Autodesk Civil 3D 2015 Borehole Tool for FDOT Plans Production

FDOT State Kit for AutoCAD Civil 3D 2015

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FDOT 2015 Civil 3D State Kit Borehole Tool and the Autodesk Geotech Module in Civil 3D for FDOT Plans Production

This session will focus on the FDOT Borehole tool provided with the FDOT 2015 Civil 3D State Kit and a Civil 3D add on from a company **Keynetix** through Autodesk. This is a free download through Autodesk as long as you have a subscription with Autodesk, which is free.

Software prerequisites:

- The most current/latest version of the FDOT Civil 3D State kit should be installed.

User prerequisites:

- Should have a good understanding of AutoCAD and a basic understanding of AutoCAD Civil 3D.

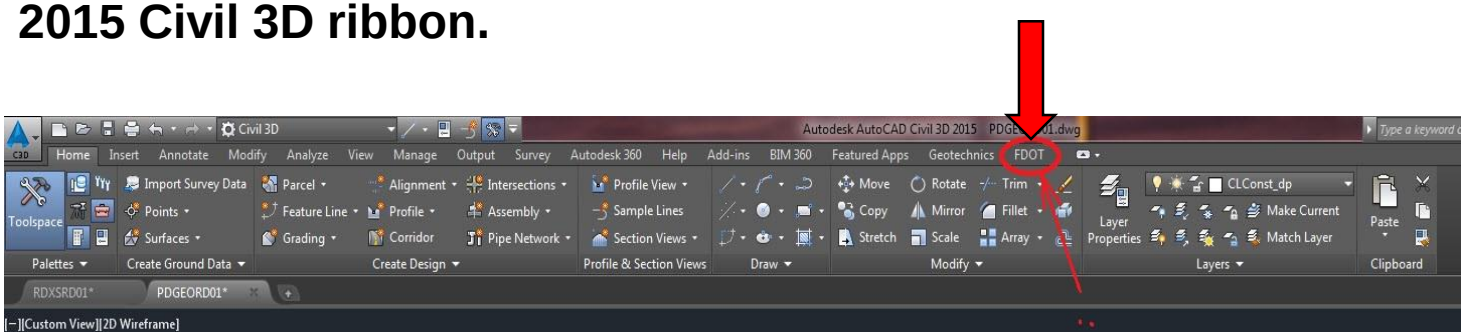
FDOT 2015 Civil 3D State Kit Borehole Tool

Session Objectives:

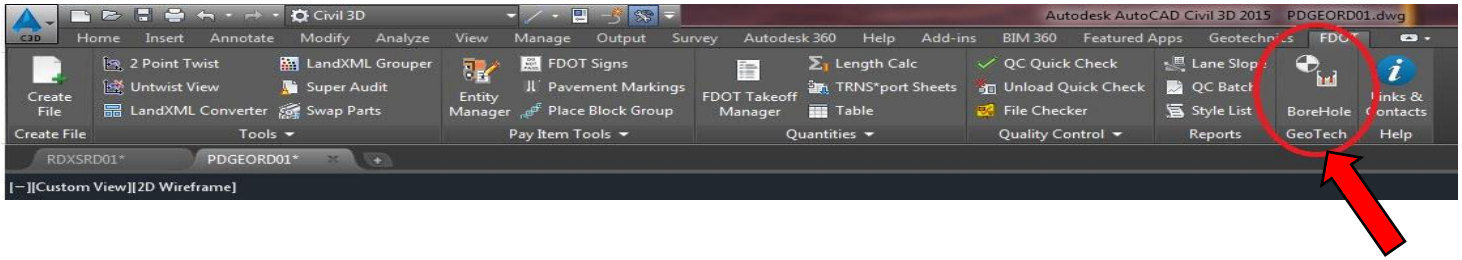
- **What is the FDOT Borehole Tool?**
- **How will this benefit my work?**
- **How does the FDOT C3D State Kit utilize the Borehole Tool?**
  - **Make sure using correct Alignment**
  - **Import Soil Borings into Plan View**
  - **Import Soil Borings into Cross Sections**
  - **Turn off before Shading**

FDOT 2015 Civil 3D State Kit Borehole Tool

- **Click on the FDOT State kit button at the top right of the 2015 Civil 3D ribbon.**

