storm runoff drains down from the upper TAN area where it is detained ~~on~~ a large, unused area east of the TSF-26 area (7). The water then drains to an irregular ditch (6), and a 2'Ø CMP culvert (5). The culvert was plugged at some point in the past to prevent runoff from entering the TSF-26 area where an open ditch, in addition to routing the offsite flow through TSF-26, collected surface water drainage from TSF-26. ~~and~~ This design will separate the waste streams.

The ditch across TSF-26 will be replaced with a silt-tight gasketed pipe to prevent sediment or surface water intrusion. TSF-26 Tfsoil will be regraded to keep surface water away from the ~~at~~ new pipe.

Pipe size selection: The area currently used for detention (7) has the effect of attenuating flows significantly. In the years since pipe (5) has been plugged, ~~no~~ the lack of an outlet ~~has not had~~ to (7) has not had any deleterious ~~effects~~ on the area. No flooding or significant ponding has been observed in (7), leading to the conclusion that the pipe in (4) is an overflow for extreme events. The pipe in (4) ~~does~~ needs to be sized to ensure that it provides the same flow capacity as the upstream pipe, and maintain the minimum pipe slope required ~~for~~ self cleaning of sediment.

Analysis Techniques - Manning's Equation, pipe full, slopes as measured.

For existing pipe the following conditions apply:

2'Ø
CMP (Poor condition), Manning's $N = 0.022$
$L = 111$ ft
$\Delta z = 0.48$ ft

$$V = \frac{1.49}{0.022}\left(R_h^{2/3}\right)S^{1/2}$$

$$R_h = \frac{A}{P_w} = \frac{\pi d^2/4}{\pi d} = \frac{d}{4}$$

$$V = \frac{1.49}{0.022}\left(0.5^{2/3}\right)\left(\frac{.48}{111}\right)^{1/2} = 2.8 \text{ ft/s}$$

$$Q_{exist} = VA = \frac{2.8 \text{ ft}}{s}\left(\frac{\pi \cdot 2^2}{4}\right) = 8.8 \text{ ft/s}$$

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JOB PNEA Stormwater
SHEET NO. 2 OF 5
CALCULATED BY [illegible] DATE 7/9/03
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For proposed pipe, solve for N given the following:
Use CPE (Corrugated Polyethylene)
Use Q = 8.8
Use S = 0.5ft/400ft = 0.00125 (Max slope allowed by site)
Use D = 2ft, ∴ A = 3.14 ft², P = 6.28 ft, R_h = 0.5

$$8.8 = VA = 3.14\left(\frac{1.49}{N}\right)(0.5)^{2/3}(0.00125)^{1/2}$$

From equation solver, n = 0.012. Smooth wall CPE N values are 0.010-0.012.

Using an N value of 0.011, $Q_{newpipe} > Q_{upstream}$.
∴ the use of 2'Φ CPE @ S = 0.125 ft/100ft provides adequate capacity.

Use smooth wall CPE Pipe; ADS N-12 IB WT or Hancor Blue Seal. Specifications for both are attached.

The minimum slope for ~~FTP~~ 24" Φ pipe reccommended by "Recommended Standards for Wastewater Facilities, 1997 ed. is 0.08 ft/100 ft. Design slope is 0.125 ft/100 ft ∴ slope OK

Cover Over Pipe

Per Mfg. recommendations, provide 12" min cover over pipe in trafficked areas.

Specifications

See attached

Summary, Part 1

Supply 2'Φ CPE pipe, watertight, gasketed bell & spigot joints, capable of supporting HS 25 load with 1' compacted cover. Smooth inside wall. Manning's "n" value for design not more than 0.012. Use ASTM F-1417 or ASTM C969 to test watertightness. Gasket shall meet ASTM F477. Pipe shall be virgin HDPE meeting the requirements of ASTM D 3350. Install at min slope of 0.125 ft/100 ft.

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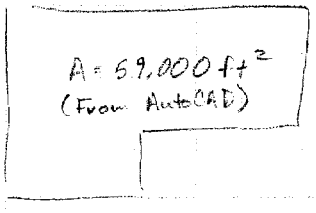
JOB: PM&A Stormwater
SHEET NO. 3 OF 4/5
CALCULATED BY: [illegible] DATE: 3/10/03
CHECKED BY: DATE:
SCALE:

Part 2: ON-SITE STORMWATER RETENTION

Objective: Demonstrate that final site grading provides enough volume to capture total runoff generated in the event of the DOE-ID INEEL site specific local precipitation std. for a 25 yr, 6hr storm, 1.4" total

Assumptions: Frozen ground, zero infiltration

TOTAL VOLUME OF RAINFALL



A = Area of TSF-26 inside fence

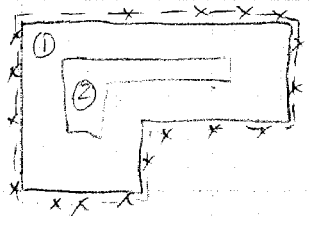
$V = A \cdot D$

$= 59{,}000\,ft^2 \cdot \frac{1.4\,in}{12\,in/ft}$

$V = 6883.3$

$V_R = 6900\,ft^3$

TOTAL VOLUME OF GRADED AREA (See attached sheet for grading plan)



A_1 = Area inside new 4780.0 contour

$A_{1,2} = 56{,}000$

$A_2 = 11{,}400$

$A_1 = 44{,}600$

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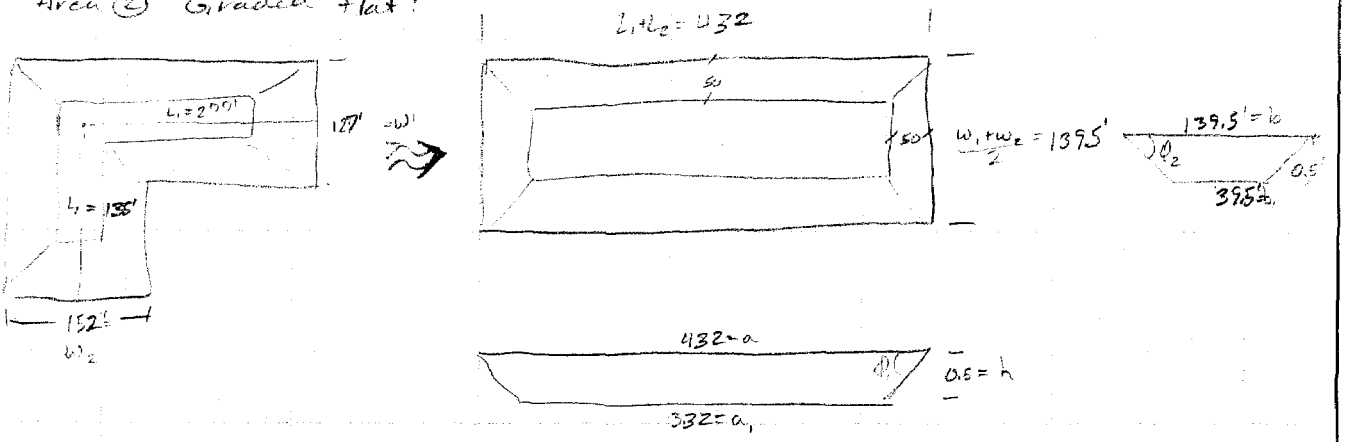
JOB PM2A Stormwater
SHEET NO. 11 OF 45
CALCULATED BY S Duetta DATE 7/10/03
CHECKED BY DATE
SCALE

