

**OREGON
DEPARTMENT
OF
TRANSPORTATION**



*200 Hawthorne Avenue
Suite B250
Salem, OR 97310
(503) 986-3103*

*Ron Singh, PLS
Chief of Surveys
(503) 986-3033*

*Dave Brinton, PLS
Lead Surveyor
(503) 986-3017*

*Lorne Brown, LSIT
Survey Support Specialist
(503) 986-3034*

*Bill Dye, LSIT
Survey Support Specialist
(503) 986-3035*

*David King
Survey Support Technician
(503) 986-3041*

DTM Boundary and Export to InRoads

**Initial CAiCE Training
December 20, 2002**

Purpose

In this tutorial we will demonstrate how to delete erroneous triangles, DTM points and DTM breaklines on the DTM surface and to create a DTM boundary. A boundary chain may be used by the designers to recreate the DTM surface in InRoads.

Concepts

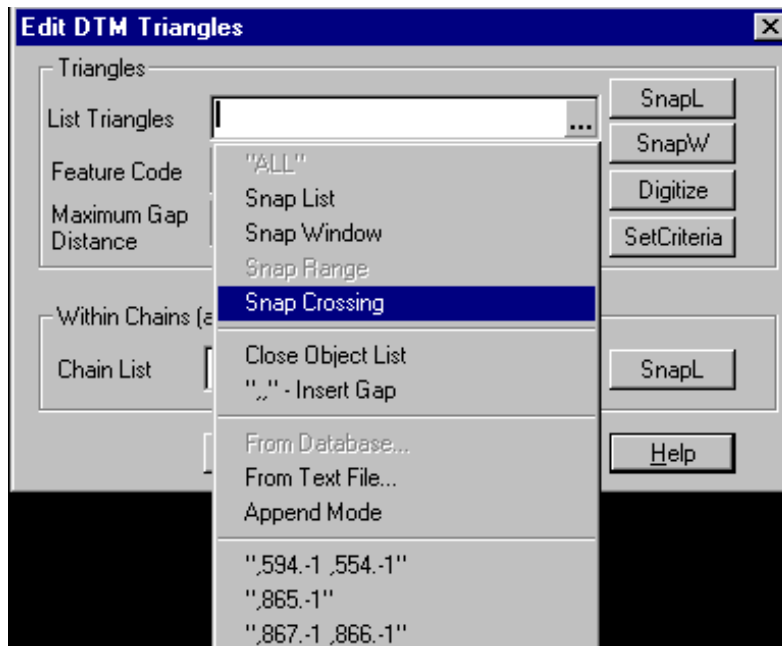
- One application could be in projects where data is collected through photogrammetric means. What happens in these types of projects is that data is collected over a large area, and some areas are impossible to get to such as underneath tree canopies and large areas covered by trees. Surveyors then end up collecting data in those areas manually, which is to be then merged into the DTM that was created from aerial data. The **Save Boundary** command will allow saving a boundary chain from a DTM created by manual survey data, and then use it to clip data out of the photogrammetric DTM and merge in the ground survey data.
- Another useful application of saving a boundary chain could be after a DTM has been cleaned up with all unwanted DTM data removed and triangles obscured. This boundary chain can then be saved for later use to obscure triangles outside the limits of it, in case a DTM is ever rebuilt due to merging or clipping.

Steps

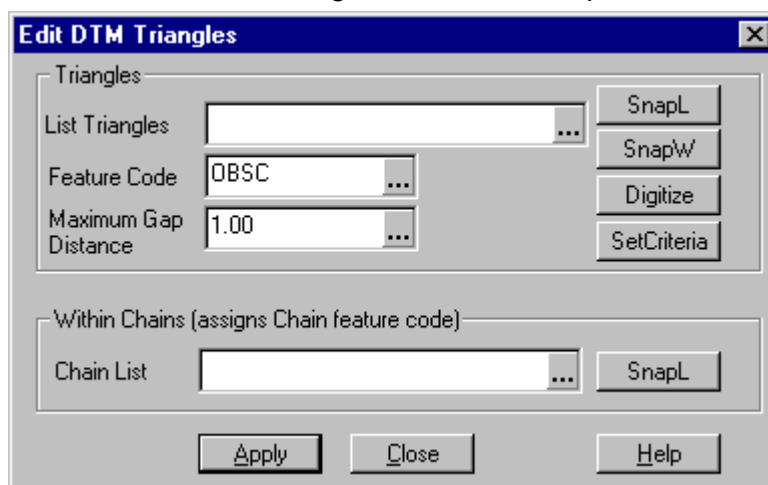
TO EDIT TRIANGLES IN CAICE:

