Importing Digital Level Data

TRIMBLE BUSINESS CENTER TUTORIAL

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About this tutorial

In this tutorial, you will import two data files captured with a Trimble DiNi level into a project that already contains GNSS data.

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

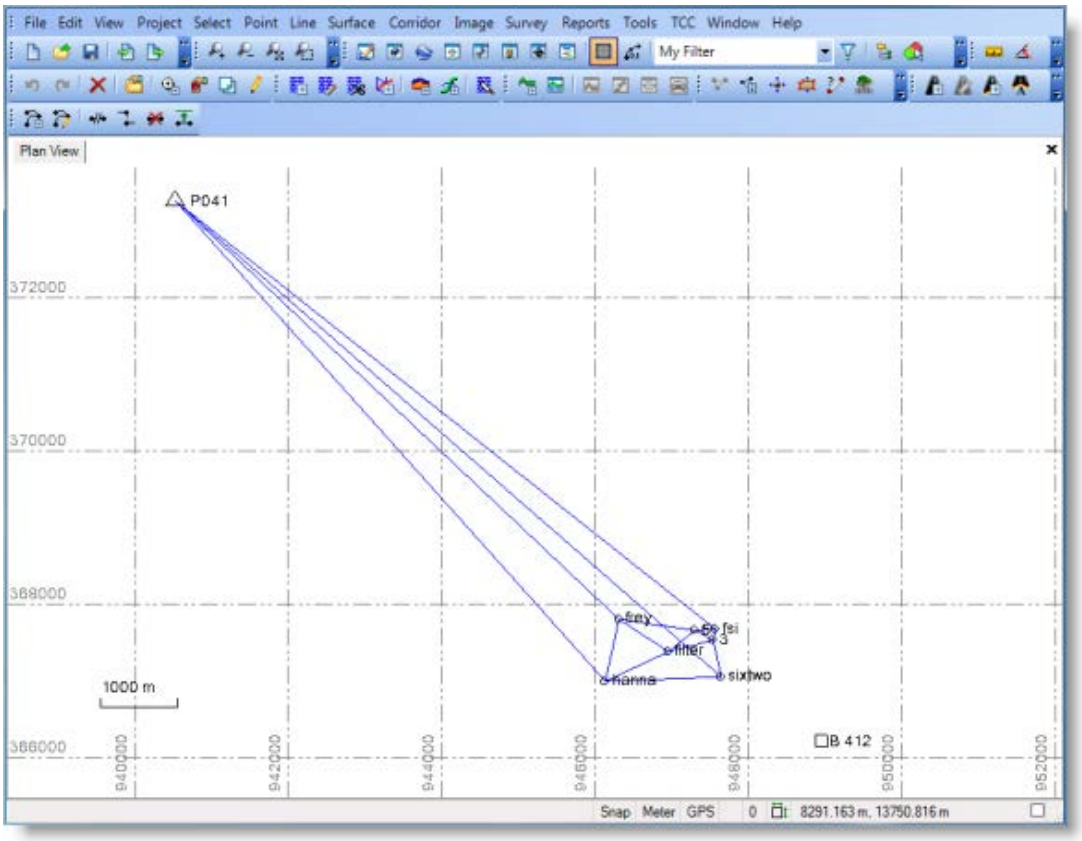
Step 1. Open the project

For this tutorial, you will use the project file *Importing Digital Level Data.vce*. GNSS data has already been imported into the project, and GNSS baselines have been processed.

1. On the **Trimble Business Center** menu bar, select **File > Open Project**. Or, click the **Open Project** icon on the toolbar.
2. In the **Open File** dialog, browse to ***C:\Trimble Tutorials\TBC\Projects\Importing Digital Level Data.vce*** and click **Open**.

   If you installed the tutorial to a location other than the default location shown here, browse to that location.

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



Note: This figure shows the **Plan View** with a white background. Your background may be black. If you want to change it to white, select **Tools > Options** and select **Background color: White** in the **Options** dialog.

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 by selecting **File > Save Project As** and saving it to ***..\My Documents\Trimble Business Center***, which is the typical location for storing project files on your computer. Then, you can re-open the project to continue the tutorial at a later time.

