

# VDOT – Microstation Select Series 3 Survey Implementation

## Revised June - 2015

In the first quarter of 2014, VDOT Survey underwent a complete rebuild of its field to finish processes due to operating system compatibility issues with the internally written survey processing software. The following is a broad overview of the changes to the each change item listed. See Chapter 2 and Appendix B in the Cadd manual for more details.

### Major Changes

1. [Carlson SurvCE - Field data collection software.](#)
  - A. [Field Code Cheat Sheets](#)
  - B. [VDOT-Carlson Settings](#)
  - C. [Known Issues Between Carlson and Bentley](#)
2. [Microstation Select Series – Office software.](#)
  - A. [New Named Levels](#)
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## Carlson SurvCE

VDOT is using the latest release for Carlson SurvCE. VDOT has developed a completely new feature code list for its use. Feature attribute data has also been setup for some of the coding: Example: PP (Power Pole) will prompt user for a company and pole number. All features have been setup to display graphically on the data collector screen either as a line feature or a point feature with symbology.

The following special codes (linking codes) are currently functional with Microstation:

ST –Start      EL -End      PC -Arc PC      PT - End Arc      CLO – Close      RECT - Close Shape

RECT-4 – Two shot rectangle with distance      NE – control code to exclude feature from DTM

JOG – allows user to draw building points not visible from setup

TMPL\* - Curb templates are setup up for standard curbs – Users can develop field templates on the fly.

Additional special codes may be incorporated at a later date for Bentley specific linking codes.

VDOT collector setup files have been uploaded in the FTP site under the Data and SurvStar folders.

Here's the VDOT feature code sheets, features included in DTM(Terrain) and settings for the VDOT configuration of SurvCE :

[Field Code Cheat Sheets:](#)



[VDOT Carlson Settings](#)



Feature attributes are associated with the field codes. These have been prebuilt from the old Edit Survey 2000 library. You will be prompted for add GIS Data after the shot. If it's a linear feature, you will only be prompted once.

Example: BDLGBR ST      Feature Attributes requested: Address & Building Type:

Address is a blank field and is user entered.

Building Type is a drop down list preloaded or can be user entered

A screenshot of the 'Add GIS Data' dialog box in Carlson SurvCE. The title bar shows 'Add GIS Data' and a dropdown menu with 'BLDGBRL'. Below the title bar, there is a '35-' label and a '[Line] \_\_ Save Values' button. The main area contains two input fields: '(Char) Address:' which is empty, and '(Char) Building Type' which is a dropdown menu. The dropdown menu is open, showing a list of building types: '1 1/2 - Sty. Br. Bldg.', '2 1/2 - Sty. Br. Bldg.', '2 - Sty. Br. Bldg.', '1 1/2 - Sty. Br. Dwl.', '1 1/2 - Sty. Br. Dwl. w/Bsmt.', and '1 - Sty. Br. Dwl.'. At the bottom of the dialog, there is a camera icon, a 'Del' button, a 'Recall' button, a 'Next' button, a 'Prev' button, and a 'Store' button.

### Known issues between Carlson and Bentley:

In Bentley, importing an rw5 into legacy files causes points to shift. This occurs because in rw5 file the second line includes code that indicates the information is in US survey feet. Bentley reads this and converts on import automatically to match the imperial working unit. Solution: Edit the rw5 file and comment out the second line of code in the rw5 file(line starts with MO) by placing two dashes at the beginning of the line(--).

VDOT has requested the following from Carlson:

1. Provide an option for automatically turning the second line of code on or off in the rw5 file.  
This issue has been resolved in version 4.01.
2. Additional buttons in collection, that will allow user to bypass feature attributes.  
This issue addressed in version 4.01.
3. A VDOT specific special code selection that incorporates more Bentley linking options.  
This issue addressed in version 4.03.
4. Additional options to change special code icons.  
This issue addressed in version 4.02.
5. RW5 doesn't change rod height after manually editing file.  
This issue has been resolved in version 4.01.

### Microstation

Select Series (SS#) is the next generation of Microstation. Bentley is integrating MXroad, Geopak, and Inroads into 1 product line. SS3 started migrating functionality from Geopak Survey into PowerGeopak(Open Roads Survey tools).

SS3 (08.11.09.608 or latest version) has been setup to automatically process all field data from an rw5 or a txt format. All feature data collected in the field will be placed on the appropriate level by feature based on VDOT's new SMD setup file. All legacy Geopak Survey functionality is still available in addition to the new integrated commands for Open Roads Survey tools.

Compatibility with SS2: Graphics generated by Open Roads Survey tools will need to be exported from SS3 to SS2 until the design team's transition to SS3(estimated to be 2015). The tin file is backwards compatible from each Geopak version.