For Area ② Graded flat:



$$V = \frac{h}{6}\left(A_1 + (a+a_1)(b+b_1) + A_2\right)$$

$$V = \frac{0.5}{6}\left[(56000) + (332+432)(139.5+39.5) + (11,400)\right]$$

$$V = (204,156)\tfrac{1}{12}$$

$$V = 17,000$$

CONCLUSION:

$V_R = 7,600 \ll V = 17,000$; ∴ There is sufficient volume for on-site retention of the 25yr-6hr storm with no infiltration with the above grading plan

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JOB PM 2A Stormwater
SHEET NO. 5 OF 5
CALCULATED BY S Dustin DATE 7/14/03
CHECKED BY DATE
SCALE

Temporary Stormwater Control, Construction Case

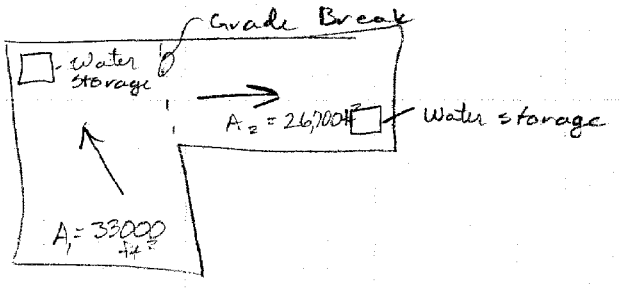
Assumptions: Work will take place when ground is not frozen

Total rainfall: 1.4"

Runoff coefficient: 0.3 (use RR yard coeficient from P 206, Wanielista)

Total runoff: Area • 0.3 • 1.4"/12"/ft = A • 0.035

Site will be graded as shown:



$V_1 = (33000) \cdot 0.035$

$V_1 = 1155 \text{ ft}^3$

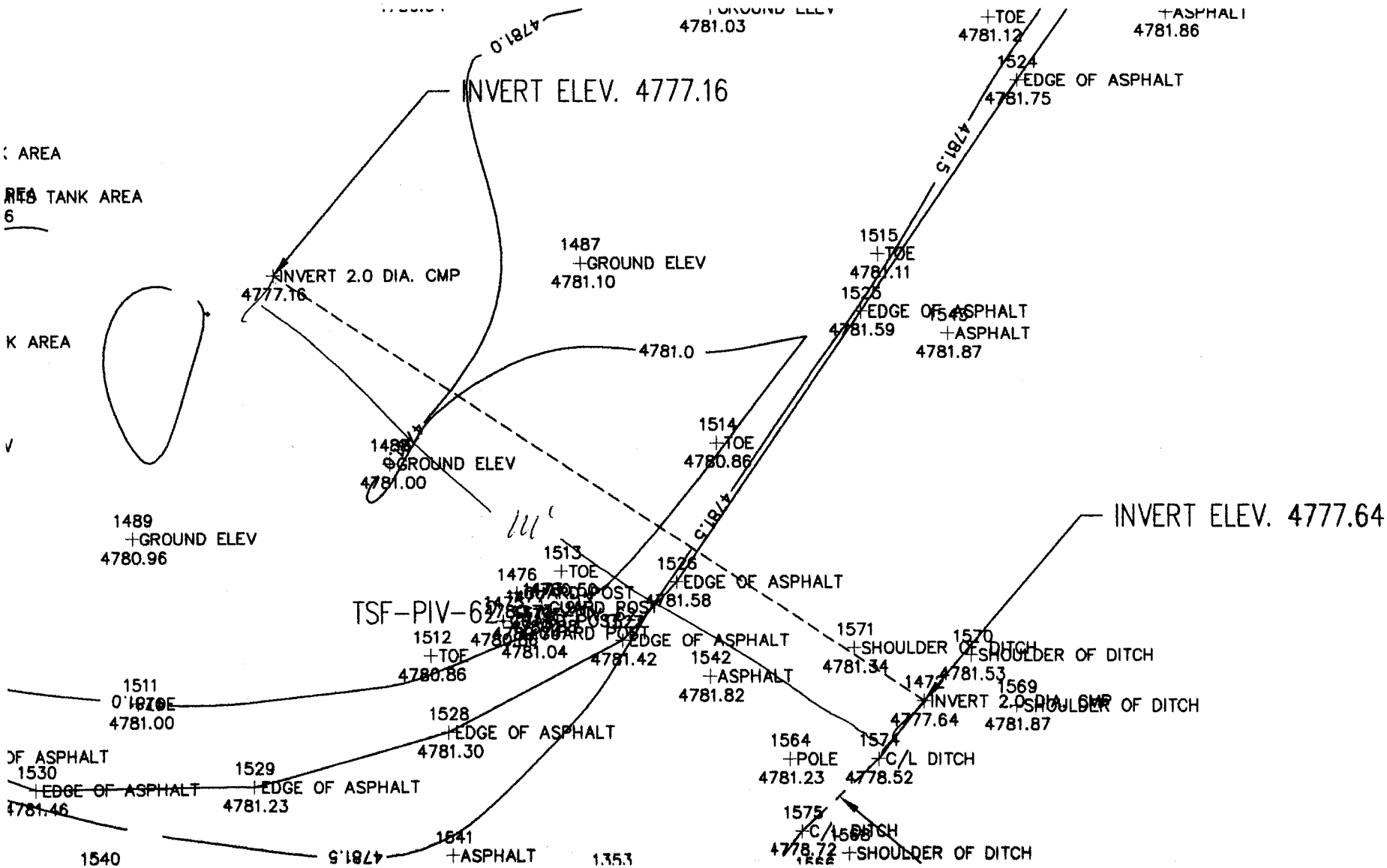
$V_2 = 26{,}700 \cdot 0.035$

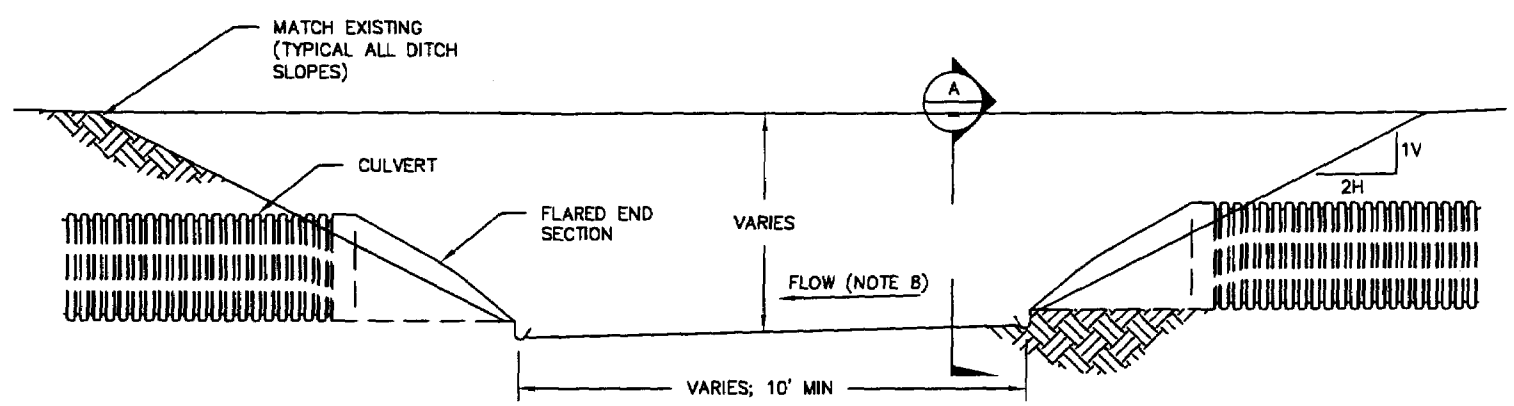
$V_2 = 935 \text{ ft}^3$

Conclusion: Require contractor to provide 2 ponds sized as shown and to grade site as shown to drain to ponds

(1) - TSF-26
(2) - Stormwater Retention
(3) - 2'Φ culvert (CMP)
(4) - Proposed 2'Φ CPE culvert
(5) - Existing 2'Φ CMP culvert
(6) - Ditch
(7) - Current Stormwater detention.

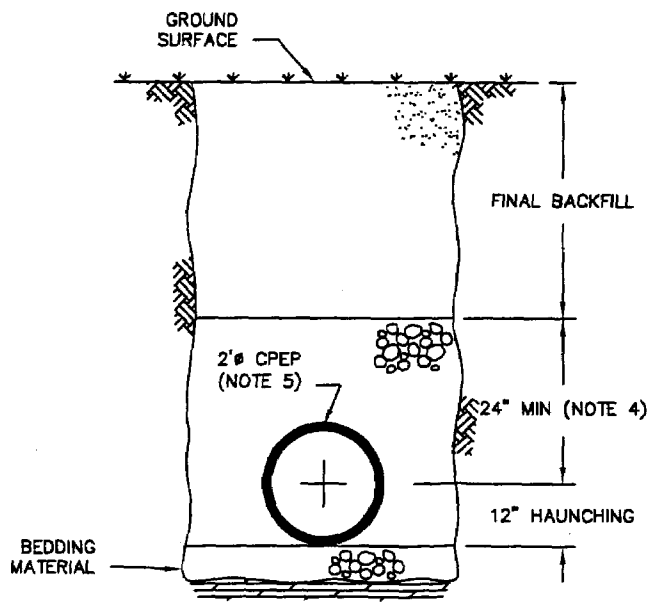
Existing Storm Drain (#5) Survey data





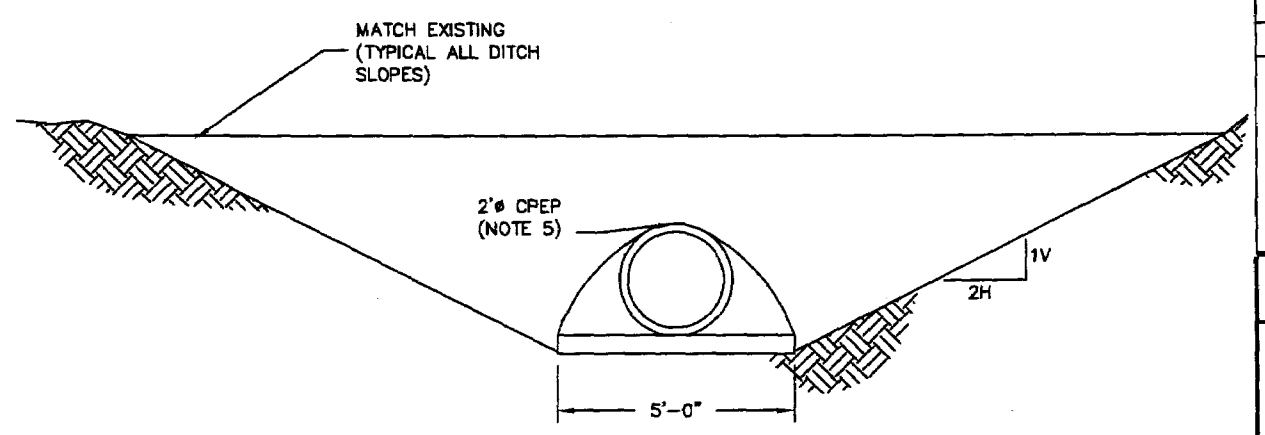
DETAIL 1/C-8

STORM DRAIN TRANSITION DITCH
AND SURFACE WATER COLLECTION
NTS



SECTION A/C-8

STORM DRAIN TRENCH
CROSS SECTION
NTS



SECTION A/–

STORM DRAIN
OPEN CHANNEL
NTS

REV	DATE	DESCRIPTION

NOTES

1) BEDDING: SUTABLE MATERIAL SHALL BE CLASS I, II, OR III AND INSTALLED PER ASTM D2321, CURRENT EDITION. MINIMUM BEDDING THICKNESS SHALL BE 4".

2) HAUNCHING AND INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II, OR III AND INSTALLED PER ASTM D2321 LATEST EDITION.

3) MINIMUM TRENCH WIDTH SHALL BE 48".

4) MINIMUM COVER OVER TRENCH @ FINAL GRADE IS 12". FOR CONSTRUCTION OPERATIONS PRIOR TO SITE GRADING, CONTRACTOR SHALL PROVIDE MIN 24" COMPACTED FILL OVER PIPE. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF ALL PIPE MATERIALS DAMAGED BY CONSTRUCTION OPERATIONS PRIOR TO FINAL COMPLETION.

5) CPEP: CORRUGATED POLYETHYLENE PIPE

6) ALL OPEN DITCHES SHALL BE GRADED AT 2H:1V TO MATCH EXISTING GROUND SURFACE ELEVATIONS.

7) GRADE GROUND SURFACE AROUND OPEN CHANNELS TO DRAING INTO CHANNELS.

8) PROVIDE CONSTANT SLOPE BETWEEN EXISTING AND NEW PIPE INVERTS. INSTALL NEW CULVERTS TO ELEVATIONS SHOWN IN SHEET C-8.

