

# Chapter 2

---

## *Working with Points*

### **Learning Objectives**

***After completing this chapter, you will be able to:***

- *Understand the concept of points in Civil 3D.*
- *Create points using different methods.*
- *Create point styles.*
- *Create point label styles.*
- *Understand file formats.*
- *Edit points.*
- *Understand description keys.*

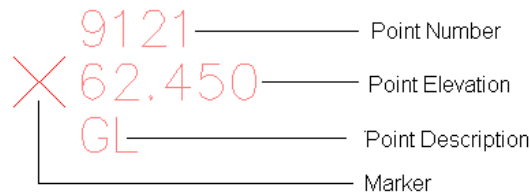
## UNDERSTANDING POINTS

Points lay the foundation of a Civil 3D project. They are the building blocks of all civil engineering projects and designs. A point basically represents a location in 3D space, defined by X, Y, and Z coordinates. Each Civil engineering project starts with the data collected from site surveys. This survey data is imported into Civil 3D as points by using a suitable coordinate system. Generally, points specify the location of different features on the site such as trees, road geometry points, property corners, edge of pavements, and so on. However, Civil 3D points offer you more than just specifying the location of different objects on the site.

In Civil 3D, each point represents an individual object with different information and has a unique point number. The information displayed by a Civil 3D point depends upon the point settings that will be discussed later in this chapter.

### Point Components

In Civil 3D, point has two major components, marker and label. Marker represents the point whereas label displays the information about that point. The display of the point marker is controlled by the point style and the display of the point label is controlled by the point label style. Figure 2-1 shows a point with number, elevation, and description.



*Figure 2-1 A typical Civil 3D point object*

The properties of an individual Civil 3D point can be viewed in the **Properties** window, as shown in Figure 2-2. You can modify the properties of the selected point(s) such as color, layer, linetype, point elevation, and so on.

### Creating Points

<b>Menu:</b>	Points > Create Points
<b>Command:</b>	Create Points

Civil 3D provides you with different ways to create points. You can create points using point tools or by importing them from other files. You can also convert the AutoCAD points into Civil 3D points.

The tools for creating points can be accessed from the menu bar or the **Create Point** toolbar. To create points, choose **Points > Create Points** from the menu bar; the **Create Points** toolbar will be displayed, as shown in Figure 2-3. The options available in the toolbar are divided into six different categories, depending upon the type of points being added. You can access these categories and options by choosing the corresponding button in the **Create Points** toolbar. These categories are discussed next.

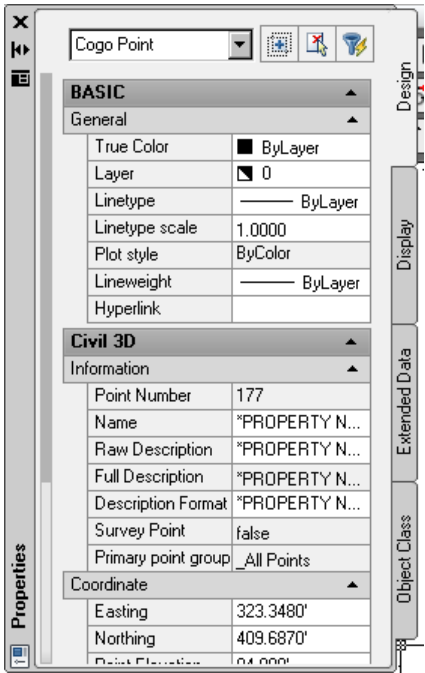


Figure 2-2 The *Properties* window showing different point properties

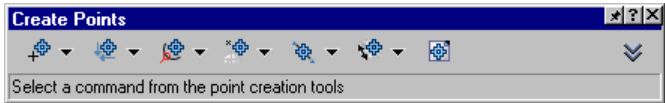


Figure 2-3 The *Create Points* toolbar

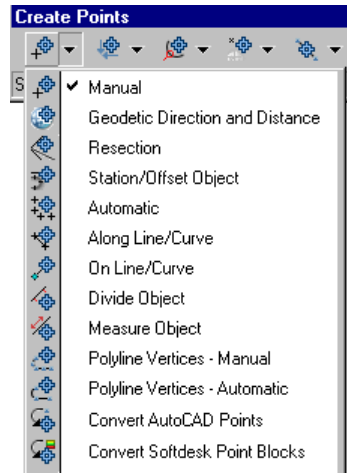


**Tip.** You can also display the *Create Points* toolbar by right-clicking on *Points* in the *Prospector* tab of the *Toolspace* palette and then choosing *Create* from the shortcut menu displayed.

### The Miscellaneous Category



The options in the **Miscellaneous** category of the **Create Points** toolbar are used to create points by selecting the point location in the drawing manually. These options are the most commonly used options to create points. To access these options, choose the down-arrow next to the first button in the **Create Points** toolbar; a flyout will be displayed with different options, as shown in Figure 2-4. In this flyout, the **Manual** option is chosen by default. Alternatively, you can access these options by choosing **Points > Create Points - Miscellaneous** from the menu bar. Some of the options in this category are discussed next.



*Figure 2-4 The options in the Miscellaneous category*

### Manual

This option is chosen by default. As a result, you will be prompted to specify the location of the point. Click in the drawing to specify the location. Next, enter a description of the point at the command line or in the dynamic input edit box and right-click; you will be prompted to specify the elevation of the point. Now, specify the elevation of the point and right-click again to continue or press ENTER to end the command.

### Geodetic Direction and Distance

Geodetic distance is the shortest path between two points along the ellipsoid of the earth, at sea level. The **Geodetic Direction and Distance** option is used to create a point by using geodetic direction and azimuth. Before using this option, you need to assign a coordinate system and a zone to the drawing. To do so, choose **Map > Tools > Assign Global Coordinate System** from the menu bar; the **Assign Global Coordinate System** dialog box will be displayed. You can use this dialog box to assign a coordinate system to the drawing.

Civil 3D displays a message box to enable coordinate transformations. On choosing this option, you will be prompted to specify the location. Click in the drawing to specify the location. Next, specify the azimuth and direction by entering values at the command line or specify it in the drawing by picking points. Next, enter a description and an elevation of the point.

### Automatic

This option is used to create points automatically from the end points of an arc, lot lines, or feature lines. After choosing this option, select the required arc, lines, or polylines and press ENTER; you will be prompted to specify the description of the point. Enter the description and then the elevation when prompted. On doing so, you will notice that points are displayed at end points, center of arc, and vertices of the selected entity. Next, press ENTER to end the command.

### Polyline Vertices - Manual

This option is used to create points at each vertex of a polyline at specified elevation. On choosing this option, you will be prompted to specify the default elevation of all points to be created by this option. Enter the default elevation at the command line. Next, select the required polyline when you are prompted to do so. Enter a description for the point at the command line or use the dynamic input edit box and press ENTER; a point will be created at the first vertex of the polyline. Similarly, enter description for all points on the polyline and then press ENTER to end the command.

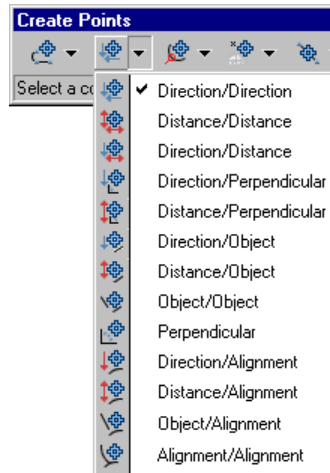
### Polyline Vertices - Automatic



This option is used to automatically create points at each vertex of a polyline. Choose this option and select the required polyline. Next, enter a point description at the command line. Press ENTER to end the command or continue it by specifying the description of all points on the polyline. On doing so, points will be created at vertices of the selected polyline and the elevation of the generated points will be the same as that of the selected polyline.

## The Intersection Category

The options in the **Intersection** category are used to create points at the intersection of directions of two points, intersection of distances of two points, intersection of two alignments, and so on. To access these options in this category, choose the down-arrow next to the second button in the **Create Points** toolbar; a flyout with various options will be displayed, as shown in Figure 2-5.



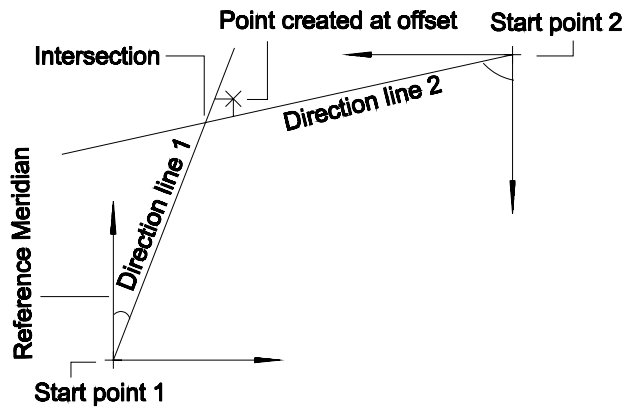
*Figure 2-5 The options in the Intersection category*

Alternatively, choose **Points > Create Points - Intersections** from the menu bar; a cascading menu will be displayed. You can choose the required option from this cascading menu. Some of the options in this category are discussed next.

### Direction/Direction

This option is chosen by default and is used to create a point at the intersection of the directions of two points. The created point is located at the specified offset from the point where the direction lines meet. Choose the **Direction/Direction** option and click in the drawing to specify the start point; you will be prompted to specify the direction. Specify the direction using a bearing or azimuth. **Bearing** is used to specify the direction with reference to a particular quadrant, whereas **Azimuth** is used to specify the direction with reference to a fixed North meridian. Enter **B** to select **Bearing** or **Z** to select **Azimuth**. If you select the **Bearing** option, a quadrant will be displayed at the specified point. Move the cursor in the required quadrant and click to select the quadrant. Next, click again to specify the bearing by clicking or by entering the bearing at the command line; you will be prompted to specify the offset from the point of intersection. Enter the offset distance at the command line or specify the distance by picking points from the drawing. After you have specified the offset distance, you will be prompted again to specify the start point for the second point. Click to specify the second point. Next, specify the direction and offset, as specified for the first point.

After you have specified the offset for the second point, you will be prompted to specify the point description and elevation. Enter the description and elevation of the point. On doing so, you will notice that a point is displayed at the specified offset distance from the intersection of direction lines of points, as shown in Figure 2-6.

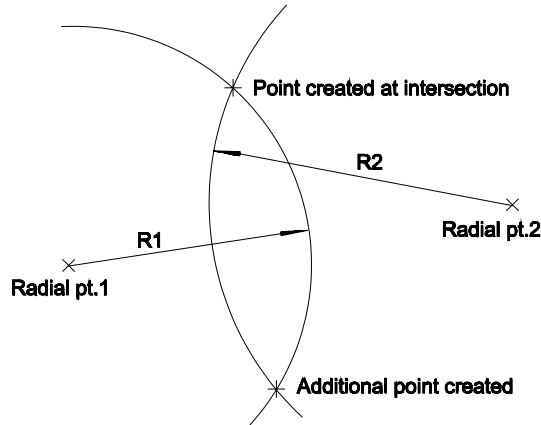


*Figure 2-6 The point added at the specified offset distance from the intersection of direction lines of two points*

### Distance/Distance

The **Distance/Distance** option is used to create a point at the intersection of radial distances from two points. The distances from points are specified in terms of radius. When you choose this option, first you will be prompted to specify the location of the radial point. Click in the drawing to specify the location; you will be prompted again to specify the radius. Enter the radius at the command line using the dynamic input or pick points in the drawing to specify the radius. Similarly, specify the location of the second point and enter a radius; two cross marks indicating two intersection points will be displayed. Click near the intersection, where you want to create point or press ENTER to accept the default **ALL** option to enable you to create points at both intersections. Next, follow the prompts and

specify the point description and elevation. On doing so, the point(s) coinciding with cross-marks will be created. Press ENTER to end the command; cross-marks will disappear and a point(s) will be added at the intersection of radial distances of two points, refer to Figure 2-7.



**Figure 2-7** Points created at the intersection of radial distances of two points



#### Note

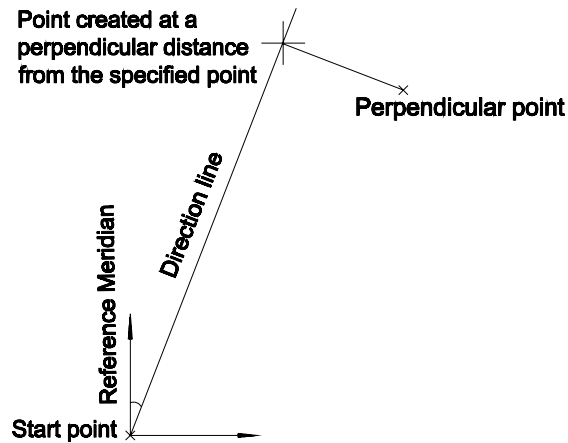
Cross-marks indicating intersections of radii distances of two points will not be displayed, if distances are non-intersecting. Also, there can be only one intersection point and in this case, only one cross-mark will be displayed.

#### Direction/Perpendicular

This option is used to create a point at the intersection of the direction line of a point and the direction line of a point perpendicular to that point. Choose this option; you will be prompted to specify the start point of the direction. Click in the drawing area to specify the start point. Next, specify the direction by specifying bearing or azimuth. On doing so, you will be prompted to specify the offset distance. Specify the offset distance from the direction line or press ENTER to accept the default value **0**. Next, specify the location of the perpendicular point; a cross mark will be displayed perpendicular to the specified point. Follow the prompts and specify the point description and elevation; a point coinciding with the cross mark will be created, as shown in Figure 2-8.

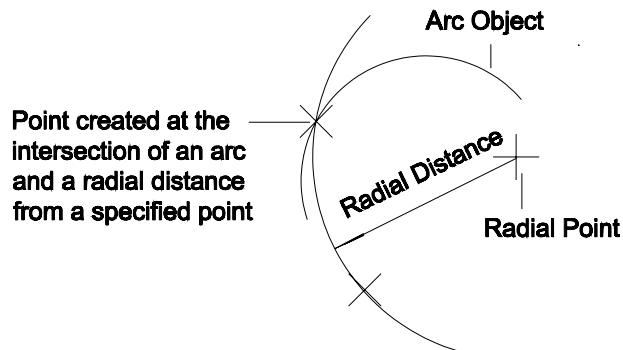
#### Distance/Object

This option is used to create a point at the intersection of an object (line, arc, feature line, or polyline, or lot line) and a radial distance of a point. To create a point, choose the **Distance/Object** option from the **Create Points** toolbar and select the required entity from the drawing; a cross mark will be displayed at the start point of it. Next, specify an offset distance of the point from the selected object either by entering a suitable value at the command line or by picking two points from the drawing area. If you do not want to create points at an offset distance from the object, press ENTER to accept the default **0** offset value. On doing so, you will be prompted to specify the radial point. Click at the required option in the drawing to specify the radial point. Next, specify the radius by entering value at the command line or by picking points from the drawing; you will notice that two cross marks are displayed at the



*Figure 2-8 The point created in a specified direction, at a perpendicular distance from the specified point*

intersection of the object and the radial distance. Click near the cross-mark where you want to add a point or press ENTER to accept the default **All** option to add points at all intersections. Enter a description and elevations for the points and then press ENTER to end the command. Figure 2-9 shows points created at 0 offset distance from the arc object.



*Figure 2-9 Point created at the intersection of the arc object and the radial distance from a point*

### The Alignment Category



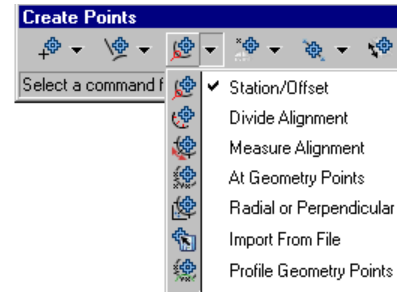
The options in the Alignment category are used to create points on the horizontal alignment or at a certain offset distance from it. To access these options for creating points from alignment, choose the down-arrow next to the third button in the **Create Points** toolbar; a flyout with various options will be displayed, as shown in Figure 2-10.

Alternatively, choose **Points > Create points - Alignments** from the menu bar; a cascading menu will be displayed. Choose the required option from it. Some of the options for creating points from alignment are discussed next.



### Station/Offset

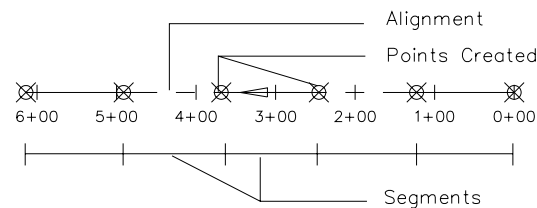
This option is chosen by default and is used to create points at a certain offset distance from the selected station in an alignment. To do so, select the required alignment. Next, select the station at which you want to create a point and specify the offset distance from the selected station at which the point will be created. Also specify the description and elevation of the point when prompted to do so. The point will be created and displayed at the specified offset distance from the selected station. This option is useful for creating points for Right of Way, lanes, and shoulders.



**Figure 2-10** Options for creating points from alignment

### Divide Alignment

This option is used to divide alignment into different segments. Using this option, you can create points at vertex or endpoints of each segment. To do so, choose the **Divide Alignment** option and select the required alignment. Next, specify the number of segments at the command line and press ENTER; you will be prompted to specify an offset distance. Specify an offset distance at the command line, if you want to create points at certain distance from alignment or press ENTER to accept the default offset value 0. Next, you will be prompted to specify the description and elevation for all points that will be created at vertex of each segment. You will automatically be prompted to specify the description and elevations for all points that will be created at vertices of end points, as shown Figure 2-11.



**Figure 2-11** Points created at 0 offset at each vertex of all five segments

### Measure Alignment

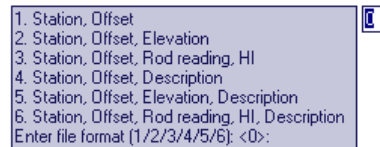
The **Measure Alignment** option is used to create points at fixed intervals along an alignment. In this option, you need to specify an interval and an offset distance from the alignment at which the points will be created. To do so, choose this option from the **Create Points** toolbar and select the required alignment. Next, specify the starting station from where you want to start creating points or press ENTER to accept the default option. Similarly, specify the end station. On doing so, you will be prompted to specify the offset from the alignment. Next, enter the offset distance at the command line or press ENTER to create points on the alignment. Similarly, specify the interval at which you want to create these point, as you are prompted. Now, enter the point description and elevation; points will be created at specified interval along the entire alignment. Note that once you specify description and elevation for points, they will be created and displayed automatically.

### At Geometry Points

This option is used to create points at each geometry point such as start and end points of alignment (EP, BO), spiral tangents (TS, ST), spiral curves (SC, CS) as well as point of intersections (PI), point of Curvature (PC), and so on. To create points using the **At Geometry Points** option, choose this option and select the required alignment from the drawing; you will be prompted to enter a point description. Specify the point description and elevation till all points are created. Next, press ENTER to end the command.