Known issues (all reported to Bentley and confirmed as bugs or needed fixes):

1. Exporting tin – geographic coordinate system must be set to none for all legacy files or a coordinate shift occurs. Solution: Set geographic system to none prior to export.
2. Export to graphics – works but will not allow user to exit command properly. Temporary Solution: Export using the File Export option. Resolved in Geopak 8.11.09.726 & Microstation 8.11.09.608
3. Templates – Starting templates on a curve produce erratic results with preset templates. Temporary Solution: Start line with ST then follow immediately with a PC shot. Do not start another line feature immediately after the template. Fix in progress for next build.
4. New Terrain Tools – Only edge triangle can be deleted. Temporary Solution: Use old Geopak to edit tin until resolved by Bentley. Fixed in Geopak 8.11.09.727

5. Terrain Display – Contour text displays but does not print and text is placed on the contour line level. Temporary Solution: Use old Geopak to import contour and text into file. **Fix in progress**
6. Survey – Observation and Setups always show when importing field data. Solution: None found at this time has to be turned off manually. Bentley incorporating more functionality to allow on or off. **Fix in progress**
7. Terrain – NE control code only works on points. Temporary Solution: Manually set Terrain Attribute for linear feature to do not include. **Fix in progress**
8. On point import of control, Bentley doesn't prompt if point exists.  
**Resolved in Geopak 8.11.09.726 & Microstation 8.11.09.608**
9. Field books coming into drawing with different setting properties. See File attached entitled VDOT Settings Issue.  
**Resolved in Geopak 8.11.09.727**



DTM Inclusions



VDOT-Settings Issue

## Levels

Separate named levels have been provided for text, line style, and cell symbology per feature. All features levels are preset with color, weight, and line style based on Chapter 2 and Appendix B in the Cadd manual. Color overrides are still available but are discouraged.

Utilities levels have been named based on the 4 quality levels (A, B, C, or D) designated in ASCE38-02. Level A and B are combined on named levels designated `_LVL_AB_`. Level C and D are combined on named levels designated `_LVL_CD_`. The colors for AB levels are setup based on the APWA color chart. The colors for CD levels are white only.

Levels can be segregated by plan, utility, DTM, and existing boundary with the following display filters. **These filters can be used to create the individual survey file, utility file, or boundary file.**

**Survey. PLAN.PLAN FEATURES -displays plan feature without points**

**Survey. EXISTING.EXISTING FEATURES –displays boundary features without points**

**Survey. DTM.DTM FEATURES -displays DTM features**

**Survey. UTIL.UTIL FEATURES -displays utility features without points.**

The Level.dgnlib has been updated and contains both legacy and the named level.

## Cell Symbology

All legacy cells are available in the survey cell library. Updated cells are based on the old legacy cells and have been set to annotative in the surveyv14 cell library. Photogrammetry has new cells based on their level structure in SurveyPhoto cell library.

New cells have been provided for any cell that previously used circles.

Note: New cells are annotative in nature and if placed manually they should be at 1 scale. If the scale is changed the cell will adjust accordingly. At a 25 scale (12x25=300) cells will ID at 300.

## Seed Files

New 2D and 3D seed files are provided that are set to the US Survey feet and should be used for **NEW projects only**. They are located in the following directory: proj\supv8i\seed\Seed V14

Named: USFootSeed & USFootSeed3D

**Any drawings created in association with legacy projects will use the legacy seed file which is set to the imperial foot.** They are located in proj\supv8i\seed folder.

Files named Survey-Legacy-2D and 3D are available with the geographic system set to none. The starting seed file should be noted in each survey file for clarity and noted when passing data to all design teams.

## Line Styles

All legacy line styles are still available. New line styles are available for use in surveyv14.rsc. The new line styles delineate: DATR(determined according to utility records), abandoned , and Miss Utility features. The symbol shown below is incorporated in the line style:

<u>Symbol</u>	<u>Designation type</u>	<u>Quality Level</u>
○	DATR -DETERMINED ACCORDING TO RECORD	CD
◇	ABANDONED	AB or CD
⊗	MISS UTILITY	CD

Line styles are NOT annotative. The global line style scale should be set on the model following the guidance in Chapter 2 of the Cadd Manual. (25 scale = .25, 50 scale = .5, etc)

## Text Styles

Survey specific styles have been setup and available ( Font 23 (Italics). Additional styles will be added as needed globally.

Survey\_Contours – for use in displaying contour text – set to 0.01

Survey\_Owner \_Text – for use in adding owner’s names – set to 0.0133

Survey-Owner\_DBPG\_Text – for use in owner db, pg, tax, etc., information –set to 0.01

Survey\_Text-for use with general text – set to 0.01

This text is annotative as well and will ID as the heights listed above. (25 scale> .01x12x25=3)

## Manuals

### Survey Manual

The following lists **some** of the changes made to the Survey manual. Additional changes have been made to references, forms, and for clarification throughout the manual, please review manual in its entirety.

