Terrain 2D Module

Version 5.0

Softree Technical Systems Inc.

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Table of Contents

Getting Started

This manual is formatted as a hands-on tutorial, which can be used by novice or experienced users.

The tutorial files referred to in the examples are found in the installation default directory**.** The default directory is determined by product and security option selected.

The default directory for Terrain 2D and 3D (stand alone) is:
C:\Program Files\Softree\Terrain\Tutorial

The default directory for RoadEng, Terrain Tools Survey, and Terrain Tools Forestry (all include 2D and 3D) is:
C:**\Program Files\Softree\RoadEng\Tutorial\Terrain**

If the location of this directory is moved remember to apply the corresponding change to the tutorial example.

NOTE: To re-install the tutorial files, select Install Tutorial Files from the CD.

Demonstration Mode

Demonstration Mode allows previewing of functions before purchasing. In *Demonstration Mode* printing, plotting, digitizing and file saving are disabled. Terrain Tools® reverts to Demonstration Mode whenever unprivileged function groups are enabled. A warning stating Demonstration Mode will appear on your screen.

Function Groups

The Terrain Module is divided into *function groups* such as CAD, Digitizing, Profiles, Terrain Modeling, Volumes, etc. The package being evaluated or

purchased determines which *function groups* operate in *Demonstration Mode* or *Full Function Mode*. To determine the privileges set for each function group:

1) Select Module | Setup from the menu bar. A Terrain Option Dialog box appears. Click on the *General* tab.
2) Click on the *Menus* button to open the *Menu Customization Dialog box.*

Function group items with a red circle before them are permitted in Demonstration Mode only. A checkmark beside an item indicates it has been enabled.

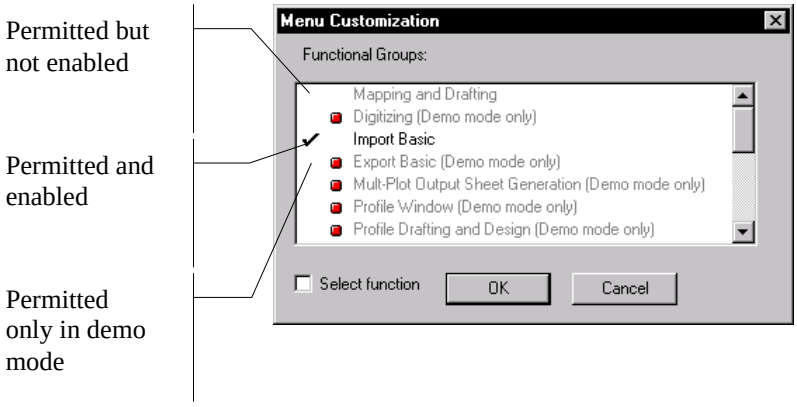

Figure 1.0: Function Groups Displayed in the Menu Customization Dialog

Function Groups Required for Examples
All required function groups are listed prior to each example in this manual. If you do not have permission to use all the required function groups, you may wish to skip the example. Also note that some function groups may be disabled even if *you* have permission to use them – this is so users with a lesser license can still do the example.

If you attempt to open a tutorial file containing function groups that are not permitted in your licensed software you will be prompted with the message box below:

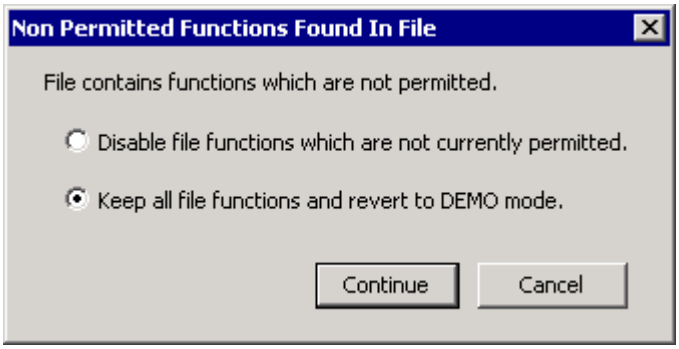

Figure 1.1: Function Groups Not Permitted Prompt

To continue the example you must respond *"Keep all file functions and revert to demo mode"*. In demo mode printing and saving are disabled.

On-line Help

Help information is available by choosing the *Help* menu or pressing F1. The On-line Help includes detailed technical information about menus, dialog boxes, and operation of the program.

It may be useful to refer to the On-line Help while working through the examples in this manual.

Tutorial Units

Most examples in this tutorial are in metric units. To correctly follow the examples ensure Metric Units are enabled. Select Module | Setup before starting. If other units are used they will be specified at the start of the example. The procedures and concepts described apply to all unit systems.

Checkpoints

Checkpoints identified by a checkmark indicate the beginning of an example. All files required to start from a checkpoint are included on the installation CD or from an Internet download file.

Conventions

The following conventions are used throughout the manual:

- Menu functions are delimited by a line "|". File|Open means to click on *File* in the menu bar and then select *Open* from the drop down menu.
- Checkboxes, dialog boxes, column headings, and button names are italicized.
- When directed to highlight, select, or activate a field or object, it becomes the active field or object. For instance, "highlight the profile window" means that click on the profile title bar to activate it.
- The symbols "< >" with words in between require some keyboard function to be performed. For example < shift + enter> means to hold down the *Shift* key and press *Enter*
- File names, path names and text to be typed in are in **bold.**
- File extensions are in upper case for file selection purposes only**.**

Overview

The Terrain Module provides you with the facilities for assembling and manipulating topographic and other map features. Information can be entered from a paper map using a digitizing tablet, from an external file or on the screen using the mouse.

The Terrain Module provides 8 windows: Profile, Plan, Status, Points, Features, 3D, Cable Data and Multi-Plot. The number and type of windows available depends on the *Function Groups* you have enabled. Figure 2.0 below shows a typical window arrangement.

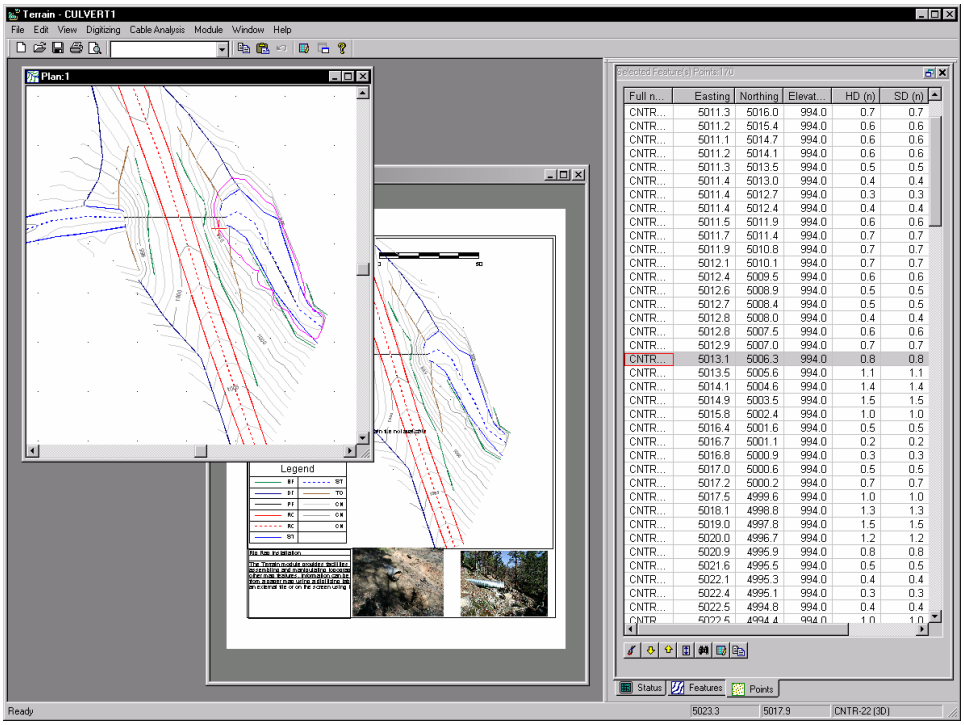

Figure 2.0: Terrain Module Windows

Window Types

Plan Window displays a plan View. It is used to display and edit features.

Status Window displays numeric information about the current feature and point. It can be used as a floating window or as a docked panel window on the right-hand side of the screen.

Points Window is used to report and/or modify attribute information about the current point. It can be used as a floating window or as a docked panel window on the right-hand side of the screen.

Features Window is used to report and/or modify attribute information about the current feature. It can be used as a floating window or as a docked panel window on the right-hand side of the screen.

Multi-plot Window is used to create an output sheet containing plans, profiles, legends, scale bar, images etc. This window requires that the Multi-plot function group be enabled.

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Each window has its own menu. These menus are available when the window is active. The active Window title bar will be highlighted and the menu Window | <active window name> will have a checkmark beside it. Each window can be sized, moved, maximized and minimized in the standard Microsoft fashion. All windows can be configured from the menu View | Active Window (<name>) Options.

Text Windows can be floating or docked to the right side of the screen. To dock a floating window, click the dock icon on the upper right side of the window. To float a docked window, click the float icon on the upper right side of the docked window.

Customizing Terrain using Screen Layouts

Options for all windows can be saved in a configuration file called a *Screen Layout*. To change the default configuration for Terrain:

1) Arrange the screen positioning of windows, scales, labels etc.
2) File | Save Screen Layout and specify **Normal.ILT** (other layout names can be used for creating layouts for different applications**.** **Normal.ILT** is the default).

NOTE: Layout files will be used extensively in the examples and are extremely valuable for saving and retrieving the large number of options available.

Tool Bars

Tool Bars display buttons or icons that are used to activate common functions. The function name appears when the cursor hovers over the icon. The Active buttons in the Tool Bar are dependent on the window selected. The various toolbars can be shown or hidden by selecting menu View | Toolbar or by right clicking on any currently visible toolbar. Toolbars can be floating or docked to the edge of the screen.

Screen Layouts can also specify which Tools options are displayed. For example, Standard Tools, Window Tools, Zoom Tools, Mode Tools and Navigation Tools are pre-set in **normal.ILT**.

Mapping and Drafting

This section is intended to provide the user with an introduction to the Terrain Module mapping and drafting functions. No special knowledge of surveying or mapping is required other than some basic familiarity with scales and coordinates.

To do the examples in this section the *Mapping and Drafting, Import Basic and Export Basic* function groups must be enabled .See *Function Groups* in the On-line help for more information).

Scaling Maps

Park Map Example

1. File | Open. Select and open **\Tutorial\Terrain\Terrain Cad\park map.TER.**

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

The Terrain Module works with *natural scales*. A natural scale of 1:5000 indicates 1 unit on the paper drawing = 5000 units on the ground. If working with mixed unit scale such as 1" = 200', then it must be converted to a natural scale before using it with Terrain (1":200' is the same as 1": 2400" i.e., a natural scale of 2400).

2. Activate the Plan Window by clicking on the Title Bar. The scale is set to 15000 in the *Scale Box* in the Toolbar. Change the scale to 25000 and press Enter.

Notice the change in the screen view.

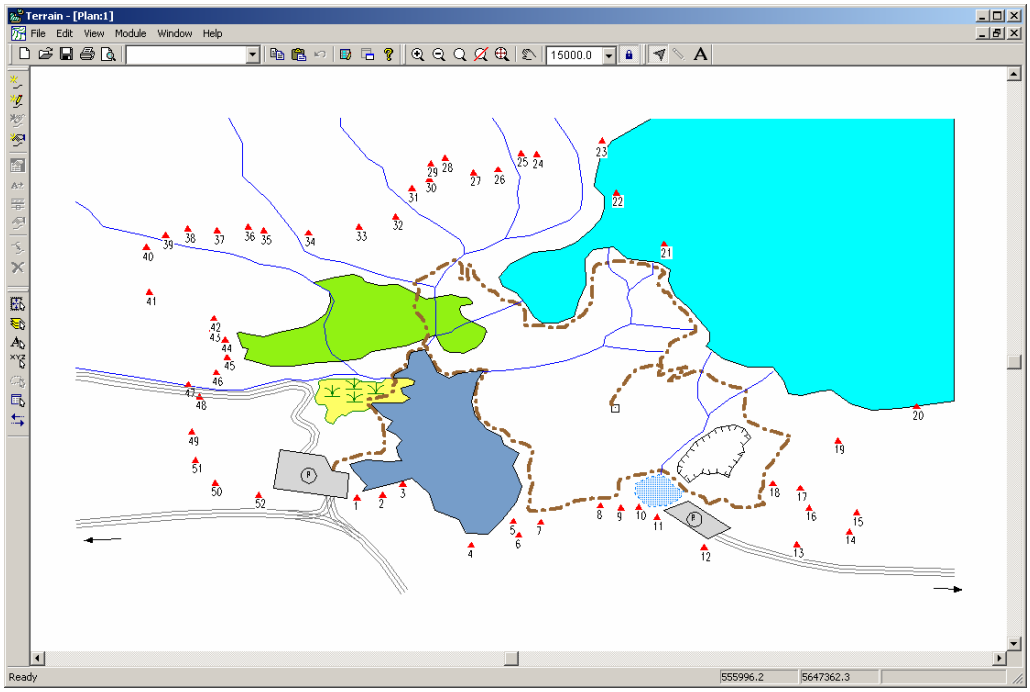


Figure 3.0: Park Map.TER

3. Choose menu View | Active Window (Plan) Options. Change the scale back to 15000. Enable *labels* checkbox and press OK.

4. Change the scale back to 25000. Notice the label sizes have remained the same but the map features have become smaller. Change the scale back to 15000.

NOTE: Changing scales adjusts the size of map features. Labels, line-types and symbols are not adjusted and remain the same size. When creating a drawing, it is important to set the scale to the required output scale before making adjustments to label positions.

NOTE: Zooming functions  magnify (or shrink) the entire drawing including labels, symbols and line-types when the *lock scale* button  is depressed or locked. When it is not depressed the scale will change but the labels, symbols and line-types will stay the same size.

5. With the *lock scale* button depressed, click on the *Magnification Double*  and *Magnification Half* buttons  several times. Notice that the label and line sizes change but the scale remains the same.

6. Turn off the *Lock Scale* button  Repeat the above step. Notice that with  *Magnification Double* the scale halves and with  *Magnification Half* the scale doubles. Labels and line-types stay the same size as the scale changes.

7. File | New to close **park map.TER** and continue to the next example or File | Exit to leave program. Do not save any changes.

Drawing Features

Drawing Features Using the Mouse – Method One 

There are three modes used to create and edit points on a feature.

 *Entry mode – New points are inserted at either end of the current feature.*

 *Insert mode+ - New points are inserted in between existing points.*

 *Edit mode*- Existing points are edited.

This example demonstrates basic drawing operations using the mouse. Edit and entry modes will be used to draw and modify a feature.

1. File | Open. Select **\Tutorial\Terrain\Terrain Cad\drawing.TER**. Press Open. The file shown in Figure 3.1 will appear.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

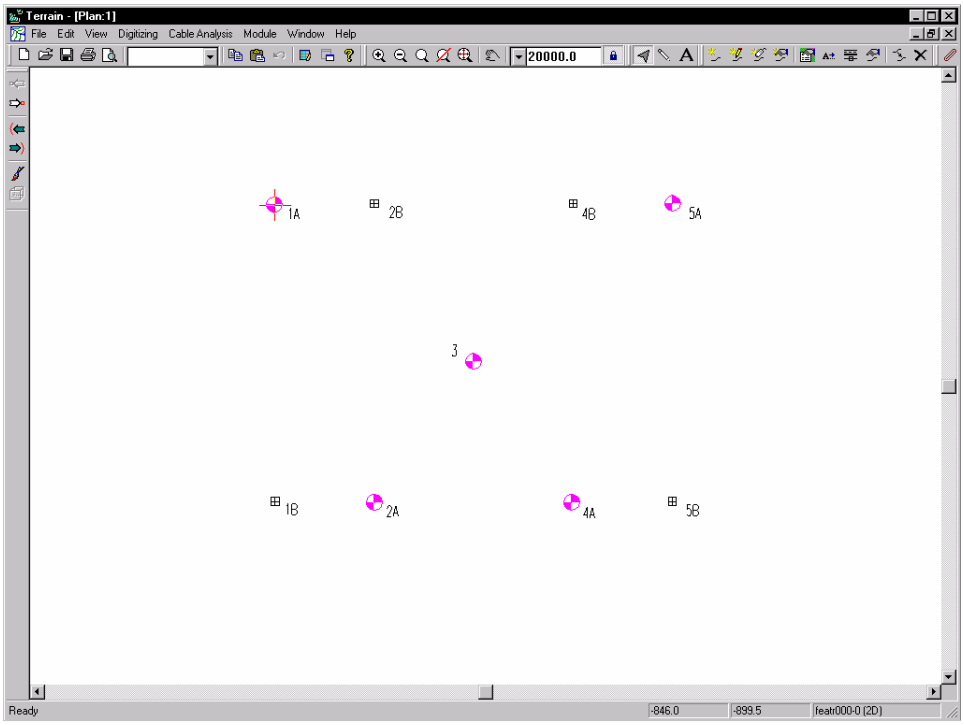


Figure 3.1: Drawing.TER

2. Left mouse click anywhere on the screen to de-select all features. A selected feature or features are displayed in magenta.

3. Press the *Draw New Feature* button. The Entry mode cursor appears in the Plan Window.

4. Locate the symbol labeled “1A” and left click once in the middle of the symbol. The point is now captured. The cursor will change to a red cross-hair.

5. Left click again and the cross-hairs will anchor to the point.

6. Locate the symbol labeled “2A”, and left click once in the middle of the symbol. This will attach point “1A” to the cursor by a rubber band line.

7. Left click again and the cross-hairs will anchor to the symbol labeled “2A”. This is now the current point of the current feature. The current feature is the line segment that attaches “1A” and “2A”. To undo any point, select *Edit | Undo Add A Point.*

8. Locate the symbol labeled “4A”. Left click once in the middle of the symbol.

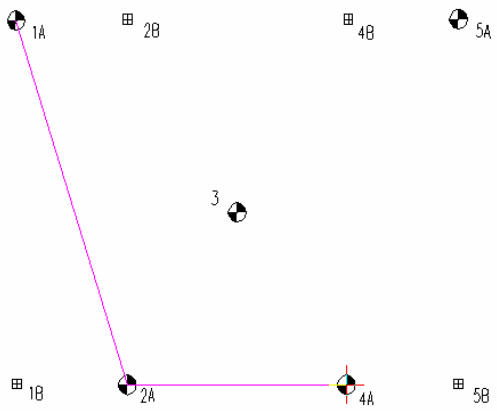


Figure: 3.2: Drawing with the mouse

9. Move the cursor over the line segment between 2A and 4A.

Notice the cursor changes to the insert cursor 

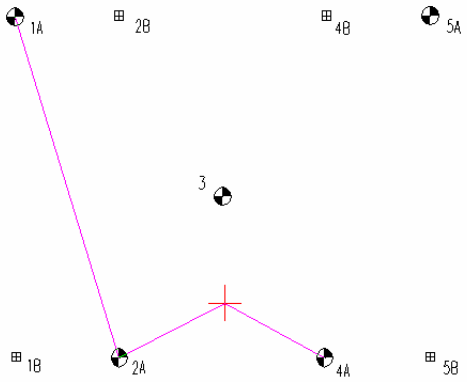


Figure 3.3: Inserting a Point at the End of a Segment

10. Left click on the line segment between 2A and 4A. Move to point 3, and left click to anchor the new point.

11. Move the cursor over the point labeled 5A and left click twice to add a new point.

You should now see a 'W' as shown in the figure below.

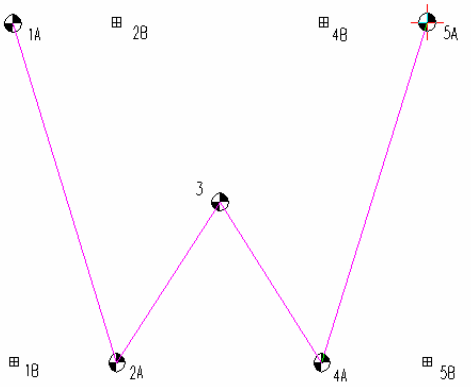


Figure 3.4: Completed W

12. Move the Entry mode cursor over "1A". The entry mode cursor changes to edit points mode and the Edit cursor now appears over 1A.

13. Left click over symbol "1A", the cursor will attach to the line segment.

14. Move the Edit cursor over symbol "1B" and left click again. This will attach the line segment to this point.

15. Repeat the above steps moving points "2A to 2B, 4A to 4B, and 5A to 5B. The W has changed to an M as shown in the Figure 3.5.

16. File | New to continue to the next tutorial or File | Exit to leave the program. Do not save changes

NOTE: When a point is captured it can be released by pressing the <Esc> key and deleted by pressing the <Delete> key. If the point is anchored and the <delete> key is pressed the entire feature will be deleted.

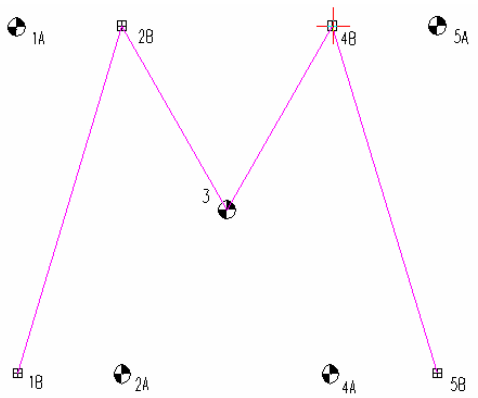


Figure 3.5: Completed M

Drawing Features Using the Mouse and Keyboard – Method Two

This example demonstrates an easier method to draw a new feature using the mouse.

1. File | Open. Select **\Tutorial\Terrain\Terrain Cad\park map.TER**. Click on the *maximize* button in the upper right corner of the Plan:1 Window.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

The Plan Window now displays triangular symbols with index stations 1 to 54. These index stations are surveyed points along the boundary. The following steps demonstrate how to trace the park boundary by "connecting the dots".

NOTE: If *Snap to Point* is selected, when a new point is created or an existing point is edited, the nearest point on an adjacent feature is also selected provided that it is within a minimum distance (2 mm).

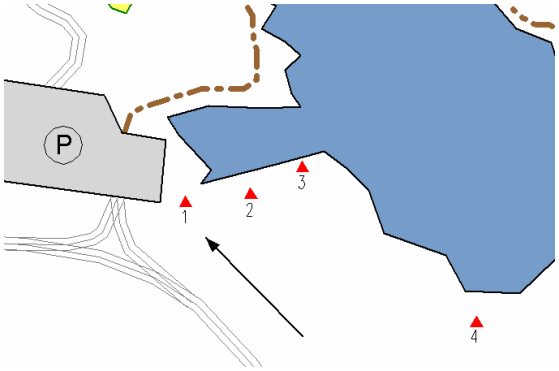


Figure 3.6: Boundary Starting Point

2. Press the *Draw New Feature* button. Position the cursor over the center of station 1 (indicated with the arrow in Figure 3.6) and press the number 5 key on the number pad. A new point should be created at the cursor position. If this does not happen, check that *Num Lock* on the keyboard is on.

NOTE: If your computer does not have a number pad, the letter S can be used instead of the number 5.

3. Move the cursor to Station 2 and press the 5 key on the number pad (or S Key). A new point will be created at the cursor position. Continue adding points around the boundary until it is closed. In case of a mistake use the edit function as described below to correct the problem.

NOTE: To change the location of an anchored point, move the entry cursor over the desired point until the cursor changes to the edit cursor and left click. Once the point is captured press the <Delete> key to delete the point. Pressing the <Esc> key will restore the point to its previous location.

Elevation Entry While Using the Mouse

If you have created a new feature with elevations (Edit | New Feature –

elevations on), it is possible to enter elevations using the following key definitions.

5	Same elevation as previous point. This may be overridden by Snap To Point including Z.
8	Up 1 contour interval. This may be overridden by Snap To Point including Z.
2	Down one contour interval. This may be overridden by Snap To Point including Z.
E or Ins	Enter co-ordinates including elevation

4. File | New. Do not save changes.

Selecting Features

A feature is a collection of points such as a contour line, a lake boundary or a single spot elevation point. Bitmap images are also considered to be features (in this case the corners of the bitmap are the feature points).

