

SCDOT GEOPAK Drainage Manual for Roadway Design

Introduction	3
Chapter 1: Data and Organization	4
1.File Types	4
2.Exchange of Information	7
- Generating Profiles	
- Info to Hydrology	7
- Info from Hydrology	10
Chapter 2: Getting Started	12
1.Opening Drainage	12
2.Main Menu Bar	12
3.Configuration & Settings Files	12
4.Setting Preferences	13
Chapter 3: Drainage Navigator	14
1.Navigating	
2. Updating Graphics	16
3. Updating Pay Items	17
4. Identifying Items	18
Chapter 4: Drafting	19
1.Driveway Pipes	19
- Start a Project	19
- Set the Preferences	19
- Add Nodes	21
- Add 1 Link	23
- Label Plans	24
2. Cross Section Files – Draw Side Line Pipes	25
3. Cross Section Files – Draw Cross Line Pipes	
4. Drainage Structures in X-Section	29
5. Displaying 3D Networks	
Chapter 5: Drainage Labeler	32
1.Labeler Setup	33
- Text Tab	
- Params Tab	35
- Shape Tab	36
- Leader Tab	37
- Rotate Tab	38
- Styles Tab	39
2.Node Labeling	42
3.Link Labeling	44
4. Updating Labels	46
5.Label Tools	47
Chapter 6: Automated Quantities	48
1.Node Quantities	48
2.Link Quantities	50
Appendix A: Update Pay Items	53
Appendix B: Drainage Revisions	54
Appendix C: Error Messages	55

Introduction

This manual is designed for the Roadway division's usage of GEOPAK Drainage.

- Purpose

As all of us know, placing drainage onto a highway project is a time consuming process. In the past, Hydrology has provided to Road Design a red lined set of prints that has the drainage design drawn onto it. The drainage design was either labeled by hand on the red line set of prints or a computer printout providing the pipe sizes, flow line information, and box types was provided.

It was then the responsibility of the engineer in Road Design to place and label the drainage accurately on our plans. This process involves careful attention to detail when placing and labeling the drainage. It is our goal to help eliminate the potential for error when transferring the drainage design onto the plans, as well as to decrease the amount of time necessary to place and label the drainage design.

- Terminology

The following is a list of Geopak Drainage terminology.

- Node A node typically represents a drainage structure that has a point location. Examples include: catch basins, drop inlets, junction boxes, manholes, and points.
- Link A link represents a linear feature connecting two nodes, running from upstream to downstream. Examples include: pipes, ditches and channels.

Chapter 1: Data and Organization

1. Files

The following is a list of typical file types utilized by Geopak Drainage.

The GDF file is the Geopak Drainage File and contains all the hydraulic information about the drainage design. This file also references the GPK file.

File Type:	GDF
Туре	Binary
Acronym	GDF = Geopak Drainage File
Use	Stores the Drainage components

The DLB file is the Drainage Library file utilized by Hydrology and contains the standards for the drainage design. It contains the nodes, links, as well as other design information necessary for Hydrology to analyze the systems contained in the design.

File Type:	DLB
Туре	Binary
Acronym	DLB = Drainage LiBrary File
Use	Geopak Drainage Library file

The LSF File is the Label Style File. This file contains the layouts of commonly used labels.

File Type:	LSF
Туре	Binary
Acronym	LSF = Label Style File
Use	Geopak Drainage Labeling

The GPK File is the main Coordinate Geometry file.

File Type:	GPK
Туре	Binary
Acronym	GPK = GeoPaK
Use	Stationing, Profiling, Reporting, Chains, Profiles, etc.

The pp.dgn file is the plan view of the project. The pp.dgn file will usually be named *#####pp.dgn. The * is either "r", "m" or "c" and the ##### is the pin number. The .dgn is the designation for all Microstation design files.

File Type:	PP.DGN
Туре	Binary
Acronym	DGN = DesiGN
Use	Plan View

The pf.dgn file is the plan and profile view of the project as it appears on the plan sheets. There will usually be more than one of these files for every project unless the project is very small.

File Type:	PF.DGN
Туре	Binary
Acronym	DGN = D esi GN
Use	Plan & Profile View

The hy.dgn file is the Microstation file that is used by the Hydrology division.

File Type:	HY.DGN
Туре	Binary
Acronym	DGN = DesiGN
Use	Microstation file for Geopak Drainage design

The Cell Library file is used by the Drainage division for placing Drainage Nodes into the HY.DGN file and for computing quantities.

File Type:	*.CEL
Туре	Binary
Acronym	CEL = CELL
Use	Used for placing Node Cells

The Design & Computation Manager database file is used to compute drainage quantities.

File Type:	*.DDB
Туре	Binary
Acronym	DDB = Design DataBase
Use	Used for computing quantities

The Drainage Report File contains the variables to output to the excel CSV file.

File Type:	*.DRF
Туре	Binary
Acronym	DRF = Drainage Report File
Use	Used for automatically selecting report variables

The Comma Separated Values file contains the output variables from the drainage GDF file.

File Type:	*.CSV
Туре	Binary
Acronym	CSV = Comma Separated Values
Use	Used for viewing report output in Excel

2. Exchange of Information

This section covers the transfer of information to and from Hydraulic Engineering.

- Generating Profiles

Hydrology requires profile information from Road Design before they can begin their design process. In addition to centerline profile grades, Hydrology will require top of curb profile grades and valley gutter profile grades early in our design process. Hydrology references our curb profile grades and valley gutter profile grades to design their drainage systems. In the future, Hydrology will be able to directly reference our shape files resulting in us not having to provide them curb grades and valley gutter grades.

It is important for Road Design to use a consistent naming symbology when generating curb profiles and valley gutter profiles. The following is an example of how to name these profiles to avoid confusion.

Example: TCL93FP or VGR93FP

Section Type = TC or VG Location from Centerline = L or R Abbreviated Alignment Name = 93 (short for SC93) Future Profile = FP

- Info to Hydrology

Once the necessary profiles have been generated, you will then need to transfer the information to Hydrology. Hydrology requires the following information:

Hard Copy

- 1. Cross Sections to scale on half size sheets
 - a. Mainline
 - b. Side roads
 - c. Outfall ditches
 - Plan Sheets to scale on half size sheets
 - a. Centerline final grades for mainline
 - b. Final grades for side roads
 - c. All outfall ditch surveys
 - d. Limits of construction line
 - e. All existing survey pipe recommendations

Electronic Copy

2.

- 1. Project .GPK file
- 2. Project **PP.DGN** file
- 3. Project **PF.DGN** file
- 4. Project **DX.DGN** & **FX.DGN** files
- 5. Project .NEW file
- 6. Excel file containing survey data, including control points
- 7. Centerline and top of curb pgl's.
- 8. Project curb grades

The excel spreadsheet is a standard form that will be made available to everyone. This file contains detailed descriptions of COGO chain names, profiles, pp.dgn file name, pf.dgn file names, the server location of project files, as well as other important information. The file should be named as follows:

Example: R21686.xls English or Metric = R or M Pin Number = 21686

The following page is a printout of what the excel spreadsheet looks like. The gray areas contain information to be edited for each project.