Survey Manual Link - <http://www.virginiadot.org/business/locdes/chapter.asp>

1. Chapter 1 - Added Sec. 1.02.3 Consultant Assignments which outlines task process.
2. Chapter 2 - Updated information in Sec. 2.01 Location Survey Report.
3. Chapter 4
  - a. Updated Sec. 4.03 Contacting Property Owners – changed letters duration to less than 90 days.
  - b. Updated Sec. 4.07 Topography – consolidated information and performed revisions.
  - c. Updated Sec. 4.08 Property and Right-of-Way – updated to match RDM, outlined when legal descriptions are necessary or required, and refined municipal sewer information.
  - d. Updated Sec. 4.13 Bridge Site Plans – Highways and Railroads – clarified right of way and property line information to be shown.
4. Chapter 5 – Photogrammetric Survey – made clarifications, eliminated the V target, added photogrammetric control deliverables, and Post Aerial Flight Deliverable Check List
5. Chapter 6 and 7 – Clarification revisions.
6. Chapter 10 – Updated 10.11 adding VDOT Project Coordinates-2014.
7. Chapter 11 and Appendix A have been updated and moved to Chapter 2 and Appendix B in the Cadd Manual. Link - [http://www.extranet.vdot.state.va.us/locdes/electronic\\_pubs/CADD\\_MANUAL/cadd\\_cover.pdf](http://www.extranet.vdot.state.va.us/locdes/electronic_pubs/CADD_MANUAL/cadd_cover.pdf)

### CADD Manual

The following lists **some** of the changes made to Chapter 2 in the Cadd manual. Additional changes have been made to references, forms, and for clarification throughout the manual, please review manual in its entirety.

1. Added new seed files with units set to USSurvey Feet – USFootSeed3D and USFootSeed
2. Added five new files for projects:
  - a) **sm(UPC#).dgn** This file will only be used by survey and will contain the original field run survey data. The design files referenced above will be created from this file. This file will be stored in the **m** sub folder of the survey folder. This file will be signed electronically for all new projects.
  - b) **sctl(UPC#).dgn** - All project control information will be placed in this file and stored in the **s** folder for new projects. This file will be stored in the survey folder.
  - c) **sbd(UPC#).dgn** - All boundary and right of way line work will be placed in this file and stored in the **s** folder for new projects. All text for the boundary and right-of-way will be placed in this file as well. This file will be stored in the survey folder.

- d) **sp###(UPC#).dgn** - ### is the RW parcel number assigned. This file will be used to lot/map check parcel takes and easements for each parcel. Levels have been provided for checking. This file will be stored in the r folder for the project and referenced to each RW sheet that the parcel is shown. Display will be set to off for each parcel file referenced after checking is complete.
  - e) **sp###(UPC#).doc** This file will contain a legal description for the parcel. This will only be created for total takes, special properties, or upon request from RW section. This file will be stored in the r folder for the project.
- 3. Added an **M** subfolder under survey which will be locked to survey access only.
  - 4. Added explanation of level naming.
  - 5. Added new cell libraries – SurveyV14 and SurveyPhoto.
  - 6. The following files only need to be provided upon request:
    - a. sdt(UPC#).dgn
    - b. s(UPC#).dat
    - c. str(UPC#).dgn

Link: [http://www.extranet.vdot.state.va.us/locdes/electronic\\_pubs/CADD\\_MANUAL/cadd\\_cover.pdf](http://www.extranet.vdot.state.va.us/locdes/electronic_pubs/CADD_MANUAL/cadd_cover.pdf)

Note:

A survey control and legend seed file is being developed that will contain 4 - LD200 cards preloaded on a sheet with an additional sheet preloaded with legends for survey and utility symbology. This will be added to the Seed v14 directory when it becomes available.

