



Trimble Business Center

Processing Feature Codes

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TRANSFORMING THE WAY THE WORLD WORKS



About this tutorial

In this tutorial, you will process and edit feature codes that have been imported into your project. Then you will view feature data in the various project views, and export the features as a CAD drawing.

Note: If you need additional help at any time you are using the software, press **F1** to display the online help.

Understanding feature code processing

When a surveyor observes a feature in the field, he can make a record of it that includes the type of feature (for example, a tree), along with its location and any associated attributes (for example, the height of the tree and a photo). He does this by selecting from a library of predefined feature codes imported from a Feature Definition (.fxl) file, and supplying attribute values as required. The feature codes, along with any associated photos and attribute values, can then be imported into a Trimble Business Center project and processed using the same feature definitions.


Note: The Feature Definition Manager, which can be launched directly from TBC, enables you to create or edit a Feature Definition (.fxl) file. This application is not covered in this tutorial.

After feature codes have been processed, the software can display symbols and line work that represent the real world objects. Features can then be exported to other systems (for example, CAD or GIS) as necessary.

There are four basic types of features:

- **Point feature** - A point feature is used to identify a single feature, such as tree or utility pole. Each point feature is assigned to a point, which specifies its location. After a point feature code is processed in TBC, the resulting feature is typically represented by a specific symbol displayed on top of the point in the various graphic views. You can view and edit attribute values assigned to a point feature by opening the **Properties** pane for the point to which it is assigned.
- **Line feature** - A line feature is used to identify a line, such as a fence or curb. When points with line feature codes are processed in TBC, a linestring with feature data is created. The feature linestring can be easily edited using the **Edit Linestring** command. If offset lines are specified for the line feature, additional linestrings are created. The line style used for the linestring is determined by the feature definition used to define the line feature. You can view and edit attribute values assigned to a linestring feature by opening the **Properties** pane for the linestring.

- **Polygon feature** - A polygon feature is used to identify a feature with a polygonal shape, such as a concrete pad or retaining wall. When a polygon feature is processed in TBC, it is converted to a polygon that can be easily edited using the **Edit Polygon** command. The border line style and fill used for the polygon is determined by the feature definition used to define the polygon feature.
- **Block feature** - A block feature is used to identify a predefined CAD block that was created in TBC or some other software application and imported into Feature Definition Manager as a DWG (.dwg) or DXF (.dxf) file. A block feature definition specifies how many of a block's insertion points (one to three) can be used to locate and, optionally, rotate and scale the block.

If a feature includes a photo or other media file attribute, a **Media Folder** icon  is displayed with the feature in the graphic views. You can view a media file by opening the appropriate **Media Folder**.

Step 1. Open the project

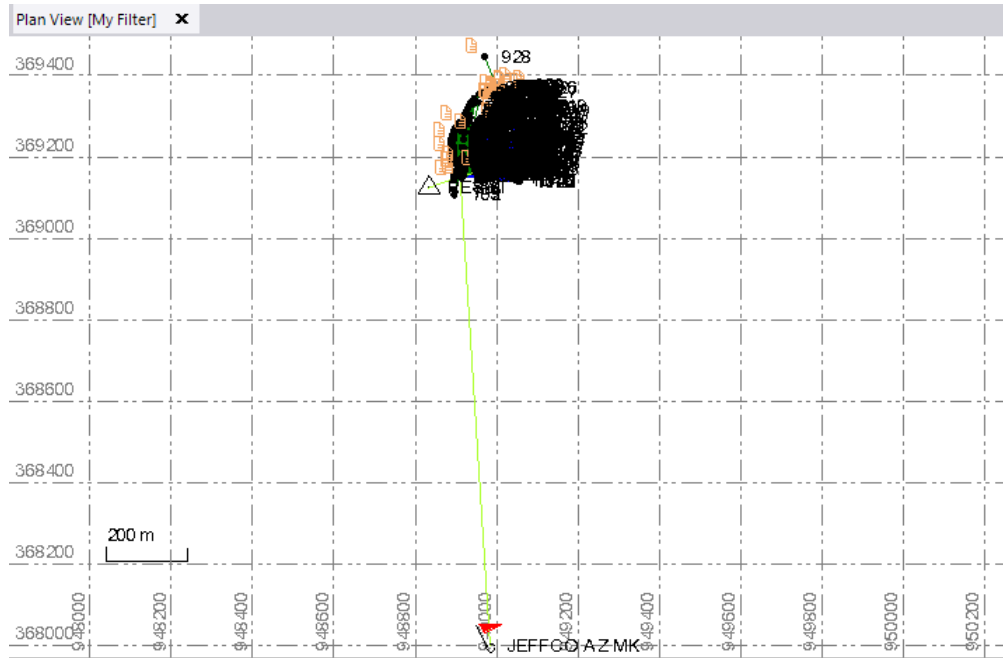
For this tutorial, you will use the project file *Processing Feature Codes.vce*. The project includes data from a Cadastral survey of a city bus terminal. Integrated surveying methods were used to collect the field data.

Note: The downloaded *ProcessingFeatureCodes* folder contains this PDF file, a *Data* folder, a *Processing Feature Codes* project folder, and the *Processing Feature Codes.vce* project file. You will import data from the *Data* folder later in this tutorial.

1. In TBC, select **File > Open**.
2. In the **Open File** dialog, browse to `..\ProcessingFeatureCodes\Processing Feature Codes.vce` and click **Open**.

The project opens in the **Trimble Business Center** window.

Step 2. Import the Feature Definition (.fxl) file



The project file is read-only. You can perform the tutorial steps without saving the project file. However, if you are interrupted while performing the tutorial, you can save it with a new name by selecting **File > Save Project As**. Then, you can re-open the project to continue the tutorial at a later time.

Step 2. Import the Feature Definition (.fxl) file

Before you can process the feature codes imported into your project, you must import the same Feature Definition (.fxl) file that was used to assign codes in the field. There are three ways of doing this:

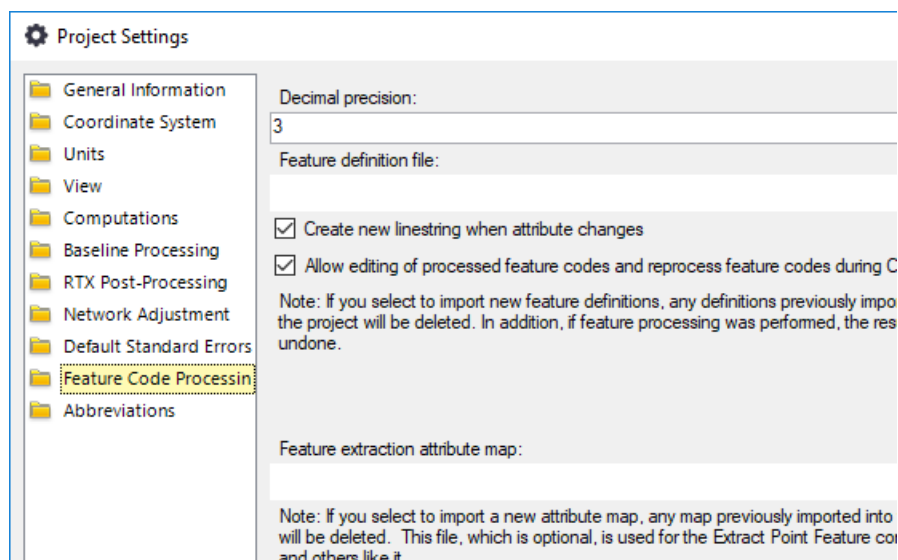
- Use the **Feature Code Processing** section of the **Project Settings** dialog to import the Feature Definition (.fxl) file.
- Use the **Import** pane to import the Feature Definition (.fxl) file. After import, the imported file is displayed in the **Feature Code Processing** section of the **Project Settings** dialog.
- When you import a Job (.job) or JobXML (.jxl) file that specifies a Feature Definition (.fxl) file that is included in the same folder, the Feature Definition (.fxl) file is automatically imported into your project as well. After import, the imported file is displayed in the **Feature Code Processing** section of the **Project Settings** dialog.