### Import From File

This option is used to create points from an ASCII or the Text file (.txt) containing information about the station, offset, and elevation of an alignment. To do so, choose the **Import From File** option from the **Create Points** toolbar; the **Import Alignment Station and Offset File** dialog box will be displayed. Browse to the required location and open the required file. On doing so, the Enter File Format dynamic input prompt will be displayed on the screen, as shown in Figure 2-12.



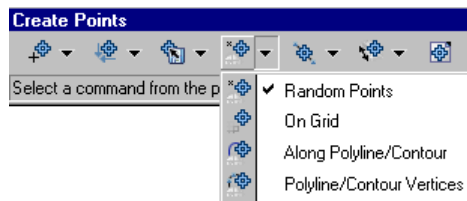
**Figure 2-12** The Enter File Format dynamic input prompt

Also, six different file formats in the prompt will be displayed. Specify the required format by entering the corresponding number of the format starting from 1 to 6 in the text box, as shown in Figure 2-12. For example, if the text file consists of the Station and Offset information, enter 1 or enter 2 in the text box. Next, enter a delimiter at the command line. Also, enter 1 for the space delimiter, or 2 for the comma delimiter. After specifying the delimiter, specify the invalid indicator for elevation, station, or offset, if prompted to do so or press ENTER to proceed. Now, select the required alignment along which points will be created using the ASCII file; civil 3D will import points from the selected file and create points along the alignment.

### The Surface Category



The options in the **Surface** category are used to create point based on surface elevations. To access the options in this category, choose the down-arrow next to the fourth button; a flyout will be displayed with various options for creating points from the surface, as shown in Figure 2-13.



**Figure 2-13** The point creation options in the **Surface** category

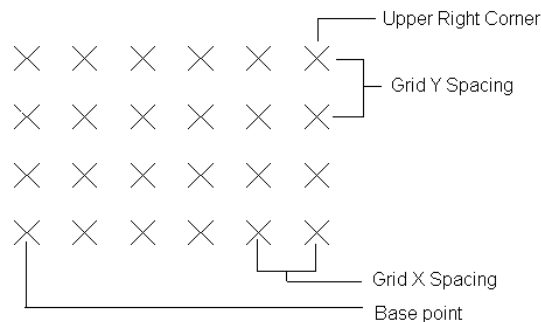
Alternatively, choose **Points > Create Points - Surface** from the menu bar to access these options. Some of the options in this category are discussed next.

### Random Points

This option is chosen by default and is used to add points anywhere within the surface. The points added acquire their elevation from the surface itself. Choose the **Random Points** option from the menu bar and select the required surface when prompted to do so. Next, click at the required location inside the surface and specify the description of the point. Continue adding these points or press ENTER to end the command.

### On Grid

This option is used to create points in a surface by specifying the spacing along the X and Y-axes of the grid. To do so, choose this option and click on the surface to specify the base point of the grid. Next, specify the rotation of the grid at the command line, dynamic input, or press ENTER to accept the default value. Now, specify the spacing between each point in the X direction at the command line or by picking points on the screen. Similarly, specify the spacing along the Y direction. Now, specify the upper right corner of the grid; a single boundary of the grid will be displayed. Also, you will be prompted to change the spacing or the rotation of the grid. Press ENTER to accept the default option **No**. Follow the prompts and enter description for points. As you continue to enter description at the command line, you will notice that points will be displayed in a grid. These points will be added at the surface elevation, as shown in Figure 2-14.



*Figure 2-14 The points created in a grid*

### Along Polyline/Contour

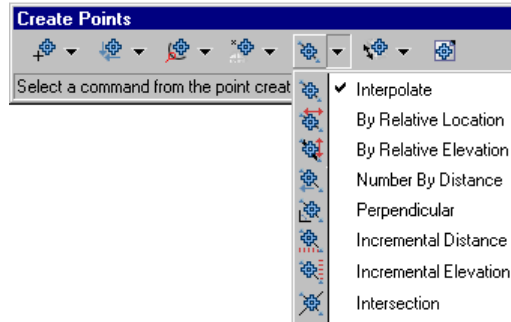
This option is used to create points at a specific distance along the polyline or a contour in the surface. To do so, choose the **Along Polyline/Contour** option from the **Create Points** toolbar and select the required surface. Next, specify the distance between each points at the command line or by picking points at the command line. Next, select the required polyline or contours the surface. Follow the prompts and specify the description of points and then press ENTER. Continue doing this till all points are created along the selected polyline or contour.

### The Interpolation Category



The options in the **Interpolation** category are used to add points in the drawing by interpolation. To access these options, choose the down-arrow next to the fifth

button in the **Create Points** toolbar; a flyout with different options will be displayed, as shown in Figure 2-15. Alternatively, choose **Points > Create Points - Interpolation** from the menu bar to display the options. Some of the options in this category are discussed next.



*Figure 2-15 The point creation options in the **Interpolation** category*

### **Interpolate**

The **Interpolate** option is chosen by default in the **Create Points** toolbar and is used to add points between the two existing points by interpolation. The point location and its elevation is defined by interpolation. To do so, choose the **Interpolate** option and then select the first point and then the second point. Next, enter the number of points that you want to create at the command line and press ENTER. Now, enter the description for points and press ENTER subsequently. On doing so, points will be added in your drawing by interpolating between the two selected points.

### **By Relative Location**

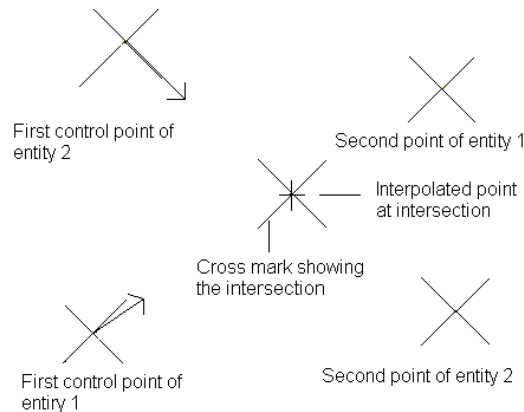
This option is used to interpolate a point between two points or control points at a required distance. Choose the **By Relative Location** option from the **Create Points** toolbar and click in the drawing to specify the first point. Next, specify the elevation of the specified point at the command line and press ENTER. This is the first control point. Again, click in the drawing at the required location to specify the second control point. On doing so, you will be prompted to specify the distance at which you want to create the point. Specify the distance either by entering at the command line or by using the dynamic input. Next, specify the offset distance of the point from the arbitrary line or the arc joining two control points. Now, specify the point description at the command line and press ENTER; the point will be created and displayed at the specified distance from the first control point and at the specified offset distance from the arbitrary line joining two control points. Press ENTER to end the command.

### **Intersection**

This option is used to create points by interpolation at the intersection of two existing entities such as arc or line. If there are no existing entities in the drawing, you can create arbitrary regions for two entities by picking points from the drawing. Choose the **Intersection** option from the **Create Points** toolbar and click in the drawing at the required location to specify the first point for the first region. The first control point of the first entity will be created. Next, specify the elevation for the first control point at the command line or press ENTER to skip the elevation. Click again to specify the second point. To

specify the elevation of the second point, enter **D** at the command line to specify the elevation difference between two points, enter **S** to specify the slope, or enter **G** to specify the grade between two points. This is called the second control point of the first entity. Thus, you have created an arbitrary region for the first entity.

Next, specify the offset distance of the point to be created from the entity. To do so, follow the prompts and specify two more control points for the second entity. On doing so, green colored cross marks indicating the intersection of two points will be displayed. If the entities intersect only at one point, one cross-mark will be displayed and if the entities intersect at two points, two cross marks will be displayed. Next, you will be prompted to specify the description for the point. Specify the description or press ENTER to skip the description; a point will be interpolated and displayed on the cross mark. Press ENTER to end the command. Figure 2-16 shows the interpolated points created at the intersection.

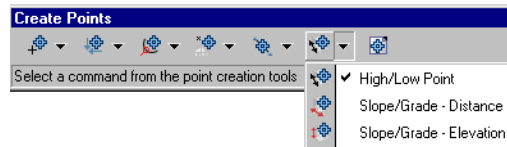


**Figure 2-16** The interpolated points created at the intersection

To create a point from the existing entities, choose the **Intersection** option from the **Create Points** toolbar. Next, enter **E** at the command line and press ENTER; you will be prompted to select the existing line, arc, lot line, feature line, or polyline entity. Select the required existing entities and follow the prompts to create points by the intersection of two entities.

## The Slope Category

The options in the **Slope** category are used to create points based on slope, grade intersections, elevations, or distances. To access these options in the **Slope** category, choose the down-arrow next to the sixth button in the **Create Points** toolbar; a flyout with all options will be displayed, as shown in Figure 2-17.

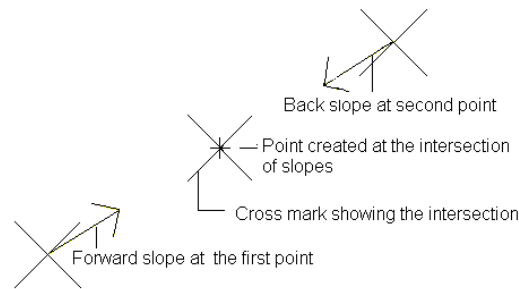


**Figure 2-17** The options in the **Slope** category

Alternatively, you can access these options by choosing **Points > Create Points - Interpolate** from the menu bar. The options in this category are discussed next.

### High/Low Point

This option is chosen by default in the Slope category. This option is used to create a high or low elevation point by specifying the slope or grade of two points. These points are created at a location where the slope or grade of two points intersect. Choose this option from the **Create Points** toolbar and click in the drawing to specify the first point. Click again to specify the second point. Now, specify the required slope or grade for the first point in the drawing area by entering a value in the command line or by using the dynamic input. To do so, enter **S** at the command line to specify the slope (in ratio) or enter **G** to specify the grade (percent) and press ENTER. Similarly, specify the required slope or grade for the second point; a cross mark will be displayed. Now, press ENTER to accept the default option **Yes** after being prompted to add a point at the intersection. Next, enter the point description; a new point will be added at the intersection of the forward slope/grade of the first point and the back slope from the second point, as shown in Figure 2-18.



*Figure 2-18 Point created at the intersection of slopes*

### Slope/Grade Distance

This option is used to create multiple points from an existing point by specifying the slope/ grade to a specified direction and distance. To do so, choose the **Slope/Grade Distance** option from the **Create Points** toolbar and click in the drawing to specify the start point. Next, click in the required direction again to specify the direction of intermediate points. Now, specify the required slope or grade at that point. Next, enter the distance upto which you want to create multiple points at the command line. Enter the number of points at the command line and press ENTER. Specify the offset distance or press ENTER to accept the default value. Optionally, press ENTER to add the end point. Follow the prompts and enter the point description or continue pressing ENTER to skip description. As you continue pressing ENTER; points will be displayed in the drawing in the specified direction.

### Slope/Grade Elevation

This option is used to create multiple points in a specific direction by specifying grade/ slope at a specified distance and elevation. Choose the **Slope/Grade Elevation** option from the **Create Points** toolbar and click in the drawing to specify the start point. Click again to specify the direction in which points will be created. Next, specify the required grade or slope at the command line and press ENTER. Specify the end elevation at the

command line and press ENTER. Now, enter the number of points to be created. Optionally, specify the offset distance at the command line and press ENTER. Again, press ENTER to add the end point, if required. Follow the prompts and enter the description for all points. As you enter the description, points will be created and displayed.

## Import Points

This is the most common method of creating points. The **Import Points** option is used to create points by using the point data contained in the imported files. The point data is generally imported from the ASCII (.txt) or Microsoft Access (.mdb) files. Creating points, using the point data collected by the data collector or surveyor, is the most convenient way to create points. Before importing points, you need to specify the file format according to the point data in the file.

To import the point data file, choose the **Import Points** button from the **Create Points** toolbar. Alternatively, choose **Points > Import/Export Points > Import Points** from the menu bar; the **Import Points** dialog box will be displayed, as shown in Figure 2-19. In this dialog box, you can select a file format and specify other necessary options prior to importing points. The options in this dialog box are discussed next.

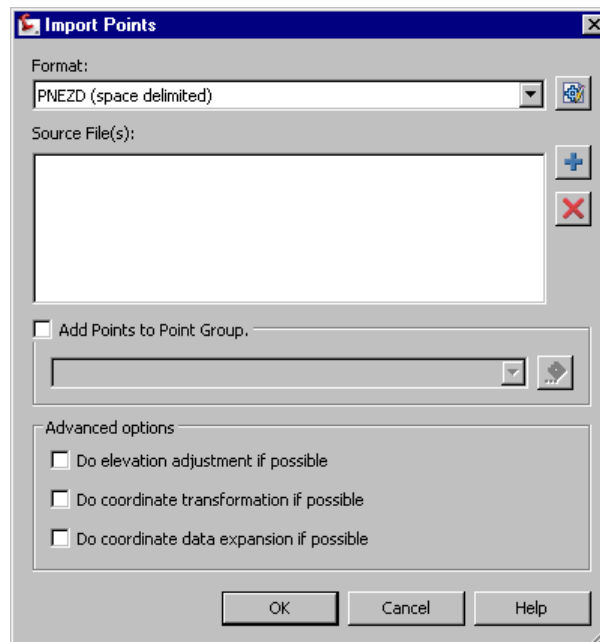


Figure 2-19 The *Import Points* dialog box

### Format

The **Format** drop-down list is used to display various file formats supported by Civil 3D. A file format describes the sequence or arrangement of point data in the file to be imported. It is important to select file format similar to point file before importing, exporting, or transferring points. For example, if the point file consists of the northing, easting, and elevation information of points, you need to select the NEZ file format.

There are two main types of file formats, **User point Database** and **User Point File**. The User Point Database format is used to specify the arrangement of point data in the ASCII (.txt) file and the **User Point File** is used to specify the arrangement in the Microsoft Access database file. You can use the in-built file formats depending upon the type of file used, or create your own formats. The methods of creating new formats are discussed later in this chapter.

### Source File(s)

The **Source File(s)** area is used to display the name and path of the selected file. To add a source file, choose the button with the **+** sign on the right of the **Source File(s)** area; the **Select Source File** dialog box will be displayed. Browse to the required folder and then select the file to be imported. Also, select the file type from the **Files of type** drop-down list and choose the **Open** button to open the file; the name and path of the file will be displayed in the **Source File(s)** area.

### Add Points to Point Group

Select the **Add Points to Point Groups** check box to add the points of the selected file in a existing point group. You can select a point group from the drop-down list located below the **Add Points to Point Groups** check box, if the drawing consists of any predefined point groups. If the drawing does not consist of a point group, you can create a point group. To create a point groups, choose the button on the right of the drop-down list; the **Point File Formats - Create Group** dialog box will be displayed. Enter the name of the point group that you want to create in the edit box and choose the **OK** button; the point group will be created and points will be added in the point group.

### Advanced Options

Selecting the **Do elevation adjustment if possible** check box from the **Advanced Options** area enables the elevation adjustment of the points being imported. Selecting the **Do coordinate transformation if possible** check box enables the coordinate transformation to transform the coordinate of the imported file format according to the current drawing. This option is applicable only if both the imported point file and the drawing in which the file will be imported are assigned the coordinate zones.

After specifying the file format and other options, choose the **OK** button; the dialog box will be closed and points will be imported. The appearance of the imported points depends upon point settings.



### Note

*Until a point group is specified, the points in the drawing created by using any of the point creation methods or imported into the drawing will be added to the default **\_All Point** point group displayed in the **Prospector** tab.*

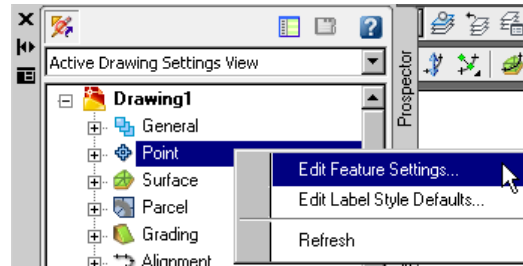
## POINT SETTINGS AND STYLES

AutoCAD Civil 3D has some in-built point styles that control the visibility and appearance of Civil 3D points. Besides controlling the visibility and display of points, these styles help you

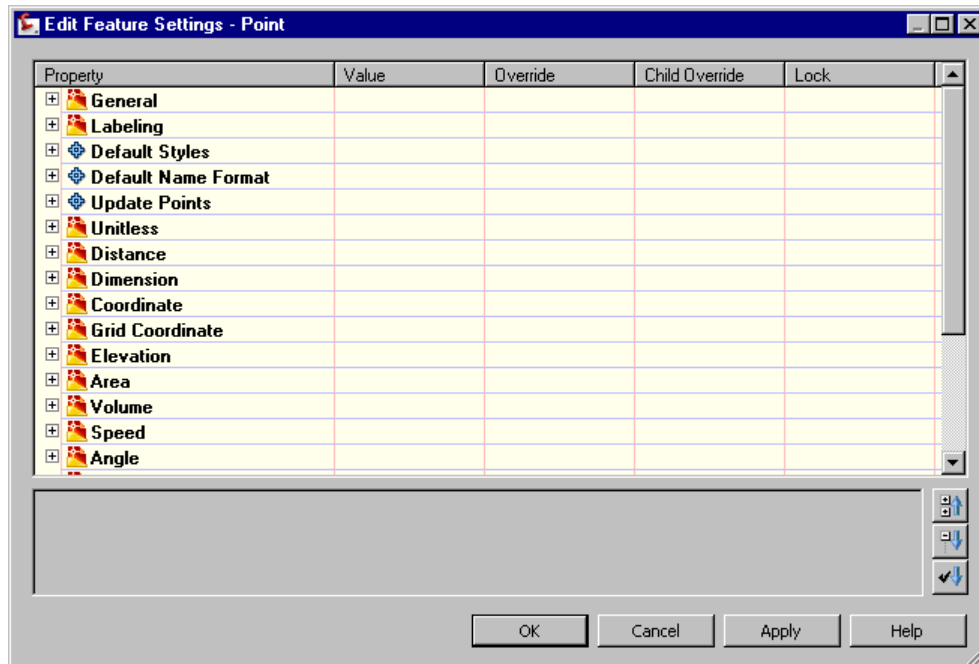


manage the workability of points. Point styles can be assigned after the points are imported or created. Alternatively, you can use a drawing template with required point settings and then import or create points according to industry standards.

Civil 3D has some default settings for points. These settings control the display, elevation, layer, visibility, size, dimension, and so on. You can view and edit these default settings as per your requirement. To do so, choose the **Settings** tab in the **Toolspace** palette and right-click on **Point**; a shortcut menu will be displayed. Choose **Edit Feature Settings** from the shortcut menu, as shown in Figure 2-20; the **Edit Feature Settings - Point** dialog box will be displayed, as shown in Figure 2-21.