## Quick Start

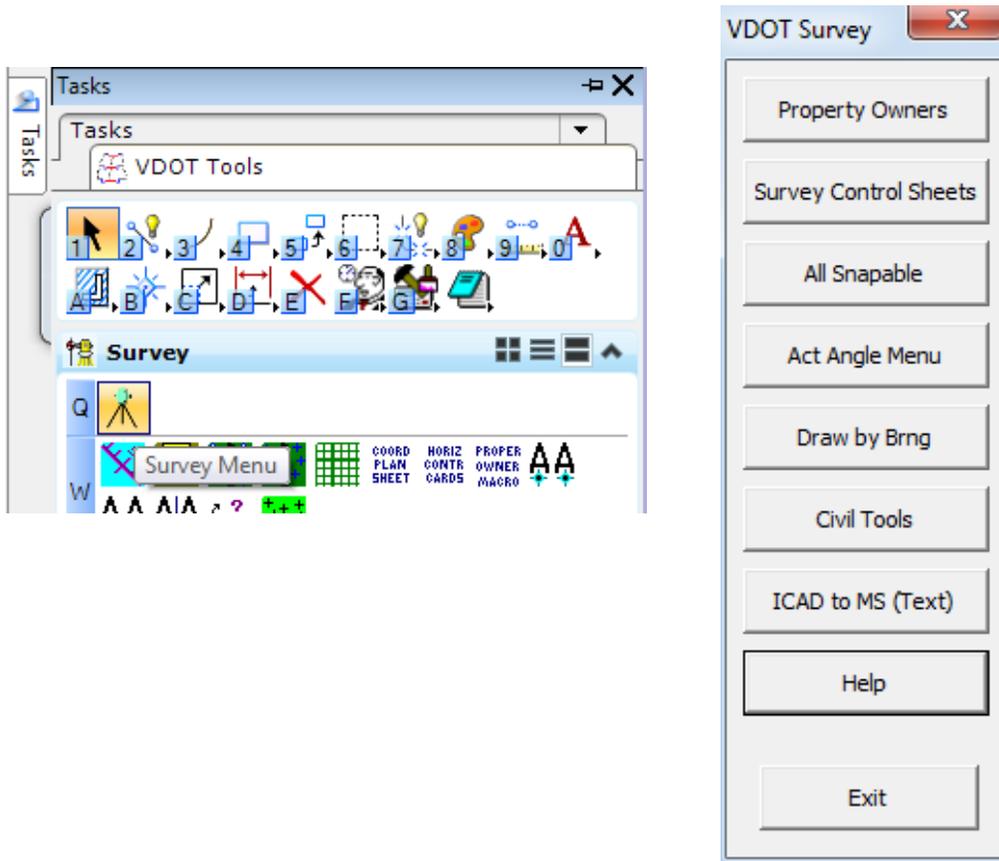
Here is a quick start guide for importing an rw5 or txt file.



## VDOT Survey Menu

A new VDOT Survey Menu has been released with commands that are specific to the survey discipline. This replaces some of the old legacy survey functionality from SS2. Full explanations for each can be found under the Help button.

This menu can be accessed from the Tasks -VDOT Tools task bar(available to internal staff immediately – consultant staff –updates to be posted in February 2015).

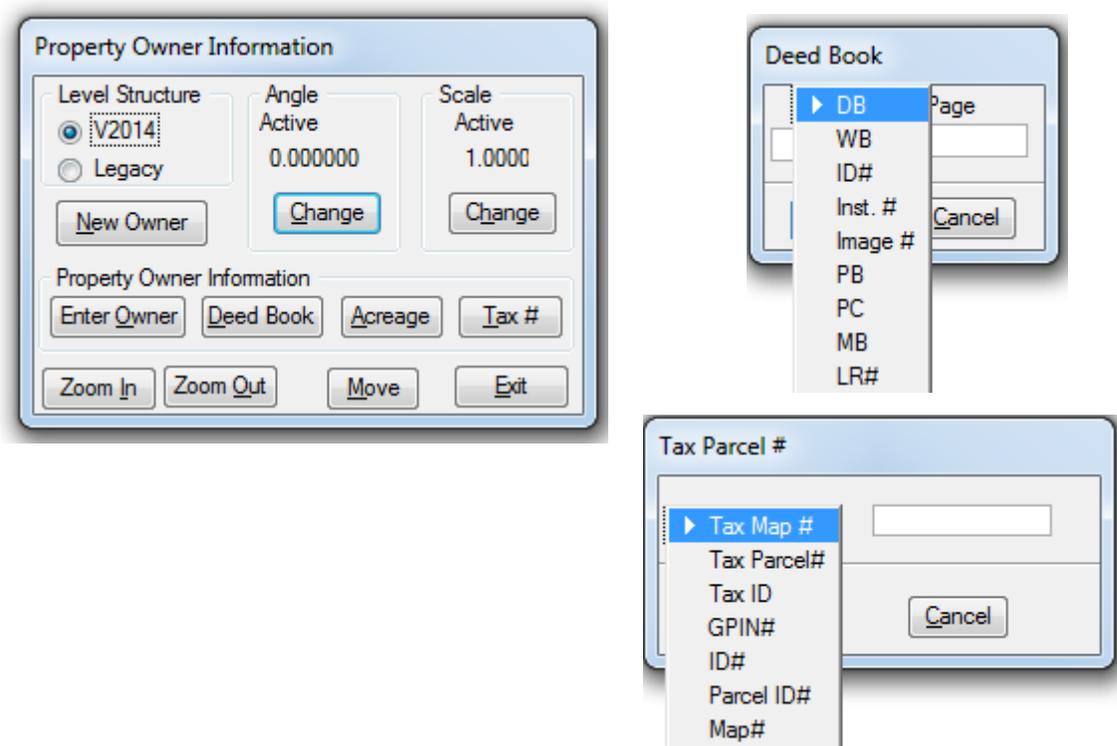


## Property Owner Macro

The Property Macro has been updated to reflect the new level structure. Selecting V2014 will place text on the named level structure and a legacy selection will place text on the numbered system.