SCALE: AS NOTED

90% DESIGN

OU 1-10 TSF-26
DETAILS,
STORMWATER

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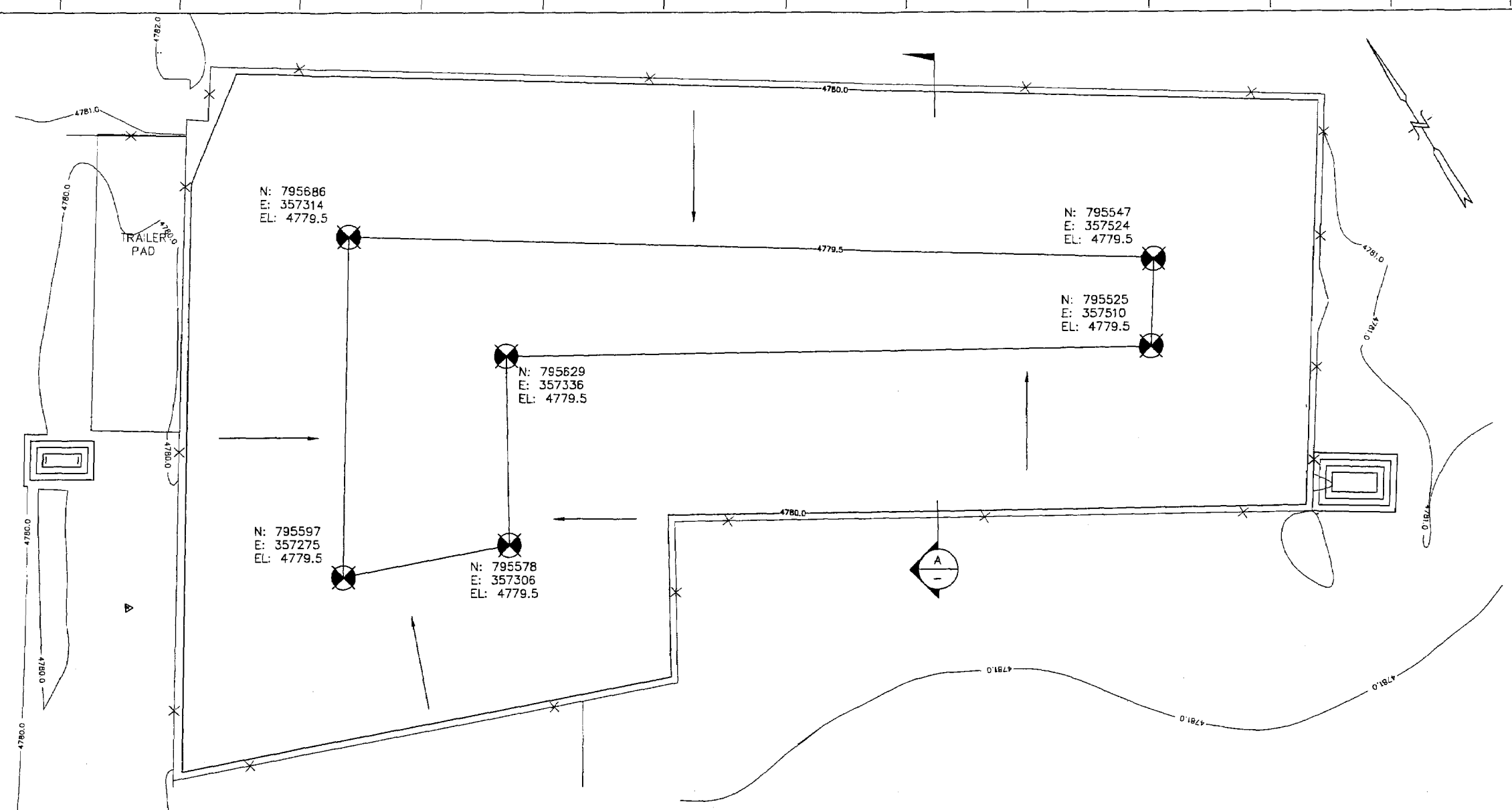
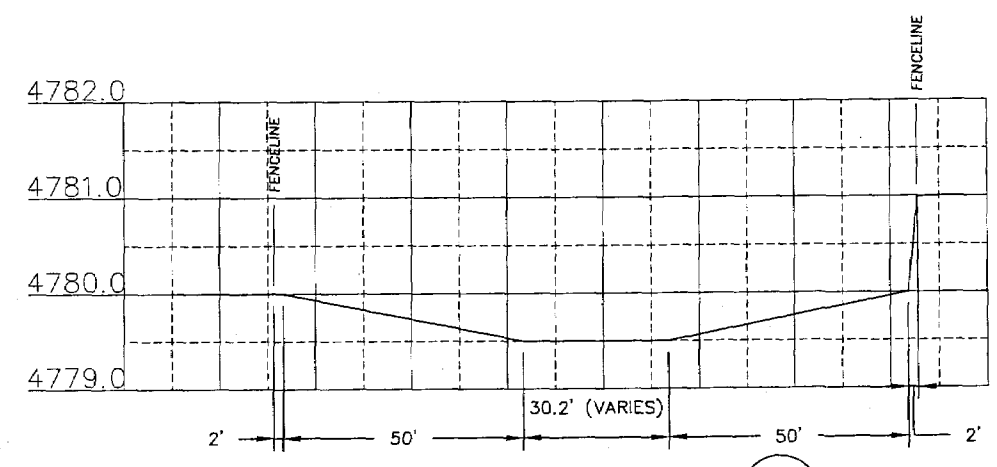
D-3

DRAWN: S DUSTIN		TASK ORDER NUMBER 2000-096
DESIGNED:		QA LEVEL: CG / DWG SIZE: D
CHECKED:		
APPROVED:		DRAWING NUMBER / REV A
CADD FILE#.DWG		



FINAL GRADING
PLAN VIEW
1"=20'



SECTION
REPRESENTATIVE CROSS SECTION
SCALE: 1"=20' H; 1"=1'V

REV	DATE	DESCRIPTION	DESIGN	APP'D BY

NOTES

1) GRADE SITE TO DRAIN AS SHOWN. PLACE 6" TOPSOIL PREPARATORY TO REVEGETATION. MATCH EXISTING ELEVATIONS AT FENCELINE. GRADE FLAT WITHIN BOUNDARY DESIGNATED BY COORDINATES AS SHOWN.

2) FERTILIZE AND SEED PER THE SPECIFICATIONS.

3) REMOVE TRAILERS AND SITE UTILITIES. REMOVE WASHDOWN PAD. CLEAN UP SITE AND RESTORE AREAS AFFECTED BY CONSTRUCTION.