A *Terrain document* is a collection of features. Each feature has a unique name consisting of an 8 character *Alphanumeric Id* portion and a *Numeric Id* example ROAD-21. It is possible to have more than 1 feature with the same Alphanumeric ID such as STREAM-1, STREAM-2 etc.

NOTE: Feature names are not case sensitive "F1" = "f1".

The next several examples demonstrate how to select features by layer, name, range, property, boundary, or by using the mouse.

Selecting Individual Features With The Mouse 

1. File | Open. Select **\Tutorial\Terrain\Terrain\Terrain Cad\park map.TER**. Press open.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

2. Move the Selection cursor , over one of the stream features in the Plan Window and left click with the mouse. The stream feature should change color from blue to magenta (indicating that it is selected). Notice in the lower right corner the Name of the feature is displayed (STREAMCx-xx).

3. Select another feature. Notice when a new feature is selected, the previous feature is de-selected. The information in the Status window also changes to reflect that of the new feature.

Selecting Groups of Features With The Mouse

4. Hold down the <Shift key> and left click on a new feature. Notice that the previous feature remains selected. Use this technique to select several more features.

5. With several features selected, press the delete key on the keyboard or press the *Delete* button. The features are deleted and disappear. Press Edit | Undo Delete and the features reappear.

6. Left mouse click in any blank area on screen to de-select all features.

7. Depress the left mouse button and move the mouse any direction. Notice a rectangle is formed from the position where the mouse was first clicked. Release the left button. All features inside (or crossing) the rectangle are now selected.

8. Hold down the <Shift key> and left click on one of the selected features. This feature is de-selected and the other features remain selected.

Selecting All Features

9. Edit | Select Feature(s) | All or press the *Select All*  button. All features are now selected (magenta).

Inverting Selection

10. Hold the <shift> key down and de-select one of the features

11. Select Edit | Select Feature(s) | Invert Selection or press the *Invert Selection*  button, feature(s) previously selected are now un-selected and all feature(s) previously un-selected are now selected. In this case one feature will be selected and the rest will be de-selected.

12. Proceed to Step #2 in Selecting by Layer or exit the program by selecting File | Exit. Do not save any changes

NOTE: One of the selected features contains a red cross-hair. This indicates the *current point.* The feature containing the *current point* is the *current feature.* Information about the current feature and current point are displayed in the Status Window.

NOTE: Most operations in the Terrain Module apply to a selected set of features or points such as formatting, moving, deleting etc.

Selecting Features By Name 

1. File | Open. Select **Tutorial\Terrain\Terrain Cad\park map.TER**.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

If you are continuing from the previous example, select Edit | Undo Delete. Left click in any blank area to de-select all features.

2. Edit | Select Feature(s) | By Name or press the *Select By Name* button.

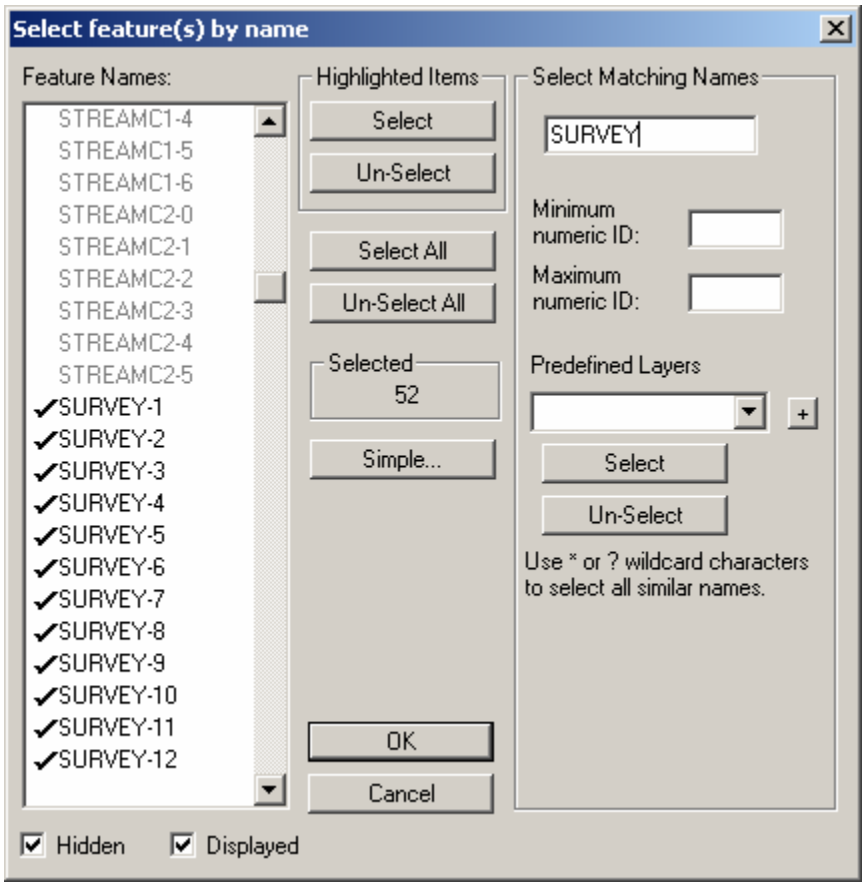


Figure 3.14: Select Feature(s) By Name Dialog

3. Press the *Advanced* button. Type "SURVEY" in the *Select Matching Names* area as shown above**.** Press the *Select* button in the *Select Matching Names* area. Press OK. A number of triangle features are selected. All of these features have the name SURVEY.

4. File | New. Do not save any changes.

Selecting Features by Layer 

Each feature has a unique ID. This name can be used to organize a map into different layers. For instance, in Park Map all Class 1 streams have been named STREAMC1 and Class 2 streams as STREAMC2. These names can be quickly used to select all Class 1 streams, Class 2 streams, or all streams.

1. File | Open. Select **\Tutorial\Terrain\Terrain Cad\park map.TER**.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

2. Edit | Select Feature(s) | By Layer or press the *Select By Layer*  button to activate the S*elect Features by Layer* dialog box.

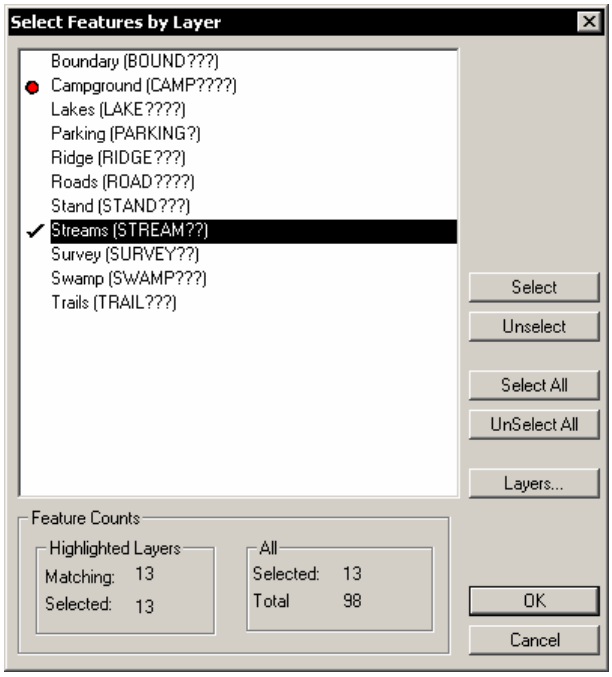


Figure 3.7: Select Features by Layer Dialog

3. Press the *Un-Select All* button to de-select all features.

4. Select Streams in the list-box and then press the *Select* button. The information in the *Feature Counts* changes indicating that 13 of the 98 features are streams. Press OK to return to the main screen. The 13 selected streams are highlighted in magenta.

Features can also be selected or de-selected by double clicking with the left mouse when the cursor is over the feature name in the dialog.

5. To create a new layer for the Class 1 streams, press the *Select By Layer*  button or Edit | Select Features | By Layer to activate the S*elect Features by Layer* Dialog Box. Click on the *Layers* button to activate the *Layers* dialog box.

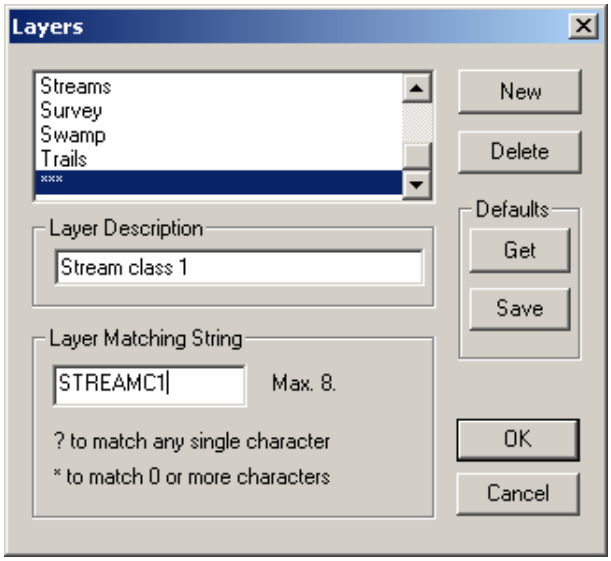


Figure 3.8: Add/Remove Layers Dialog

6. Press the *New* button. Type in the *Layer Description* field "Stream Class 1". Type in STREAMC1 into the *Layer Matching String*. Press OK to return to the *Select Features by Layer dialog*.

7. Press the *Un-Select All* button to de-select all features. Select *Streams Class 1* in the list-box and press the *Select* button to select all Class 1 stream features. Look at the Streams item. Note the grey check mark beside Streams. This indicates that only part of the STREAM layer has been selected. Press OK to return to the main screen.

The following steps demonstrate how to turn off the display of all features except the STREAMS.

8. Edit | Select Features | By Layer or press the *Select By Layer* button to activate the S*elect Features by Layers Dialog Box*. Press the *UnSelect All* button to un-select all features. Highlight *Streams* in the list-box and press the *Select* button to select them. Press OK.

9. Choose menu Edit Select Features | Invert Selection. This will this will switch the selected and unselected features so that all features are now selected except the stream class 1 features.

10. Edit | Modify Selected Feature(s) | Properties or press the *Properties*  button in the toolbar. Turn off the *Display check box.* Press OK to return to the main screen.

NOTE: All the features are still displayed. Click on a blank area of the screen (where there are no features) to de-select all features.

11. Press the *Repaint All* button  to redraw the entire screen (removes the hatched areas). Notice that only the streams are displayed. If the *Repaint All* button is not visible, select View | Toolbar | Navigation Tools.

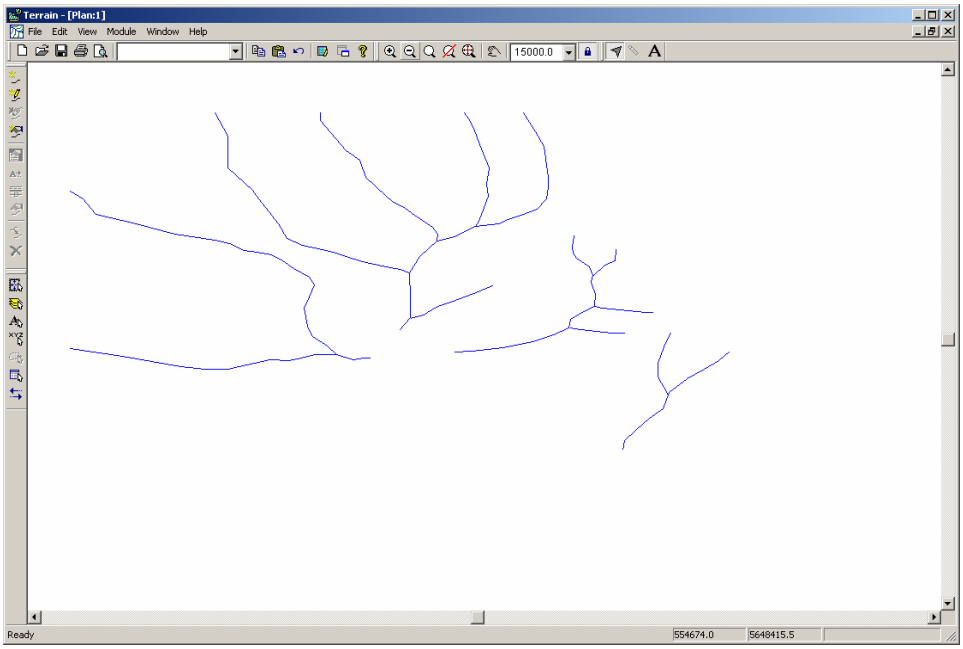


Figure 3.9: Streams Layer

12. File | New. Do not save any changes.

Line-types

1. File | Open. Select **Tutorial\Terrain\Terrain Cad\park map.TER**. Press Open. Click on the *maximize* button in the upper right corner of the Plan:1 Window.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

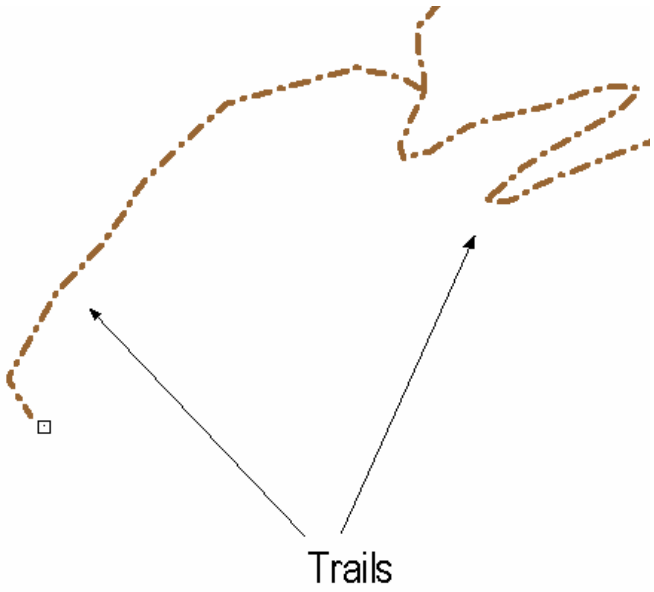


Figure 3.16: park map.TER

2. Dashed lines identify the trails in Park Map (see Figure 3.16). Hold down the <Shift> key, with the *Select* cursor left click on each of the trails. Use zoom and screen scrolling to see all of the trails. If a wrong feature is accidentally selected, de-select by clicking again on the same feature with the shift key still depressed. To start again left click in a blank area to de-select all features.

The trails could also have been selected by either pressing the *Select By Name* button or selecting menu Edit | Select Feature(s) | By Name.

3. Edit | Modify Selected Feature(s) | Line-types, Symbols or press the *Line style* button to activate the *Plan Window Feature Formatting* dialog box.

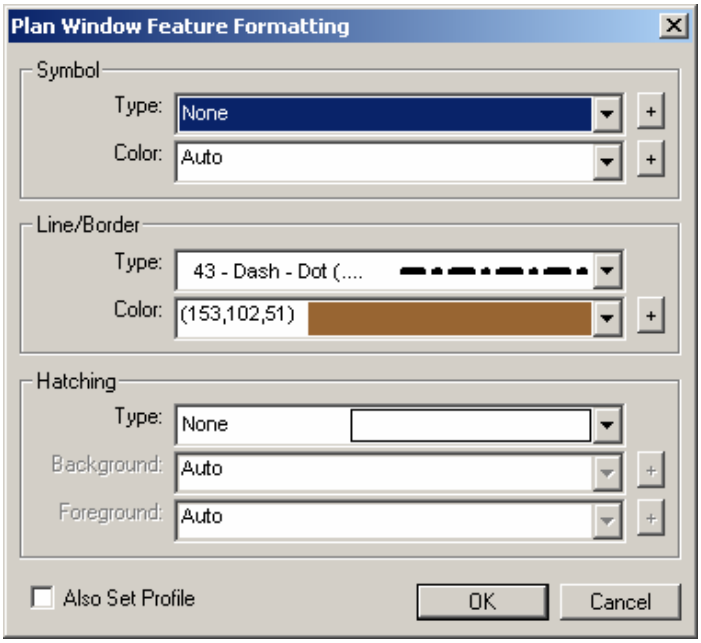


Figure 3.17: Line-types and Symbols Dialog

4. Change the line-type: from 43 Dash Dot to 43 - Dash x 2 (narrow). Press OK. Left click anywhere in the Plan Window to de-select trails.

5. Proceed to step #2 in Adding Symbols or File | New to exit the program. Do not save changes.

Symbols

Park Map Example

1. File | Open. Select **\Tutorial\Terrain\Terrain Cad\park map.TER**. Press Open. Click on the *maximize* button in the upper right corner of the Plan: 1 Window. If continuing from the previous example, left click in a blank area to de-select all features.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

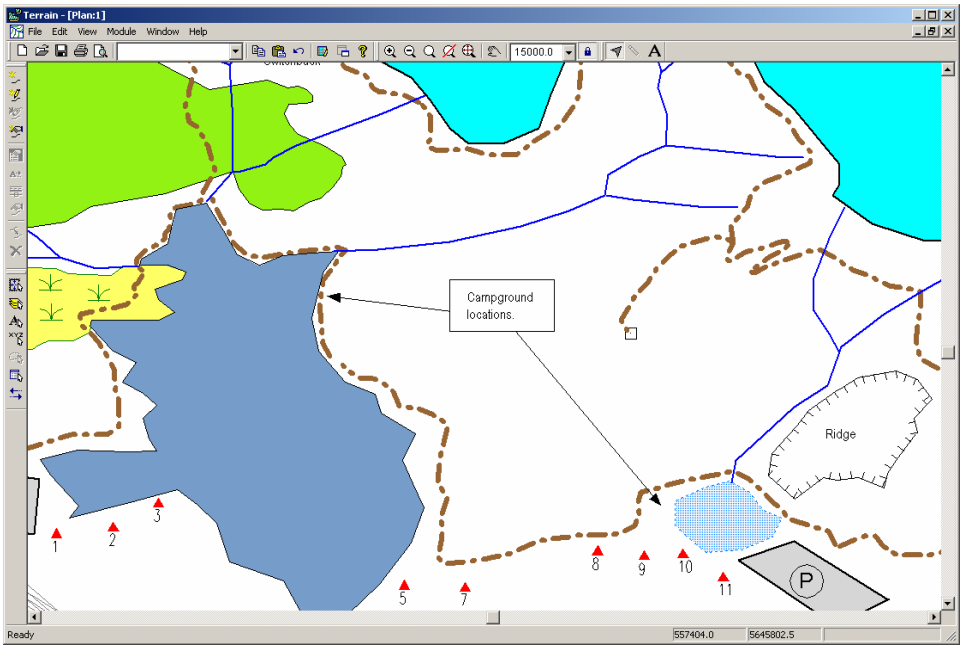


Figure 3.18: Campground Locations

2. Edit | New Feature to activate the *Feature Properties* dialog box. Select CAMP from the *Name combobox*. Turn off *Elevations* and *Modelled* as shown in Figure 3.19. Press the *Mouse* button.

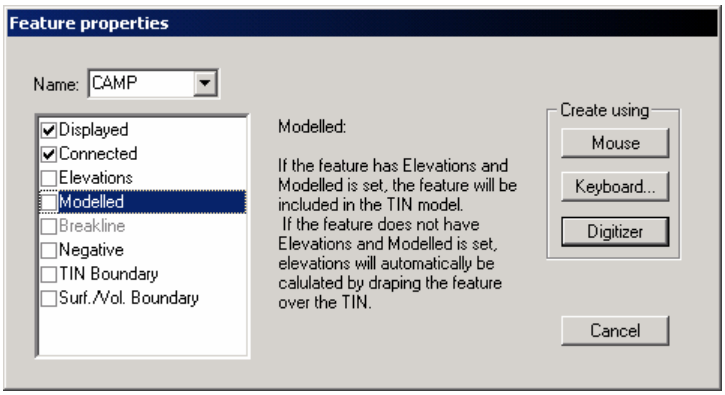


Figure 3.19: New Feature Properties Dialog

3. Move the  cursor to one of the campground locations as indicated by the 2 arrowheads in Figure 3.18 and press the left mouse once to create (and capture) a new point. Left click again to anchor the new point.

4. Edit | Modify Current Point(s) | Symbols and choose *Campground* for the symbol. Press OK to return to the main window.

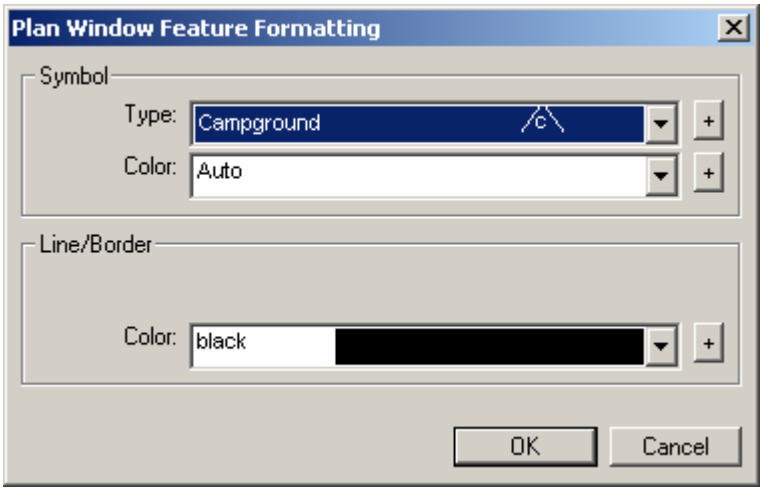


Figure 3.20: Campground Symbol Selection Dialog

5. Press the *Repaint All* button  to redraw the entire screen.

A campground symbol has now been created. The following steps will duplicate this symbol at the other two campground locations.

6. With the campground symbol still selected, press <Ctrl +C> or press the *Copy*  button to copy it. These are shortcuts for menu Edit | Copy.

7. Press <Ctrl +V> to paste symbol. A rectangle should appear around the campground symbol.

8. Move the cursor inside the rectangle. The cursor should change its' shape to a 4 sided arrow. Left click and drag the copied symbol to the other location.