**Figure 2-20** Choosing **Edit Feature Settings** option from the shortcut menu



**Figure 2-21** The **Edit Feature Settings - Point** dialog box

This dialog box is used to edit settings of points. Every Civil 3D object has some default settings that can be viewed and modified using the **Edit Feature Settings** dialog box. You can expand various categories in the dialog box and click in the **Value** field of properties to modify values. For example, expand the **Default Styles** category and then click in the **Value** field of the **Point Style** property; a browse button will be displayed. Choose the button to display the **Point Style** dialog box. Select the required point style from this dialog box and choose the **OK** button, refer to Figure 2-22. The dialog box will be closed and the default point style will be modified. Now, when you create or import points in the drawing or template, the selected point style will be assigned automatically to points.

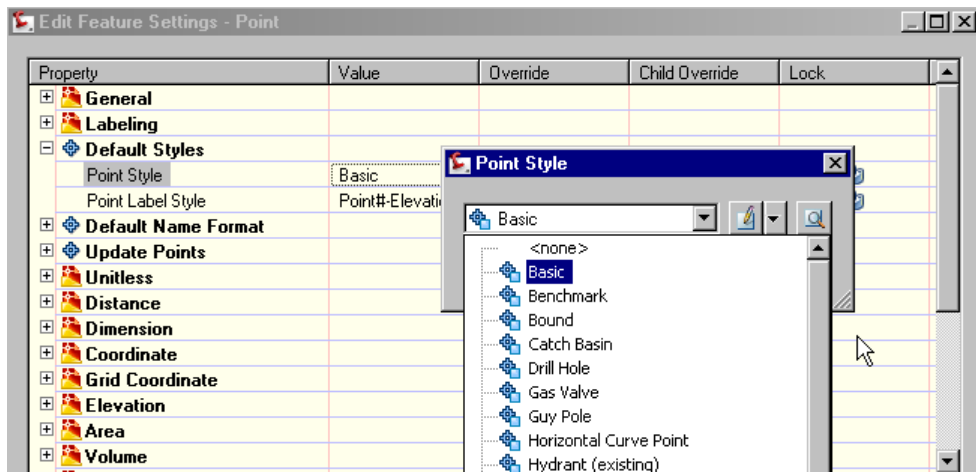


Figure 2-22 Selecting the point style from the **Point Style** dialog box



#### Note

The point style will be displayed in the **Point Style** dialog box depending upon the type of template selected while working on a new drawing or the point styles that you have created in the existing drawing. The **\_AutoCAD Civil 3D (Imperial) NCS Base.dwt** template will have any two default point styles ( **Basic** and **Standard** ), whereas the **\_AutoCAD Civil 3D (Imperial) NCS Extended.dwt** template has multiple in-built point styles.

Similarly, you can modify the other default values related to the point object in this dialog box and choose the **OK** button to close the dialog box.

## Point Styles

Point styles control the shape, size, color, location of the point marker as well as controls the visibility of the point label. Point styles are created and assigned before or after points are created in the drawing. As discussed earlier, AutoCAD Civil 3D provides you with some in-built point styles. However, you can create your own point styles as per the project requirements and use them in the drawing. Point styles are created and managed in the **Settings** tab of the **Toolspace** palette.

### Creating a Point Style

To create a point style, choose the **Settings** tab in the **Toolspace** palette and expand **Point > Point Styles** to view the default point styles. Now, right-click on **Point Styles** and choose **New** from the shortcut menu that is displayed, as shown in Figure 2-23.

On doing so, the **Point Style - New Point Style** dialog box along with the default **Information** tab will be displayed, as shown in Figure 2-24. The options in this dialog box are discussed next.

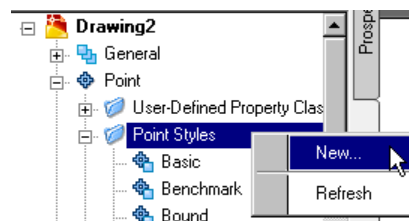


Figure 2-23 Choosing the **New** option from the shortcut menu

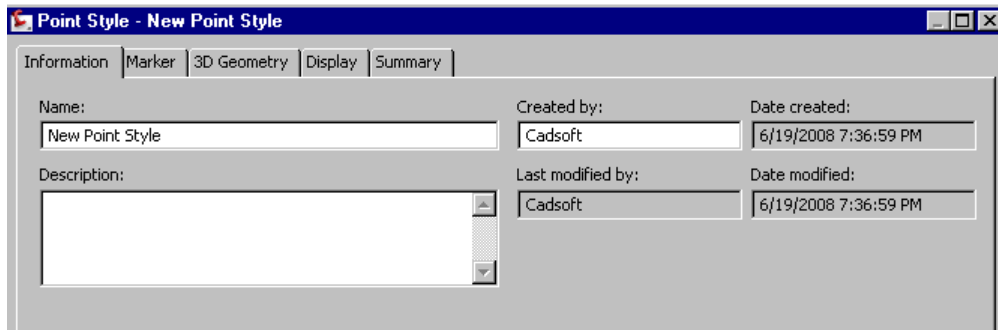


Figure 2-24 Partial view of the **Information** tab of the **Point Style - New Point Style** dialog box

### The Information Tab

This tab is chosen by default and is used to specify the name for the point style. Specify a name for the new point style in the **Name** edit box. If no name is specified, the point style will be created with the default name, **New Point Style**. Optionally, you can enter a description about the point style in the **Description** text box.

### The Marker Tab

The **Marker** tab, as shown in Figure 2-25, is used to specify the appearance of the marker point in the drawing. Using this tab, you can specify the point marker as that of the AutoCAD point style or you can use the AutoCAD blocks to represent them in the drawing. In this tab, you can also use the custom defined point markers to represent as a point marker in the drawing. Various options in the **Marker** tab are discussed next.

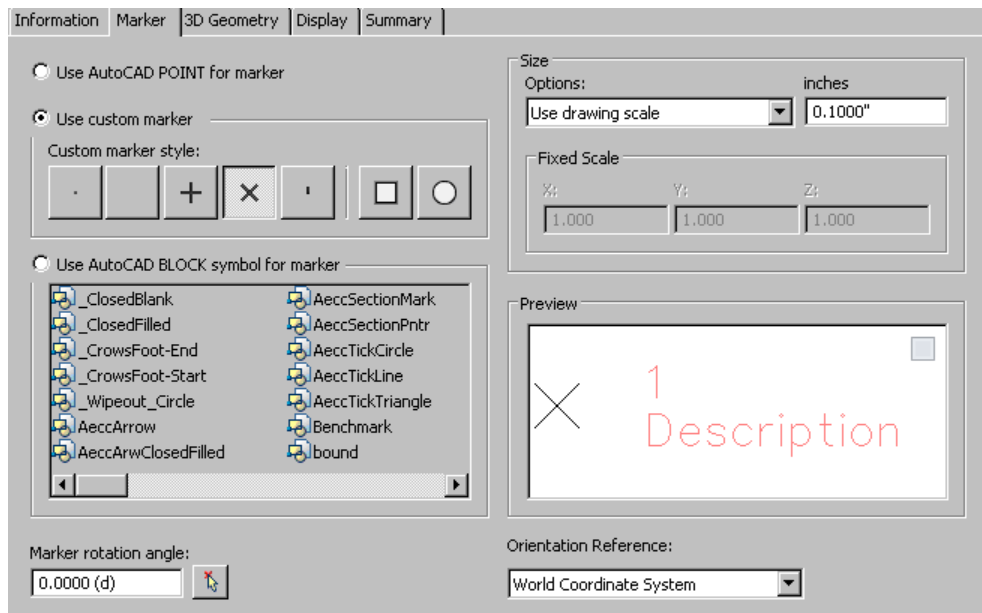


Figure 2-25 The **Marker** tab in the **Point Style - New Point Style** dialog box

In the **Markers** tab, you can specify the marker point using the current AutoCAD point symbol, which can be specified by the AutoCAD PDMODE and PDSIZE system variables. To do so, select the **Use AutoCAD POINT for marker** radio button and see its preview in the **Preview** area.

In this tab, you can also use a specified symbol to represent a point marker in the drawing. To do so, select the **Use custom marker** radio button. On selecting this radio button, different symbols to represent the point marker will be displayed as a button in the **Custom marker style** area. The buttons displayed in this area specify the symbol to be displayed as a point marker in the drawing. You can choose any one of the five buttons on the left to be used as a base symbol and then choose either of the sixth and seven buttons or both. The last two buttons that is chosen individually or in combination superimposes over the base symbol to form a combined symbol. As you choose these buttons, you can preview them in the **Preview** area of the **Marker** tab.

You can also display the point marker in the drawing using a block reference of an AutoCAD block. To do so, select the **Use AutoCAD symbol for marker** radio button; the list of blocks defined in the drawing are listed in the text box below it. Choose any of the blocks from the list and preview it in the **Preview** area.

Next, after selecting the marker style, specify the size of the marker in the **Size** area. You can set the size of the markers using four different options available in the **Options** drop-down list. Select the **Use drawing scale** option to specify the size of the marker by multiplying a specified value with the current drawing scale. Enter the required value in the **inches** edit box. You can select the **Use Fixed Scale** option from the drop-down list to set the size of the point marker by specifying the fixed scale values in the **X**, **Y**, and **Z** edit boxes. Enter a suitable value in these edit boxes to assign a fixed display scale to the marker.

You can also select the **Use size in absolute units** option from the **Options** drop-down list to set the marker size in an absolute value, based on the units displayed. Enter the required value for the size in the edit box next to the this drop-down list. The **Use size relative to screen** option in the **Options** drop-down list is used to sets size of the marker as percentage of the drawing screen size. Enter the percentage in the **percent** edit box.

Optionally, specify the marker rotation in the **Marker rotation angle** edit box or choose the button on the right to specify the rotation by picking points from the drawing. Also, specify the orientation of the marker by selecting the option from the **Orientation Reference** drop-down list. If you Select the **World Coordinate System** option ensures that the marker rotation angle will be relative to the world coordinate system. Select the **Object** option from the drop-down list to ensure that the marker rotation angle will be relative to the object it is attached to. If you select the **View** option from the **Orientation Reference** drop-down list, the marker rotation angle will be relative to the current AutoCAD view direction.

### The 3D Geometry Tab

This tab is used to specify the display of points in the Model view or 3D views. The **Point**

**Display** mode property specifies the display of point in 3D view. Click in the **Value** field of this property and select any of the three display modes from the drop-down list. Select the **Use Point Elevation** mode to display points at their actual elevation. The **Flatten Points To Elevation** mode is used to flatten or project points to the specified elevation. On selecting this option, the **Point Elevation** property will be enabled. You can specify the required elevation in the **Value** field of this property. The **Exaggerate Points By Scale Factor** mode is used to raise or exaggerate the elevation of point by a specified scale factor. On selecting this option, the **Scale Factor** property will be available and you can enter the required scale factor in the **Value** field of this property.

### The Display Tab

This tab is used to set the visibility and display of the point marker and label. Using this tab, you can set different display settings for points in different views such as plan view (2D), model (3D), section, or profile view. You can select the required view from the **View Direction** drop-down list. To do so, select the required view from the **View Direction** drop-down list and then set the display settings in the **Component Display** area.

The **Component Display** area is used to display the point component and different display settings in different columns. The **Component Type** column in this area, lists the components of point object. The number of components in the **Component Type** column varies according to the types of object present in the drawing. The **Visibility** column specifies the visibility of component. Click on the light bulb icon in this column to control the visibility. The bulb in yellow color indicates that the component is visible. Click on the bulb to turn it off; the select component will now become invisible in the drawing.

The **Layer** column specifies the layer assigned to the component. Click on the default layer value to display the **Layer Selection** dialog box. You can use this dialog box to specify the required layer for the component and choose **OK** to exit the dialog box. The **Color** column specifies the color of the component. Click on the default value in the **Color** column to display the **Select Color** dialog box. You can use this dialog box to select a color of the component.

The **Linetype** column specifies the linetype of the component. Click on the default value in this column to display the **Select Linetype** dialog box. Select the required linetype from the dialog box. Note that the **Show Linetypes in Drawing** radio button is selected by default in this dialog box. As a result, the linetypes that are loaded in the current drawing are displayed. To view more linetypes, select the **Show Linetypes in File** radio button.

The **LT Scale** column specifies the linetype scale for the component. Click on the default value and enter the scale in the **LT Scale** column.

The **Lineweight** column specifies the lineweight of components. Click on the default **Value** in this column to display the **Lineweight** dialog box. Select the required lineweight from this dialog box and choose the **OK** button; the specified lineweight will be applied on the component. The **Plot Style** column specifies the plot style of the component. You can edit the value for the plot style.

### The Summary Tab

This tab is used to review or edit the values of properties, if required. After you have specified settings in the point style, choose the **OK** button; the **Point Style** dialog box will be closed and the point style will be added in the **Point Styles** node in the **Settings** tab.

## POINT LABEL STYLES

Point label styles control the behavior and appearance of point labels. Point labels provide information about points. Like point styles, point label styles are created and managed in the **Settings** tab of the **Toolspace** palette.

### Creating a Point Label Style

Civil 3D provides you with some in-built label styles such as the point styles. But you can create your own point label styles and use them in the drawing. To create a new point label, choose the **Settings** tab and expand **Point > Label Styles** to view the in-built label styles. Right-click on the **Label Styles** option; a shortcut menu will be displayed. Choose **New** from the shortcut menu; the **Label Style Composer dialog box - New Point Label Style** dialog box will be displayed. The options in this dialog box are discussed next.

### The Information Tab

This tab displays information about point label style such as name, date of creation, and so on. Enter a name for the required point label style in the **Name** edit box in this tab.

### The General Tab

The **General** tab is used to specify if label is displayed as label or tag. In addition, it specifies the visibility, orientation reference, and so on of the label. The properties in this tab are listed in the **Properties** column under three different categories, **Label**, **Behavior**, and **Plan Readability**. The default values of properties are listed in the **Value** column. The **Preview** pane in this tab displays the preview of the point and point label style. You can use the **ViewCube** tool in this pane to view the point style and point label style in different directions. Various properties displayed under these three categories are discussed next.

#### Text Style

The **Text Style** property is used to specify the default text style of the label text. Click in the **Value** field of this property; a browse button will be displayed. Choose the browse button to display the **Select Text Style** dialog box. Select the required style from this dialog box and then choose the **OK** button to apply the specified style.

#### Visibility

This property is used to control the visibility of the entire label. By default, the value of this property is set to **true**. As a result, the label will be visible in the drawing. To hide the point label in the drawing, set the value of this property to **false**.

#### Layer

The **Layer** property is used to specify the default layer of all label components. To modify the layer, click in the **Value** field and choose the browse button available on the right of this field; the **Layer Selection** dialog box will be displayed. You can use this dialog box to select or create the required layer.

### Orientation Reference

This property is used to specify the orientation of the point label. By default, orientation is set to **Object**, which indicates that the label will be oriented according to object such as line or arc. To change the orientation of the point label, click in the **Value** field and select the required options from the drop-down list. The options have been explained earlier in this chapter.

### Forced Insertion

This property will be available only when the orientation reference is set to **Object**. Click in the **Value** field of this property and select the required option to place the label. Next, select the **Top** option to place the label at top of the object; the **Bottom** option to add the label at the bottom of the object; and the None option to place the label as it is composed originally.

### Plan Readable

This property is used to specify whether to rotate the label text to make it easy-readable in the plan view. By default, the value of this property is set to **true**, which indicates that the label will be rotated in the plan view to make it easy-readable. If you set the value of this property to **false**, the label text will be displayed as it is inserted originally. You can specify the rotation angle in the **Value** field of the **Readability Bias** property.

## The Layout Tab

The **Layout** tab, as shown in Figure 2-26, is used to specify the layout of the point label by creating and editing label components. The options in this tab are discussed next.

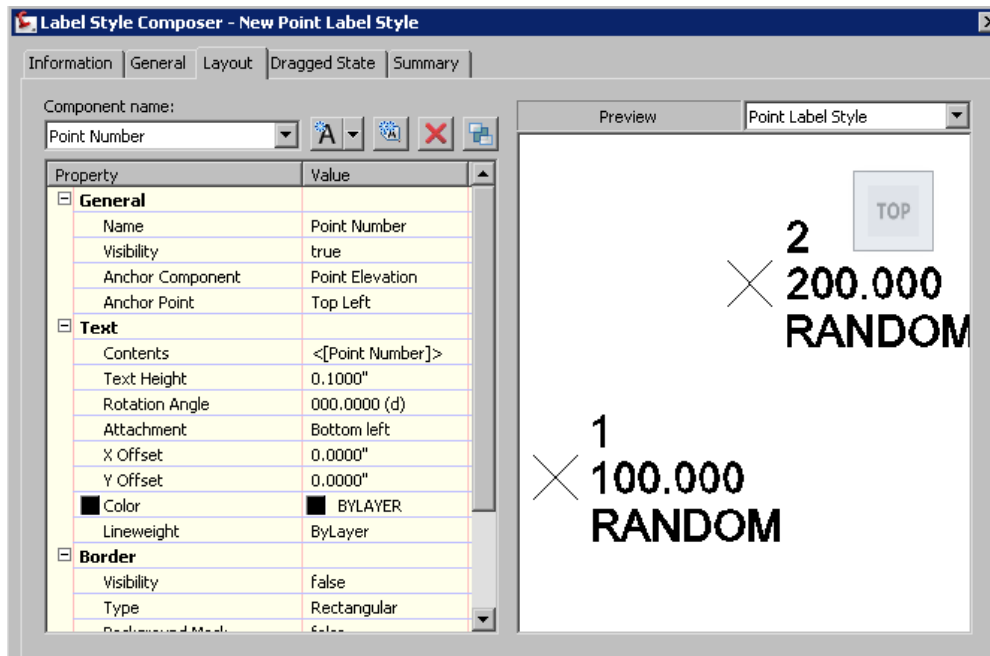


Figure 2-26 Partial view of the **Layout** tab of the **Label Style Composer** dialog box - **New Point Label Style** dialog box



**Component name**

The **Component name** drop-down list is used to display the components of point label. By default, the point label has three components, **Point Number**, **Point Elevation**, and **Point Description**. Select the required label component from the **Component name** drop-down list to view its properties in the **Property** column, refer to Figure 2-26. Different label properties in this tab are discussed next.

**Name**

This property of the **General** category is used to specify the name of the selected label component. Click in the **Value** field of this property and specify the name of the new created component or the existing label components. Note that you cannot change the name of **Point Elevation**.

**Visibility**

This property is used to specify whether the component is visible or not. By default, the value of this property is set to **true**. As a result, the component will be visible in the drawing. Click in the **Value** field of this property and select **false** from the drop-down list to hide the selected component.