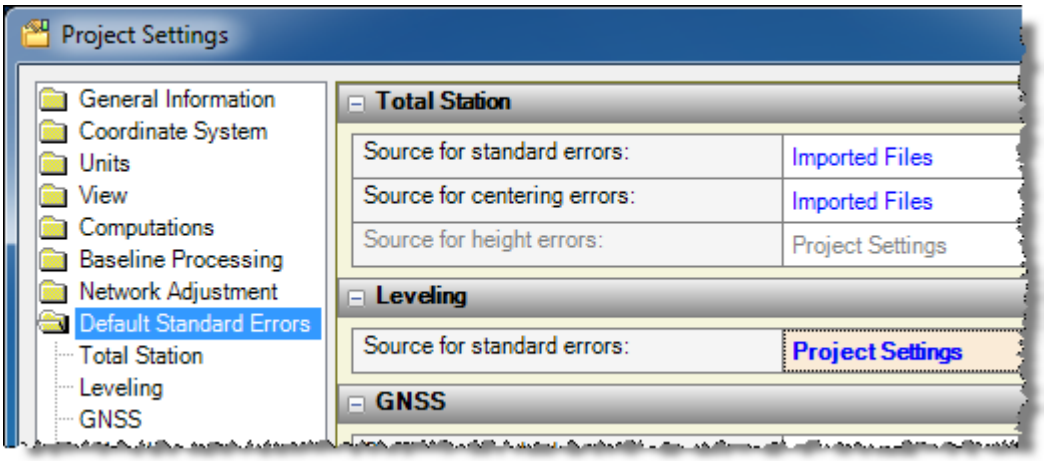
Before you import digital level data into your project, you will select a default standard error to use for the data.

Note: You can change the default standard error for a project at any time. However, to apply the changes, you must open and close the **Level Editor** dialog as described later in this tutorial.

Step 2. Select a default standard error

In this step, you will select to use default standard errors in your project, and verify the default value to be used to calculate the standard error applied to observations in the **Level Editor**.

1. Select **Project > Project Settings**. Or, click the **Project Settings** icon on the toolbar.
2. In the navigation (left) pane in the **Project Settings** dialog, select **Default Standard Errors**.
3. In the **Leveling** section, select **Project Settings** in the **Source for standard errors** drop-down list.

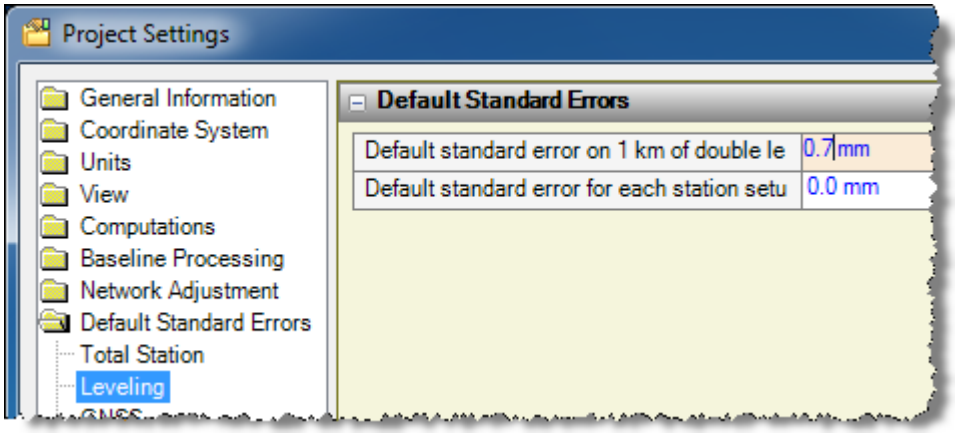


This ensures that the standard error value you specify in **Project Settings** (as described in the next two steps) is used to calculate the standard error applied to observations in the **Level Editor.**

Note: As an alternative, you could select to use a standard error value specified in the data file and displayed in an editable field in the **Level Editor** dialog during import. This would be helpful if, for example, you were importing level data from multiple DiNi instruments with differing accuracies and you wanted to edit the standard error for each during import. But, for this tutorial, you will use the **Project Settings** value.

4. In the navigation pane in the **Project Settings** dialog, select **Default Standard Errors > Leveling**.
5. In the **Default standard error on 1 km of double leveling** field, enter *0.7 mm*.