9. Press the *Repaint All* button  to redraw the entire screen.

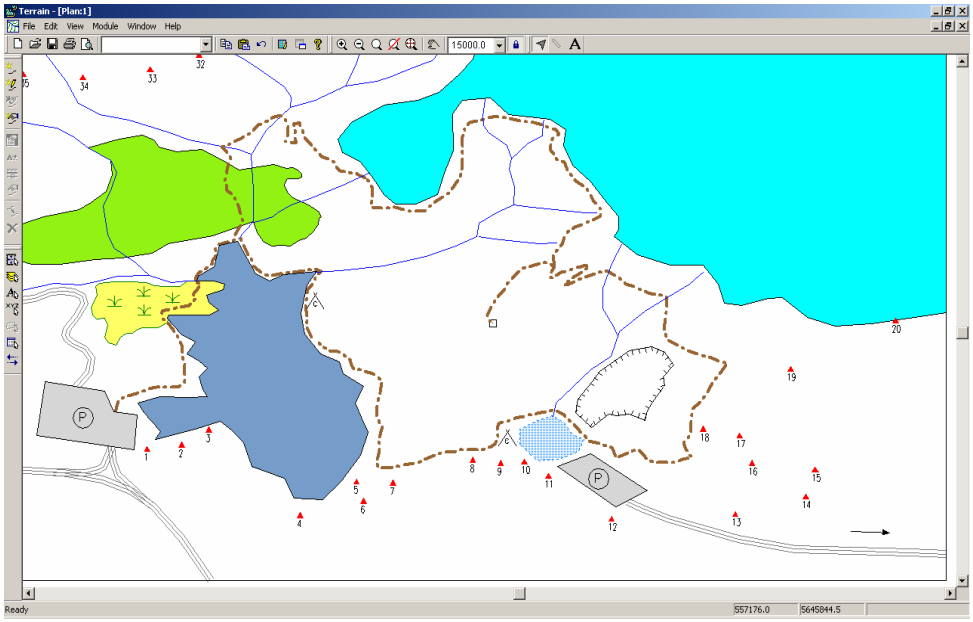


Figure 3.21: Park Example with Campground Symbols

10. Proceed to Step #2 of the next example or exit the program by selecting File | New. Do not save changes

Creating a Boundary Polygon

To do this example the *Mapping and Drafting, Import Basic and Export Basic Enhanced Mapping and Drafting* must be enable. See *Function Groups* in the On-line help for more information

1. File | Open. Open **\Tutorial\Terrain\Terrain Cad\park map.TER**. If continuing from the previous example, left mouse click in a blank screen area to de-select campgrounds.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

2. Edit | Select Feature(s) | By Name or press the *Select By Name* button.

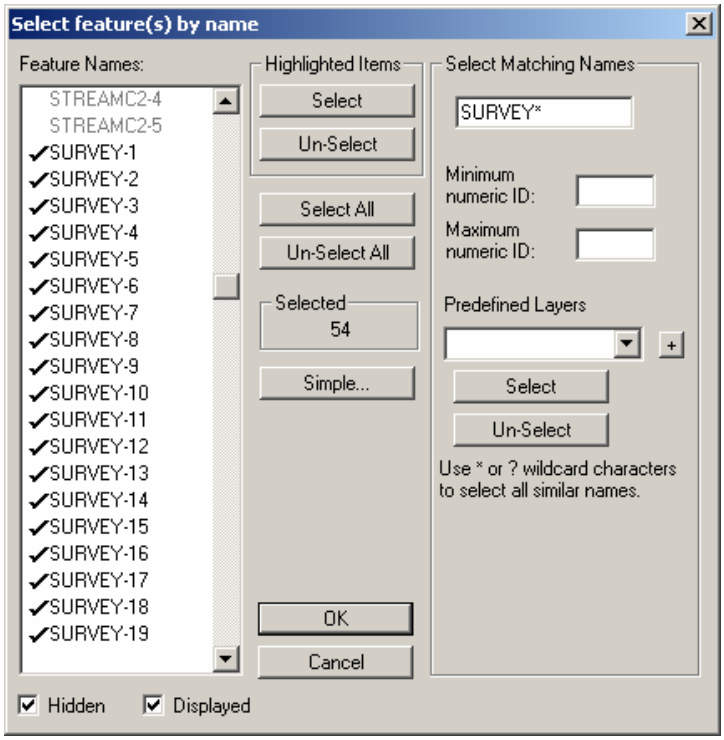


Figure 3.22: Select feature(s) by Name Dialog

3. Press the *Advanced* button and type **SURVEY*** into the *Select Matching Names* area as shown in the figure above. Press the *Select* button in the *Select Matching Names* area. Press OK. A number of triangle features are selected. All of these features have the name SURVEY.

4. Press the *Properties* button in the toolbar or Edit | Modify Selected Feature(s) | Properties. Turn *Connected* on. Press OK.

5. Edit | Modify Selected Feature(s) | Join. All the selected features will be joined.

6. Press the *Line style* button to activate the *Plan Window Feature Formatting* dialog box. Change the *Line-type* to *5-thick (medium*) and change the Symbol to *None.*

7. Edit | Modify Selected Feature(s) | Close. The boundary will close and the map should look like Figure 3.23.

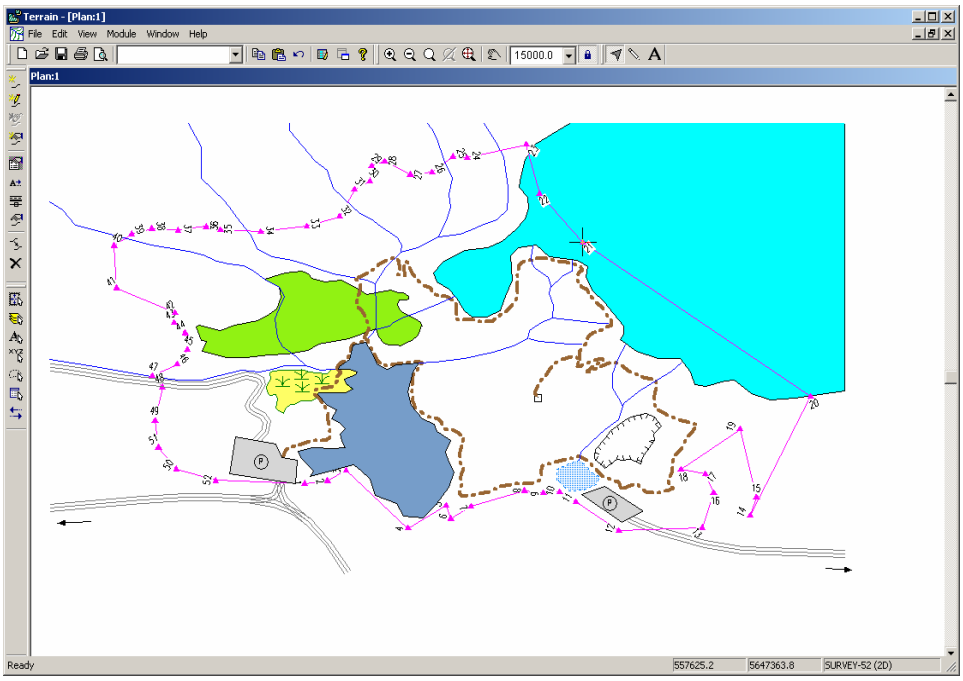


Figure 3.23: Park Boundary

Labels

There are two types of labels used in the Terrain Module, *Automatic labels* and *Floating Labels*.

> ***Feature Labels*** are labels associated with a feature. *Elevation*, *Azimuth*, and *Distance* are all examples of automatic labels. Point or feature attributes such as *Comments, Date, Point Numbers* etc. are Feature Labels. Whenever a feature is edited or deleted feature labels are modified accordingly.
>
> ***Floating Labels*** are simply user-defined text. They do not depend on any feature and can be placed anywhere and modified directly.

The default characteristics (position, font, size, orientation etc.) for each label class is controlled by window type (Plan, Profile etc.). For the Plan Window these defaults are set in menu *View* | *Active Window (Plan) Options* | *Labels* | + .

8. Choose menu View | Active Window (Plan) Options | Labels tab. Turn on *Floating Labels* by double clicking on it in the list box. Press OK twice to return to the main screen.

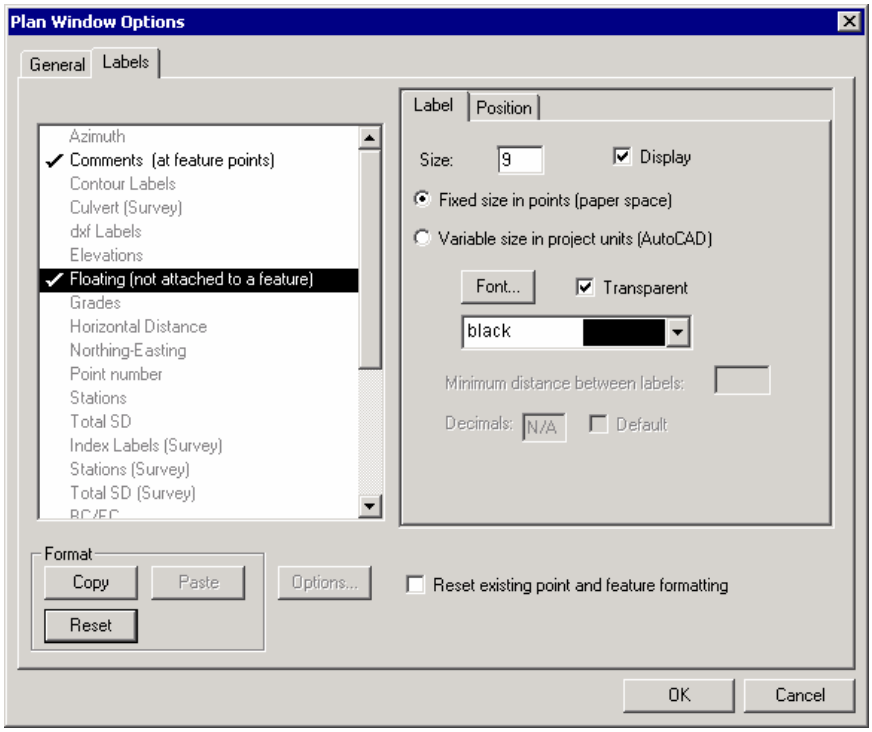


Figure 3.23a: Plan Window Options- Default Label Format

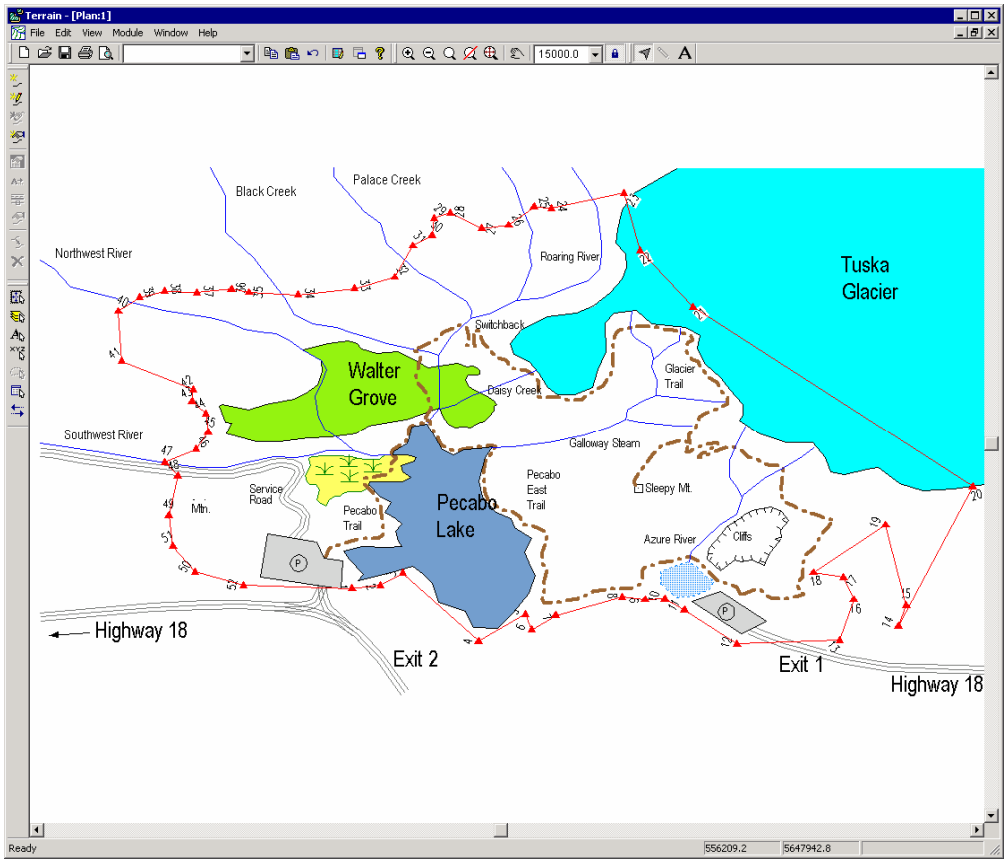


Figure 3.24: Plan Window with Floating Labels

It is often useful to override the default label positioning for individual features. For instance you may wish to turn on or off a certain class of labels for a specific feature. Label control of individual features is done using menu Edit | Modify Selected Features | Labels. We will use this function to turn off the labels in our boundary.

9. Highlight the park boundary with the Selection cursor.

10. Choose menu Edit |Modify Selected Features | Labels. Turn off the display of *Comments (at feature points)* by double clicking in the list box.

11. Click the *Reset all existing point and feature formatting* checkbox. Press OK and answer "Yes" to the prompt "Do you wish to reset point formatting?"

We will now add a floating label to our park map.

12. Click on the  *Label Edit* button to initiate *Label Edit mode*.

13. With the  cursor click on upper left corner of the map and enter the text ("Park Boundary"). See Figure 3.24a.

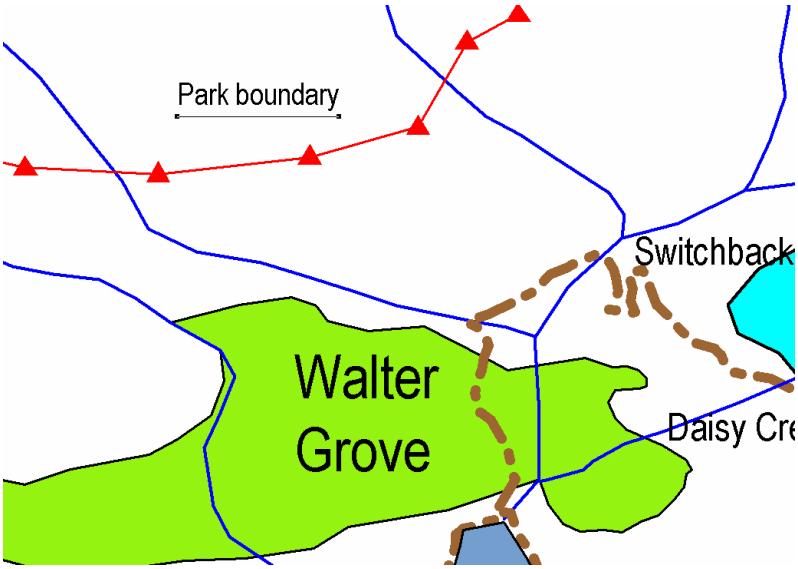


Figure 3.24a: Plan Window Feature Formatting Dialog Box

Note: The is referred to as the *Orientation handle* and the , is referred to as the *Position Handle.*

To move the position of a label, move the cursor over the *Position Handle* (or any part of the label). Left click and drag the label to a new location and release.

To rotate a label, move the cursor over the *Orientation Handle*. Left click and pivot the label to the preferred position and release the left mouse.

Hatching

To complete the example hatching will be used to shade the park area.

14. Highlight the park boundary with the Selection cursor.

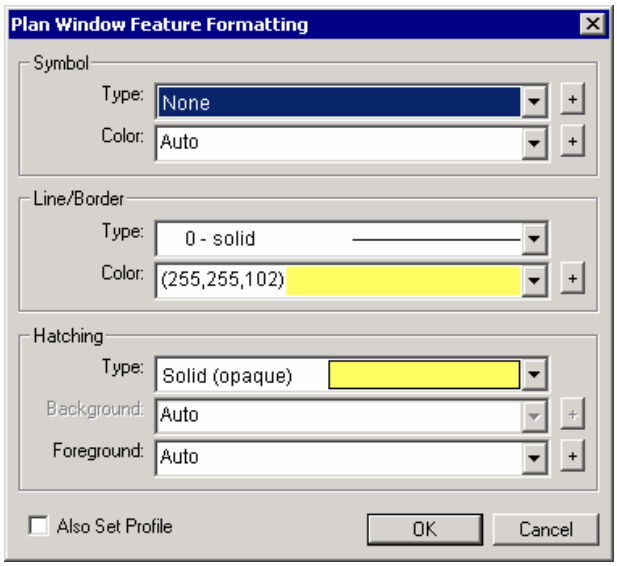


Figure 3.25: Plan Window Feature Formatting Dialog Box.

15. Edit | Modify Selected Feature(s) | Line-types, Symbols. Set Symbols to *None*, color *Yellow (255,255,102)* and hatch type *Solid (opaque)*. Press OK.

NOTE: (*255,255,102*) is a notation for Red, Green, Blue values. It is possible to create any color (supported by a graphics card) by clicking on the plus (+) button beside the color combo box and entering an RGB value.

16. With the boundary still selected, choose menu Edit | Modify Selected Feature(s) | Shuffle Display Order | Shuffle to back.

At this point your map should look similar to the Figure 3.26.

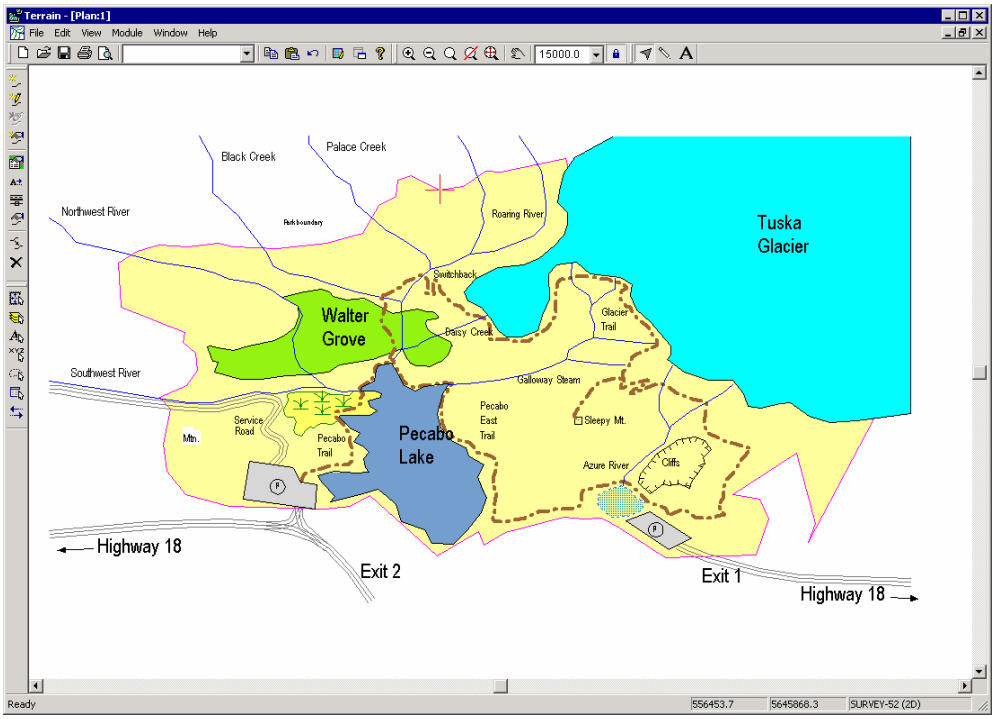


Figure 3.26: Map with Shaded Boundary Polygon

17. File | New. Do not save changes.

Creating an Output Sheet

Park Map Example

This example is intended to familiarize you with the Multi-plot functions for creating an output sheet.

1. File | Open. Select **\Tutorial\Terrain\Terrain Cad\park map II.TER**. Press Open.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

2. Go to File | Printer Setup. Ensure the printer is setup for letter size (21.59 x 27.94 cm or 8.5 x 11 in) and Orientation is Landscape.

NOTE: The Multi-Plot output setup depends on the paper size of your default printer.

3. Window | New Window | Multi-Plot, a blank multi-plot page will appear. Click on the *maximize* button in the upper right corner of the Multi-Plot Window.

4. Choose menu View | Multi-plot Options. Check *Snap to grid* and *Show Grid*. Press OK.

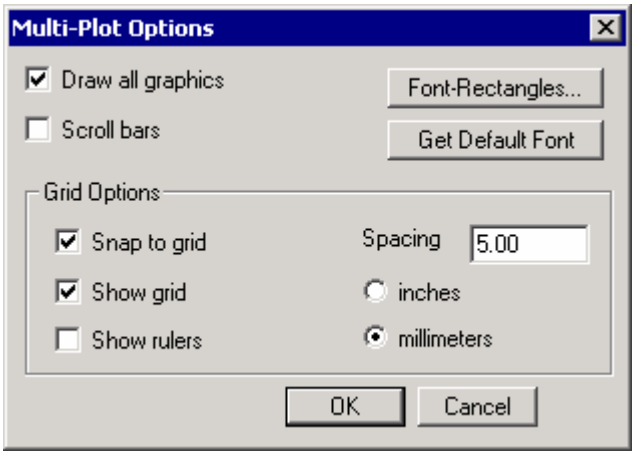


Figure 3.27: Multi-plot Options

A Multi-plot sheet consists of a series of *Sub-views* such as plans, profiles, legends, images, title blocks etc.

5. Edit | New Sub-View | Plan: 1. A Plan Sub-View will appear in the middle of your multi-plot sheet.

Notice that there are 8 handles that you can click and drag to change the size of the Sub-View. Click and drag anywhere else on the Plan Sub-View to move it. The <Delete> key will remove the selected Sub-View(s).

6. Resize and reposition the Plan Sub-View until it appears approximately in the top 2/3 of the output sheet (see Figure 3.30).

7. To center the map in the Plan Window, press <Shift + left arrow >. A prompt as shown in Figure 3.28 will appear. Press OK and continue manually controlling the position of the Plan window using the <Shift +arrow >keys.

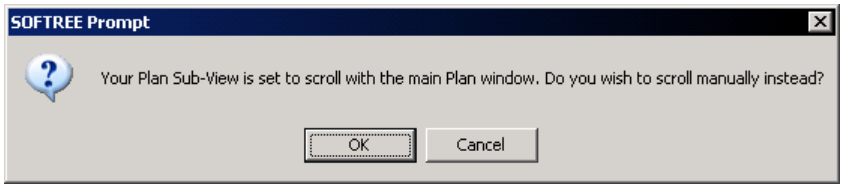


Figure 3.29: Plan Window Sub-view Manual Scrolling Prompt

NOTE: Positioning the map inside the Plan Window can be done using the <Shift + arrow> keys. By default, the Plan Sub-View scrolls with the main Plan Window (menu Plan:1).

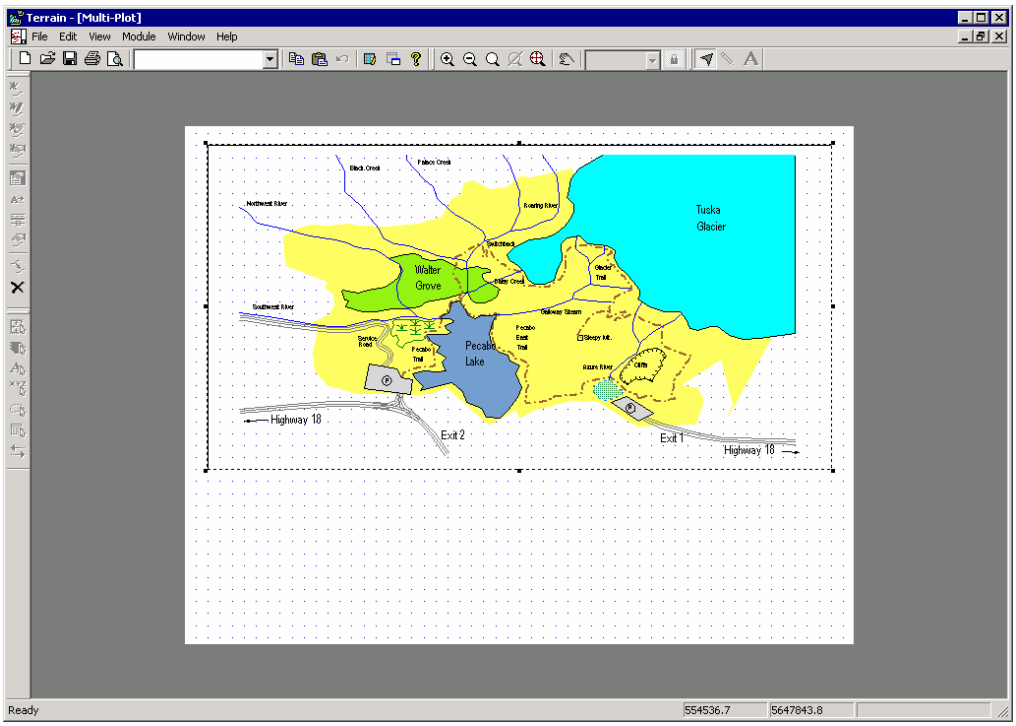


Figure 3.30: Multi-Plot Plan Sub-View of Plan1.TER

Adding a Legend and Scale Bar

8. Edit | New Sub-View | Legend. A legend will appear in the middle of your multi-plot sheet.

9. View | Multi-Plot Sub-View Options, to activate the Legend Sub-view Options dialog box or double click on the Legend sub-view will also activate this dialog box.

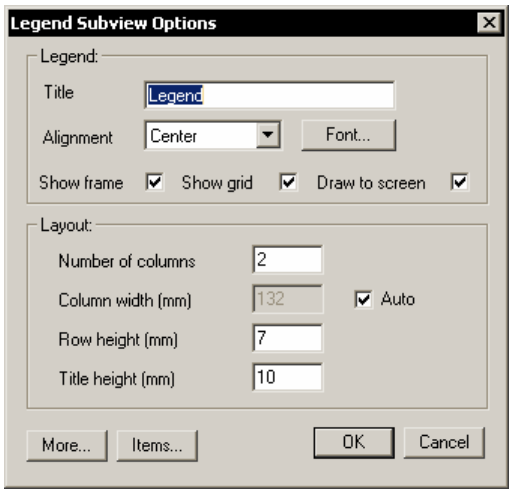


Figure 3.31: Legend Sub-view Options Dialog

NOTE: When the *Auto* check box is enabled, the window frame size determines the width of the column. The frame can be made smaller or larger by clicking and dragging on any of the eight handles. If you disable the *Auto* option, the column width can be changed manually.

