# **InRoads Tutorial Guide**

Version 1.0

October 2, 2007

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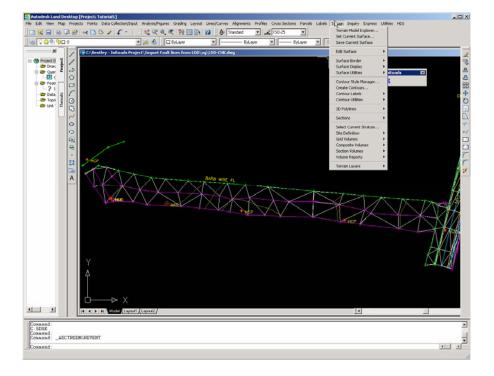
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## Chapter 1

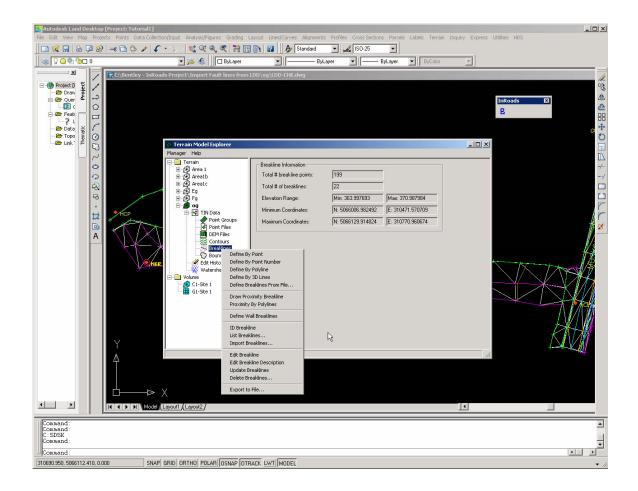
# Extracting faults file and points data from LDD project

## **1.** Generating the fault (.flt) file.

**1.** Click on terrain menu in LDD as shown below:



2. Click on Terrain model explorer, click on the plus sign of the surface that includes the breaklines, then right click on the breaklines and select export to file as shown below:



3. Type the file name of the fault line file to be created by LDD as shown below:

Write ASCII B	reakline File			<u>? ×</u>
Save in: 🔂	og	E (	* 🎟 •	2 🕵 💱
align	🗐 fault lines file.flt			
cogo	置 og.flt 置 og1.flt 置 ogh.flt			
🗅 dwg	🗒 oghh.flt			
survey				
ZZ ZZ				
File name:	og.flt		Save	
Save as type:	×.flt	•	Cancel	

4. Select all breaklines and click OK as shown below:

Export to File	×
Select breaklines to export to a file           *1         OG           *2         OG1           *3         OG           *4         BD           *5         BD1           *6         BD4           *7         BD5           *9         TS           *10         UR	Clear All
OK Cancel	Help

The file will be generated in the directory that you have specified.

If the fault file has zero elevations, rebuild the og surface by right click on the og (without expanding it i.e with the plus sign in front of og) and select build. In the following window select "Convert Proximity breaklines to standards" as shown below then repeat steps 2-4.

Build og	×
Surface Watershed	
Description:	
- Build options	
Log Errors to file	
Build Watershed	
Compute Extended Statistics	
Surface data options	
Use point file data	
Use point group data 0	
Use DEM file data	
Use breakline data	
Convert proximity breaklines to standard	
Use contour data	
Minimize flat triangles resulting from contour data	
Apply boundaries	
Apply Edit History	
OK Cancel Apply Help	

The build og function may take sometime and you may see AutoCAD as if it is not responding. Just let it continue until you get a window saying surface done.