- Open CAiCE.
- Remember: When you **Build Triangles** the initial Model Boundary will automatically be displayed. This can be redisplayed, at any time, from the main menu by selecting **View > DTM > Model Boundary**.
- Clear the active view window graphics by selecting the **Clear View** button or using the **F8** key.
- To View DTM Triangles from the main CAiCE menu select **View > DTM > Triangles**.
Note: If you **View > DTM > Surface** you will not be able to edit any triangles.
- To remove unwanted or erroneous triangles from your DTM surface; From the main CAiCE menu select **DTM > Edit DTM Triangle Feature Codes**.

- Click on the picker control for the **List Triangles** field and select an appropriate Snap option.

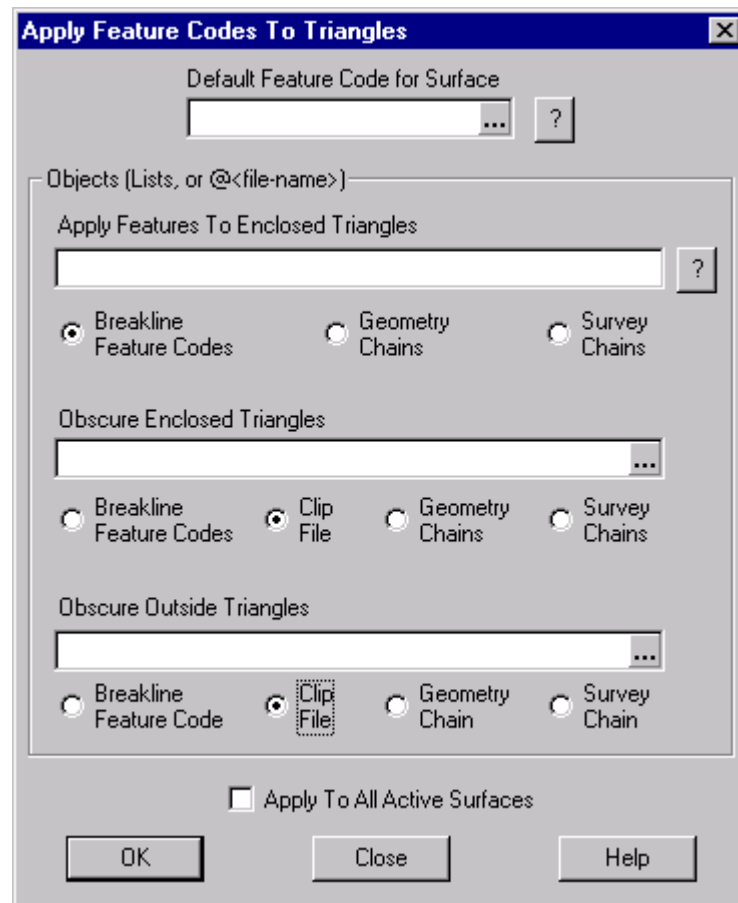


- Snap on the erroneous triangles that occur in the DTM surface. The selected triangles are then highlighted and listed in the List Triangle field.
- Enter **OBSC** in the **Feature Code** field. Feature Code defines the feature code to be applied to the selected triangles. The CAiCE reserved feature code **OBSC** is used to mark triangles in obscured areas and effectively deletes these triangles from the surface. Triangles with feature code **OBSC** are ignored in all DTM operations.



