

# Heights and Profiles

## 14.1 Overview

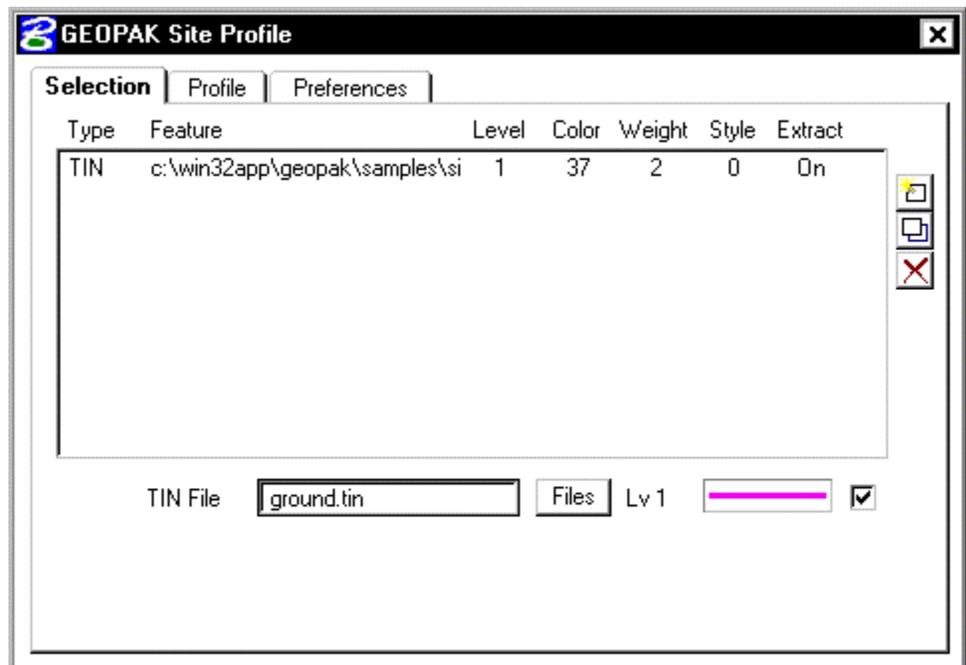
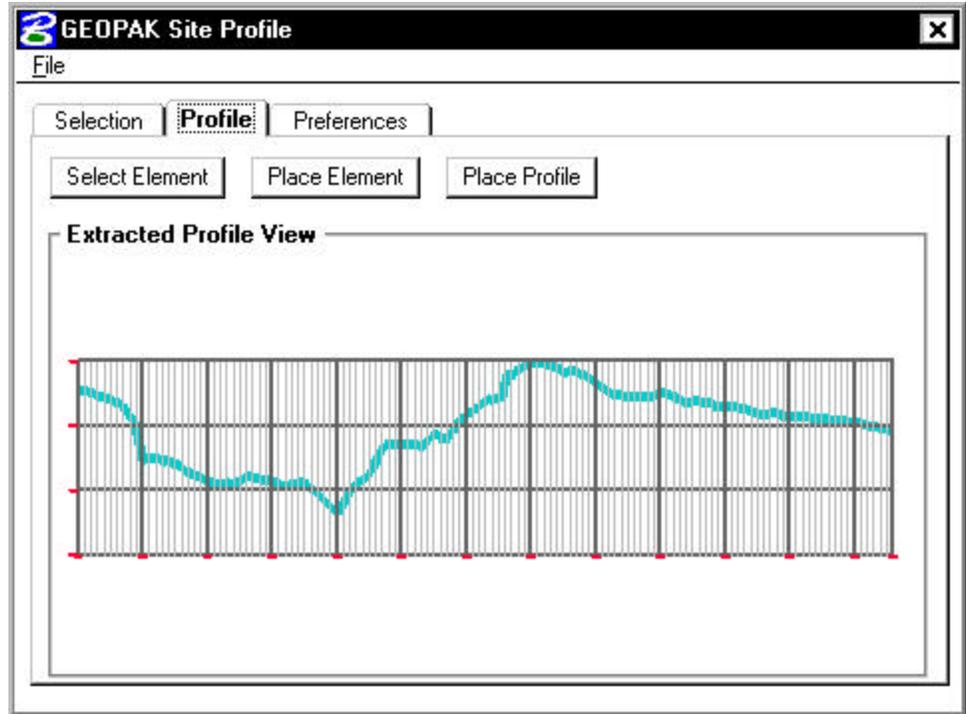
<b>Feature / Function</b>	Viewing profiles of a specified element within TIN model. The Height tool displays and optionally draws the elevation of the model at user specified X, Y coordinates.
<b>Tools</b>	
<b>DTM Menu Bar</b>	Analysis > Height or Analysis > Profile