In this step, you will import the Feature Definition (.fxl) file created for this tutorial using the **Project Settings** dialog.

1. In the **Quick Access Toolbar** (located at the top of the **TBC** window), select **Project Settings**.

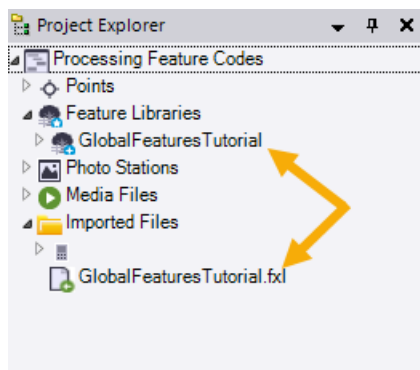
Step 2. Import the Feature Definition (.fxl) file

2. In the navigation (left) pane in the **Project Settings** dialog, select **Feature Code Processing**.



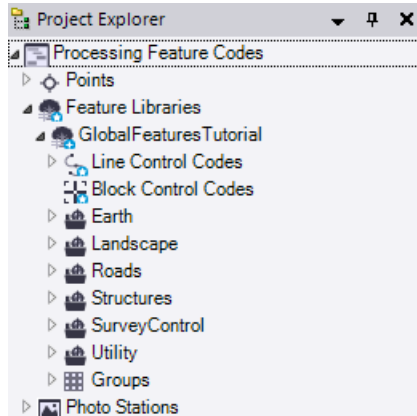
3. Click the **Browse** button  located to the right of the **Feature definition file** field.
4. In the **Open** dialog, browse to `..\\ProcessingFeatureCodes\\Data\\GlobalFeaturesTutorial.fxl` and click **Open**.
Be sure to import the *GlobalFeaturesTutorial.fxl* file, which is part of your downloaded tutorial package, not the default *GlobalFeatures.fxl* (installed with TBC) that first displays when you click the **Browse** button
5. In the **Project Settings** dialog, click **OK** to close the **Project Settings** dialog.

The feature definitions contained in *GlobalFeaturesTutorial.fxl* are imported into your project's Feature Library to be used for feature processing.

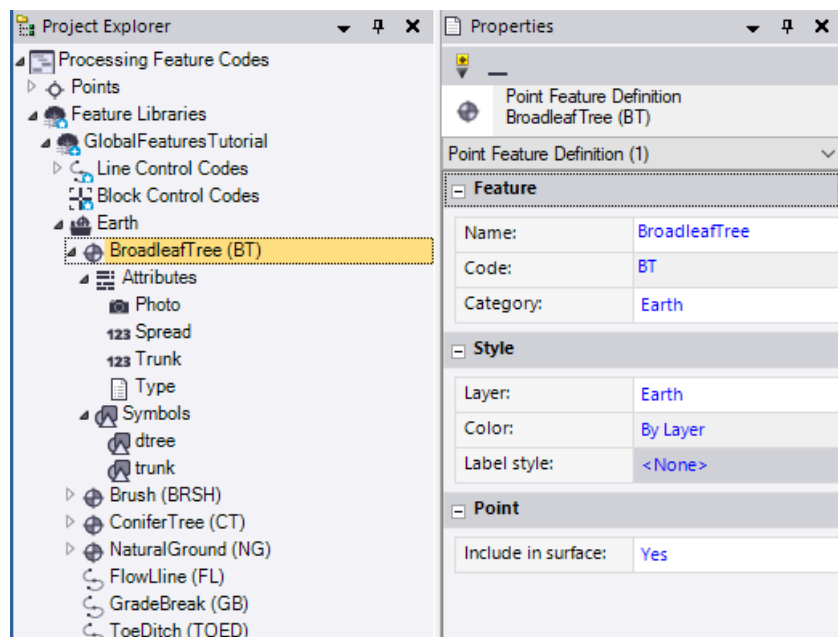


Step 3. View unprocessed feature codes

6. In the **Project Explorer**, click to expand the **Feature Libraries > Global Features Tutorial** node.



You could, if necessary, make changes or additions to the project's Feature Library using the **Properties** pane. See the TBC Help for instructions. For this tutorial, you will not make any changes.



Before processing, you will take a look at the unprocessed feature codes in your project.

Step 3. View unprocessed feature codes

Before you process the feature codes in your project, you can view the codes and their assigned values, and make changes if necessary.

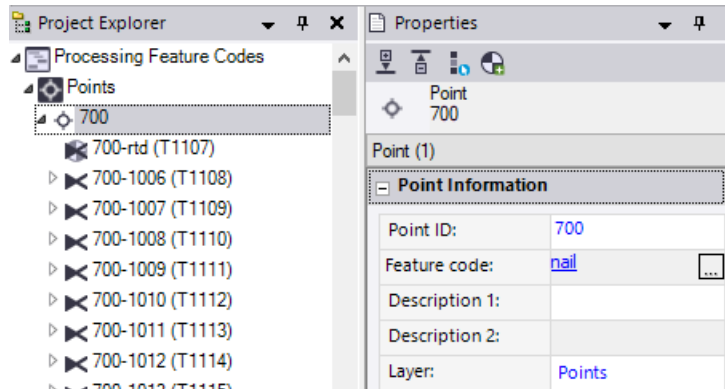
1. In the **TBC** ribbon, select **Home > Data > Project Explorer**.

The **Project Explorer** pane displays.

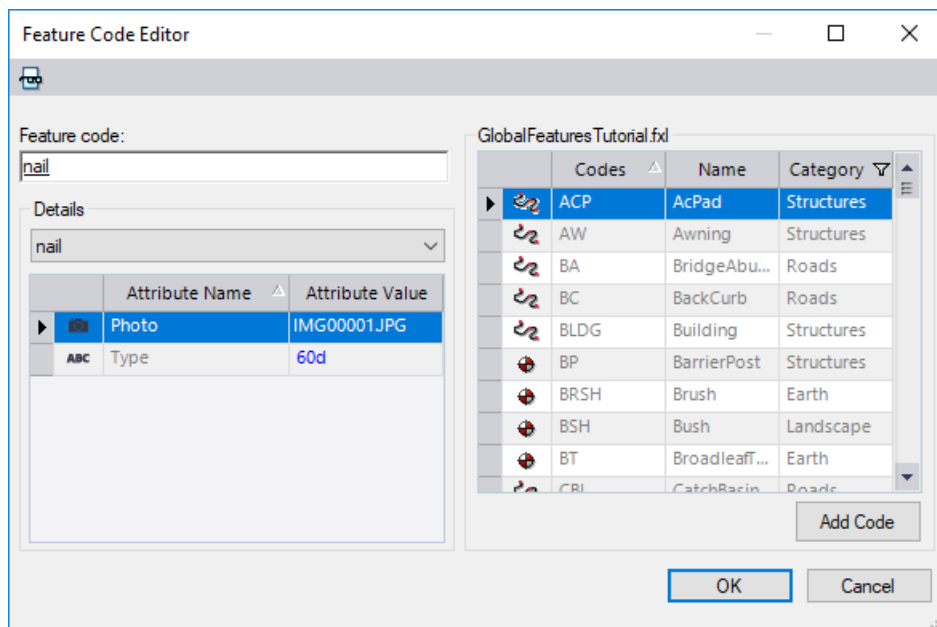
Step 3. View unprocessed feature codes

2. In the **Project Explorer** pane, expand the **Points** node. Then double-click point 700.


The **Properties** pane displays showing properties for point 700. The feature code assigned to the point displays in the **Point Information** section.