LR# was added to the drop down selection for Deed Book. Under Tax# the prefix is selectable from the list shown below. The V2014 uses the two text styles: Survey\_Owner\_Text & Survey\_Owner\_DBPG\_Text. V2014- If text doesn't appear to be coming in correctly check the text settings, both should be set to center center justification and 0.0133 and 0.01 respectively.

You must select the correct drawing scale under Scale-Change for Legacy projects



This macro can be accessed from the VDOT survey menu.

## Side Bar Menu

A side bar menu has been provided with shortcuts to line, text, and symbols for the new level structure.

CTRL + F9 opens the planimetric menu.

CTRL +F10 opens the Utility menu.

It will take 15-20 seconds for the menu to load the first time.



When you select the 2014 SURVEY CADD field, the following options are available on the right hand side as shortcuts. The color codes on the right hand side at the bottom are helpful. Line commands are blue, text commands are green, cells are orange, and line/text lists are white (example on right).

V14MAP	
<b>2014 SURVEY CADD</b>	<b>REFERENCE DIALOG</b>
BRIDGE	REF Attach
BUILDING	REF Display Off-All
C&G	REF Display On-All
<b>CEMETERY</b>	
CONC & MISC	<b>ACTIVE ANGLES</b>
CONTROL	AA=0°
FENCES	AA=90°
GASOLINE ABOVE GRD	AA=180°
GUARDRAIL	AA=270°
MISC.	<b>ROTATE TEXT</b>
PAVEMENT	<b>SET TEXT STYLES</b>
PLAN & PROJECT INFO	Survey TEXT (Default Style)
PROP. LINE & ESMT	Survey Owners
R/W	Survey Info
RAILROAD	<b>SET VIEWS</b>
REDLINE	Top VIEW
ROAD-EXISTING	VIEW=ABSOLUTE
STORM-DITCH	VIEW=ELEMENT
SEPTICS	VIEW=90°
SHOULDER	VIEW=180°
STEPS	VIEW=270°
STORM DRAIN	VIEW=BY POINTS
STORM DRAIN-Elliptical	
STORM-DITCH	<b>PROJECT EXPLORER</b>
TANKS	<b>TASKS</b>
VEGETATION	<b>LEVEL MANAGER</b>
VEGETATION-TREES	<b>LEVEL DISPLAY</b>
WALK (RES.)	SAVE ALN DATA
WALKS (ROAD)	STA & OFFSET
WALLS	TABLE DATA
WATER FEATURES	<b>SURVEY MENU</b>
WELLS	<b>VIEWS</b>
WETLANDS	VIEW PREVIOUS
	VIEW NEXT
	VIEW ATTRIBUTES
2014 Scale Settings	
Set Scale → 1"=25 FT	
Set Scale → 1"=50 FT	
Set Scale → 1"=100 FT	
<b>UTILITY MENU</b>	<b>Color Codes</b>
	Line Commands
	Text Commands
	~-TEXT - DIALOG BOX
	Cell Commands
Originally Created by	
Mike Taylor - RA	Line or Text Lists
Version - 6/2015	

V14MAP	
<b>2014 SURVEY CADD</b>	
BRIDGE	Tree Line LEFT
BUILDING	Tree Line RIGHT
C&G	Brush Line LEFT
CEMETERY	Brush Line RIGHT
CONC & MISC	Hedgerow
CONTROL	Planter (Flower Bed)
FENCES	
GASOLINE ABOVE GRD	<b>TREE</b>
GUARDRAIL	<b>SHRUB</b>
MISC.	
PAVEMENT	Vegetation-TEXT
PLAN & PROJECT INFO	
PROP. LINE & ESMT	<b>VEGETATION TEXT</b>
R/W	Brush
RAILROAD	Flower Bed
REDLINE	Hedgerow
ROAD-EXISTING	Shrub
STORM-DITCH	Woods
SEPTICS	
SHOULDER	
STEPS	
STORM DRAIN	
STORM DRAIN-Elliptical	
STORM-DITCH	
TANKS	
<b>VEGETATION</b>	
VEGETATION-TREES	
WALK (RES.)	
WALKS (ROAD)	
WALLS	
WATER FEATURES	
WELLS	
WETLANDS	
2014 Scale Settings	
Set Scale → 1"=25 FT	
Set Scale → 1"=50 FT	
Set Scale → 1"=100 FT	
<b>UTILITY MENU</b>	
Originally Created by	
Mike Taylor - RA	
Version - 6/2015	

Note: This menu will be limited to the main screen only for now. Long term this menu may be moved to a VBA version.