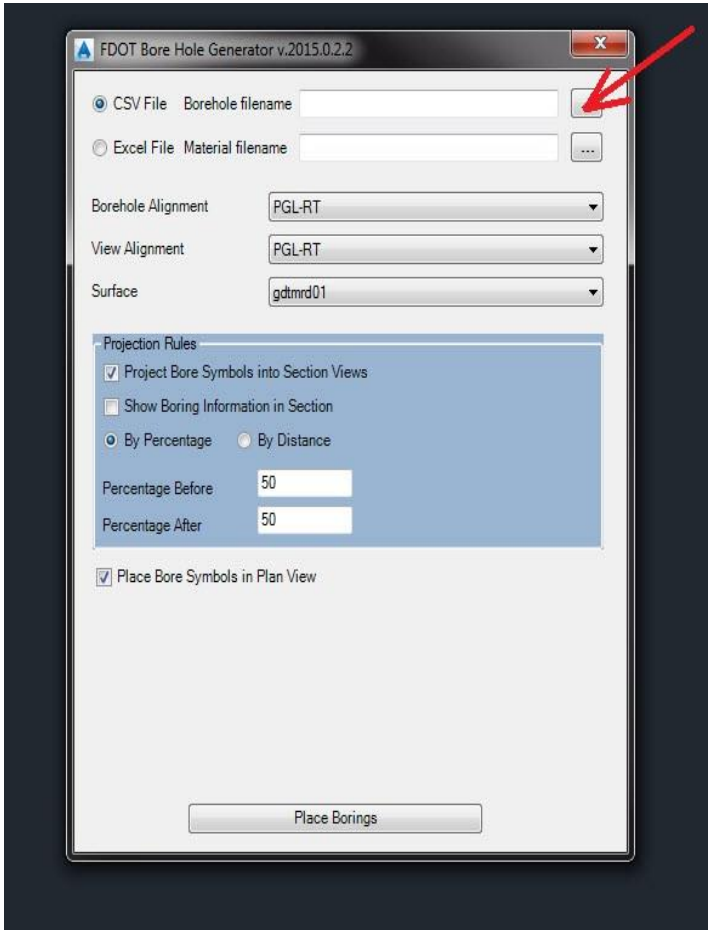


- **Click on the FDOT Borehole Tool button on the FDOT ribbon.**



FDOT 2015 Civil 3D State Kit Borehole Tool

- **This will pull up the FDOT Borehole Generator Dialog Box.**



- **Notice it automatically fills in your active Alignment and Surface you have loaded. Note you can also have a separate View Alignment from your Borehole Location Alignment.**

- **Make sure your Project Bore Symbols into Section Views button is toggled on if you want to place them into your Cross Sections.**

- **Make sure your Project Bore Symbols in Plan View is toggled on if you want to place them into your Plan View.**

- **In the Projection Rules Box there are two options to place the Borings. By distance or by Percentage.**

FDOT 2015 Civil 3D State Kit Borehole Tool

- **For example if you have by Distance toggled and your Cross Sections are every 50 feet you can use 25 feet as the distance to place them in the middle of the sections if they do not fall right on the station.**

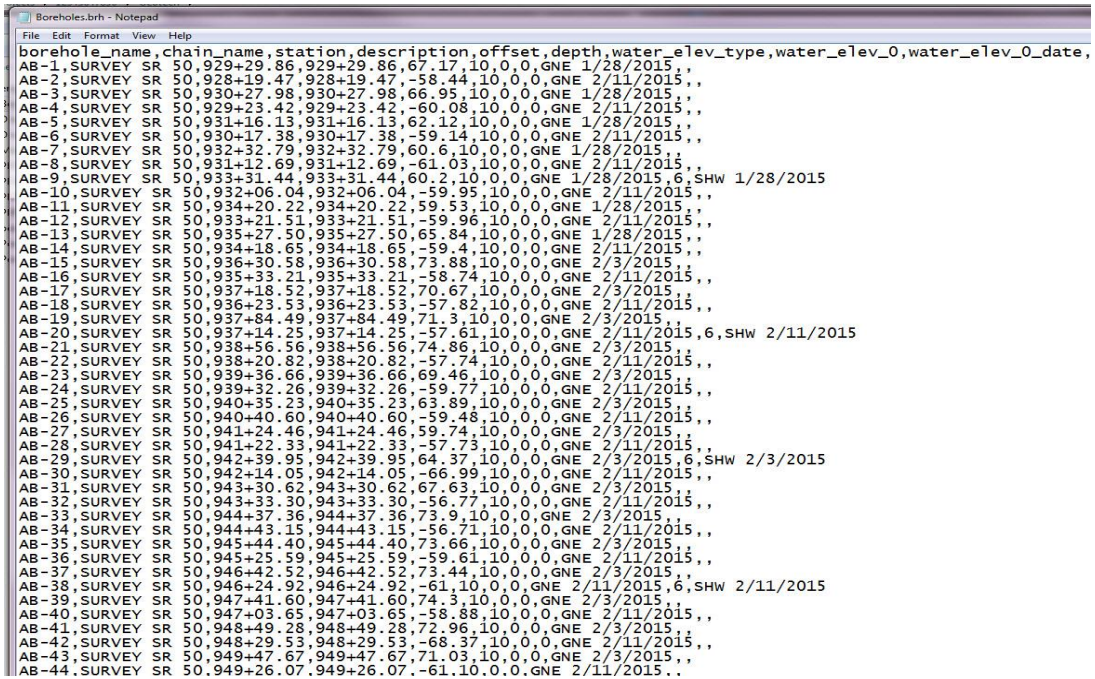
- **I like to use percentage as I feel it's more accurate as if you have sections every 50 feet and you have 25 percent toggled it will place them within 25 percent of the section closest to the Boring location.**

- **At the top under the File Names I prefer to use the (*.csv) files as they're more accurate. The Location (*.csv) file needs to have a (*.brh) extension and the Material or Geology file needs to have a (*.mtl) extension.**

FDOT 2015 Civil 3D State Kit Borehole Tool

- Here are two examples of those two Comma Separated value files. The first one here is the **boreholes.brh** file (This must have the *.brh extension).

- Both of these (*.csv) files can be downloaded from this site: http://www.kenetix.com/Civil3Dcsvfiles/