10. Configure the dialog box as shown in Figure 3.31 above.

NOTE: When the Legend Sub-view is created, the current file is searched to find all distinct symbols, line-types, and hatch types. These items are included in the default legend along with their associated feature name.

11. To modify the legend entries, press the Items button. Delete all line-types that do not appear in Figure 3.32. Change the descriptions to match. Do this by clicking on the desired list item and then changing the Description in the Current item area. Press OK to close dialog boxes.

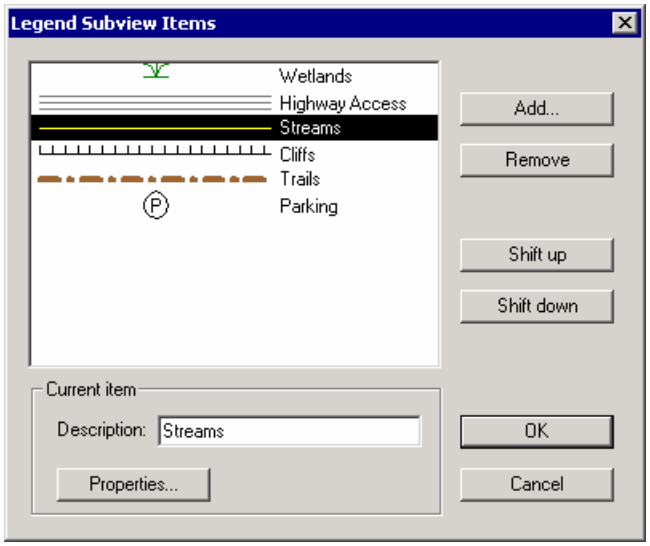


Figure 3.32: Legend Sub-view Options Dialog

12. Re-size and re-position the legend directly below the plan sub-view and on the left side of the page.

13. Edit | New Sub-View | Scale Bar, a scale bar will appear in the middle of your multi-plot sheet.

14. View | Multi-Plot Sub-View Options or double click on the scale bar to activate the Scale Bar Sub-view options dialog box.

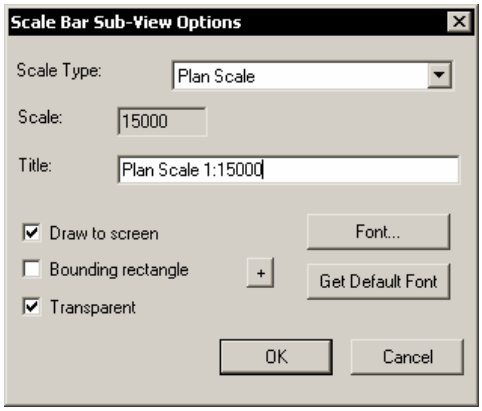


Figure 3.33: Scale Bar Sub-View Options Dialog

15. Type in the *Title:* **Plan Scale 1:15000** and press OK.

16. Re-size and re-position the scale bar inside the Plan sub-view (see 3.34 below). If you click on the Plan Sub-View by mistake the scale bar will be shuffled to the back and you will no longer be able to move or size it with the mouse; use the Edit | Shuffle Front To Back menu to correct this.

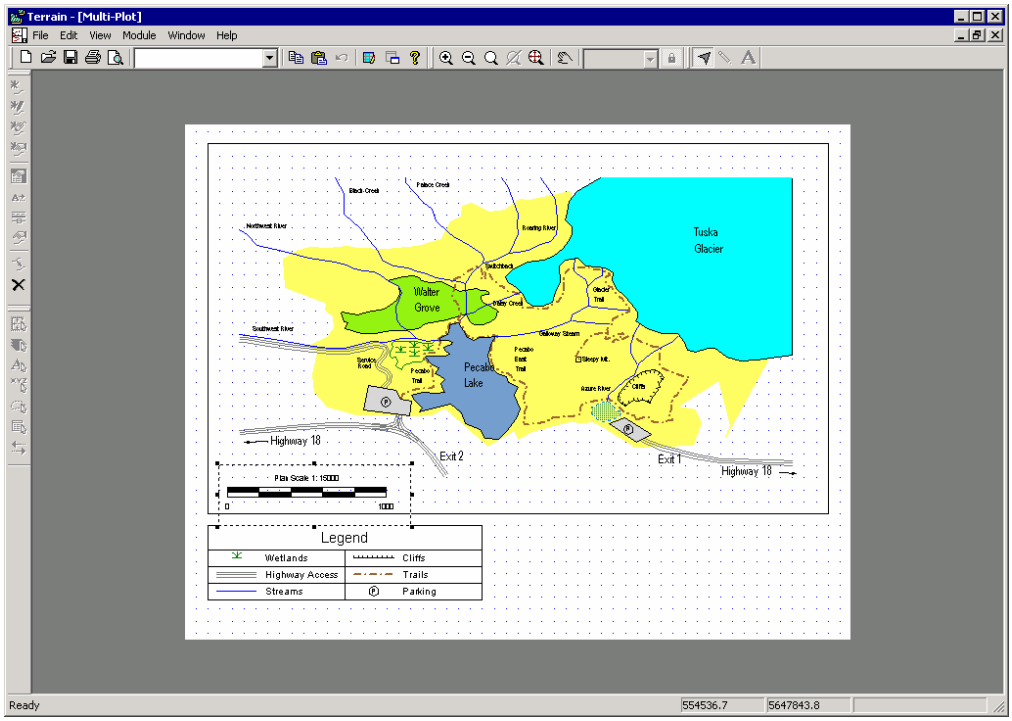


Figure 3.34: Final Multi-Plot Output

17. Choose menu Edit | New Sub-view | Rectangle. Type in the Text "Example Park Map" and choose the Font button and set the font size to 18. Press OK and position the sub-view as shown in figure 3.35.

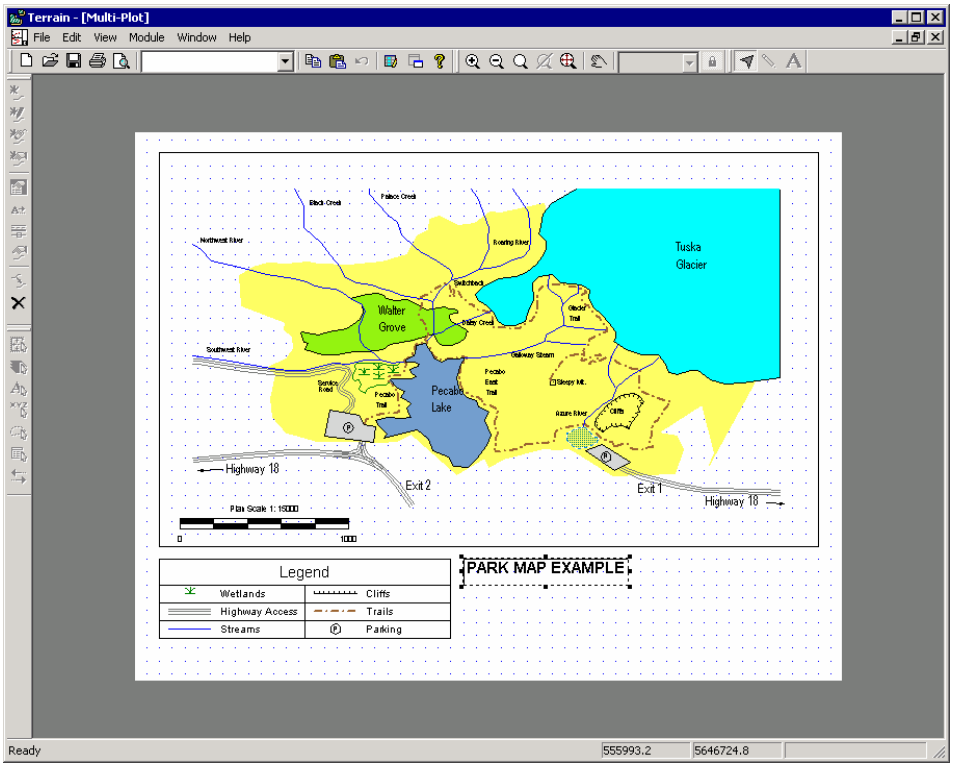


Figure 3.35: Multi-Plot Rectangle

18. Repeating the procedure from step 17, create and position several rectangles as shown in Figure 3.36. Enter any text you wish.

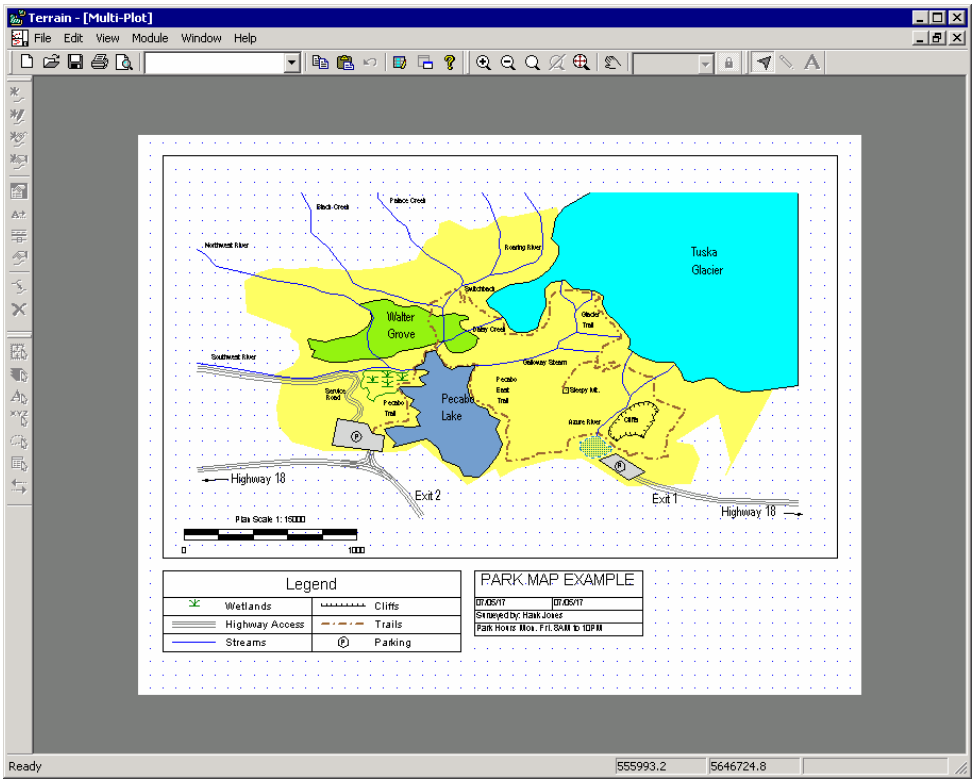


Figure 3.36: Multi-Plot With Rectangle

19. File | New. Do not save changes.

Bitmap Images

Digital images (or bitmaps) can be used to enhance the visual impact of a map or drawing. They can also be used to extract and/or represent geometric information. The Terrain Module allows you to import bitmap images in various standard formats such as BMP, JPG or TIF. In order to use images for mapping they must be *georeferenced*.

In GIS terminology *Georeferenced* means 'tied to a specific geographic location on the earth'. A georeferenced image is one that has been scaled, rotated and stretched into position to correlate to a map projection. It may be an aerial photograph, a scanned paper map or a satellite image. What makes a georeferenced image distinct from other raster images is the inclusion of coordinate data used to locate its exact geographic position. This additional coordinate information can either be encoded in the image (e.g. Geotif), or as a separate "world" file (e.g. *.tfw).

Standard images (*.bmp, *.jpg etc) do not contain georeference information. However, images from mapping or GIS sources contain this information. If an image is not georeferenced, Terrain Tools can used to create this information. This example will explore several methods for georeferencing an image.

To do this example *Mapping and Drafting, Import Basic and Export Basic* function groups must be enabled. See *Function Groups* in the on-line help for

Scaling an Image 

Real-estate Areas Example

In this example we will measure a feature of known length on the image. The image will then be scaled (by setting the pixel size) so that the feature has the correct length.

NOTE: This procedure will only scale the image. The image is not corrected for position and rotation.

1. File | Retrieve Screen Layout. Select and open **\Tutorial\Terrain\Terrain Bitmap\bitmap scale.ILT**.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

This screen layout sets options such as Plan Window location and scale. To check which options have been set go to View | Active Window (Plan) Options.

2. File | Insert File to activate the *Insert File* dialog box.

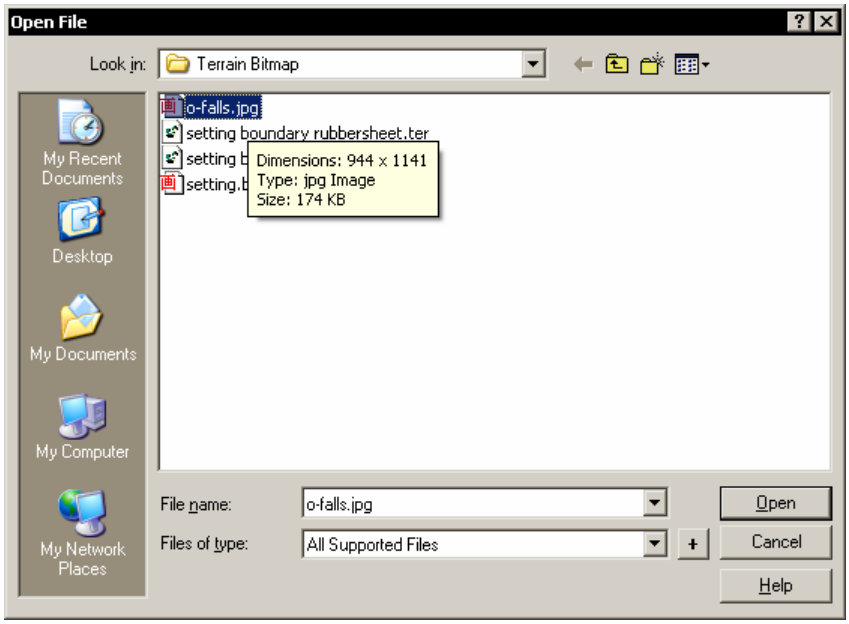


Figure 4.0: Insert File Dialog

Set *Files of type* to either *All Supported Files* or *Image Files [*.TIF, *.JPG, *.BMP]*. Select **\Tutorial\Terrain\Terrain Bitmap\O-FALLS.JPG** to activate the Import Options dialog box.

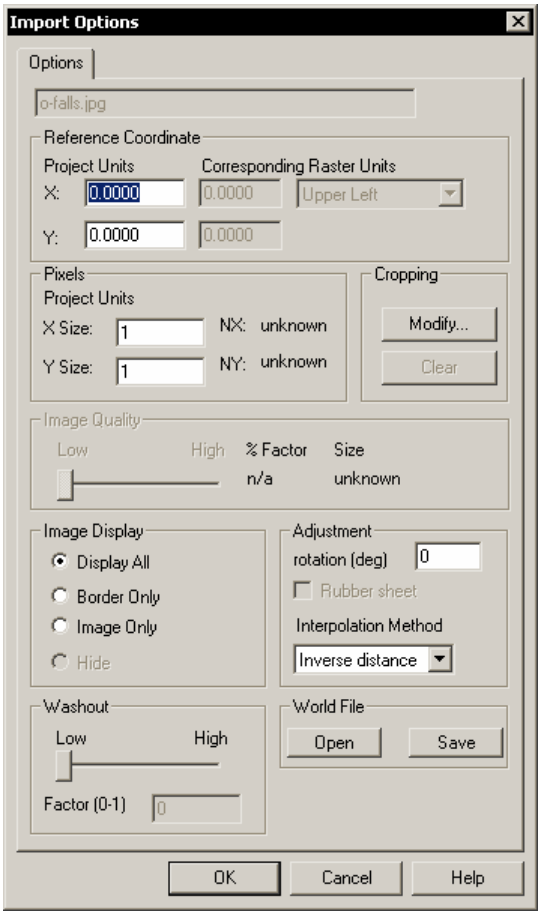


Figure 4.1: Import Bitmap Options Dialog (Used to Geo-Reference and Scale Bitmaps)

NOTE: If the natural scale and the dots per inch (dpi) are known then the pixel size can be calculated using the following formula:
An image was scanned at 200dpi (dots per inch) and the natural scale is 1:12000. Hence:

$$\text{Pixel size} = \frac{1\text{map-inch}}{200\text{pixel}} * \frac{12000\text{inch}}{1\text{map-inch}} * \frac{25.4\text{mm}}{1\text{inch}} * \frac{1.0\text{m}}{1000\text{mm}}$$

$$= 1.524\text{m/pixel}$$

In this example the natural scale is known, but the dots per inch are not. By creating a feature over the scale bar, you will be able to determine the length of the scale bar and calculate the pixel size accordingly.

3. Press *OK* to import the image. The Plan window now displays the imported bitmap.

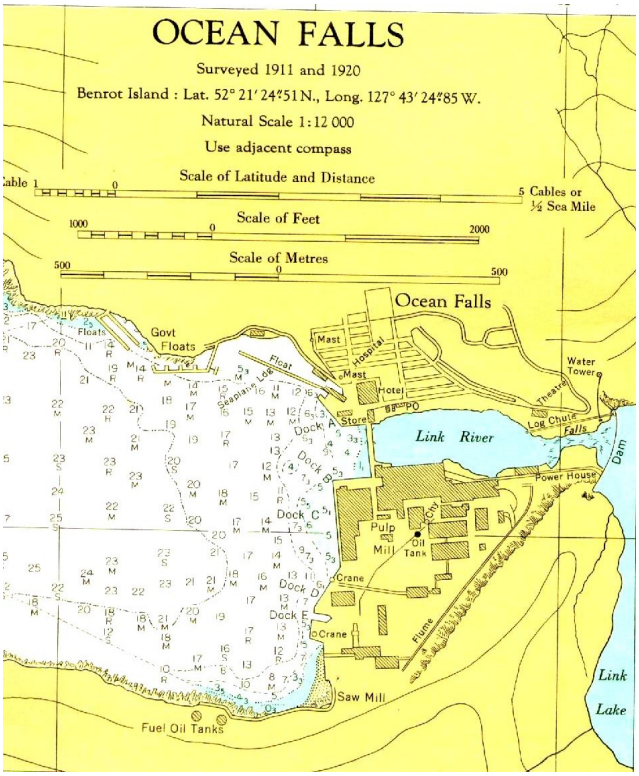


Figure 4.2: Imported Bitmap

4. Click the *Zoom In* button  once or twice or use the *Zoom to Window* button  and click and drag so the scale bars are clearly visible.

This map has three scale bars. This example is in metric units. Go to the Module | Setup dialog box to change units if necessary.

5. With the cursor in the Plan Window, right-click and choose menu *New Measurement*. Move the mouse until the cross-hair is over one end of the "*Scales of Metres*" bar and left-click, move the mouse over the other end of the scale bar. Create a second point in a similar way over the other end of the *"Scales of Metres*" bar.

The length of the new feature is now displayed in the Measure Tool window (see below).

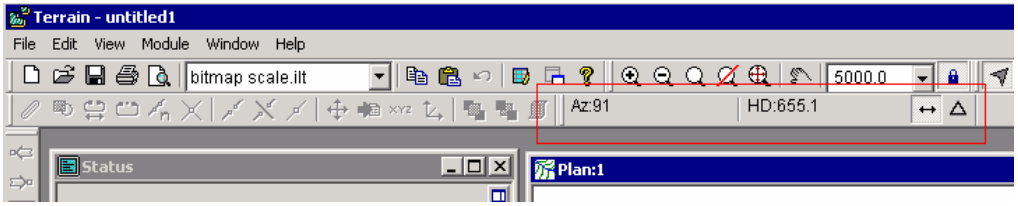


Figure 4.2a Measure Tool

The *"Scale of Metres"* bar should be about 655.1m long. This length is clearly wrong so the bitmap must be re-scaled.

6. Use the right mouse to change back to *select* mode . Left click on the bitmap border to select it (the border turns magenta).

7. Edit | Modify Selected Feature(s) | Properties or press the *Properties* button in the toolbar menu to activate the *Bitmap Options* dialog box.

The current pixel size is set to 1.0. Scale it by multiplying by the true scale bar length divided by the measured scale bar length:

New Pixel Size (m) = 1.0m * 1000.0m/655.1m = 1.526m

New Pixel Size (ft) = 1.0ft * 3000.0ft/597.8ft = 5.018ft

8. Type the appropriate pixel size (1.526m or 5.018ft) into both the *X size* and *Y size* fields assuming that the bitmap is not distorted). Press OK to close the dialog box and re-paint the image.

The image is scaled correctly. If the image were distorted then the process should be repeated using a vertical feature of known length to calculate the *Y size.*

If desired, verify the image is scaled correctly by measuring the scale bar again.

Tracing Image Features

The following steps demonstrate how to trace features in the image and use them to calculate their area.

9. Activate the Plan Window by clicking on the title bar and select menu View | Active Window (Plan) Options. Change the scale to 5000 if working in metric units (or 1000 if working in feet units).

10. Scroll the Plan window so that the pulp mill buildings are visible. Use  to zoom in on buildings. Trace around the boundary of three of the buildings using the mouse tracing functions. See *Drawing a Feature* in the *Mapping and Drafting* section or *Tracing with the Mouse* in the On-line help.

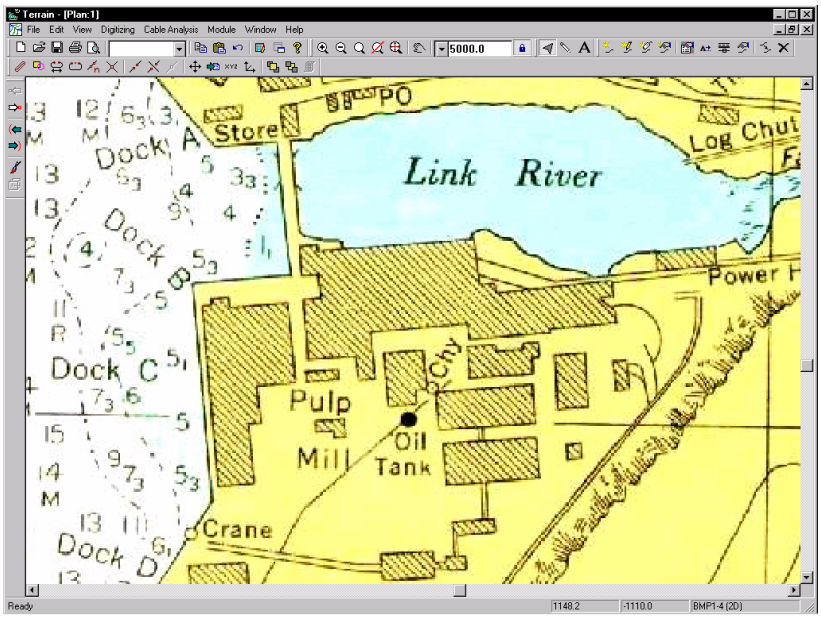


Figure 4.3: Ocean Falls Buildings

11. Make sure the Num/Lock is active on the computer keyboard. Click the *Draw New Feature* button  to begin drawing a new feature. Move the pencil  cursor over one of the corners of a building left click to anchor the new point. Move to next adjacent corner and left click again to create another point. Continue this procedure until you have traced around all the points in the building.

12. Click the *Draw New Feature*  button to begin a drawing a new feature and repeat the above step to trace around the next two buildings.

