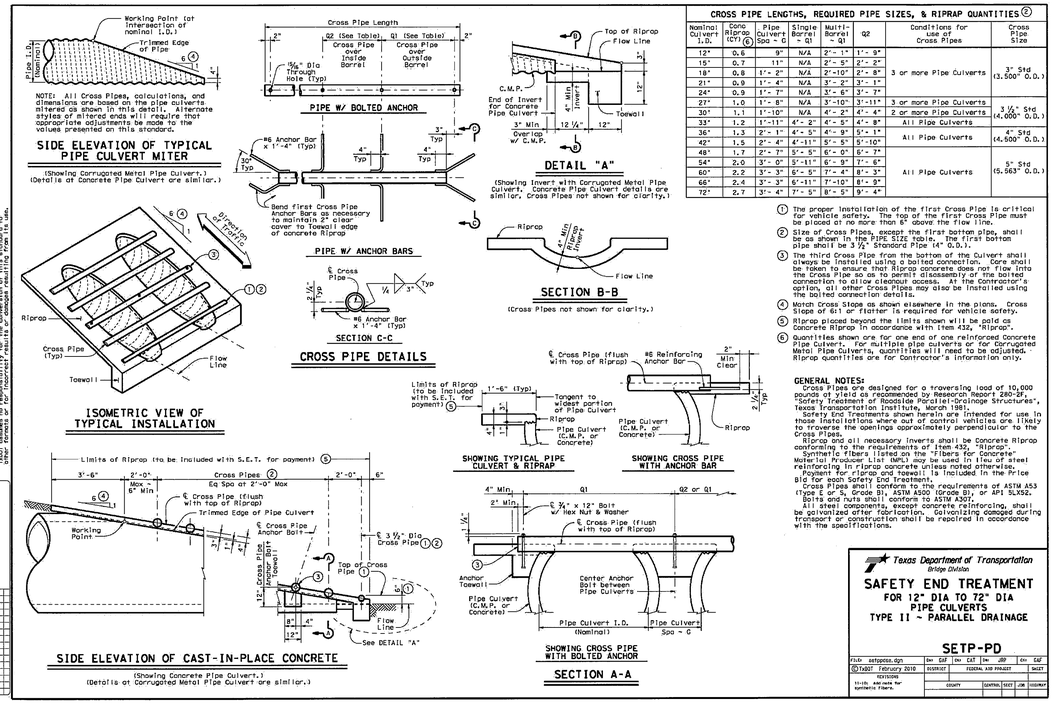


CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES ②							
Nominal Culvert I.D.	Conc Riprap (CY) ⑥	Pipe Culvert Spa ~ C	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'-1"	1'-9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'- 5"	2'- 2"		
18"	0.8	1'- 2"	N/A	2'-10"	2'- 8"		
21"	0.9	1'- 4"	N/A	3'- 2"	3'- 1"		
24"	0.9	1'- 7"	N/A	3'- 6"	3'- 7"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'- 2"	4'- 5"	4'- 8"	All Pipe Culverts	
36"	1.3	2'- 1"	4'- 5"	4'- 9"	5'- 1"	All Pipe Culverts	4" Std (4.500" O.D.)
42"	1.5	2'- 4"	4'-11"	5'- 5"	5'-10"		
48"	1.7	2'- 7"	5'- 5"	6'- 0"	6'- 7"		
54"	2.0	3'- 0"	5'-11"	6'- 9"	7'- 6"		
60"	2.2	3'- 3"	6'- 5"	7'- 4"	8'- 3"	All Pipe Culverts	5" Std (5.563" O.D.)
66"	2.4	3'- 3"	6'-11"	7'-10"	8'- 9"		
72"	2.7	3'- 4"	7'- 5"	8'- 5"	9'- 4"		

① The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.

② Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 ½" Standard Pipe (4" O.D.).

③ The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care should be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.

④ Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.

