LAB 8 - Exporting the Fieldbook

Lab 8.1 - Exporting Survey Data to Graphics

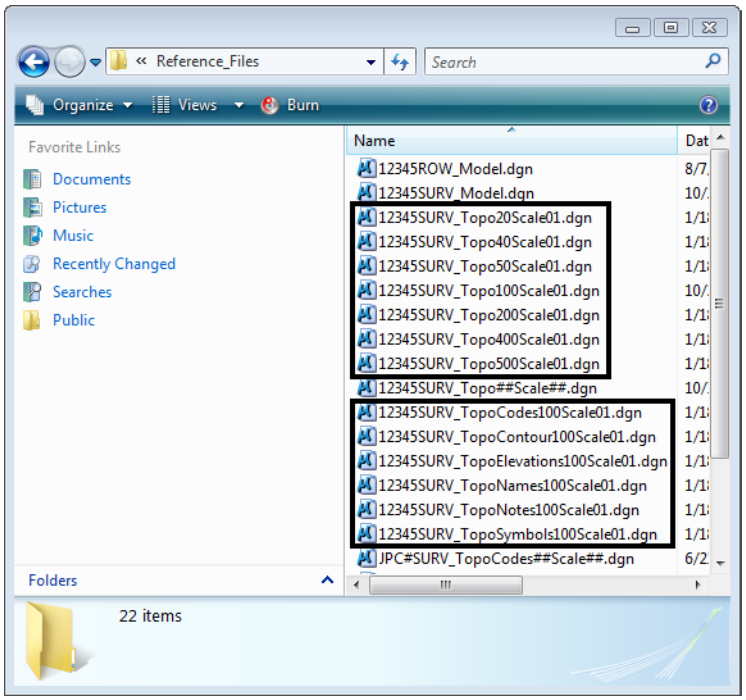
Managing Drawings in the Reference Files folder

The files in the Reference Files folder are for other disciplines to reference. Other disciplines are to reference in the 01 model file. There are already 01 files in the Reference Files folder that are out of date. The new Survey Fieldbook that is exported will become the new 01 file.

Section Objectives:

- Create a new design file to write survey data to graphics.
- Run the CDOT Stratify Survey tool from the CDOT Menu.

1. Open Windows Explorer.
2. Navigate to the folder ***C:\Projects\12345\ROW_Survey\Drawings\Reference_Files***



3. Rename each file ***12345SURV_Topo**** with a ***01*** counter and rename it to ***02***.

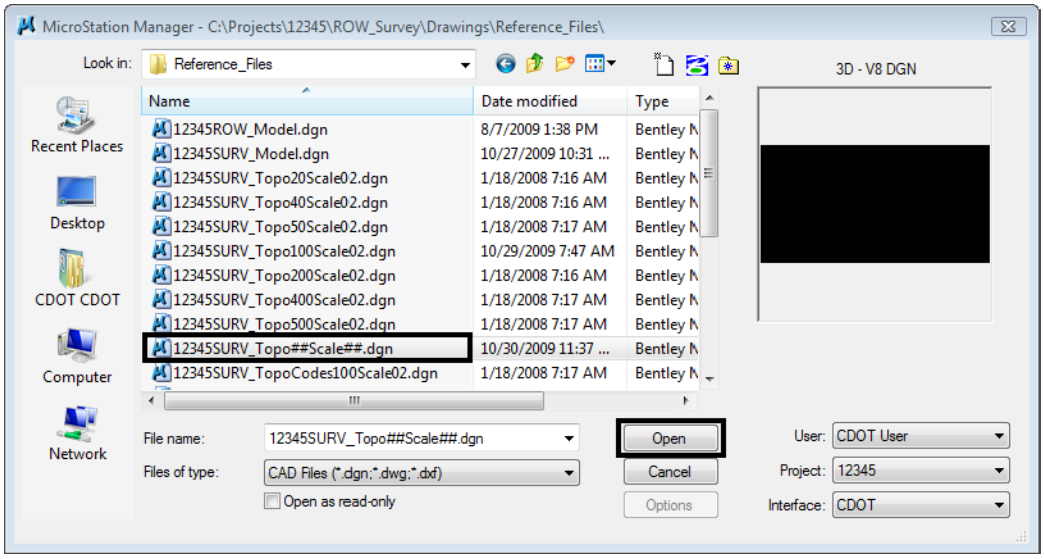
Note: The next steps will create these model files with an updated InRoads Survey fieldbook.

Creating new 01 design files.

4. From the MicroStation pull down menu select **File > Open** the Open dialog will appear.

5. In the MicroStation Manager dialog path to the directory:
   C:\Projects\12345\ROW_Survey\Drawings\Reference_Files

6. Select the file ***12345SURV_Topo##Scale##.dgn*** from the ***Open*** dialog.

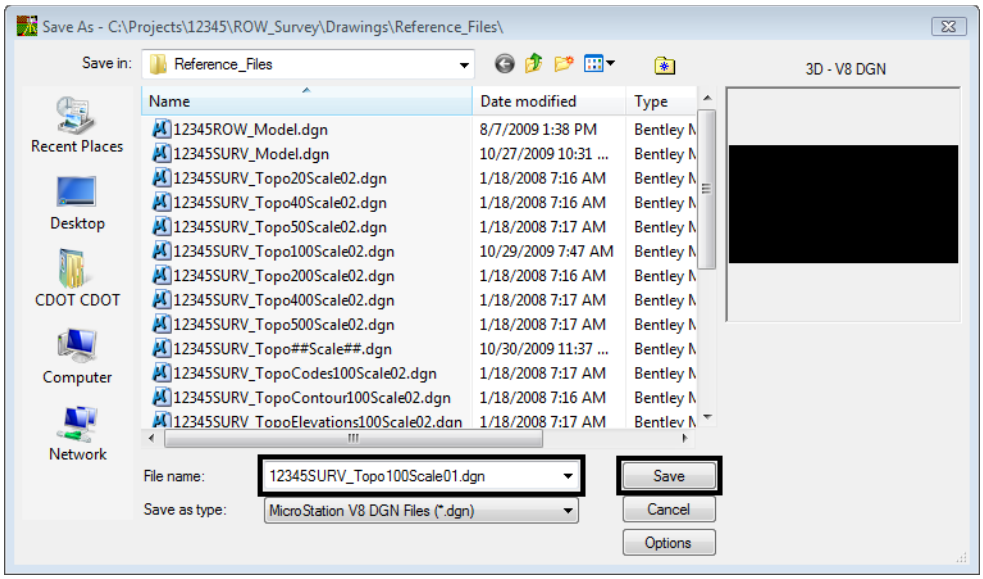


Note: The purpose of the files with "##" symbols are for creating new files with the correct naming convention.

7. **<D>** the **Open** button MicroStation Manager dialog will close and open the file.

8. From the MicroStation pull down menu select **File > Save As** the ***Save As*** dialog will appear.

9. Replace the *##* symbols with ***100*** scale and ***01*** model.
   Type in ***File name***: ***12345SURV_Topo100Scale01.dgn***



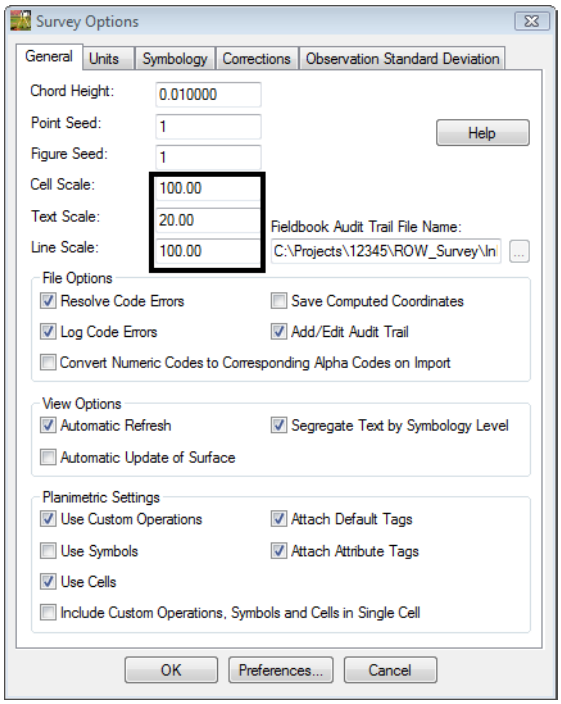
10. **<D>** the **Save** button the ***Save As*** dialog will close and MicroStation will open the file ***12345SURV_Topo100Scale01.dgn***

11. Verify the ***12345SURVFieldbook01*** survey fieldbook is active. You can tell which fieldbook is active by the red box around the fieldbook button.

12. To modify the scale as it relates to cells, text, and linestyles go to **Tools > Survey Options > [General]**. The ***Survey Options*** dialog will appear.