Boreholes.brh - Notepad

File Edit Format View Help

```
borehole_name,chain_name,station,description,offset,depth,water_elev_type,water_elev_0,water_elev_0_date,
AB-1,SURVEY SR 50,929+29.86,929+29.86,67.17,10,0,0,GNE 1/28/2015,,
AB-2,SURVEY SR 50,928+19.47,928+19.47,-58.44,10,0,0,GNE 2/11/2015,,
AB-3,SURVEY SR 50,930+27.98,930+27.98,66.95,10,0,0,GNE 1/28/2015,,
AB-4,SURVEY SR 50,929+23.42,929+23.42,-60.08,10,0,0,GNE 2/11/2015,,
AB-5,SURVEY SR 50,931+16.13,931+16.13,62.12,10,0,0,GNE 1/28/2015,,
AB-6,SURVEY SR 50,930+17.38,930+17.38,-59.14,10,0,0,GNE 2/11/2015,,
AB-7,SURVEY SR 50,932+32.79,932+32.79,60.6,10,0,0,GNE 1/28/2015,,
AB-8,SURVEY SR 50,931+12.69,931+12.69,-61.03,10,0,0,GNE 2/11/2015,,
AB-9,SURVEY SR 50,933+31.44,933+31.44,60.2,10,0,0,GNE 1/28/2015,6,SHW 1/28/2015
AB-10,SURVEY SR 50,932+06.04,932+06.04,-59.95,10,0,0,GNE 2/11/2015,,
AB-11,SURVEY SR 50,934+20.22,934+20.22,59.53,10,0,0,GNE 1/28/2015,,
AB-12,SURVEY SR 50,933+21.51,933+21.51,-59.96,10,0,0,GNE 2/11/2015,,
AB-13,SURVEY SR 50,935+27.50,935+27.50,65.84,10,0,0,GNE 1/28/2015,,
AB-14,SURVEY SR 50,934+18.65,934+18.65,-59.4,10,0,0,GNE 2/11/2015,,
AB-15,SURVEY SR 50,936+30.58,936+30.58,73.88,10,0,0,GNE 2/3/2015,,
AB-16,SURVEY SR 50,935+33.21,935+33.21,-58.74,10,0,0,GNE 2/11/2015,,
AB-17,SURVEY SR 50,937+18.52,937+18.52,70.67,10,0,0,GNE 2/3/2015,,
AB-18,SURVEY SR 50,936+23.53,936+23.53,-57.82,10,0,0,GNE 2/11/2015,,
AB-19,SURVEY SR 50,937+84.49,937+84.49,71.3,10,0,0,GNE 2/3/2015,,
AB-20,SURVEY SR 50,937+14.25,937+14.25,-57.61,10,0,0,GNE 2/11/2015,6,SHW 2/11/2015
AB-21,SURVEY SR 50,938+56.56,938+56.56,74.86,10,0,0,GNE 2/3/2015,,
AB-22,SURVEY SR 50,938+20.82,938+20.82,-57.74,10,0,0,GNE 2/11/2015,,
AB-23,SURVEY SR 50,939+36.66,939+36.66,69.46,10,0,0,GNE 2/3/2015,,
AB-24,SURVEY SR 50,939+32.26,939+32.26,-59.77,10,0,0,GNE 2/11/2015,,
AB-25,SURVEY SR 50,940+35.23,940+35.23,63.89,10,0,0,GNE 2/3/2015,,
AB-26,SURVEY SR 50,940+40.60,940+40.60,-59.48,10,0,0,GNE 2/11/2015,,
AB-27,SURVEY SR 50,941+24.46,941+24.46,59.74,10,0,0,GNE 2/3/2015,,
AB-28,SURVEY SR 50,941+22.33,941+22.33,-57.73,10,0,0,GNE 2/11/2015,,
AB-29,SURVEY SR 50,942+39.95,942+39.95,64.37,10,0,0,GNE 2/3/2015,6,SHW 2/3/2015
AB-30,SURVEY SR 50,942+14.05,942+14.05,-66.99,10,0,0,GNE 2/11/2015,,
AB-31,SURVEY SR 50,943+30.62,943+30.62,67.63,10,0,0,GNE 2/3/2015,,
AB-32,SURVEY SR 50,943+33.30,943+33.30,-56.77,10,0,0,GNE 2/11/2015,,
AB-33,SURVEY SR 50,944+37.36,944+37.36,73.9,10,0,0,GNE 2/3/2015,,
AB-34,SURVEY SR 50,944+43.15,944+43.15,-56.71,10,0,0,GNE 2/11/2015,,
AB-35,SURVEY SR 50,945+44.40,945+44.40,73.66,10,0,0,GNE 2/3/2015,,
AB-36,SURVEY SR 50,945+25.59,945+25.59,-59.61,10,0,0,GNE 2/11/2015,,
AB-37,SURVEY SR 50,946+42.52,946+42.52,73.44,10,0,0,GNE 2/3/2015,,
AB-38,SURVEY SR 50,946+24.92,946+24.92,-61,10,0,0,GNE 2/11/2015,6,SHW 2/11/2015
AB-39,SURVEY SR 50,947+41.60,947+41.60,74.3,10,0,0,GNE 2/3/2015,,
AB-40,SURVEY SR 50,947+03.65,947+03.65,-58.88,10,0,0,GNE 2/11/2015,,
AB-41,SURVEY SR 50,948+49.28,948+49.28,72.96,10,0,0,GNE 2/3/2015,,
AB-42,SURVEY SR 50,948+29.53,948+29.53,-68.37,10,0,0,GNE 2/11/2015,,
AB-43,SURVEY SR 50,949+47.67,949+47.67,71.03,10,0,0,GNE 2/3/2015,,
AB-44,SURVEY SR 50,949+26.07,949+26.07,-61.10,0,0,GNE 2/11/2015,,
```

FDOT 2015 Civil 3D State Kit Borehole Tool

This is the **Materials.mtl** file. This file must have the (*.mtl) extension. The DOC stands for “Depth of Cover”