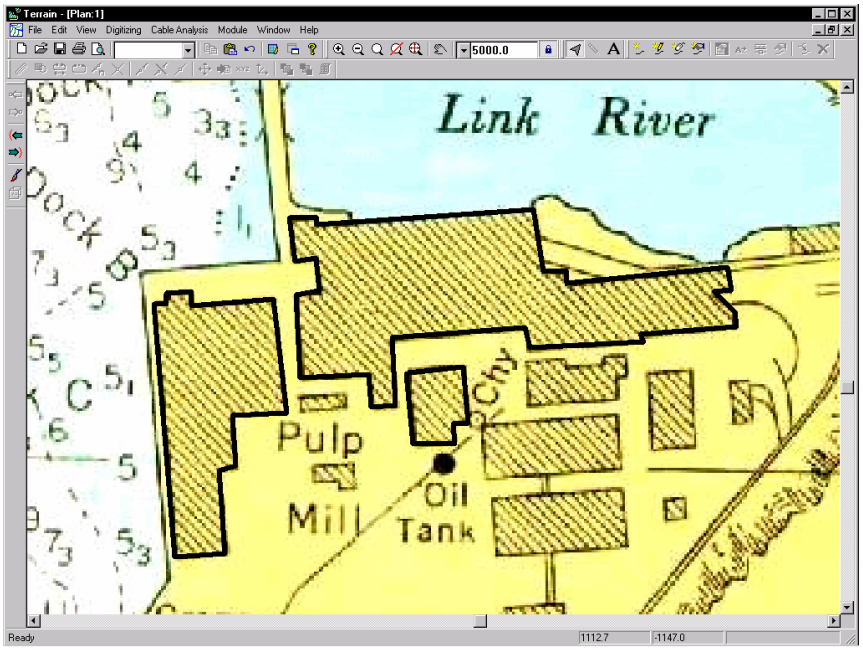


Figure 4.4: Traced Buildings

13. Use the right mouse to change back to *select* mode. To select all the traced buildings, left click and drag a rectangle to encompass all the traced buildings.

14. Edit | Modify Selected Feature(s) | Line-types, Symbols. Select line-type *6-thick (heavy)* and change the color to *blue*. Press OK.

15. Activate the Status Window to view the area of the selected features. If working in metric units the area of the buildings should be approximately 2.9 Ha. (Imperial units the area should be approximately 7.0 acres).

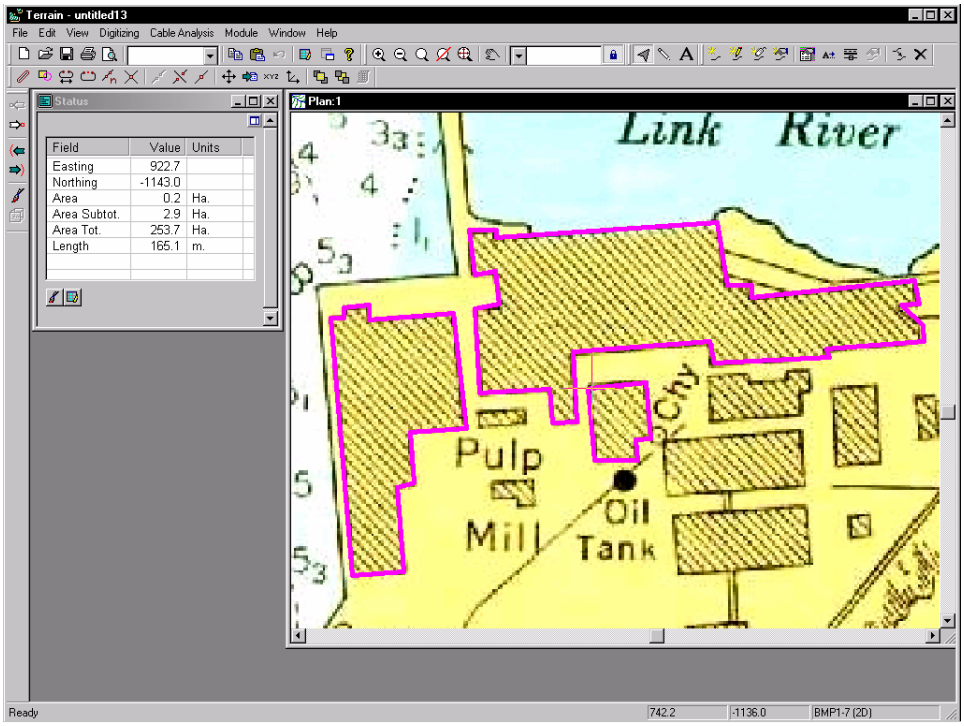


Figure 4.5: Selected Buildings with Area Reported in the Status Window

16. File | New. Do not save changes.

Adjusting an Image

Forestry Cut Block Layout Example

This example requires *Mapping and Drafting, Import Basic and Export Basic* function groups enabled (see *Function Groups* in the On-line help for more information).

Moving and Resizing

This example demonstrates how to overlay a series of traverses on a scanned contour map. These traverses were entered in the Survey Module, however they could have come from other sources.

1. File | Open. Change *Files of Type to [All Files *.*]*. Select **\Tutorial\Terrain\Terrain Bitmap\setting boundary shift.TER**.

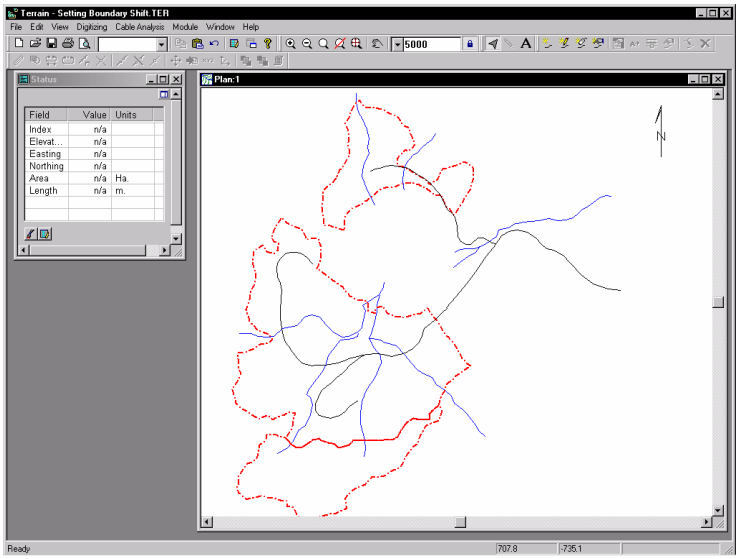


Figure 4.6: Setting Boundary Shift.TER - Surveyed Traverses

setting boundary shift.TER includes several block boundaries, roads and streams. Notice that the traverses are in correct positions with respect to each other. These traverses were entered and adjusted in the Survey/Map Module.

2. File | Insert File. Change Files of type to Image Files [*.TIF, *.JPG, *.BMP]. Select **\Tutorial\Terrain\Terrain Bitmap\setting.BMP**. Press Open. The Import Options dialog box appears. Press OK to insert the bitmap.

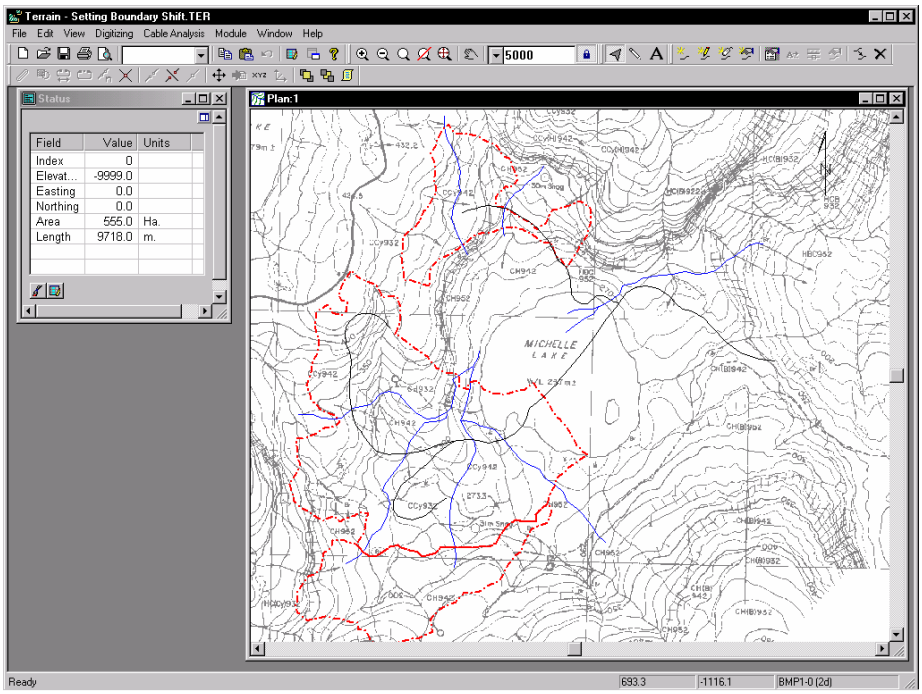


Figure 4.7: Plan Window after Adding setting.BMP

The bitmap file was created from a 1:5000 topographic map. The image was scanned and saved as a Windows Bitmap (*.BMP) using external software.

The bitmap is not correctly positioned with respect to the traverses (MICHELLE LAKE is offset). The size of the bitmap image is also incorrect. The next steps

show how to adjust the position and size of the bitmap by trial and error (although it is possible to be more analytical if you know the pixel size and the coordinates of one corner of the scanned image).

Using the lakeshore to tie into the traversed streams:

3. Select the bitmap by left clicking its boundary with the Selection cursor .

4. Edit | Modify Selected Feature(s) | Move/Size or press the *Move/Size*  button. This activates Move/Size mode with the bitmap selected. The cursor changes to the Move cursor when it is inside the image. Zoom out several times to see the handles.

5. With the Move cursor displayed, left click and drag to position MICHELLE LAKE so that the stream traverses line up with the lakeshore. Release the left mouse key to redraw the screen.

The bitmap image is too large to match with the traverses. The next step will reduce the size of the bitmap.

6. Still in Move/Size mode, hold down the <Ctrl> and press the <Down Arrow> on the keyboard. Notice that when the screen re-paints the bitmap image is smaller. Pressing the <Ctrl + Up Arrow> will expand the image, and <Shift + Ctrl + Arrow keys> allows for fine adjustments.

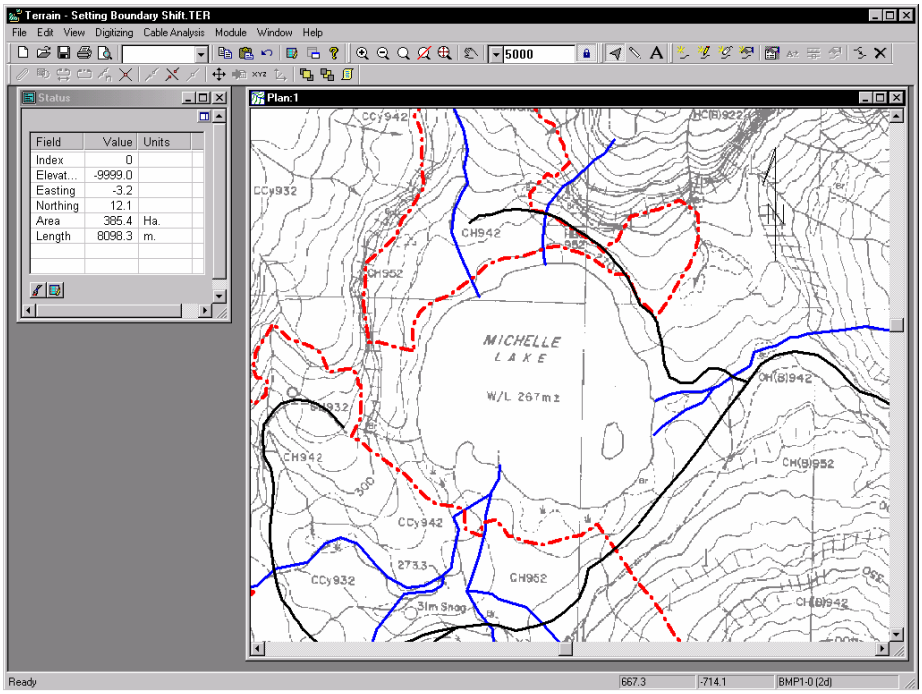


Figure 4.8: Lining Up Michelle Lake with Streams by Trial and Error

7. Repeat the above two steps until the lakeshore lines up with the traversed streams. This procedure involves some trial and error to adjust both the size and position of the bitmap. The Zoom In/Out buttons are useful in this process.

Information about the bitmap can be displayed and modified. This can be useful for rotating, scaling and positioning a bitmap using explicit coordinates.

8. With the bitmap still selected, activate the Bitmap Options Dialog box by choosing Edit | Modify Selected Feature(s) | Properties or pressing the *Properties*  button in the toolbar.

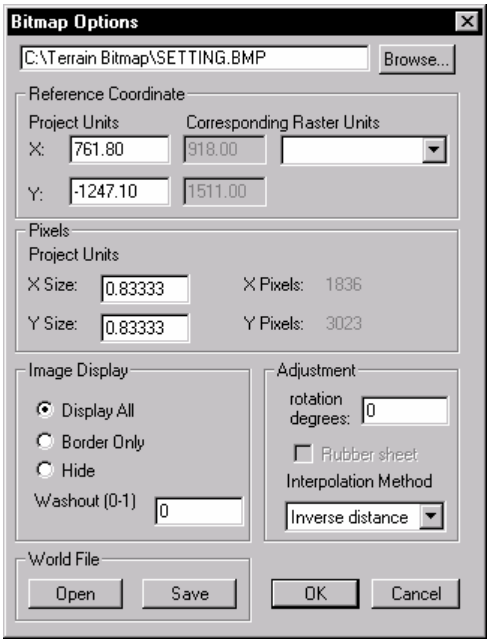


Figure 4.9: Bitmap Options Dialog

NOTE: The X and Y pixel sizes. The default size of bitmap pixels is 1. The coordinates of the upper left corner are 0,0. These defaults were changed when the bitmap was moved and sized in the previous example. This dialog box can be used to explicitly set the rotation, size and position of a bitmap.

9. Press Cancel. Select menu File | New. Do not save changes.

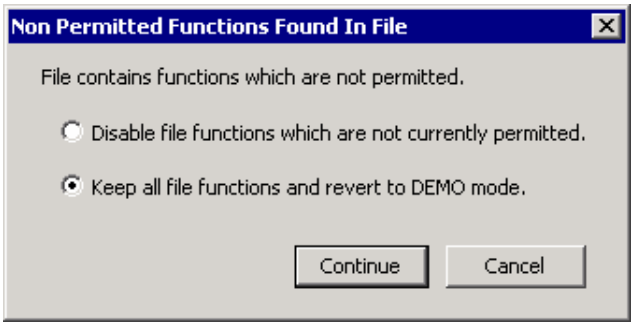
Figure 4.11: Rubbersheeting File

Importing Coordinates

Terrain Tools™ works with Cartesian coordinates such as UTM. Coordinates can be entered directly by typing them into a dialog box, traced from an existing map using the mouse or a digitizer (See *Digitizing*) or by importing them from an external file. This section of the documentation will familiarize you with some of the methods for importing from external files and for entering coordinates via the keyboard.

To follow the examples in this section the *Mapping and Drafting*, *Import Basic, and Import Extended* function groups must be enabled. See *Function Groups* in the On-line help for more information.

If your software license does not include a required Function Group, when you open a file or screen layout you will be prompted:



Choose “Keep all the functions and revert to DEMO mode”. Examples in this section can be completed in Demonstration Mode. Contact Softree to upgrade your license to permit more functions.

Importing DWG or DXF Files

Municipal Plan Example

The Terrain Module will read most standard DWG files. Importing DWG files is easy. It is generally not necessary to understand the format of a DWG file since, in most cases, the file is created automatically by other software. More information about the technical aspects of DWG files can be found in the On-line help.

1. File | Retrieve Screen Layout. Open file **Tutorial\Terrain\Terrain Import\city.ILT**.

Note: Depending on the version of the software you are using you may get a message. “Non Permitted Functions Found in File”. If this message appears choose “Keep all functions and revert to DEMO Mode”.

The screen layout city.ILT contains screen settings such as scales used in this example. It is not required for importing DWG files.

2. File | Insert File. Change *Files of type to Autocad DWG [*.DWG]*. Select **Tutorial\Terrain\Terrain Import\municipal.DWG**. Press Open.

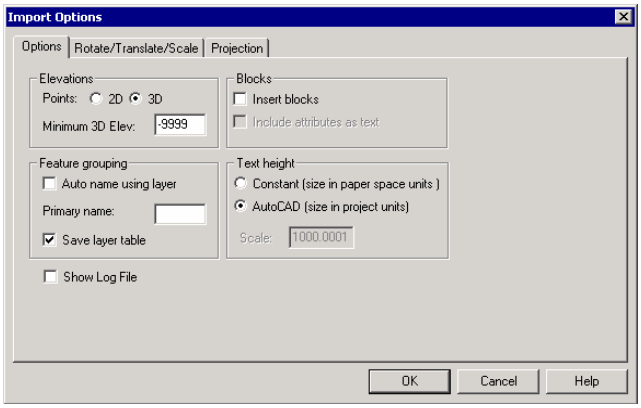


Figure 5.0: Import DWG/DXF Options Dialog

For on-line help descriptions for each of the dialog box items, press F1 while the *Import DWG/DXF Options* dialog is still active.

The options in the *Text Height* group box allow you to control the text size when importing the DWG file. If *Constant* is selected, the text size is based on the drawing scale entered in the *Scale* field. If *AutoCad* is selected, the text size is determined by the scale of the drawing. Changing the scale will resize the text. This is the best option to correctly size text.

3. Set the dialog options to match those shown in Figure 5.0 and press OK.

4. After the import process is complete press the *Zoom extents*  button. A city map with all the features selected will appear. De-select all features by clicking in a blank area of the Plan Window.

5. Zoom in with the Magnify  button to examine the details of the legal plans as shown in Figure 5.1.

NOTE: If *Primary Name* (from the *DWG Import Options dialog box*) is left blank, the incoming features will have their Alphanumeric ID set to the 1st 8 characters of the DWG layer name. The Numeric ID will be automatically generated.

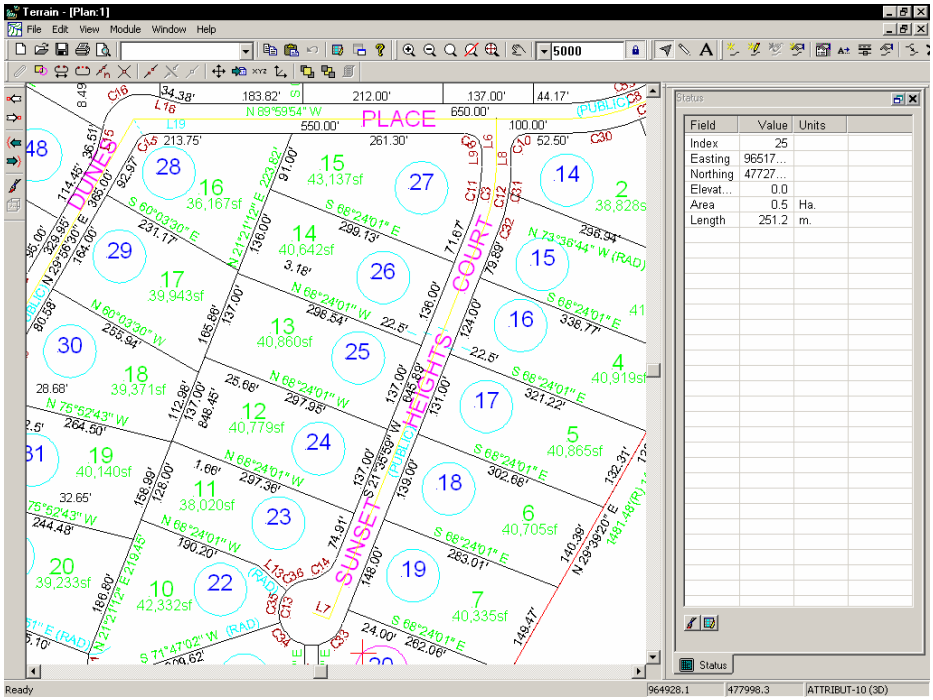


Figure 5.1: Imported DXF File

6. File | New. Do not save the changes.

Importing ASCII Files

Topographic Survey Example

The Terrain Module will accept a variety of different ASCII files by allowing the user to configure the import format. The position of X, Y, Z coordinates, descriptions and field delimit characters (TAB, space, comma etc.) can be specified as well as how the points are organized into features.

This example illustrates the use of these functions to import a site plan from a total station data collector file. The file (Figure 5.2) consists of a sequence number, X, Y, Z, and code separated by commas.

```
1, 5469160.150, 492582.842, 269.490, RP1
2, 5469112.743, 492575.602, 270.810, RP2
3, 5469172.251, 492534.767, 267.431, RP3
4, 5469195.868, 492566.517, 269.478, RP4
5, 5469065.895, 492602.503, 273.804, RD1
6, 5469077.143, 492598.650, 272.818, RD1
7, 5469091.730, 492591.373, 271.955, RD1
8, 5469106.665, 492581.080, 271.206, RD1
9, 5469126.966, 492565.644, 269.649, RD1
10, 5469146.155, 492553.177, 268.071, RD1
11, 5469164.442, 492540.689, 267.615, RD1
12, 5469180.404, 492527.023, 266.848, RD1
13, 5469192.047, 492525.252, 266.200, RD1
14, 5469179.074, 492537.460, 267.208, RD2
15, 5469174.058, 492541.835, 267.453, RD2
```

Figure 5.2: Excerpt from total.ASC

1. File | Retrieve Screen Layout menu. Select and open **\Tutorial\Terrain\Terrain Import\import.ILT.**

Note: Depending on the version of the software you are using you may get a message. “Non Permitted Functions Found in File”. If this message appears choose “Keep all functions and revert to DEMO Mode”.

Import.ILT contains appropriate screen settings such as scale used in this example. It is not required for importing ASCII files.

2. Select Module | Setup, and press the *Import* tab

3. Press the *Add* button to activate the *Define New File Format Options* dialog as shown in Figure 5.3.

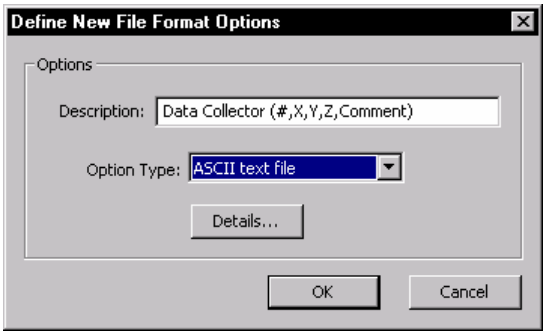


Figure 5.3: Define New File Format Options Dialog

4. Change the description and option type to match the dialog box above.

5. Click on the *Details* button to activate the *Import ASCII Options* Dialog box shown in Figure 5.4.

The *Import Ascii Options* dialog box allows you to describe the format of external files. Several options are available to identify, select and format incoming coordinate data. Detailed descriptions of the options in this dialog box are available by pressing F1.

6. Press the *Attributes* button, select Comment from the *Available* list, and press the *Add* button. The Comment attribute will appear in the selected column. Press OK.

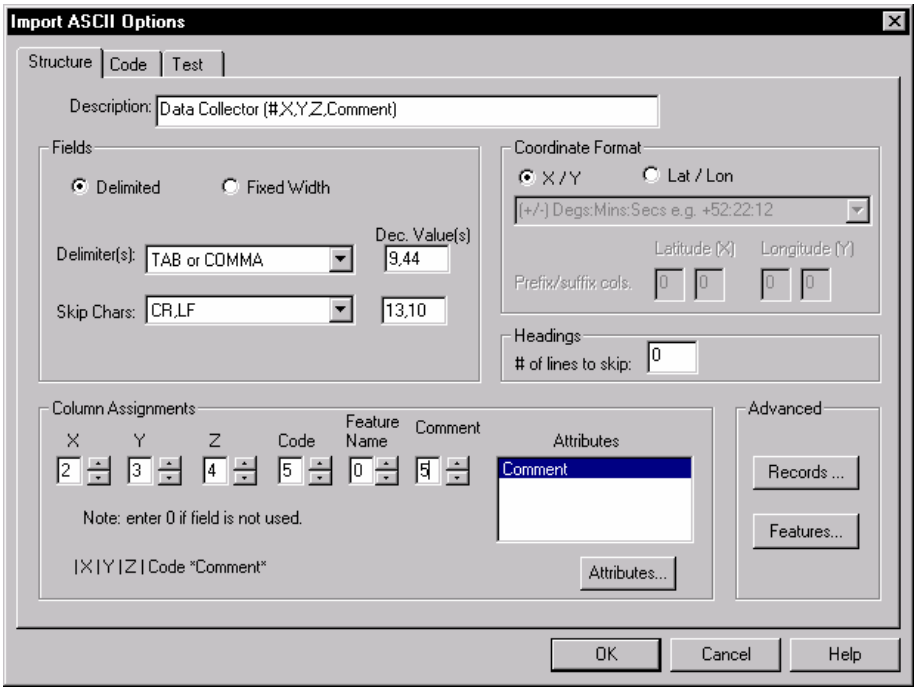


Figure 5.4: Import ASCII Options Dialog – Structure Tab

7. Change the entries in the dialog box to match Figure 5.4.

This configuration will read each record of the file as a single point feature. The feature ID (*ID field position*) will be taken from the comment field. Any duplicates will automatically be assigned different feature sub-id.