### 2. Generating the Points file (symbols).

10. Select Points menu, Point Management, Point Group Manager... as shown below:

Manager Help									
0 🧳 🔗 🔶	<b>۹ X</b>								
🗄 🗳 og		Num	Name	Northing	Easting	Elevation	Raw D	Full Desc	1
主 🗬 symbols	-0	1000		4822806.762	238363.775	344.492	PH-TR	PH-TR	
	4	• 1001		4822810.204	238367.306	344.619	PH-TR	PH-TR	_
	4	• 1002		4822825.206	238361.923	345.224	PH-TR	PH-TR	
	4	• 1003		4822814.916	238372.101	344.752	PH-TR	PH-TR	
	-	1004		4822909.511	238374.407	348.682	PH-HP	PH-HP	
	4	1005		4822939.504	238419.523	345.957	PH-HP	PH-HP	
	-	1006		4823154.639	238209,494	340.582	PH-HP	PH-HP	
	-@	1007		4823081.141	238281.518	341.994	PH-HP	PH-HP	
	4	1008		4823007.874	238353.120	343.821	PH-HP	PH-HP	
	-0	1009		4823177.449	238233.849	340.751	PH-HP	PH-HP	
	-@	1010		4823204.235	238209.563	340.769	PH-TR	PH-TR	
	-@	1011		4823198.333	238214.444	340.664	PH-TR	PH-TR	
	-@	1012		4823192.948	238219.798	340.629	PH-TR	PH-TR	
	-0	1013		4823190.757	238222.619	340.594	PH-TR	PH-TR	
	4	1014		4823187.505	238225.733	340,623	PH-TR	PH-TR	
	-@	1015		4823112.151	238297.796	341.142	PH-TR	PH-TR	
	4	1016		4823090.918	238318.704	341.749	PH-TR	PH-TR	
	4	1017		4823069.398	238339.665	342.192	PH-TR	PH-TR	
	-@	1018		4823048,108	238362.103	342.846	PH-TR	PH-TR	
	4	1019		4822909.532	238497.594	346.032	PH-TR	PH-TR	
	4	1020		4822908.149	238508.598	345.985	PH-TR	PH-TR	
	-0	1021		4822912.614	238513.485	345.857	PH-TR	PH-TR	*

Select symbols as shown in the above window then click menu Manager and select **Print to File** as shown below:

Point Group Ma	nager									
1anager <mark>Help</mark>										
Create Point Group.										
Load from Prototype	·	Nam	e	Northing		Easting	Elevation	Raw D	Full Desc	
Save to Prototype				22806.762	238	363.775	344.492		PH-TR	
Check Status of all P	oint Groups			22810.204		367.306	344.619	PH-TR	PH-TR	
Show Changes to all				22825.206		361.923	345.224		PH-TR	
Update all Point Grou	-		48	22814.916	238	372.101	344.752	PH-TR	PH-TR	
		_	48	22909.511	238	374.407	348.682	PH-HP	PH-HP	
Print Setup			48	22939.504	238	419.523	345.957	PH-HP	PH-HP	
Print			48	23154.639	238	209.494	340.582	PH-HP	PH-HP	
Print Preview			48	23081.141	238	281.518	341.994	PH-HP	PH-HP	
Print to File			48	23007.874	238	353.120	343.821	PH-HP	PH-HP	
			48	23177.449	238	233.849	340.751	PH-HP	PH-HP	
Exit			48	23204.235	238	209.563	340.769	PH-TR	PH-TR	
	•	1011	48	23198.333	238	214.444	340.664	PH-TR	PH-TR	
	•	1012	48	23192.948	238	219.798	340.629	PH-TR	PH-TR	
	•	1013	48	23190.757	238	222.619	340.594	PH-TR	PH-TR	
	•	1014	48	23187.505	238	225.733	340.623	PH-TR	PH-TR	
	•	1015	48	23112.151	238	297.796	341.142	PH-TR	PH-TR	
	•	1016	48	23090.918	238	318.704	341.749	PH-TR	PH-TR	
	<b></b>	1017	48	23069.398	238	339.665	342, 192	PH-TR	PH-TR	
	¢	1018		23048.108		362.103	342.846		PH-TR	
	¢	1019		22909.532		497.594	346.032		PH-TR	
	¢	1020		22908.149		508.598	345.985		PH-TR	
	<b></b>	1021	48	22912.614	238	513.485	345.857	PH-TR	PH-TR	