Materials.mtl - Notepad

File Edit Format View Help

```
borehole_name,material_name,type_of_elev,doc_or_se
AB-1,1,DOC,10
AB-2,1,DOC,10
AB-3,1,DOC,10
AB-4,1,DOC,10
AB-5,1,DOC,10
AB-6,1,DOC,10
AB-7,1,DOC,10
AB-8,1,DOC,10
AB-9,1,DOC,10
AB-10,3,DOC,1
AB-10,1,DOC,10
AB-11,1,DOC,10
AB-12,3,DOC,1
AB-12,1,DOC,10
AB-13,1,DOC,3
AB-13,2,DOC,10
AB-14,3,DOC,1
AB-14,1,DOC,10
AB-15,1,DOC,2.5
AB-15,2,DOC,10
AB-16,3,DOC,1
AB-16,1,DOC,9
AB-16,2,DOC,10
AB-17,1,DOC,8
AB-17,2,DOC,10
AB-18,3,DOC,1
AB-18,1,DOC,9
AB-18,2,DOC,10
AB-19,1,DOC,8
AB-19,2,DOC,10
AB-20,3,DOC,1.5
AB-20,1,DOC,10
AB-21,1,DOC,8
AB-21,2,DOC,10
AB-22,3,DOC,1
AB-22,1,DOC,10
AB-23,1,DOC,8
AB-23,2,DOC,10
AB-24,1,DOC,10
AB-25,1,DOC,10
AB-26,1,DOC,10
AB-27,1,DOC,10
AB-28,3,DOC,1
AB-28,1,DOC,10
```

FDOT 2015 Civil 3D State Kit Borehole Tool

- **Note you need to have both your ALGNRD.dwg and RDXSRD.dwg attached to your working file this to work. You also need the Data References for your Surface and Alignment loaded.**

Autodesk Civil 3D Geotech Module for FDOT Plans Production

FDOT State Kit for AutoCAD Civil 3D 2015

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Session Objectives:

- **What is the Autodesk Geotech Module?**
- **How will this Geotech Module benefit my work?**
- **How does the FDOT C3D State Kit utilize the Geotech Module?**
  - **Import Soil Borings into Geotech Module.**
  - **How to create 3D Soil Borings and why?**
  - **Create Civil 3D surfaces with the Geotech Module.**
  - **The tools within Geotech Module.**
  - **Create Civil 3D profiles using the Geotech Module.**
- **Edit data in the Geotech Module.**
- **Turn off all Xrefs before Shading for expedience.**

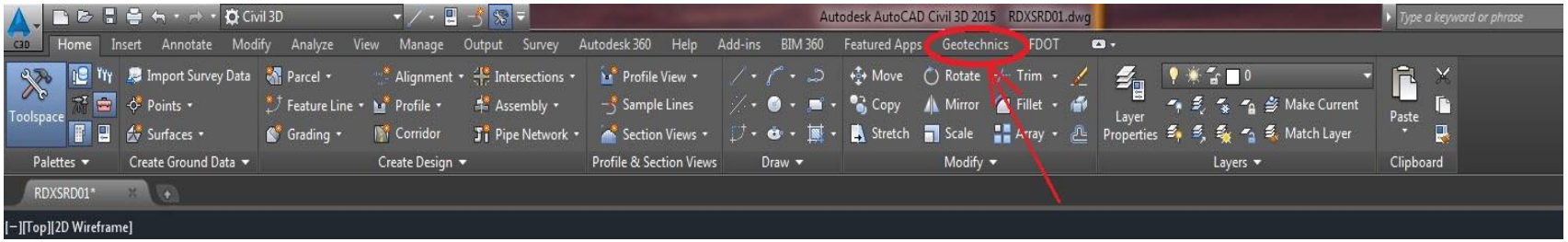
Autodesk Geotech Module in Civil 3D for FDOT Plans Production

- **What is the Geotech Module?**

The Geotech Module is a free download through Autodesk, that allows you to create 3D Bore Holes along with Civil 3D surfaces and profiles on the fly.

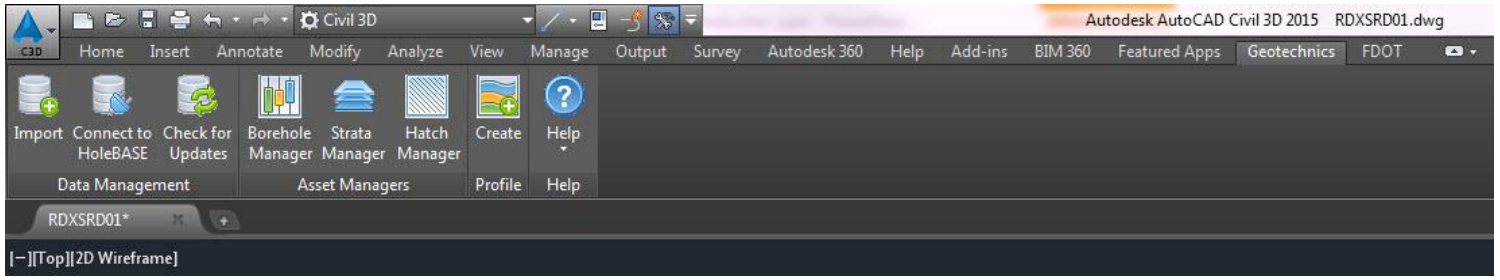
You can download a free version here: http://www.keynetix.com/downloads

Once you have downloaded the Geotech Module (*.exe) file and install it you will find a “Geotechnics” pull down in your Civil 3D ribbon.

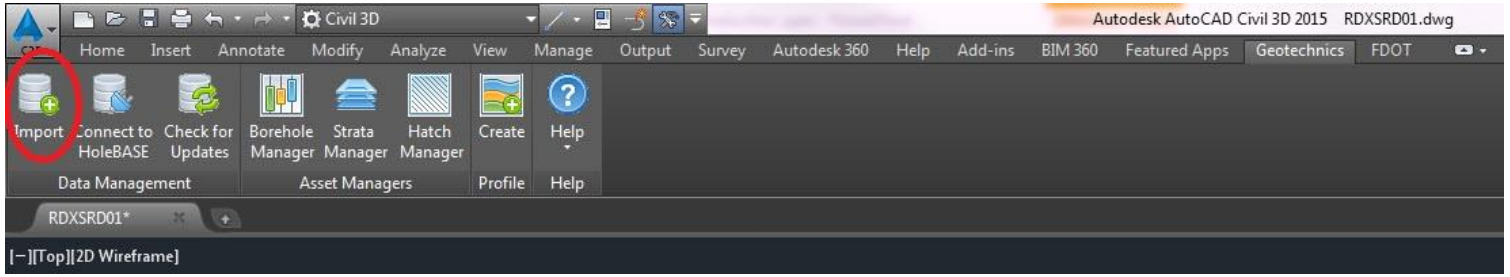


Autodesk Geotech Module in Civil 3D for FDOT Plans Production

- **Once you have installed and clicked on the "Geotechnics" button you will get the following Geotech Module ribbon.**