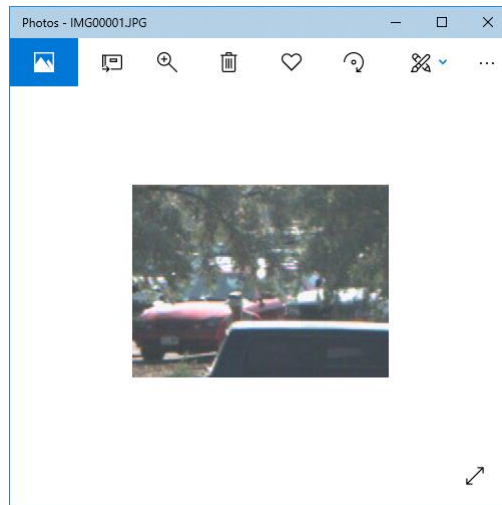
3. Click the **Browse** button  in the **Feature code** field to view more information about the feature code in the **Feature Code Editor** dialog.



This dialog allows you to remove a feature code, select a different feature code, add a feature code, and/or change attribute values. Note that the feature codes are defined in the *GlobalFeaturesTutorial.fxl* file.

4. To view the photo assigned to point 700, select the photo attribute row and click the **View File** icon  located near the top of the dialog.

The photo displays in your default photo viewing software.



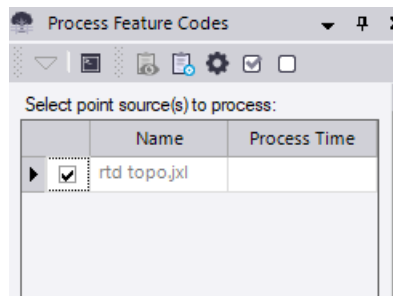
5. When you are done viewing the **Feature Code Editor**, click **Cancel** to close the dialog.

You are now ready to process the feature codes in your project.

Step 4. Process feature codes

You must process features codes to display their associated features correctly in graphic views and to export feature data.

1. In the **TBC** ribbon, select **GIS > Feature Definition > Process Feature Codes**.
2. In the **Process Feature Codes** pane, check the check box for *rtd topo.jxl* and click the **Process Source(s)** button.



After processing is complete, the **Feature Codes Processing** dialog displays asking if you want to view the *Feature Code Processing Report*.

3. In the **Feature Codes Processing** dialog, click **Yes**.

The *Feature Code Processing Report* displays on a new tab in the **TBC** window.

4. Scroll to the "Unknown Feature Codes" section.

Unknown Feature Codes		
Point source	Point ID	Feature
rtd topo.jxl	727	rd
rtd topo.jxl	728	rd end
rtd topo.jxl	780	cb 1x2m
rtd topo.jxl	781	cb inv

Note that there are four points whose feature codes are unknown. This means that there is no corresponding feature code contained in the project's Feature Definition Library to process the codes. In this case, the codes were incorrectly entered in the field.

Do not close the report. You will continue to use it in the next step.

Next, you will fix the unknown feature codes before reprocessing.

Step 5. Change feature codes

In this procedure, you will assign the correct feature code to each of the four points listed in the "Unknown Feature Codes" section of the *Feature Code Processing Report*.

By default, the *Feature Code Processing Report* opens in **Print Preview** to better facilitate scrolling long reports. However, to enable the links in the report, you must first change the layout to the **Normal** view.



1. In the toolbar at the top of the **Feature Code Processing Report** tab, click the **Print Layout** button to toggle to **Normal** view.
2. In the "Unknown Feature Codes" section of the *Feature Code Processing Report*, click point 727.

Point 727 is selected in TBC and the properties for point 727 are displayed.

The screenshot shows the 'Properties' window in a software application. The title bar says 'Properties'. Below the title bar is a toolbar with several icons. The main area of the window is titled 'Point 727'. Below this, there is a section labeled 'Point (1)'. Underneath, there is a tab labeled 'Point Information'. This tab contains a table with the following information:

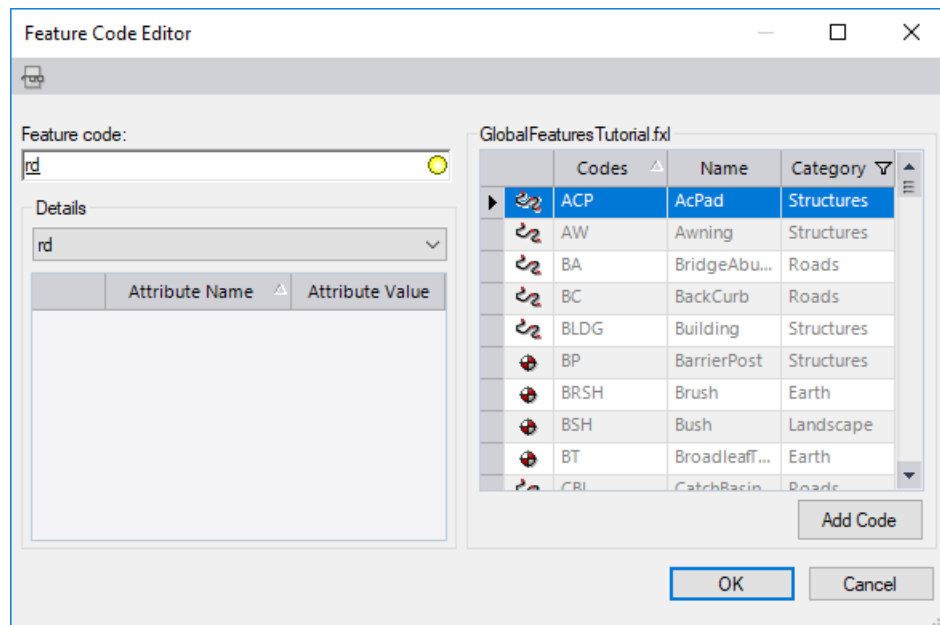
Point ID:	727
Feature code:	rd
Description 1:	
Description 2:	
Layer:	Points

Step 5. Change feature codes

The yellow icon  located at the right in the **Feature code** field indicates the point has an unknown feature code. You can enter a new code directly in the field if you know it and you do not need to specify any attributes. Otherwise, you can click the  button to open the **Feature Code Editor** dialog to make the changes. For this tutorial, you will use both methods.