ROAD DESIGN DATA FOR HYDRAULIC DESIGN DATE: 8/18/2008

DESIGN GROUP:	RPG 4 - UPSTATE	
PIN NO.:	36298	
	0001/77	
COUNTY:	OCONEE	
	S-402 / SHEEPEARM RD	
PROJECT	WIDEN (SHEEPFARM RD.) EXIS	TING 2 LANES TO 5 LANE CURB & GUTTER
DESCRIPTION:	WITH BIKE LANES AND SIDEWA	LKS ON BOTH SIDES. CONNECT
	SHEEPFARM ROAD TO SC 28 (E	
	STARTING AT S-135 (BOUNT FLA	AND ROAD).

ADDITIONAL NOTES:S-135 WILL BE WIDENED TO 5 LANE CURB & GUTTER AT THE
INTERSECTION WITH SHEEPFARM ROAD. IT WILL THEN TIE BACK TO THE
EXISTING PAVEMENT. STONEBROOK DRIVE WILL HAVE A VALLEY
GUTTER. ALL OTHER SIDE ROADS WILL HAVE DITCH SECTIONS.

FILE INFORMATION

	SERVER	DESIGN GROUP	COUNTY	PIN
FILES LOCATED:	NTS/HQ/Precon/	RPG 4	OCONEE	36298

'.GPK' FILE(S): JOB298.G	K
--------------------------	---

'PP' FILE(S): R36298PP.DGN

'PF' FILE(S)	R36298PF1.DGN	S-402 (SHTS. 6 - 13)
		SIDE ROADS (SHTS. 14 -
	R36298PF2.DGN	23)
		SIDE ROADS (SHTS. 24 -
	R36298PF3.DGN	26)

'.NEW' FILE(S):	36298.NEW	
	36298A.NEW	

CHAIN NAME	PROPOSED PROFILE	DESCRIPTION
S402REL	S402RFP	CENTER LINE GRADE S-402 RELOCATION
US76		CENTER LINE US 76
BROOKLANER	BROOKLANERFP	CENTER LINE GRADE BROOK LN. REL.
STONEBROOKR	STONEBROOKRFP	CENTER LINE GRADE STONEBROOK DR. REL.
S135REL	S135RFP	CENTER LINE GRADE S-135 RELOCATION
SPRINGWOOD		CENTER LINE EAST SPRINGWOOD DR.
OCONEER1	OCONEER1FP	CL GRADE OCONEE ESTATES REL. PART 1
OCONEER2	OCONEER2FP	CL GRADE OCONEE ESTATES REL. PART 2
ALBERTSR	ALBERTSRFP	CENTER LINE GRADE ALBERT'S RD. REL.
PAULGILLR	PAULGILLRFP	CENTER LINE GRADE PAUL GILLISON RD. REL.
SC28		CENTER LINE SC 28
TANGLEWOOD		CENTER LINE TANGLEWOOD DR.
STREAM1		CENTER LINE OF STREAM #1
STREAM2		CENTER LINE OF STREAM #2
STREAM3		CENTER LINE OF STREAM #3
STREAM4		CENTER LINE OF STREAM #4
STREAM5		CENTER LINE OF STREAM #5
STREAM6		CENTER LINE OF STREAM #6

CHAIN NAME	CROSS SECTIONS	DESCRIPTION
S402REL	S402REL_DX_SCALED.DGN	STA. 10+00.00 - 114+64.38
US76	US76DX.DGN	STA. 10+50.00 - 20+00.00
BROOKLANER	BROOKLANERDX_SCALED.DGN	STA. 10+35.87 - 16+27.98
STONEBROOKR	STONEBROOKRDX_SCALED.DGN	STA. 10+35.92 - 15+94.48
S135REL	S135RDX_SCALED.DGN	STA. 10+00.00 - 42+79.57
SPRINGWOOD	SPRINGWOODDX.DGN	STA. 10+12.71 - 15+57.93
OCONEER1	OCONEER1DX_SCALED.DGN	STA. 10+30.38 - 16+00.00
OCONEER2	OCONEER2DX_SCALED.DGN	STA. 36+00.00 - 41+26.31
ALBERTSR	ALBERTSRDX_SCALED.DGN	STA. 7+00.00 - 12+22.35
PAULGILLR	PAULGILLRDX_SCALED.DGN	STA. 15+02.15 - 19+01.89
SC28	SC28DX.DGN	STA. 648+00.00 - 660+00.00
TANGLEWOOD		

- Info from Hydrology

When Hydrology completes their drainage design, they will send you an excel spreadsheet containing information necessary for you to understand their drainage design. This spreadsheet will contain the server location of their files, the name of the gdf file, the name of the dlb file, as well as other important information.

The following is a printout of what the excel spreadsheet from Hydrology will look like:

HYDRAULIC DESIGN DATA FOR ROAD DESIGN				
	DATE	•		
HYDRO SQUAD:	VAUGHAN			
PIN NO.:	21686	1		
COUNTY:	ABBEVILLE			
	0.0 70			
ROAD/ROUTE NO.:	SC-72			
		WILL BE USE	D TO DESCRI	BEIHE
DESCRIPTION:	PROJECT			
ADDITIONAL NOTES:	THIS SPACE	WILL BE US	ED FOR ANY	
	ADDITIONAI	_		
		1	1 1 1	
FILE INFORMATION				
	SMPSERVO	SQD	COUNTY	
FILES LOCATED:	SMPSERV6	\ VAUGHAN	\ ABBEVILLE	\ 21686
'.GDF' FILE:	SC93.GDF			
'.DLB' FILE:				
EXCEL' FILE(S)				

In addition to receiving the spreadsheet from Hydrology, we will also receive the following information:

Hard Copy

1. Plan sheets stating which existing pipes are to be abandoned or retained.

Electronic Copy

- 1. Project .GDF file
- 2. Project .**DLB** Drainage Library file (if modified for project exceptions)
- 3. Project **HY.DGN** file
- 4. Proposed ditch cross sections
- 5. Alternate Pipe spreadsheet
- 6. Erosion Control Data Sheet
- 7. Additional erosion control BMP recommendations as appropriate

Chapter 2: Getting Started

1. Opening Drainage

The location and names of the files you will need for the drainage design are on the spreadsheet you received from Hydrology.

Before opening Drainage use the following steps:

- 1. Copy the GDF File and (if received) the DLB File to the project directory on your machine; you are now ready to begin using GEOPAK Drainage.
- 2. Open the pp.dgn file for the project.

2. Main Menu Bar

The Drainage Menu Bar is initiated from the Applications pull-down menu, remains open while Drainage is open, and can be docked:



The Menu Bar always displays the **GDF file** name (shown above in **yellow**) and the **Active Network** (shown above in **red**).

To open the Drainage file:

- 1. Use the Drainage menu bar shown above and select **Project>Open** and select the GDF File from the project directory.
- 2. Ignore any Warning Messages (if any) for now.