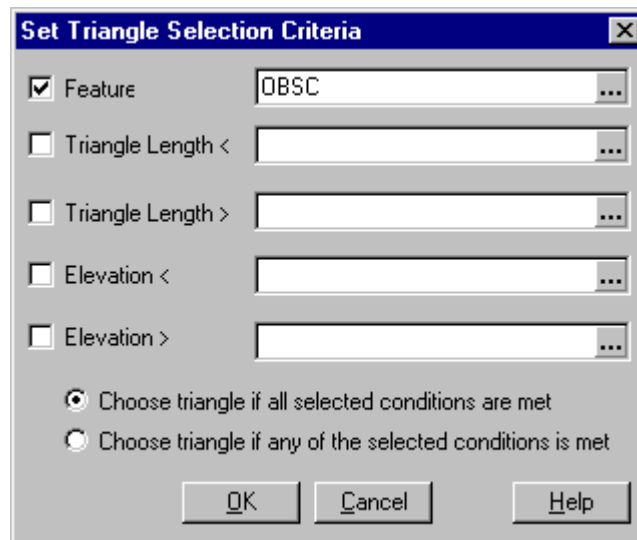
- Click on the **Apply** button to obscure the selected triangles.

- The **Edit DTM Triangle Feature Codes** procedure can be repeated, as necessary, until all erroneous triangles have been obscured.
- **Close** the dialog box.
- Clear the active view window graphics by selecting the **Clear View** button or using the **F8** key, then **View > DTM > Triangles** again. For the same results you could also use **View > Clear Selected Elements** (if command is not grayed out).
- Triangles can also be edited by using boundaries. From the main menu select **DTM > Apply Feature Codes to Triangles**.

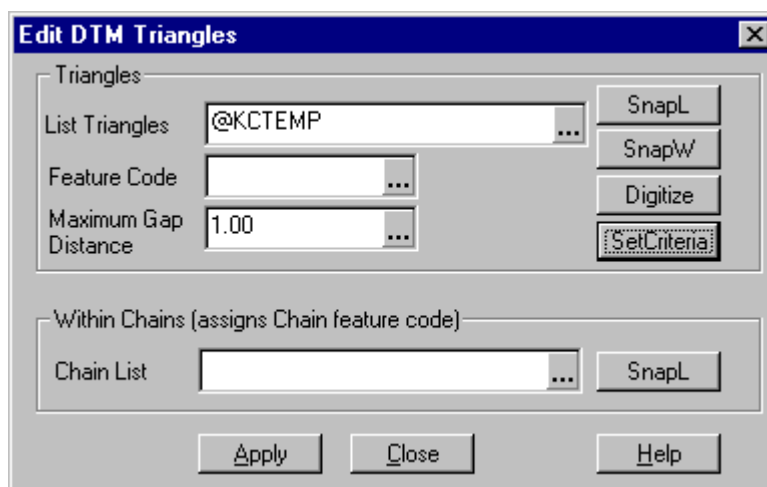


- Select boundary.
- **OK**
- **Close** the dialog box.

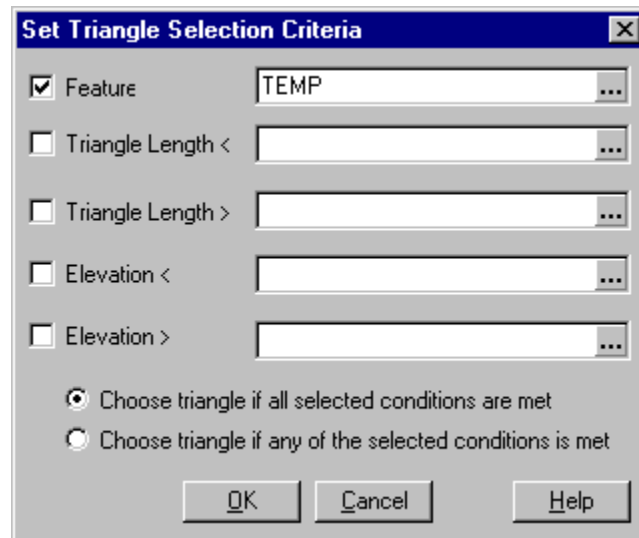
- Clear the active view window graphics by selecting the **Clear View** button or using the **F8** key.
- **View > DTM > Triangles** again.
- To redisplay or see the Obscured Triangles again select **DTM > Edit DTM Triangle Feature Codes > SetCriteria**