   Ensure that the **Default standard error for each station setup** field contains the value *0.0 mm*. If values are specified in both fields, the standard errors for leveling will use the combination of these two values to calculate the standard errors for the observations.



6. Click **OK**.

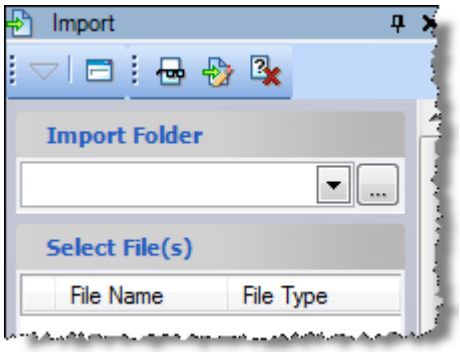
You are done changing project settings and are now ready to import digital level data into your project.

Step 3. Import the first digital level data file

For this tutorial, you will import two digital level data files. For the first data file, which contains multiple level runs, you will merge runs, rename and deselect points, and adjust the runs before importing. For the second data set, which contains a single level run, you will import the data without adjusting it.

1. Select **File > Import.** Or, click the **Import** icon on the toolbar.

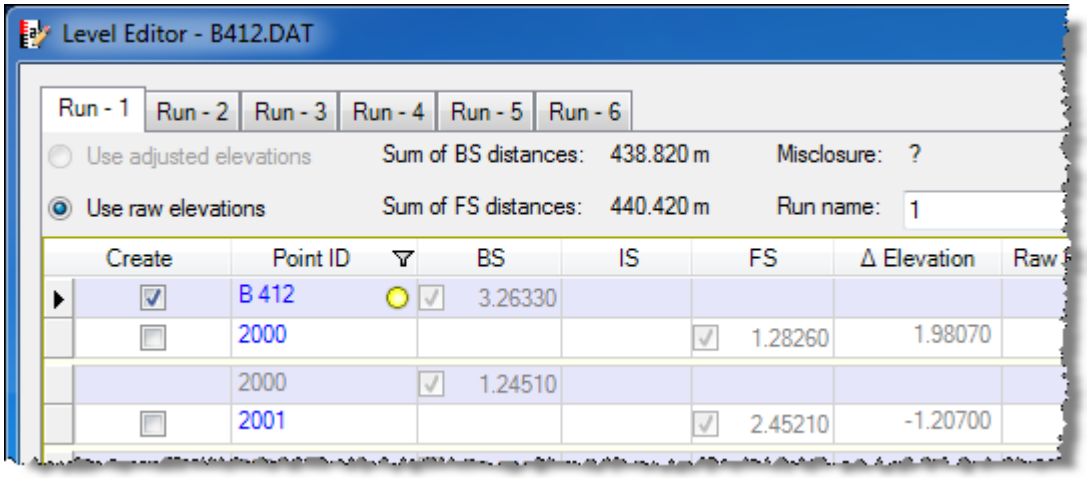
The **Import** pane opens in the right side of the **Trimble Business Center** window.



2. In the **Import** pane, click the **Browse** button .
3. In the **Browse For Folder** dialog, browse to ***C:\Trimble Tutorials\TBC\Data\Importing Digital Level Data*** and click **OK**.

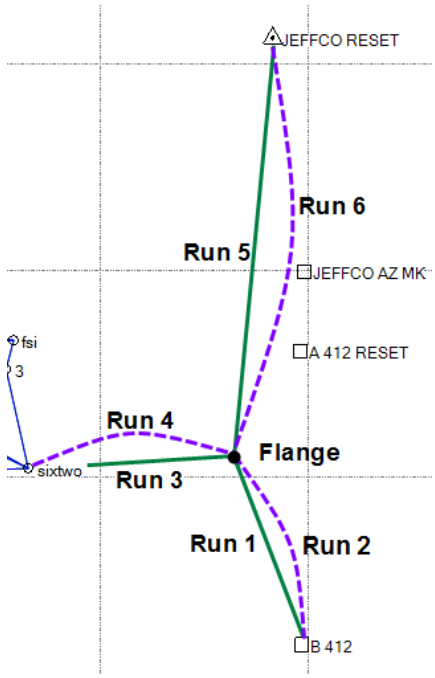
   The content of the *Importing Digital Level Data* folder displays in the **Select File(s)** list in the **Import** pane.
4. In the **Select File(s)** list, select *B412.DAT* and click the **Import** button.