SCALE: AS NOTED

90% DESIGN

OU 1-10 TSF-26
FINAL
GRADING PLAN

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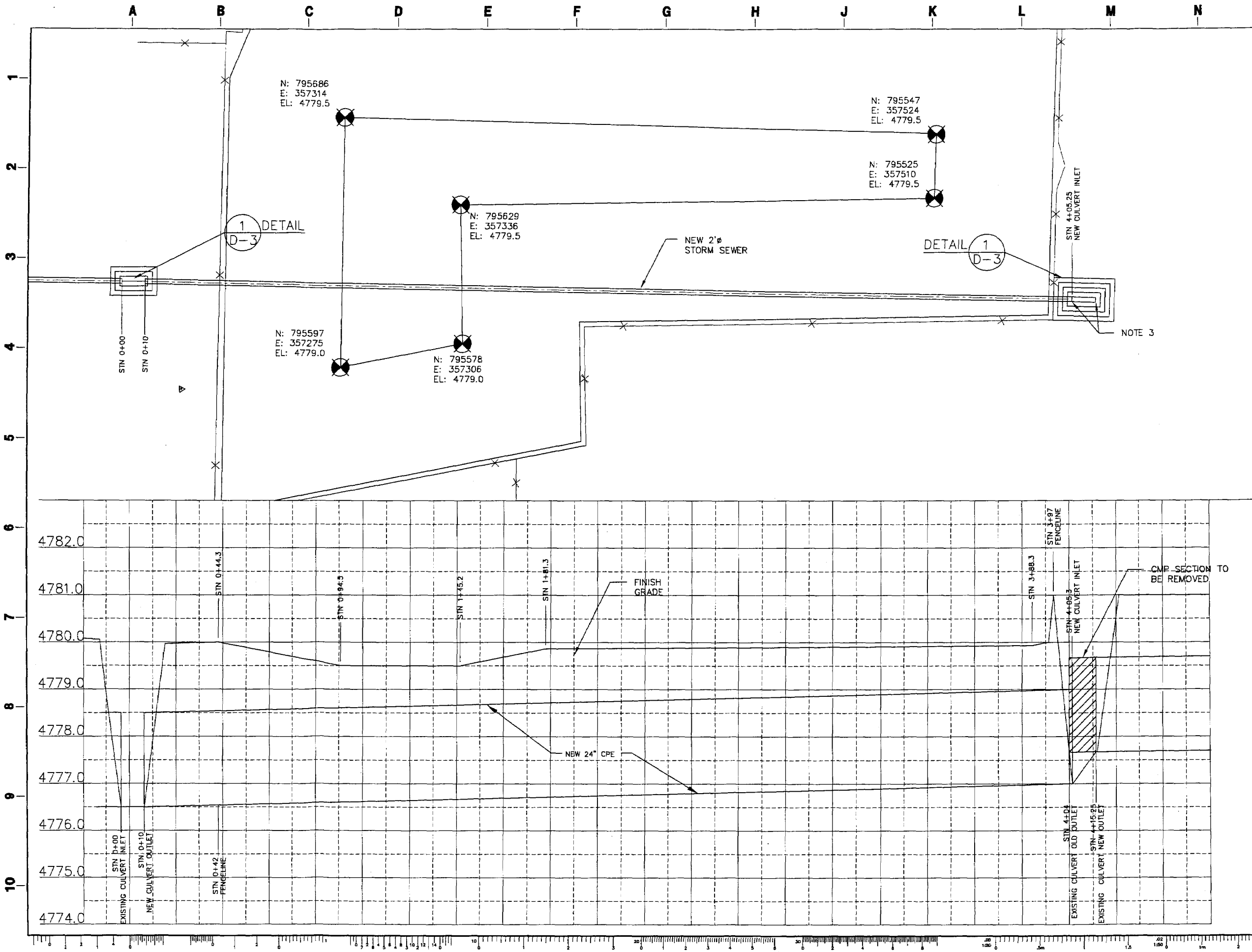
C-8

DRAWN: S DUSTIN		TASK ORDER NUMBER 2000-096	
DESIGNED:		QA LEVEL: CG	DWG SIZE: D
CHECKED:		DRAWING NUMBER	REV A
APPROVED:			
CADD FILE#.DWG			



REV	DATE	DESCRIPTION	DESIGN	APP'D BY

NOTES

1) PLACE 2' ø STORM SEWER AS SHOWN PRIOR TO PLACEMENT OF CLEAN SUBGRADE FILL.

2) SEE SHEET D-3 FOR STORM DRAIN DETAILS

3) REMOVE SECTION OF CMP AS SHOWN BETWEEN STN 4+04 AND STN 4+14.

SCALE: AS NOTED

Reference Dwg # only

90% DESIGN

OU 1-10 TSF-26
STORM SEWER
PLAN & PROFILE

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C-7

DRAWN: S DUSTIN		TASK ORDER NUMBER 2000-096	
DESIGNED:		QA LEVEL: CG	DWG SIZE: D
CHECKED:		DRAWING NUMBER	REV A
APPROVED:			
CADD FILE: *.DWG			

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BLUE SEAL™ PIPE, WATERTIGHT PERFORMANCE

BLUE SEAL™ Bury it and forget it.

THE PERFORMANCE YOU EXPECT. THE INNOVATIONS YOU NEED.

With over a century of experience, we're experts when it comes to drainage, providing innovative solutions for all kinds of applications. Our HDPE pipe delivers superior value while providing physical strength and structural design that just cannot be matched by metal or concrete.

Hancor's new patent pending, highly engineered composite pipe joining system, a unique combination of three different materials, is being described as the best watertight solution on the market.

BLUE SEAL is a gravity flow, watertight pipe ideal for storm sewers, detention systems, and cross, slope or edge drains. Other applications include golf courses, sports playing fields, or parking lot drainage, as well as irrigation ditch enclosures.

Available in a complete range of sizes from 12" - 60" (300 - 1500mm) diameters, this Hancor exclusive solution is 3rd party verified to meet 10.8 psi pressure and vacuum testing requirements and EPA Phase II Best Management Practices. Once again, Hancor leads the way in offering a 60" corrugated HDPE verified watertight joining system.

The unique feature that sets this system apart from any other is a highly engineered integral bell-and-spigot system that utilizes expanding structural foam technology for gasket support. This revolutionary coupling system maintains bell dimension after pressurization providing uniform tolerances to ensure the highest consistent performance not found in the corrugated pipe industry. Hancor's multicomposite reinforced bell design is easily recognized by its blue product identification wrap.

5 YEAR WARRANTY

BLUE SEAL, Hancor's new highly engineered composite pipe joining system is backed by an industry exclusive 5 year limited warranty.

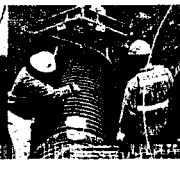
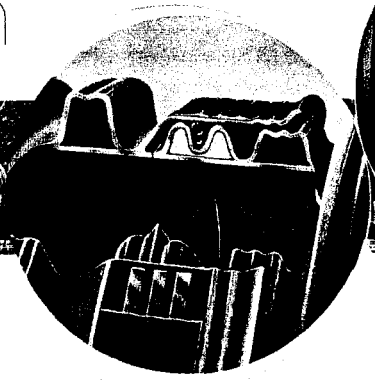
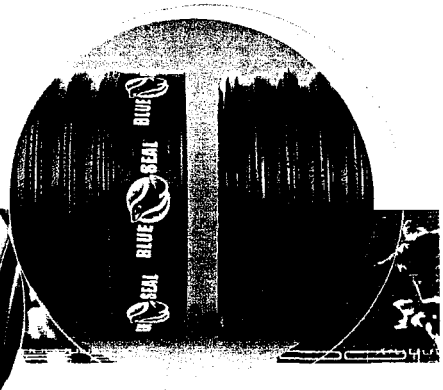
FEATURES

- Meets 10.8 psi water pressure and vacuum testing requirements.
- Addresses EPA Phase II Best Management Practices for long-term service reliability.
- Lightweight, high strength composite system requires less labor time for faster installations and reduced costs.
- Bell and gasket corrugation reinforcement provides uniform support not found in the corrugated polyethylene pipe industry.
- Fast bell-and-spigot joint assembly with unsurpassed structural integrity.
- HDPE pipe provides superior resistance to prevent rusting, deterioration or crumbling.