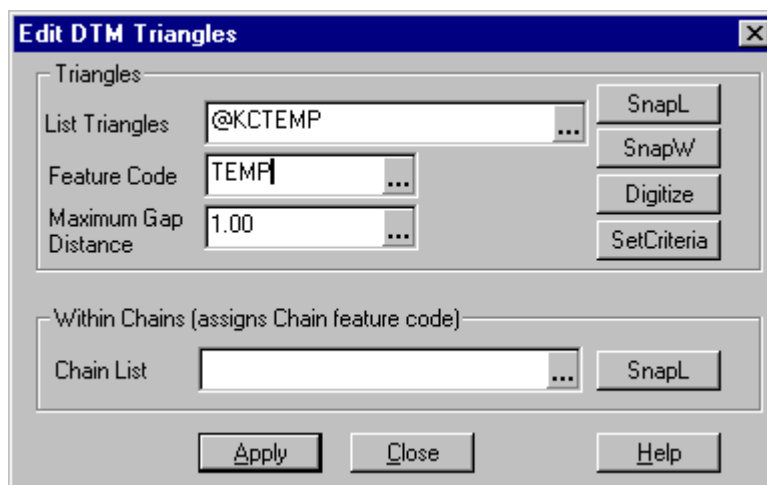
- **OK** will select the Triangles that have been Obscured to edit their features again so they can be redisplayed.
- **OK** automatically creates a file named **@kctemp.lis** (that may be renamed and saved if you wish) containing all your Triangles with the feature **OBSC**.



- You may also assign a Feature Code, e.g. **TEMP**, to the triangles. This will allow you to view only those **TEMP** triangles for further editing if desired.
- Clear the active view window graphics by selecting the **Clear View** button or using the **F8** key.
- If you assign a Feature Code, e.g. **TEMP**, to the triangles by entering **TEMP** in the Feature Code field and you wish to view and edit only the **TEMP** triangles go to **DTM > Edit DTM Triangle Feature Codes > SetCriteria**.



- **OK**



- **Apply**

TO SAVE A DTM BOUNDARY:

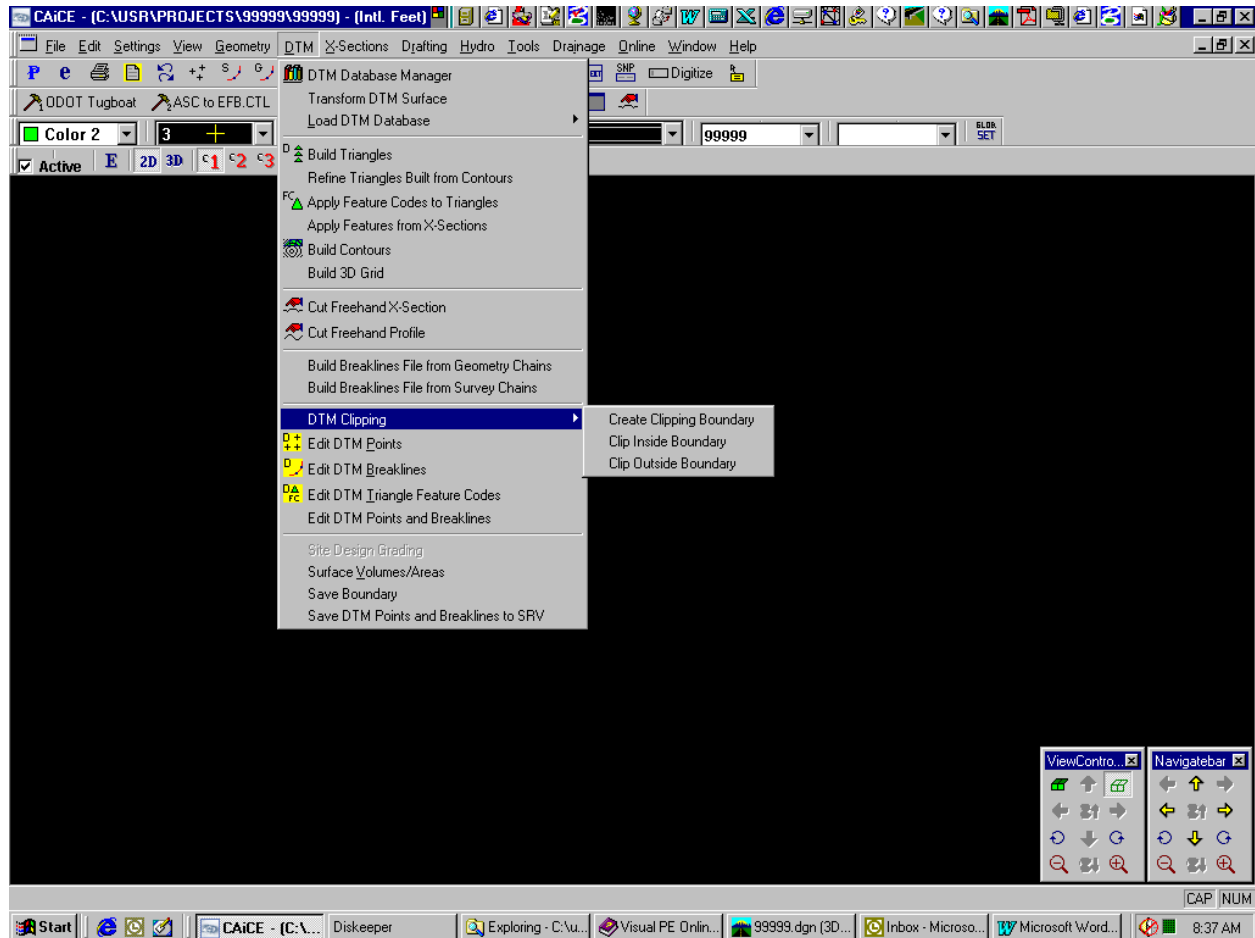
- From the main menu select **DTM > Save Boundary**.
- Check all the boxes.