   The **Level Editor** dialog displays.



This dialog allows you to review the level data you are importing and make changes as necessary. The sum of the *BS* and *FS* distances are displayed so you can verify observation distance balancing is met.

The imported level data file includes data for six separate level runs that make up three double runs. In the sketch below you can see how the runs are connected.

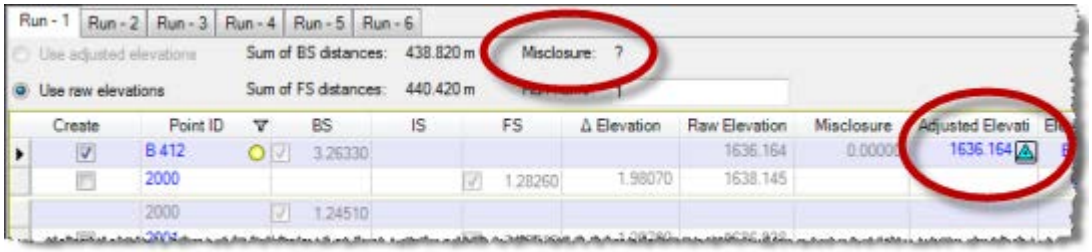


Your first step is to merge level runs so the **Level Editor** can calculate misclosures.

Step 4. Merge level runs

In the *B412.dat* file, point *B412* is the only point that has a control elevation entered (see the figure below).

For the **Level Editor** to calculate misclosures, a run must begin and end on the same point, or begin and end on two control point elevations. These level runs either begin or end on a benchmark, or they begin or end on unknown points. In all of these cases, no misclosures are calculated for the runs.

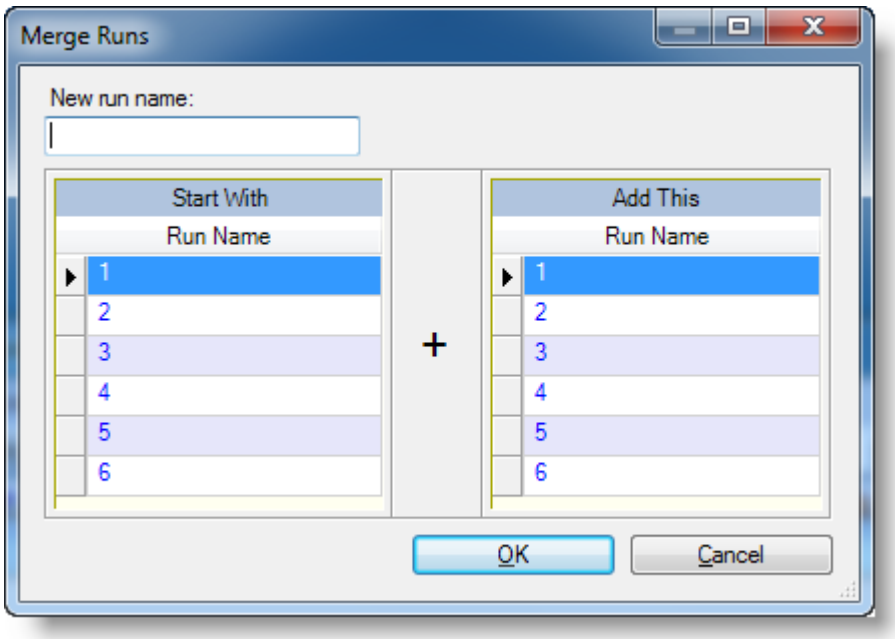


Note: It would be acceptable to import level data into the project without merging level runs or without misclosures. All the data would be combined to reflect the survey as it was ran. You could also perform a least-squares adjustment in the **Level Editor** without merging the runs. However, combining level runs provides a good quality check of the data and helps discover errors and blunders.

For this tutorial, you will use the **Level Editor** to merge level runs. Note that for two level runs to be merged, the ending point of the first run must be the first point in the second run.

1. In the **Level Editor** dialog, click the **Merge Runs** button located in the lower-right corner of the dialog.

   The **Merge Runs** dialog displays.