Two viewing tools are supported within GEOPAK: **Profile** and **Height Query**. Each tool utilizes a triangulated model and displays either a profile or heights.

## 14.2 Profile Dialog

<b>Feature / Function</b>	View a profile based on a user defined MicroStation element.
<b>Tool</b> 	
<b>DTM Menu Bar</b>	Analysis > Profile

One tool is the Profile dialog, which creates a series of line strings by draping each linear reference element onto the triangulated model. The Profile dialog is sensitive to any polynomial factors built into the triangulation model. Hence, the produced line strings can appear quite smooth in appearance. The Profile Dialog is depicted below.



The main dialog has three tabs:

- Selection - TIN file specifications and profile element symbology
- Profile - profile placement buttons and viewing dialog before drawing the actual profile into the MicroStation file.

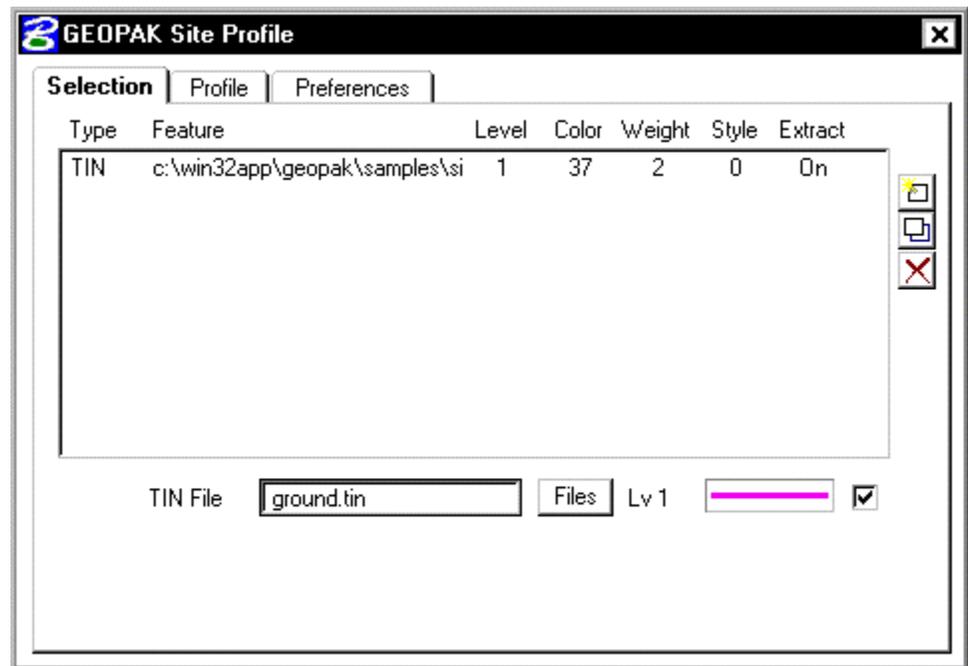
- Preferences - Profile and grid scales, text parameters, elevation and station ranges.