The screenshot shows a dialog box titled "Save DTM Boundary". At the top, there is a dropdown menu for "DTM Surface Name" set to "99999". Below this are three sections, each with a checked checkbox:

- Save To Clip File:** Includes a "File Name" field with the path "C:\USR\PROJECTS\99999\99999B1.CLP".
- Save As Survey Chain:** Includes fields for "Name" (KC1), "Feature" (BL), "Zone" (39), and "Desc." (TERRAIN BREAKLINE).
- Save As Geometry Chain:** Includes identical fields for "Name", "Feature", "Zone", and "Desc.".

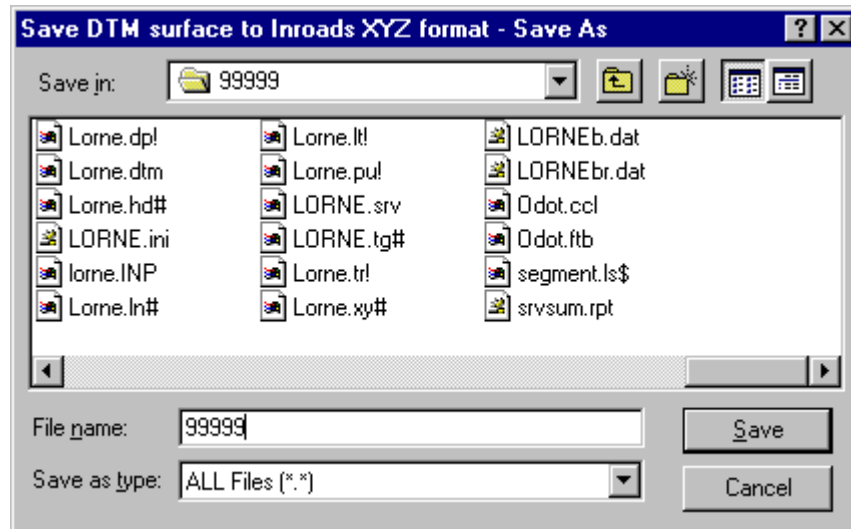
At the bottom of the dialog are four buttons: "OK", "Preview", "Close", and "Help".