**Anchor Component**

This property is used to specify a reference for positioning the component. Click in the **Value** field of this property and select the required component from the drop-down list to use it as an anchor for the label. The default option **<Feature>** helps you anchor the label to a feature. A point is called a feature, if a label style is created for it.

**Anchor Point**

This property is used to specify the location on the anchor **component**, where the text of the label style will be attached. For example, if you select **Feature** as the anchor component for the **Point Number** component and **Top Left** as the anchor point, the **Point Number** will be placed at top left corner of the existing feature (point).

**Contents**

This property of the **Text** category is used to specify the content of label component. Click in the **Value** field of this property and choose the browse button; the **Text Component Editor - Content** dialog box will be displayed. You can use this dialog box to create label text. The procedure to Add a text to the label is discussed later in this chapter.

**Text Height**

This property is used to specify the height of the text in the label. Click in the **Value** field of the **Text Height** property and specify the required text height.

**Rotation Angle**

This property is used to specify the angle of rotation or inclination of the text component. Click in the **Value** field of this property and enter a positive or negative value for the rotation. Alternatively, choose the button displayed on the right to specify the rotation by picking points from the drawing. The positive angle direction is always counterclockwise.



**Attachment**

This property is used to specify the attachment point of the label component attached to the anchor point. Click in the **Value** field and select the required attachment point from the drop-down list that is displayed.

**X Offset**

This property is used to specify the offset distance of the component from anchor point in the X direction. Click in the **Value** field of this property and enter the offset value to adjust label, if required.

**Y Offset**

This property is used to specify the offset distance of the component from anchor point in the Y direction. Click in the **Value** field of this property and enter the offset value to adjust the label, if required.

**Color**

This property is used to specify the default color of the label component. To change the default color, click on the value, and choose the browse button; the **Select Color** dialog box will be displayed. Select the required color from this dialog box and choose the **OK** button.

**Lineweight**

This property is used to specify the lineweight of the text. Click in the **Value** field of **Lineweight** and choose the button displayed on the right; the **Lineweight** dialog box will be displayed. Select the required lineweight from the dialog box and choose **OK**; the **Lineweight** dialog box will be closed.

**Visibility**

This property of the **Border** category is used to specify whether the label component text will be displayed with a border or not. By default, the value of this property is set to **false**. As a result, the border will be invisible. To display label in a border, click in the **Value** field of this property and select **true** from the drop-down list to make the border visible. You can view the border in the **Preview** window.

**Type**

This property is used to specify the shape of the border. The **Rectangular** is the default border type. To select a border shape, click in the **Value** field of the **Type** property and select the required shape for the border from the drop-down list. You can view the shape of the border in the **Preview** pane after setting the visibility of the border to **true**.

**Background Mask**

This property is used to specify whether or not a background mask will be applied to the label. Click in **Value** field of this property and select **true** from the drop-down list to apply the background mask. If you apply the background mask to the component, the background of the label, such as surface contours, will be hidden by mask.

**Gap**

This property is used to specify the distance between label component and border. Click in the **Value** field of this property and specify the distance between label and border.

**Color**

This property is used to specify the color of the border. The default value of this property is **By Layer**, which indicates that the current color assigned to the label is controlled by the layer property of the border.

**Linetype**

This property is used to specify the linetype of the border. The default value of the **Linetype** property is **By Block**.

**Lineweight**

This property specifies the lineweight of the border.

**Create component**

To create a new label component, choose the down-arrow button next to the **Component name** option; a flyout will be displayed. You can choose the required component to be added from the flyout. You can add a new text component, a line component, or a block component and then set its properties as required.

**Copy component**

Choose the **Copy component** button to create a copy of the selected component. Specify a name in the **Value** column for the copied component; the component will be added in the **Component** name drop-down list.

**Delete component**

Choose the **Delete component** button to delete the selected label component from the **Component** name drop-down list.

**Component draw order**

Choose the **Component draw order** button; the **Component Draw Order** dialog box will be displayed, as shown in Figure 2-27. You can use this dialog box to specify the order in which label components will be displayed in the multicomponent label. Select the required component from the **Component** area and choose the **Top** or **Bottom** button to move the selected component to the top or bottom in the label. Note that the component at top in the dialog box is the last component displayed in the label.

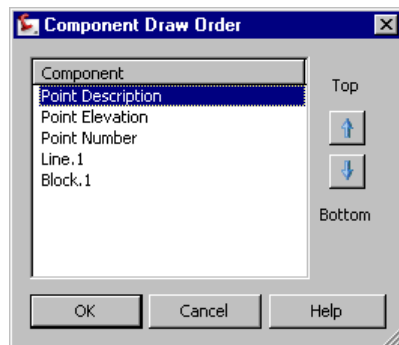


Figure 2-27 The **Component Draw Order** dialog box

## The Dragged State Tab

This tab is used to specify the properties and display of label when it is dragged from its insertion point. You may drag the label from its original insertion point due to the lack of space in the drawing. When you drag label to a different position, it is followed by a leader with an arrow head. The properties of this tab are listed under two categories, **Leader** and **Dragged State Components**. The **Leader** component contains leader properties where as the **Dragged State Components** contains label properties. Some of the properties of this tab are discussed next.

### Arrow Head Style

This property of the **Leader** category is used to specify the default arrow head style of the leader attached to the dragged label. Click in the **Value** field of this property and select the required style from the drop-down list. The **None** option is used to create a leader without arrow head.

### Arrow Head Size

This property is used to specify the default arrow head size of the leader. Click in the **Value** field and change the size, if required.

### Visible

The **Visible** property controls the visibility of the leader. By default, the value is set to **true**. If you do not want the leader to be displayed when the label is dragged, set the visibility of the leader to **false**.

### Type

This property is used to specify the type of leader that will be drawn after dragging the label. Click in the **Value** field of this property and then select the **Straight Leader** or **Spline Leader** type from the **Value** field of this property.

### Display

This property of the **Dragged State Component** category is used to control the display of label after it is dragged. There are two options to display the dragged label, **As Composed** and **Stacked Text**. Select the **As Composed** option to display the label the way it is originally composed and oriented. On selecting this option, all other properties in the **Dragged State Components** category will disappear. Select the **Stacked Text** option to display the label based on the settings of the properties specified in the **Dragged State Components** category. On selecting this option, label components will be stacked or arranged vertically in the order they are defined in the label style.

### Leader Attachment

This property is used to specify the attachment location of the leader with reference to the label content. Click in the **Value** field of this property and select the required option to attach the leader from the drop-down list.

### Leader Justification

This property specifies whether the label text is justified according to the leader or not. Set the value of this property to **true** to enable the left justification of the text if the leader is on the left and vice versa. If the leader justification is set to **false**, the text will always be left-justified, irrespective of the leader position.

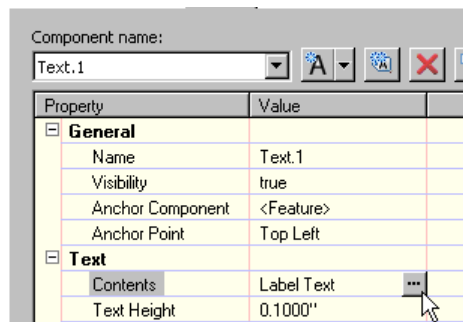
## The Summary Tab

This tab is used to review and edit the properties of all components of a label. Expand the categories in this tab to view properties and values.

After you have specified the settings of the label style, choose the **OK** button to close the **Label Style Composer - New Point Label Style** dialog box. The label style will be added in the **Label Styles** node of the **Settings** tab.

## Adding the Text Component to the Label

To add a new Text component to a label, choose the **Layout** tab from the **Label Style Composer - New** dialog box and then choose the default **Create Text component** button available at the right of the **Component name** drop-down list; the component with the default name **Text.1** will be added to the **Component name** drop-down list and its properties will be displayed in the **Property** column. Now, click in the **Value** field of the **Contents** property. In the **Text** category, choose the browse button displayed on the right of **Value** field, as shown in Figure 2-28.



*Figure 2-28 Choosing the button displayed in the Value field of the Contents property*

On doing so, the **Text Component Editor - Contents** dialog box will be displayed, as shown in Figure 2-29. In this dialog box, the **Properties** tab is chosen by default. Now, in the **Properties** drop-down list of this dialog box, select the required property to be added to the label text; the property modifier and their respective values will be displayed in the **Modifier** and **Value** columns, respectively. Change the property modifier value if required and then choose the right-arrow button next to the **Properties** drop-down list to add the selected property in the **Text Component Editor** window.



### Note

*You cannot change modifier values after the property is added to the **Editor** window that is on the right pane of the **Text Component Editor - Contents** dialog box. If you want to do so, select and delete the property, change the modifier values, and then add the property again in the window.*

To format the text, choose the **Format** tab. Select the text in the **Editor** window in the right pane of the **Text Component Editor - Contents** dialog box and choose the options in the **Format** tab to format the text as required. After you have formatted the text, choose the **OK**

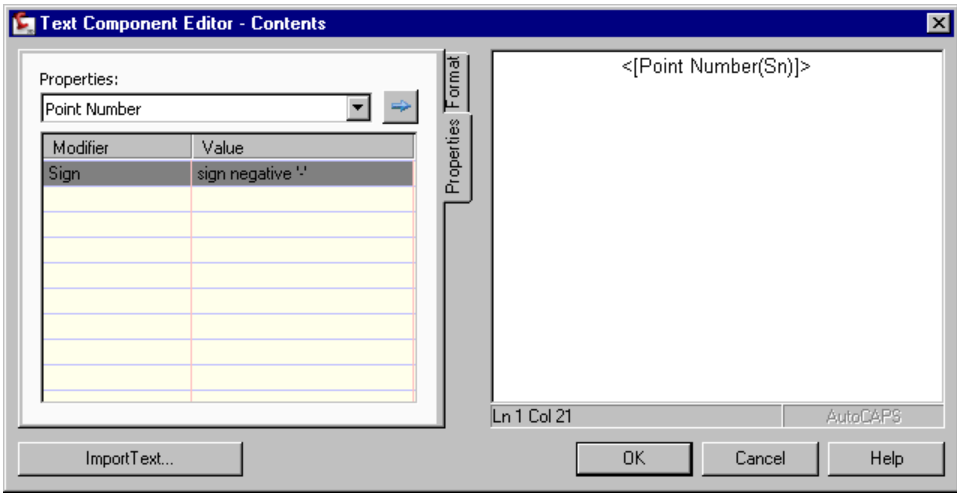


Figure 2-29 The Text Component Editor - Contents dialog box

button from the **Text Editor Component - Contents** dialog box; the dialog box will be closed and you can preview the label content in the **Preview** window.

To view and edit default settings of point label styles, expand the **Point** collection and right-click on **Point Styles** in the **Settings** tab of the **Toolspace** palette to display a shortcut menu. Choose the **Edit Label Style** option from the shortcut menu; the **Edit Label Style Defaults - Point Label Style** dialog box will be displayed. Expand the categories in this dialog box to view and edit the default values of label properties, as shown in Figure 2-30.

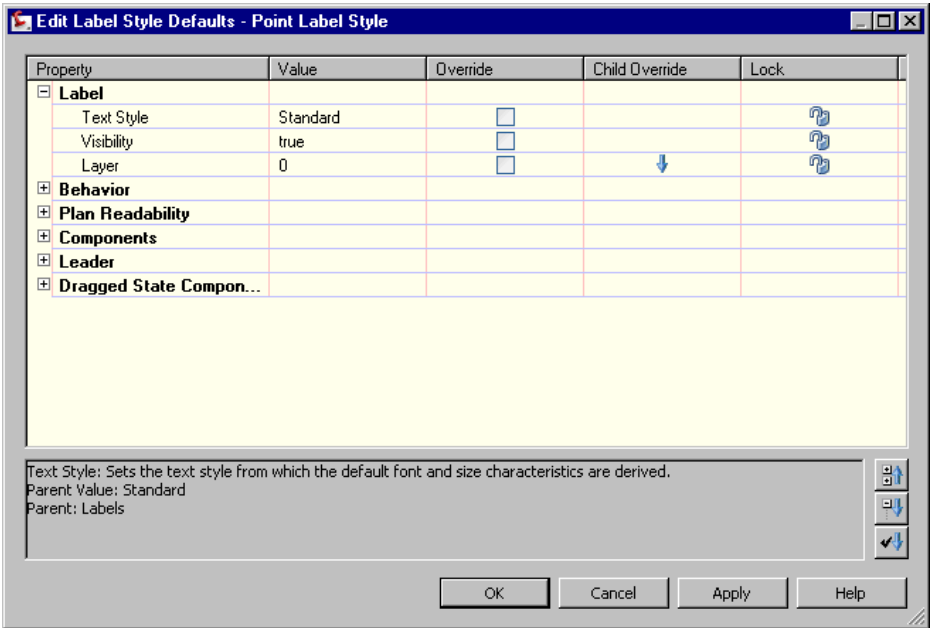


Figure 2-30 The Edit Label Style Defaults - Point Label Style dialog box

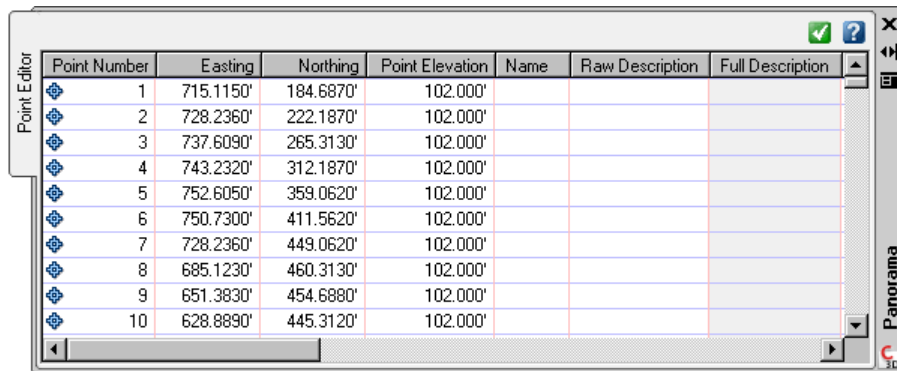
You can assign point style or point label style to a group of points. The point groups are discussed later in this chapter.

## EDITING POINTS

**Menu:** Points > Edit Points > Points  
**Shortcut Keys:** ALT+N+E+P

You can edit individual points either graphically in the drawing or using the **Point Editor** tab in the **Panorama** window. You can also use the **AutoCAD** commands such as rotate, copy, move, erase to edit points graphically.

To edit points using the Point Editor, choose **Points > Edit Points > Points** from the menu bar; the **Panorama** window with the **Point Editor** tab chosen will be displayed, as shown in Figure 2-31.



Point Number	Easting	Northing	Point Elevation	Name	Raw Description	Full Description
1	715.1150'	184.6870'	102.000'			
2	728.2360'	222.1870'	102.000'			
3	737.6090'	265.3130'	102.000'			
4	743.2320'	312.1870'	102.000'			
5	752.6050'	359.0620'	102.000'			
6	750.7300'	411.5620'	102.000'			
7	728.2360'	449.0620'	102.000'			
8	685.1230'	460.3130'	102.000'			
9	651.3830'	454.6880'	102.000'			
10	628.8890'	445.3120'	102.000'			

Figure 2-31 The **Point Editor** tab of the **Panorama** window displaying points

The **Point Editor** tab in the **Panorama** window is used to display information about points such as its Elevation, Northing, Easting, Number, and others that are relevant to it.

Click in the required cell and edit a new value of the point property. For example, to change the elevation of point number 1, click in the corresponding cell of the **Point Elevation** column and enter a new value for this number. Similarly, you can change the **Easting**, **Northing**, **Elevation** and other properties of individual points.

You can also use different point editing commands in the **Point Editor** tab. To do so, right-click on any point number in the **Point Number** column of the **Point Editor** tab; a shortcut menu will be displayed. The options in the shortcut menu are discussed next.



**Tip.** Alternatively, right-click **Points** in the **Prospector** tab and choose **Edit Points** from the shortcut menu to display the **Point Editor Panorama** window.

## Renumbering a Point

To renumber a point, right-click on the required point number in the **Point Number** column; a shortcut menu will be displayed. Choose **Renumber** from the shortcut menu; you will be

prompted to enter an additive factor. Enter an integer value at the command line and press ENTER; the point will be renumbered according to the integer value specified. The value (additive factor) specified will be added to the existing point number to renumber it.

You can also access this option by choosing **Points > Edit Points > Renumber** from the menu bar; the *Points [All/Numbers/Group/Selection] <All>*: prompt will be displayed at the command line. Press ENTER to accept the default **<All>** option to renumber all points. Enter **N** at the command line to specify the required point number to renumber, **G** to select the point group to renumber points in the point group, or enter **S** to renumber the selected points from the drawing.

## Changing the Elevation of the Point

You can change the elevation of a point(s) with respect to a specified datum. To do so, right-click on the point number and choose **Datum** from the shortcut menu; you will be prompted to enter a new elevation or select a reference. Enter the required elevation at the command line or Enter **R** at the command line to select the **Reference** option and press ENTER. The elevation of the selected point will be modified in the **Point Elevation** column. If you select the **Reference** option, you need to specify the reference elevation and then the new elevation. The elevation of the selected point will be modified on the basis of difference between two elevations.



### Note

To change properties of multiple points, press and hold the **CTRL** key and then select the required number of points in the **Point Number** column.

## Changing the Point Elevation with Respect to a Surface

This option can be applicable only if the drawing has a surface object. To change the elevation of point(s) based on the surface elevation, select the required point number(s) and choose **Elevations from surface** from the right-click shortcut menu. On doing so, the **Select surface** dialog box will be displayed. Select the required surface from the dialog box and choose the **OK** button to close the dialog box. The **Point Elevation** column will display the elevation from the surface. Note that Civil 3D will display a message if there does not exist any surface in the drawing.

Alternatively, you can also access this option by choosing **Points > Edit Points > Elevations from Surface from** the menu bar; the **Select surface** dialog box will be displayed. Select the desired surface from the drop-down list and then choose the **OK** button to close the dialog box. In this case, after selecting the required surface, you will be prompted to specify the required points to be edited. You have the option of editing the elevations of all the points, points of a particular point group, or using the selection window to select the required points from the drawing.

## Deleting the Point

You can delete a point from the drawing. To do so, right-click on the point number; shortcut menu will be displayed. Choose the **Delete** option from the shortcut menu; the AutoCAD Civil 3D 2009 message box will be displayed. Choose the **Yes** button to delete the required point(s).

## Zooming to the Point

To zoom to a point(s), right-click on the point number(s) in the **Point Number** column; a shortcut menu will be displayed. Choose **Zoom to** from the shortcut menu to zoom to the selected point (s). Similarly, choose the **Pan to** option to pan to the select point(s).