3. Configuration & Settings Files

Geopak Drainage by default will select configuration files, but a good rule of thumb is to use the same dlb, cel library & ddb files that the hydraulic designer used in creating their systems. These are usually found in the projects hydro folder or by asking the designer for help in their location. Care should be taken to ensure that the correct workspace is utilized.

4. Setting Preferences

Select **Project>Preferences** and set the Project Components as shown below:

DRAINAGE - Drainage.gdf	- [No Active Network]		×
Project Component Netv	vork Reports <u>U</u> tilities <u>T</u> o	ol Boxes	
<u>N</u> ew			
Open			
<u>S</u> ave			
Save <u>A</u> s			
Preferences Drainage Library			
Import Drainage Project Export	•		
E <u>×i</u> t			
C:\Training\Drainage\Drair Drainage.gdf	nage.gdf		
🥂 Preferences - Project Con	nponents		
<u>Fi</u> le			
Options	Drainage Library File (DLB):	e\SCDOT english 2011 1	2 Alt.dlb Q
Units	GPK Job Number:		er Preferences
Project Components			
Land Use Options	Drainage Cell Library:	1_Design \MStiles \cell \Ro	adv8.cel
Frequency Options	Category Discretes and		()
	Untena Directory:		×
Intensity Option	DDB:	Geofiles\Dtabase\scdot_en	gV8.ddb Q
Intensity Option Junction Losses	Uniterna Directory: DDB: Water and Sewer Project:	Geofiles\Dtabase\scdot_en	gV8.ddb Q Q
Intensity Option Junction Losses Inlet Options Node Options	Unterna Directory: DDB: Water and Sewer Project: Superelevation Shapes File:	Geofiles\Dtabase\scdot_en	ر gV8.ddb کر م
Intensity Option Junction Losses Inlet Options Node Options Link Options	Uniternal Directory: DDB: Water and Sewer Project: Superelevation Shapes File:	Geofiles\Dtabase\scdot_en	ر gV8.ddb کر کر ک
Intensity Option Junction Losses Inlet Options Node Options Link Options Profile Options Plan Symbology	Uniteria Directory: DDB: Water and Sewer Project: Superelevation Shapes File: Site Project:	Geofiles\Dtabase\scdot_en	gV8.ddb Q Q Q Q Q
Intensity Option Junction Losses Inlet Options Node Options Link Options Profile Options Plan Symbology Updates	Criteria Directory: DDB: Water and Sewer Project: Superelevation Shapes File: Site Project: Original Ground	Geofiles\Dtabase\scdot_en	ر gV8.ddb ر ر ر
Intensity Option Junction Losses Inlet Options Node Options Link Options Profile Options Plan Symbology Updates Save Options	Critena Directory: DDB: Water and Sewer Project: Superelevation Shapes File: Site Project: Original Ground TIN File	Geofiles\Dtabase\scdot_en	gV8.ddb Q Q Q Q Q
Intensity Option Junction Losses Inlet Options Node Options Link Options Profile Options Plan Symbology Updates Save Options	Critena Directory: DDB: Water and Sewer Project: Superelevation Shapes File: Site Project: Original Ground TIN File Design Surface	Geofiles\Dtabase\scdot_en	Q gV8.ddb Q Q Q Q Q
Intensity Option Junction Losses Inlet Options Node Options Link Options Profile Options Plan Symbology Updates Save Options	Critena Directory: DDB: Water and Sewer Project: Superelevation Shapes File: Site Project: Original Ground TIN File Design Surface TIN File	Geofiles\Dtabase\scdot_en	Q gV8.ddb Q Q Q Q Q Q

- 1. Select the DLB File from the project Hydro folder as used by the Hydraulic Designer
- 2. Select the correct GPK File.
- 3. Check the Road Preferences to make sure everything is properly setup
- 4. Select RoadV8.cel for your Drainage Cell Library
- 1. Select scdot_engV8.ddb as your Geopak ddb file
- 2. Select **OK** when finished.

Chapter 3: Drainage Navigator

The Navigator tool provides an easy way to maneuver, add, edit, delete, query and identify the drainage components of the GEOPAK Drainage Project.

It also allows us to easily draw the drainage into our pp.dgn file by means of updating graphics. After that, we can update pay items and use automated quantity computation.

To open the Navigator, select **Utilities>Navigator** from the pull-down on the main Drainage menu bar:

DRAINA	DRAINAGE - Drainage.gdf - [NetworkOne Active]					
<u>P</u> roject	<u>C</u> omponent	<u>N</u> etwork	R <u>e</u> ports	<u>U</u> tilities	<u>T</u> ool B	oxes
				<u>N</u> aviga	ator	
				Conflict Finder		
				<u>L</u> abele	r	
				Dis <u>p</u> lay 3D		
				<u>D</u> TM D	rainage	Tools

The Navigator has the following toolsets:



1	Networks	Choose to navigate through "All Networks" or only the "Active Network".
2	Components	Options include: Areas, Inlets, Nodes, Links, Profiles, Culverts and Routings, displayed left to right
3	ID List	The list of components available by the selection in bullet #2 above
4	Action buttons	Click to add / modify / delete / or ID any component for modifications

1. Navigating

The Navigator window allows you to click through the lists of drainage objects to identify and modify the components you are interested in.



1	Туре	Select the component type of interest – only that type will be shown in the components list.
2	Toggles	Toggle ON so the Microstation view will highlight and center on a drainage component when it is selected.
3	Component	Click any component in the list.
4	View	The Microstation view updates to window center and highlight the selected drainage component.
5		Repeat as necessary to navigate the components

2. Updating Graphics

To update the Drainage graphics in the PP.DGN file, follow the steps below:



1	Туре	Select the component type of interest			
2	Selection	Select all (or any you wish) components in the list for graphical updating			
3	Tools	Select Tools > Update Graphics to commence the procedure			
4	View	The Microstation view updates with the revised graphics.			
5	Repeat as necessary to update the graphics on the components.				

3. Updating Pay Items

To update the Drainage graphics in the PP.DGN file according to the symbology in the DDB file, in order to compute quantities, follow the steps below:



1	Туре	Select the component type of interest			
2	Selection	Select all (or any you wish) components in the list for Pay Item updating			
3	Tools	Select Tools > Update Pay Items to commence the procedure			
4	View	The Microstation view updates with the revised Pay Items			
5	Repeat as necessary to update the Pay Items on the components				



Links will be on level "RD_PD_DR_Pipe" with a custom line style of PIPE NEW1; the nodes will be on level "RD_PD_DR_Inlet" with the proper cell.

4. Identifying Items

Navigator can also be used to identify a drainage component from its graphic in the Microstation file.



1	Туре	Select the component type of interest.	
2	ID	Click the ID button	
3	Select	Select any Node or Link in the DGN file	
4	Navigator	Notice the specific Node or Link gets found and highlighted in the Navigator window	
5	Repeat as necessary to identify the drainage components.		

Chapter 4: Drafting

1. Driveway Pipes

The following procedures are used to draw, label, and report on drive pipes or cross pipes.