⑤ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

⑥ Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Polyethylene Pipe shall be included in the Price Bid for each Safety End Treatment.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation
Bridge Division

SAFETY END TREATMENT
FOR 12" DIA TO 72" DIA PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

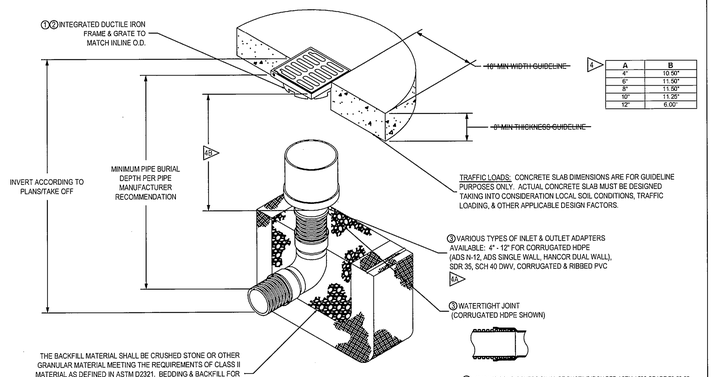
SETP-PD

File: setppcss.dgn	Dn: GJF	Ck: GJF	Dw: JBP	Ck: GJF
©TxDOT February 2010	REVISIONS	FEDERAL AID PROJECT		SHEET
10-10: Added note for Synthetic Fibers.	COUNTY		CONTROL	SECT	JOB	HIGHWAY

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the use of this standard in other locations or for incorrect results or damage resulting from its use.

LOAD & RESIST

NYLOPLAST 12" INLINE DRAIN: 2712AG _ _ X



A	B
4"	10.50"
6"	11.50"
8"	11.50"
10"	11.25"
12"	6.00"

① GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05 WITH THE EXCEPTION OF THE BRONZE GRATE.
② FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
③ DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & MANCOR DUAL WALL) & SDR 35 PVC

GRATE OPTIONS	LOAD RATING	PART #	DRAWING #
PEDESTRIAN	MEETS H-10	1299CGP	7001-110-002
STANDARD	MEETS H-20	1299CGS	7001-110-203
SOLID COVER	MEETS H-20	1299CGC	7001-110-204
PEDESTRIAN BRONZE	LIGHT DUTY	1299CGPB	7001-110-205
DOME	N/A	1299CGD	7001-110-206
DROP IN GRATE	LIGHT DUTY	1201DI	7001-110-021

DRAWN BY	EBC	MATERIAL
DATE	4-3-06	
APPD BY	CJA	PROJECT NO./NAME
DATE	4-3-06	
DWG SIZE	A	SCALE 1:20 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

TITLE: 12 IN INLINE DRAIN QUICK SPEC INSTALLATION DETAIL

DWG NO. 7003-110-025 REV B

Section 2722

Engineered Surface Drainage Products

GENERAL

PVC surface drainage inlets shall be of the inline drain type as indicated on the contract drawing and referenced within the contract specifications. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer. The surface drainage inlets shall be as manufactured by Nyloplast a division of Advanced Drainage Systems, Inc., or prior approved equal.

MATERIALS

The inline drain required for this contract shall be manufactured from PVC pipe stock, utilizing a thermo-molding process to reform the pipe stock to the furnished configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477. The pipe bell spigot shall be joined to the inline drain body by use of a **swage mechanical joint**. The raw material used to manufacture the pipe stock that is used to manufacture the inline drain body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.

The grates furnished for all surface drainage inlets shall be ductile iron grates for sizes 8", 10", 12", 15", 18", 24" and 30" shall be made specifically for each fitting so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for inline drains shall be capable of supporting H-20 wheel loading for traffic areas or H-10 loading for pedestrian areas. 12" and 15" square grates will be hinged to the frame using pins. Metal used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05 for ductile iron. Grates shall be provided painted black.

INSTALLATION

The specified PVC surface drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be crushed stone or other granular material meeting the requirements of class 2 material as defined in ASTM D2321. Bedding and backfill for surface drainage inlets shall be placed and compacted uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade. No brick, stone or concrete block will be required to set the grate to the final grade height. For H-20 load rated installations, a concrete ring will be poured under and around the grate and frame. The concrete slab must be designed taking into consideration local soil conditions, traffic loading, and other applicable design factors. For other installation considerations such as migration of fines, ground water, and soft foundations refer to ASTM D2321 guidelines.