13. Set the Scales for ***Cell***, ***Text***, and ***Line*** as shown below.

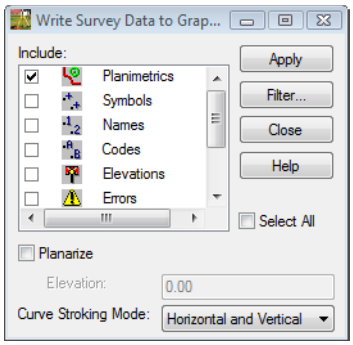
    - Cell Scale: ***100***
    - Text Scale: ***20***
    - Line Scale: ***100***



Note: Segregate Text by Feature Level, should be checked on, this will save the symbols, point names, codes, notes, errors, and elevations to the same level as the survey feature.

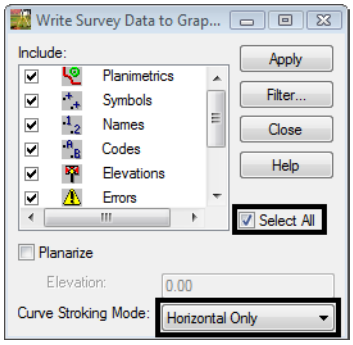
14. **<D>** the **OK** button the ***Survey Options*** dialog will close.

15. From the InRoads pull down menu select, **Survey > View Survey Data > Write Survey Data to Graphics…** the ***Write Survey Data to Graphics*** dialog will open.



Note: By default if you had dynamic graphics still toggled on, those same components would be toggled on in the Write Survey Data to Graphics dialog.

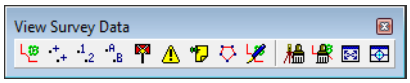
16. **Check ON** the **Select All** box.



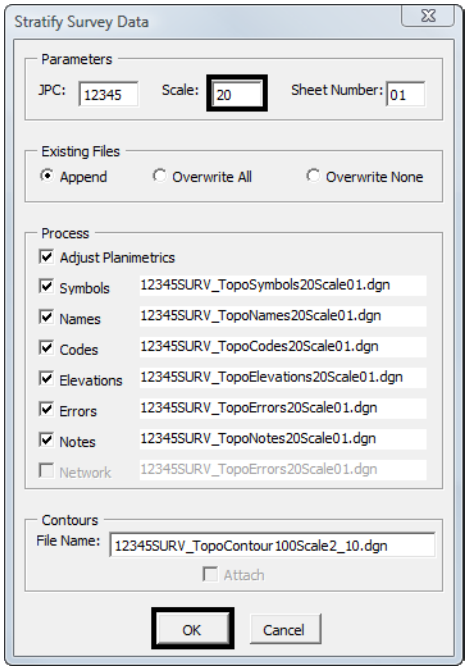
17. From the drop down list for ***Curve Stroking:*** **Horizontal Only**

18. **<D>** the **Apply** then **Close** button. The Survey fieldbook planimetrics has been written to graphics.

19. Verify all View Survey Data buttons are toggled display off.



20. From the MicroStation view border **Fit** the design file.
21. Review your results.
22. From the CDOT Menu pull-down select **CDOT Tools > Stratify Survey**. The ***Stratify Survey*** dialog will appear.
23. Type in the ***Scale***: ***20***

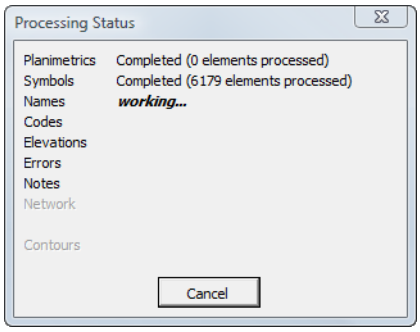


Note:

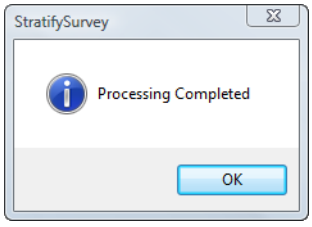
- Under Existing Files, the Append option will add or merge the new data into an existing file. A new file will be created if the file does not already exist.
- Under Existing Files, the Overwrite All option will create a new file, deleting any previously existing file.
- Under Existing Files, the Overwrite None option will disable the processing option for a file if the file already exists.
- The Process option Adjust Planimetrics will resize the planimetrics text (if necessary) and convert the grouped text strings to view independent cells in order to allow for viewing this text in any 3D view.

24. Verify the JPC, Scale, and Sheet Number entries are correct. Altering any of those values will automatically alter the output file names. If the Attach check box in the Contours section is grayed out, the contour file does not exist. You may edit the name specified in the File Name field to enter the name of an existing contour file.
25. **<D> OK** button to start the process.

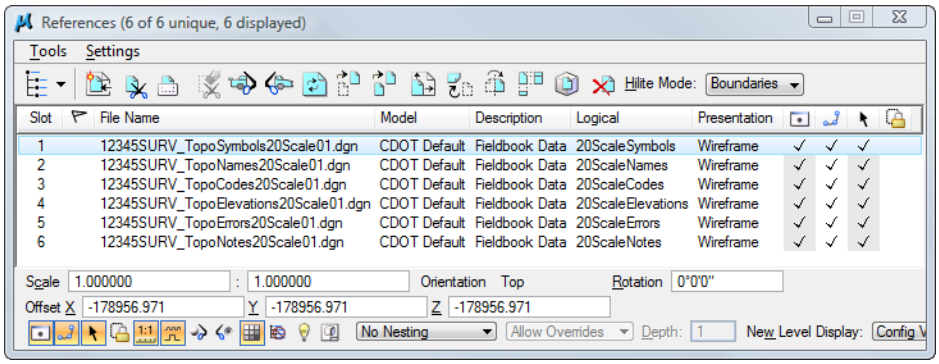
26. As the data is being moved to the appropriate reference file a Processing Status dialog provides an update on the progress. You may Cancel at any time to stop the processing, if necessary.



27. When completed, a Processing Completed message is displayed. **<D> OK** to exit the program.



28. The fieldbook data has now been stratified into separate reference files. The planimetrics will be in the master design file with all of the symbols, names, codes, etc., attached as reference files. To view these attachments select **File > Reference** from the MicroStation pull down menu.



Lab 8.2 - Exporting Survey Data to Surface

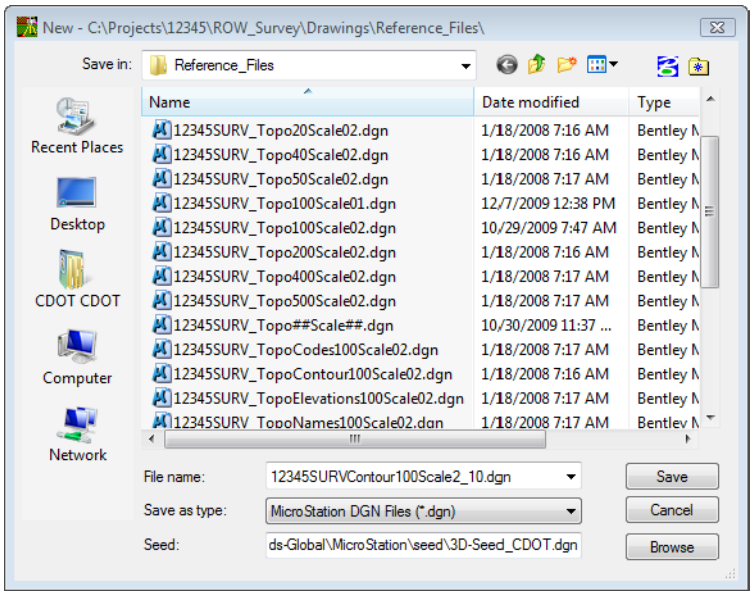
Managing Drawings in the Reference Files folder

The files in the Reference Files folder are for other disciplines to reference. Other disciplines are to reference in the contour model file. There is already a contour file in the Reference Files folder that is out of date. The new Survey Fieldbook that is exported will become the new contour file.

Section Objectives:

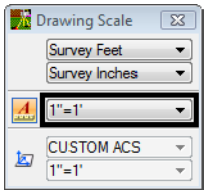
- Create a new design file to create the surface display graphics.
- Export the survey data to a surface file for a final deliverable.
- Use the delete triangle command to constrain the triangles to the survey points collected in the field.
- View the new surface perimeter.
- Import new perimeter into the surface as an exterior boundary.

1. From the MicroStation pull down menu select **File > New**. The ***New*** dialog will appear.
2. Navigate to the file folder ***Reference_Files*** by double clicking the directory folders.
3. At the bottom of the dialog box verify that the seed file is set to ***Roadway_Design_3D.dgn***.
4. Key in the file to be created ***12345SURVContour100Scale2_10.dgn***
5. **<D>** the **OK** button in the New dialog. The New dialog will close and the file ***12345SURVContour100Scale2_10.dgn*** will open.