The basic procedure is as follows:

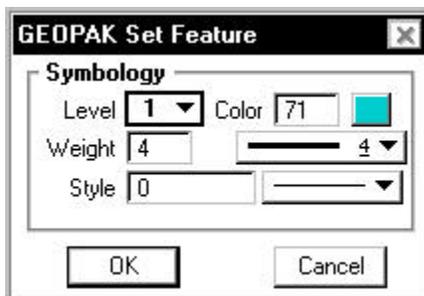
1. Identify the TIN file(s) through which the profile intersects.
2. Select or draw the element whose X,Y values are utilized to generate a profile along the TIN.
3. Set the element symbology and text parameters.
4. Generate the profile and view in the Profile window.
5. Draw the profile into the MicroStation file.

Each tab and step is discussed in more detail.

### 14.2.1 Selection Tab



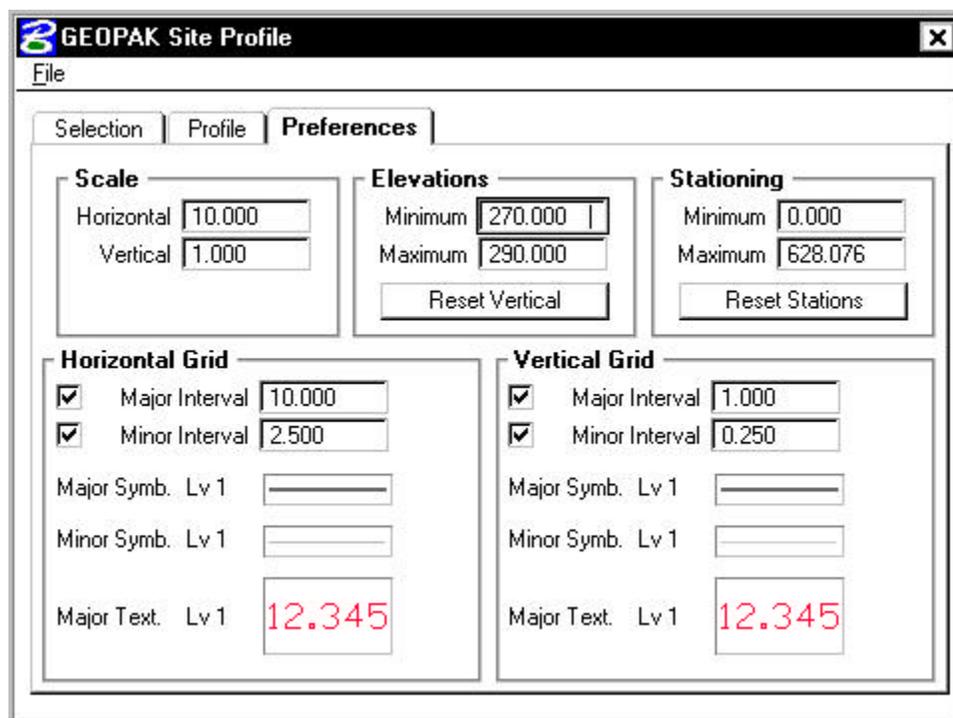
The triangulated model is specified in the **TIN File** keyin field. In lieu of typing, press the **Files** button invoke the Files dialog, wherein the desired file may be selected. If a GEOPAK Site project is open, a Site Model or Site Object may also be utilized. The symbology of the profile is displayed to the right of the files. By double clicking on the color picker, the dialog depicted below is displayed, wherein the symbology can be set.



Set the symbology, then press the **OK** button. The dialog automatically closes and populates the bottom of the main dialog with the symbology from the Set Feature dialog.

Any number of TIN files may be utilized, with different profile symbology for each file. Edit buttons are located on the right side of the dialog: **Add**, **Modify** and **Delete**. To add a TIN file and associated symbology, populate the edit fields at the bottom of the dialog, then press the **Add** button. To modify, highlight the line to be modified and GEOPAK populates the edit fields. Change the desired field(s), then press the **Modify** button. To delete a line, simply highlight the line, then press the **Delete** button.