2. To merge runs, do the following:

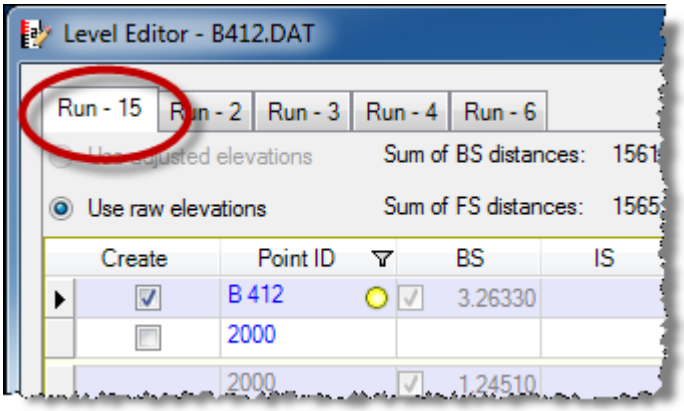
   a. In the **New run name** field, enter *15*.

   b. In the **Start With Run Name** list, select *1*, which ends with point *flange*.

   c. In the **Add This Run Name** list, select *5*, which starts with point *flange*.

   d. Click **OK.**

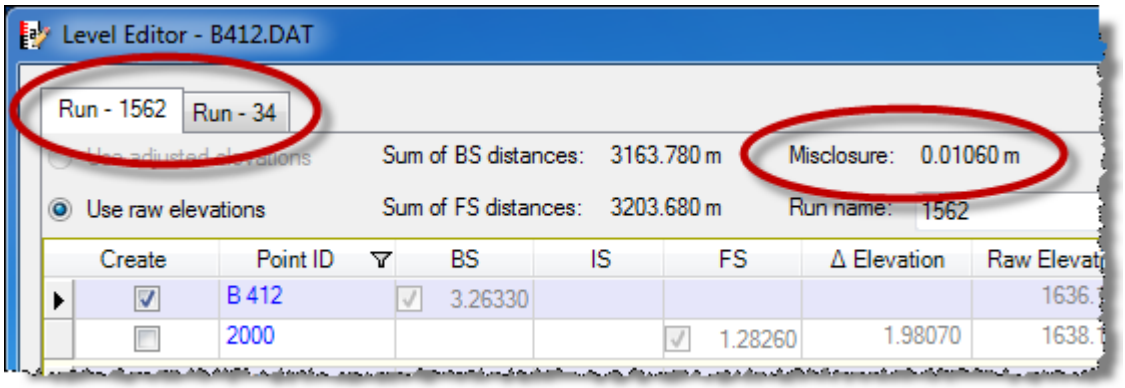
   The **Run** tabs in the **Level Editor** dialog show how runs *1* and *5* have been merged into a new run *15.*



Note: In the **Level Editor** dialog, you can click the **Reset** button located in the lower-right area of the dialog to undo any changes made to the file during the editing session. However, once you make changes and click **OK**, those changes are saved, including merged runs. If you re-open the **Level Editor** dialog for this file after import, clicking the **Reset** button will not undo the changes made in the previous editing session. If mistakes were made during the previous editing session, you can delete the file from the **Project Explorer > Imported files** area, then re-import the file.

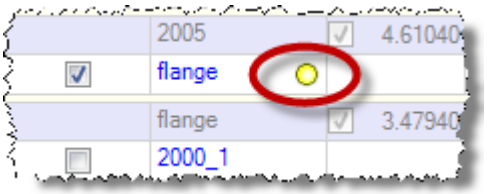
3. Repeat the merge procedure to merge runs as follows:
   a. Merge runs *6* and *2* into a new run *62*.
   b. Merge runs *15* and *62* into a new run *1562*.
   c. Merge runs *3* and *4* into a new run *34.*

   A misclosure is displayed for each merged run, allowing you to determine if the runs have met their requirements.

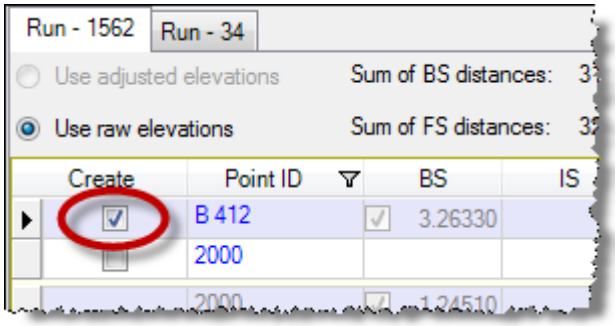


Step 5. Rename and deselect points

In *Run 1562* you can see points with a yellow dot next to the point ID. This indicates that the point is used in other runs within this file.