6. From the MicroStation menu pull down select Settings > Drawing Scale the Drawing Scale dialog will appear.

7. In the ***Annotation*** drop down list select **1" = 1**'



8. From the MicroStation pull down menu select **File > Save Settings**.

Note: The reason annotation scale needs to be set to 1"=1' is so that the linestyles will be displayed correctly from InRoads Survey.

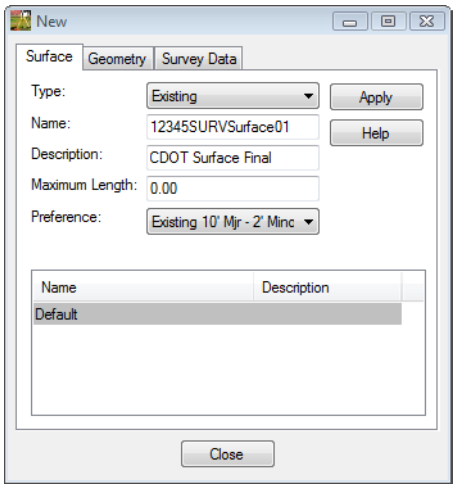
9. Verify the ***12345SURVFieldbook01*** fieldbook is active. You can tell which fieldbook is active by the red box around the fieldbook button.

Survey Data to Surface

10. From the InRoads pull down menu, select **File > New**. The ***New*** dialog will appear.
11. **<D>** the **Surface** tab.
12. From the drop down list select ***Type***: **Existing**
13. Key in the surface ***Name: 12345SURVSurface01***
14. Key in the ***Description: CDOT Surface Final***

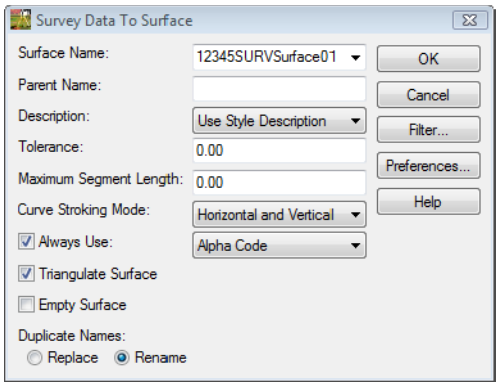
Note: Key in any additional file information in the Description field of the dialog, such as Date, User, and Design file name. You have up to 34 characters even though you may not see all the characters in the Description field.

15. Keep the ***Maximum Length*** set to ***0***
16. From the drop down list ***Preference:*** **Existing 10' Mjr – 2' Minor**

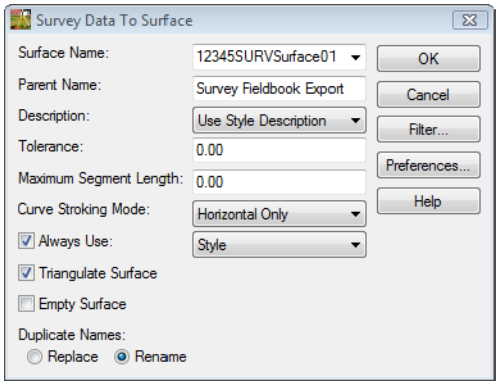


17. **<D>** the **Apply** then **Close** buttons.

18. From the pull down menu **Survey > Survey Data to Surface**. The ***Survey Data to Surface*** dialog will appear.

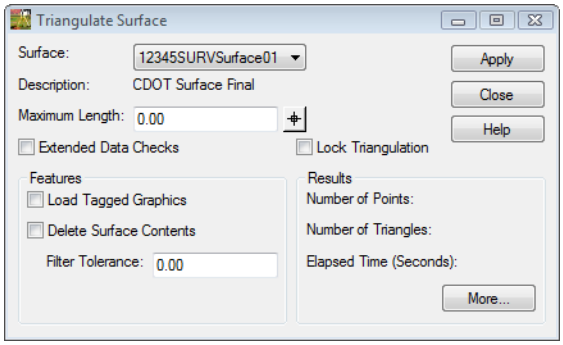


19. From the drop down list ***Surface Name:*** **12345SURVSurface01**
20. Type in the ***Parent Name***: ***Survey Fieldbook Export***
21. From the drop down list ***Description:*** **Use Style Description**
22. Keep the ***Tolerance*** and ***Maximum Segment Length*** set to ***0.00***
23. From the drop down list ***Curve Stroking Mode:*** **Horizontal Only**
24. Check **ON** ***Always Use:*** **Style**
25. Check **ON** ***Triangulate Surface***

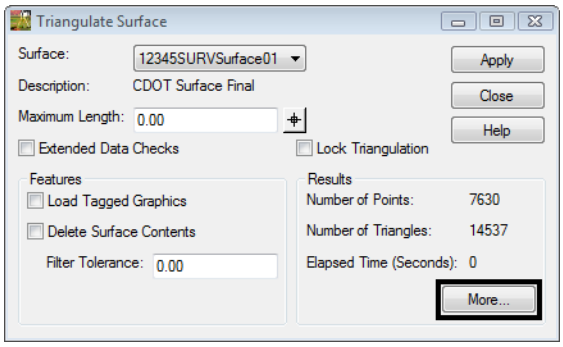


26. **<D>** the **OK** button the ***Triangulate Surface*** dialog will appear.

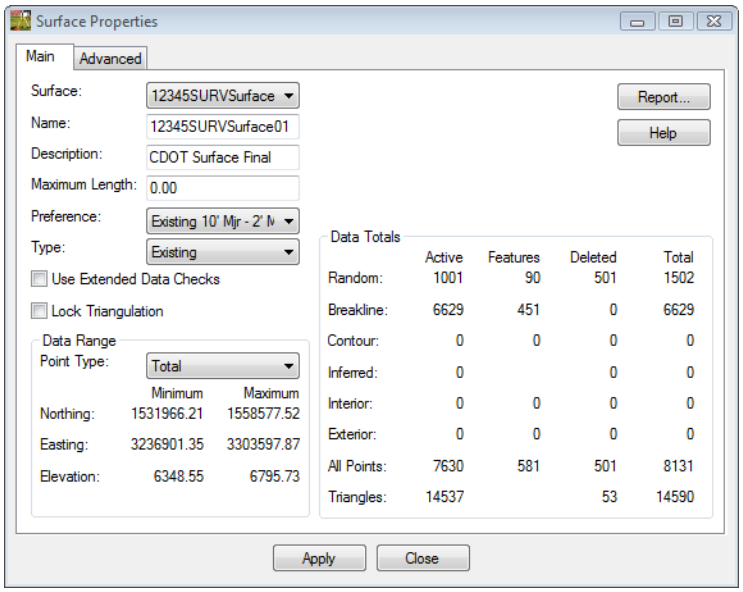
27. Leave all settings unchecked. ***Maximum Length*** should be set to ***0.00***.



28. **<D>** the **Apply** button. The Results section of the dialog should look similar to the image below.



29. **<D>** the **More** button. The ***Surface Properties*** dialog will appear.

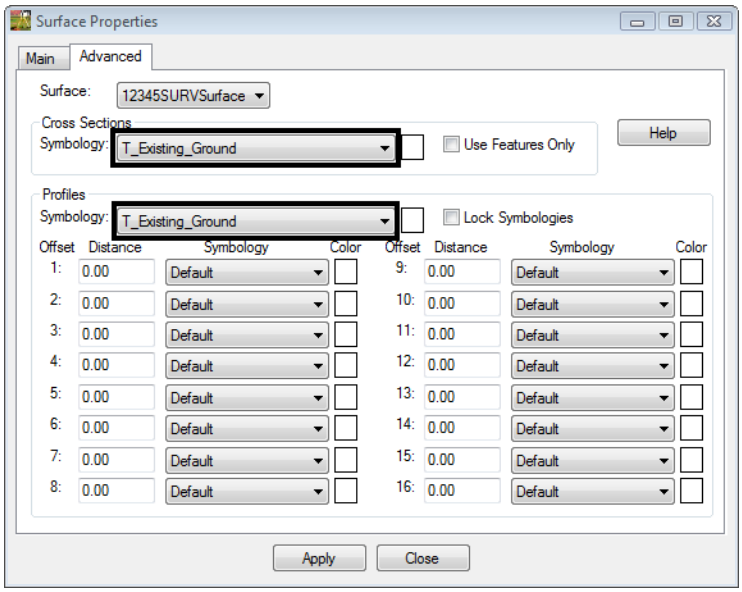


30. Verify you are working with the correct surface ***12345SURVSurface01***.

31. Review the section for ***Data Range***. The Northing, Easting, and Elevation values should fall within the project limits.