8. Press the *Records* button. Ensure that *All* is selected. Select OK to close the records dialog box.

NOTE: Wild card expressions are used in the *Record Selection* area of the *Records* dialog box if either *By Inclusion* or *By Exclusion* is chosen. The question mark ? in a wild card expression means any character will match. For example:
The wild card string ?ABC?? matches the following:

1ABC11
AABC1
AABC

It does not match the following:

ABC11
1ABC111

An Asterisk * at the end of a character string means include all characters after the primary string
The character string AB* matches

ABD-1278
ABF

9. Press the *Features* button and choose *Identify Features by Code* from the pull-down box. Press OK.

NOTE: The *Feature Detection Method* dialog allows specification of the logic used to group points together into a single feature. For a complete description of the methods available, see the online help by pressing F1.

10. Go to top of the dialog box and select the *Codes* tab to activate the Import ASCII Options Dialog box. Here you can assign symbols and line-types to the incoming points.

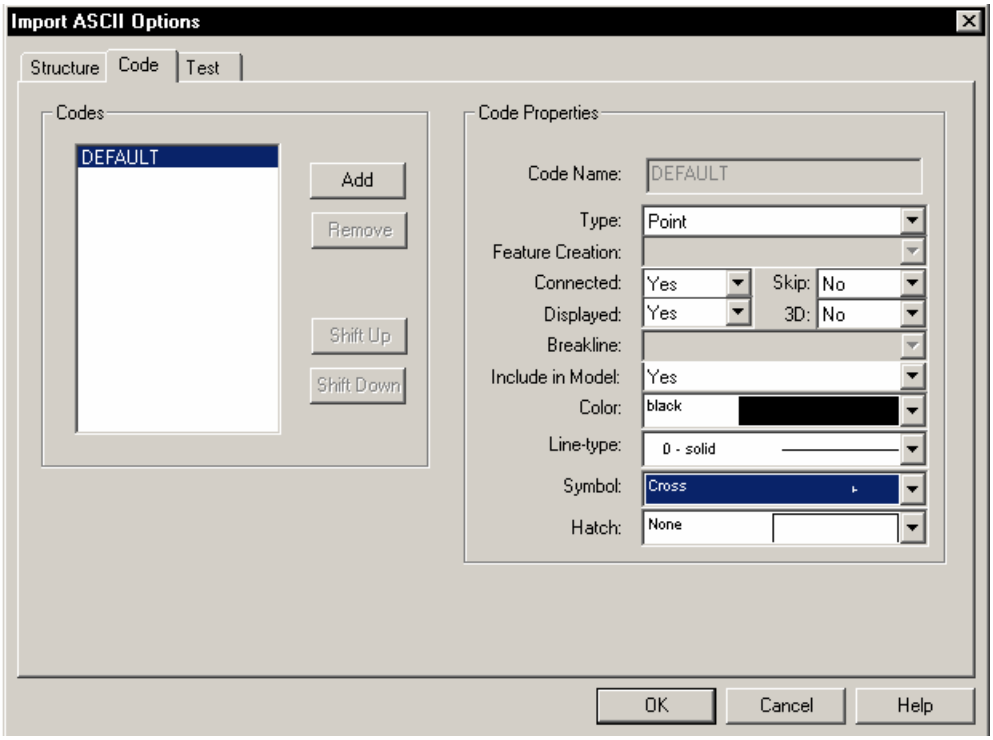


Figure 5.5: Import ASCII Options Dialog – Code Tab

11. Change your default code properties to match those shown in Figure 5.5.

NOTE: The Code Properties available are based on the Feature Detection Method set during step 9. The *Feature Creation* and *Breakline* properties are unavailable when the *Code Type* is set to *Point*.

12. Press *Add*. Type **RD1*** in place of NewCode1 in the *Code Name* field. Change *Type* to *Polyline*. Change Feature Creation to *Connect All*. Change *Connected* to *Yes* Change *3D to Yes.* Change *Breakline* to *Yes*. Change *Include in Model* to *Yes.* Change the *Color* to *Blue, Line-type* to *thick (medium)-5,* and *Symbol* to *triangle.*

13. Press *Add* button. Type **RD2*** in place of the NewCode2 in the *Code Name* field. Change the properties to match those of RD1*.

14. Press *Add again*. Type **CL*** in place of NewCode3 in the *Code Name* field. Change *Type* to *Polyline*. Change *Connected* to *Connect All*. Change *3D to Yes.* Change *Breakline to No*. Change *Include in Model* to *Yes.* Change the *Color* to *Red, Line-type* to *thick (heavy)-6,* and *Symbol* to *square (Large).*

15. To test the specification, press the *Test* Tab to open Import ASCII Options dialog box as shown in Figure 5.6.

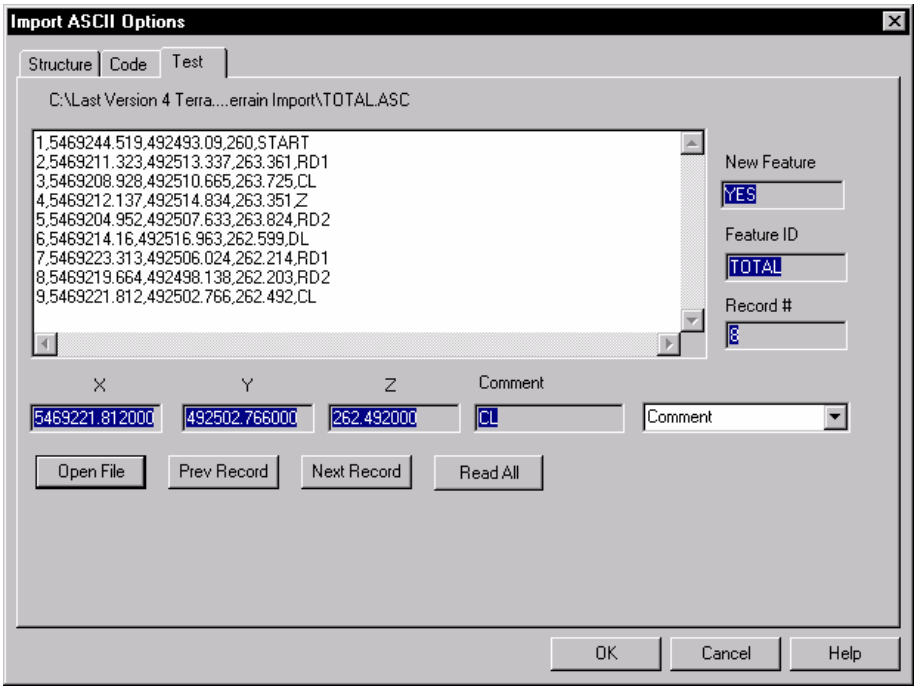


Figure 5.6: Import ASCII Options Dialog – Test Tab

16. Press the *Open file* button and choose **\Tutorial\Terrain\Terrain Import\total.ASC.**

17. Press the *Next Record* button several times. At the bottom of the dialog box the values of X,Y,Z and comment are displayed. Confirm that the incoming fields are being correctly interpreted and press the *OK button*. Press OK to close the dialog box.

18. To save the new import specifications for future use press the *Save* button and choose the file called *Normal.IOP* (Normal.IOP is a file that stores all import formats.) Press *Save* and then *Yes* to replacing Normal.IOP. Press OK and a new ASCII format specification has been created.

19. To open the file select File | Insert File. Change Files of type to *Data Collector (#,X,Y,Z,Comment)(*.ASC, **.***TXT**,***CSV)*.* Open **\Tutorial\Terrain\Terrain Import\total.ASC**.

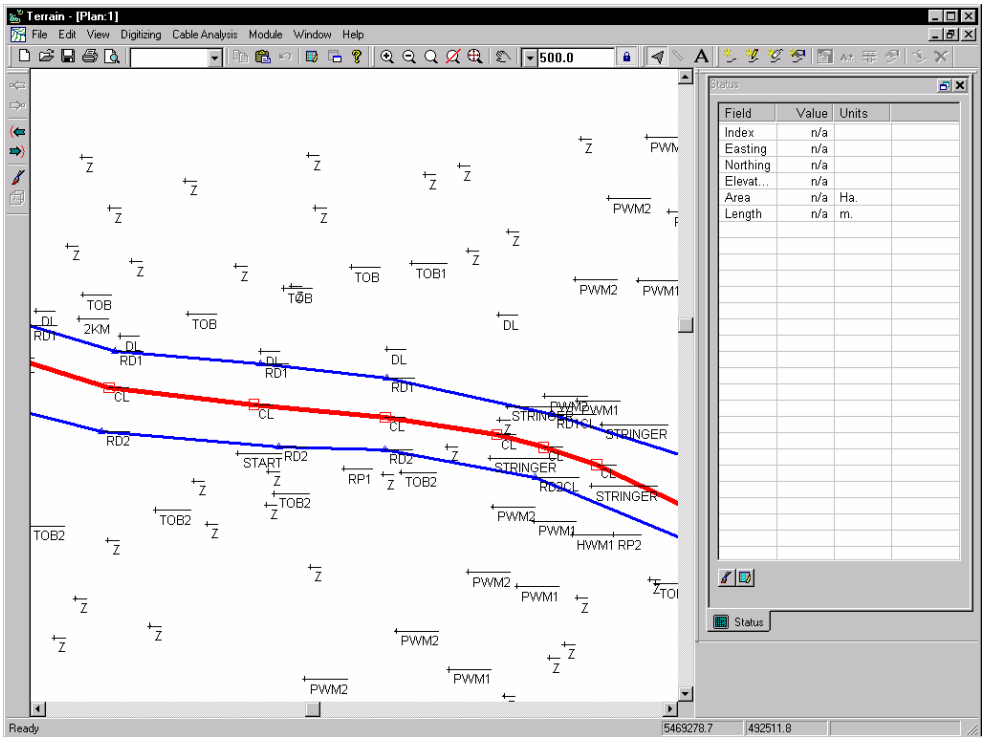


Figure 5.7: Plan Window after CL Feature Imported

20. Select a blank part of the Plan Window and left click to de-select all features. Note that the RD features are connected with a blue line and the CL feature is connected with a thick red line. The import specification was successful.

21. File | New. Do <u>not</u> save any changes.

Keyboard Coordinate Entry

Legal Survey Example

To follow the examples in this section the *Mapping and Drafting, Import Basic, Import Extended and Enhanced Mapping and Drafting* function groups must be enabled. See *Function Groups* in the On-line help for more information.

The Terrain Module allows you to create a feature and enter its coordinates directly from a dialog box. This example will demonstrate this procedure by creating a plat boundary from the following legal description.

> *Beginning at the Northeast corner of Lot 23, Block 1, "Plat of Williams Beach";*
> *thence S 30º 15' E a distance of 403 feet of the Point of Beginning;*
> *thence S 43º 42' W a distance of 446 feet;*
> *thence N 67º 47' W a distance of 368 feet;*
> *thence N 3º 18' E a distance of 317.5 feet;*
> *thence along a curve to the right having a radius of 200 feet, a chord bearing of N 46º 16' E, and a chord distance of 272.66 feet;*
> *thence N 83º 37' E a distance of 231.97 feet to the Point of Beginning*

1. Module | Setup. Choose *Imperial (Ft)* for *Units* and change Direction to *Quadrant Deg:Mins N32:16W* . Press OK.

Note: Depending on the version of the software you are using you may get a message "Non Permitted Functions Found in File". If this message appears choose "Keep all functions and revert to DEMO Mode".

2. File | Retrieve Screen Layout. Select **\Tutorial\Terrain\Terrain Enter\deed.ILT**.

3. Edit | New Feature to activate the *Feature properties* dialog box

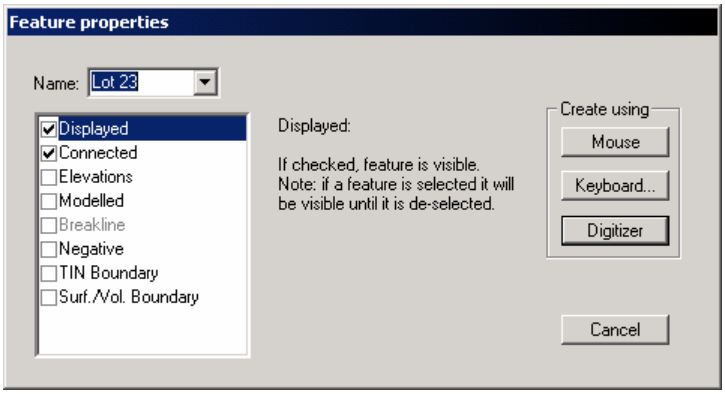


Figure 6.0: Feature Properties Dialog

4. Beside *Name* type **Lot 23**. Disable *Elevations* and *Modelled*. Press the *Keyboard* button to activate the *Feature Coordinates* dialog box.

5. Press the *Add* button. The cursor goes to the *Radius* field under *Current Shot* Group Box. Press <TAB> to skip the *Radius* field and move to the *Azimuth* field. Enter S30.15E and then press <TAB> to advance to the *Dist.* field. Enter a distance of **403**. Press <Enter> to accept the fields and add a new shot.

NOTE: An alternative is to press the *Add* button after typing in the distance instead of pressing the <Enter> key. Note that the azimuth is entered as S30.15E and displayed as S 30:15 E.

6. Press <TAB> to move to the *Azimuth* field. Enter **S43.42W** and then press <TAB> to advance to the *Distance* field. Enter a distance of **446**. Press <Enter> to accept the fields and begin the next shot.

7. Repeat the previous step for the next 2 shots.
   Type **N67.47W, 368** feet

   N3.18E, 317.5 feet

8. Enter a curve radius of **200** and press <TAB>.

Notice the headings change after entering the radius to *Chord Az*. and *Chord Dist*. Additional options for entering curve data are available by selecting the *Curve Options* button (see On-line help for more information).

9. Select *Right* curve. <TAB>. Enter a chord azimuth of **N46.16E**. <TAB>. Enter a chord distance of **272.66**. Press <Enter>.

10. Press the <TAB> key to skip the *Radius* field and enter **N83.37E** and a distance of **231.97**. After entering the distance, press the *Update List* button. (Do not press enter or add).

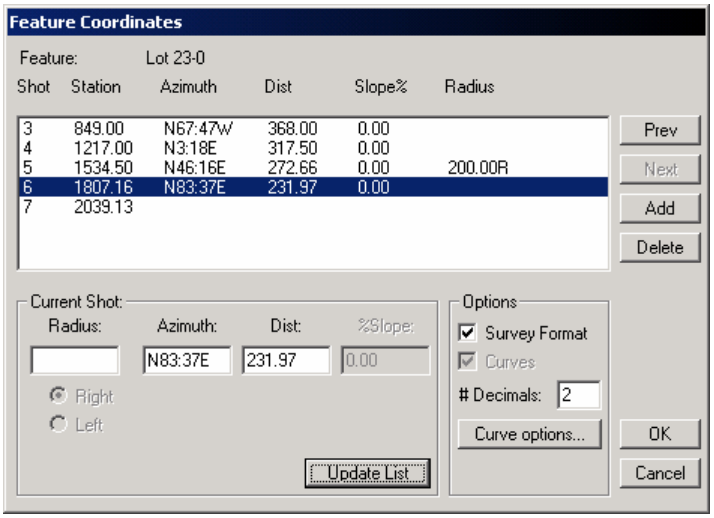


Figure 6.1: Feature Coordinates Dialog

11. Check the entered bearings and distances and then press OK.

12. Using the Selection Cursor click on the second lot corner, identified by the red cross-hair position in the Figure 6.2.

The Status Window reports the X, Y coordinate (i.e. Easting and Northing) for the current point is 203.0, -348.1.

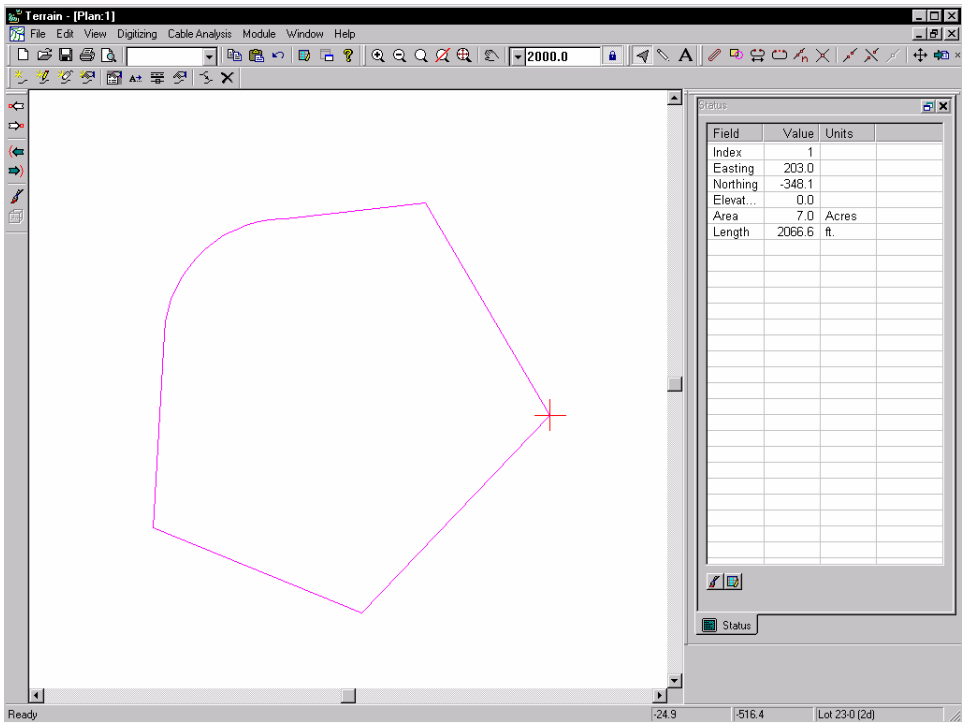


Figure 6.2: Lot Boundary

13. Select Edit | New Feature to activate the *Feature Properties* dialog box. Set the *Name* to **Easement**. Disable *Elevations* and *Modelled*. Enable *Negative*. Press *Keyboard* to open the *Feature Coordinates* Dialog box.

NOTE: Negative features create a hole or void. Their area will be subtracted when total areas are reported and the TIN will not enter these areas if TIN Boundary is also selected.

14. In the *Options g*roup box disable *Survey Format*. Enter **203.0**, **-348.1** as the X, Y coordinates and re-enable *Survey Format*.

This sets the starting point of the easement traverse to (203.0, -348.1).

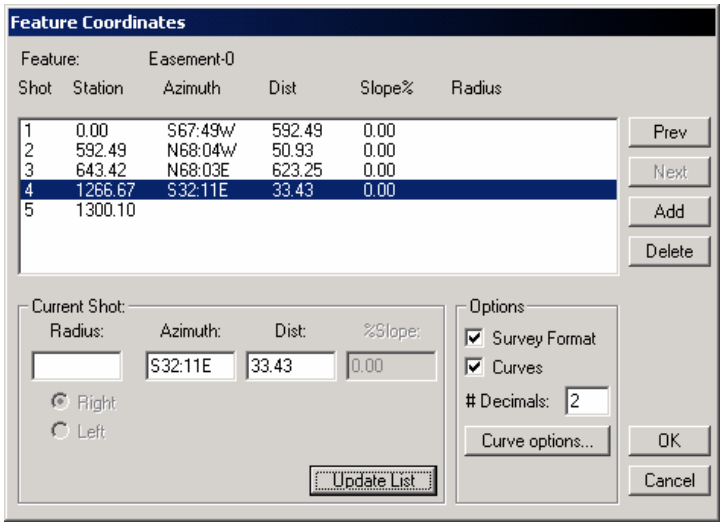


Figure 6.3: Easement Survey

15. Enter the *Easement Survey* traverse as above. After entering the last distance, press the *Update List* button. Press OK.

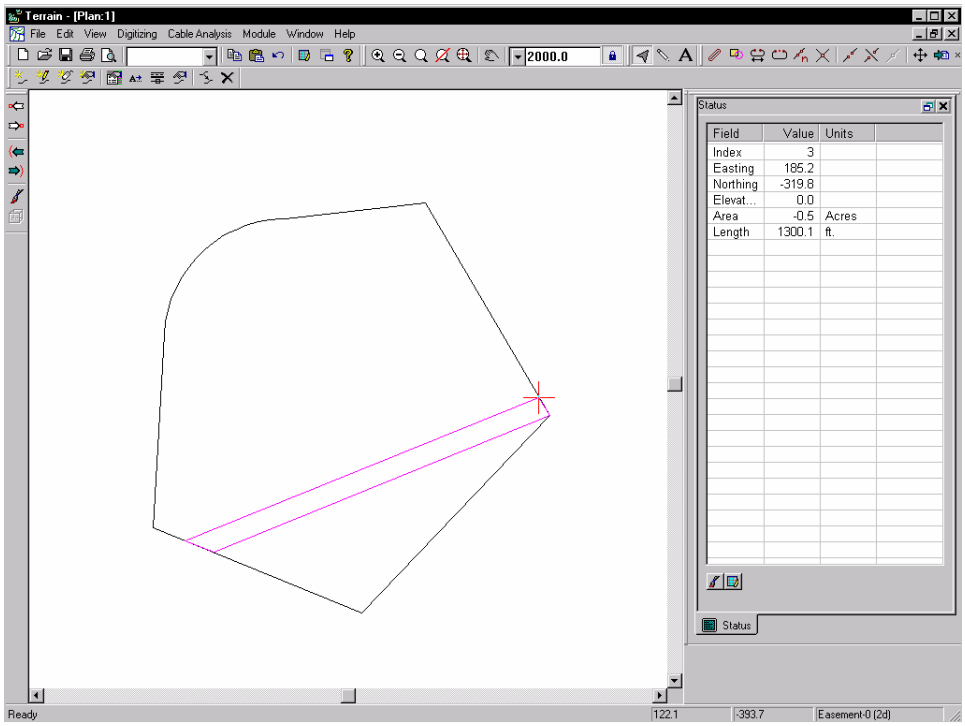


Figure 6.4: Lot Boundary and Easement

The map should now display the Lot Boundary and Easement as in Figure 6.4. Notice the negative area in the status window

16. Select the Lot Boundary.

17. Edit | Modify Selected Feature(s) | Labels. Turn on *Azimuth*, *Horizontal Distance*, *Curve Radius* and *Area* labels (double click on the appropriate item in the list-box). Press OK. The selected feature labels are now displayed in the Plan Window (Figure 6.5).