Type the point file name in the following Window:

Select Output	File		? 🗙
Save in: 🗀 Po	oints data	🖌 🕑 💆	⊳ 🖽
points data fr points data fr points data fr	or 104001.txt or 104002.txt or 104003.txt or 104004.txt or 104005.txt or 104006.txt	<ul> <li>points data for 104007.txt</li> <li>points data for 104008.txt</li> <li>points data for 104009.txt</li> <li>points data for 1040010.txt</li> <li>points data for 1040010.txt</li> <li>points data for 1040011.txt</li> </ul>	
File <u>n</u> ame:			<u>S</u> ave
Save as type:	Fext Files (*.txt)	~	Cancel

A sample of this file is shown below:

📕 p	oints	s data	for 1	0400	10.txt	t - Not	tepad	
File	Edit	Forma	t Vie	w Hel	р			
1000	, 482	2806.	7620	2383	63.77	50,34	4.4920, 4.6190,	PH-TR
1002	2,482	2825.	2060	2383	67.30 61.92	30,34	5.2240,	PH-TR
1003	3,482	2814.	9160	23837	72.10	10,34	4.7520,	PH-TR
							8.6820, 5.9570.	
							0.5820	
							1.9940	
							3.8210, 0.7510,	
1010	), 482	3204.	2350	23820	09.56	30,34	0.7690,	PH-TR
1011	L, 482	3198.	3330	2382:	14.44	40,34	0.6640	PH-TR
							0.6290, 0.5940,	
							0.6230	
1015	5,482	3112.	1510	2382	97.79	60,34	1.1420	PH-TR
							1.7490, 2.1920,	
							2.8460	
1019	9, 482	2909.	5320	23849	97.59	40,34	6.0320	PH-TR
							5.9850, 5.8570,	
							6.2190,	
1023	3,482	2907.	3400	2385:	18.54	50,34	5.7290	PH-TR
							6.3350, 6.7610,	
							6.6510	
1027	7,482	2891.	6040	2385:	16.62	40,34	6.4000	PH-TR
							6.5280,	
1025	482	2893.	5080	2385.	13.85	10,34	6.4520	PH-IK

The above points represent Trees (TR) and Hydro Pole (HP). If the identification of each type of data points is required in the DTM then separate files to be created one for each i.e file for trees (TR) and another for Hydro Poles (HP) in this case.

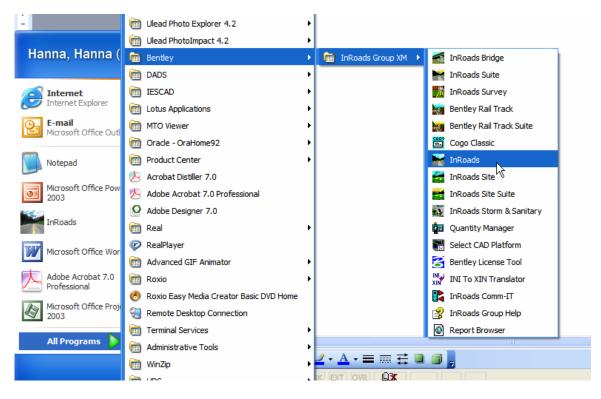
These files to be imported into the DTM created from the fault file using the Text Import Wizard using random features as described in chapter 2.

## Chapter 2

### Generating the OG surface in InRoads.

### 1. General Set up

- 1. Copy the InRoads Tutorial Guide directory to C:\Documents and Setting\your user ID.
- 2. Open InRoads with AutoCAD as shown below:



3. In AutoCAD select file open MTO standard Drawing template from the standard sub directory of the InRoads Tutorial Guide directory as shown below:

🐨 Select File	? <mark>×</mark>
Look in:	🔁 Standards 🛛 🗸 🌾 🕺 Views 🔻 Tools 🔻
History Documents My Documents Favorites C	Name Size Trong InRoads Template.dwg 3,276 KB
Desktop V FTP	Select Initial View File name: Complete DG Surface for 104001.dwg
Buzzsaw	Files of type: Drawing (".dwg) Cancel