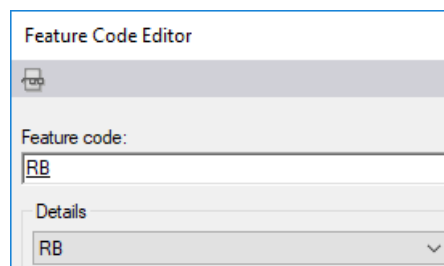
3. Click the Browse button  in the **Feature code** field.

The **Feature Code Editor** dialog displays.




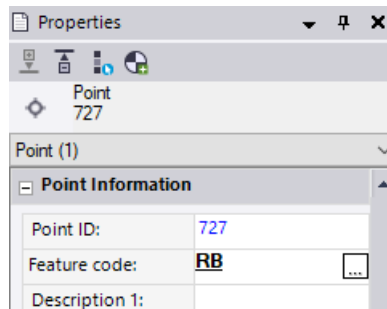
4. Delete *rd* from the **Feature code** field.
5. In the **GlobalFeaturesTutorial.fxl** list, select *RB* (*RoadBarrier*) and click the **Add Code** button.

The code is added to the **Feature code** field.





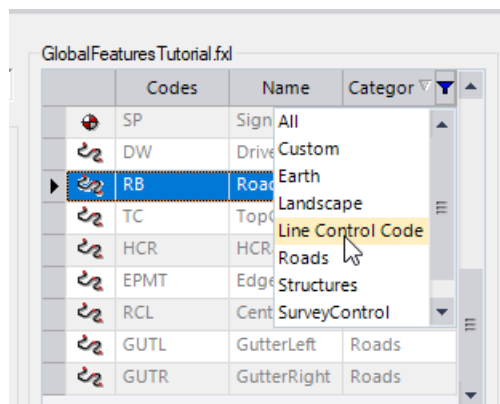
6. Click **OK**.

The newly assigned code displays in the **Feature code** field in the **Properties** pane for point 727. The yellow icon  no longer displays with the feature code.

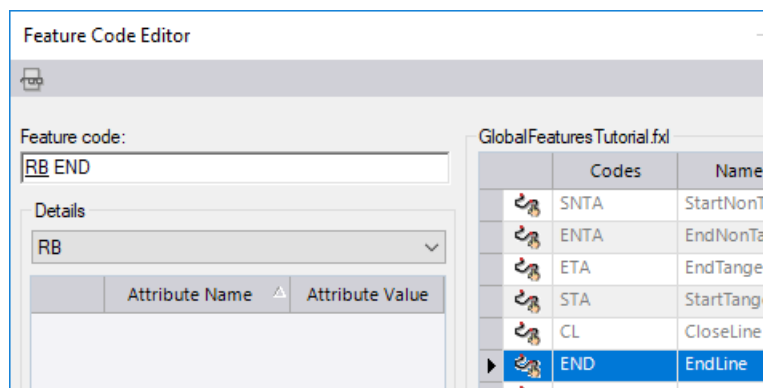


7. Change codes for the other points displayed in the "Unknown Feature Codes" section of the *Feature Code Processing Report*. Just click each point in the report to display its properties in the **Properties** pane.
 - a. For point 728, change *rd end* to *RB END*.

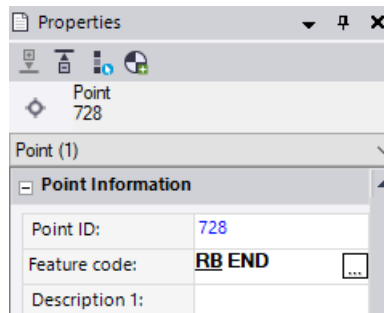
For this change, click the  button to open the **Feature Code Editor** dialog. Delete *rd end* from the **Feature code** field. Then select *RB (RoadBarrier)* in the **GlobalFeaturesTutorial.fxl** list and click the **Add Code** button. The code *RB* represents a line feature and should include the *END (EndLine)* line control code. Click the **Category** filter icon  and select **Line Control Code** to display only line control codes in the list.



Select *END* in the list, and click the **Add Code** button.

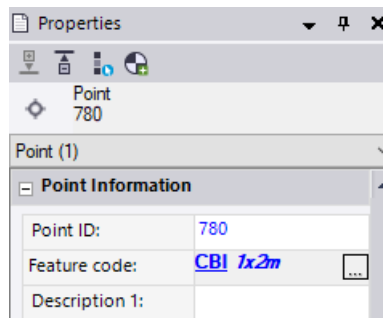


Then click **OK** to see the change in the **Properties** pane for point 728.



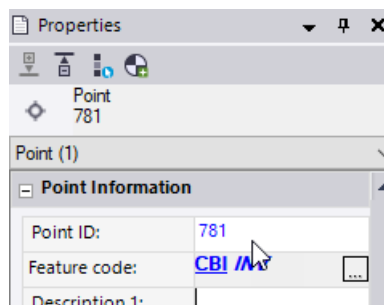
- b. For point 780, change *cb 1x2m* to *CBI 1x2m*.

For this edit, type the change directly in the **Feature code** field. Note that the italicized text *1x2m* is simply a free-form description for the code preceding it and is not used in processing.



- c. For point 781, change *cb inv* to *CBI INV*.

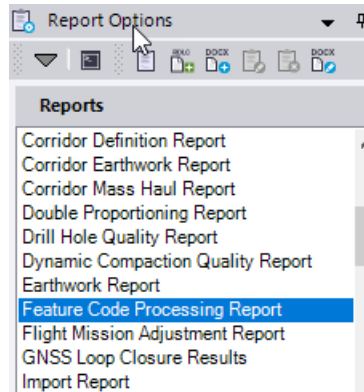
Again, type the change directly in the **Feature code** field. Note that *INV* is a free-form description.



You are now ready to reprocess the feature codes with the changes you made.

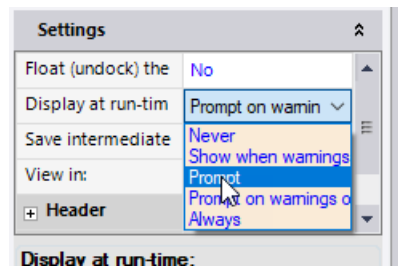
Step 6. Reprocess feature codes

1. In the **TBC** ribbon, select **GIS > Feature Definition > Process Feature Codes**.
2. In the toolbar located at the top of the **Process Feature Codes** command pane, click the **Report Options** icon.



The **Feature Code Processing Report** is selected by default.

3. In the **Settings** section of the **Report Options** command pane, select **Prompt** in the **Display at run-time** drop-down list. Then click **OK**.



4. In the **Process Feature Codes** pane, select the checkbox for *rtd topo.jxl* and click the **Process Source(s)** button.

After processing is complete, the **Feature Codes Processing** dialog displays asking if you want to view the *Feature Code Processing Report*.