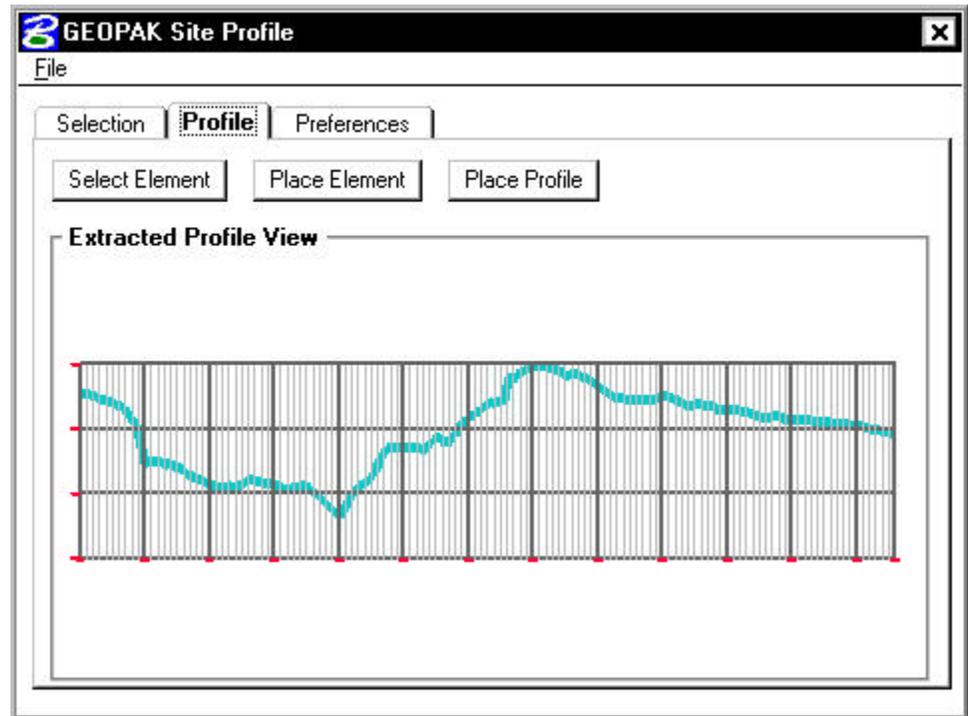
## 14.2.2 Preferences Tab



The Preferences tab is depicted above and consists of a variety of element and text parameters. The table below details each grouping.

<p><b>Scale:</b>  <b>Horizontal</b>  <b>Vertical</b></p>	<p>Specify the horizontal and vertical scale utilized to draw the profile. Note the horizontal is drawn to true measurements, while the vertical is distorted.</p>
<p><b>Elevations:</b>  <b>Minimum</b>  <b>Maximum</b>  <b>Reset Vertical</b></p>	<p>When the <b>Reset Vertical</b> button is pressed, the minimum and maximum values from the TIN file are populated in the appropriate fields. The user may choose to round the values, in order to draw a complete grid.</p>
<p><b>Stationing:</b>  <b>Minimum</b>  <b>Maximum</b>  <b>Reset Stationing</b></p>	<p>The profile is stationed from 0.00. Pressing the <b>Reset Stations</b> button sets the fields to the beginning and end of the profile element. Once again, to draw a complete grid, the user may round off the values in the fields.</p>
<p><b>Horizontal Grid:</b>  <b>Major Interval</b>  <b>Minor Interval</b>  <b>Major Symbology</b>  <b>Minor Symbology</b>  <b>Major Text.</b>  <b>Major Interval</b></p>	<p>All element and text symbology for the horizontal grid. The information is utilized within the Profiles tab and also when drawing the profile into the MicroStation file. Major interval is the distance between the major grid lines, while the minor interval is the number of lines between each major grid. GEOPAK supports unique symbology for both major and minor intervals. The text is stationing across the bottom of the grid.</p>
<p><b>Vertical Grid:</b>  <b>Major Interval</b>  <b>Minor Interval</b>  <b>Major Symbology</b>  <b>Minor Symbology</b>  <b>Major Text.</b></p>	<p>All element and text symbology for the vertical grid. The information is utilized within the Profiles tab and also when drawing the profile into the MicroStation file. Major interval is the distance between the major grid lines, while the minor interval is the number of lines between each major grid. GEOPAK supports unique symbology for both major and minor intervals. The text is elevations along the left side of the grid.</p>