The **Level Editor** searches the file to find points that were named automatically by the Trimble DiNi level and the points that were uniquely named by the surveyor. This is why some points are checked to be created in **Trimble Business Center** and some are not.



If one of these DiNi-named points or a point that is similar to the DiNi naming convention is actually meant to be created, you can select the box next to the **Point ID** to create the point in the project.

In this file, some of the point IDs need to be renamed due to the number of characters in the point ID allowed by the DiNi. In these cases, the points need to be renamed to match points already in the project.

1. Select the *Run 1562* tab and change the point IDs for each of the following points by clicking in the **Point ID** field and typing the new name:
   - Change *jeffcoaz* to *jeffco az mk*.

     Since this point has other observations in this run, a message displays asking whether or not to rename all of the observations. Select **Yes**.
   - Change *jeffco r* to *jeffco reset.*

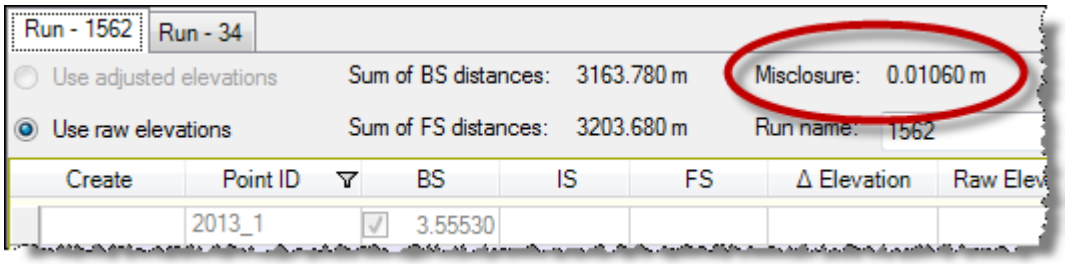
     Since this point is observed again only as the backsight for the next setup, no message displays asking whether or not to rename all of the observations.
   - Change *A412 res* to *A 412 reset.*

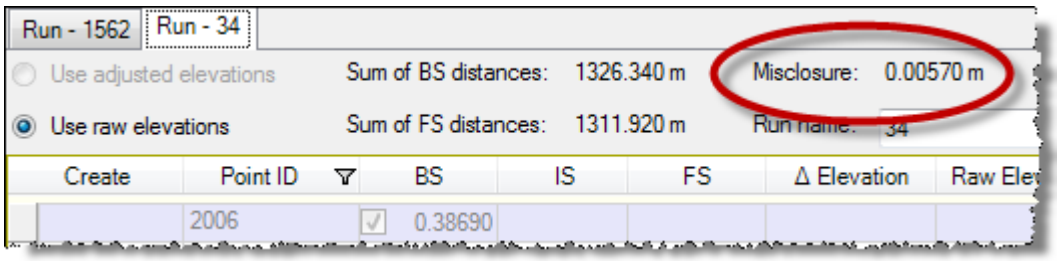
   In *Run 34* there are several points selected to be created in the project that do not need to be created. You can de-select them, as explained in the next step.
2. Select the *Run 34* tab and deselect the following points in the **Create** column:
   - *HYD1*
   - *thing*
   - *HYD2*
   - *HYD3*

You are now ready to adjust level runs and import the data.

Step 6. Adjust level runs and import the data

Note that misclosures for *Run 1562* and *Run 34* have been calculated.

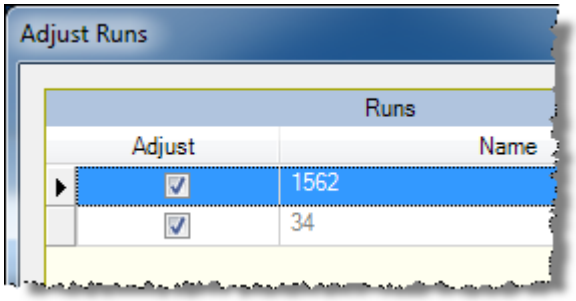




You could import this data using the raw elevations, and then use the **Adjust Network** command in **Trimble Business Center** to adjust the errors in the data. But, for this tutorial you will be using the DiNi established points as vertical control points for a network adjustment, so you need to adjust the runs in the **Level Editor**.