- **Preview** allows viewing of the DTM boundary on the screen.
- **OK**
- **Close** the dialog box.
- Note: A clip boundary (.CLP) file can be used for clipping (DTM) points and (DTM) breaklines from a DTM surface database. CAiCE will not build triangles in these clipped areas, but can build triangles across them. (These erroneous triangles will then have to be edited as previously discussed.)
- The CAiCE clip boundary options are accessed from the main menu by:
DTM > DTM Clipping >



TO EXPORT CAICE DTM TO INROADS:

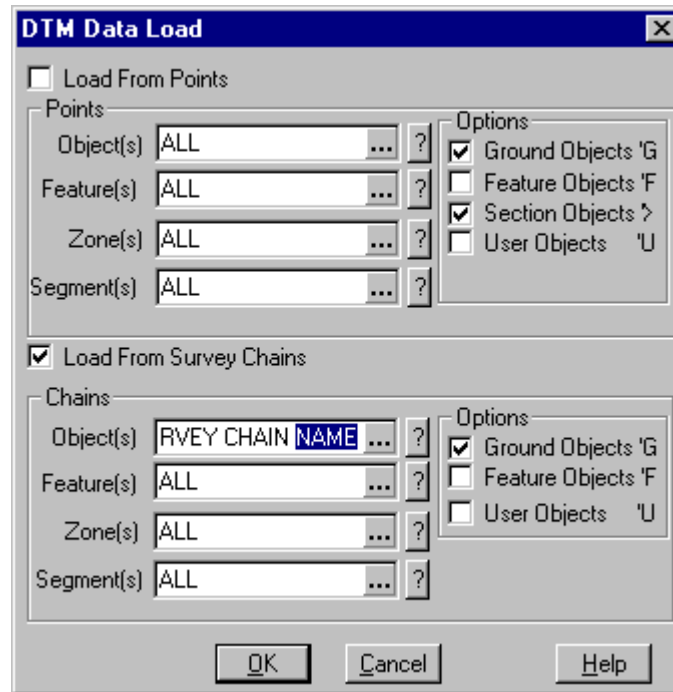
- **File > Export Translators > To Inroads > DTM Surface to XYZ Format.**



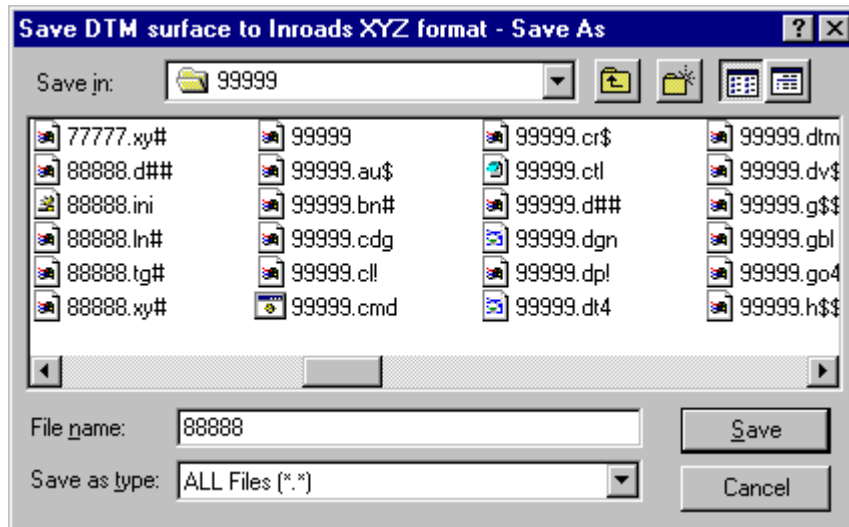
- **Save** will automatically create 2 files (from the example above):
 1. **99999br.dat** is an ascii file of all the DTM (random points).
 2. **99999b.dat** is an ascii file of all the DTM breaklines.

TO EXPORT CAICE BOUNDARY TO INROADS:

- To save a CAiCE boundary (for later export to InRoads) see the previously covered information, in this handout, on 'TO SAVE A DTM BOUNDARY:' Note: Boundaries to be exported to InRoads are best saved as '**Save As Survey Chain**'.
- **DTM > DTM Database Manager >** to create a new surface.
- With the new DTM surface Active; **DTM > Load DTM Database > From Survey Points and Chains.**
- Check 'Load From Survey Chains' and select the Object(s) or survey chain.