## 14.2.2 Profile Tab

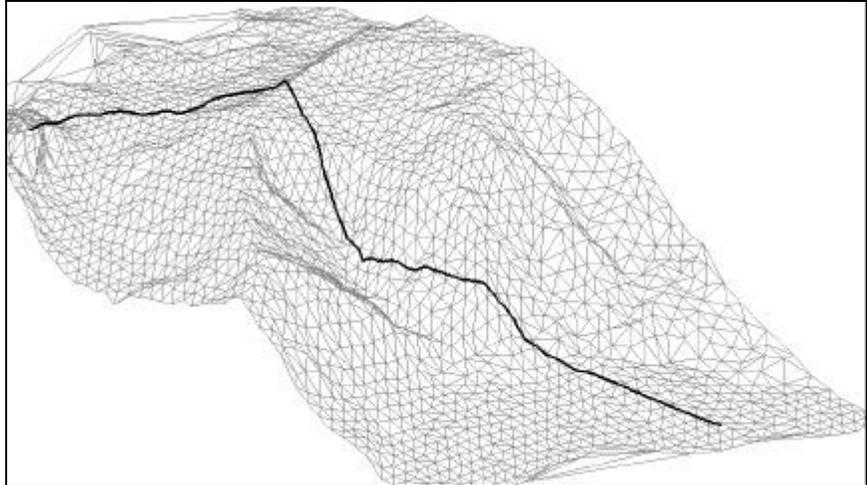


Three action buttons are supported on this tab:

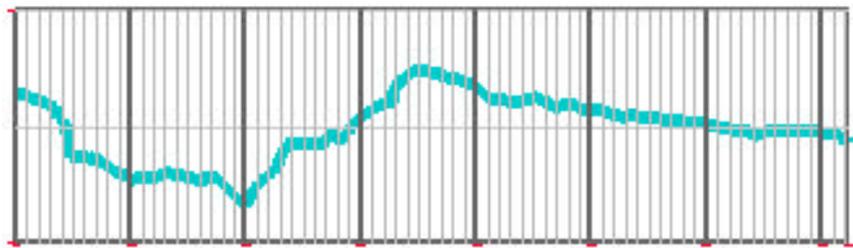
- Select Element
- Place Element
- Place Profile

If a profile is needed on a previously placed element, press the **Select Element** button, then identify the element. Press the **Place Element** push button to interactively define the reference profile line. GEOPAK prompts you to select a number of data points defining the reference line for the profile. The definition process is terminated by pressing the **Reset** cursor button.

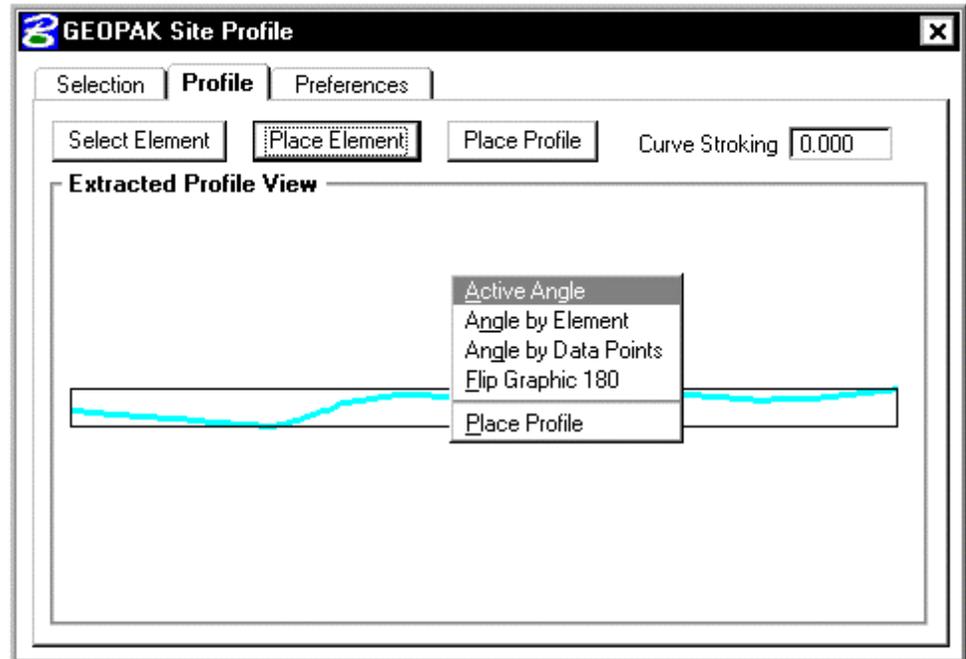
After the element has been identified, the profile is displayed within the viewing area, as depicted in the dialog above. Note all displayed element symbology is defined within the Preferences tab. The graphic below depicts the selected element utilized for profile generation.



