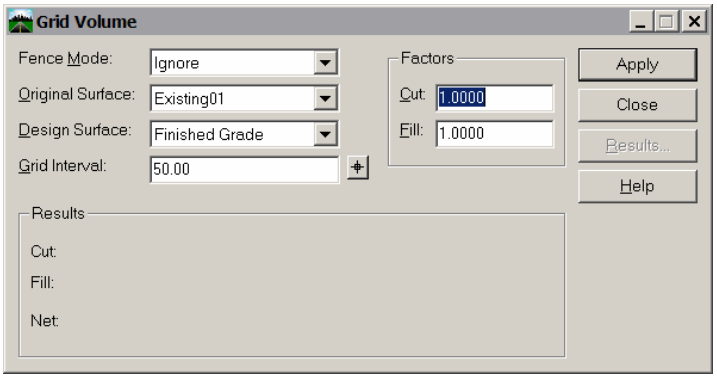
CDOT Calculate Volume

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

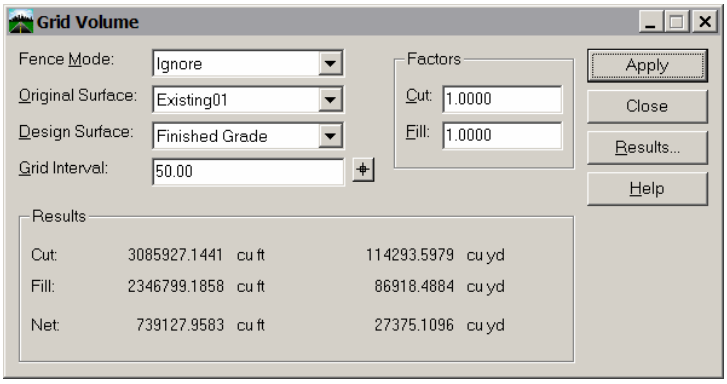
Calculating Grid Volumes

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.



   - Set the **Original Surface** to: ***Existing01.***
   - Set the **Design Surface** to: ***Finished Grade.***
   - Enter the **Grid Interval**: ***50*** then **Tab** to accept.
   - Leave the **Cut Factor** and **Fill Factor** set to ***1.0***.
3. **<D> Apply**.



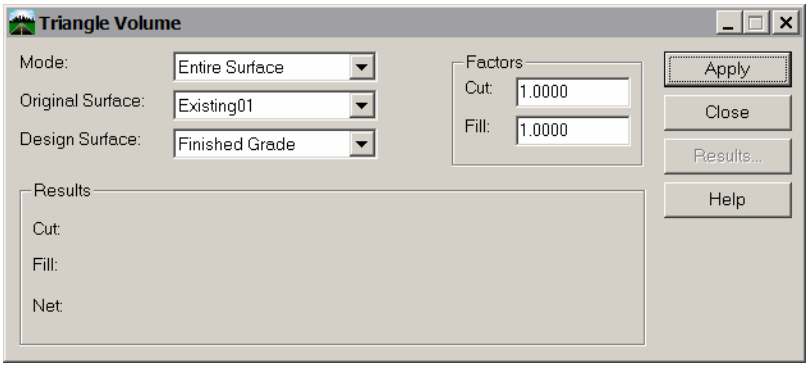
4. Record the results in the table provided.
5. Enter a **Grid Interval** of ***10*** then **Tab** to accept.

6. **<D> Apply**.
7. Record the results in the table provided.
8. Enter a **Grid Interval** of ***5*** then **Tab** to accept.
9. **<D> Apply**.
10. Record the results in the table provided.
11. **<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***.
   - Set the **Original Surface** to: ***Existing01***.
   - Set the **Design Surface** to: ***Finished Grade***.
   - Leave the **Cut Factor** and **Fill Factor** set to ***1.0***.

2. **<D> Apply**.