32. On the Advanced tab choose
Cross Sections - Symbology: **T_Existing_Ground**

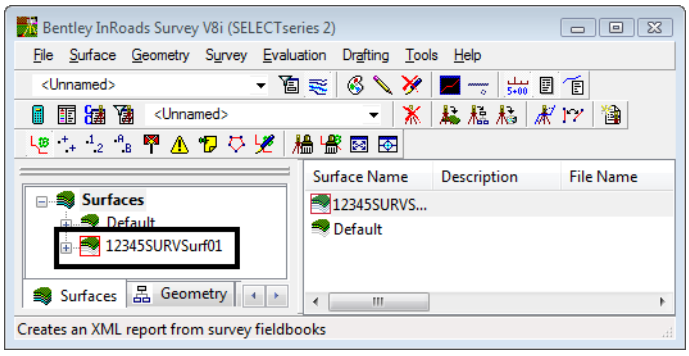
33. On the Advanced tab choose
Profiles - Symbology: **T_Existing_Ground**



34. **<D> Apply** then **Close** in the ***Surface Properties*** dialog.

35. **<D>** the **Close** button in the ***Triangulate Surface*** dialog.

36. Use the Workspace bar scroll arrows to view the Surfaces tab.

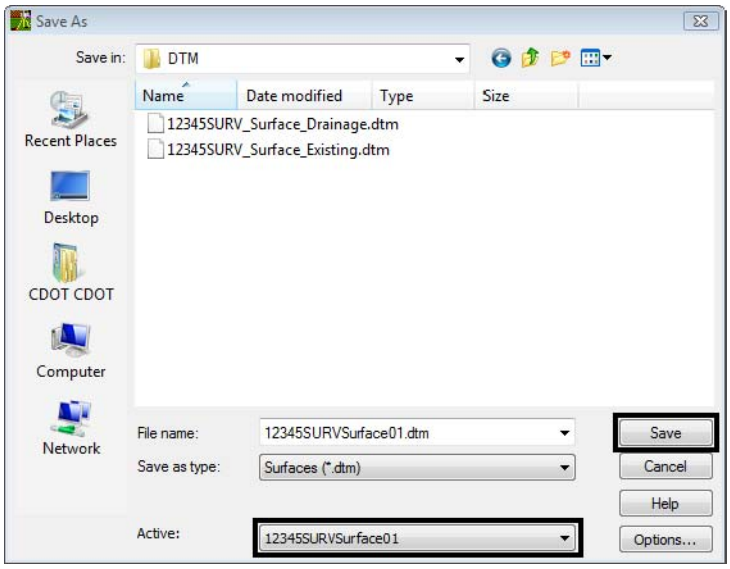


37. Verify ***12345SURVSurface01*** is the active surface.

Note: You can change the active surface from the pull-down menu Surface > Active Surface; highlight the surface name and <D> the Apply button.

38. From the InRoads pull down **File > Save > Surface**. The ***Save As*** dialog will appear with the ***Save as type:*** **Surfaces (*.dtm)**.

39. Verify you are in the correct project directory.
C:\Projects\12345\ROW_Survey\InRoads\DTM



40. The file name should match the Active name at the bottom of the Save As dialog. If necessary, use the drop down arrow in the Active field and reselect the desired name to ensure the saved file name will match the surface name.

Note: Ensuring that the saved Surface name in the project folder matches the Surface name displayed in InRoads explorer will minimize any confusion.

41. **<D>** the **Save** then **Cancel** button. The file will be saved to disk and the ***Save As*** dialog will close.

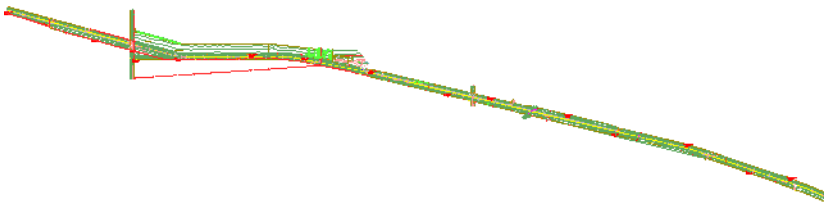
Lab 8.3 - Exterior Boundary

Errant triangles can be eliminated by controlling the maximum triangle length. However this can cause problems in areas of the DTM where data density varies. A more refined method is to add an exterior boundary that constrains the triangles to fall within the limit of the exterior boundary.

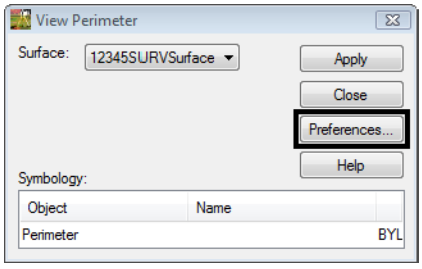
Section Objectives:

- Delete unwanted triangles from the design file.
- Display the perimeter of the model (active triangle limits).
- Import the displayed perimeter into the DTM as an exterior feature.
- Verify the results.

1. Open the MicroStation file - ***12345SURVContour100Scale2_10.dgn***
2. Open the InRoads Survey Fieldbook file - ***12345SURVFieldbook01.fwd***
3. Open the InRoads Survey Surface file - ***12345SURVSurface01.dtm***
4. Using MicroStation **Delete**. Delete all graphics from the design file.
5. Using MicroStation **Window Area** button center the survey fieldbook dynamic display planimetric graphics to ***View 1 Top rotation***.

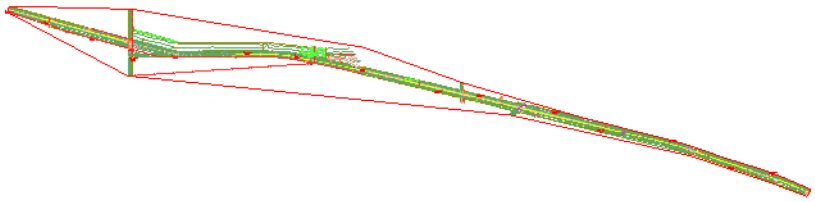


6. From the pull down menu select, **Surface > View Surface > Perimeter**. The ***View Perimeter*** dialog will appear.



7. **<D>** the **Preferences...** button. The Preferences dialog will appear.
8. Select **CDOT** from the Preferences dialog
9. **<D>** the **Load** then **Close** buttons in the Preferences dialog.
10. **<D>** the **Apply** button in the ***View Perimeter*** dialog.

11. Review your results.

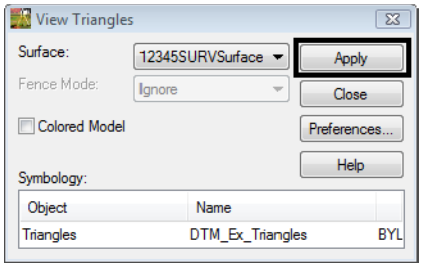


12. Close the ***View Perimeter*** dialog.

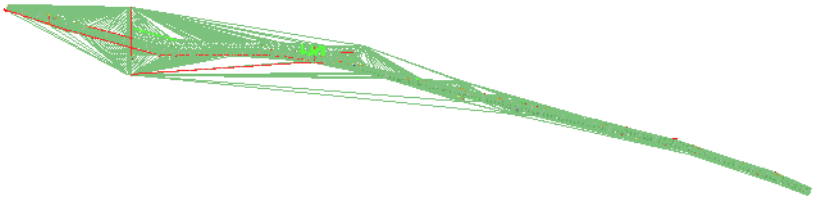
Note: The perimeter will be used as a reference line as triangles are deleted.

13. Redisplay the triangles **Surface > View Surface > Triangles**. The ***View Triangles*** dialog will appear.

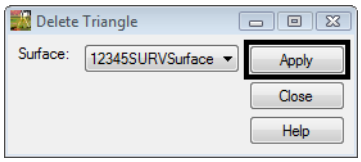
14. **Load** the ***Existing Preferece*** for View Triangles.



15. **<D>** the **Apply** button in the ***View Triangles*** dialog.

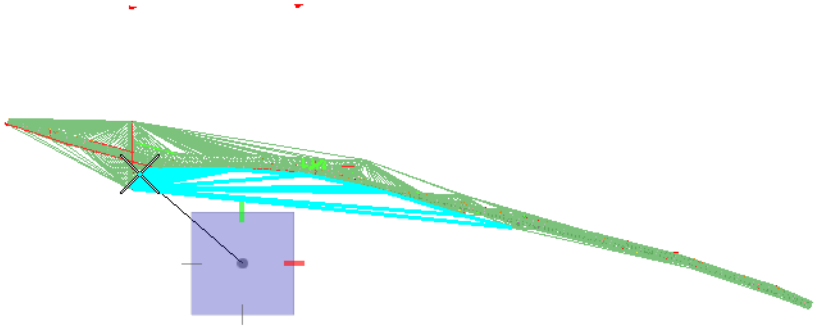


16. From the InRoads pull down menu select, **Surface > Edit Surface > Delete Triangle.** The ***Delete Triangle*** dialog will appear.



17. **<D>** the **Apply** button. The ***Delete Triangle*** dialog will minimize allowing you to select a point in the view.

18. **<D>** a point in the MicroStation view off to the side of the surface limits.
    - ♦ There is no need to hold down on the Left mouse button.



19. Move the cursor, a line will be displayed
20. Sweep the cursor over the surface model to dynamically highlight surface triangles

Note: The line highlights triangles as they are crossed. Highlighted triangles will be removed from the surface model once a data point <D> is given to establish the endpoint of the line (selection).