- Start a Project

To start a new Drainage Project:

- 1. Open the Microstation DGN file.
- 2. From Microstation, select Applications>GEOPAK DRAINAGE>Drainage (if GEOPAK is not activated select Applications>GEOPAK>Activate GEOPAK).
- 3. You should now have a new menu item by Applications titled Drainage.
- 4. Selecting Drainage>Project>Save As... Name the file after the driveways pipes or cross pipes being improved.



GEOPAK Drainage always starts in an untitled project; it does not remember or automatically reopen a GDF that was previously worked in. The .GDF file must be reopened manually each time you open the DGN file. Select Project > Open each time you start to edit or continue working on a project.

- Set the Preferences

Set the Preferences; from the main Drainage menu bar <u>Project > Preferences</u>:

DRAINAGE - Drainage.gdf - [No Active	Network]	×
Project Component Network Report	ts <u>U</u> tilities	Tool Boxes
- <u>N</u> ew		
<u>O</u> pen		
<u>S</u> ave		
Save <u>A</u> s		
Preferences	n –	
Drainage Library		
Import Drainage Project		
Export •		
E <u>xi</u> t		
C:\Training\Drainage\Drainage.gdf		
Drainage.gdf		

(

Set the **Project Components** as shown below:

8 Pro	eferences - Project	Components			. 🗆 🔀	
Elle Options Units Project Components Rainfall Parameters Land Use Options Frequency Options Intensity Option Junction Losses Inlet Options Node Options Link Options Profile Options Plan Symbology Updates Save Options OK Cancel		Drainage Library File (DLB): GPK Job Number: Drainage Cell Library: Criteria Directory: GPK DDB: Water and Sewer Project: Superelevation Shapes File: Site Project: Original Ground <u>TIN File</u> Design Surface <u>TIN File</u>	SCDOT_english_2008 2 RoadV8.cel scdot_engV8.ddb 7 7298sh.dgn	09_Alt.dlb		
DLB	Click on the ma	ignifying glass button a	and select the DL	B file		
GPK	Click the magnifying glass button and select the GPK Job Number. You need to select your project directory and choose the file job###.gpk; there should only be one .gpk file. When you choose OK only the 3-digit number that was in the file name appears.					
CEL	Click the magni	Click the magnifying glass and select the roadv8.cel file in the workspace folder.				
DDB	Click the magnifying glass and select the scdot_engV8.ddb file in the workspace location.					

.gpk

- Add Nodes

To add nodes go to *Drainage>Component>Node>Add*. The "Add a New Node" dialog will open for each Node asking for a Node name prefix and number. The number automatically increases for each node up to 10000. These instructions will place the upstream node for the pipe. Repeat them for the downstream node when you are through.

DRAINAG	RAINAGE - Drainage.gdf - [No Active Network]					
Project	Component	<u>N</u> etwork	R <u>e</u> por	ts <u>U</u> tilities	<u>T</u> ool Boxes	
	<u>A</u> rea		+			
	<u>N</u> ode		•	<u>A</u> dd		
	<u>L</u> ink		•	<u>E</u> dit	, in the second se	
	<u>P</u> rofile <u>C</u> ulvert <u>R</u> outing		•	ID Delete		
			+	<u>R</u> ename		
	Land <u>U</u> ses <u>M</u> iscellaneo	us Utilities	۲ (Update All Update wit	h <u>P</u> ay Items	

Set the Properties Options:

📕 Node Configuratio	n - Properties	_ 🗆 🗙
Node ID	🗖 🖌 🔽 🦗 🖉 🖉 🐨 🖉	Apply 3
Details		
Options	Description:	
Properties	1 Node Type: Other	
Location	Profile: On Grade	
Elevations	2 Library Item: DUMMY JOINT	
Junction Loss	✓ · /	
Discharge Options		
Computations	Node Bottom: None Available	
		Align

1	Node Type	Set to "Other"
2	Library Item	Set to "DUMMY JOINT"
3	Apply	Click the Apply button to accept the Properties.

Set the Location Option:

Node ID 4 DI-632	🔹 🕨 Window Center 🐄 🏂 🏂 🖓 🗛 Apply 🌘
Details	
Options	Chain: ROPERMTNR 🔹 🔲 Profile: RMLCGFP 💌
Properties	Coordinates / Stationing
Location	Align: Tangent to Chain 🔻 🐇 + Angle: 0.000
Spread Criteria	
Elevations	Station: 63+80.00 X: 1618822.245
Junction Loss	✓ Offset: -36.500 ✓ Y: 1093570.076
Computations	Mirror Node Offset from Gutter to Inlet: 0.000

1	Chain	Use the pulldown arrow to select the correct chain name. This information comes from the GPK File. If you are placing a node on a side road make sure to use the corresponding side road chain name. Turn off the curb profile option for dummy nodes.
2	Station DP	Click the Station DP button, move the cursor to place the upstream dummy joint at the upstream entrance of the driveway pipe.
3	Apply	Click the Apply button to accept the Location.

	Node Configuration - Location
FO	Node ID DN-900 Window Center Image: Section and the section and th
Click here to place the node	C 44



Repeat this **Node>Add** procedure for the downstream pipe location, so you'll have 2 Nodes for each Link.

- Add 1 Link

To add a link, select **Drainage>Component>Link>Add** and give it a name:



Set the Definition Option:

	K Link Configuration Definition					
	Link I	D: DP-401 Fighlight D: Description De				
	Details					
	Option Definit	ion From Node: DN-401 () To Node: DN-402 (2) T				
	Conditions Length: 0.0000 Use MS Element ID Constraints Configuration					
	Compu	utation 3 Shape: Circular Material: Concrete				
		Design Size Size: 24" R.C. PIPE 4 .Sellect				
		Ditch Override Library Payitem:				
1	From Node	Select the Upstream Node				
2	To Node	Select the Downstream Node				

3	Shape/ Material	Set the Shape to "Circular" and the Material to the appropriate type from the Drainage Library
4	Design Size	Toggle OFF, and click Select to pick the size from the Drainage Library
5	Apply	Click Apply to accept the Pipe Definition.



Continue adding Nodes and Links for the rest of the driveway or cross pipes.

- Label Plans

The plans are now ready to be labeled using the Drainage Labeler.



Since only a few Node and Link variables were set, only certain label variables will be available for driveway or cross pipes.

2. Cross Section Files – Draw Side Line Pipes

Open the *dx.dgn design file and select

Applications -> GEOPAK -> ROAD -> Design & Computation Manager from the menu bar.



Select English -> VBA Applications -> XS Pipes and double click to start the macro.

📕 Design and Computation Manager	3
<u>File Edit Settings Favorites H</u> elp	
产 id 🔲 🚧 🧬 💷 🔁 🚮 😭	
 \\nts\\hq\CaddStandards\SCDOT-Ben\scdot_engV8.ddb ENGLISH DESIGN COMPUTATION VBA APPLICATIONS XSMovie VBA - Review cross sections GPK Merge B Traw Pattems VBA - Draw pattern lines 	* III
XS Pipes VBA - Draw pipes in cross sections Drainage Patterns VBA - Draw special pattern lines XSDrawBuildup VBA - Compute and draw buildup in c SOR VBA - S-O-Reprot XS Report Settings Test - XS Report Settings XS Report Test - XS Report for Ditch Anal	

On the **General** tab, select the Job and Chain, then browse to select the *.gdf file in the project folder. Check on the Honor XS Exaggeration. (This toggle controls the size of the pipe drawn on the cross sections in case they are drawn 10:5 vs. 5:5).

