

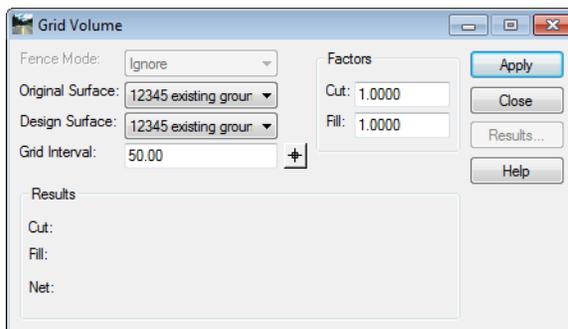
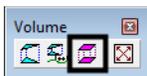
# Workflow IR 10 - Calculate Volume

This document guides you through three methods to calculate volume: Grid, Triangle, and End Area.

## Calculating Grid Volumes

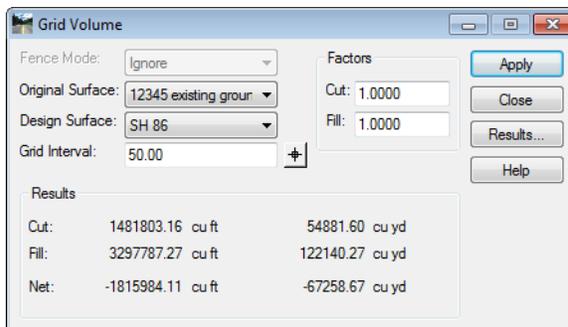
Calculate the volume between the existing surface and the proposed surface using the grid volume method.

1. Select **Tools > Customize > [Toolbars]** and check on **Volume**. <D> **Close** to dismiss the **Customize** dialog.
2. Select the **Grid Volume** command.



- ◆ Select the desired **Original Surface**.
- ◆ Select the desired **Design Surface**.
- ◆ Enter the **Grid Interval**. Ideally, this should be equal to or a factor of the template drop interval or the interval at which data was collected.
- ◆ Set the desired the **Cut Factor** and **Fill Factor**.

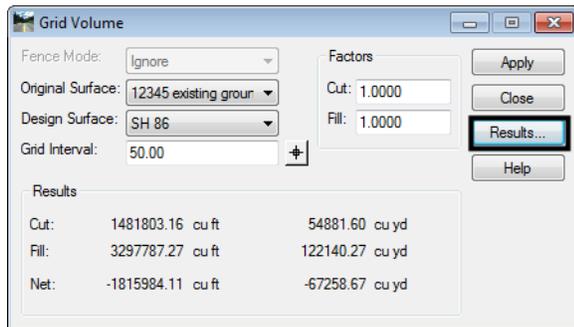
3. <D> **Apply**.



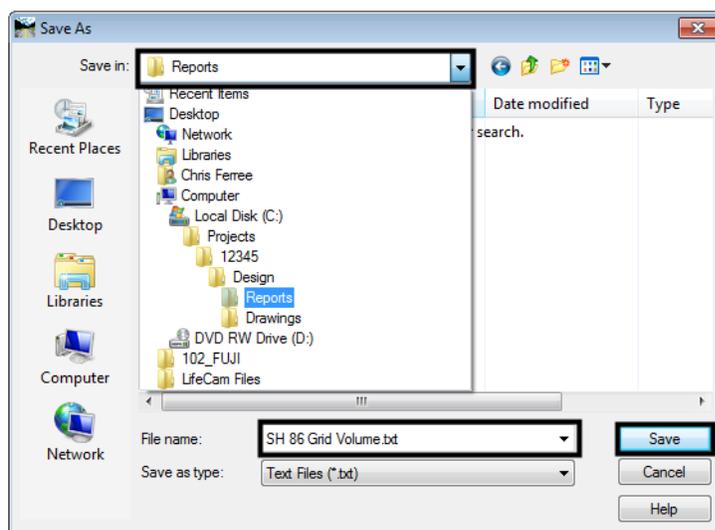
4. Record the results.

If you would like an electronic copy of the Grid Volume:

5. <D> the **Results** button. This displays the Results dialog box with the volume data.



6. In the **Results** dialog box, <D> the **Save As** button.
7. Navigate to the desired folder, enter a **File name**, then <D> **Save** to create the report file.