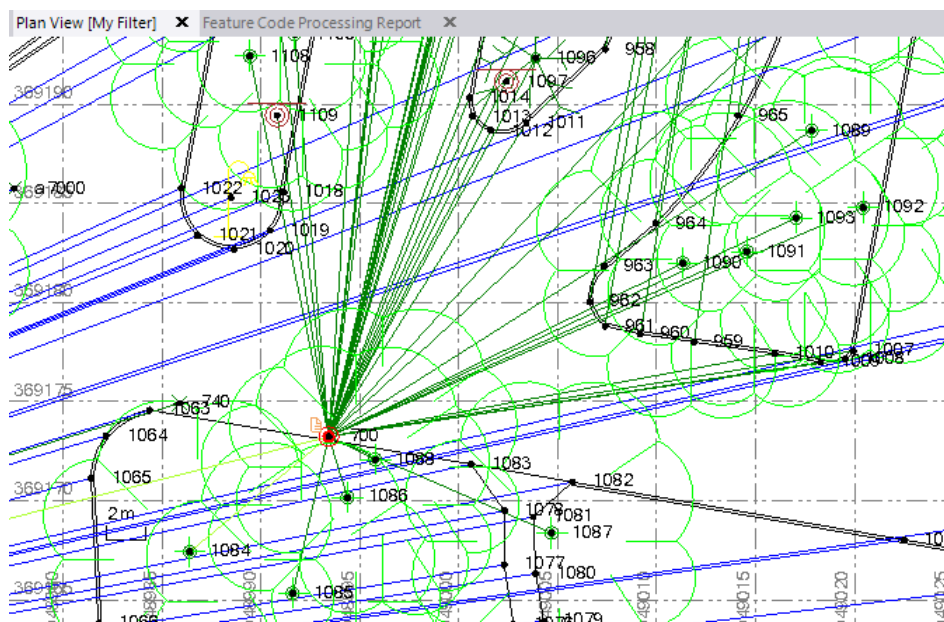
5. In the **Feature Codes Processing** dialog, click **Yes**.

A new *Feature Code Processing Report* displays on a new tab in the **TBC** window. Note that there are no longer any unknown feature codes listed in the report.

You can now view the processed features.

Step 7. View processed features

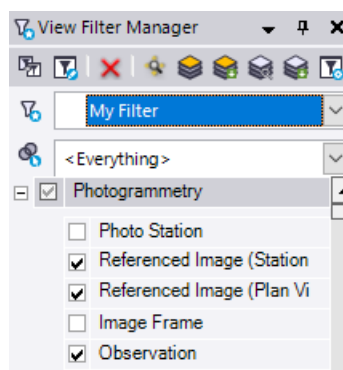
1. Select the **Plan View** tab and use your mouse wheel to zoom in to view the processed feature data, as shown below.



To better view the features, you can choose to hide unnecessary data in the **Plan View**.

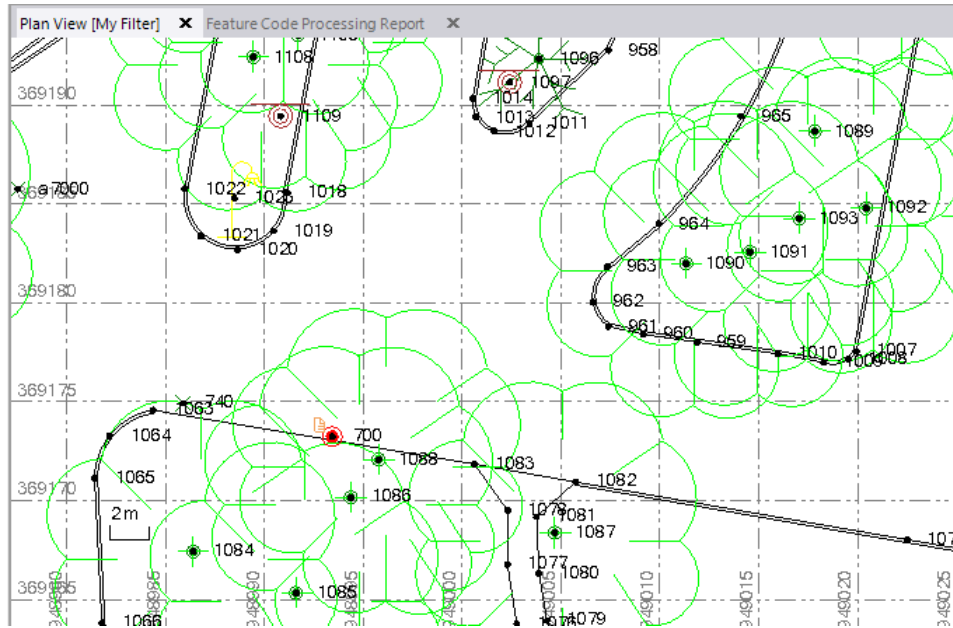
2. In the **TBC** ribbon, select **Home > View > View Filter Manager**.

The **View Filter Manager** pane displays.



3. In the **Raw Data** list:
 - Uncheck **RTK Vector**.
 - Uncheck **Total Station**.

Point feature symbols and feature linestrings are more clearly visible in the **Plan View**.

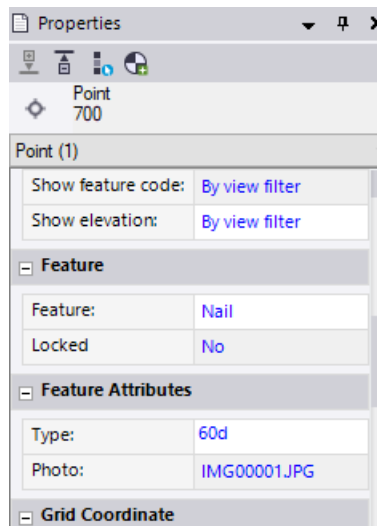


To view information about a feature, including any attribute values, you can select the point or linestring to which the feature is assigned.

4. In the **Plan View**, click the red symbol on point 700 and select *Point: 700* in the context menu.

If necessary, right-click anywhere on the **Plan View** and select **Properties** in the context menu to display the **Properties** pane.


The **Properties** pane for point 700 displays. In the lower portion of the pane, the **Feature** section displays the processed feature name and attribute values assigned to the point feature.

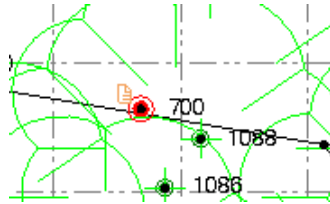


You can select a different feature or change any attribute values using these fields. If you select a different feature for the point and then reprocess the feature codes in your project, the new feature you assigned to the point is kept with the point, while the original feature code is used to create a "secondary" feature for the point, which you can select in the **Plan View**.

In addition, because the **Allow editing of processed feature codes** check box is checked (by default) in **Project Settings > Feature Code Processing**, you can edit the point's feature code directly in the **Feature code** field. However, for your change to take effect, you must re-process the feature codes in the project.


Note: When you type into an empty **Feature code** field, the auto-fill feature automatically displays the "next" suggested character based on the feature codes imported from the Feature Definition (.fxl) file.

If a feature includes a media attribute, such as a photo, a **Media Folder** icon  is displayed next to the point, as shown here.

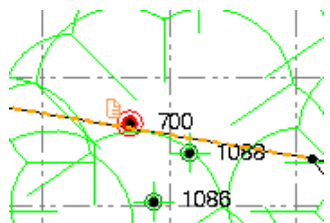


Note: A **Media Folder** is attached to any point or line to which a media file is assigned, whether it was assigned to the point as a feature attribute or assigned some other way. If a media file (for example, a photo) is assigned to a point as a feature attribute and additional media files are assigned to the point as well, you can select to use one of the other media files as the feature attribute by selecting it in the media (for example, **Photo**) drop-down list in the **Feature** section of the **Properties** pane.