4. In InRoads click on file, open the MTO\_xin file from the standards sub directory of the tutorial directory as shown below:

Open						? 🛛
Look in:	🚞 Standards		*	3 💋	P 🖪	•
My Recent Documents	MTO_civil.xin					
Desktop						
My Documents						
My Computer						
My computer	File name:	MTO_civil xin			*	Open
<b></b>	Files of type:	Preferences (*xin)			~	Cancel
My Network						Help

This file contains most of the symbology and styles as per IESCAD standards as well as other preferences that will be used through out this tutorial.

5. In InRoads right click on surfaces as shown below to create a new surface:

🚟 Bentley InRoads XM Edition							
<u>File Surface Geometry Drainage Eva</u>	uation <u>M</u> odeler Dr <u>a</u> fting <u>Q</u> uantities	<u>T</u> ools <u>H</u> elp					
<unnamed> 🛛 🖌 👔</unnamed>	🚳 🔪 ờ 📕 🚽 🐜 🗉 🖉						
	Surface Name Description	File Name	By Whom	Last Revised	Access Mode		
E Surface	Complete OG	C:\Documents	hannaha	19/09/2007 2:0	Read-Write		
Ner	🤜 Default		hannaha	19/09/2007 1:4	Read-Write		
🕞 🦔 OpéÑ 1	Points data 1	C: Documents	hannaha	18/09/2007 3:2	Read-Write		
	🗢 feature for 1	C: Documents	hannaha	19/09/2007 1:4	Read-Write		
Close All							
Empty All							
Surfaces 🖁 Geometry 🙋 🔾 🔪							
	<				>		
Ready							
		LAND THE SAME STORE					

6. Click on New menu item to obtain the following window:

🚟 New		
Surface Geometry	/	
Туре:	Existing 🗸	Apply
Name:	Complete OG 104001	Help
Description:		
Maximum Length:	0.000	
Preference:	мто	
Name	Descripti	on
Default feature for 10400 Points data 10400 Complete OG 104	1	
	Close	

Select existing for the type. Type the name feature for 104001. Select MTO for the preference. Repeat steps 5 and 6 to create two new more surfaces. These are Points data for 104001 and Complete OG 104001 as shown in the following:

Roads XM Edition								
<u>F</u> ile <u>S</u> urface <u>G</u> eometry <u>D</u> rainage <u>E</u> valuation <u>M</u> odeler Dr <u>a</u> fting <u>Q</u> uantities <u>T</u> ools <u>H</u> elp								
<unnamed> 🔽 🔞 💊 🏏 🧱 🛶 🐜 🗉</unnamed>								
	Surface Name Description	File Name	By Whom	Last Revised	Access Mode			
🖃 🛢 Surfaces	Complete OG	C:\Documents	hannaha	19/09/2007 2:0	Read-Write			
🗈 🤿 Default	🤜 Default		hannaha	19/09/2007 1:4	Read-Write			
🗈 🧬 feature for 104001	🗬 Points data 1	C:\Documents hann	hannaha	hannaha 18/09/2007 3:2	Read-Write			
Points data 104001     Complete OG 104001	seature for 1	C:\Documents	hannaha	19/09/2007 1:4	Read-Write			
Surfaces 🖁 Geometry 🖻 🕻	<		]		>			

- 7. Click on feature for 104001 and right click and select set active.
- 8. In InRoads click on file and select Text Import Wizard as shown below:

🔡 B	entley Inf	Roads XM	Edition									
<u>F</u> ile	<u>S</u> urface	Geometry	<u>D</u> rainage	<u>E</u> valuation	<u>M</u> odeler	Dr <u>a</u> fting	<u>Q</u> uantities	<u>T</u> ools <u>H</u> elp				
	<u>N</u> ew						Ctrl+N					
	Open						Ctrl+O	Active	Features	Deleted	Total	^
	<u>S</u> ave						•	78079	8871	0	78079	
	Save <u>A</u> s							0	0	0	0	
	Close						•	0	0	0	0	=
	Project Def	aults						0	0	0	0	
緍	Text Import	Wizard						0	0	0	0	
	Import						•	0	0	0	0	~
	Export						•	-	0071	^	^	>
Ir	Translators						•					