BENEFITS

- Provides a visible commitment to better water quality, minimizing environmental impact.
- Prevents the contamination of soil and local waters from harmful substances such as sediment from construction runoff, lawn care products or automobile emissions.
- Avoids possible joint infiltration of sands and fines resulting in sinkholes and differential settlement to adjacent structures.
- Reduces the risk of blockage caused by vegetation infiltration into joints.
- Reduces soil migration.
- Exclusive 5 year limited warranty for superior value.

Hancor Service: Hancor representatives and engineers are committed to providing you with the answers to all your questions, including specifications, installation, backfill recommendations and more.

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BLUE SEAL™ PIPE SPECIFICATIONS

Diameter: 12" - 60" (300 - 1500mm)

Length:

- 20' (6m) for 12" - 30" (300 - 750mm) diameter pipe.
- 20.5' (6.24m) for 36" - 60" (900 - 1500mm) diameter pipe.

Specifications: AASHTO M294, Type S and AASHTO MP7, Type S.

Joint Performance: Watertight

Joining System: Bell-and-spigot

Gasket: Polyisoprene meeting ASTM F477

Fittings and Accessories: Hancor offers a full line of fittings for all diameters of Hancor pipe.

SCOPE

This specification describes 12" - 60" (300 - 1500mm) Hancor BLUE SEAL pipe for use in gravity flow applications.

PIPE REQUIREMENTS

BLUE SEAL pipe shall have a smooth interior and annular exterior corrugations.

- 12" - 48" (300 - 1200mm) shall meet AASHTO M294, Type S.
- 60" (1500mm) meets AASHTO MP7, Type S.
- Manning's "n" value for use in design shall be no less than 0.010.

MATERIAL PROPERTIES

Pipe and fitting material shall be high-density polyethylene meeting ASTM D3350 minimum cell classification 335400C. The pipe material shall be Hancor Resin 8™, which is a high stress crack resistant material evaluated using the single point notched constant tensile load (SP-NCTL) test. Average SP-NCTL test specimens must exceed 24 hrs. with no test result less than 17 hrs. The closed cell structural foam core must have a free rise density no less than 3 lbs/ft^3 and compressive strength no less than 20 lbs/in^2.

JOINT PERFORMANCE

Pipe shall be joined with the BLUE SEAL™ joint meeting the requirements of AASHTO M294, or AASHTO MP7. 12" - 60" (300 - 1500mm) shall be watertight according to the requirements of ASTM D3212. Gaskets shall be made of polyisoprene, meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hours exposure in 50 PPHM ozone at 104° Fahrenheit. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. 12" - 30" (300 - 750mm) bells shall include a reinforcing rib at the flare OD to assure meeting roundness tolerances and enhance proper joint assembly. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly. 24" - 60" (600 - 1500mm) diameters shall have a reinforced bell-and-spigot, including a bell tolerance device. The bell tolerance device shall be installed by the manufacturer and covered with a protective wrap. The gasket corrugation shall be reinforced with a closed cell structural foam core.

FITTINGS

Fittings conform to AASHTO M294 or AASHTO MP7. Fabricated fittings are welded at all accessible interior and exterior junctions.

WATERTIGHT FIELD TEST PERFORMANCE

To assure watertight field performance, verification may be accomplished using ASTM F 1417 or ASTM C 969 test procedures. Appropriate safety precautions must be used when field testing any pipe material.

Pipe I.D., in. (mm)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	60 (1500)
Pipe O.D., in. (mm)	14.2 (361)	17.7 (450)	21.5 (546)	28.4 (721)	36.0 (914)	41.4 (1052)	48.0 (1219)	55.0 (1397)	67.3 (1709)
Flare O.D., in. (mm)	15.4 (391)	19.6 (498)	23.9 (607)	29.9 (759)	37.9 (963)	43.6 (1107)	50.8 (1290)	57.4 (1458)	73.7 (1872)
Pitch, in. (mm)	2.0 (51)	2.4 (61)	3.0 (76)	4.0 (102)	4.0 (102)	4.6 (117)	5.8 (147)	5.8 (147)	7.8 (198)
Approx. Weight* lb/20 ft. stick (kg/6m stick)	70 (32)	100 (46)	130 (59)	220 (100)	330 (150)	400 (182)	500 (227)	597 (260)	861 (315)

*One stick is 20' (6m) for 12"-30" (300-750mm) diameter pipe and 20.5' (6.24m) for 36"-60" (900-1500mm) diameter pipe.

All sales of Hancor product are subject to a limited warranty and purchasers are solely responsible for installation and use of Hancor products and determining whether a product is suited for any specific needs. Please consult a full copy of Hancor's Terms and Conditions for Sale for further details.

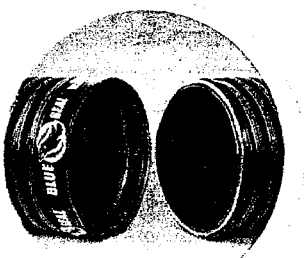
BLUE SEAL™ Bury it and forget it.

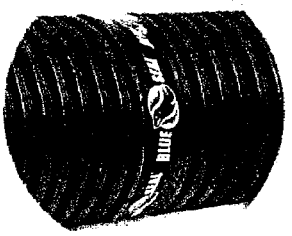
INSTALLATION

Installation should be in accordance with ASTM D2321, with the exception that minimum cover in trafficked areas for 12" - 48" (300 - 1200mm) diameters is 1 ft. (0.3m), and for 60" (1500mm) diameters, 1.5 ft. (0.5m).

QUALITY ASSURANCE

All corrugated polyethylene pipe meeting or exceeding AASHTO M294 or MP7 shall only be provided by manufacturers listed by the Plastic Pipe Institute (PPI) as having met the requirements of the PPI sponsored third-party certification program. All AASHTO M294 and MP7 pipe shall be clearly marked with a certification program mark or logo representing the supplied pipe is in compliance with all applicable standards.