21. **<D>** a second point to define the line at the point shown above.
22. **<D>** a point in the view to accept and delete the triangles.
23. Continue drawing lines to remove undesirable triangles from other areas of the surface.
24. **<R>** when you have completed deleting triangles from this zoom ratio. The ***Delete Triangle*** dialog will reappear.

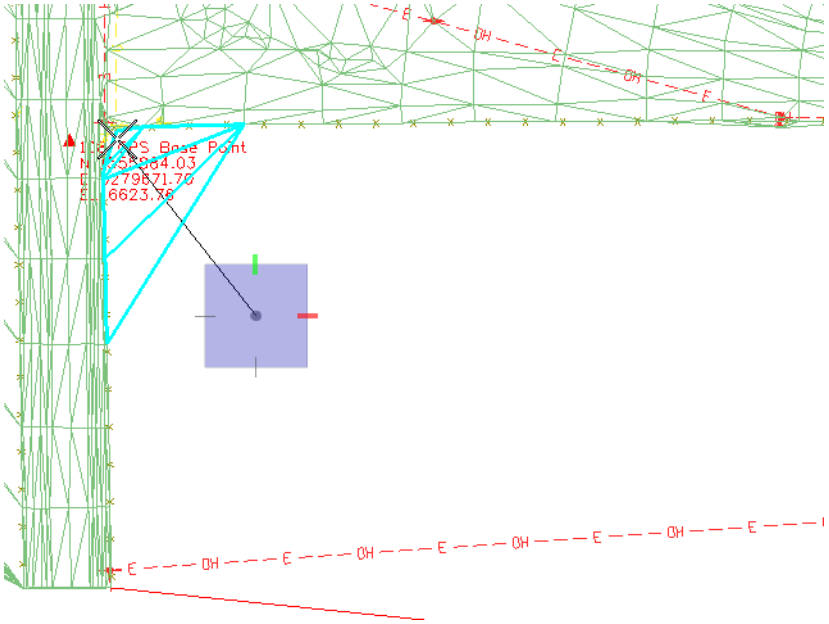
Note: You can write triangles to the display as MicroStation graphics at any time. Do not re-triangulate the surface before defining an exterior boundary as deleted triangles will be re-established.

Note: If the triangles are redisplayed, keep in mind, displayed triangles are a reflection of what InRoads has in memory at a specific point in time. If triangles are deleted (from memory) the MicroStation graphics displayed will not reflect this change until the triangles written to graphics are redisplayed (refreshed).

25. Use MicroStation to view **Window** into an area of the survey.

26. From the ***View Survey*** toolbar toggle display **ON** for **Symbols**

    ♦ If your symbols are not displaying make sure the level is turned on.



Note: Triangles should only span between known (collected) points. The above graphic shows a group of triangles that should be eliminated.

27. Continue to **Pan** along the file and deleting triangles. Don't be concerned that the model may not be perfect for this training.

When you have finished:

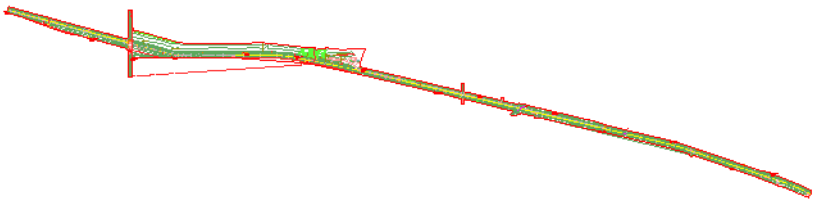
28. **<D>** the **Close** button in the ***Delete Triangle*** dialog.

29. From the ***View Survey*** toolbar toggle display **OFF** for **Symbols**

30. Redisplay the perimeter **Surface > View Surface > Perimeter**. The ***View Perimeter*** dialog will appear.

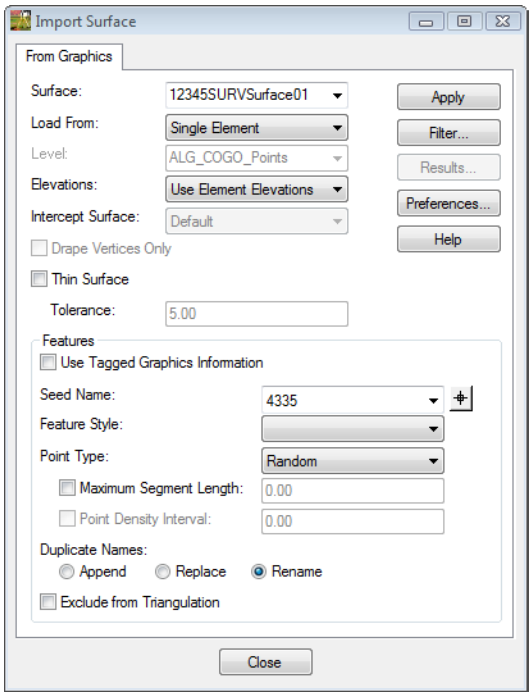
31. **<D>** the **Apply** button in the ***View Perimeter*** dialog.

32. Review your results.



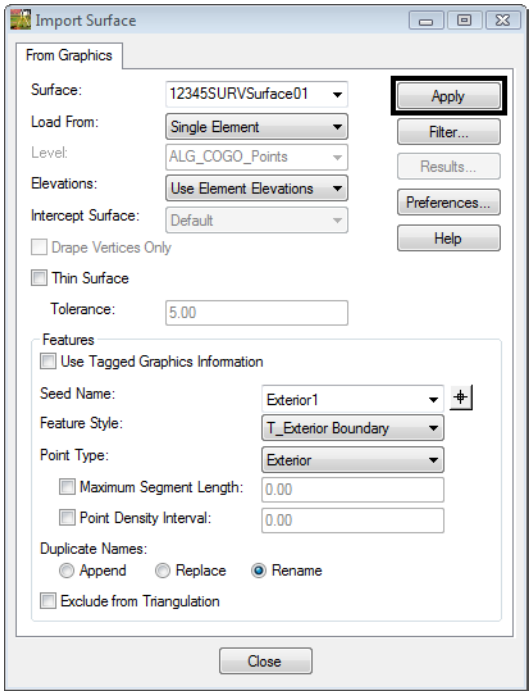
Note: This closed shape represents the edge of the surface (triangles) spatially correct (location and elevation). Importing this shape into the DTM will act as an exterior boundary to constrain the triangulation process.

33. From the InRoads pull down menu select, **File > Import > Surface**. The ***Import Surface*** dialog will appear.



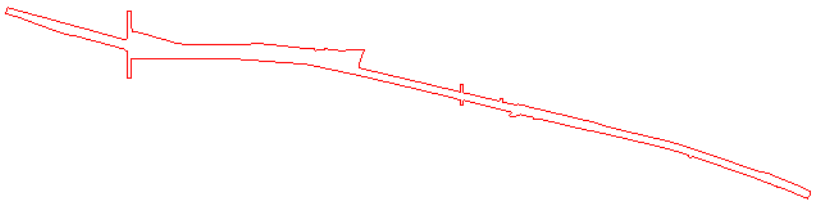
34. Set the following dialog items:

- ***Surface:* 12345SURVSurface01**
- ***Load From:* Single Element**
- ***Elevations:* Use Element Elevations**
- ***Key-in Seed Name:* Exterior1**
- ***Feature Style:* T_Exterior Boundary**
- ***Point Type:* Exterior**



35. **<D>** the **Apply** button. The ***Import Surface*** dialog will minimize allowing you to select the perimeter element.

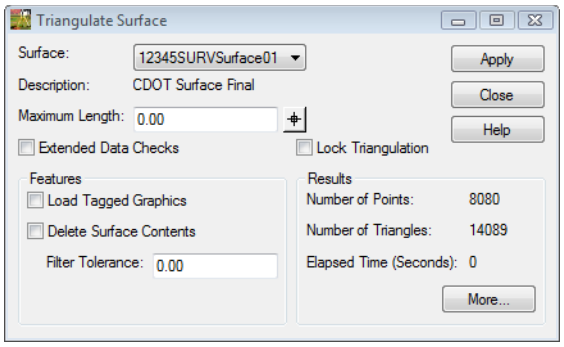
36. **<D>** on the surface ***Perimeter graphics*** displayed in MicroStation View 1.



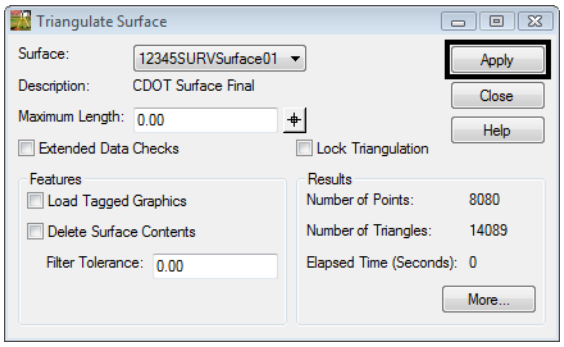
37. **<D>** again to accept this element. The ***Import Surface*** dialog will reappear.