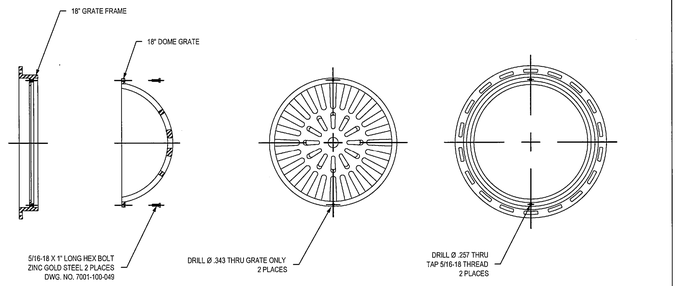
DRAWN BY	CJA	MATERIAL
DATE	3-10-09	
APPD BY	CJA	PROJECT NO./NAME
DATE	3-10-09	
DWG SIZE	A	SCALE 1:1 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

TITLE: 8 IN - 30 IN SPECIFICATIONS

DWG NO. 7003-110-003 REV E

1899CGDL



NOTE: LOCATION OF LOCKING DEVICE MAY VARY

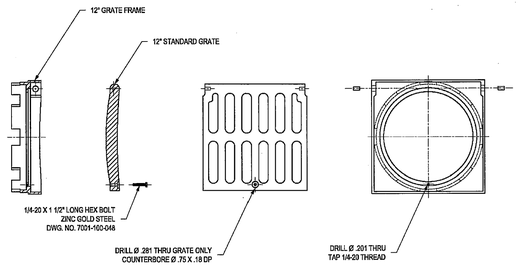
DRAWN BY	CJA	MATERIAL
DATE	8-8-03	
APPD BY	CJA	PROJECT NO./NAME
DATE	8-8-03	
DWG SIZE	A	SCALE 1:10 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

TITLE: 18 IN DOME LOCKING GRATE ASSEMBLY

DWG NO. 7001-110-125 REV B

1299CGSL



NOTE: LOCATION OF LOCKING DEVICE MAY VARY

DRAWN BY	AWA	MATERIAL
DATE	7-5-00	
APPD BY	CJA	PROJECT NO./NAME
DATE	7-5-00	
DWG SIZE	A	SCALE 1:8 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

TITLE: 12 IN STANDARD LOCKING GRATE ASSEMBLY

DWG NO. 7001-110-035 REV B

FOR ADDITIONAL DETAILS REFER TO NCTCOG STANDARD DRAWINGS OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION THIRD EDITION AND THE CITY OF ROCKWALL SPECIAL PROVISIONS (AVAILABLE FROM THE CITY'S WEBSITE)

OAC SENIOR LIVING, LLC.
ROCKWALL BY-PASS ADDITION
DETAILS
DRAINAGE DETAILS

PROJECT TITLE:
OAC SENIOR LIVING, LLC.
ROCKWALL BY-PASS ADDN.

mma
mycoskie+mcinnis+associates
civil engineering surveying landscape architecture planning
tbpe registration number: f - 2759
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arlington, texas 76010
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www.mmatexas.com

STATE OF TEXAS
ANDRES E. CASCO
94938
LICENSED PROFESSIONAL ENGINEER
2-12-15

RECORD DRAWINGS

PROJECT NUMBER:	2651-00-01
PROJECT MANAGER:	J. SUMPTER
DRAWN BY:	S. BELL
CHECKED BY:	A. CASCO
ISSUE DATE:	04/30/2013

TO THE BEST OF OUR KNOWLEDGE MYCOSKIE MCINNIS ASSOCIATES, INC. HEREBY STATES THAT THIS PLAN IS AS-BUILT. THIS IS BASED ON SURVEY DATA, VISUAL POST-CONSTRUCTION FIELD OBSERVATIONS AND INFORMATION PROVIDED BY THE CONTRACTOR.

REV.	DATE	DESCRIP.	BY
	02.12.15	RECORD DRAWINGS	AEC

SHEET CONTENT:
DRAINAGE DETAILS

SHEET NO:
23