5. In the **Plan View**, click the **Media Folder** icon for point 700 and, if necessary, select *Media Folder: 700* in the context menu.

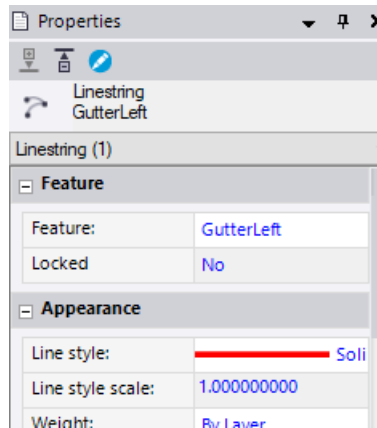
The **Properties** pane for the **Media Folder** is displayed showing the media file assigned to the point and information associated with it. You can click the **View** button  located to the right of the media file path to view the image in your default photo viewing software.

6. In the **Plan View**, click the line running through point 700 and, if necessary, select *Linestring: GutterLeft* in the context menu.



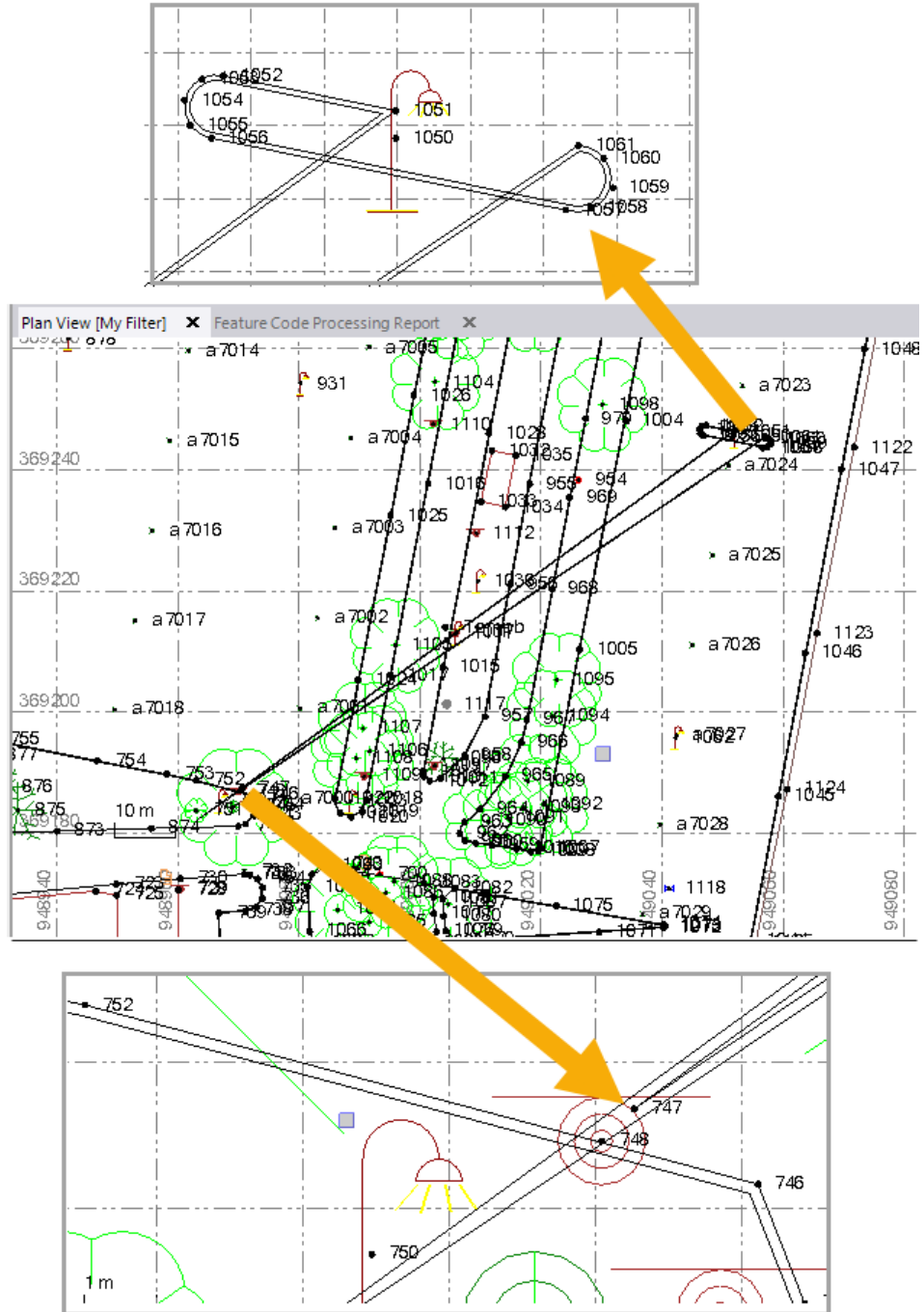
Step 7. View processed features

This is a linestring created from line feature codes during processing. The **Properties** pane for the linestring displays showing the feature name and any feature attributes.



On closer examination of the **Plan View**, you can see what appears to be an error in coding for point 747.

Step 7. View processed features

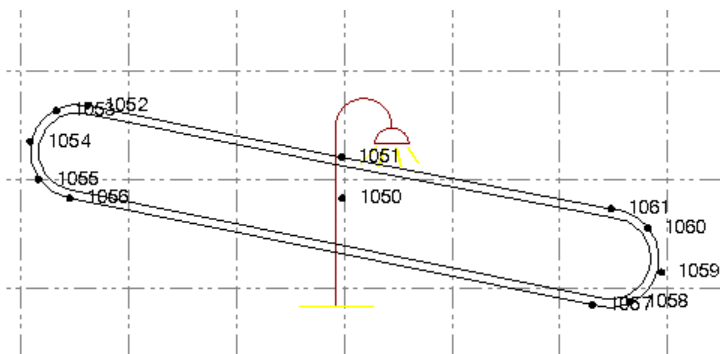
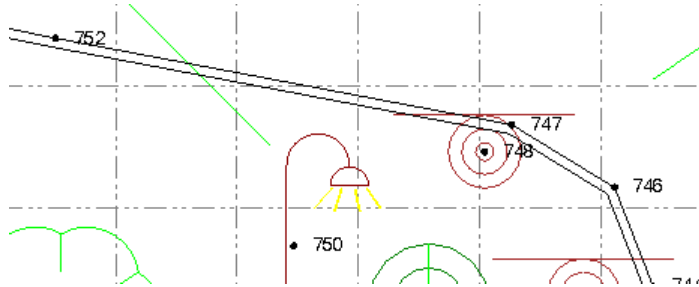


If you view the **Properties** pane for point 747, you can see that it is feature coded *gutl* for *gutter left*. However, if you view the **Properties** pane for the line feature points that precede and follow it (746 and 752), you can see that their codes include the numeric instance identifier 1 following the *gutl* code: *gutl1*.