Direct Contact

Customer Service
888-FOR PIPE (367-7473)
Fax 888-FAX PIPE (329-7473) 24 hours a day

Application Engineering
For technical questions, call
800-2HANCOR (242-6267), ext. 809

Electronic Media

Web Site
Find market- and application-specific information and the latest industry news at our On-Line Pipeline – www.hancor.com

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#1121/0402

HANCOR BLUE SEAL™ PIPE SPECIFICATIONS

Scope
This specification describes 12- through 60-inch (300 to 1500 mm) Hancor BLUE SEAL™ pipe for use in gravity flow applications.

Pipe Requirements
BLUE SEAL™ pipe shall have a smooth interior and annular exterior corrugations.

- 12- through 48-inch (300 to 1200 mm) shall meet AASHTO M294, Type S.
- 60-inch (1500 mm) shall meet AASHTO MP 7, Type S.
- Manning's "n" value for use in design shall not be less than 0.010.

Joint Performance
Pipe shall be joined with the BLUE SEAL™ joint meeting the requirements of AASHTO M294, or AASHTO MP7.

12- through 60-inch (300 to 1500 mm) shall be watertight according to the requirements of ASTM D3212. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hour exposure in 50 PPHM ozone at 104□Fahrenheit. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. 12- through 30-inch (300 to 750 mm) bells shall include a reinforcing rib at the flare O.D. to assure meeting roundness tolerances and enhance proper joint assembly. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.

24- through 60-inch (600 to 1500 mm) diameters shall have a reinforced bell & spigot including a bell tolerance device. The bell tolerance device shall be installed by the manufacture and covered with a protective wrap. The gasket corrugation shall be reinforced with a closed cell structural foam core.

Watertight Field Test Performance
To assure watertight field performance verification may be accomplished using ASTM F 1417 or ASTM C 969 test procedures. Appropriate safety precautions must be used when field testing any pipe material.

Fittings
Fittings shall conform to AASHTO M294 or AASHTO MP7. Fabricated fittings shall be welded at all accessible interior and exterior junctions.

Material Properties
Pipe and fitting material shall be high-density polyethylene meeting ASTM D3350 minimum cell classification 335400C. The pipe material shall be Hancor Resin 8™, which is a slow crack resistant material evaluated using the single point notched constant tensile load (SP-NCTL) test. Average SP-NCTL test specimens must exceed 24 hrs. with no test result less than 17 hrs. The closed cell structural foam core must have a free rise density no less than 3 lbs/ft^3 and compressive strength no less than 20 lbs/in^2.

Quality Assurance
All corrugated polyethylene pipe meeting or exceeding AASTHO M294 or MP7 shall only be provided by manufactures listed by the Plastics Pipe Institute (PPI) as having met the requirements of the PPI sponsored third-party certification program. All AASHTO M294 and MP7 pipe shall be clearly marked with a certification program mark or logo representing the supplied pipe is in compliance with all applicable standards.

Installation
Installation shall be in accordance with ASTM D2321, with the exception that minimum cover in trafficked areas for 12- through 48-inch (300 to 1200 mm) diameters shall be 1 ft. (0.3 m) and for 60-inch (1500 mm) diameter, the minimum cover shall be 1.5 ft. (0.5 m).

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1-0 SPECIFICATIONS

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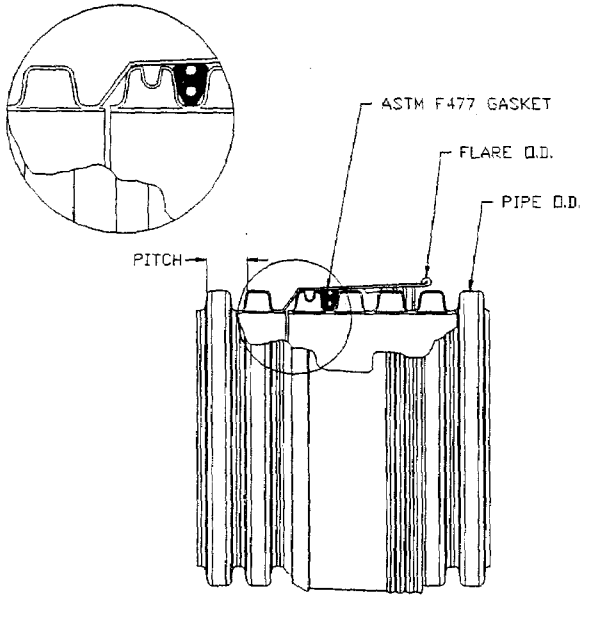
BLUE SEAL™ JOINT SYSTEM

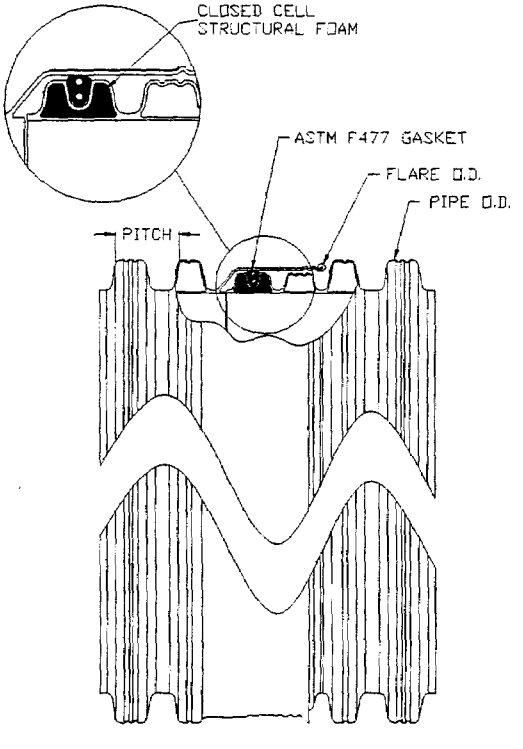
(Joint configuration & availability subject to change without notice.)

Pipe Dimensions

		Nominal Diameter, in (mm)								
Pipe (mm)	in I.D.	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	60 (1500)
Pipe O.D.	in (mm)	14.2 (361)	17.7 (450)	21.5 (546)	28.4 (721)	36.0 (914)	41.4 (1052)	48.0 (1219)	55.0 (1397)	67.3 (1709)
Flare O.D.	in (mm)	15.4 (391)	19.6 (498)	23.9 (607)	29.9 (759)	37.9 (963)	43.6 (1107)	50.8 (1290)	57.4 (1458)	73.7 (1872)
Pitch (mm)	in	2.0 (51)	2.4 (61)	3.0 (76)	4.0 (102)	4.0 (102)	4.6 (117)	5.8 (147)	5.8 (147)	7.8 (198)
stick Approx. Weight stick)	Lb/20 ft. (Kg/6m	70 (32)	100 (46)	130 (59)	220 (100)	330 (150)	400 (182)	500 (227)	597 (260)	861 (315)



12"-18" (300-450mm)



24"-60" (600-1500mm)

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HANCOR SURE-LOK® WT PIPE SPECIFICATIONS

Scope
This specification describes 4- through 8-inch (100 to 200 mm) Hancor Sure-Lok WT pipe for use in non-pressure drainage applications.