## Consultant Project Guidance

All legacy consultant projects should be submitted in the legacy format (seed files, line styles, and symbology) for the duration of the project. It is your responsibility to ensure the correct seed files is used.

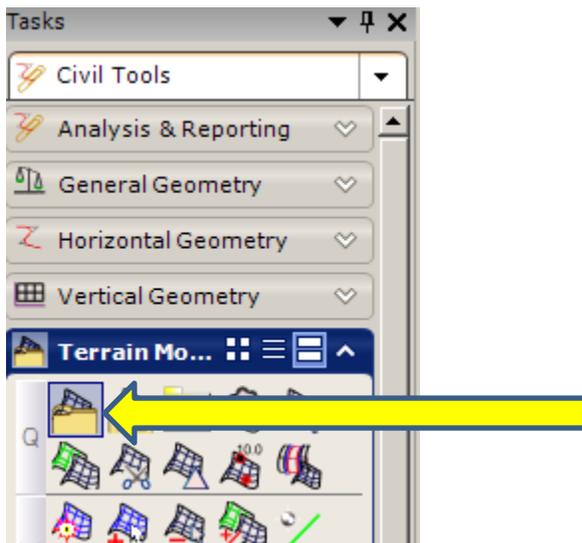
Any new project assignments will be completed in the 2014 format. Files must note the seed file used to begin the project.

Installation instructions and files are on the FTP server for SS3. The proj folder will be updated on a regular basis and posted on the FTP.

## Terrains

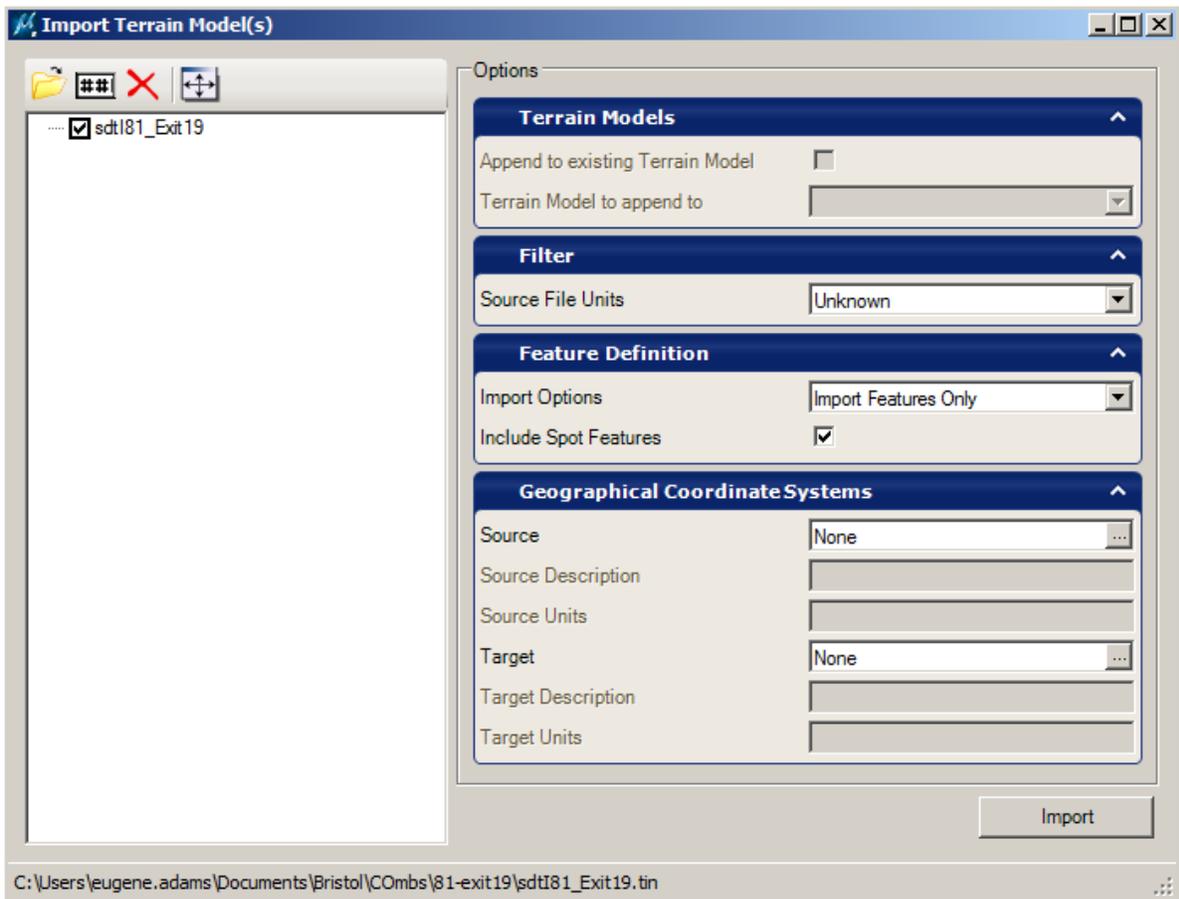
There are multiple ways of merging tin data from different sources. SS4 can merge adjacent tins but there are some situations where tin data may be harder to merge. One example is merging road pavement data into a photogrammetry data set. The existing photogrammetry data will need to be removed from the original. Here's an easy way to retrieve the data from each tin source.