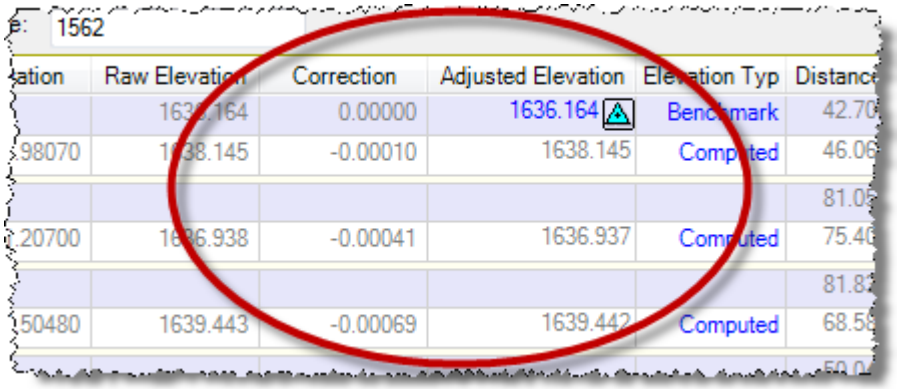
1. Click the **Adjust Runs** button located in the lower-right area of the dialog.

   The **Adjust Runs** dialog displays. By default, both runs are selected to be adjusted.



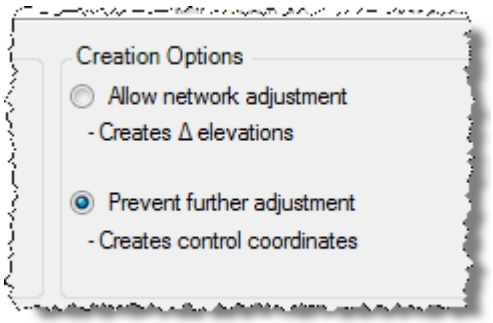
2. Click **OK**.

A least-squares adjustment is performed on the data. The correction and adjusted elevation displays for each point in the **Level Editor** dialog.



You can now use these adjusted elevations when you perform a network adjustment to adjust the other data in the project.

3. In the **Creation Options** box in the lower area of the **Level Editor** dialog, select the **Prevent further adjustment** option.

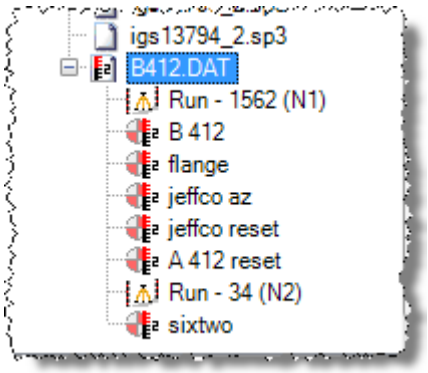


This will cause each point to be created with a Control quality elevation. Only the Control quality elevation will be imported; the observation will not. For the network adjustment, these points will be in the **Fixed Coordinates** list, eligible to be used as fixed points.

If you had selected the **Allow network adjustment** option, each point would be created with Survey quality and the accumulated delta elevation observations between the points would be created.

4. Click **OK** to import the adjusted level data into your-project.
5. To view the newly imported digital level data in the **Project Explorer**.
   a. Select **View > Project Explorer**.
   b. In the **Project Explorer,** click the plus symbol preceding **Imported Files.**

c. Scroll down to *B412.DAT,* right-click the file name, and select **Expand** in the context menu.



You are now ready to import the second digital level data file required for this project.