## Locking Points

Locking the points prevents you from changing the properties of points. You cannot delete, move, edit, or even change the point style and the point label style of the locked points. To lock points, select the required point numbers from the **Point Number** column of the **Point Editor**; a shortcut menu will be displayed. Choose **Lock** from the shortcut menu; the selected point will be locked and a red colored symbol will be displayed next to the selected point in the **Point Editor** tab, as shown in Figure 2-32.

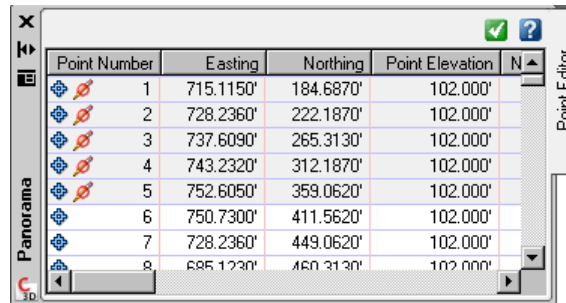


Figure 2-32 The **Point Editor** tab of the **Panorama** window showing locked points

Similarly, you can choose **Unlock** from the shortcut menu to unlock points to edit them. The locked points will be displayed in the **Point Editor** as well as in the **Prospector List** view.

## Using the Geodetic Calculator

**Menu:** Points > Utilities > Geodetic Calculator  
**Shortcut Keys:** ALT+N+U+G

You can use the **Geodetic Calculator** utilities of points to calculate geodetic information about the points. To do so, the drawing must have been assigned a coordinate zone and transformation values. Civil 3D will display a warning message if no coordinate zone is assigned to the drawing.

To calculate geodetic information, choose **Points > Utilities > Geodetic Calculator** from the menu bar; the **Geodetic Calculator** dialog box will be displayed, as shown in Figure 2-33. Choose the **Specify point** button at top left corner of the dialog box and click in the drawing to specify the point; the geodetic information of the point will be displayed in the dialog box. Alternatively, enter the point number in the **Value** column.

You can also specify the required geodetic information such as **Latitude**, **Longitudes** or **Grid Easting** or **Grid Northing** and create the point with specified geodetic information. To do so, specify the geodetic information and choose the **Create Points** button from top right corner of the dialog box; you will be prompted to specify the point description. Enter the



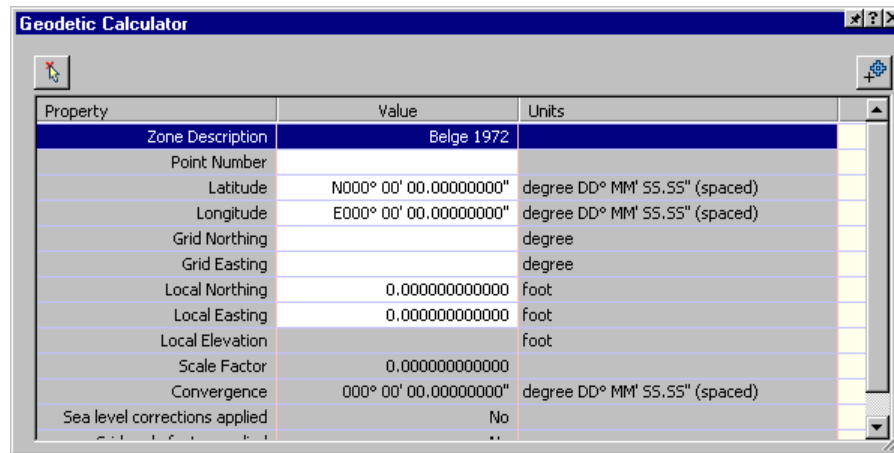


Figure 2-33 The Geodetic Calculator dialog box

point description at the command line and press ENTER; the point with the specified geodetic information will be created.

## Importing/Exporting/Transferring Points

**Menu:** Points > Import/Export > Import Points/Export Points / Transfer Points  
**Shortcut Keys:** ALT+N+X+ I /E /T

Civil 3D allows you to import, export, and even transfer points from one file to another. Points can be imported and exported in the ASCII (.txt) format or in the Microsoft Access database (.mdb) format. Importing points is the easiest method to create and add points in the drawing. The surveyor collects the point data and then imports it to Civil 3D as an ASCII file.

### Importing Points

To import points into AutoCAD Civil 3D, choose **Points > Import/Export Points > Import Points** from the menu bar; the **Import Points** dialog box will be displayed. While importing, exporting, and transferring points, you need to select the right type of file format. AutoCAD Civil 3D will display a warning message, as shown in Figure 2-34.

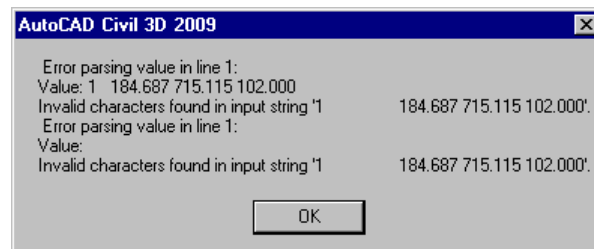


Figure 2-34 The AutoCAD Civil 3D 2009 warning message

Select the required file format from the **Format** drop-down list in the **Import Points** dialog box and then import the required point file. You can also create your own file format. The method of creating file format is discussed later in this chapter.

## Exporting Points

You can export specific points to AutoCAD Civil 3D to ASCII file or a Microsoft Access database. Before exporting points, you need to select the appropriate file format depending upon the point data and then export points. To export Civil 3D points, choose **Points > Import/Export Points > Export Points** from the menu bar; the **Export Points** dialog box will be displayed, as shown in Figure 2-35.

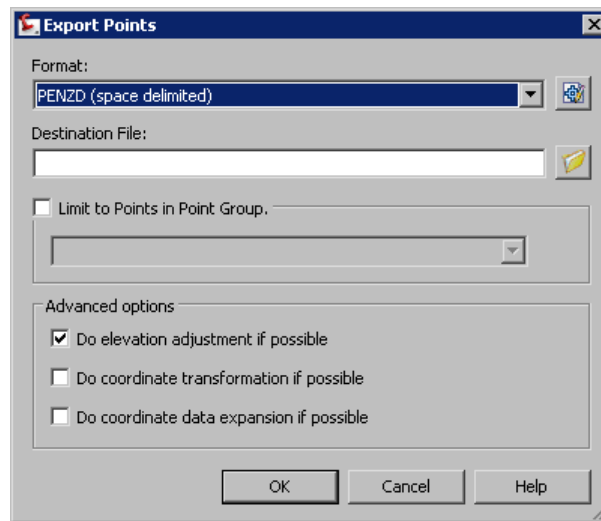


Figure 2-35 The **Export Points** dialog box



**Tip.** Alternatively, right-click on **Points** in the **Prospector** tab of the **Toolspace** palette and choose **Export** from the shortcut menu to display the **Export Points** dialog box.

Next, select the required file format from the **Format** drop-down list in the dialog box. You can also create your own file format, which will be discussed later in this chapter. Next, enter the name and path of the file to which points will be exported or choose the button on the right of the **Destination File** text box; the **Select Destination File** dialog box will be displayed. Browse to the required location where the file is saved. Select the file and then choose the **Open** button; the file name and path will be displayed in the **Destination File** text box. You can export files by using any of the two file format options, **Columnated** or **Delimited**. These option are discussed next.

Next, in the **Export Points** dialog box, select the **Limit to Points in the Point Group** check box and select the required point group from the drop-down list below it. On doing so, points will be added to the required point group

Now, use the options in the **Advanced options** area of this dialog box and choose the **OK** button; the dialog box will be closed and points will be exported.

## Transferring Points

AutoCAD Civil 3D allows you to transfer points from the source file to the destination file. A source file is a file from which points are transferred and destination file is a file to which points will be transferred. The source and destination files can be .txt files or .mdb files. Before transferring points, ensure that the file format of both the files are the same. Before transferring points, you need to create two types of file formats for both the source and destination files to specify the layout or arrangement of the point data in files.

After you have created the file formats for both the files, choose **Points > Import/Export > Transfer Points** from the menu bar; the **Transfer Points** dialog box will be displayed, as shown in Figure 2-36.

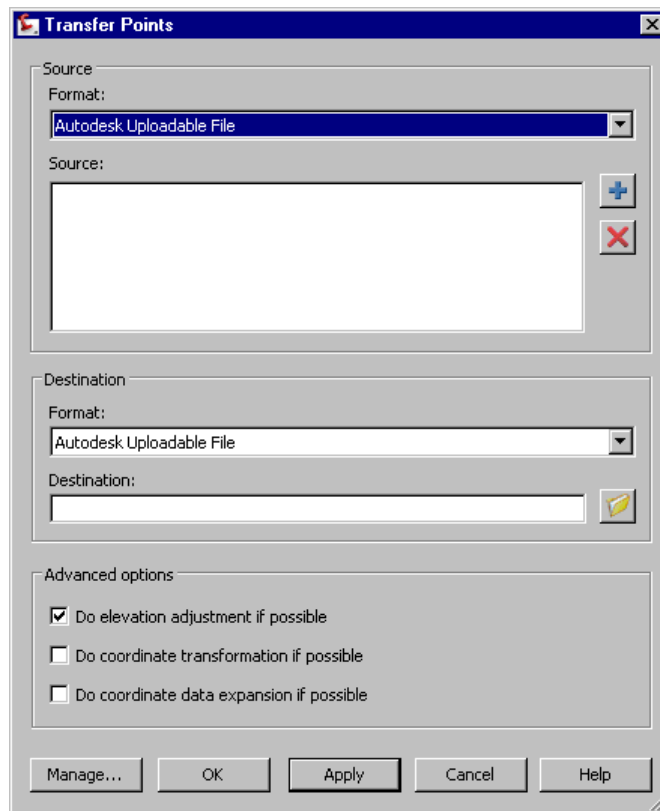


Figure 2-36 The Transfer Points dialog box

In the **Source** area of the dialog box, select the required file format of the source file from the **Format** drop-down list. Choose the button with the ( + ) sign on the right of the text box of this area to display the **Select Source File** dialog box. Select the required file from this dialog box and choose the **OK** button to close it. Similarly, select the required file format and select the destination file from the **Destination** area.



**Tip.** Alternatively, right-click on **Points** in the **Prospector** tab of the **Toolspace** palette and choose **Transfer** from the shortcut menu to display the **Export Points** dialog box.

Now, select the required check boxes from the **Advanced options** area to enable the elevation, coordinate adjustment, or data expansion of the point data while transferring point from the source file to the destination file. Note that you can create a new file format by choosing the **Manage** button in the **Transfer Points** dialog box. After selecting the file formats and the files, choose the **OK** button; the **Transfer Points** dialog box will be closed and the point will be transferred to the destination file.

**Note**

*To transfer points from .mdb file to .txt file, you need to select the **User Point Database** format and to transfer points from .txt file to .mdb file, you need to use the **User Point File** format matching with the point layout. The details of these formats are discussed next.*

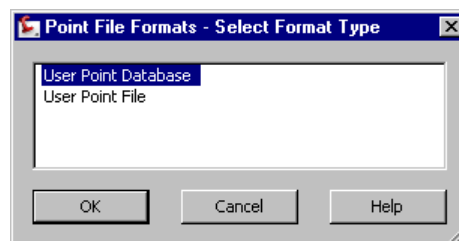
The method of creating a new file format is discussed next.

## Creating a New File Format

As discussed earlier, the file formats do not maintain point data but provide the layout of the point data in a point file. For example, the point properties in the source point file are arranged in the order, point number, easting, elevation, and description. To import or export the point to or from this file, the file format to which points are imported or exported should have the same format. If the order of properties in the destination file is easting, elevation, and description, the point numbers of the source file will not be transferred to the destination file.

Civil 3D has some in-built file formats that can be used before importing, exporting, or transferring the points. However, you can also create your own file formats as per the requirement. The new file formats are created by using the **Point File Formats** dialog box that can be accessed by choosing the button on the right of the **Format** edit box either in the **Import Points** or **Export Points** dialog box. You can also create a new point file format while transferring points by choosing the **Manage** button from the **Transfer Points** dialog box as discussed earlier.

To create a new point file format, choose the **Settings** tab in the **Toolspace** palette and expand the **Point** collection. Right-click on the **Point File Formats** node and choose **New** from the shortcut menu; the **Point File Formats - Select Format Type** dialog box will be displayed, as shown in Figure 2-37.

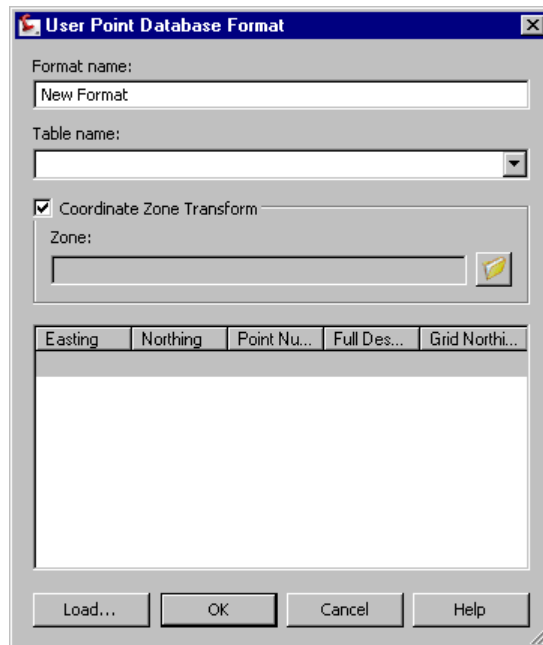


**Figure 2-37** The **Point File Formats - Select Format Type** dialog box

You can select any of the two file format types from the dialog box. The **User Point Database** format type is used to describe the arrangement of points in the Microsoft Access database file (.mdb) and the **User Point File** option is used to describe the arrangement of points in the ASCII or Text file. The methods of creating file formats using these two format types are discussed next.

### Creating the User Point Database File Format

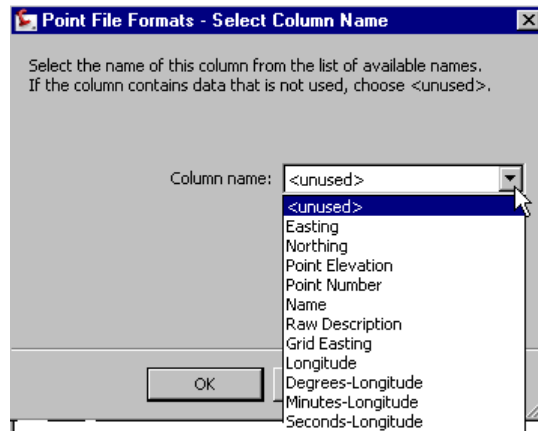
To create the user point database point file format, right-click on the **Point File Format** node in the **Settings** tab; a shortcut menu will be displayed. Choose the **New** option from it; the **Point File Format - Select File Format Type** dialog box will be displayed. Choose the **User Point Database** option from this dialog box and then choose the **OK** button; the **User Point Database Format** dialog box will be displayed, as shown in Figure 2-38.



**Figure 2-38** The User Point Database Format dialog box

This dialog box is used to view or edit the properties of the user point database format used to import points from .mdb files or export points from .mdb files. In the **Format name** edit box, enter a name of the file format; the name of the file format will be displayed in the **Point File Format** node in the **Settings** tab. Select the required table from the **Table name** drop-down list. Note that if the table name is not available in the drop-down list, choose the **Load** button and load the required .mdb file from the **Select Source Database** dialog box displayed. You can browse to the location where you have saved the .mdb file and choose the **Open** button from this dialog box to load the file. On doing so, the table name will be displayed in the **Table name** drop-down list and the data will be displayed in columns. You can refer it for creating format.

Optionally, select the check box in the **Coordinate Zone Transformation** area to assign a coordinate zone to the file format. Choose the button on the right of the **Zone** edit box and select the required zone from the **Select Coordinate Zone** dialog box. Now, you need to format the column names. To do so, click on the default unused column in the dialog box; the **Point File Formats - Select Column Name** dialog box will be displayed. Select the required column according to the point data from the **Column name** drop-down list, as shown in Figure 2-39.



*Figure 2-39 Selecting the column name from the Column name drop-down list*

If you do not want any data to be imported and exported, accept the default **<unused>** option from the drop-down list and choose the **OK** button. Similarly, select the name for all columns in the dialog box. To change the order of columns, simply click and drag the column to the required position. Next, choose the **OK** button; the **User Point Database Format** dialog box will be closed and the name of format will be added in the **Point File Format** node of the **Points** collection in the **Settings** tab.

### Creating the User Point File Format

To create the **User Point File** format, right-click on the **Point File Format** node in the **Settings** tab; a shortcut menu will be displayed. Choose the **New** option from it; the **Point File Format - Select File Format Type** dialog box will be displayed. Choose the **User Point File** option from the text box in it and then choose the **OK** button; the **Point File Format** dialog box will be displayed, as shown in Figure 2-40. Enter the format name in the **Format name** edit box. In the **Default file extension** drop-down list of this dialog box, select the required file extension of the point data file. You can select any of the following extensions from the drop-down list:

- **.auf:** Autodesk Uploadable File, comma delimited. Required values in the file are point number, northing, easting, elevation, and description (in the order).
- **.csv:** Comma Separated Value file; ASCII (text) file comma-delimited
- **.nez:** Northing, Easting, and Elevation data

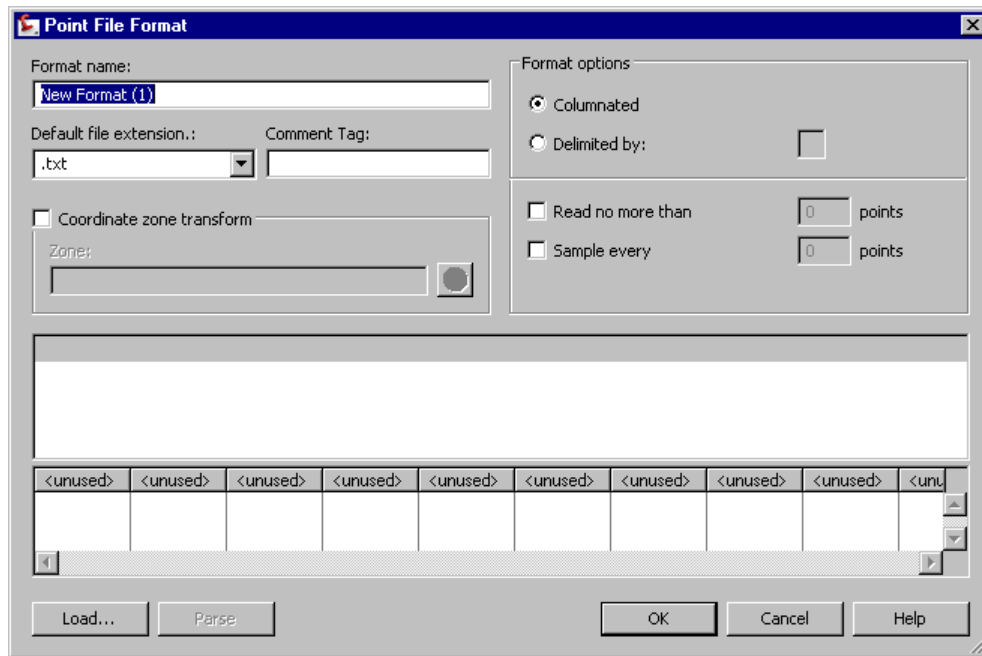


Figure 2-40 The Point File Format dialog box

- .pnt:** Point file
- .prn:** Formatted text, space delimited
- .txt:** Delimited ASCII (text) file
- .xyz:** Coordinates X, Y, and Z

After selecting the default extension, choose the **Load** button; the **Select Source File** dialog box will be displayed. Select the point file from this dialog box and load the point data. You can refer the point data in the file while creating the format. Optionally, assign a coordinate zone to the file format, as explained earlier. Now, in the **Format options** area, select the required format option. There are two types of format options, **Columnated** and **Delimited by**. Select the **Columnated** radio button; the imported point data will be arranged in columns and rows, separated by tabs. If you select the **Delimited by** radio button, the point data will be separated by a delimiter such as comma(,) or a space, as shown in Figure 2-41. Figure 2-42 shows the point data arranged in columns separated by tabs.