Pipe Requirements
Sure-Lok WT pipe shall have a smooth interior and annular exterior corrugations.
- 4- to 8-inch (100 to 200 mm) shall meet AASHTO M252, Type S.
- Manning's "n" value for use in design shall not be less than 0.010.

Joint Performance
Pipe shall be joined with the Sure-Lok joint meeting the requirements of AASHTO M252. The joint shall be watertight according to the laboratory requirements of ASTM D3212. Joints shall remain watertight when subjected to a 1.5 degree axial misalignment.

Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hour exposure in 50 PPHM ozone at 104° F (40° C).

Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

Fittings
4" – 8" (100 – 200 mm) fittings shall conform to AASHTO M252.

Material Properties
Pipe and fitting material shall be high density polyethylene meeting ASTM D3350 minimum cell classification 324420C for 4- through 8-inch (100 to 200 mm) diameters.

Installation
Installation shall be in accordance with ASTM D2321 with the exception that minimum cover in trafficked areas shall be one-foot (0.3 m).

Pipe Dimensions

Nominal Pipe I.D. in (mm)	4 (100)	6 (150)	8 (200)
Approx. Pipe O.D. in (mm)	4.7 (119)	6.9 (175)	9.4 (239)
Approx. Pitch in (mm)	0.6 (16)	0.7 (19)	1.0 (26)
Approx. Weight* Lb/20 ft stick (kg/6m stick)	10 (5)	20 (9)	30 (14)
Perforations	All diameters available with or without perforations		

*One stick is 20' (6m) for 4" – 8" (100 – 200 mm) diameter pipe.
*Check with sales representative for availability.

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CONTACT ADS

Phone, Fax or E-mail us with product questions or comments about our website.

SALES INFORMATION

Get ADS Sales/Pricing Information

LANGUAGE / IDIOMA

Cambie al español

RELATED INFORMATION

See related Pipe Technical Data

View Products by Market

View Products by Product Type

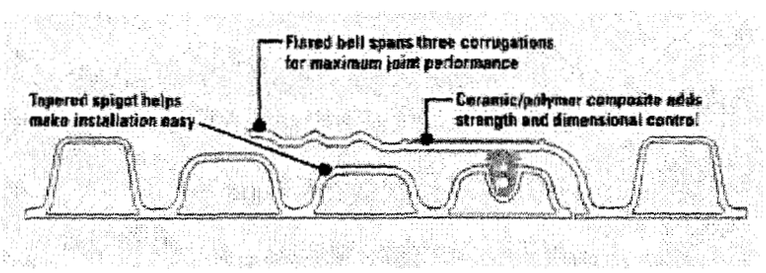
Product-related questions? See our Product/Technical FAQs

N-12 IB WT (water-tight) Pipe

N-12 IB WT's ceramic/polymer **composite** joint c HDPE's **excellent abrasion** and **corrosion** resista joint with **excellent strength**. The wide proprietar **ceramic**/polymer composite **is** fused to **the** outsic built-in **bell**, improving the joint's **integrity and** tol

With its integral built-in bell and factory-installed gasket, the pipe requires no extra c other sealants to install. The joint meets or exceeds ASTM 3212 lab test and ASTM field test, which helps fill an essential role in meeting the new, stricter Environmental Agency guidelines.

N-12 IB WT pipe is so advanced in it's design, it's easy to install and easy to put you for long term reliability.



Applications:

Storm Sewers
Sanitary Sewers
Retention/Detention
Roof Drainage

N-12 IB WT

Includes a pressure-tested coupler that provides watertight connections meeting a fu accordance with ASTM D3212.

ProLink WT PipeProduct Information	
Diameters Available:	4"-60"
Lengths Available:	3m
Joint Performance:	Water-tight(D3212)
Joining System:	Integral Bell
Specifications:	Product Note 3.107

Product Notes

Product Note 3.107

Re: Specification for Smooth Interior Corrugated Polyethylene Pipe

Date: June 17, 2002

This specification applies to high density polyethylene corrugated pipe with an integrally formed smooth waterway. Nominal sizes for which this specification is acceptable are 100 – 1500 mm (4 - 60 inch) diameters. Sizes 100 – 1500 mm (4 - 60 inch) shall be either AASHTO Type 'S' or Type 'D' as follows. Sizes 100 – 1500 mm (4 - 60 inch) designated as AASHTO Type 'S' (N-12) shall have a full circular cross-section, with an outer corrugated pipe wall and an essentially smooth inner wall (waterway). Corrugations for Type 'S' sizes 100 – 1500 mm (4 - 60 inch) shall be annular (N-12). Sizes 1050 – 1500 mm (42 thru 60 inch) designated as AASHTO Type 'D' (N-12HC) shall consist of an essentially smooth waterway braced circumferentially with circular ribs which are formed simultaneously with an essentially smooth outer wall. The 1050 – 1500 mm (42 thru 60 inch) (N-12HC) sizes shall conform to AASHTO Type 'D' (which describes dual wall pipe with a smooth waterway).

Pipe manufactured for this specification shall comply with the requirements for test methods, dimensions and markings found in AASHTO Designations M252, M294 and MP7. Pipe and fittings shall be made from virgin PE compounds which conform with the applicable current edition of the AASHTO Material Specifications for cell classification as defined and described in ASTM D3350.

The minimum parallel plate stiffness values when tested in accordance with ASTM D2412 shall be as follows:

Diameter (nominal)	Pipe Stiffness (minimum)	Diameter (nominal)	Pipe Stiffness (minimum)
100 mm (4")	340 kN/m^2 (50 pii)	600 mm (24")	235 kN/m^2 (34 pii)
150 mm (6")	340 kN/m^2 (50 pii)	750 mm (30")	195 kN/m^2 (28 pii)
200 mm (8")	340 kN/m^2 (50 pii)	900 mm (36")	150 kN/m^2 (22 pii)
250 mm (10")	340 kN/m^2 (50 pii)	1050 mm (42")	140 kN/m^2 (20 pii)
300 mm (12")	345 kN/m^2 (50 pii)	1200 mm (48")	125 kN/m^2 (18 pii)
375 mm (15")	290 kN/m^2 (42 pii)	1500 mm (60")	95 kN/m^2 (14 pii)
450 mm (18")	275 kN/m^2 (40 pii)		

The fittings shall not reduce or impair the overall integrity or function of the pipeline. Fittings may be either molded or fabricated. Common corrugated fittings include in-line joint fittings, such as couplers and reducers, and branch or complimentary assembly fittings such as tees, wyes and end caps. These fittings may be installed by various methods such as snap-on, bell and spigot, bell – bell and wrap around couplers. Couplers shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints. Only fittings supplied or recommended by the manufacturer shall be used. Where designated on the plans or project specifications, an elastomeric gasket meeting the requirements of ASTM F477 shall be supplied.

Installation of the pipe specified above shall be in accordance with either AASHTO Section 30 or ASTM Recommended Practice D2321 as described elsewhere in these specifications and as recommended by the manufacturer.

Appendix G

Agency Comment Resolution Forms