1. If the tin files exist, open a new file with the correct seed file.
2. Import the tin by selecting the Create from File button under Terrain Model

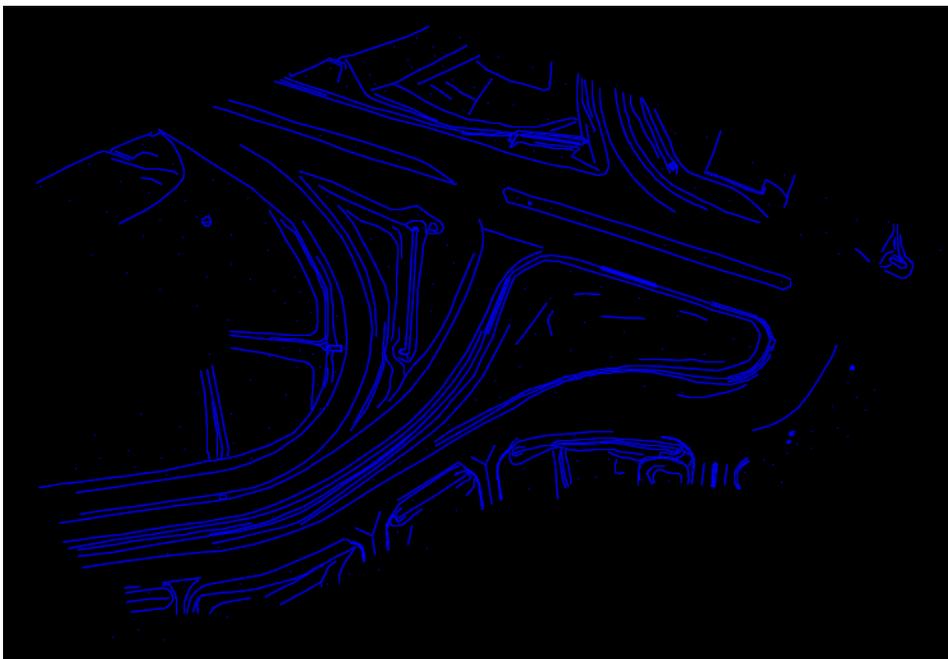


3. Select the tin file.

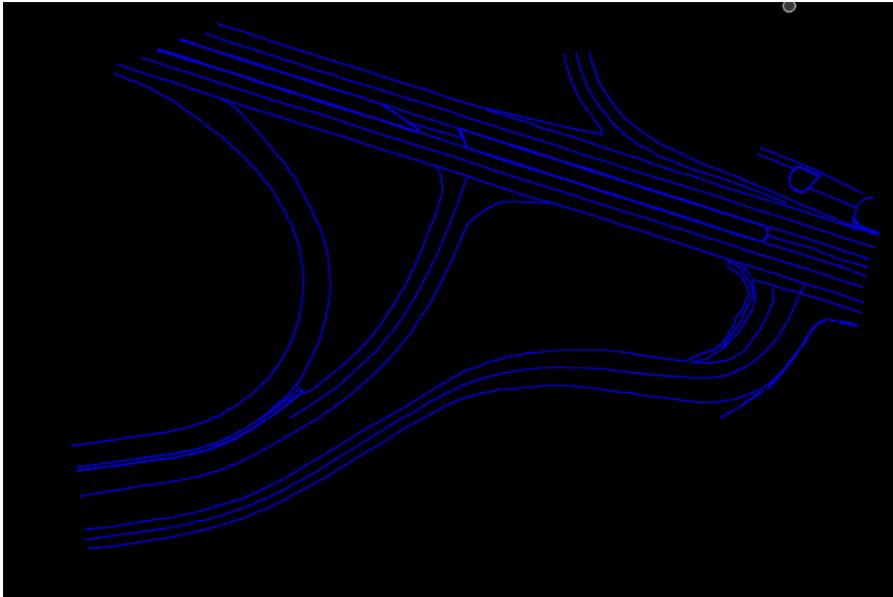
4. The following dialog will appear.