Select the **Read no more than** check box and enter a value in the **points** edit box next to it. This value specifies the maximum number of points to be imported or exported. Civil 3D imports or exports only the specified number of points. For example, if you enter **1000** in the **points** edit box, only 1000 points will be imported or exported from the file. Similarly, select the **Sample every** check box and enter a number in the **points** edit box next to it. Civil 3D samples the point data at the specified number and import or export points accordingly. For example, if you enter a value of **50**, every 50th point will be imported or exported from the file.

1,715.1150,184.6870,-99999,	1	184.687	715.115	102.000
2,728.2360,222.1870,-99999,	2	222.187	728.236	102.000
3,737.6090,265.3130,-99999,	3	265.313	737.609	102.000
4,743.2320,312.1870,-99999,	4	312.187	743.232	102.000
5,752.6050,359.0620,-99999,	5	359.062	752.605	102.000
6,752.6050,359.0620,-99999,	6	411.562	750.730	102.000
6,750.7300,411.5620,-99999,	7	449.062	728.236	102.000
7,728.2360,449.0620,-99999,	8	460.313	685.123	102.000
8,685.1230,460.3130,-99999,	9	454.688	651.383	102.000
9,651.3830,454.6880,-99999,	10	445.312	628.889	102.000
10,628.8890,445.3120,-99999,	11	439.688	600.772	102.000
11,600.7720,439.6880,-99999,	12	420.938	563.282	102.000
12,563.2820,420.9380,-99999,	13	392.812	546.412	102.000
13,546.4120,392.8120,-99999,	14	349.688	520.169	102.000
14,520.1690,349.6880,-99999,	15	321.562	497.675	102.000
15,497.6750,321.5620,-99999,	16	282.188	480.805	102.000
16,480.8050,282.1880,-99999,	17	252.187	448.938	102.000
17,448.9380,252.1870,-99999,	18	209.063	430.194	102.000
18,430.1940,209.0630,-99999,	19	164.062	447.064	102.000
	20	141.563	486.428	102.000
	21	115.312	523.918	102.000
	22	102.187	559.533	102.000
	23	100.312	613.893	102.000

**Figure 2-41** Point values separated by comma

**Figure 2-42** Point values separated by space

## Adding Point Tables

**Menu:** Points > Add Tables  
**Shortcut Keys:** ALT+N+T

Point tables help you view point information in tabular form. You can create different point table styles and use them to create tables. To add point tables, choose **Points > Add Tables** from the menu bar; the **Point Table Creation** dialog box will be displayed, as shown in Figure 2-43.

From the **Table style** drop-down list, select the required table style. The **Table layer** options is used to display the default layer on which the table will be created. To modify the default layer, choose the button on the right of this option; the **Object Layer** dialog box will be displayed. You can use this dialog box to select or create a new layer for the table.

The options in the **Selection** area are used to select the points to be labeled. You can create a table only if points are labeled in the drawing. The data in the table will be created based on point labels. The **Selection** area displays the list of existing point label styles in the **Label Style Name** column. To select the required point label style, select the corresponding check box in the **Apply** column. The label content of the selected point label style will be used to create point table.

Now, choose the **Select Point Groups** button to display the **Point Groups** dialog box. Select the required point group from the dialog box and choose the **OK** button; the points of the selected point group will be added in the table and the total number of point group(s) will be displayed next to the **Select Point Groups** button. You can choose the **Pick On-Screen** button and select the required points from the drawing by using any window selection method and then press ENTER; the selected points will be added in the table and displayed next to the **Pick On-Screen** button.



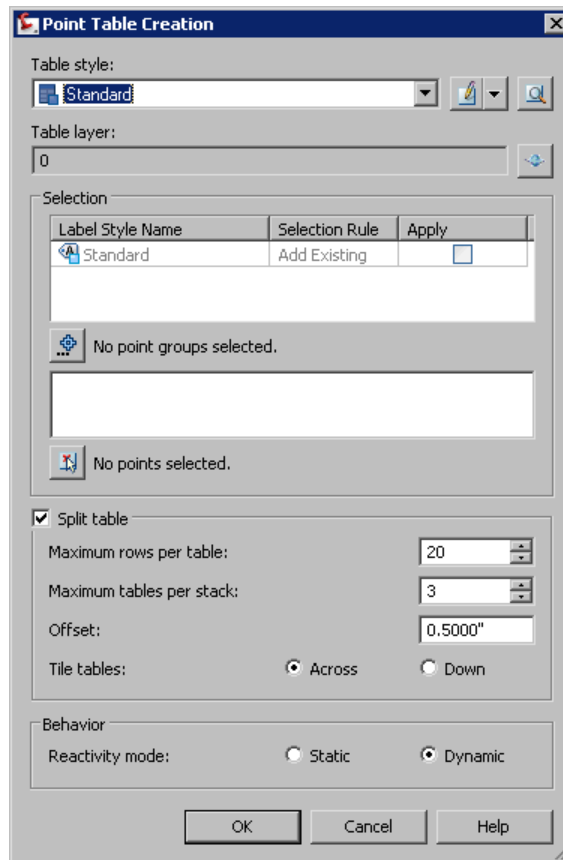


Figure 2-43 The *Point Table Creation* dialog box

Optionally, choose the options in the **Split table** to format the table and choose the **OK** button; the **Point Table Creation** dialog box will be closed and you will be prompted to specify the upper left corner of the table. Click at the required location in the drawing area; the point table will added in the drawing.

## POINT GROUPS

As mentioned earlier, a point group is a collection of similar points. Point groups help you control, organize, and manage a point easily. Points with similar properties such as description, elevation, and so on can be grouped together with a common point group name. Like points, point groups also have their own styles and label styles. You can assign different point styles and point label styles to each point group and control the appearance of points of a point group. It helps you quickly identify and modify point styles or point label styles of the required points of any point group. For example, you can group surface points that are used for creating surface in a group and assign a point style to them. Also, you can create another point group containing points of the centerline of an alignment and assign them a different point style and label style. Now, you can easily identify and distinguish the surface creation points from the centerline points in the drawing. These points can then be easily edited or managed in the drawing as required.

## Creating Point Groups

**Menu:** Points > Create Point Group

Point groups are created based on point properties. You can group points based on their point numbers, elevation, description, and so on. To create a point group, choose **Points > Create Point Group** from the menu bar; the **Point Group Properties - Point Group - (1)** dialog box will be displayed, as shown in Figure 2-44. The options in the dialog box are discussed next.

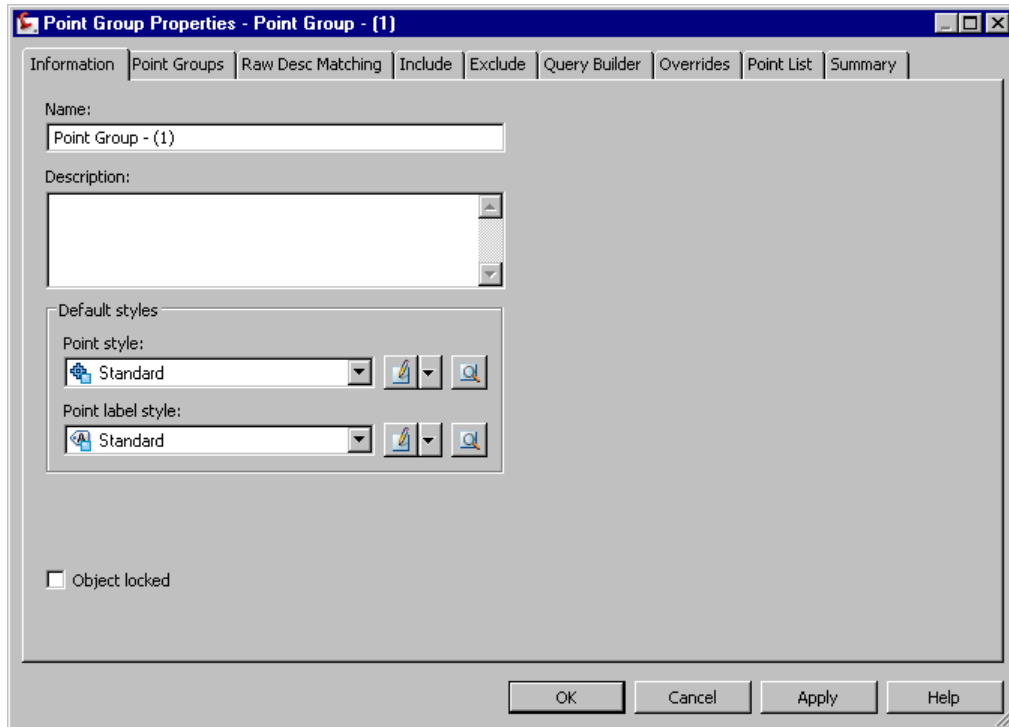


Figure 2-44 The **Point Group Properties - Point Group - (1)** dialog box



**Tip.** Alternatively, right-click on **Point Groups** in the **Prospector** tab and choose **New** from the shortcut menu; the **Point Group Properties - Point Group - (1)** dialog box will be displayed.

### The Information Tab

The **Information** tab in this dialog is chosen by default. Enter a name of the point group in the **Name** edit box. Optionally, enter a short description about the point group in the **Description** text box. Next, in the **Default styles** area, select the point style from the **Point style** drop-down list for the points included in the point group. Similarly, select a point label style from the **Point label style** drop-down list to label the points included in the point group.

### The Point Groups Tab

This tab is used to list the existing point groups in the drawing. To select a particular point group from the list, select the check box on the left of the point group name in the **Point Group** column. The **\_All Point** point group is the default point group.

### Raw Desc Matching Tab

This tab is used to list the codes that are used for description keys in the drawing. You can use this tab to include the points whose raw description match with the description key codes displayed in this tab. You can select the required description key code by selecting the check box next to it. The points whose raw description match with the selected codes will be included in the point group. Note that codes will be displayed in this only if the drawing contains description keys.

The description keys and their functions are discussed later in this chapter.

### The Include Tab

This tab is used to specify the criteria to include points based on their point numbers, elevations, names, raw description, full description either in the respective edit boxes or by selecting them from the drawing. The options are discussed next.

#### With numbers matching

Select the **With numbers matching** check box to include points based on specified point numbers. You can enter point numbers in the edit box next to the check box. The points numbers should be separated by comma. You can also enter a point number range separated by hyphen. For example, you can enter point numbers like, 100, 150, 200. On doing so, the points with the point numbers matching to 100, 150, 200 will be included in the point group. Enter the point range as 50-500; all the points with point numbers starting from 50 to 500 will be included in the drawing. Alternatively, choose the **Selection Set in Drawing** button and select the required points from the drawing using the window selection method and press ENTER; the point numbers or the ranges will be displayed in the edit box after the selection.

#### With elevations matching

Select this check box to include points in the point group based on their elevations. You can enter elevations of points in different ways in your drawing. First, you can enter the elevation by using a comma separated values. For example, if you enter **100,500,1000**, these points will be included in the point group. Second, you can also use the greater than symbol (>) followed by the elevation value to include points whose elevation value is greater than the specified value. For example, if you enter **>-500**, the points having elevation greater than **-500** will be included in the point group. Third, you can use the (<) less than symbol to include points having elevation less than the specified elevation. For example, if you enter **<1000**, all points having elevation less than **1000** will be included in the point group. Fourth, you can also use range for specifying the points to be included in the point group. For example, 100-1000 will include points having elevation varying from **10** to **1000**.

**With names matching**

Select this check box to include points based on name. Enter point names in the edit box next to this check box. The point names should be separated by a comma.

**With raw descriptions matching**

Select this check box to include points in the point group based on their raw description. Enter the comma separated description in the edit box next to the **With raw descriptions matching** check box; for example, GRND, STN, BLDG. The raw descriptions are not case-sensitive. You can also use wild cards after the raw description, for example, STN\*.

**With full description matching**

Select this check box to include those points match with the specified full description of points. Enter the required full description in the edit box next to the **With full description matching** check box.

**Include all points**

Select the **Include all points** check box to include all points of the drawing in the point group. On selecting this check box, all other options are disabled.

**The Exclude Tab**

This tab is used to specify the criteria for excluding points from point groups. The options in this tab are the same as discussed in the **Include** tab.

**The Query Builder Tab**

This tab is used to create point groups using a set of query. Query is a set of combined logical expressions that use logical operators such as OR, NOT, AND and so on, using the query builder.

**The Overrides Tab**

The **Overrides** tab is used to display the existing properties of points in a point group and allows you to override properties of points in a point group that is required. Select the check box on the left of the property that you want to override. To modify **Raw Description**, select the check box in the **Property** column. Next, click in the **Overrides** column and enter a new value in the column. Similarly, enter a new value in the **Overrides** column for the **Point Elevation** property.

To override the **Point Style** and **Point Label Style**, select the corresponding check boxes in the **Property** column and double-click in the **Overrides** column; the **Point Style** or **Point Label Style** dialog box will be displayed. Select the required style from the dialog box and choose the **OK** button.

**The Point List Tab**

This tab is used to display the list of all points and their properties in the point group. You cannot edit any information in this tab. You can change the sequence of columns by dragging column heads to the desired position.

## The Summary Tab

This tab is used to review information about point group properties and also lists point group query.

After you have specified the point style, point label style, included the points, and specified other properties in the dialog box, choose the **OK** button; the **Point Group Properties - Point Group (1)** dialog box will be closed and the point group name will be added in the **Point Group** collection in the **Prospector** tab of the **Toolspace** palette.

## Editing Point Groups

**Menu:** Points > Edit Points > Point Group

To edit point group properties, right-click on the point group in the **Point Group** collection in the **Prospector** tab and choose **Properties** from the shortcut menu; the **Point Group Properties - <point group name>** dialog box will be displayed. In the **Information** tab of the dialog box, you can modify the point group name, point style, point label style of points included in the point group. Choose the **Include** or **Exclude** tab from the dialog box to include and exclude the required points from point group. After you have modified properties, choose the **Apply** button to apply the changes and choose **OK** to close the dialog box.



**Tip.** Alternatively, select any point of the point group in the drawing and right-click to display a shortcut menu. Choose **Point Group Properties** from the shortcut menu.

The options discussed earlier for editing points are used to edit points of any point group. To access the editing options, expand the **Point Groups** collection in the **Prospector** tab and right-click on the required point group to display a shortcut menu, as shown in Figure 2-45. You can choose the required options from the shortcut menu and edit the points of the point group as discussed earlier.

## Out of Date Points Groups

A point group is called out of date if you add or delete points, or modify properties such as elevation or description of points included in the point group. The out of date point groups are indicated by a yellow symbol displayed in the **Prospector** tab on the left of the point group name, as shown in Figure 2-46. The **Point Group -(1)** is out of date as indicated by the symbol on the left. This shows that some changes have been made in the point group.

Alternatively, to view the out of date point groups, choose **Points > Edit Points > Point Groups** from the menu bar; the **Point Groups** dialog box will be displayed. Also, the out of date symbol will be displayed on the left of the point group name in the dialog box.

To view changes made in the point group, choose the **Show Point Group Differences** button from the **Point Groups** dialog box; the **Point Group Changes** dialog box will be displayed. This dialog box is used to list the changes made in the points of a point group. To update the point group, choose the **Update Point Group** button from the **Point Group Changes or the Point Groups** dialog box; the point group will be updated and the out of date symbol will disappear.

Alternatively, right-click in the **Prospector** tab and choose the **Show Changes** option to view the changes made in a point group or choose the **Update** option to update the point group from the shortcut menu, as shown in Figure 2-45.

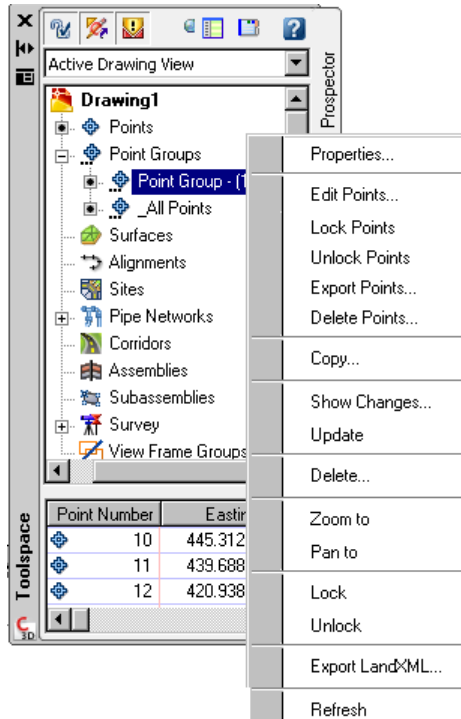


Figure 2-45 The point group editing options

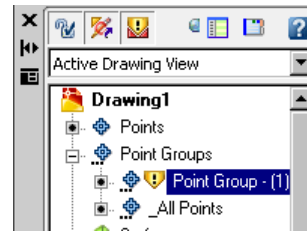


Figure 2-46 The symbol indicating the out of date point group

## Description Keys

The Description Key is another tool in AutoCAD Civil 3D. This key is used to control the visibility and appearance of points. Unlike point groups, the description keys cannot be used for controlling and appearance of the existing points. You can use these keys for creating and importing new points in the drawing or converting points in the drawing. The point groups are used to control the style and label of all points in a point group but the description keys are applied to individual points as an override. On importing or creating new points, the points are assigned the styles based on the raw description of points matching with the code and format of description keys.