General Side-Line Pipes Cross-Line Pipes	
Job: 165 💌 Chain: SC9R 💌	
Drainage Project File:	
D:\pipes\SC9.gdf	9
Tolerance: 1.0	
Honor XS Exaggeration	

On the **Side-Line Pipes** tab, accept the defaults and press the **Process Cross Sections** button. (You can change the symbology by clicking the appropriate buttons prior to processing as well.)

General Side-Line Pipes Cross-Line Pipes
Draw Through Pipes Symbology:
Draw Outside of Through Pipes Line Style: ByLevel Draw Eropt Pipes Symbology: Doctored Pipes
Draw Outside of Front Pipes Line Style: ByLevel
🔽 Draw Back Pipes Symbology: 🗰 🕫 🛔
Draw Outside of Back Pipes Line Style: ByLevel
Side-Line Pipe Label Draw Symbology:
Process Cross Sections

Press the **Begin** button and wait for the program to finish. Select **Yes** to save a *.csv pipe report file. Pipe drawings in cross sections **should be reviewed by roadway and hydraulic engineers** after processing.

3. Cross Section Files – Draw Cross Line Pipes

Open a plan view .dgn file showing the cross line pipes. Draw drainage pattern lines along each cross line pipe using Microstation "draw line" command. Pattern lines should be set to one of the RD_PD_PatLn# levels and should extend a minimum of 20 feet beyond each end of the cross line pipe or to the construction limits.



Alternatively, open the D&C Manager (*Applications -> GEOPAK -> ROAD -> Design & Computation Manager* on the menu bar), select *English -> VBA Applications -> Drainage Patterns*, and double click to start the macro.



In the Culvert Pattern Lines window, enter the Job number of the project and select the chain of the road being crossed. Click the magnifying glass next to the "Drainage Project"

space and browse to the .GDF file for the project. Check the box marked "Pattern Lines for Cross-Line Pipes" and enter 0 for the Pattern Line Offsets

Culvert Pattern Lines
Job: 283 🔻 Chain: GARLINGTN 💌 🧏
Drainage Project:
C:\Users\Holtzdajr\Desktop\39283_s548_564\road\S-548 SW. Q
✓ Pattern Lines for Cross-Line Pipes ● Pattern Lines for Drainage Nodes
Pattern Line Offsets Tolerance: 1
Left: 0 Right: 0 Draw Pattern Lines

Open or create a *xp.dgn file for the project. Cut existing and proposed cross sections using the new drainage pattern lines. Cross sections will be skewed.

Open the D&C Manager, select *English -> VBA Applications -> XS Pipes* and double click to start the macro.

📕 Design and Computation Manager	
<u>File Edit S</u> ettings F <u>a</u> vorites <u>H</u> elp	
🖅 id 🔲 🗾 🌮 💷 🔁 👫 😭	
CaddStandards\SCDOT-Ben\scdot_engV8.ddb	
ENGLISH	
DESIGN	
C VBA APPLICATIONS	
XSMovie VBA - Review cross sections	
🖹 GPK Merge VBA - GPK Merge 😑	
Draw Patterns VBA - Draw pattern lines	
XS Pipes VBA - Draw pipes in cross sections	
🕒 Drainage Patterns 🛛 VBA - Draw special pattern lines	
SDrawBuildup VBA - Compute and draw buildup in c	

On the **General** tab, select the Job, Chain and browse to select the *.gdf file. Check on the Honor XS Exaggeration. On the Side-Line Pipes tab, turn off all of the checks.

General Side-Line Pipes Cross-Line Pipes	General Side-Line Pipes
Job: 165 💌 Chain: SC9R 💌	Draw Through Pipes
Drainage Project File:	
D:\pipes\SC9.qdf	IM Draw Outside
	🗌 Draw Front Pipes
Tolerance: 1.0	🔽 Draw Outside
Honor XS Exaggeration	🔲 Draw Back Pipes

GEOPAK Drainage Road Design Training

Last printed 7/29/2015 4:09:00 PM

On the **Cross-Line Pipes** tab, check on all of the boxes. You can accept the defaults for symbology or click the appropriate buttons to change them.



Press the **Process Cross Sections** button. Press the **Begin** button and wait for the program to finish. Select **Yes** to save a *.csv pipe report file. Pipe drawings in cross sections **should be reviewed by roadway** and hydraulic engineers after processing.

4. Drainage Structures in X-Section

In order to view Drainage structures (Nodes & Links) in Roadway cross sections, use the following procedures:

1. The **Drainage Preferences: Project Components** option must have the proper Criteria Directory set.

- 2. The Drainage Preferences: Link Options must have the correct Criteria File Name set.
- 3. The Drainage Library: Nodes must have the correct Criteria File Name.
- 4. The Drainage Nodes Cells must have Front and Back points.
- 5. The Roadway Proposed Cross Sections must be run.

5. Displaying 3-D Networks

Create a new 3-D .dgn. Start GEOPAK Drainage and open the .gdf containing the network. Open the GEOPAK Drainage Preferences menu and go to the Project Components tab. Ensure that the Drainage Cell Library being used is the most up-to-date RoadV8.cel dated 8/24/2011 or later. If not, load the *.dpf file associated with the project and check again.

Update all Nodes and Links via Navigator.

🔛 Na	vigator	
View ID 1 CB-1 CB-2 CB-3 CB-4 OUT	Tools Update Graphics Update Pay Items Descript	on
Пн	ighlight 🔲 Window Cer	nter 🗌 Query

Activate the 3D display using Utilities -> Display 3D in the Drainage menu. Change the Display Style in View Attributes from "Wireframe" to "Smooth."

M DRAIN	AGE - Untit	led - [No /	Active Ne	twork]	
Project	<u>C</u> omponent	<u>N</u> etwork	R <u>e</u> ports	<u>U</u> tilities	<u>T</u> ool Boxes
				<u>N</u> aviga <u>C</u> onflic <u>L</u> abele	ator ct Finder er
				Dis <u>pla</u>	y 3D
				<u>D</u> TM I	Drainage Tool
View Attr	ributes - Viev 1 • 🖓 🛱	v 1			
Present	tation			回入	
Display Style:	🔊 Smooth			~ ?	
 ACS Tria Backgro Boundar Camera Clip Back 	ad und y Display k	Fill Grid Grid Grid Level Line S Line V	Overrides tyles /eights		

A 3-D representation of the network will be drawn above the existing 2-D version. Use the **Rotate View** tool in the View menu to observe the network from other angles.



A 3-D view can reveal errors in the network design, such as incorrect structure and pipe elevations. Examining this view for pieces that appear out of place or incorrectly shaped can be much quicker than comparing the data associated with each pipe and node in text format using the Navigator tool.