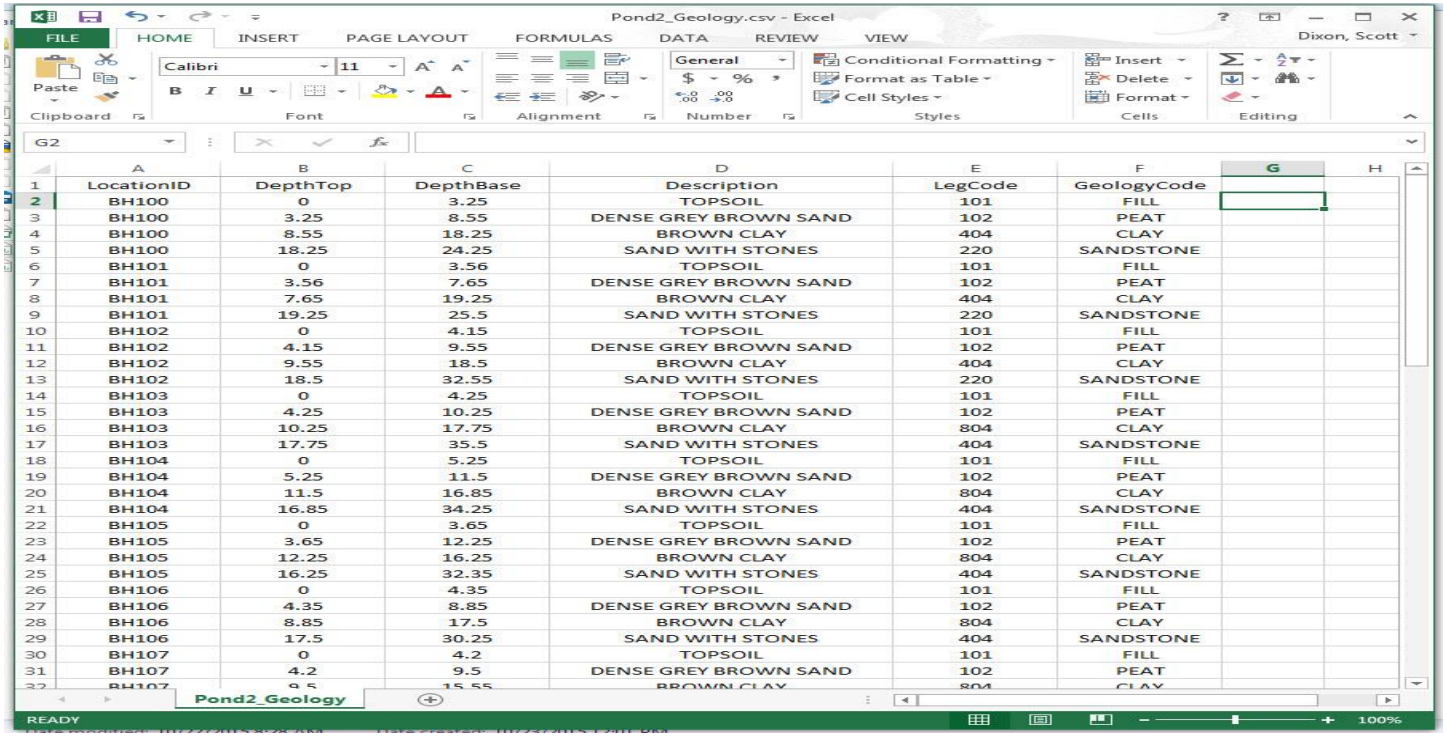


- **Your next step is to "Import" Geotech data into the program.**



- **Both Excel and Comma Separated value files can be used.**
- **The formats are shown below.**

This is the Geology.csv file opened with Excel.