38. **<D>** the **Close** button in the ***Import Surface*** dialog.

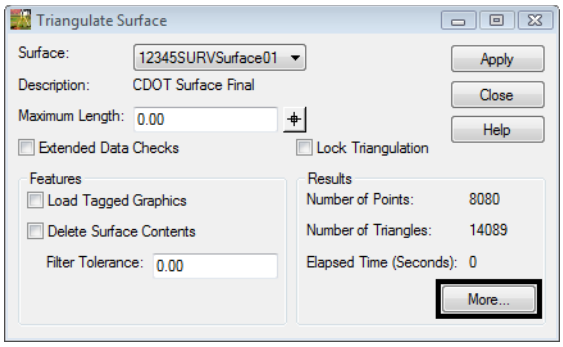
39. From the pull down menu select, **Surface > Triangulate Surface**. The ***Triangulate Surface*** dialog will appear.



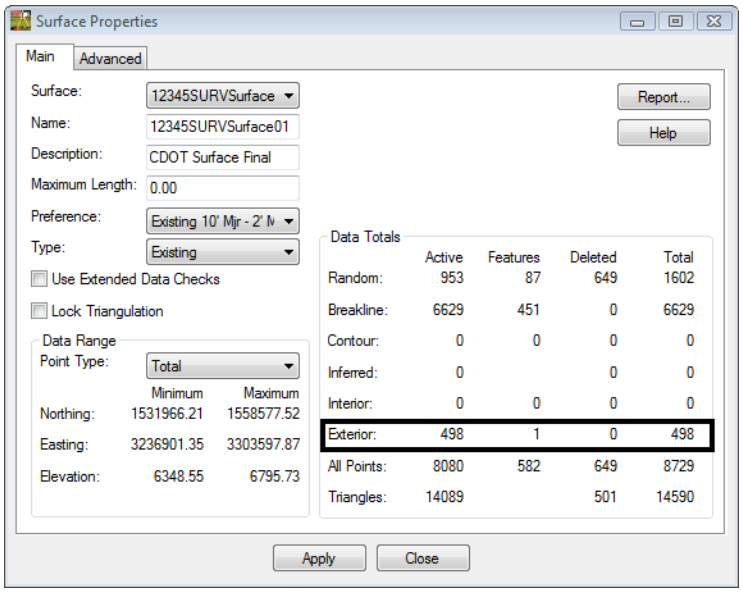
40. **<D>** the **Apply** button in the ***Triangulate Surface*** dialog.



41. **<D>** the **More** button on the ***Triangulate Surface dialog***. The ***Surface Properties*** dialog will appear.



42. Review your results.



Note: The surface now has Exterior point data, your numbers will not match exactly.

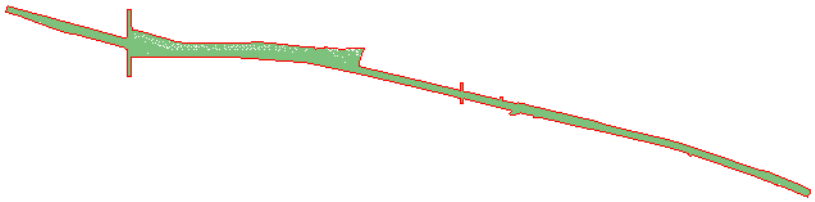
43. **<D>** the **Close** button in the ***Surface Properties*** dialog.

44. **<D>** the **Close** button in the ***Triangulate Surface*** dialog.

45. Redisplay the triangles **Surface > View Surface > Triangles**. The ***View Triangles*** dialog will appear.

46. **<D>** the **Apply** button in the ***View Triangles*** dialog.

47. Review your results.



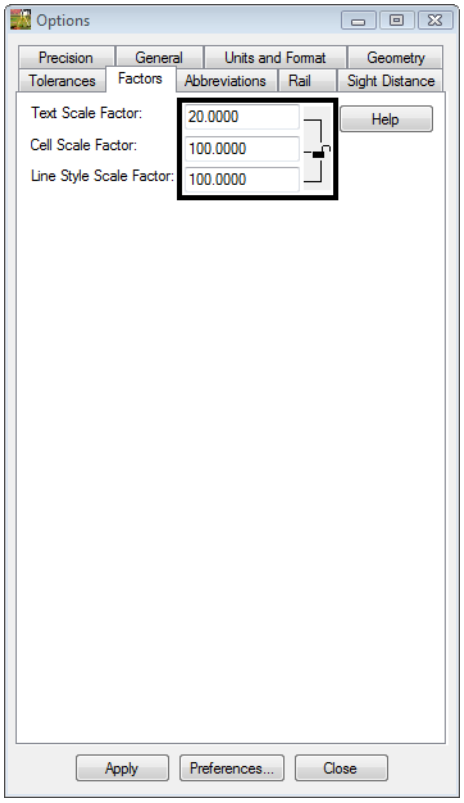
48. In the Workspace bar Surface tab **<R>** on ***12345SURVSurface01*** select **Save** from the shortcut menu.

Contour Files

Contour information will be saved to separate files for ease of referencing and level control. Each scale and contour interval will have a unique name.

49. From the pull-down menu select, **File> Project Options**. The InRoads ***Options*** dialog will appear.

50. **<D>** the **Factors** tab.



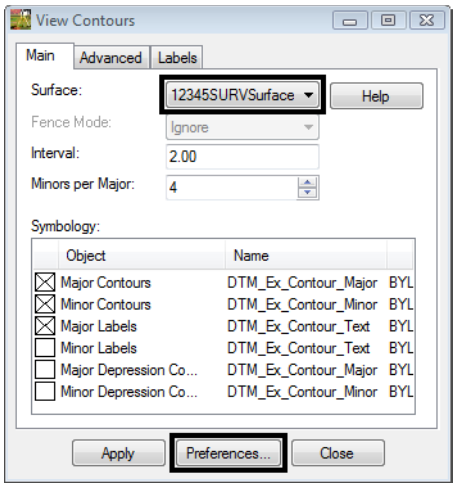
Note: The values shown here will be applied to all commands that display text, cells, or linestyles.

51. Verify the Scale Factors

- ***Text***: ***20***
- ***Cell***: ***100***
- ***Linestyle***: ***100***

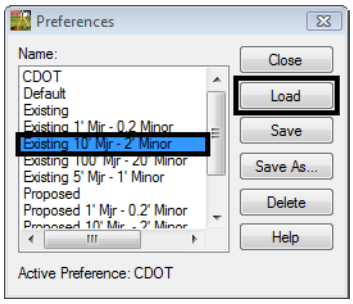
52. **<D>** the **Apply** then **Close** buttons.

53. From the pull-down menu select, **Surface > View Surface > Contours**. The ***View Contours*** dialog will appear.



54. Verify the active ***Surface***: ***12345SURVSurface01***

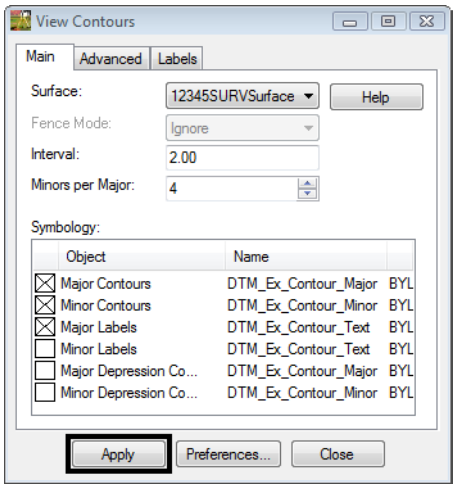
55. **<D>** the **Preferences** button.



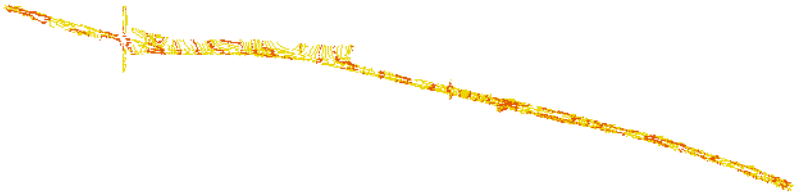
56. Select the preference **Existing 10' Mjr – 2' Minor**

57. **<D>** the **Load** then **Close** buttons.

58. **<D>** the **Apply** button. The View Contours dialog will temporarily minimize as the surface is processed and the contours are generated the dialog will reappear when the contours have been generated.