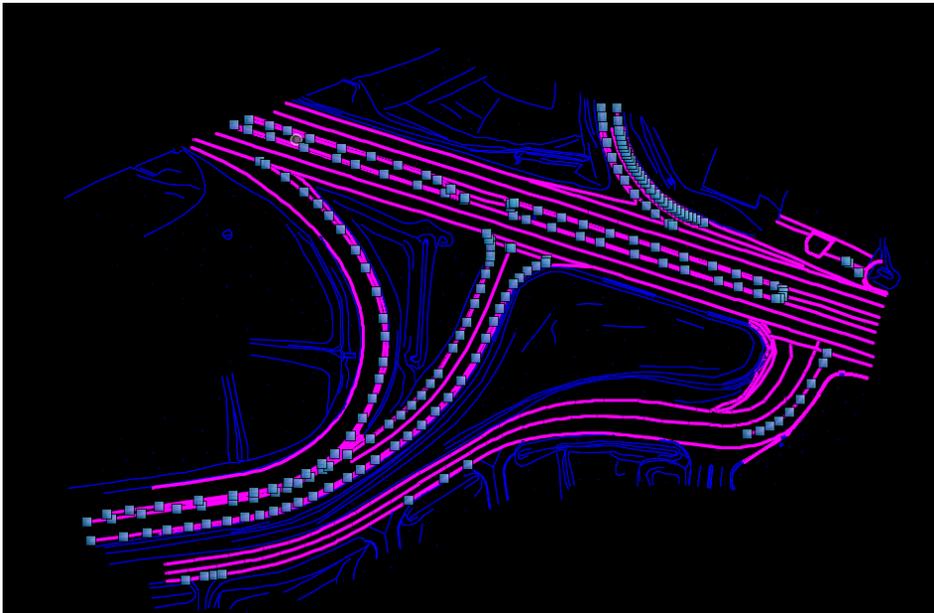
5. You want to select **Import Features Only** and check **Include Spot Features** box. This will only import break lines and spots as graphics into your file. This file represents the aerial data.



6. Start another file with the correct seed file and import the survey field data tin.

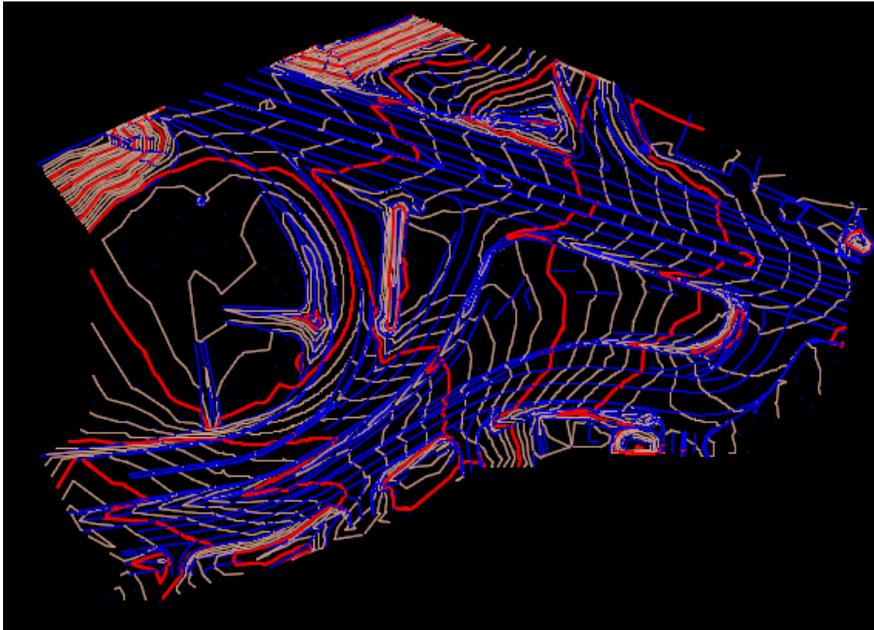


7. Open the photogrammetry file again and reference the field data to it. Hilite the referenced file then select the breaks that are duplicated shown below. Delete the duplicated information.



8. Merge the field file into the file.

9. Select all the elements then use the Create from Elements command to create the combined tin.



10. Remember to remove the rules before you start file tin edits.