To place the profile into the MicroStation file, simply press the **Place Profile** button and place a data point in a blank area of the file. The profile is drawn as depicted below, once again, utilizing symbology in the Preferences tab.



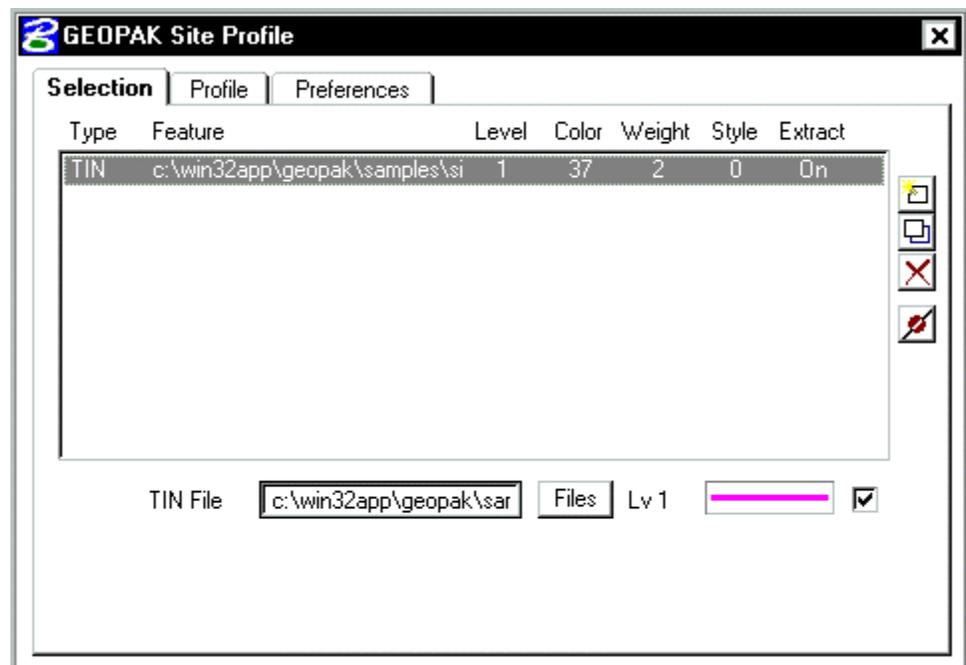
The profile is placed horizontally across the screen. However, by placing a right mouse click inside the Preview window before placement, the pop-up dialog appears as depicted below.



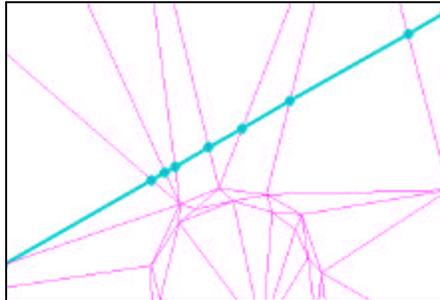
Options are supported for placing the profile at a variety of angles, as depicted in the exploded view above.