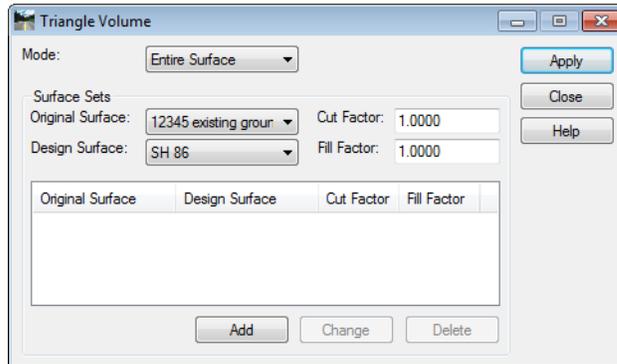
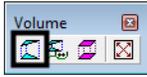


8. <D> **Close** to dismiss the **Results** dialog box.
9. <D> **Close** to dismiss the **Grid Volume** command.

## Calculating Triangle Volumes

Calculate the volume between the existing surface and the proposed surface using the triangle volume method.

1. From the **Volumes** toolbar select the **Triangle Volume**.



- ◆ Set the **Mode** to **Entire Surface**.
  - ◆ Select the desired **Original Surface**.
  - ◆ Select the desired **Design Surface**.
  - ◆ Set the **Cut Factor** and **Fill Factor** as required for the project.
2. <D> the **ADD** button.
  3. <D> **Apply**.

This method will take longer to process than the grid method.

4. The results are displayed in the **Bentley Civil Report Browser** dialog box.
5. Use the **Triangle Volume.xls** template to review the report.

If you would like an electronic copy of the Triangle Volume:

6. Select **File > Save** from the menu bar.
7. Navigate to the desired folder, enter a **File name**, then <D> **Save** to create the report file.
8. <D> **Close** to dismiss the **Triangle Volume** command.

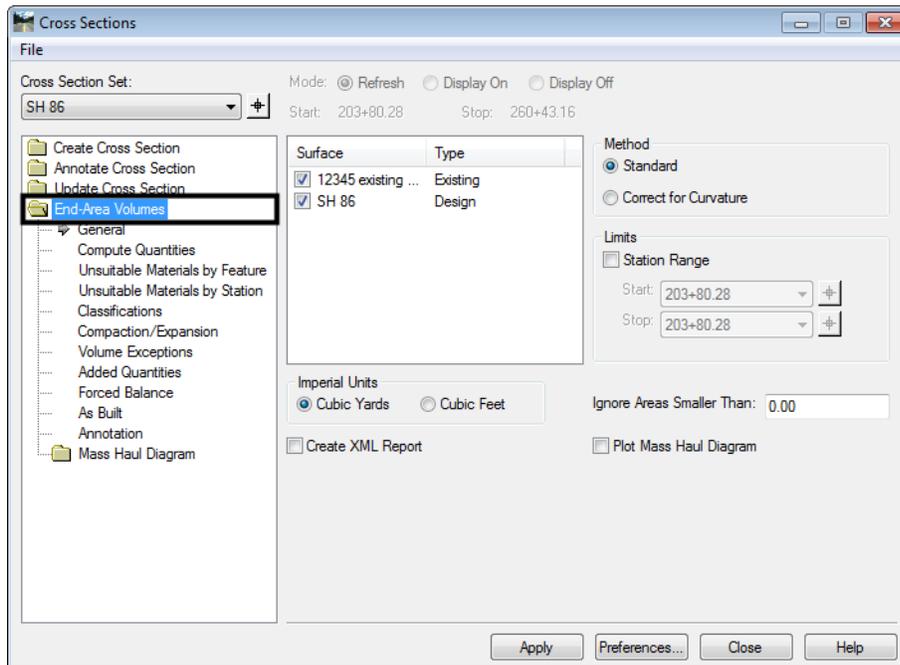
## Calculating End-Area Volumes

Calculate the volume between the existing surface and the proposed surface using the end-area volume method (CDOT standard method). With the first run, you will not take the subgrade into account.

In order to use this command, you must be in the design file where your final cross sections were cut.