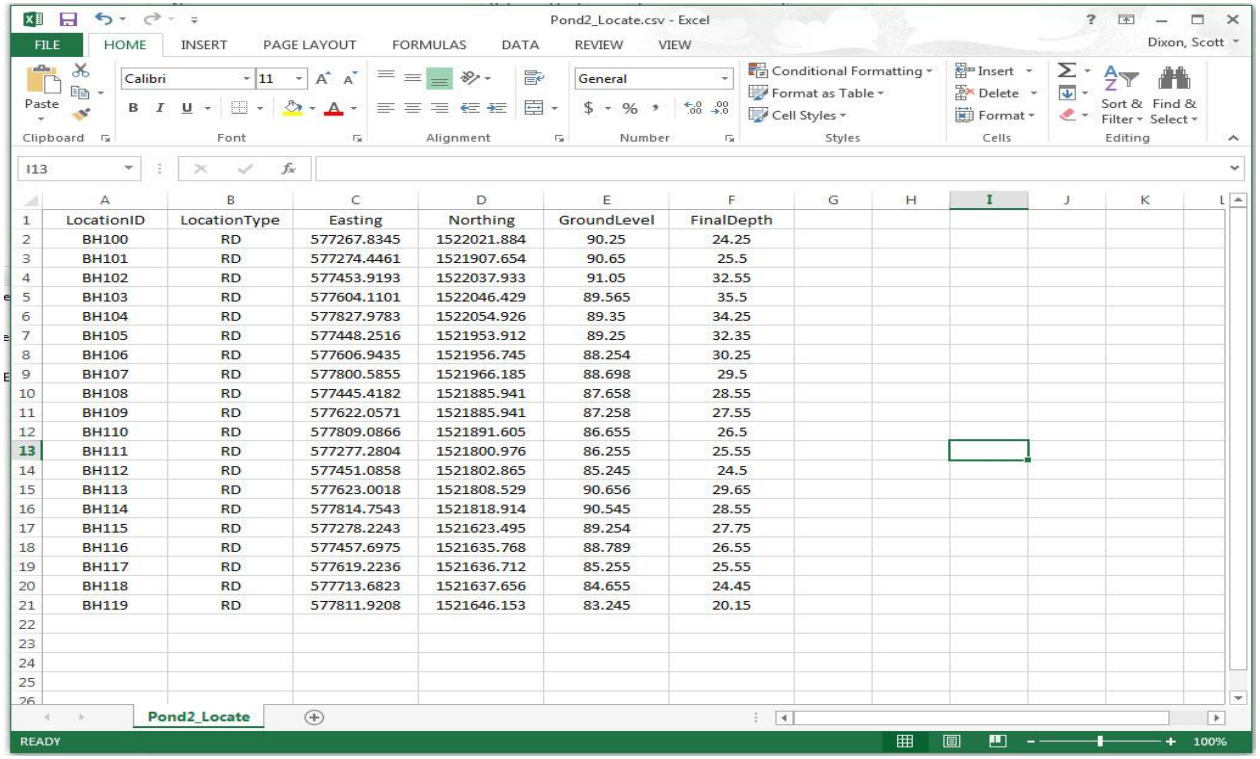


	A	B	C	D	E	F	G	H
1	LocationID	DepthTop	DepthBase	Description	LegCode	GeologyCode		
2	BH100	0	3.25	TOPSOIL	101	FILL		
3	BH100	3.25	8.55	DENSE GREY BROWN SAND	102	PEAT		
4	BH100	8.55	18.25	BROWN CLAY	404	CLAY		
5	BH100	18.25	24.25	SAND WITH STONES	220	SANDSTONE		
6	BH101	0	3.56	TOPSOIL	101	FILL		
7	BH101	3.56	7.65	DENSE GREY BROWN SAND	102	PEAT		
8	BH101	7.65	19.25	BROWN CLAY	404	CLAY		
9	BH101	19.25	25.5	SAND WITH STONES	220	SANDSTONE		
10	BH102	0	4.15	TOPSOIL	101	FILL		
11	BH102	4.15	9.55	DENSE GREY BROWN SAND	102	PEAT		
12	BH102	9.55	18.5	BROWN CLAY	404	CLAY		
13	BH102	18.5	32.55	SAND WITH STONES	220	SANDSTONE		
14	BH103	0	4.25	TOPSOIL	101	FILL		
15	BH103	4.25	10.25	DENSE GREY BROWN SAND	102	PEAT		
16	BH103	10.25	17.75	BROWN CLAY	804	CLAY		
17	BH103	17.75	35.5	SAND WITH STONES	404	SANDSTONE		
18	BH104	0	5.25	TOPSOIL	101	FILL		
19	BH104	5.25	11.5	DENSE GREY BROWN SAND	102	PEAT		
20	BH104	11.5	16.85	BROWN CLAY	804	CLAY		
21	BH104	16.85	34.25	SAND WITH STONES	404	SANDSTONE		
22	BH105	0	3.65	TOPSOIL	101	FILL		
23	BH105	3.65	12.25	DENSE GREY BROWN SAND	102	PEAT		
24	BH105	12.25	16.25	BROWN CLAY	804	CLAY		
25	BH105	16.25	32.35	SAND WITH STONES	404	SANDSTONE		
26	BH106	0	4.35	TOPSOIL	101	FILL		
27	BH106	4.35	8.85	DENSE GREY BROWN SAND	102	PEAT		
28	BH106	8.85	17.5	BROWN CLAY	804	CLAY		
29	BH106	17.5	30.25	SAND WITH STONES	404	SANDSTONE		
30	BH107	0	4.2	TOPSOIL	101	FILL		
31	BH107	4.2	9.5	DENSE GREY BROWN SAND	102	PEAT		
32	BH107	9.5	15.55	BROWN CLAY	804	CLAY		

Note: The (*.csv) files can be opened in Excel as I find it easier to edit this way. Also if opened in Excel the Table headers and everything has to be as shown above.

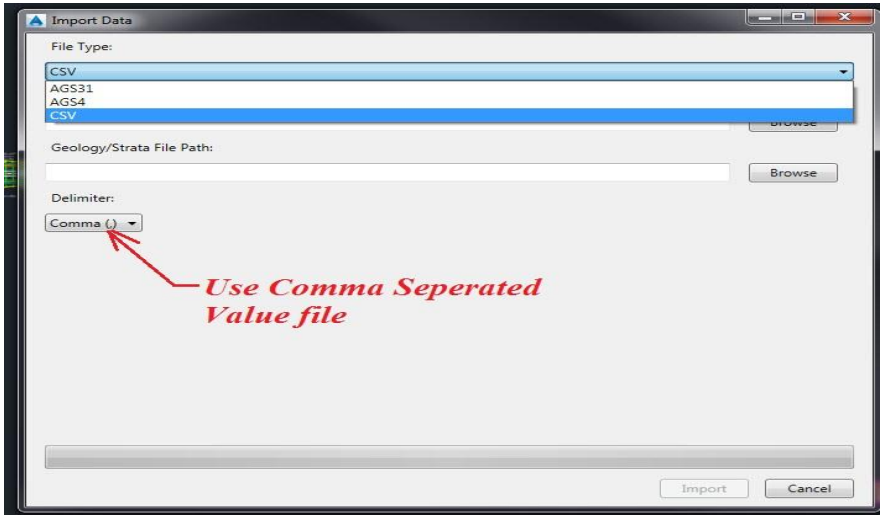
Autodesk Geotech Module in Civil 3D for FDOT Plans Production

This is the Location.csv file opened with Excel.