### 14.2.3 Extracted Points and Line

After the profile has been generated, two additional icons are displayed directly below the edit buttons on the right side of the Selection tab dialog, as depicted below.



When pressed, the top icon draws small display circles wherever profile points are extracted. One close-up example is depicted below.



The bottom icon draws a line string denoting the location of the generated profile. One example is depicted below (triangles shown for reference only and were previously drawn.)

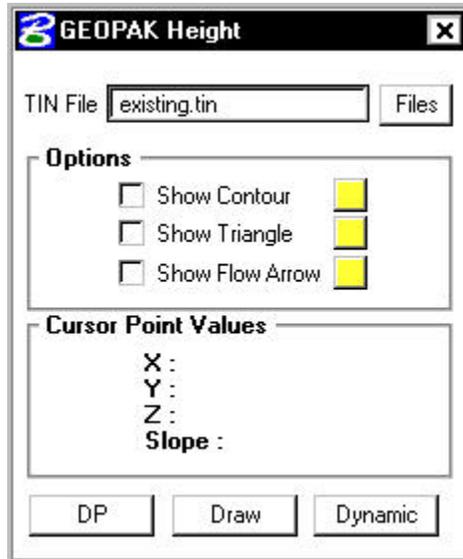


## 14.4 Height Query Tool

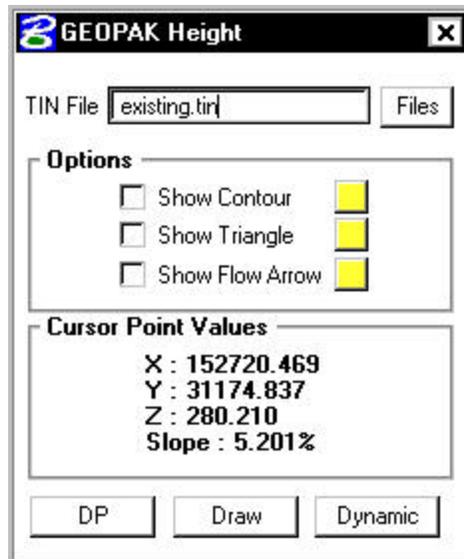
<b>Feature / Function</b>	Determine height and other associated data dynamically based on user-defined data points within the model.
<b>Tool</b> 	
<b>DTM Menu Bar</b>	Analysis > Height Query

GEOPAK offers a tool by which the plan view coordinates, elevation, slope and aspect of the triangulated model can be interrogated. If the triangulation file was created in linear mode, the spot data will be calculated on the plane of the triangle. If the triangulation file was created in polynomial mode, the spot data will be calculated on the polynomial.

The dialog used to interrogate the triangulated model is depicted below.



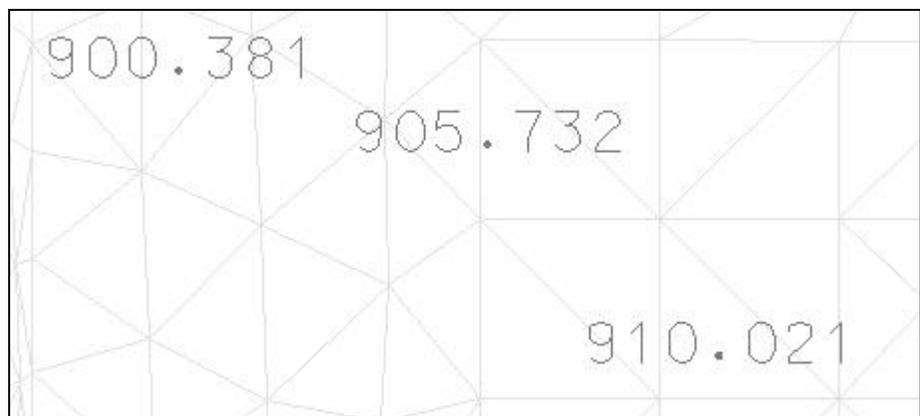
The operation is quite simple. Key in the name of the TIN file. In lieu of typing, pressing the **Files** button invokes the File Manager, wherein the desired file may be selected. Then press the **DP** button. A prompt appears to select a data point. Select a data point at any location within the hull boundary of the triangulated model. If a data point is selected outside the hull boundary, the message displayed is: "Point External To Tin." The **Plan View Coordinates, Elevation, Slope** and **Aspect** of the triangulated model is populated in the dialog as shown below.