Chapter 5: Drainage Labeler

GEOPAK Drainage Labeler automates the composition and placement of drainage notes onto drawings. The label is composed of inserts that the user controls. These inserts can be customized to form labels. Several standard label styles are provided in order to label pipes and inlets.

Step 1. From the main menu bar, select <u>Utilities > Labeler</u>:

DRAINA	GE - Drainage	e.gdf - [No	Active N	etwork]	
Project	<u>C</u> omponent	<u>N</u> etwork	R <u>e</u> ports	<u>U</u> tilities	<u>T</u> ool Boxes
				<u>N</u> aviga	ator
				⊆onflic	t Finder
				<u>L</u> abele	r 📐
				Dis <u>pl</u> ay	y 3D
				<u>D</u> TM D	rainage Tools

Step 2. *First* click the Styles Tab; then Select *Style* $\underline{Files} > \underline{Open...}$ and open the \\nts\hq\CaddStandards\SCDOT-

Bentley\Standards\SCDOT_Design\Geofiles\Labelers\scdot.LSF.

BDrainage Labeler - Style:\bin\def_drg.lsf -> Unnamed Style	
Style Files Options Scale Tools	
<u>N</u> ew	
Open	1
Save	
Save <u>A</u> s	
E⊻it	
c:\program files\bentleyv8\program\geopakv8\bin\def_drg.lsf	Space Return
	Clear Delimit
New Style Update Style	Place Label
New Category Scale : N/A 👛 Node and Shape Only 🔻	

Step 3. The dialog should look similar to below:

t Params. Shape Leac	ler Rotate Styles		
n Selector	Style Preview		
7 Labels			
NEW PIPE FL1			(/
■ NEW PIPE_FL2		Space	Return
		Clear	Dolimit
NEW TEE JOINT	LB .	Lieai	Deama

1. Labeler Setup >

To setup the Labeler and remaining tabs:

- Text Tab: the text should be built automatically from the selected style (in step #3)
- Parameters Tab: set the text symbology
- Shape Tab: set the label's shapes
- Leader Tab: set the leader specifications
- Rotate Tab: set the label's rotation
- Styles Tab: select the label's text content

- Text Tab

If the text is different from the stored style, set the label's text content as shown below:

궁 Drainage Labeler - Style:\scdothydroLN.lsf -> NEW PIPE_FL1 - Active 🛛 🗾 🖂 🖂			
Style <u>Fi</u> les <u>O</u> ptions <u>S</u> cale <u>T</u> ools			
Text Params. Shape Leader R	otate Styles	PICC 227' - 18" R. IN = 608.12	
🐵 👑 🕺 🖊	Computed Inserts O User Inserts	F E. OUT = 607.39	
Element ID	Computed Text		
EP-1	Link - Upstream Junction Loss 🔳 🍈		
EP-2	Link - Soffit Upstream	Space Return	
EP-3	Link - Soffit Downstream		
EP-4	Link - Invert Upstream	Delimit	
NP-1		Place Label	
NP-2	Link - Minimum Rise		
NP-3	Link - Maximum Rise	Automatic Label	
Highlight 🔽 Window Center	880.00 3 2 -		

1	Element ID	Select the Type of component and then the Element ID .	
2	Computed Text	Single-click on the computed text of interest	
3	Read-Only	View the <i>read-only</i> computed text readout (shown in bold), and set the <i>#</i> of decimals (if available)	
4	Computed Text	<i>Double-click</i> on the computed text to place it (bullet #5)	
5	Label Window	After double-clicking the computed text (bullet #4) the text is inserted into the label window at the cursor's location in the window	
6	Prefix & Suffix	<i>(Optional)</i> Use keyboard text to add prefixes and/or suffixes to the Computed Text (bullet #5) but <i>not</i> inside the computed text itself (as breaking inside the computed text breaks the auto computed text)	

- Params Tab

Set the Text symbology:

BDrainage Labeler - Style:\scdothydroLN.lsf -> NEW PIPE_FL1 - Active	
Style <u>Files</u> ptions <u>S</u> cale <u>T</u> ools	
Style lies Dations Stale Loois Text Params Shape Leader Rotate Styles Text Preferences / Symbology Justification: Sample Output Height: 5.000 Justification: Image: Sample Output Width: 5.000 Justification: Image: Sample Output Line Sp.: 1.000 Image: Sample Output Image: Sample Output Font: Image: Sample Output Image: Sample Output Image: Sample Output Line Sp.: 1.000 Image: Sample Output Image: Sample Output Color: ByLevel Image: Sample Output Image: Sample Output Weight: ByLevel Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample Output Image: Sample	PLACE 237' - 18" R. F. L. IN = 608.12. F. L. OFFE 607.39 Space Return Clear Delimit Place Label Automatic Label

1	Text Prefs/Symb	Select the Height/Width/Line sp/font/level/color/weight/justification.
2	Sample Output	View the actual label in the Sample Output window.
3	Labeler Window	View the label text; and also allows further keyboard text commands.

- Shape Tab

Set the label's Shape:

BDrainage Labeler - Style:\scdothydroLN.lsf -> NEW PIPE_FL1 - Active	
Style <u>Fi</u> les <u>Option</u> ale <u>T</u> ools	
Text Params. Shape Leader Rotate Styles Shape Preferences Sample Output Image:	PLACE 237' - 18" R. F. I. IN = 608.12. F. I. OUD = 607.39 Space Return Clear Delimit Place Label Automatic Label

1	Shape Preferences	Set the shape of the label, or XX for No Shape.	
2	Sample Output	View the actual label in the Sample Output window.	
3	Labeler Window	View the label text; and also allows further keyboard text commands.	

- Leader Tab

Select the label's Leader Line:

ZDrainage Labeler - Style:\scdothydroLN.lsf -> NEW PIPE_FL1 - Active	
Style <u>Fi</u> les <u>Options</u> <u>S</u> cale <u>T</u> ools	
Text Params. Shape Leader Rotate Styles 1 Leader Type 2 erminator Sample Output NO Image Image Image Image 3 ymbology Level: RD_TX_Drainage Image Image Image Color: ByLevel Image Image Image Image Image Style: Image Image Image Image Image Image Image Weight: ByLevel Image <	PLACE 237' - 18" R. F.L. IN = 608.12. F.L. OUP 607.39 Space Return Clear Delimit Place Label Automatic Label

1	Leader Type	Set the Leader Type.
2	Terminator	Set the Terminator Type.
3	Symbology	Set the Leader symbology



Note: the Leader is *not* displayed in the Sample Output window.

- Rotate Tab

Set the label's Rotation:



1	Rotate	Set the Rotation of the label by any of the methods.
2	Sample Output	The leader will not be shown until the Place Label button is pressed.
3	Labeler Window	View the label text; and also allows further keyboard text commands.
4	Place Label	Click the Place Label button and data-point in the DGN; you may have to data-point several times to place the leader line in the correct location.

- Styles Tab

The Styles Tab is where the individual Styles are stored, displayed and retrieved.