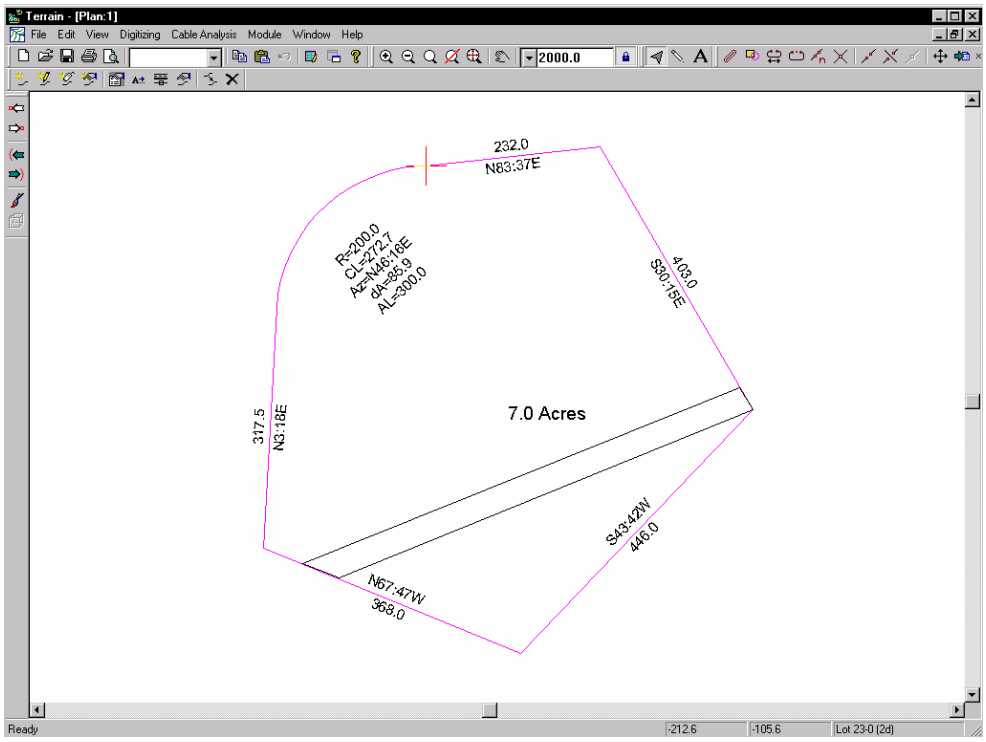


Figure 6.5: Annotated Lot Boundary and Easement

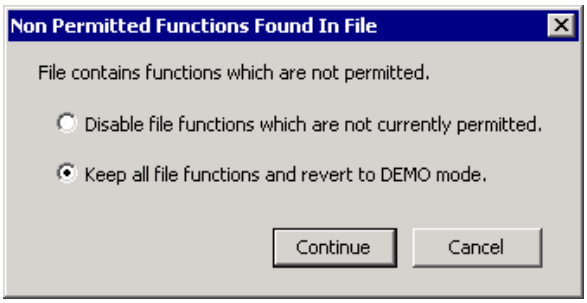
18. File | New. Do not save the changes.

Digitizing

Digitizing is a very useful method for calculating areas and lengths from a scaled map. It can also be used to capture contours or other planimetric information.

To follow the examples and procedures in this section you will need to have the *Mapping and Drafting* and *Digitizing* function groups enabled. See *Function Groups* in the On-line help for more information.

If your software license does not include the required Function Groups, when you open a file or screen layout you will be prompted:



Choose "Keep all the functions and revert to DEMO Mode". Examples in this section can be completed in Demonstration Mode. Contact Softree to upgrade your license to permit more functions.

Choosing a Digitizer Driver

The Terrain module supports a variety of digitizers using either a *Softree ASCII format driver* or a *WINTAB* driver. The driver used is a matter of preference, however, if using the digitizer with other CAD or GIS software, WINTAB will provide greater compatibility.

1. Select Digitizing | Digitizer Config, to open the *Digitizer Configuration dialog box* shown in Figure 7.0.

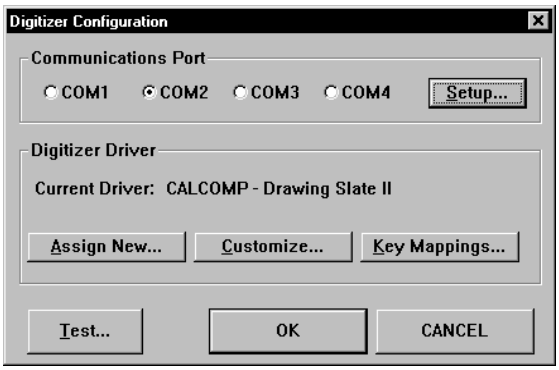


Figure 7.0: Digitizer Configuration Dialog Box

2. Press the *Assign New* button. Select the digitizer either by type and model or WINTAB from the list box. Press the *Select* button. Press OK. The selected driver is now identified as the "Current Driver".

3. Press OK to return to the main screen. A Softree prompt will appear "Warning Config will be Changed". Press OK.

If using WINTAB drivers, skip the next section on *Configuring an ASCII Format Driver*. The installation and configuration of WINTAB depends on the type of digitizer tablet used. Consult the manufacturers' manual for information on the recommended procedures for installing the WINTAB driver.

Configuring an ASCII Format Driver

The following steps are required when setting up a digitizer using an ASCII format driver.

1. To determine the required port communications parameters for your digitizer, press F1 for on line help. Search index topics for *Standard ASCII Digitizer Setting*s.

2. Locate the brand, model and type of your digitizer. Make note of the following parameters:
   BAUD RATE (*bits per second)* *PARITY*
   DATA BITS *STOP BITS*
   FLOW CONTROL

3. To set the port communications parameters, select Digitizing | Digitizer Config, and press the *Setup* button to access the *Control Panel*.

Configuring port parameters from the Control Panel is different for each type of Windows operating system.

- **Windows NT:** double click on the *Ports* icon, double click on the correct Communication Port (usually COM 1 or COM 2) this will display a dialog box similar to that shown in the *Figure 7.1*.

- **Windows 2000 and XP:** Double click on the *System* icon. Select the *Hardware* tab. Press the *Device Manager* button. Double click on *Ports.* Double click on the correct Communication Port (usually COM 1 or COM 2). Choose the *Port Settings* tab to display the *Communication Port (COM) Properties dialog box* shown in Figure 7.1.

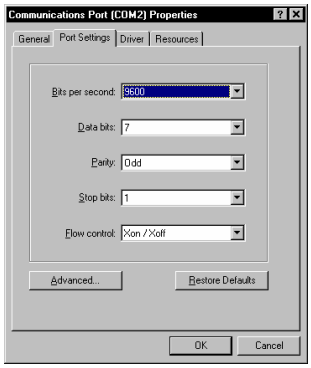


Figure 7.1: Communication Port (COM 2) Properties dialog box

4. Change the settings to match your digitizer. Press OK until all dialog boxes are closed. Close the Control Panel.

5. Ensure the appropriate port (COM1, COM2, etc.) is selected. Press OK. A Softree prompt appears"? Warning config has changed" Press OK.

Testing Your Digitizer

6. To test your digitizer, select Digitizing | Digitizer Config to open the *Digitizer Configuration dialog box.*

7. Press the *Test* button to check that the digitizer is transmitting characters properly. The *Digitizer Test dialog box* shown in Figure 7.2 appears. This dialog box will display characters transmitted from the digitizer. Try pressing a key on the digitizer. If the parameters have been setup correctly a new character string should appear at the bottom of the dialog box whenever a key is pressed on the digitizer keypad.

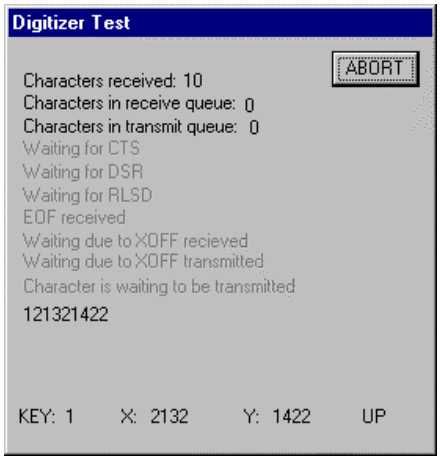


Figure 7.2: Digitizer Test dialog box

8. If you do not see any characters appearing in the *Config Test* dialog box check the digitizers switch settings and parameters as described in the previous section (*Configuring an ASCII Format Driver*).

If the test still does not work, check *Common Digitizer Setup Problems* in the on-line Help.

9. The digitizer transmits a 'packet' or string of ASCII characters whenever a key is pressed. Each packet contains a KEY field, an X coordinate field and an Y coordinate field. The Terrain Module will extract these fields from the packet. Using the *Test* option (as described in step 2) check that the key pressed on the digitizer matches the value displayed in the Key field at the bottom of the Test dialog box.

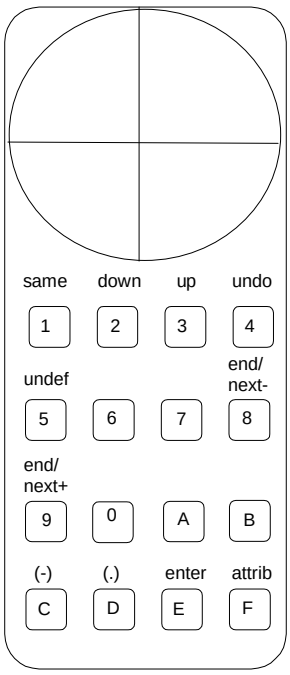


Figure 7.3: Typical Digitizer Keypad Definitions

The Terrain program is shipped with a standard set of digitizer key definitions. The key definitions depend on the type of digitizer and are defined in the *Standard Digitizer Settings* in the On-line Help. It is useful to attach these key definitions to your tablet for reference. (See also *Digitizer Key Definitions* in the On-line Help for information on the key functions).

10. To print a key definitions table, select File | Open menu, retrieve file Terrain Digitize\key definitions.TER.

11. Select menu File | Print Active Window. Respond No to "Plot Multi-Page Montage" prompt. File |New when printing is complete.

12. Digitizing | Digitizer Config and press the *Test* button. Press each key on the digitizing puck and record the assigned key definitions (if any) in the blank table (printed in the previous step). Cut out the table and tape it on or near the tablet.

SAME	
END/NEXT+	
END/NEXT-	
UP	
DOWN	
ENTER	
UNDEF	
UNDO	
ATTRIB	
DECIMAL	
NEG.	

Figure 7.4: Blank Key Definitions Table.

13. File | New. Do not save the changes.

Digitizing Areas

Planimeter Example

The Terrain Module is a useful tool for digitizing areas and lengths. This example demonstrates how to digitize areas. If you have not setup your digitizer, please refer to the previous section of this manual before proceeding.

In this example the *Same* and *End/Next* + and *End/Next* - digitizer cursor functions will be used.

1. File | Open. Select **\Tutorial\Terrain\Terrain Digitize\digitize area.TER.**

2. Highlight the Plan Window and select menu File | Print Active Window. Choose NO to plot current page only. Press OK

This will print the Plan View shown in the Figure 7.5. The boundaries will be digitized and the area checked against the original. The smaller polygon will be excluded

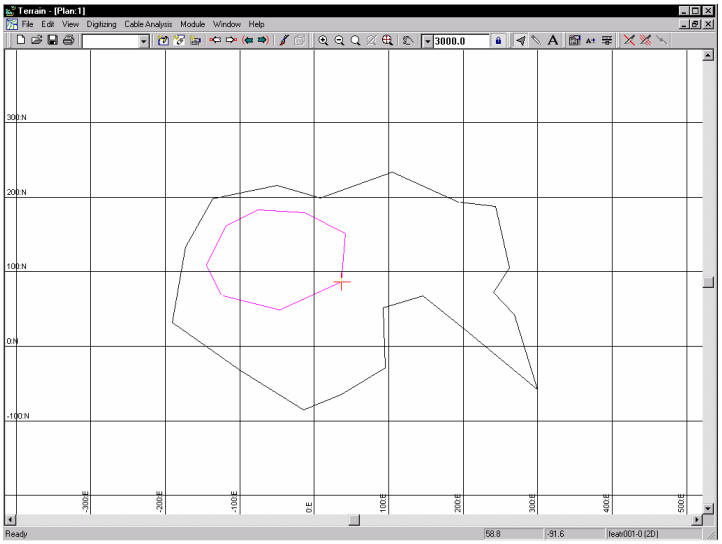


Figure 7.5: Plan View of digitize area.TER

3. Attach the Plan to your digitizer (so that it does not move).

4. In the Plan Window, click on the larger polygon with the *Select* cursor. Notice in the Status Window, the reported area is 9.67 Ha. or 2.2 acres if you are working in imperial units. Click on the smaller polygon. Note the area is -1.87 Ha. or -.43 acres. and the total area (*Area Tot.*) is 7.8 Ha (1.79 acres). File | New. Do not save the changes.

NOTE: The smaller polygon is negative because the feature has the "negative area" property set (see *Properties Dialog* in the On-line help). The negative area property is very useful for calculating the area of large polygon while subtracting one or more islands inside.

5. To set the sound option, open Digitizing | Sound and select *Partial*.

With sound set to *Partial*, an audible tone ("beep" or “click”) will be produced when near the start point (see On-line Help - *Closing Distance for Sound Warning* for more information).

6. File | Save Screen Layout. Type in the layout file name **area.ILT** and press OK. This will save the present screen configuration as a layout file, which can be activated the next time you want to digitize areas. This is a big time saver.

7. Press the *Digitize New Feature button*  to activate the *Mapsheet Orientation dialog* box shown in Figure 7.6. Change the Map Scale from "5000.0" to "3000.0" (this is the scale of the printed boundary). Make sure "Enter a know map scale" is selected in the *Registration Method* combo box. Press OK.

Alternatively you could select Digitizing | Mapsheet setup. Change the Map Scale from "5000.0" to "3000.0" and press OK. Select Edit | New Feature. Disable *Elevations* and *Modelled.* Select *Create using Digitizer*

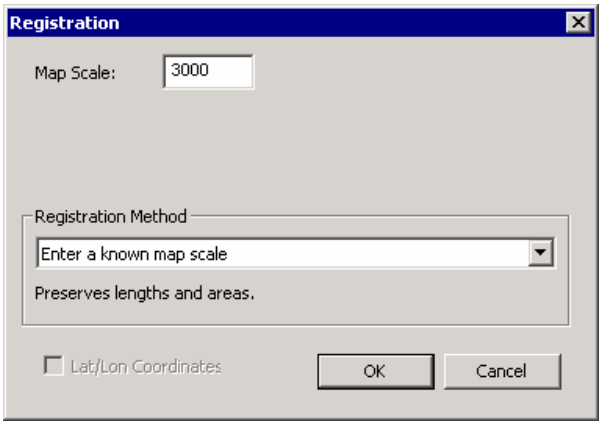


Figure 7.6: Mapsheet Orientation Dialog

This example is concerned about the area only, not preserving map coordinates (accounting for origin and skew).

8. The prompt ***Digitize featr0000-0 Pnt. #:1*** will appear. Choose a starting point on the larger boundary and begin tracing the outline by pressing the *Same* key over each point on the boundary. The image will appear in the Plan Window.

You can also digitize in *track mode* where holding down the *Same* key and sliding the digitizing cursor creates a continuous series of points. See the *Coordinate Digitizing of Map Features* example following this one.

9. The last point digitized is the starting point; a "beep" or click" will be audible when you digitize this point. Press the ***End/Next-*** key on the digitizer cursor. Pressing ***End/Next -*** ends the current feature and begins a new "negative area" feature.

10. The prompt ***Digitize featr0000-1 Pnt. #:1*** will appear. Choose a starting point on the smaller boundary and begin tracing the outline by pressing the *Same* key over each point on the boundary. As with the larger polygon you should see the shape appearing in the Plan Window.

11. Press the ***End/Next+*** key on the digitizer cursor twice (the first key press ends the current feature allowing you to begin digitizing another, the second press exits from digitizing mode).

12. Check the areas in the Status Window. They should match the areas noted in Step 4.

13. File |New. Do not save the changes.

Coordinate Digitizing of Map Features 

The Terrain Module can also be used to digitize features from maps while preserving map coordinates.

This form of digitizing allows you to correctly position objects spatially. This is important if you are merging information from more than one source (e.g. such as map features and surveyed data) or if you are digitizing from the same map at a different time.

1. File | Open, select **\Tutorial\Terrain\Terrain Digitize\digitize area.TER**

The next 2 steps are the same as the previous example (*Digitizing Areas*) you can omit them if you have already done that example.

2. Highlight the Plan Window and select menu File | Print Plan. Choose NO to plot current page only. Press OK.

3. Attach the Plan to your digitizer (so that it does not move).

4. Again select Digitizing | Digitizing Options. Select *Digitize in Track Mode*. This sets your digitizer into track mode. (In track mode, holding down the *Same* key and sliding the digitizing cursor creates a continuous series of points.) If you get an error message stating (*Point/Track initialization String Undefined*) it means your digitizer does not support track mode. Continue this example in point mode. (In point mode, points are only created when you click a digitizer cursor button.)

5. On the map, sketch with a pencil a line across the block similar to the one shown below.

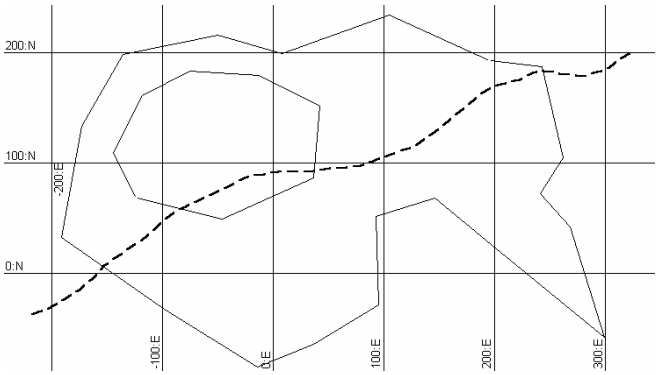


Figure 7.7: Plan View of digitize area.TER with Line Drawn

6. Select menu Digitizing | Mapsheet Setup (for digitizing) and the *Mapsheet Orientation* dialog box will appear. Select "Enter scale, match 1 coordinate and digitize a direction vector" and set the scale and origin to match those shown in Figure 7.8 below.

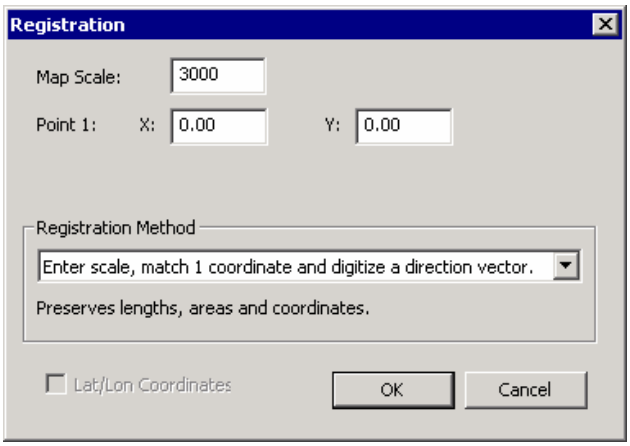


Figure 7.8: Mapsheet Orientation Dialog

7. After pressing OK, a message box will appear prompting you to ***Digitize Origin Point X:0.00 Y:00***. Find this point on the map and digitize it using the *Same* key.

8. Next the ***Digitize 1st direction vector point (Southmost)*** message will appear. Digitize point (0,0) on the map again using the *Same* key.

9. Next the ***Digitize 2nd direction vector point (Northmost)*** message will appear. Digitize point (0,200) on the map again using the *Same* key.

Steps 7, 8, 9 and 10 have "registered" the mapsheet on the tablet accounting for the coordinates and the skew of the paper. Digitizing will now preserve coordinates.

10. Select menu Edit | New Feature to activate the *Feature Properties* dialog box shown below. Change your dialog box to match Figure 7.9 and press *Digitizer*.

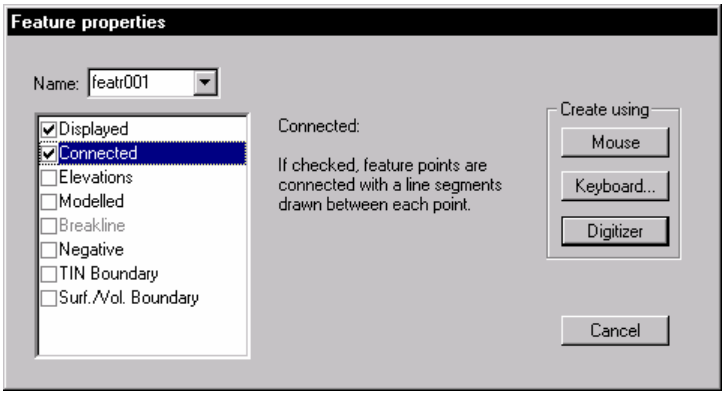


Figure 7.9: Feature Properties Dialog

11. Trace the line feature (that you drew) on the tablet using the *Same* key. In Track Mode you may click and drag to trace the line *or* do individual clicks to create fewer points. When complete press the *End/Next* key twice.

12. Notice in the Plan Window the line feature overlays the block and is in the correct position.

13. File | New. Do not save the changes.

Attributes

Importing Shape Files

In this example contours saved in a shape file (*.SHP) will be imported into the Terrain Module. The elevations of the contours are stored as attributes in the file. Terrain features are assigned elevations using the attribute data making the file useful for profiles, 3D viewing, surface area, volume calculations etc.

1. To import the shape file and corresponding attributes, select menu File | Open. In the *Files of Type* Combo box choose *ArcView Shape(*.SHP)*. Select **\Tutorial\Terrain\Terrain Attributes\theme 17.SHP**

2. The *Import Shapefile Options* dialog box appears. Confirm that Include *Attributes* and *Add themes to layer table* are selected. Press OK to import the file.

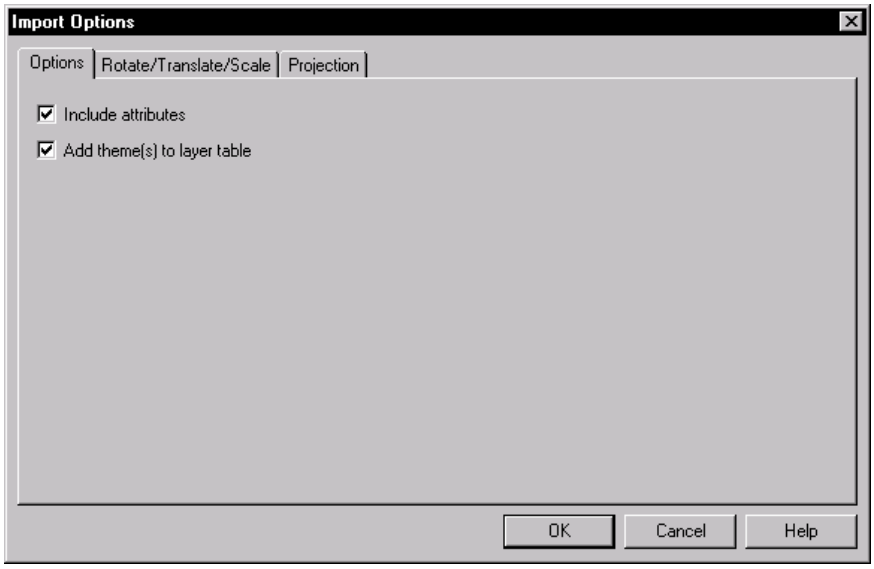


Figure 10.0: Shape File Import Options Dialog

3. File | Retrieve Screen Layout. Select **\Tutorial\Terrain\Terrain Attributes\shape.ILT**

4. Press the *Zoom Extents*  button. A Softree Error appears, "Reached maximum zoom, can not show extents without scale change". Press OK.

5. From Edit | Select Features | All, select all features.

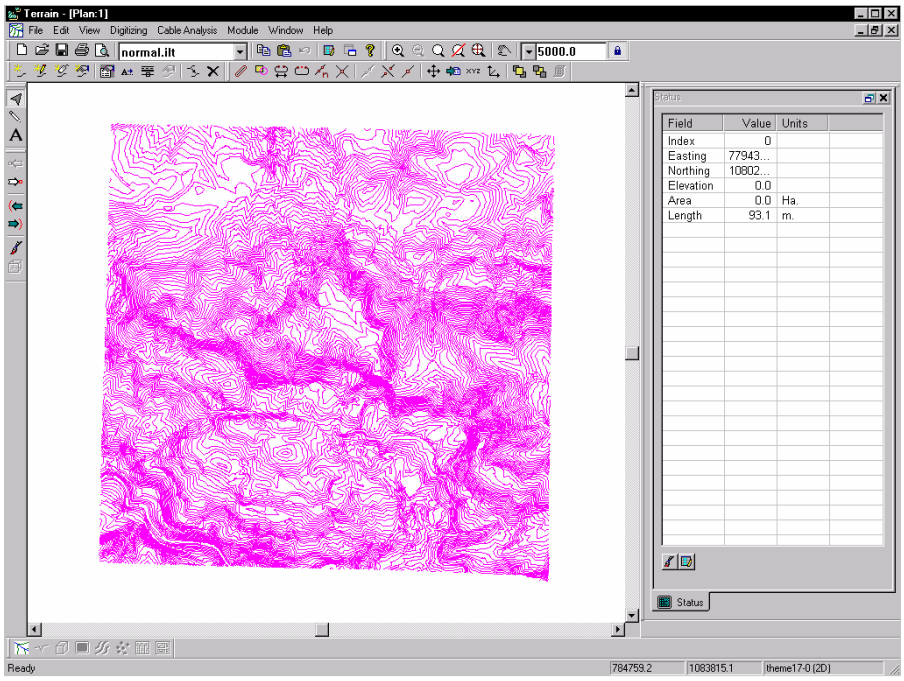


Figure 10.1: Imported Shape File

6. Select Edit | Modify Selected Features | Properties, change all features to "Elevations" and "Modelled". "Warning No Space for Undo" appears Press OK to continue.