Note: The number of decimal places is based on the GEOPAK User Preferences.

The Height dialog automatically updates for each successive data point; you need press the **DP** button only once.

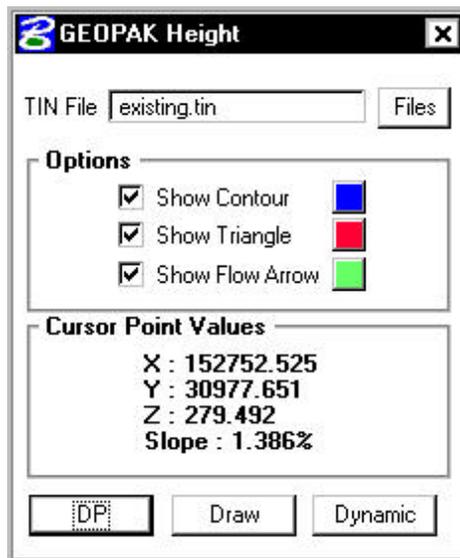
Another option is the drawing the elevation into the active MicroStation file. The process is identical to the Display procedure, simply press the **Draw** button, and select the point on the TIN. In addition to displaying the information within the dialog, GEOPAK places the elevation utilizing the active element symbology and text parameters. In addition, the text is justified (in this case center-center) about the selected data point. The graphic below depicts three elevations placed with the **Draw** option. Note the triangles are shown for reference only as the data points do not have to coincide with a triangle vertex.



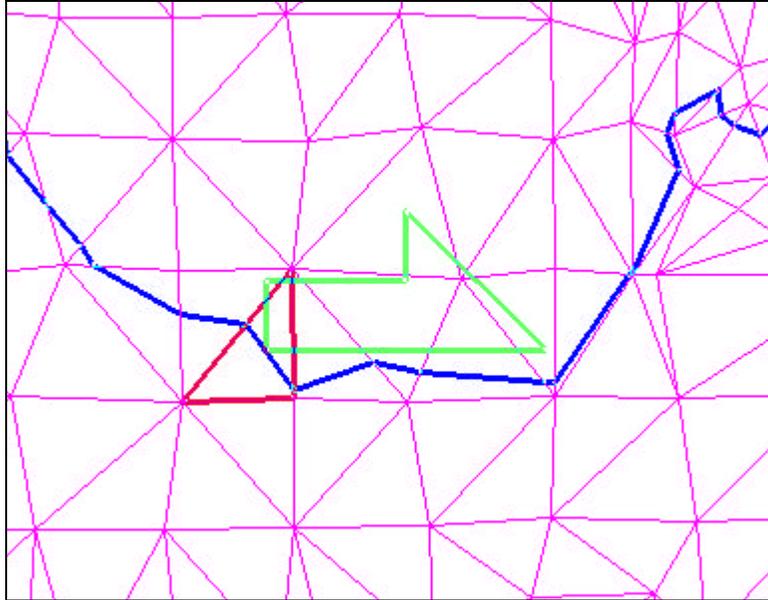
Three options are supported within the dialog:

- Show Contour - displays a contour of the same elevation as the selected point.
- Show Triangle - identifies the triangle wherein the point is located.
- Show Flow Arrow - displays an arrow to indicate direction of flow.

To utilize any option, simply activate the toggle to the left of the option, then select the desired color. In the sample dialog below, all three options are active and unique colors set.



The **DP** button is pressed, and a point on the model identified. The results are displayed below.



The affected triangle (wherein the identified point is located) is red, the flow arrow points to the right (and is in green), while the blue contour shows the contour at elevation 279.492, same elevation as our selected point.

When the **Dynamic** button is pressed, all active options are attached to the cursor, and change as you move about the model.