59. Review your results.

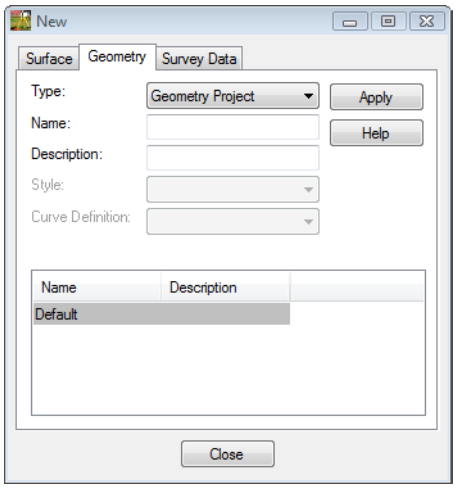


Lab 8.4 - Exporting Survey Data to Geometry - FINAL

Section Objectives:

- Export survey data to a Geometry Project for a final deliverable.

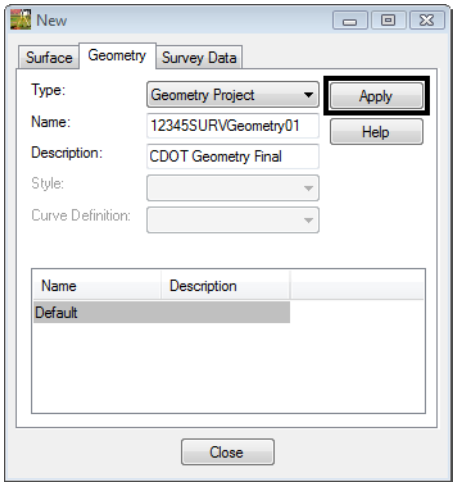
1. Verify the ***12345SURVFieldbook01*** fieldbook you want to export is active. You can tell which fieldbook is active by the red box around the fieldbook button.
2. From the InRoads pull down menu, select **File > New**. The ***New*** dialog will appear.
3. Select the **Geometry** tab.



4. From the type pick list verify the ***Type***: **Geometry Project**
5. Key in the geometry ***Name***: ***12345SURVGeometry01***
6. Key in the ***Description***: ***CDOT Geometry Final***

Note: Key in any additional file information in the Description field of the dialog, such as Date, User, and Design file name. You have up to 34 characters even though you may not see all the characters in the Description field.

7. **<D>** the **Apply** and **Close** buttons.

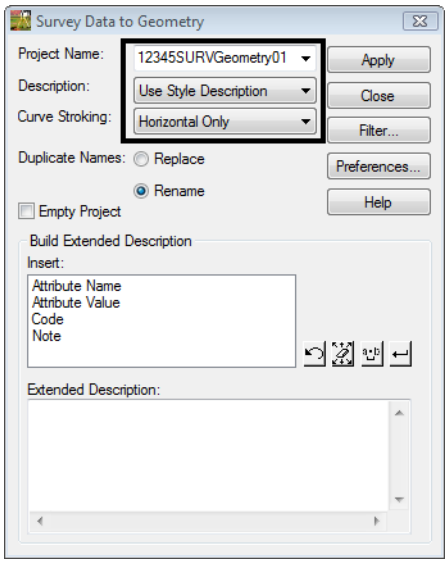


8. From the InRoads pull down menu, select **Survey > Survey Data to Geometry**. The ***Survey Data to Geometry*** dialog will appear.

9. From the drop down list select ***Project Name***: **12345SURVGeometry01**

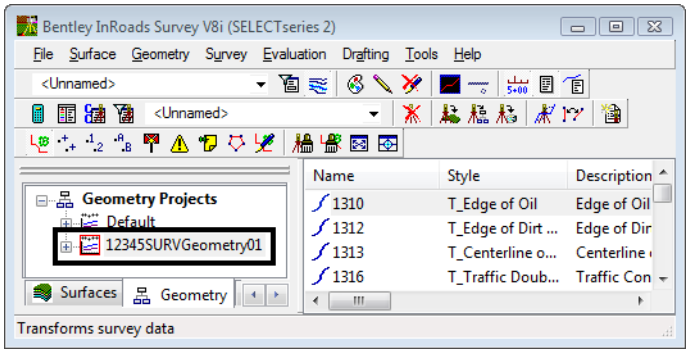
10. Set the ***Description:*** **Use Style Description**

11. Set the ***Curve Stroking:*** **Horizontal Only**



12. **<D>** the **Apply** then **Close** button.

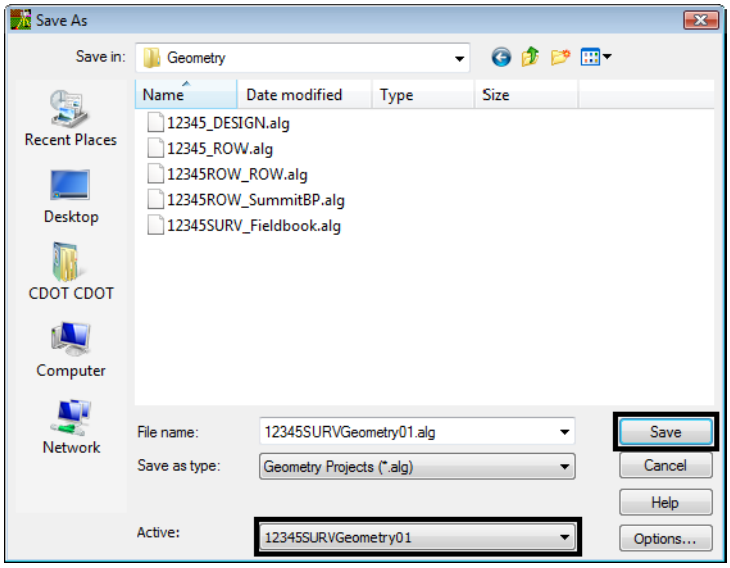
13. Use the Workspace pane scroll arrows to view the Geometry tab.



14. Verify ***12345SURVGeometry01*** is the active ***Geometry Project***.

15. From the InRoads pull down select **File > Save > Geometry Project**. The ***Save As*** dialog will appear with the ***Save as type***: **Geometry (*.alg)**.

16. Verify you are in the correct project directory.
C:\Projects\12345\ROW_Survey\InRoads\Geometry



17. The file name should match the Active name at the bottom of the Save As dialog. If necessary, use the drop-down arrow in the Active field and reselect the desired name to ensure the saved file name will match the surface name.

Note: Ensuring that the saved Geometry name in the project folder matches the Geometry name displayed in InRoads explorer will minimize any confusion.

18. **<D>** the **Save** and then the **Cancel** button. The file will be saved to disk and the ***Save As*** dialog will close.

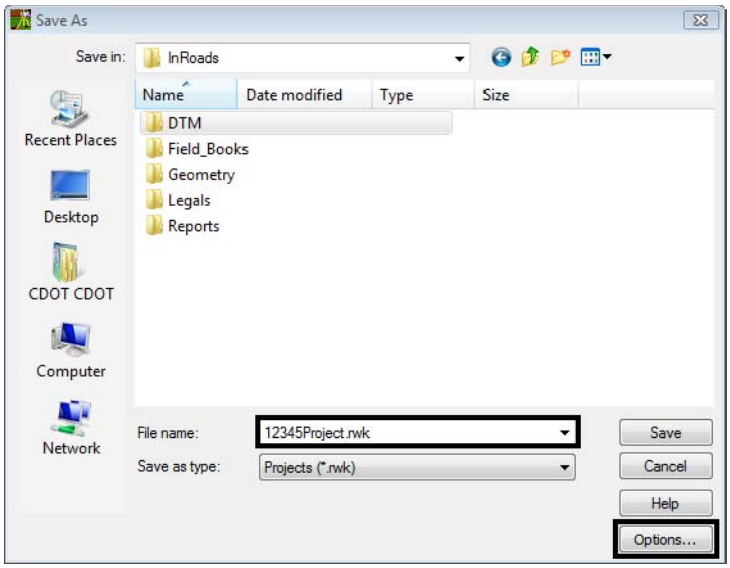
Lab 8.5 - Saving an InRoads Project file RWK

Project file stores the location of multiple InRoads files. RWK files allow the user to open just one RWK which could load a survey, surface, and geometry project. The RWK can be opened and edited in Notepad incase there are changes in the directory structure.

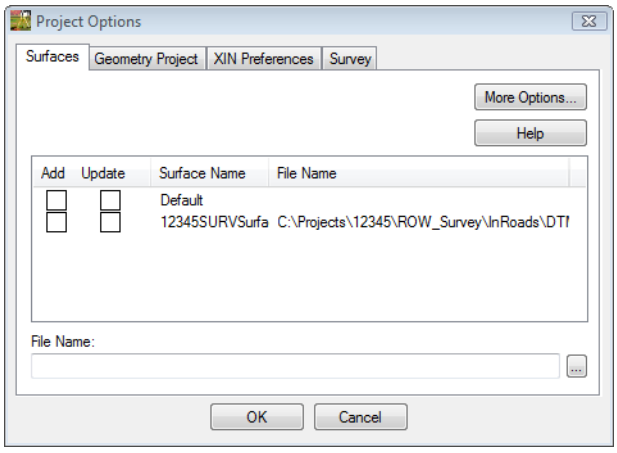
Section Objectives:

- Create a new Project file that will autoload the survey fieldbook file and final deliverable.