## Creating Description Keys

To create a description key, choose the **Settings** tab of the **Toolspace** palette and expand the **Point** collection. Next, right-click on **Description Key Sets** and choose **New**; a shortcut menu will be displayed. Choose **New** from the shortcut menu; the **Description Key Set - New DescKey Set** dialog box will be displayed. Enter a description key set name in the **Name** edit box. Optionally, enter a short description about the key set in the **Description** text box and

then choose the **OK** button; the dialog box will be closed and a name for the description key set will be added in the **Description Key Sets** node of the **Settings** tab. After creating and naming a description key set, you will create a description key to the description key set.

To do so, expand the **Description Key Sets** node, right-click on the description key set that you have created and then choose **Edit Keys** from the shortcut menu, as shown in Figure 2-47.

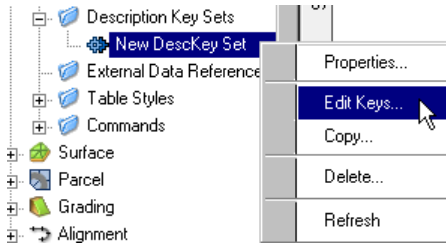


Figure 2-47 Selecting the *Edit Keys* option

On doing so, the **DescKey Editor Panorama** window will be displayed, as shown in Figure 2-48. In the **DescKey Editor Panorama** window you will add the raw descriptions that will match the description keys. The columns used for creating description keys in the **DescKey Editor Panorama** window are discussed next.

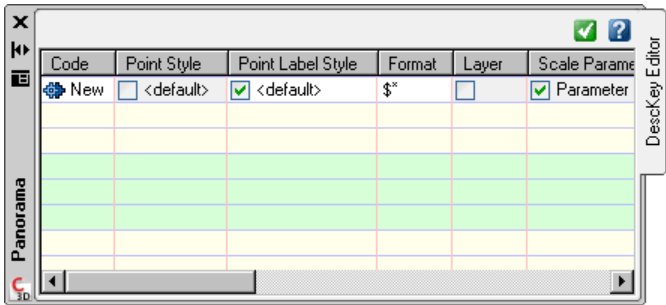


Figure 2-48 The *DescKey Editor Panorama* window

**Code**

This column specifies the raw description of points. A raw description is a code that is used for points by a person who has created points from the site or field. To enter a code, double-click in the **Code** field to activate it and enter the required code in the **Code** column. You can also use the wild cards characters within the codes. These characters are used to expand the matching capabilities of description keys. Some of the common wild card characters used are \*(asterick), # (pound), and so on. For example, the MH raw description for the Man Hole points can have raw descriptions as MHole, MH-1, MH-2, and so on. Thus, if you want to assign the same points style, label style and description to all the man hole points, you can use wild card characters with code such as MH\*. Adding this wild character (\*) means that code MH \* will match with all raw description that match with MH such as MH-1, MH-2, MHole, and so on. Thus, all man hole points when imported into drawing will be identified automatically and assigned the same style and label styles.

Note that the description key matching are case-sensitive, unlike the raw description of points in a point group. This means the raw description MHole will not match with the description key code, MHOLE. Some of the wild cards used are; ? for specifying number, # for single digit, @ for single alphabetical character only, . for non- alphanumeric character, [ ] for a list, and so on. Note that wild cards characters are always added after the description key code.

### Point Style

This column specifies the default point style to be assigned to points matching with description key codes. To modify the point style, select the check box in the **Point Style** column field and click on the **Point Style** field; the **Point Style** dialog box will be displayed. You can use this dialog box to select the required point style or create a new point style using the options in the dialog box.

### Point label Style

To specify the required point label style, select the check box in the **Point label Style** field and click in the **Point Label Style** field; the **Point Label Style** dialog box will be displayed. The **Point Label Style** dialog box displays the default point label style to be assigned to the points matching with the description key code. Select the required point label style or create a new point label style using this dialog box.

### Format

This column specifies the format used for translating the raw description of points matching the description key into full description. As a result, you can make the raw description more meaningful and comprehensive. As discussed earlier, raw descriptions refer to the point description that is specified by the surveyor on the field and may not give the proper description of points. So, to create a full description of points, you can use the **Format** code of description keys.

The raw description of a point can be translated into full description in three ways. The first way is to keep the full description same as that of the raw description. For example, **GRND** is both the full description and raw description of ground points. To do so, enter \$\* in the **Format** field to accept the raw description as full description.

The second way is to change the raw description into full description. For example, the **IP** raw description will be replaced by **Iron Pin**. The third way is to change the order and adding information or parameters to the full description. For example, a point has a raw description **TREE OAK 5**, in which **OAK** is a parameter of the raw description. This raw description matches with a description key code **Tree** in the key set. Assume that the format for the key is \$2"\$1tree. Now, this format will help you create a full description in a specified order. The full description of the point will be **5"OAK tree**.

During the description key match, the raw description **TREE OAK 5** will match the description key having the code **TREE** and format code, \$2"\$1tree. This format code will translate the raw description into full description, **5"OAK tree**. \$2 refers to the second parameter in the raw description, **5**, whereas \$1 refers to the first parameter, **OAK**. The added information in the format code is " and tree. Thus, the full description



is created by replacing the values of \$2 to 5" and \$1 to OAK to create the 5"OAK tree as the full description.

To create new description keys in the description key set, right-click in any of the fields and choose **New** from the shortcut menu; a new key will be added in the **Code** column of the **DescKey Editor Panorama** window, as shown in Figure 2-49. After you have specified the code, point style, point label styles, and format, choose the green colored button at top right corner of the **Panorama** window to close it. Figure 2-50 shows an example of a description key set having different keys.

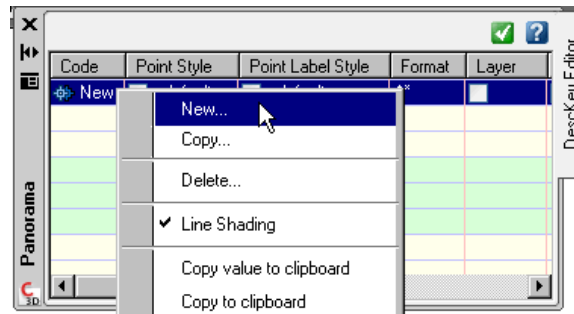


Figure 2-49 Adding a new description key

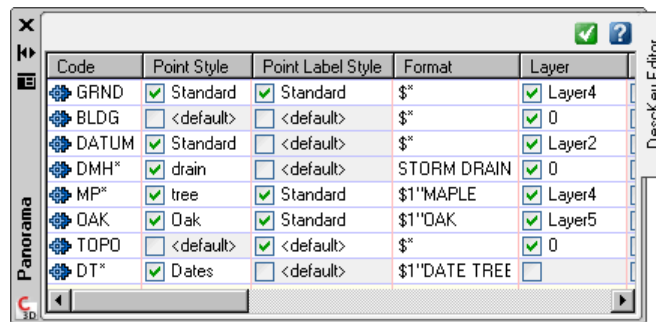


Figure 2-50 The DescKey Editor Panorama window showing different keys of the description key set

## Activating the Description Key Matching

To activate the process of description key matching, choose the **Settings** tab from the **Toolspace** palette and expand **Points > Commands** in the **Settings** tab. Next, right-click on **Create Points** and choose **Edit Command Settings** from the shortcut menu; the **Edit Command Settings - Create Points** dialog box will be displayed. Expand the **Point Creation** category and ensure that the **Disable Description Keys** property is set to **false**. Choose the **OK** button to exit the dialog box.

Alternatively, choose **Points > Create Points** from the menu bar; the **Create Points** toolbar will be displayed. Expand the toolbar and then expand the **Points Creation** category in it. Next, ensure that the **Disable Description Keys** property is set to **false**, as shown in Figure 2-51.

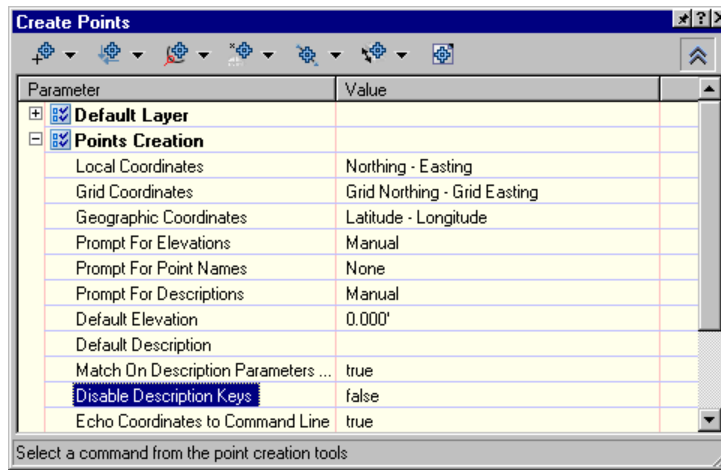


Figure 2-51 The expanded *Create Points* toolbar

## TUTORIALS

### Tutorial 1

### Creating Points

In this tutorial, you will create points, as shown in Figure 2-52, using the tools in the **Create Points** toolbar. (Expected time: 30 min)

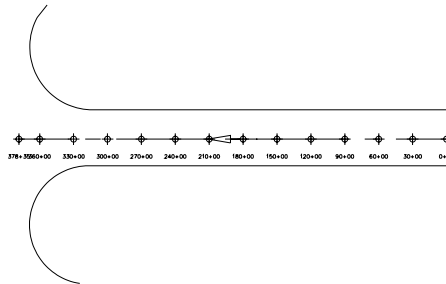


Figure 2-52 Points created along the alignment, lines, and arcs


The following steps are required to complete this tutorial:

- Download the *civil-3d-2009-c02-tut-1.dwg* file from the [http://www.cadcim.com/civil\\_3d\\_2009/civil\\_3d\\_2009.htm](http://www.cadcim.com/civil_3d_2009/civil_3d_2009.htm) link and save it.
- Create points using different options in the **Create Points** toolbar.
- Save the file.

### Opening the File

1. Choose **File > Open** from the menu bar; the **Select File** dialog box is displayed.
2. Browse to the required location where you have saved the file.
3. Select the file and choose the **Open** button to open the file. The drawing file consists of an alignment and two lines on both sides. You will now create points from the alignment and lines using the options in the **Create Points** toolbar.

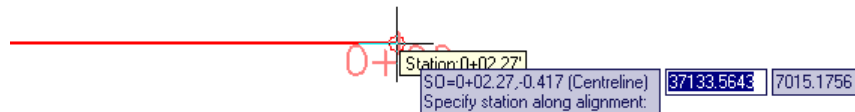
### Creating Points Using the Options in the Alignment Category

1. Choose **Points > Create Points** from the menu bar; the **Create Points** toolbar is displayed.
2. Choose **Point > Create Points - Alignments > Station/Offset** from the menu bar to create point at some offset distance from the stations on an alignment. 



**Tip.** Alternatively, choose the default **Station/Offset** button from the alignment category in **Create Points** toolbar.

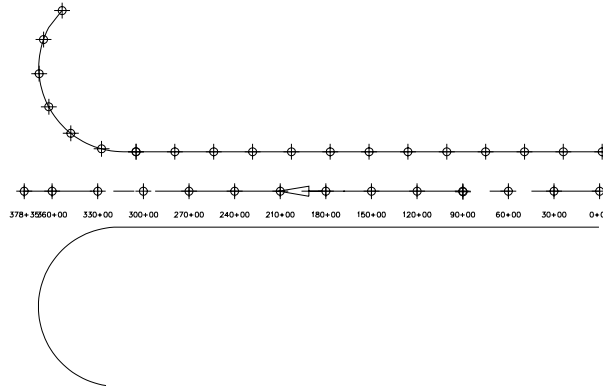
3. Next, select the **Centreline** alignment in the drawing; you are prompted to specify the station.
4. Zoom in to view the alignment and click on **0+00** at the start of the alignment. Note that, as you move the cursor over the alignment, a tooltip showing stations is displayed, as shown in Figure 2-53. On doing so, you are prompted to specify the offset at the command line.



**Figure 2-53** Selecting the first station of the alignment

5. Press ENTER to accept the default offset value; you are prompted to specify the point description.
6. Enter **CL** at the command line and press ENTER; you are prompted to specify the point elevation.
7. Enter **100** at the command line and again, press ENTER; a blue colored point is displayed at the first station of the alignment. Note that at the command line, you are prompted to specify a station.

8. Press ENTER to accept the default offset value; you are prompted to specify the description.
9. Now, pan to the second station on the alignment and click at the station **30+00**.
10. Follow the prompts and enter **CL** and **100** when you are prompted to specify the description and elevation; a new point is added at specified station and you are again prompted to specify the next point.
11. Similarly, select the remaining alignment stations and specify the point description, offset and elevation for points as explained in the above steps. As you press ENTER after specifying description and elevation, the points are created and displayed at each selected station, as shown in Figure 2-54. Thus, you have created points from the alignment.



*Figure 2-54 Points created from the alignment*

### Creating Points Using the Options in the Miscellaneous Category

Now, you will create offset point from lines and arcs in the drawing.

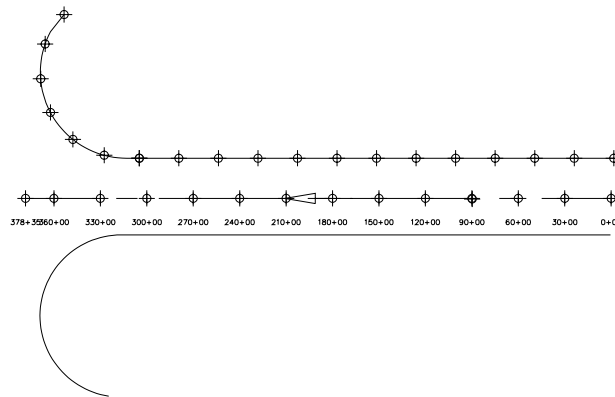
1. Choose **Point > Create Points - Miscellaneous > Divide Object** from the menu bar; the **Create Points** toolbar is displayed and the *Select an arc, line, polyline, lot line, or feature line:* prompt is displayed at the command line.
2. Select the line above the alignment; you are prompted to enter the number of segments.
3. Enter **12** from the number of segments and press ENTER; you are prompted to specify the offset.
4. Press ENTER to accept the default offset value; you are prompted to specify the point description.
5. Enter **OSP** and press ENTER; you are prompted to specify the point elevation.
6. Enter **100** and press ENTER; a blue colored point is displayed at the endpoint of the selected line and you are prompted again to specify the description and elevation.

7. Follow the prompts and enter **OSP** and **100** when prompted to specify the point description and elevation. You will notice that as you press ENTER after specifying the point description and elevation, the point will be created and displayed on the selected line.

Keep on specifying the point description and elevation till the *Select an arc, line, polyline, lot line, or feature line:* prompt is displayed again.

8. Now, select the arc object above the alignment, enter **6** at the command line, and press ENTER; you are prompted to specify the offset.
9. Enter **5** at the command line and press ENTER; you are prompted to specify the point description.
10. Enter **OSP** at the command line and press ENTER; you are prompted to specify the point elevation.
11. Enter **100** at the command line and press ENTER.
12. Continue specifying the point description and elevation as you have done in the above steps. Points are created along the curve at the specified offset distance.

Thus, you have created points from the line and arc objects by dividing these objects into specified segments, as shown in Figure 2-55.



**Figure 2-55** Points created from the line and arc object

Now, you will create points by using the options in the **Intersection** category.

### Creating Points Using the Options in the Intersection Category

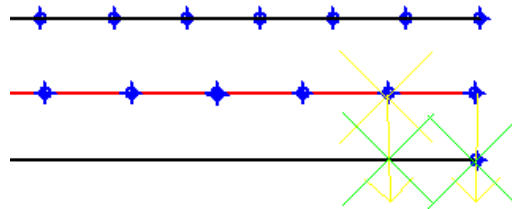
1. Choose **Points > Create Points - Intersection > Direction/Perpendicular** from the menu bar; the **Create Points** toolbar is displayed and you are prompted to specify the start point.

2. Click at the first point of the alignment to specify the first point; you are prompted to specify the direction.
3. Drag the cursor straight downward and click on the line just below the point on alignment; an arrow showing direction is displayed and you are prompted to specify the offset.
4. Press ENTER to accept the default offset value; you are prompted to specify the location of the perpendicular point.
5. Click on the line object just below the first point on alignment; a green cross-mark indicating the position of the point is displayed on the screen and you are prompted to specify the point description.

**Note**

Ensure that the **OSNAP** or **ORTHO** command is activated to specify the perpendicular point. You can also use the transparent commands to specify the perpendicular points.

6. Enter **PP** (perpendicular point) and press ENTER; you are prompted to specify the elevation.
7. Enter **100** at the command line and press ENTER; a point is displayed on the line and you are prompted again to specify the start point.
8. Now, click at the second point on alignment; a yellow colored cross-mark is displayed and you are prompted to specify the direction.
9. Again, drag the cursor downward and click on the line just below the selected point; the arrow is displayed and you are prompted to specify the offset.
10. Press ENTER to accept the default offset distance; you are prompted to specify the location of the perpendicular point.
11. Click on the line just below the second point; a green colored cross-mark is displayed and you are prompted to specify the point description, as shown in Figure 2-56.

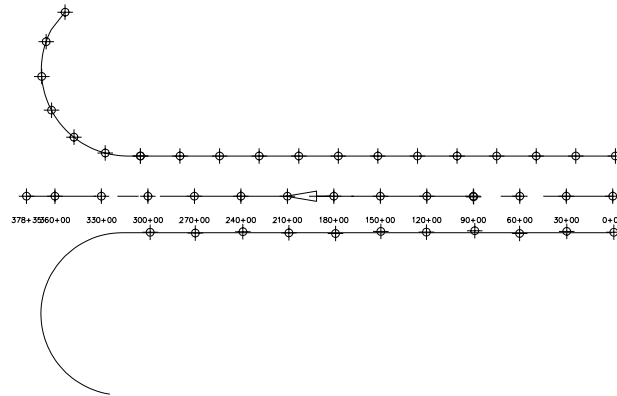


**Figure 2-56** Cross-marks displayed while creating points

12. Specify the description and elevation as specified in steps 6 and 7; a point is displayed on the line.

13. Repeat steps 2 to 7 and create point in the perpendicular direction of the alignment points.

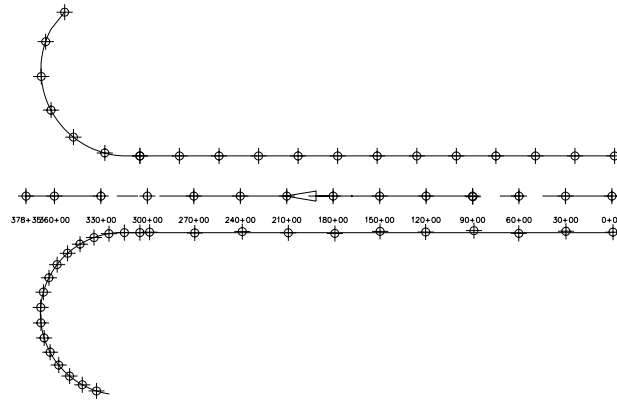
Thus, you have created points at the intersection of the direction specified from the alignment point and the perpendicular points specified on the line, as shown in Figure 2-57.