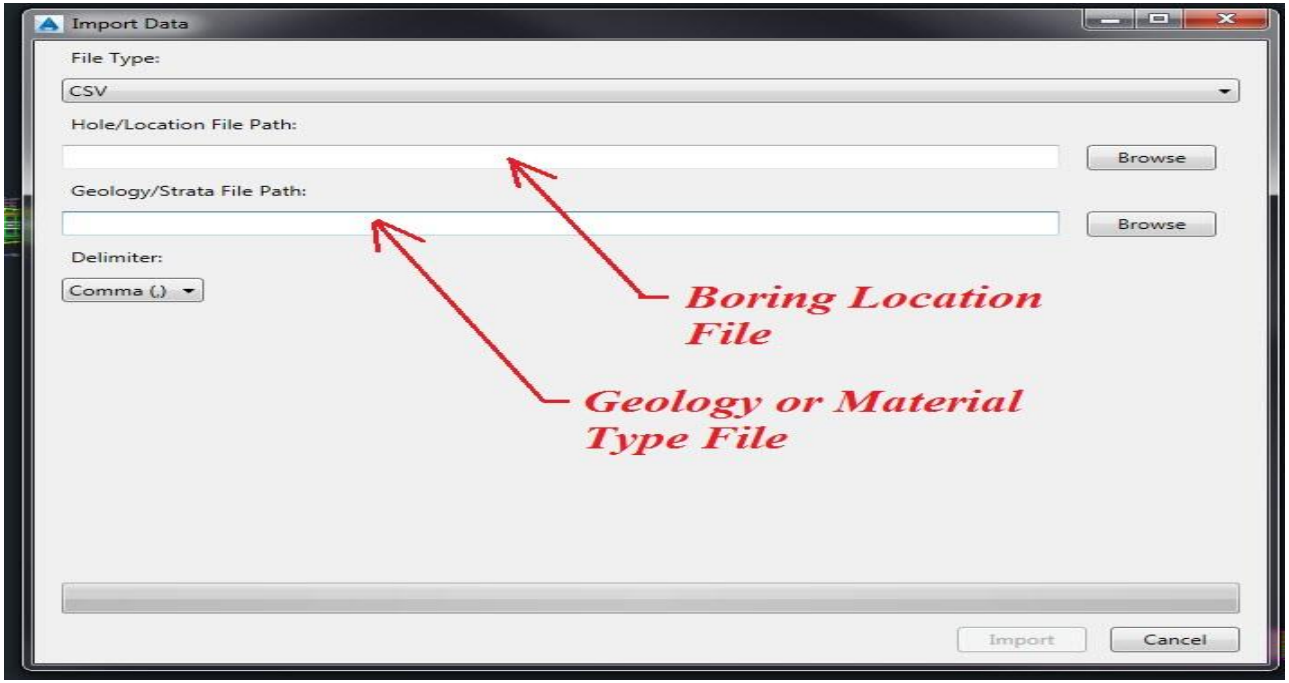


	A	B	C	D	E	F
1	LocationID	LocationType	Easting	Northing	GroundLevel	FinalDepth
2	BH100	RD	577267.8345	1522021.884	90.25	24.25
3	BH101	RD	577274.4461	1521907.654	90.65	25.5
4	BH102	RD	577453.9193	1522037.933	91.05	32.55
5	BH103	RD	577604.1101	1522046.429	89.565	35.5
6	BH104	RD	577827.9783	1522054.926	89.35	34.25
7	BH105	RD	577448.2516	1521953.912	89.25	32.35
8	BH106	RD	577606.9435	1521956.745	88.254	30.25
9	BH107	RD	577800.5855	1521966.185	88.698	29.5
10	BH108	RD	577445.4182	1521885.941	87.658	28.55
11	BH109	RD	577622.0571	1521885.941	87.258	27.55
12	BH110	RD	577809.0866	1521891.605	86.655	26.5
13	BH111	RD	577277.2804	1521800.976	86.255	25.55
14	BH112	RD	577451.0858	1521802.865	85.245	24.5
15	BH113	RD	577623.0018	1521808.529	90.656	29.65
16	BH114	RD	577814.7543	1521818.914	90.545	28.55
17	BH115	RD	577278.2243	1521623.495	89.254	27.75
18	BH116	RD	577457.6975	1521635.768	88.789	26.55
19	BH117	RD	577619.2236	1521636.712	85.255	25.55
20	BH118	RD	577713.6823	1521637.656	84.655	24.45
21	BH119	RD	577811.9208	1521646.153	83.245	20.15
22						
23						
24						
25						

- **When clicking on the Import button it pulls up the "Import data" dialog box.**



- **Set the delimiter to CSV (or Comma Separated Value) file and then click the browse buttons for the Location and Geology files..**