### 2. Importing the Fault File

9. In the Text Import Wizard window shown below:

🚟 Text Impo	rt Wizard					
Wizard Name:	< New >	ОК				
Data Type:	< New > Import Fault File	Cancel				
	Importing Random Points	Edit				
		Delete				
		Help				
File Name:						
C:\Documents and Settings\hannaha\InRoads Tutorial Gu						

In Wizard Name select Import Fault File then click on the square in the lower right corner to select the fault file in the surfaces sub directory of this tutorial as shown below:

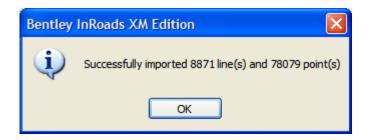


10. Click OK in the Text Import Wizard to get the following Window:

🖌 Surface Options - og104001.flt							
Surface:	feature for 104001	*	ОК				
Region Mode:	Ignore	~	Cancel				
Features							
Seed Name:	OG	~	Filter				
Feature Style:	PH-E-GND-OG	~	Help				
Point Type:	Breakline	*					
Pen Order:	One then Zeros	*					
Exclude from Trian	gulation						
Relative Alignment							
Geometry Project:	Default	$\mathbf{v}$					
Horizontal Alignment:	Default	~					
Vertical Alignment:	Default	$\mathbf{v}$					

Type OG as Seed Name, select Feature Style PH-E-GND-OG, select Point Type as Breakline and then click the OK button. Wait until processing has been completed as indicated in InRoads bottom left status bar window.

The following window is displayed when importing has been completed showing the number of features (lines) and number of points:



11. To view the features, click on Surface menu in InRoads and select View Surface then features to obtain the following window:

🞬 View Fea	tures		X
Surface: Region Mode: Features:	test 💙 Ignore 😒		Apply Close Filter Edit Style Help
Name AE AE1 AE10 AE100 AE101 AE102 AE103 AE104 AE105 AE106	Style PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG	Description	<u></u>
AE107 AE108 AE109 AE11	PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG PH-E-GND-OG		~

Click on apply then close when the features are displayed in AutoCAD as shown in the following window:



It is important to point out that all features are currently using PH-E-GND-OG style. The style of all features should be changed to use its corresponding style as described below.

## **3.** Assigning the Proper Styles in the Surface

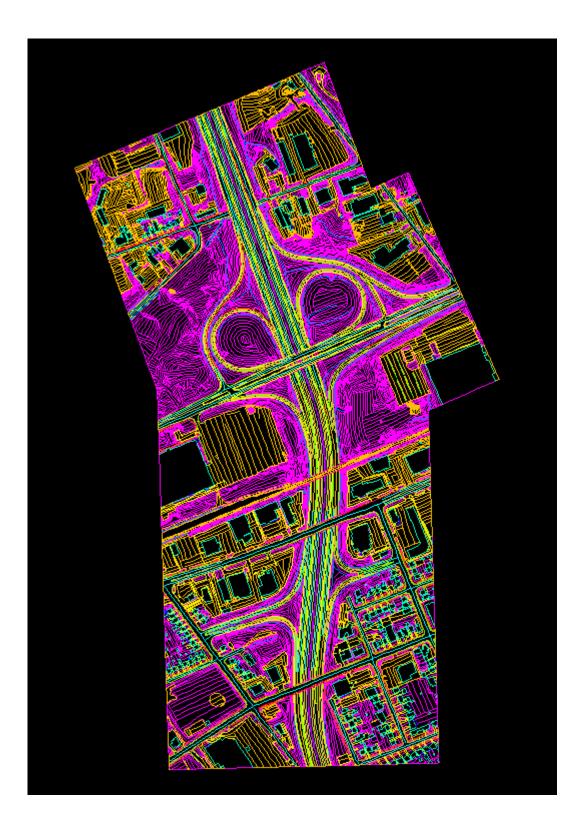
1. Click on surface menu, Features, Features Properties as shown below:

	File	<u>S</u> urfa	ace <u>G</u> eometry	<u>D</u> rainage	Evaluation M	<u>M</u> odeler Dr <u>a</u> fting	<u>Q</u> uantities	<u>T</u> ools <u>H</u> elp		
	<uı< td=""><td></td><td>View Surface</td><td></td><td></td><td>• 🎽 📕 🔫</td><td><u>ببل</u> 5+00</td><td></td><td></td></uı<>		View Surface			• 🎽 📕 🔫	<u>ببل</u> 5+00			
-	<ul> <li>Surface Display</li> <li>■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■</li></ul>			e		Active	Feature			
				ne Features		78079	887			
		38:	Triangulate Surface			ur Features		0		
		Design Conferen				pr Features		0	)	
	Design Surface Design Pad			ed Breaklines		0				
				r Features		0				
	_		Edit Surface		1	mFeatures		0		
		-	<u>F</u> eature		3	Feature P	and the second		007	
Edits the Surface Properties			Feature Selection Filter							
	-		Active Surface			S Component Properties				
		and the second s	Copy Surface							
		<b>X</b>	Delete Surface							
			Rename Surface	ə						
			<u>U</u> tilities		)					

2. Click on the first of each feature and click shift key and scroll to the end of this feature type to select all occurrences of this feature. Click on the Primary drop down box to select the corresponding style and then click Apply button as shown below:

Surface:	test	•		Style Available:		Apply
Feature:			1	Asphalt Base Course 1	~	Close
Name	Style	Description 📩	+	Asphalt Base Course 2	^	
AE82	PH-E-GND-OG	_		Asphalt Base Course 3		Filter
AE83	PH-E-GND-OG			Asphalt Base Course 4 Asphalt Shoulder Base Course		List Points
AE84	PH-E-GND-OG			Asphalt Shoulder Top Course	×	LIST POINTS
AE85	PH-E-GND-OG				_	New Style
AE86 AE87	PH-E-GND-OG PH-E-GND-OG			Primary:		New Style
AE87 AE88	PH-E-GND-OG PH-E-GND-OG			PH-E-GND-OG	*	Help
AE88 AE89	PH-E-GND-OG			PH-E-MSC-GC	~	
AE9	PH-E-GND-OG			PH-E-MSC-HR	000	
AE90	PH-E-GND-OG			PH-E-MSC-OR		
AE91	PH-E-GND-OG			PH-E-MSC-OS		
AE92	PH-E-GND-OG			PH-E-MSC-RLT PH-E-MSC-RW		
AE93	PH-E-GND-OG			PH-E-MSC-RW PH-E-MSC-SW		
AE94	PH-E-GND-OG			PH-E-MSC-T		
AE95	PH-E-GND-OG			PH-E-MSC-VI		
AE96	PH-E-GND-OG			PH-E-MSC-WW		
AE97	PH-E-GND-OG			PH-E-RDS-AE		
AE98 AE99	PH-E-GND-OG			PH-E-RDS-BRD		
AE99 AS	PH-E-GND-OG PH-E-GND-OG			PH-E-RDS-CR PH-E-RDS-CU		
AS1	PH-E-GND-OG	~		PH-E-RDS-EG		
<	THEOREG	>		PH-E-RDS-EN		
1-1			1	PH-E-RDS-EP	1	
Name:				PH-E-RDS-ES	1	
Description:			ř	PH-E-RDS-NG PH-E-RDS-NP		
Description.				PH-E-RDS-RD		
Parent:			1	PH-E-RDS-T		
				PH-E-RDS-UR	-	
Refresh/Di	splay in 3-D/Plan View			PH-E-SCANNED	= 2	
				PH-E-UTL-AN		
				PH-E-UTL-BH PH-E-UTL-BP	-	
				PH-E-UTL-FH		
				PH-E-UTL-HP		
				PH-E-UTL-HT		
				PH-E-UTL-LS		
				PH-E-UTL-PO		
				PH-E-UTL-PW PH-E-UTL-T		
				PH-E-UTL-WE		
				PH-E-VEG-HE		
				PH-E-VEG-T		
				PH-E-VEG-TR		