Step 7. View processed features

If you view the **Properties** pane for points *1051* and *1061* (upper close-up), you can see that they both are coded *gutl*, just like point *747*. (Point *1061* also includes a non-processed description string.) Because *747*, *1051*, and *1061* share the same *gutl* feature code, the resulting line connects them; when, in fact *747* should be connected to *746* and *752*.

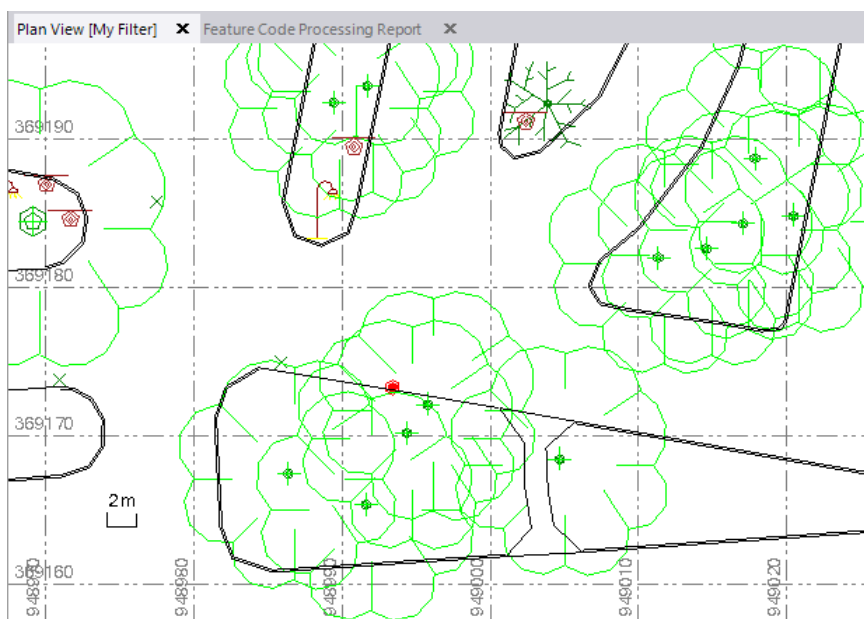
- To fix this problem, use the **Properties** pane to change the feature code for point 747 from *gut1* to *gut11*. Then re-process the feature codes.



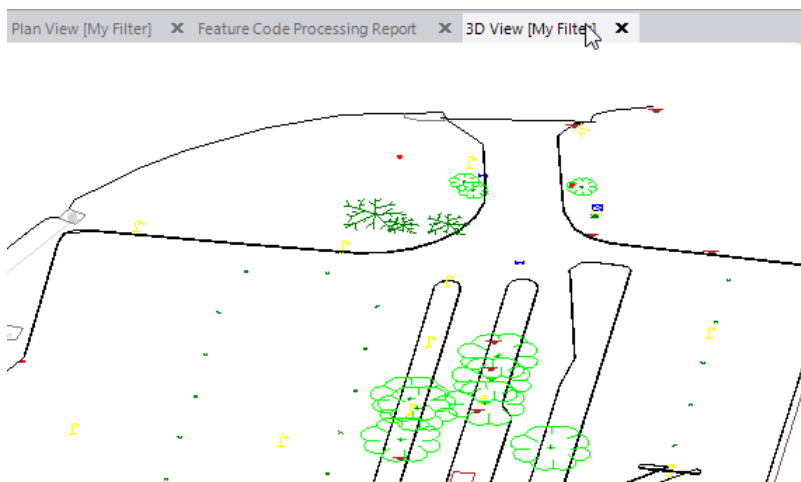
You can also view the features in your project in 3D. But before you do, you will apply additional filters to your view to make the features easier to see.

- In the **View Filter Manager** pane:
 - In the **Raw Data** list, uncheck **Media Folder**.
 - In the **Layers** list, uncheck **Points**.
 - On the **Point** tab, uncheck **Show point IDs**.
 - On the **Point** tab, check **Show feature symbol only**.

Step 7. View processed features



9. In the **TBC** ribbon, select **Home > View > 3D View**. Then use your mouse wheel to zoom in as shown here.

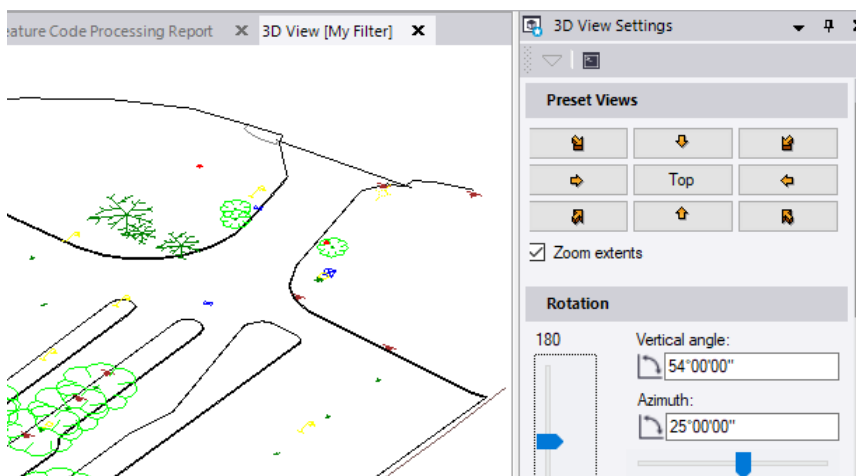


10. In the **TBC** ribbon, select **Home > Views > 3D View > 3D View Settings**.

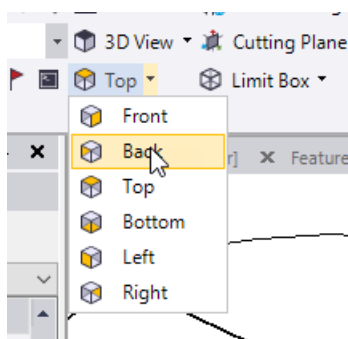
The **3D View Settings** pane displays. You can use the controls in this pane to change the 3D view of the features.

- a. In the **Vertical angle** field, enter $54^{\circ}00'00''$.
- b. In the **Azimuth** field, enter $25^{\circ}00'00''$.

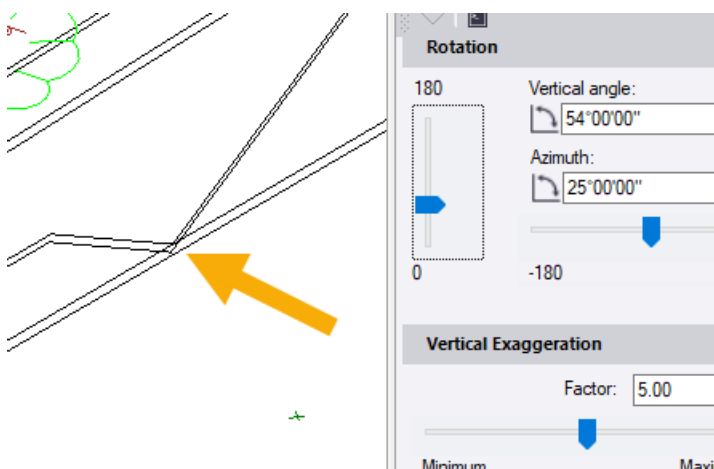
Step 7. View processed features



You can also click any of the **Preset Views** buttons in the **3D View Settings** command pane or on the ribbon.