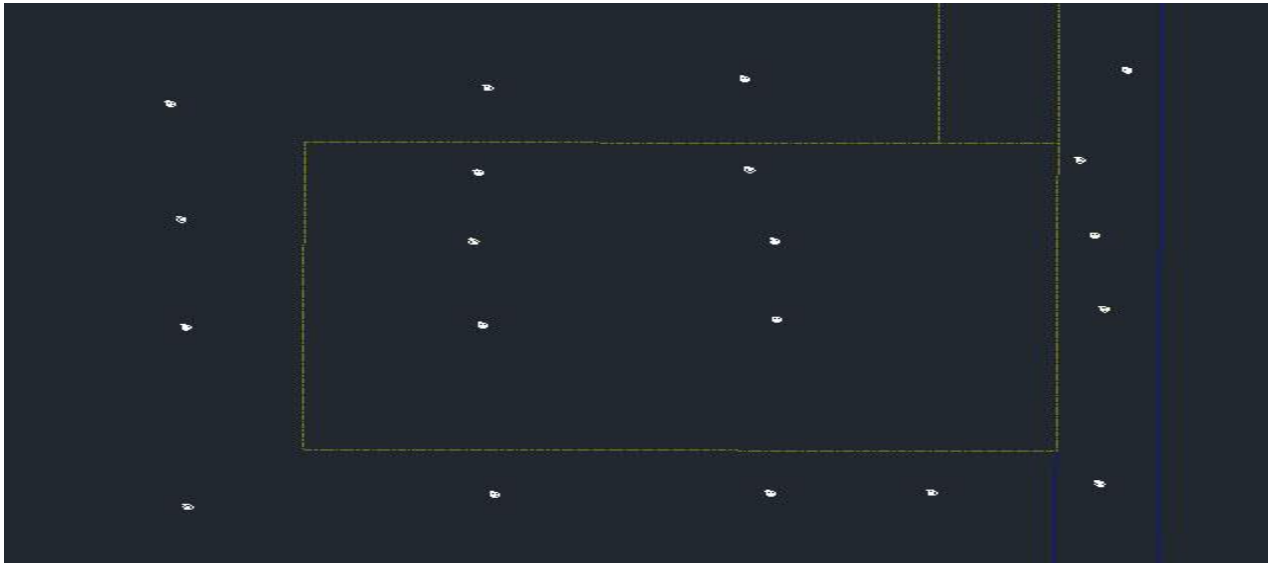


- **For this program the Location CSV file has a (*.csv) extension and the Geology or Material CSV file has a (*.csv) extension.**

- **Once you have selected these files you then hit the "Import" button.**

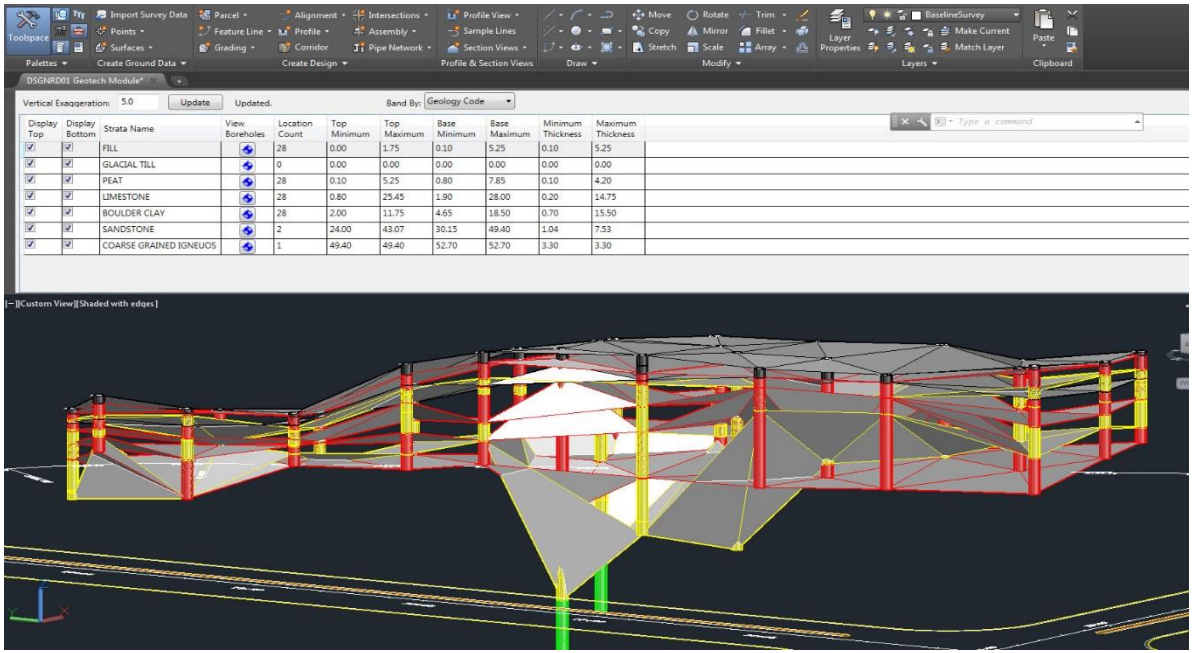
Note: Also the lowest "Depth Base" in the (*.mtl) file MUST match the "Final Depth" in the (*.brh) file. If not there will be errors. It will run, but you will encounter errors in the graphics. These depths are all in (Depth of Cover) from the existing ground as they're not Elevations.

- **After the files Import you should see them on the screen.**



- **Now that the Boreholes are on the screen they should be in 3D.**

- **As I said before this is a very powerful tool with a lot of options such as creating Civil 3D surfaces and profiles and being able to Model your project.**



- **I will now Demo the Geotech Module.**

Autodesk Geotech Module in Civil 3D for FDOT Plans Production

Some helpful tips:

* The excel spreadsheets and Csv files can be found at this link: \FDOT2015.C3D\data\Templates\XLSX\Geotechnical folder.

- You must have an active Alignment, Surface and Cross Sections for these tools.

Thank You!

Questions?

Email me:

scott.dixon@dot.state.fl.us

The Civil 3D FDOT State kit is available for download at:

http://www.dot.state.fl.us/ecso/downloads/software/FDOT2015CADDSoftware.shtm

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Florida Department of TRANSPORTATION

Engineering/CADD Systems Office