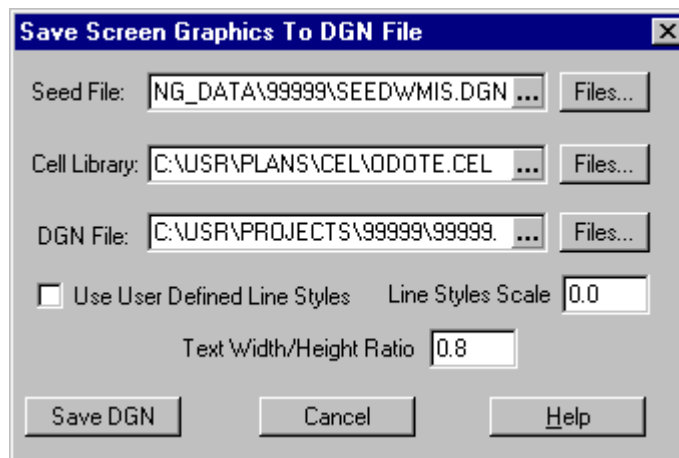
- **File > Export Translators > To Inroads > DTM Surface to XYZ Format.**



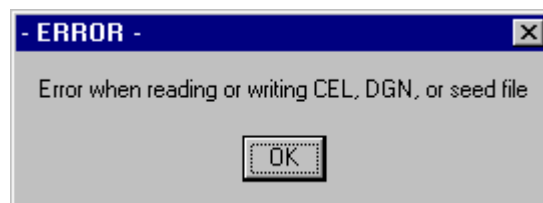
- **Save** will automatically create 2 files (from the example above):
 3. **88888br.dat** is an ascii file reserved for DTM (random points) therefore it contains zero data as all we need to load is the Survey Chain.
 4. **88888b.dat** is an ascii file of the Survey Chain.

TO EXPORT CAICE GRAPHICS TO MICROSTATION:

- Display any boundaries (Clip Boundaries, Survey Chains, Geometry Chains) and/or Triangles you would like to export to MicroStation. Note: In CAiCE, if the Object does not have an attached feature (from the Feature Table) it will be displayed at the active Level as set in **Settings > Global Options > Graphics**. Object(s) may be displayed at different levels and exported separately, if desired, and appended to the DGN.
- Export to MicroStation: **File > Export Translators > To Intergraph/MicroStation > Screen Graphics to DGN File**.
- Note: These Boundaries and Triangles should be on separate levels for later use in a temporary quality check in InRoads.



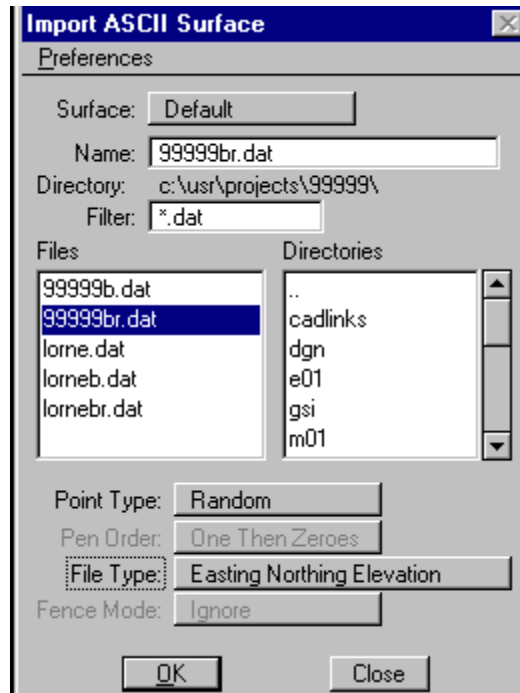
- Select **Save DGN**.
- Note: If the DGN file is open in MicroStation, when you select **Save DGN**, this ERROR message will appear:



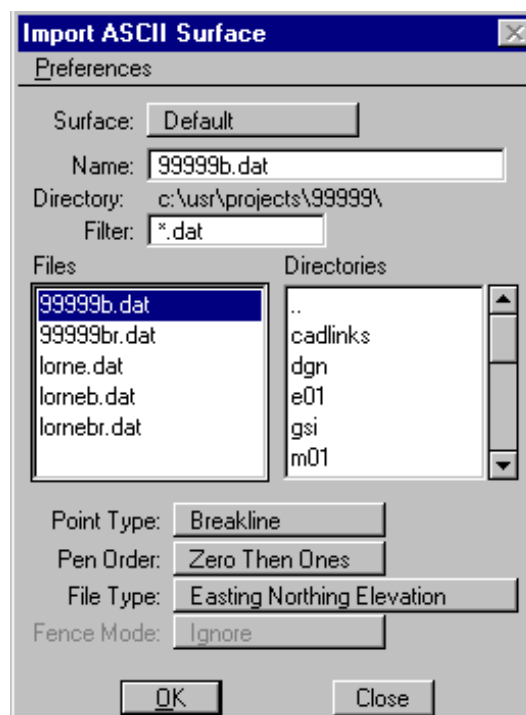
- If you get this error message, close the DGN in MicroStation and **Save DGN** again.
- Note: Files from CAiCE should not be introduced into MicroStation without first cleaning the files using **FIXDGN**.

TO IMPORT A CAICE DTM AND BOUNDARY INTO INROADS:

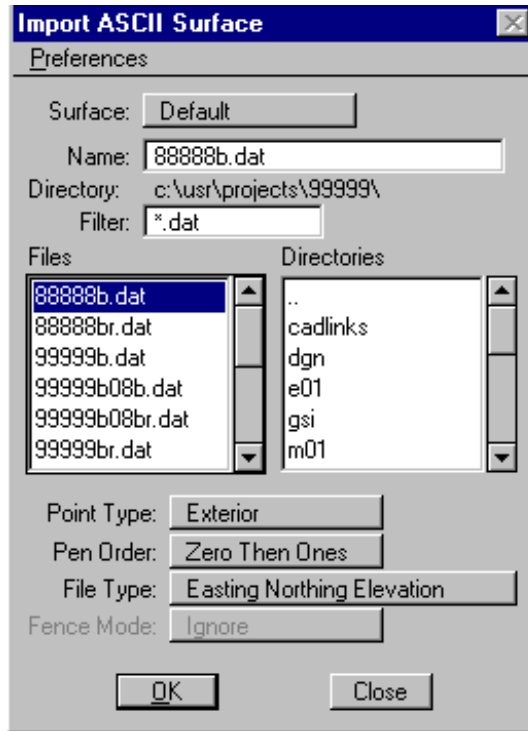
- Open InRoads and create a surface file: **File > Import > ASCII Surface**.
- Shown below are the settings for importing a .dat file of DTM points:



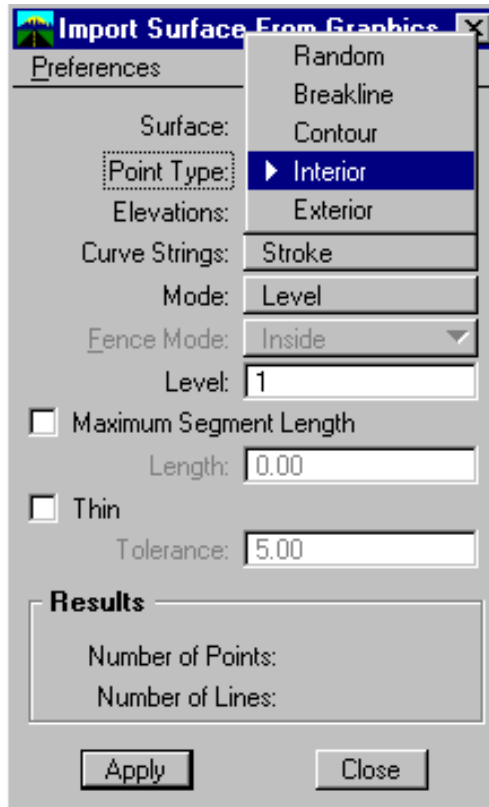
- Shown below are the settings for importing a .dat file of DTM breaklines:



- Shown below are the settings for importing a .dat file of an exterior boundary. There is also a 'Point Type' for an Interior (boundary) option:



- Or another method to Import any Boundaries (from CAiCE): **File > Import > Surface From Graphics**.
- Boundaries can be imported as either Interior or Exterior boundaries.



- Save the Surface in InRoads: **File > Surface > Save**.
- Continue with the normal process of triangulating in InRoads.
- Do a quality check by displaying the InRoads DTM triangles and then displaying the triangles from the CAiCE DTM in a different color.