3. Repeat the above two steps until all features are moved to their corresponding styles. The final OG surface for the features should look as follows:



### 4. Importing the Points File

- 1. In InRoads right click on **Points Data 104001** surface.
- 2. Click File and select Text Import Wizard.
- 3. Click on the Wizard name and select Importing Random Points as shown below:

🔚 Text Import Wizard 🛛 🛛 🔀						
Wizard Name:	Importing Random Points 🛛 🗸	ОК				
Data Type:	Surface 🗸 🗸 🗸	Cancel				
		Edit				
		Delete				
		Help				
File Name:						
"C:\Documents	s and Settings\hannaha\lnRoads	Tutorial G				

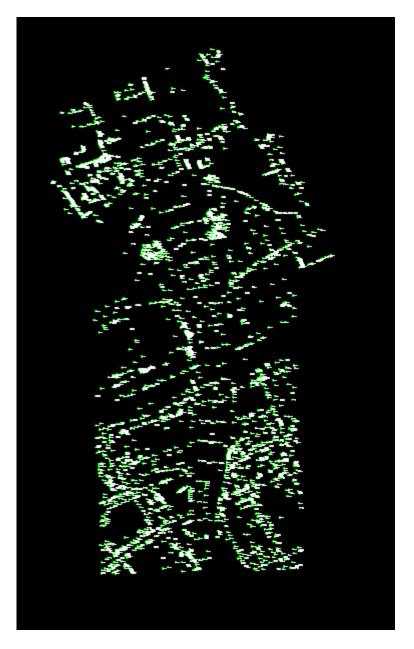
4. In Data Type select Import Fault File then click on the square in the lower right corner to select the fault file in the surfaces sub directory of this tutorial as shown below:

Browse								? 🗙
Look in:	🗀 Surfaces		*	G	ø	ø	•	
My Recent Documents	📋 points data for	104001.txt						
Desktop								
My Documents								
My Computer	File name:	points data for 104001.txt				*		Open
	Files of type:	TIW Import Files (*.bd)				~		Cancel
My Network								Help

- 5. Click Open then click OK in the Text Import Wizard to start importing the points data.
- 6. In the surface options window type TR as the seed name, select style PH-E-VEG-TR (style for trees) and Random for the points and check off the Exclude from Triangulation option as shown below:

🚟 Surface Options - points data for 104001.txt 🛛 🔀								
Surface:	Points data 104001	~	ОК					
Region Mode:	Ignore	~	Cancel					
- Features								
Seed Name:	TR	*	Filter					
Feature Style:	PH-E-VEG-TR	~	Help					
Point Type:	Random	~						
Pen Order:	One then Zeros	~						
Exclude from Trian	gulation							
Relative Alignment								
Geometry Project:	Default	$\sim$						
Horizontal Alignment:	Default	~						
Vertical Alignment:	Default	~						

 View the random features by clicking on Surface, View Surface and select Features, Repeat for annotate feature using MTO preferences as shown below:



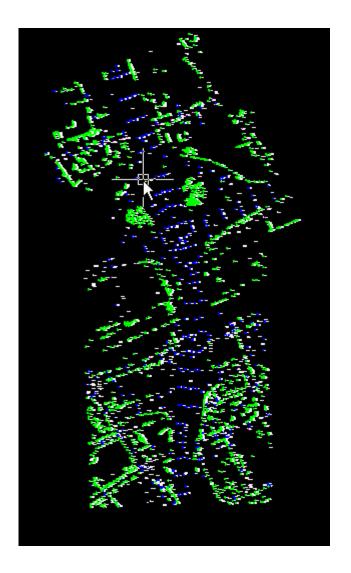
### **5.** Assigning the Proper Style for each point type

Click on surface menu, Features, Features Properties.