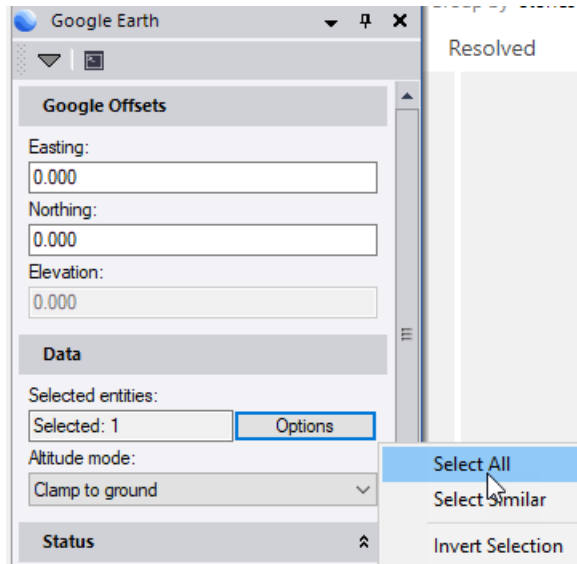
Note that by setting the **Vertical Exaggeration** factor to approximately 5 (experiment by sliding the control right and left), you can spot the elevation bust on a curb.



11. To view the feature data in Google Earth Pro, do the following:

Note: It is recommended that you use the Google Earth Pro desktop application to view data from TBC due to its extensive feature set when compared to the browser-based Google Earth application.

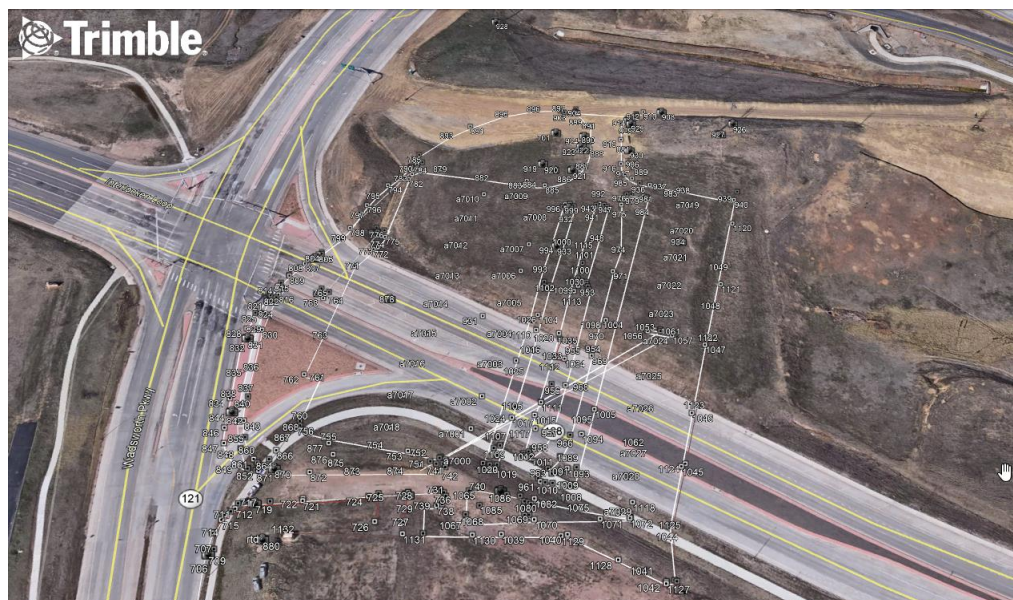
- In the **TBC** ribbon, select **Home > View > Google Earth**.
- In the **Google Earth** pane, click the **Options** button and select **Select All**.



Do not change the other default settings.

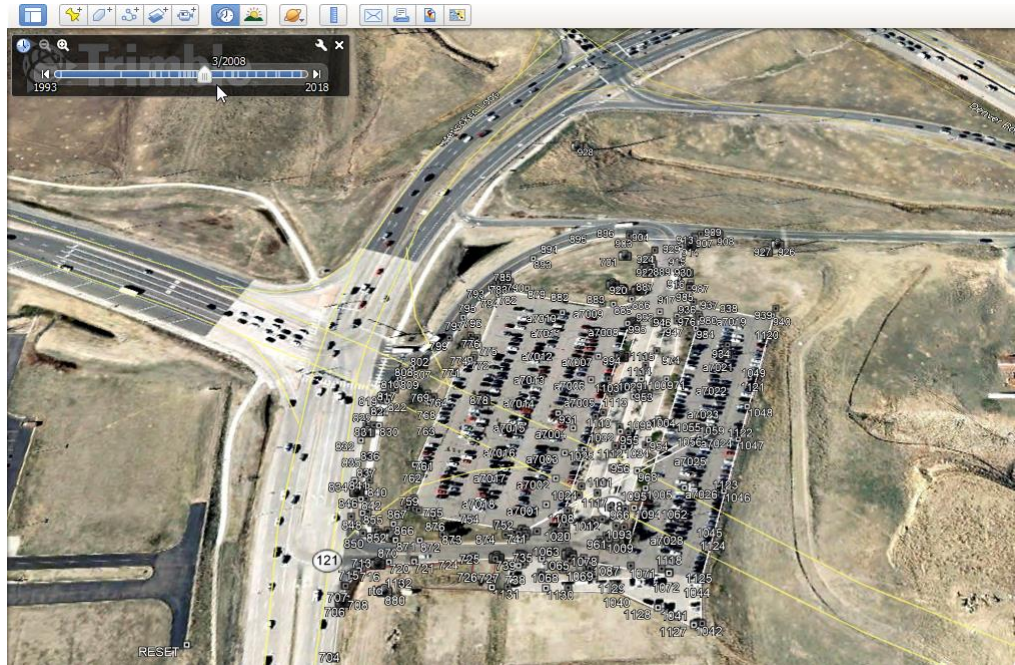
- Click the **Apply** button.

If the Google Earth Pro desktop application is installed, it automatically opens and points, feature lines, and camera icons are displayed. You can click any camera icon to display the associated image.



Step 8. Export as a CAD drawing

Note that the features extend across a roadway that did not exist when the survey was performed. Using Google Earth Pro's **Historical Imagery** view option, change the date to 3/2008 to see the parking lot that was originally surveyed.

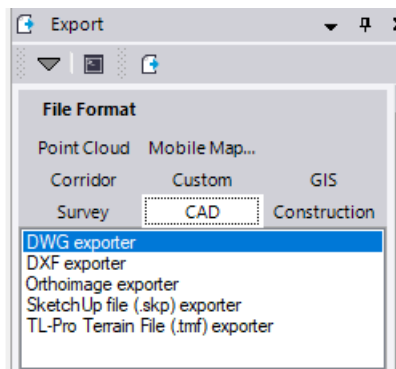


Next, you will export the processed feature data as a CAD drawing file.

Step 8. Export as a CAD drawing

In the **TBC** ribbon, select **Home > Data Exchange > Export**.

1. In the **Export** pane, select the **CAD** tab.



2. On the **CAD** tab, select **DWG exporter** in the list at the top of the tab.
3. In the **Data** section, click the **Options** button and select **Select All**.
4. Click the **Export** button to create the CAD drawing (.dwg) file and save it to your project folder.

This completes the tutorial.