Options include:

- Style: Adding: add new styles
- Style: Updating: modify existing styles
- Style: Categories: add new styles category



You *must* be on the **Styles Tab** to utilize the StyleFiles pull-down menu.

To add a Style:

궁 Drainage Labeler - Style:\scdoth	ydroLN.lsf -> NEW PIPE LINK - A	Active 💶 🖂 🗙
Style Files Options Scale Tools		
Text Params. Shape Leader Rota	ate Styles	PLACE 303' PIPE (NF
Item Selector	Style Preview	
🗁 Labels 🦳 💆	<u> </u>	CAMP -
🗁 SCDOT 🛛 🚺		
A NEW CATCH BASIN		
		Space Return
	- ₋	
NEW PIPE_FL1		
New Ords On the Los Ords 1		Place Label
New Style Dpdate Style		Automatic Label
New Category Scale : N/A	🐣 🔣 Node and Shape Only 🔻	

1	Item Selector	Select the Category (folder icon) in which to place the Style.
2	Save the Style	Click the New Style button to save the Label Style.



You must first use the **Place Label** button before the label can be saved as a Style.
 Use Styles whenever possible so that the Label Updater can update the labels.

To update a Style:

궁 Drainage Labeler - Style:\scdothydroLN.lsf -> NEW PIPE LINK - Active 📃 🔲 🗙				
Style <u>Fi</u> les <u>O</u> ptions <u>S</u> cale <u>T</u> ools				
Text Params. Shape Leader Rotate	Styles Style Preview	PLACE 303' PIPE (NF d-e-l-i-m-i-t		
	× C	Space Return Clear Delimit		
New Style Update Style2 New Category Scale : 1.00	A Node and Shape Only	Place Label Automatic Label		

1	Item Selector	First activate a Style, then make changes to any of the Tabs (Text, Params, Shape, Leader, or Rotate); then place the New Label in the DGN File.
2	Update the Style	Click Update Style to update the Label Style.



You must first use the **Place Label** button before the label can be saved as a Style.
 Use Styles whenever possible so that the Label Updater can update the labels.
 When complete (or periodically) select *<u>File > Save</u>* from the StyleFiles pulldown menu (must be on the Styles Tab to do this).

To Add a New Style Category:

8 Drainage Labeler - Style:\scdothy	droLN.lsf -> NEW PIPE LINK - Active	
Style <u>Fi</u> les <u>Options</u> <u>S</u> cale <u>T</u> ools		
Text Params. Shape Leader Rotate	e Styles	PLACE 303' PIPE (NF
Item Selector	Style Preview	
🗁 Labels 📃 🔺		A MILE
scdot ()		Site
		Space Return
NEW TEE JOINT	Re l	Clear Delimit
■ NEW PIPE_FL1		
New Style	×	Place Label
	<u>_</u>	Automatic Label
New Category 2 Scale : N/A	Node and Shape Only 🔻	

1	Item Selector	Select an existing Category (folder icon)
2	New Category	Click the New Category button to create a New Category within the existing Category.



When complete (or periodically) select *<u>File > Save</u>* from the *StyleF<u>i</u>les* pulldown menu (must be on the Styles Tab to do this).

2. Node Labeling

When labeling nodes using the following workflow:

Step 1. Select and activate a label:



Double-click the Item Selector to find the Label you wish to place.
 Click the check mark, which will activate the style, and place it in the label window

Step 2. Select the Text Tab and then highlight a Drainage Node to label:



1	Select the Element ID you wish to label.
2	Ensure the Label data is correct.
3	Click the Place Label button, and data point (multiple times if leaders are included) in the DGN File to place the label.

Step 3. Repeat as necessary to label all the Nodes.



For the remaining tabs see Labeler Setup.

3. Link Labeling

When labeling links using the following workflow:

Step 1. Select and activate a label:



Double-click the Item Selector to find the Label you wish to place.
 Click the check mark, which will activate the style, and place it in the label window

Step 2. Select the Text Tab and then highlight a Drainage Link to label:



1	Select the Element ID you wish to label.
2	Ensure the Label data is correct.
3	Click the Place Label button, and data point (<i>multiple times if leaders are included</i>) in the DGN File to place the label.

Step 3. Repeat as necessary to label all the Links.



For the remaining tabs see Labeler Setup.

4. Updating Labels

Auto-Computed Labels can be automatically updated. From the Labeler pull-down menu, select <u>*Tools*</u> > <u>*Label Updater:*</u>

🔗 Drainage Labeler - Style	:\drainagelabels.lsf -> l
Style <u>Fi</u> les <u>O</u> ptions <u>S</u> cale	Tools
Text Params, Shape L	Label Updater
	Selection Set Labeling
- 🔍 💆 🖉 🌽	Plan Label Preferences
Element ID	Computed Text

Use the workflow shown below:

🔁 Update Labels 📃 🛛 🗙
Select By: All Labels 🚺 💌
Center Label
StartDdate Label
S <u>k</u> ip U <u>p</u> date All
Highlight Labels
Content Correct
Highlight 0 (2)

1	Click on All Labels (or choose individual labels, or labels within a Microstation selection set)
2	Select the constraint for which labels will Highlight, then click Highlight , the plan view labels matching the constraint will highlight in the DGN.
3	Click the Start button to initiate updating, and then use the Skip , Update Label , or Update All buttons to select which labels will be updated.

5. Label Tools

From the Labeler window, select Options > Label Tools:



1	Active Angle	Rotates the label to the active angle
2	Element Angle	Rotates the label to the same angle as any Microstation element
3	Two Points	Rotates the label by issuing 2 data points in the design file
4	Rotate 180	Rotates the label by 180 degrees
5	Rotate Align	Rotates the label to a chain alignment angle
6	Increase Text	Increase the text size by one point
7	Decrease Text	Decrease the text size by one point
8	Data Point	Pick a point to label (must be a point style label)
9	Element	Pick an element to label (must be an element style label)
\$	2 GPK Line	Pick 2 COGO points to label the line in-between
*	3 GPK Arc	Pick 3 COGO points to label the arc in-between
\$	Edit Label	Click to edit an already placed label
\$	Move Label	Click to move an already placed label
†	Extract Label	Click to extract the settings from an already placed label
\$	Place Label	Click to place the current label
*	Restore dialog	Click to reopen the main Labeler dialog if it has been minimized

Chapter 6: Automated Quantities

See the sections below for computing Node and Link quantities.

1. Node Quantities

Step 1. From the main menu bar, select <u>Component > Node > Update with Pay Items</u>:



Update individual **Node** Items by selecting the individual Nodes in the Navigator, then using the Navigator's pull-down menu, select, <u>*Tools > Update Pay Items.*</u>

Step 2. Open the D&C Manager:





Step 3. Set the dialog using the workflow shown below:

Step 4. Set the Plan Quantity Computation dialog as shown below to compute within a View (or Fence, or file, or etc.):

8 Plan Quantity Computation	<u>_ </u>
Job: 01	▼ Inside ▼ III
✓ Hilite During Computation	Compute Quantities

Step 5. Click the **Compute Quantities** button to initiate the computation.