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

3. Record the results in the table provided.
4. **<D> Close** to dismiss the **Triangle Volume** command.

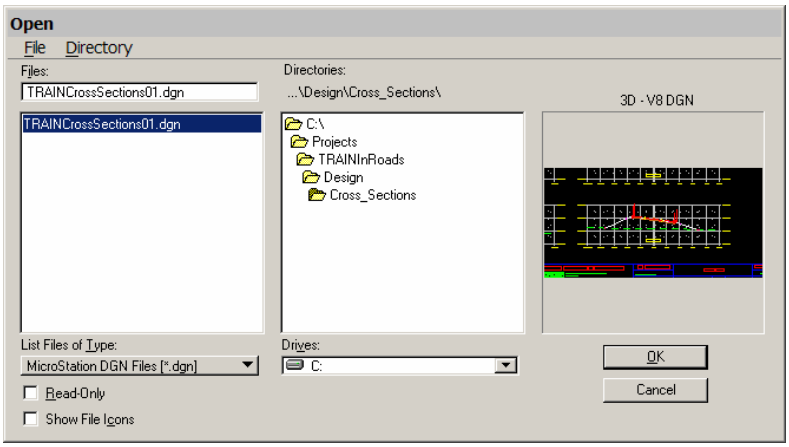
Calculating End-Area Volumes

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.

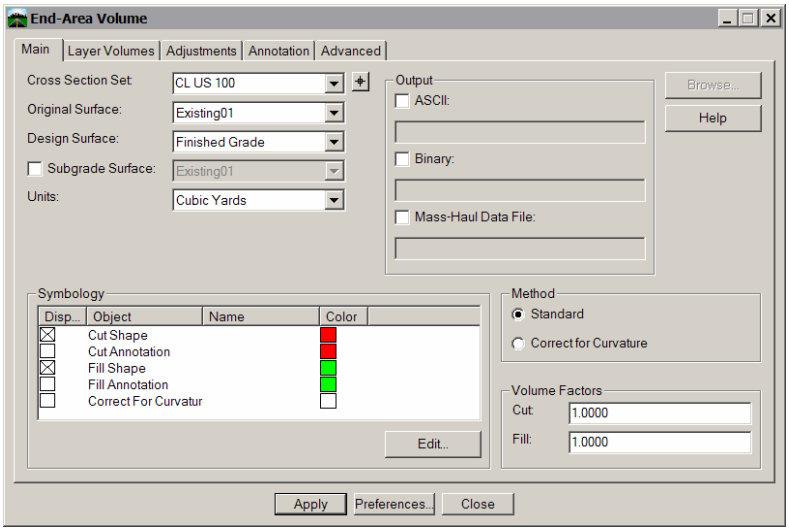
End Area without Subgrade

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

1. Select **File > Open** to open the cross section design file.



2. From the **Volumes** toolbar, select the **End-Area Volume** command.



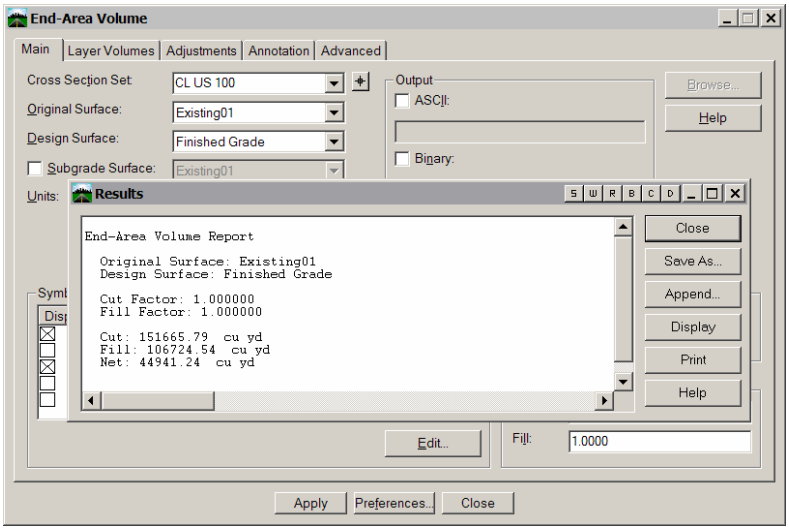
3. Define the cross sections and surfaces to be used for the volume calculations.