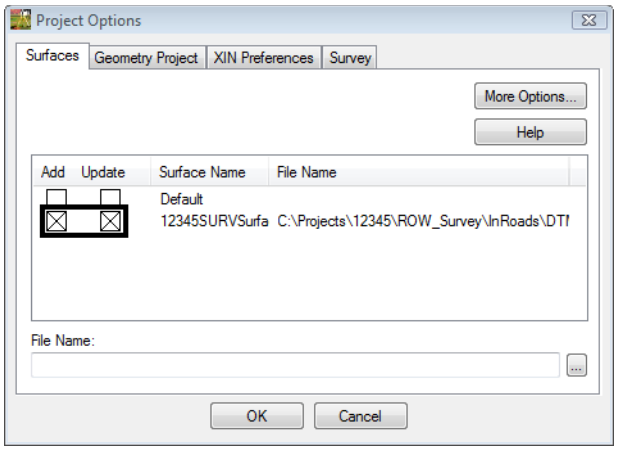
1. From the pull down menu, select **File > Save > Project**. The ***Save As*** dialog will appear.
2. Key-in the ***File name: 12345Project.rwk***



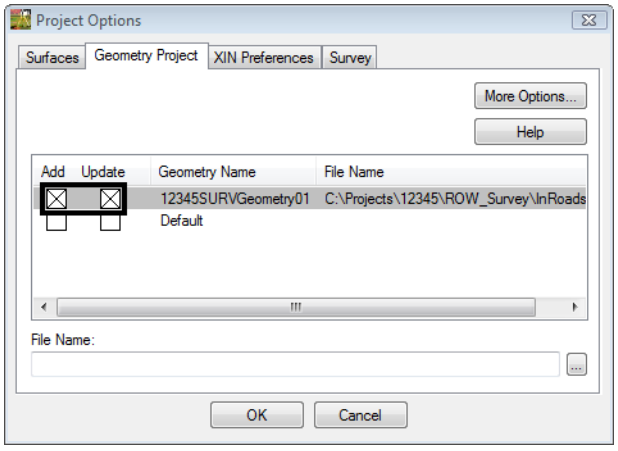
3. **<D>** the **Options…** button. The ***Project Options*** dialog will appear.



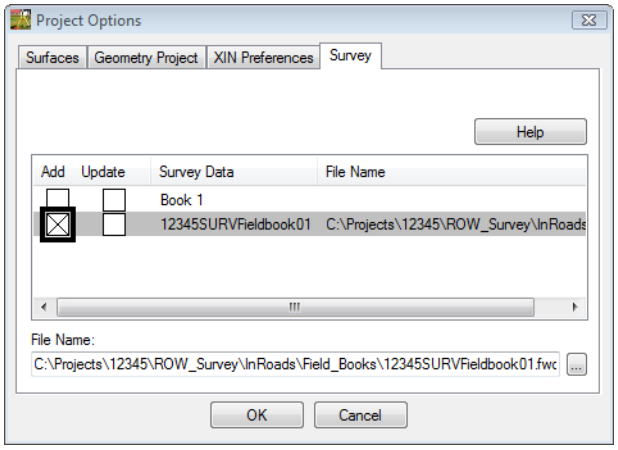
4. From the **Surfaces** tab check the **Add** and **Update** boxes for Surface Name ***12345SURVSurface01***.



5. From the **Geometry Project** tab check the **Add** and **Update** boxes for Geometry Name ***12345SURVGeometry01***.

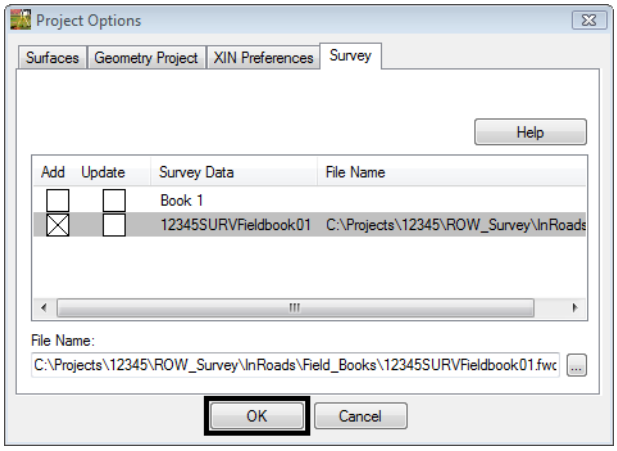


6. From the **Survey** tab check only the **Add** box for Survey Name ***12345SURVFieldbook01***.

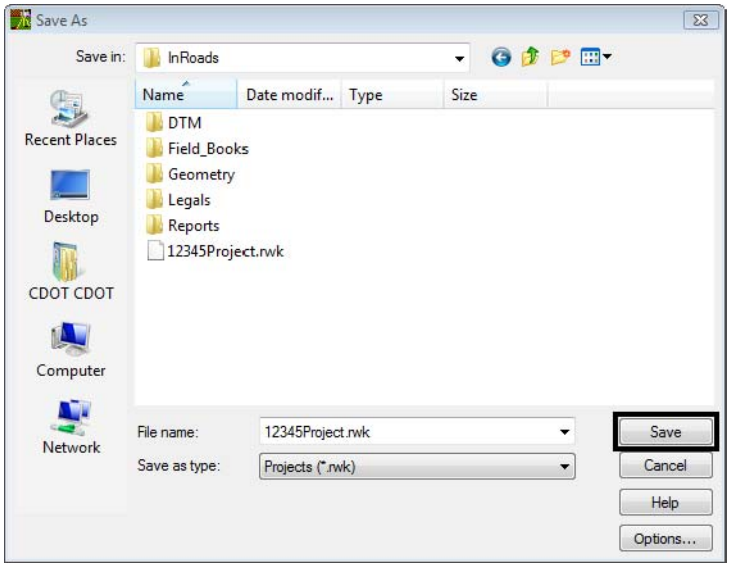


Note: By only selecting the Add check box for the Survey tab the file will act as read only when opened and saved with the RWK file in the future.

7. **<D>** the **OK** button. The ***Project Options*** dialog will close.

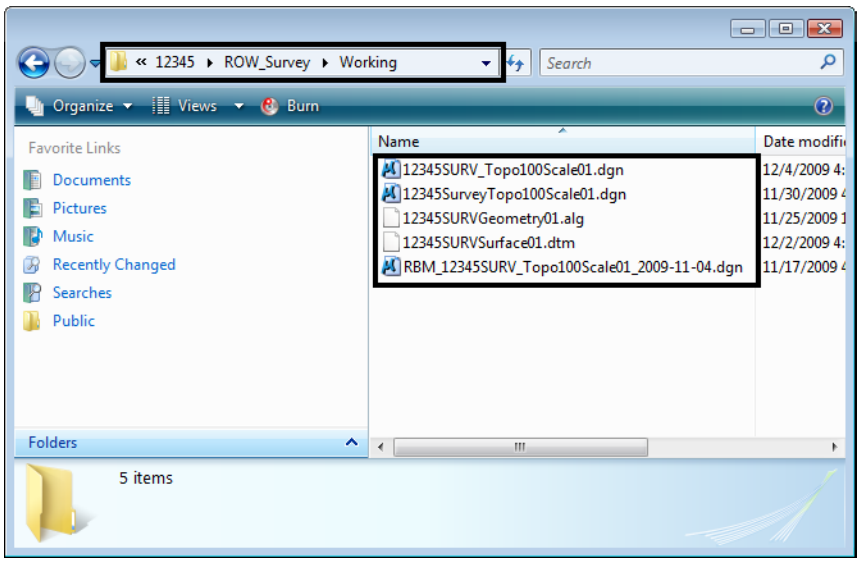


8. **<D>** the **Save** then **Cancel** buttons. The ***Save As*** dialog will close.



Lab 8.6 - Directory Clean up

1. Open Windows Explorer Windows + E
2. Navigate to the folder ***C:\Projects\12345\ROW_Survey\Working***
3. Delete any old or duplicated files for the Working directory.



Section Summary:

- In *Lab 8.1 -Exporting Survey Data to Graphics* the survey fieldbook was exported to graphics including the point names, codes, etc. The file was then stratified using the custom application CDOT Stratify Survey to create multiple survey files and reference the files appropriately.
- In *Lab 8.2 -Exporting Survey Data to Surface* the survey fieldbook was exported to the final surface file.
- In *Lab 8.3 -Exterior Boundary* the surface was then cleaned up by deleting errant triangles and a new exterior boundary was created.
- In *Lab 8.4 -Exporting Survey Data to Geometry - FINAL* the survey fieldbook file was exported as a final geometry project.
- In *Lab 8.5 -Saving an InRoads Project file RWK* the final deliverable survey files were used to create a Project file to help the user load multiple files.
- In *Lab 8.6 -Directory Clean up* the working directory was cleaned up to make sure all files that were no longer needed were removed from the folder.