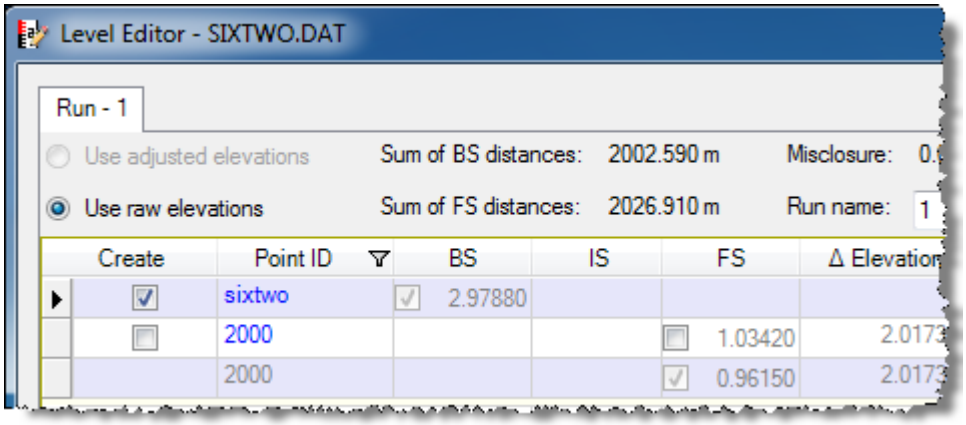
Step 7. Import the second digital level data file

For this step, you will import a level data file with only one level run. It is a loop starting on point *sixtwo* The surveyor assumed an elevation of 100.000 when he started the run. Point *sixtwo* was one of the control points established by the *B412.DAT* level data. Because the points in those runs were stored as control points, you can use those elevations to establish elevations in this run. The point must have an elevation with Control quality to be selectable here.

In "Step 3. Import the first digital level data file," you imported data using the **Import** command. For this step, you are going to use a different method for importing data: drag-and-drop.

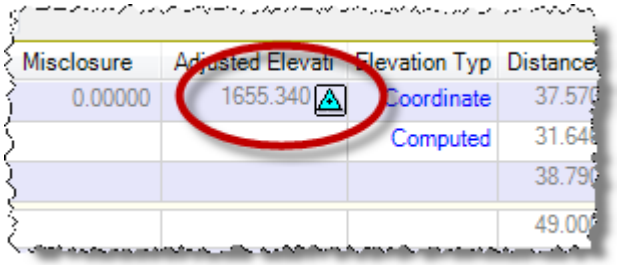
1. In Windows, select **Start > (My) Computer** and browse to ***C:\Trimble Tutorials\TBC\Data\Importing Digital Level Data***.
2. In the *Digital Level Data* folder, click and drag the *SIXTWO.DAT* file onto the **Plan View** in the **Trimble Business Center** window.

   The **Level Editor** dialog displays.



3. In the **Elevation Type** field for point *sixtwo*, select **Coordinate** in the drop-down list and click off the field.

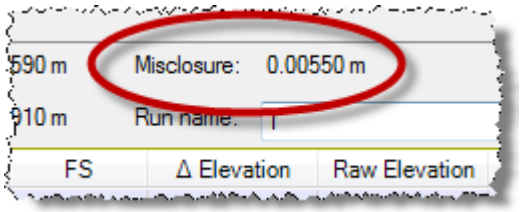
The **Level Editor** reads the elevation of point *sixtwo* from the project and enters it in the **Adjusted Elevation** field.



This loop runs through several points in your project: *sixtwo*, *hanna*, and *filter*. However, there are several other points in the run that do not need to be created.

4. In the **Create** column, deselect all points except for *sixtwo*, *hanna*, and *filter*.

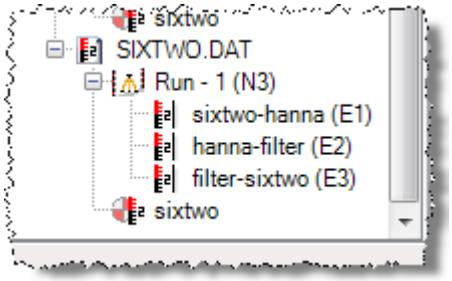
   Since this is a loop level run, the **Level Editor** has calculated a misclosure of *0.00550m*.



   You could adjust this run to correct for this error as you did with the *B412.DAT* file. But instead, you will import the data without an adjustment. The data will be adjusted later as part of a network adjustment.

5. Click **OK** to import the second data file into your project.

   The newly imported digital level data displays in the **Project Explorer.**



   You are done importing digital level data into your project.

6. Select **File > Close Project**.

   The **Save Changes** dialog displays. If you saved the project to a new location or with a new name, you can click **Yes**. Otherwise, click **No**.