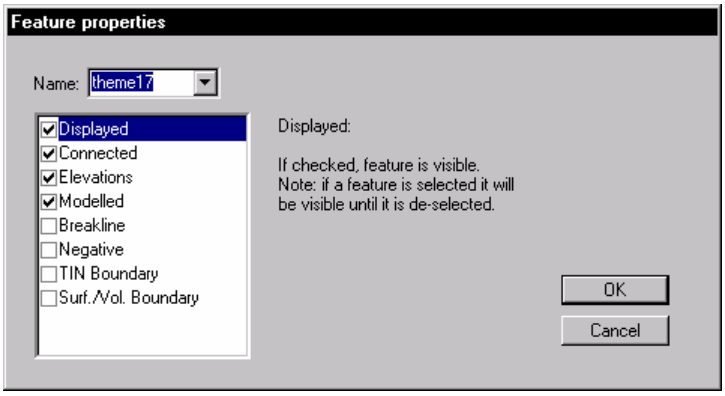


Figure 10.2: Feature Properties Dialog

7. Press the *Assign*  button or select Edit | Modify Selected Feature(s) | Assign. Again "Warning No Space for Undo" appears Press OK to continue. Turn on the *Attrib* beside "Z" as shown in Figure 10.3.

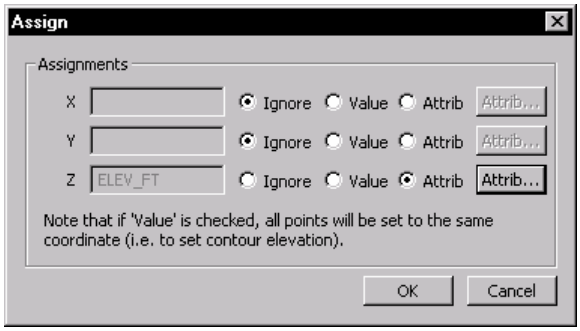


Figure 10.3: Assign Dialog

8. Press the *Attrib* button. A list off all standard Terrain attributes and any attributes imported from the shape file are displayed. In this example the contour elevations are stored in a table called *theme-17*. Open the *theme-17* folder, highlight *ELEV_FT* and click *Add* button. *ELEV_FT* now is displayed in the *Selected* column. Press OK twice to assign the attribute to the selected features.

NOTE: That all of the features have elevations suitable for Terrain Model Calculation, as indicated in the Status Window.

To focus on an area of interest, a clipping rectangle will be inserted and all features outside of the area will be removed.

9. File | Insert File. From the *Files of Type* pull-down choose *Softree Terrain File (*.TER).* Select and open **\Tutorial\Terrain\Terrain Attributes\polygon_clip.TER.** No changes are required in the Import Option dialog box. Press OK to import the polygon. The selected polygon outline is visual in the left bottom corner.

10. Press the *Break at Feature*  button. This activates a box prompting you "No additional features selected, OK to break all features that cross the current feature". Press OK.

11. Select the Polygon feature with the mouse again, this time Edit | Select Feature(s) | By Boundary and choose *Outside* and keep *Retain Currently Selected Feature(s)* checked

12. Features outside of the clipping rectangle will be selected. Press the <delete> key to remove them.

13. Press the *Zoom Extents*  button. The end result should be similar to Figure 10.4.

14. Proceed to Step 2 in Slope Vectors or File | New to exit the program. Do not save changes.

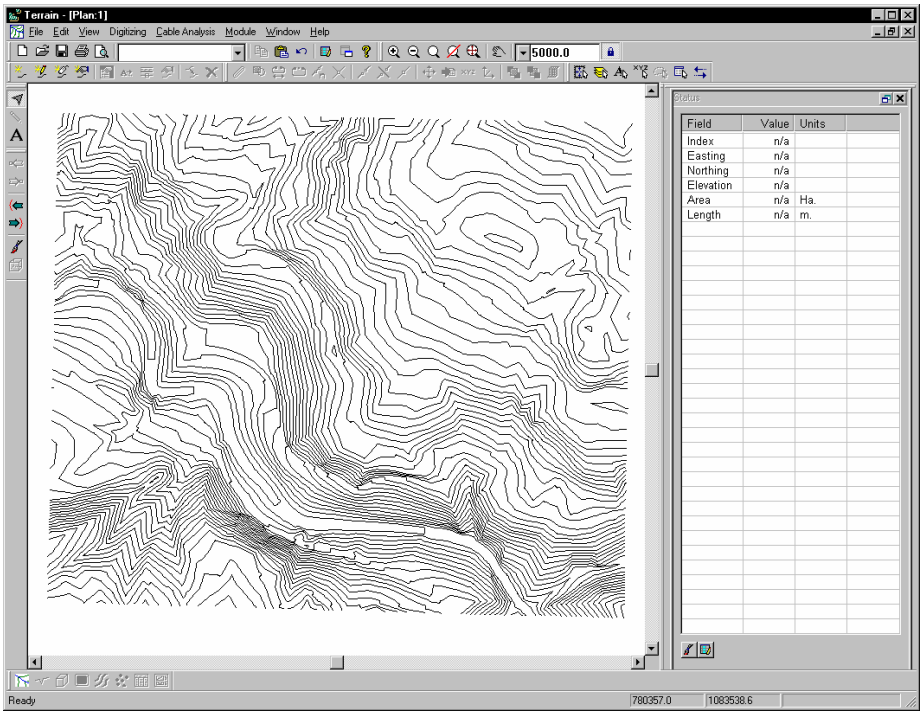


Figure 10.4: Remaining Features after Clipping

Creating Custom Symbols and Line-types

In this section new symbols and line-types will be created. Tables of symbols and line-types are store together in TRF files. The default symbol and line table file is called **\RoadEng\normal.TRF**

Terrain and Location documents have private symbol/line tables stored in their files with extension **TE1** for Terrain and extension **DS3** for Location. The Survey/Map module always uses the default file **normal.TRF**.

Creating Symbols 

A Symbol consists of Symbol Items and Text Items. Symbol items are a series of line segments. Text items are text and font information.

1. Module | Setup. Select the *General* tab. Press the *Symbols* button to activate the Symbols Editor.

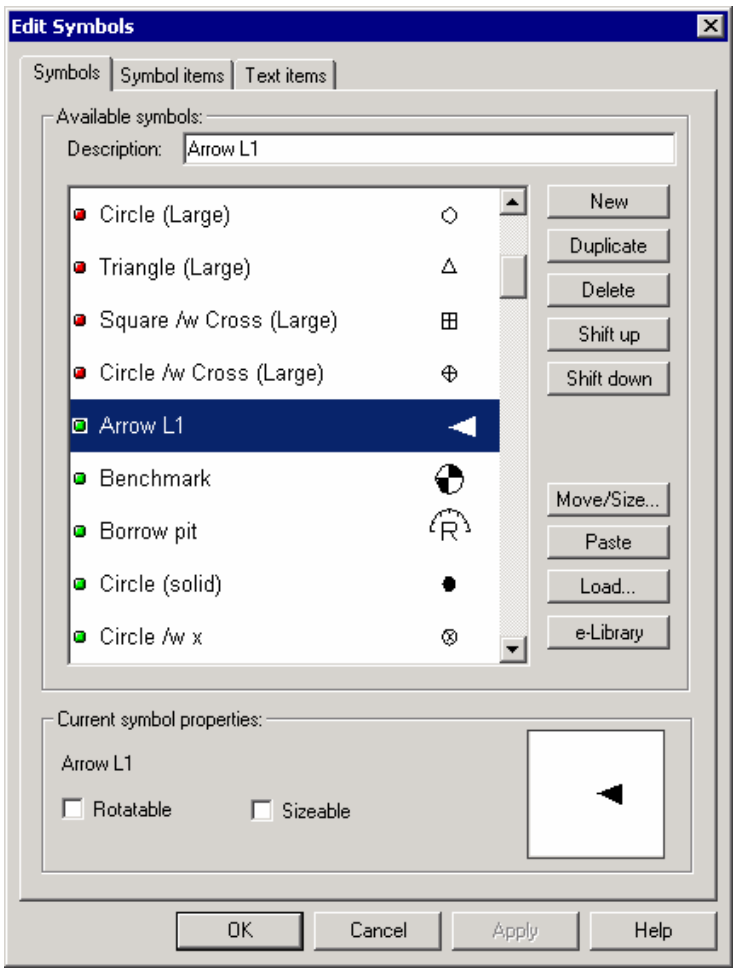


Figure 13.0: Symbol Editor Dialog

2. Press the *Load* button. Select and open the symbol table called **\Tutorial\Terrain\Terrain Customization\example.SYM**. You will need to select Softree V31.from the Files of Type dropdown menu.

NOTE: Symbols and line-types can be loaded from Translation Files (extension TRF, TE1, or DS3), old-style symbol or line-type files (SYM or LIN), or from AutoCAD DWG files.

3. To select all of the symbols in the list, highlight the first item in the list. While holding down the shift key, scroll down using either <page down> or the <down arrow >to highlight all symbols. Press OK.

NOTE: Symbols will not be loaded if a symbol of the same name already exists in the table.

4. Press the *New* button and a new symbol *xxx* will appear in the *Existing symbols* list. The *Symbol items* and *Text items* tabs will be available.

5. Change the Description from *xxx* symbol to ***Tree*.**

6. Click on the *Symbol items* tab. Press the *New* button

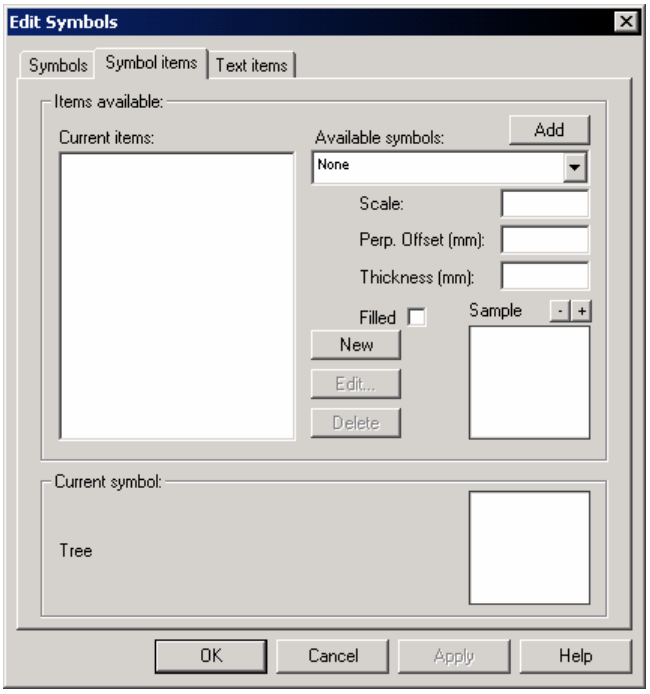


Figure 13.1: Symbol Editor Dialog - Symbol Items Tab

You are ready to draw a new symbol. Notice that the main drawing surface is composed of a grid, and that the *Snap To Grid* and *Add* options are activated.

7. Press the Zoom + button until you have zoomed to (x4).

8. Start 4 grid points above the red cross- hair. Click and drag with the arrow until you draw a straight line that is 4 grid points below the red cross-hair.

9. Repeat step 8. This time start 4 grid points to the left of the red cross-hairs and finish 4 grid points to the right of the red cross- hair.

10. Draw two more lines that run diagonally as shown in Figure 13.2. Once you are done press OK.

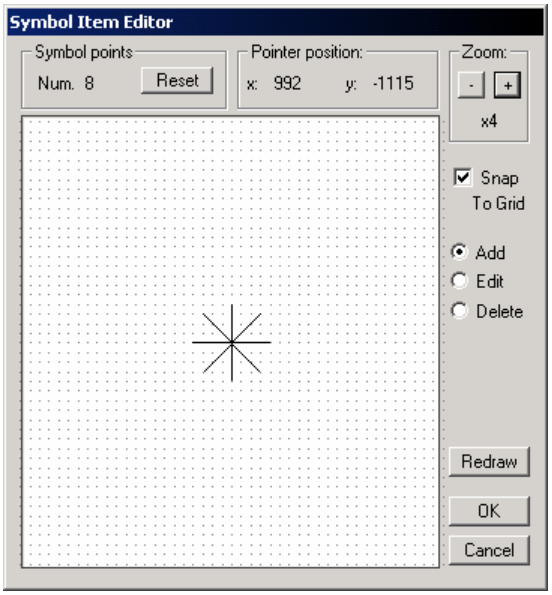


Figure 13.2: Symbol Item Editor

NOTE: This dialog box contains some other useful features. The *Reset* button will clear the whole drawing, so that you can redraw the symbol. Activating the *Edit* or the *Delete* options will allow you to edit or delete a line segment by clicking on a point. The *Redraw* button refreshes the drawing surface. If you do not want the lines to attach to grid points, turn off the *Snap To Grid* option. Up to 20 points can be added to an item.

11. Press the Symbols tab. The new symbol *Tree* is appears in the *Current Items* list and the *sample* box.

If the symbol is more complex than the one just drawn (i.e. more than 20 points) you will have to add portions of the symbol as separate items. You can also add *Available symbols* to the *Current items* list by selecting a symbol in the pull down box and pressing the *Add* button.

If the symbol is a closed area you can:

- Fill it by activating the *Fill* option.

- Change the scale to something other than the default value of 1.00
- Perpendicularly offset the item by changing the *Perp Offset* option.
- Change the thickness of each item.

It is also possible to create symbols from characters and fonts. To make a compound symbol with one or more characters combined with one or more graphic items like the one created above.

12. To make a symbol with a single character, select the *Symbols* tab and press the *New* button. Change the *Description* from "xxx" to **Omega.** Click on the *Text items* tab.

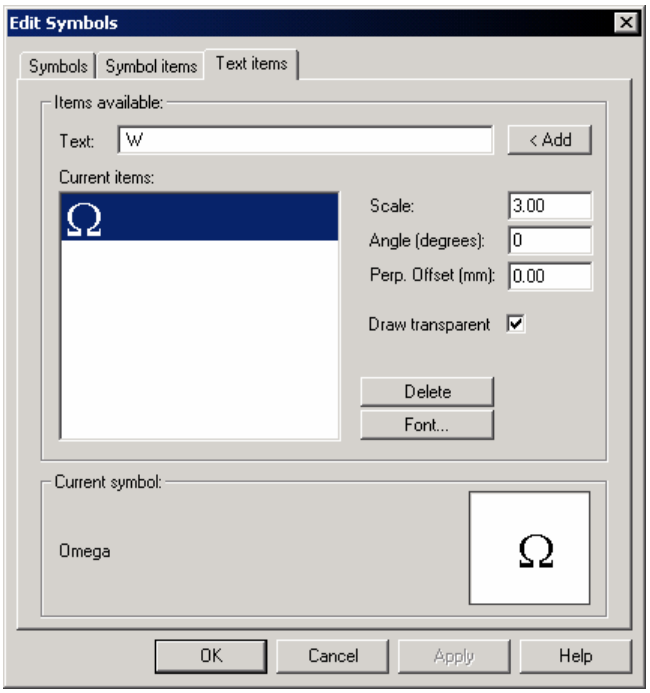


Figure 13.3: Symbol Editor Dialog - Text Items Tab

13. Type **W** in the *Text* field and press the *Add* button. Press the *Font* button to open the *Font Selection* dialog box. Select *Symbol* font, if available. Press OK.

NOTE: It is possible to create symbols from other specialized fonts as shown in the figure below.

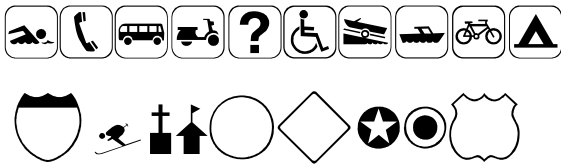


Figure 13.4: Symbols Created using Specialized Fonts

Fonts are not provided with the Terrain Module (check your software dealer or use the Internet to locate specialized font sets).

14. Press the Symbols tab. The new symbol *Omega* appears in the *Current Items* list and the *sample* box. Press *Save* in the Tables section of the Terrain Setup dialog. You are prompted with the File Save dialog box to save this table. Press *Cancel*.

15. Close the Symbols editor. Continue to step 2 in Creating Line-types or File | New to close. The symbol table files you create are available from the *Open* button.

If you save your file as **\RoadEng\normal.TRF** it will be the default Symbol and Line-type tables on your computer.

Creating Line-types

Line-types can contain periodic symbols and text as well as lines.

To load the Symbols Table please see steps 1-3 in the previous example Creating Symbols.

1. Select Module | Setup. Select the *General* tab. Press the *Line-types* button to activate the Edit Line-types Dialog box. (Figure 13.5)

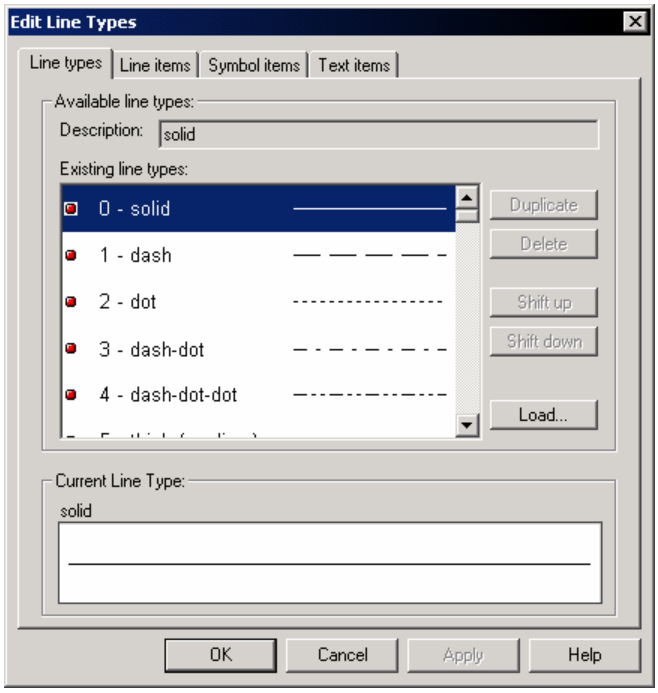


Figure 13.5: Edit Line-types Dialog Box

2. Click on the *Load* button and select the line-type table called **\Tutorial\Terrain\Terrain Customization\example.LIN**. From the *Files of Type – Softree V3.1 Lines (*.lin*) Press Open.

NOTE: Symbols and line-types can be loaded from Translation Files (extension TRF, TE1, or DS3), old-style symbol or line-type files (SYM or LIN respectively), or from AutoCAD DWG files.

3. To select all of the line-types in the list, highlight the first item in the list. While holding down the shift key, scroll down using either <page down> or the <down arrow >to highlight all line-types. Press OK.

NOTE Line-types will not be loaded if a line-type of the same name already exists in the table.

4. From the *Existing line-types* list, scroll until you find the line-type called *Solid (.3 mm)* and select it. This will activate a number of buttons on the right side of the dialog box, as well as tabs at the top of the dialog box.

5. Press the *Duplicate* button. The Solid (.3 mm) will be duplicated at the end of the list. Change the *Description:* from *Solid (.3 mm)* to *Gully with S6 stream.*

6. Press the *Symbol items* tab, and the *Line-type Editor* will change to look like the Figure 13:6.

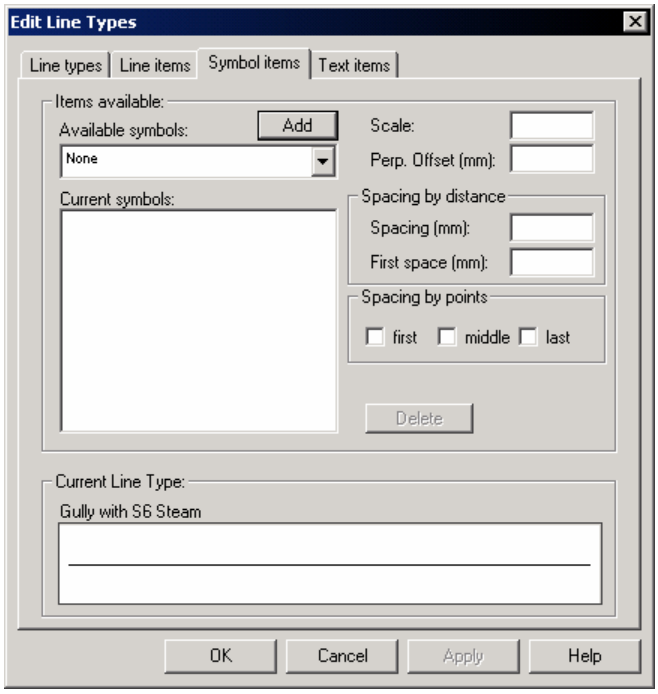


Figure 13.6: Line-type Editor Dialog - Symbol Items Tab

7. Scroll through the *Available symbols* list until you find a symbol called *open arrow* (near the end of the list). Select this symbol.

8. Press the *Add* button. The arrow symbol will be added to the *Current symbols:* list, and at the start of the *Current Line-Type.*

9. Un-select the F*irst* point option, and the symbol will now reappear every 10mm.

10. Again scroll through the *Available symbols* list select the symbol called *arrowhead*, and select the *last* point option. The arrowhead is now at the end of the line.

11. Press the *Text items* tab. Type **S6** in the *Text:* box, and press the *Add* button

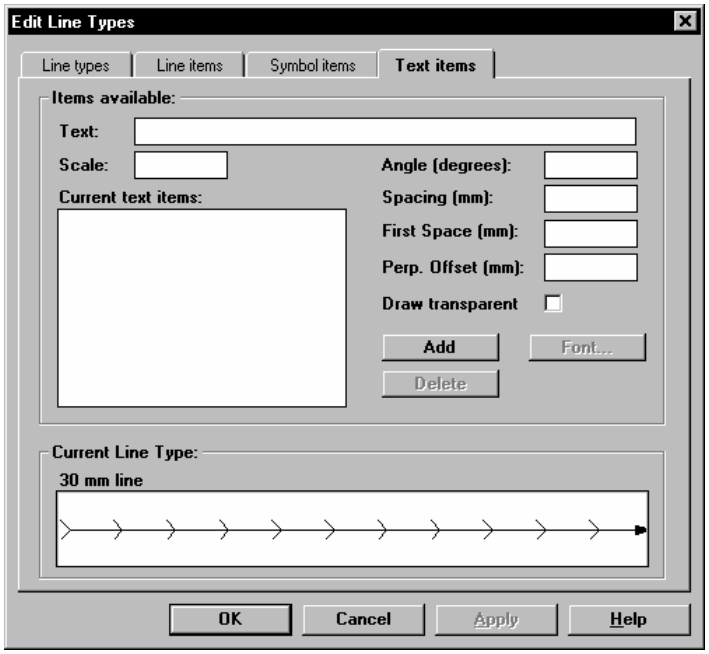


Figure 13.7: Line-type Editor Dialog - Text Item Tab

12. Change the *Spacing (mm):* to 20. Turn off the *Draw transparent* option. The text S6 will appear every 20-mm.

13. Click OK to return to the *Setup* dialog. Press *Save* in the Tables section of the Terrain Setup dialog box. You are prompted with the File Save dialog box to save this table. Press *Cancel*

Any TRF file you create is available from the *Open* button. If you save your file as **\RoadEng\normal.TRF** it will be the default Line-type and Symbol tables on your computer.

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