1. Open the desired cross section design file.

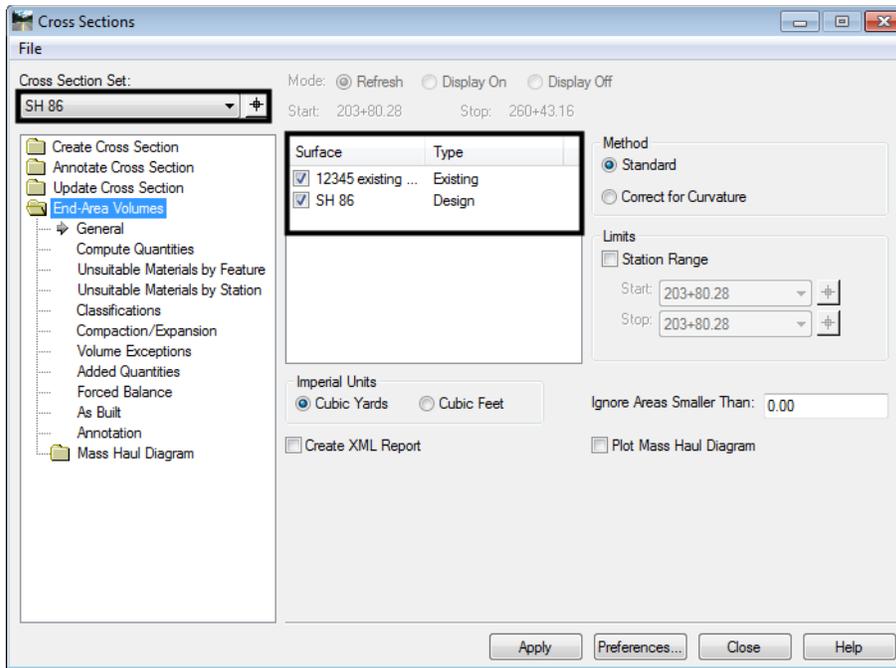
- From the **Cross Sections** dialog box, select the **End-Area Volumes** from the dialog box explorer.



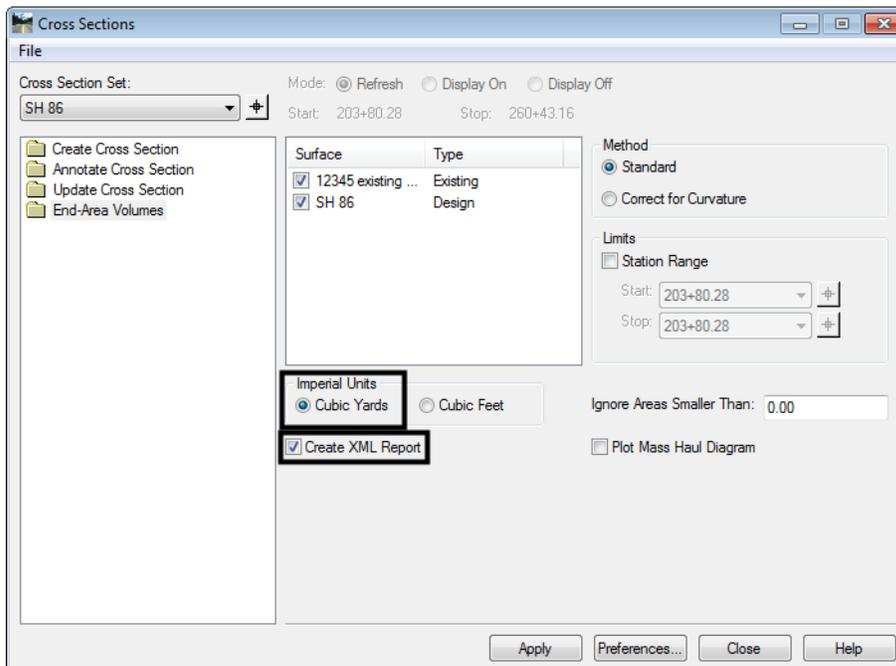
- Select the desired Cross Section Set using the drop down menu.

**Note:** End area volumes are calculated based on the cross section graphics. If the selected set does not contain sections for the full length of the project, or the design toes fall outside the cross section grid, then the volumes will not be correct for the project.

- Identify the surfaces to be compared from the Surfaces list. There must be one Existing type surface and one Design type surface.



- Set **Imperial Units** to **Cubic Yards**.
- Toggle on **Create XML Report**.



- <D> Apply.

8. The **Bentley Civil Report Browser** appears. There are several report templates that are useful. Some recommended templates to look at are:

- ◆ EndAreaVolume.xml
- ◆ EndAreaVolumePage Totals.xml
- ◆ Volumes.xls

The first two are standard end area volume reports. the Volume.xls also has the same volume data, but is formatted differently. It also contains volume information on the closed shape template components contained in the design surface.

If you would like an electronic copy of the End Area Volume:

9. Select **File > Save** from the menu bar.
  1. Navigate to the desired folder, enter a **File name**, then <D> **Save** to create the report file.
  2. **Close** the **Bentley Civil Report Browser**.