Step 6. A typical computation will display as follows:

Computation R	esults			_ 🗆 🗙
Item FLARED END 18'' TY A (5' DIA)	Description DIA CATCH BASIN	Quantity 2.0000 2.0000	Unit EA EA	Export
	SAMPLIC			
Export Format: <u>Iter</u> Bun:	n Report 🔻 🔽 Phase: DesignEstim	Create	▼	Export Display

Step 7. Click **Export** to export to the preferred format.

2. Link Quantities

Step 1. From the main menu bar, select <u>Component > Link > Update with Pay Items</u>:

<u>N</u> ode	► Add
Profile	Edit
<u>C</u> ulvert <u>R</u> outing	Delete
Land <u>U</u> ses Miscellaneous Utilities	Update All Update with Pay Items

The same option is available in the Navigator.

Step 2. Open the D&C Manager:



Step 3. Set the dialog using the steps below:



Last printed 7/29/2015 4:09:00 PM

Step 4. Set the Plan Quantity Computation dialog as shown below to compute within a View (or Fence, or file, or etc.):

Job: 01 C Extents:	View	▼ Insi	de ▼] 🛱
Baseline Reference			
None 🔨			
None			

Step 5. Click **Compute Quantities** to initiate the computation. This will scan the view or fence in the DGN file for Drainage Library Links.

Step 6. A typical computation will display as follows:

Computation R	esults			_ 🗆 ×
Item	Description	Quantity	Unit	Export
48" RCP (CL V)		200.1000	LF	2
FLARED END 18"	DIA	2.0000	EA	V
TY A (5' DIA)	CATCH BASIN	2.0000	EA	
Export Format: <u>Ite</u>	m Report 💌	Q Create	•	Export
Run:	Phase: DesignEsti	nate	-	Display

Step 7. Click **Export** to export to the preferred format.

Appendix A: Update Pay Items

When the **Update Pay Items** option is selected, GEOPAK Drainage sets the elements of the drainage design to the attributes as defined in our scdot.ddb file and the links and nodes take on their proper symbology. This is because GEOPAK Drainage associates a pay item to the design elements. D&C Manager recognizes the pay item and gives it the proper appearance and characteristics of its' corresponding item in the 'scdot.ddb' file. In doing so, D&C Manager is now ready to compute the quantity total for all the drainage as shown in the drainage design.

There will still be a need for coordination between Road Design and Hydrology concerning outfall ditches, special ditches, riprap pads, and similar drainage items that cannot be stored as a graphical element in the design file. Because these elements do not have graphics associated with them, automated quantities will not pick up "Clean Outfall Ditch" or "Place Riprap Pad" quantities. In cases that involve those types of quantities, Hydrology will provide us with information showing the necessary information.

Pipe lengths are computed using the slope distance. This gives a more accurate measurement between inlets. The following is a sample report of computed quantities generated by D&C Manager.

Page No. 1 Pay Items List Date: 03/22/2000 File Name: cmp.out				
Item No.	 Description	 Unit 	Quantity	
7141112	15" RC PIPE CULVERT - CLASS III	++ LF	74.0	
7141113	18" RC PIPE CULVERT - CLASS III	LF	14217.6	
7141114	24" RC PIPE CULVERT - CLASS III	LF	2798.5	
7141115	30" RC PIPE CULVERT - CLASS III	LF	2451.3	
7141116	36" RC PIPE CULVERT - CLASS III	LF	124.5	
7141117	42" RC PIPE CULVERT - CLASS III	LF	680.2	
7191205	CATCH BASIN - TYPE 9	EA	1	
191605	CATCH BASIN - TYPE 16	EA	59	
191625	CATCH BASIN - TYPE 17	EA	46	
191650	CATCH BASIN - TYPE 18	I EA	5	

Appendix B: Drainage Revisions

Drainage revisions are a common occurrence on projects. When the need arrives for a revision, the person responsible for the design in Hydrology must be notified. Only Hydrology can change the location and placement of drainage items. We will be unable to manually move any drainage items because GEOPAK Drainage will lose its' ability to recognize the attributes of that item. This will cause problems when we try and label the item using GEOPAK Drainage and also when we try and perform automated quantity computations.

If a revised drainage design is received:

- Delete the current drainage design out of the **pp.dgn** file. This will be easy because it should be the only thing on levels "RD_PD_DR_Inlet", "RD_PD_DR_Pipe", "RD_PD_DR_Inlet_TX", "RD_PD_DR_Pipe_TX", and "RD_HY_Gpkprofile". You can check for objects placed on other levels by activating the Level Display window and sorting by whether levels are Used - check the RD_PD_DR group as well as the Default level in particular.
- 2. Perform another Update Graphics and then Update Pay Items as described in the Navigator.
- 3. Use the Label Updater to update all the labels.

Appendix C: Error Messages

Below are some common error messages & resolutions listed alphabetically:



If your problem is not listed then call your coordinator for help.

Check Rainfall in Preferences

Probable Cause:

The DLB stored in the Preferences: Project Components could not be found and the resulting Rainfall could not be located

Possible Solutions:

1. Open the Preferences: Project Components and select the correct DLB.

2. Click OK to the Preferences, the message should no longer appear.

Error Opening Drainage Library File

Probable Cause:

The DLB File cannot be found in the specified directory, or has version issues.

Possible Solution:

Copy the file to the project directory on your machine and try opening there.
 Ensure the file works in the previous version, is a supported file type, not corrupt, exists, etc.

Error Opening Drainage Project

Probable Cause:

The File>Open command couldn't complete.

Possible Solution:

1. Use File>Open to open the correct GDF file.

Error Opening GPK File

Probable Cause:

The GPK File cannot be found in the specified directory.

Possible Solution:

1. Open the Preferences: Project Components option, Road Preferences button, and ensure the working directory is set correctly.

2. In the Preferences: Project Components option, ensure the GPK Job Number is selected.

Error Retrieving Cell

Probable Cause:

The Microstation cell library is not attached to the DGN file.

Possible Solutions:

1. Use Microstation to attach the correct cell library.

Failed to open the database

Probable Cause:

The D&C Manager file stored in the Preferences: Project Components could not be found.

Possible Solutions:

1. Open the D&C Manager file manually from the Applications pull-down menu (which may default to the ../Geopak/bin/default.ddb) then use the D&C File>Open command to open the correct DDB file.

Rainfall Item Specified in Preferences not found...

Probable Cause:

The DLB stored in the Preferences: Project Components could not be found and the resulting Rainfall could not be located

Possible Solutions:

- 1. Open the Preferences: Project Components and select the correct DLB.
- 2. Click OK to the Preferences, the message should no longer appear.

Unable to find library in Preferences: DLB

Probable Cause:

The DLB stored in the Preferences: Project Components could not be found.

Possible Solutions:

1. Open the Preferences: Project Components and select the correct DLB.

Unable to find cell library in Preferences: CEL

Probable Cause:

The CEL stored in the Preferences: Project Components could not be found.

Possible Solutions:

1. Open the Preferences: Project Components and select the correct CEL.