*Figure 2-57 Points created by intersection*

14. To add points on the arc below the alignment, choose **Points > Create Points - > Miscellaneous > Measure Object** from the menu bar and select the arc; you are prompted to specify the start station of the arc.
15. Press ENTER to accept the value **<0.000>** value; the end station is displayed at the command line.
16. Next, press ENTER to accept the value **<16852.956>** value of the end station of the arc; you are prompted to specify the offset.
17. Again, press ENTER; you are prompted to specify the interval.
18. Enter **1000** at the command line and press ENTER; you are prompted to specify the point description.
19. Enter **OSP** at the command line and press ENTER; you are prompted to specify the elevation.
20. Enter **100** at the command line and press ENTER; you are again prompted to specify the description and elevation.
21. Keep on specifying the description and elevation at the command line till you are prompted. Note that points are created along the arc as you keep on pressing ENTER after specifying the point description and elevation.

Thus, Civil 3D creates the point first by measuring arc object by identifying the start and end stations of the arc and then divides the arc into specified intervals. Points are created at the end of each interval, including the start and end stations of the arc, as shown in Figure 2-58.



**Figure 2-58** Points created along the arc object below the alignment

This completes Tutorial 1 of this chapter. In this tutorial, you learned to create points from the alignment, from the miscellaneous options, and using the intersection options.

### Saving the File

1. Choose **File > Save As** from the menu bar; the **Save Drawing As** dialog box is displayed.
2. In the **File name** edit box, enter *civil-3d-2009-c02-tut-1a.dwg*.
3. Browse to the *My Documents/civil\_3d* folder.
4. Choose the **Save** button to save the file. The file is saved as *civil-3d-2009-c02-tut-1a.dwg* in the specified location.

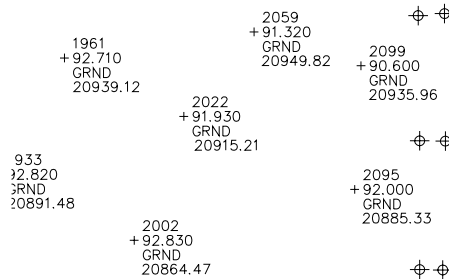


## Tutorial 2

## Importing Points

In this tutorial, you will import points into a drawing, create a point group, create a new point style, and a point label style for the points, as shown in Figure 2-59.

(Expected time: 30 min)



**Figure 2-59** Points created with a new point style and point label style


The following steps are required to complete this tutorial:


- Download the *civil-3d-2009-c02.dwg* file from the [http://www.cadcim.com/civil\\_3d\\_2009/civil\\_3d\\_2009.htm](http://www.cadcim.com/civil_3d_2009/civil_3d_2009.htm) link and save it.
- Open a new template.
- Import points from the point file.
- Create a point group.
- Create a new point style and assign it.
- Create a new label style and assign it.
- Save the drawing.

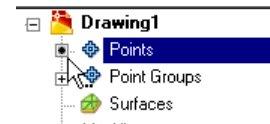
### Opening the New Template

- Choose **File > New** button from the menu bar; the **Select template** dialog box is displayed.
- Select the *\_Autodesk Civil 3D (Metric) NCS Base.dwt* template and choose the **Open** button to open the template file.

### Importing Points

- Choose **Points > Create Points** from the menu bar; the **Create Points** toolbar is displayed.
- Choose the **Import Points** button from the **Create Points** toolbar; the **Import Points** dialog box is displayed. 
- Select **PENZD (space limited)** from the **Format** drop-down list. The format is selected to match the arrangement of point properties and the type of delimiter used. The points are arranged in the order of the point **Number (P)**, **Easting (E)**, **Northing (P)**, **Elevation (P)**, and **Description**. The points are separated by a space delimiter.

4. Choose the button available on the right of the **Source File(s)** area; the **Select Source File** dialog box is displayed. Browse to the required location where you have saved the *civil-3d-2009-c02-tut-2* file. 
5. Select the file and choose the **Open** button; the dialog box is closed.
6. Now, choose the **OK** button; the **Import Points** dialog box is closed and points are imported.
7. Choose the **Prospector** tab in the **Toolspace** palette and note that a black colored symbol is displayed on the left of **Points** indicating that point shave been added in the drawing as shown in Figure 2-60.
8. Enter **ZE** (Zoom Extents) at the command line and press ENTER; points are displayed in the drawing. Now, you can close the **Create Points** toolbar.



*Figure 2-60* Cursor showing the symbol

Expand the **Point Groups** collection of the **Toolspace** palette and expand the **Point Groups** collection and note that all the points are added to the default **\_All Points** group.

9. Zoom in the drawing and note the default point style. Now, you will create a new point group and point style and assign it to the points.

### Creating the Point Group

Before creating points, you need to view the description of all points that are imported.

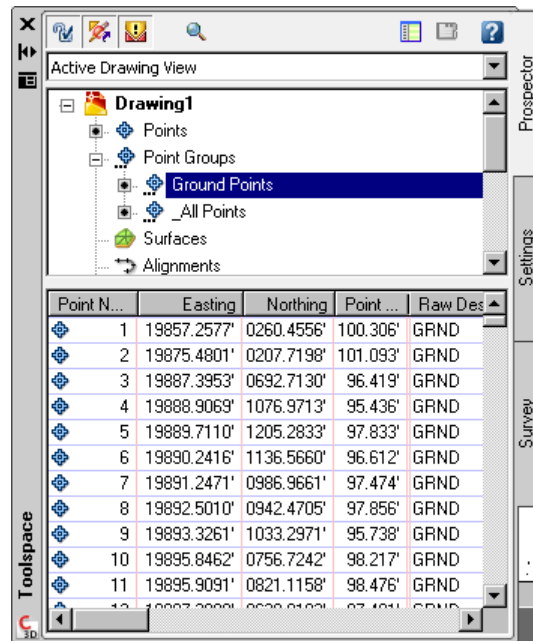
1. Choose **Points > List Points** from the menu bar; the **Panorama** window with the **Point Editor** tab chosen is displayed.



**Tip.** Alternatively, select **Points** in the **Prospector** tab and view the points in the **Prospector's List View**.

2. Scroll the bar in the **Panorama** window to view the description of points. On scrolling the bar, you will notice that some of the points have **GRND** as the point description. You will create a new point group that will include all the points with **GRND** as the description.
3. Close the **Panorama** window after viewing the point description of all points that you have imported.
4. Now, right-click on **Point Groups** in the **Prospector** tab of the **Toolspace** palette; a shortcut menu is displayed. Choose **New** from the shortcut menu; the **Point Groups Properties - Point Group (1)** dialog box is displayed.
5. Enter **Ground Points** in the **Name** edit box and choose the **Include** tab.

6. Select the **With raw descriptions matching** check box in the tab and enter **GRND** in the edit box next to the check box.
7. Choose the **OK** button; the dialog box is closed. All points with **GRND** as the raw description are added to the **Ground Points** point group.
8. Expand the **Point Groups** collection and select the **Ground Points** point group; all ground points are displayed in the **Panorama List View**, as shown in Figure 2-61.

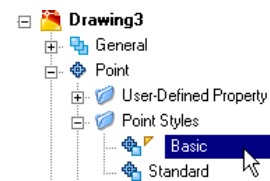


*Figure 2-61 The Prospector List View showing the ground points*

You can drag and expand the **Toolspace** palette for better visibility of points in the List View. Now, you will create a point style for these points.

### Creating the Point Style

1. Choose the **Settings** tab of the **Toolspace** palette and expand **Points > Point Styles**; a yellow triangular symbol on the left of the style name is displayed, as shown in Figure 2-62. This symbol indicates that the style being used is an existing style.
2. Right-click on **Point Styles** and choose **New** from the shortcut menu; the **Point Style - New Point Style** dialog box is displayed.
3. Accept the default point group name in the **Name** edit box and choose the **Marker** tab from the dialog box.



*Figure 2-62 The cursor pointing at the symbol*

4. Ensure that the **Use custom marker** radio button is selected and then choose the third button from the **Custom marker style** options.
5. Select **Use size relative to screen** from the **Options** drop-down list in the **Size** area.
6. Enter **5** in the **percent** edit box.
7. Now, choose the **Display** tab and make sure that **Plan** is selected from the **View Direction** drop-down list.
8. Next, click on the default color of the **Marker** component; the **Select Color** dialog box is displayed.
9. Select the blue color from the dialog box and choose the **OK** button to exit the dialog box.
10. Now, choose **OK** from the **Point Style - New Point Style** dialog box; the dialog box is closed and the point style name is added in the **Point Styles** node in the **Settings** tab. Thus, you have created a new point style. Now, you will create a point label style.

### Creating the Point Label Style

1. Choose the **Settings** tab of the **Toolspace** palette and expand **Point > Label Styles** in the tab. You will notice that **Standard** is the current point label style.
2. Right-click on **Label Styles** and choose **New** from the shortcut menu; the **Label Style Composer - New Point Label Style** dialog box is displayed.
3. In the **Label Style Composer - New Point Label Style** dialog box, accept the default label style name displayed in the **Name** edit box and choose the **Layout** tab from this dialog box.
4. Now, choose the **Create Text component** button on the right of the **Component name** drop-down list; a new component **Text.1** is created and added in the **Component name** drop-down list.
5. Click in the **Value** field of the **Name** property and enter **Northing** as the component name.
6. Click in the **Value** field of the **Anchor Component** property and select **Point Description** from the drop-down list. Note the position of the component in the **Preview** window.
7. Similarly, set the value of the **Anchor Point** property to **Bottom Center**. Note the position of the component.
8. Set the values of the **X-Offset** and **Y-Offset** properties in the **Text** category to **0.1500"** and **-0.0700"**, respectively. Again, note the position of the component in the **Preview** window.

9. Now, click in the **Value** field of the **Contents** property; a browse button is displayed.
10. Choose the browse button; the **Text Component Editor - Contents** dialog box is displayed.
11. In the **Text Component Editor - Content** dialog box, select **Northing** from the **Properties** drop-down list and set the value of the **Precision** modifier to **0.01**.
12. Choose the button next to the **Properties** drop-down list; the selected property is added to the **Text Editor** window available on the right pane of the **Text Component Editor - Contents** dialog box.
13. Select **Label Text** in the Text Editor window and delete it so that only the **Northing** property is displayed in the Text Editor window. Refer Figure 2-63.

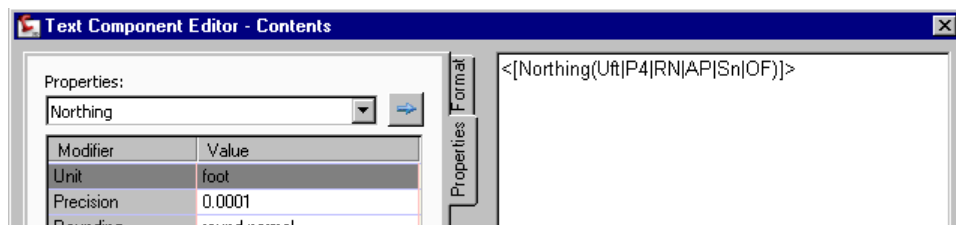


Figure 2-63 Partial view of the **Text Editor** window showing the label text

14. Now, choose the **OK** button to close the **Text Component Editor - Contents** dialog box.
15. Again, choose the **OK** button to close the **Label Style Composer - New Point Label Style** dialog box. Now, after creating a new label style, you need to assign it to the point group.

### Assigning the Point Style and the Point Label Style to the Point Group

1. Choose the **Prospector** tab of the **Toolspace** palette and expand the **Point Groups** collection.
2. Right-click on the **Ground Points** group and choose **Properties** from the shortcut menu that is displayed; the **Point Group Properties - Ground Points** dialog box is displayed.
3. Select the **New Point Style** option from the **Point style** drop-down list in the **Default styles** area of the **Information** tab, as shown in Figure 2-64.

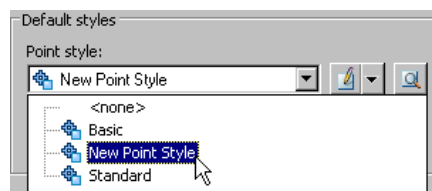
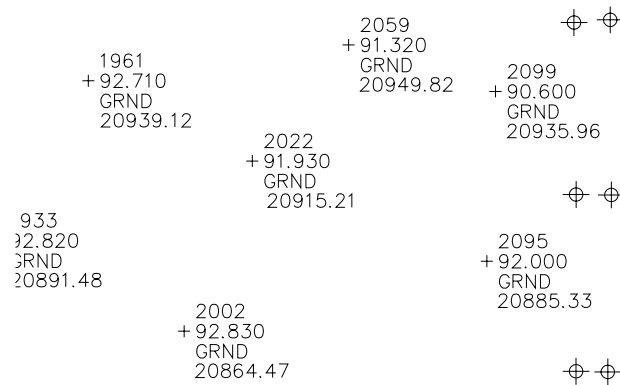


Figure 2-64 Selecting the **New Point Style** option from the **Default styles** area

4. Choose the **Apply** button from the **Point Group Properties - Ground Points** dialog box; you will notice that all ground points are displayed in blue color and with the select marker style.
5. Similarly, select the **New Point Label Style** option from the **Point label style** drop-down list in the **Default styles** area of the **Information** tab.
6. Next, choose the **OK** button from the **Point Group Properties - Ground Points** dialog box will be closed and the ground points will be displayed with a new point style and label style.

Note that point label displays the point number, elevation, description, and northing of each point, as shown in Figure 2-65.



**Figure 2-65** Ground points displayed after applying the new point style and point label style

This completes Tutorial 2 of this chapter. In this tutorial, you imported points, created a point group, created a new point style, and a point label style.

### Saving the File

1. Choose **File > Save As** from the menu bar; the **Save Drawing As** dialog box is displayed.
2. In the **File name** edit box, enter *civil\_3d-2009-c02-tut-2a.dwg*.
3. Browse to the *My Documents/civil\_3d* folder.
4. Next, choose the **Save** button to save the file. The file is saved as *civil-3d-2009-c02-tut-2a.dwg* in the specified location.

### Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Points are the building block of all civil engineering projects and designs. (T/F)
2. Points specify the \_\_\_\_\_ of different features.
3. The two main components of a Civil 3D point are, \_\_\_\_\_ and \_\_\_\_\_.
4. To create points, choose **Points > Create Points** from the menu bar. (T/F)
5. The \_\_\_\_\_ category options are the most commonly used options for creating points.
6. Besides controlling the visibility and display of points, \_\_\_\_\_ help you manage the workability of points.
7. Point styles control the shape, size, color, location of the point marker and also controls the \_\_\_\_\_ of the point label.
8. To edit points in the drawing, choose **Points > Edit Points > Points** from the menu bar. (T/F)
9. To calculate geodetic information, choose **Points > Utilities > \_\_\_\_\_** from the menu bar.
10. To import points into AutoCAD Civil 3D, choose **Points > Import/Export Points > \_\_\_\_\_** from the menu bar.

### Review Questions

Answer the following questions:

1. Points can be created by using point tools, but cannot be imported from files. (T/F)
2. In Civil 3D, each point is an individual object with different information. (T/F)
3. The AutoCAD points can be converted to Civil 3D points. (T/F)
4. The \_\_\_\_\_ option is used to create points by using the point data contained in point files.
5. The file \_\_\_\_\_ describes the sequence or arrangement of the point data in a file to be imported.
6. There are two main types of file formats, \_\_\_\_\_ and **User Point File**.

7. The \_\_\_\_\_ window displays all points in the drawing and allows you to edit them.
8. Locking the points prevent you from changing the point style of the points. (T/F)
9. The \_\_\_\_\_ dialog box is used to export points into AutoCAD Civil 3D.
10. The \_\_\_\_\_ tab in the **Point Groups Properties** dialog boxes is used to specify the criteria on the basis of their properties to include points into a point group.

## Exercises

### Exercise 1

Download the *civil-3d-2009-c02-ex-1.dwg* file from the [http://www.cadcim.com/civil\\_3d\\_2009/civil\\_3d\\_2009.htm](http://www.cadcim.com/civil_3d_2009/civil_3d_2009.htm) link and import points from the file. Also, create a point style for points and create a label style. Next, assign these styles to points using the following parameters.

**(Expected time: 30 min)**

Point Style name: **New Style**

Marker Style: **default**

Marker Color: **blue**

Point Label Style Name: **New Label Style**

Color of all the label components: **blue**

Save the file as *civil-3d-2009-c02-ex-1a.dwg*.



## Exercise 2

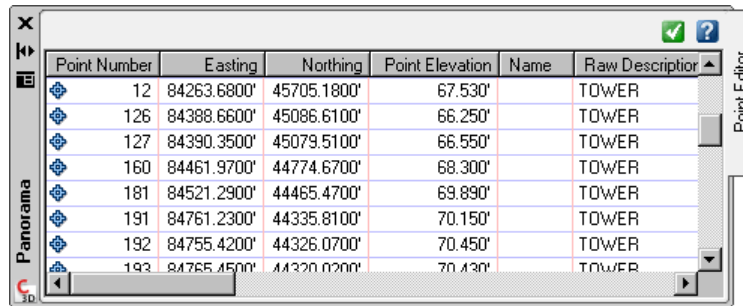
Using the *civil-3d-2009-c02-ex-1.dwg* file, create a point group and edit the points in the point group using the Point Editor. Use the following parameters. **(Expected time: 30 min)**

Point Group Name: **Tower points**

Raw Description to include Points: **Tower**

Edit the elevation of the first five points as shown in Figure 2-66.

Save the file as *c02-ex-2a.dwg*.



Point Number	Easting	Northing	Point Elevation	Name	Raw Description
12	84263.6800'	45705.1800'	67.530'		TOWER
126	84388.6600'	45086.6100'	66.250'		TOWER
127	84390.3500'	45079.5100'	66.550'		TOWER
160	84461.9700'	44774.6700'	68.300'		TOWER
181	84521.2900'	44465.4700'	69.890'		TOWER
191	84761.2300'	44335.8100'	70.150'		TOWER
192	84755.4200'	44326.0700'	70.450'		TOWER
193	84765.4500'	44320.0200'	70.430'		TOWER

Figure 2-66 The *Point Editor* window showing the edited elevations

**Answers to Self-Evaluation Test**

1. T, 2. location, 3. Marker label, 4. T, 5. Miscellaneous, 6. Point Styles, 7. visibility, 8. T, 9. Geodetic Calculator, 10. Import Points