Click on the first of each feature and click shift key and scroll to the end of this feature type to select all occurrences of this feature. Click on the Primary drop down box to select the corresponding style and then click Apply button.

This is similar to section 3, Assigning the Proper Styles in the Surface.

The final drawing for the points data is as follow:

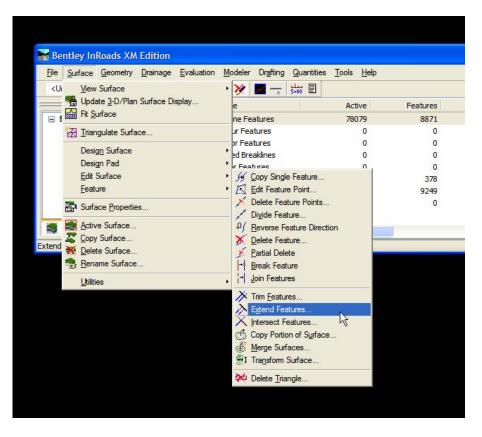


## **6** Combing Features and Points data into one Surface

1. Select the surface Feature for 104001 then right click and select copy surface as shown below:

🚟 Copy Sur	face		
From Name: Description: Preference:	feature for 104001 MTO	~	Apply Close Help
To Name: Description: Preference:	Complete OG 104001 MTO	<ul> <li>•</li> </ul>	

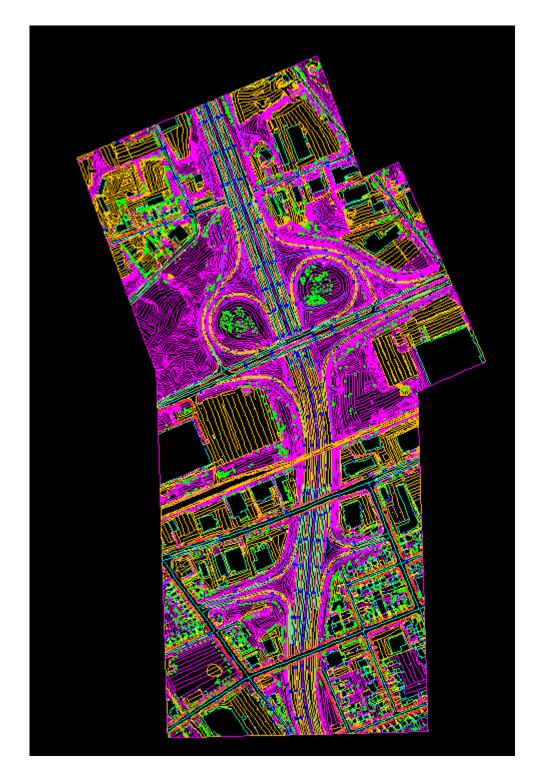
- 2. Enter Name of complete surface and select MTO preference and then click apply.
- 3. Select Surface, Edit Surface, Copy Portion of Suraface as shown below:



4. Select the point data surface and complete OG surface and then click Apply as shown below:

Copy Portion of	of Surface			
Source Surface:	Points data 10400	)1 🗸		Apply
Destination Surface:	Complete OG 104	00 🗸		Close
Region Mode:	Ignore	~		Filter
Features:				
Name	Style	Description	+	Results
PH-AN	PH-E-VEG-TR			Help
PH-AN1	PH-E-VEG-TR			<u> </u>
PH-AN10 PH-AN11	PH-E-VEG-TR PH-E-VEG-TR			
PH-AN12	PH-E-VEG-TR			
PH-AN13	PH-E-VEG-TR			
PH-AN14	PH-E-VEG-TR			
PH-AN15	PH-E-VEG-TR			
PH-AN16	PH-E-VEG-TR		►	
Duplicate Names:				
Append	Replace ORe	name		
C Append		name		

5. The complete surface looks as follows:



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