    - Select the ***final section*** set from the **Cross Section Set** list.

    This should be a full set of cross sections generated along the alignment. A box is drawn around the set to show which one you've picked.

    - Set the **Original Surface** to ***Existing01***.
    - Set the **Design Surface** to ***Finished Grade***.
    - Set **Units** to ***Cubic Yards***.
    - Leave the **Cut Factor** and **Fill Volume Factors** set to ***1.0***.

4. **<D> Apply**.



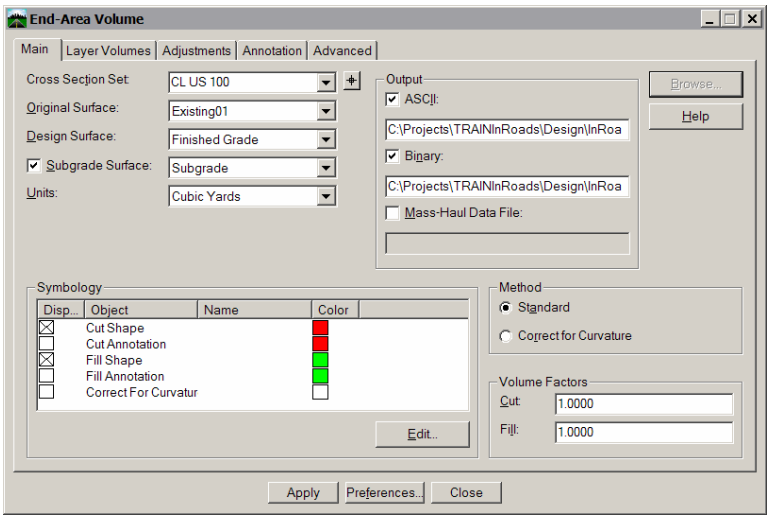
Results appear in a separate dialog box.

5. Record the results in the table provided, then **<D> Close** to dismiss the **Results** dialog.

End Area with Subgrade Considered

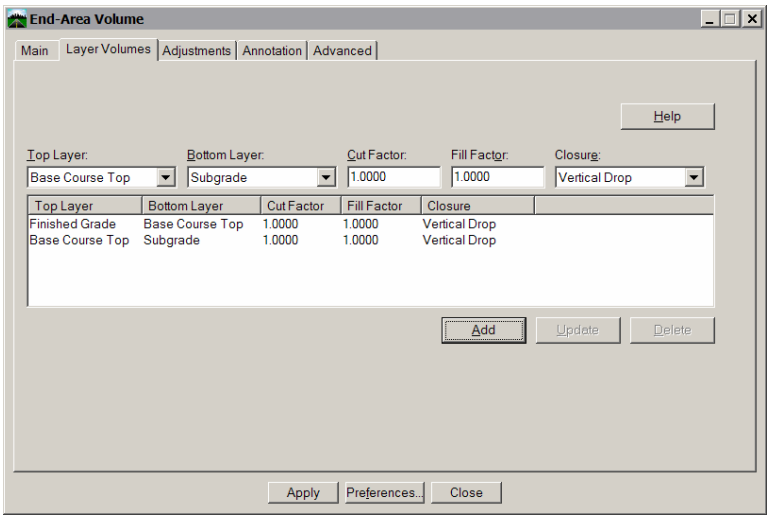
Calculate the volume between the existing surface and the proposed surface including the subgrade surface using the end-area volume method and generate an ASCII report and binary file to be formatted into an ASCII report in a later exercise. You will also calculate the additional material volumes.

6. In the **End Area** Volume dialog.



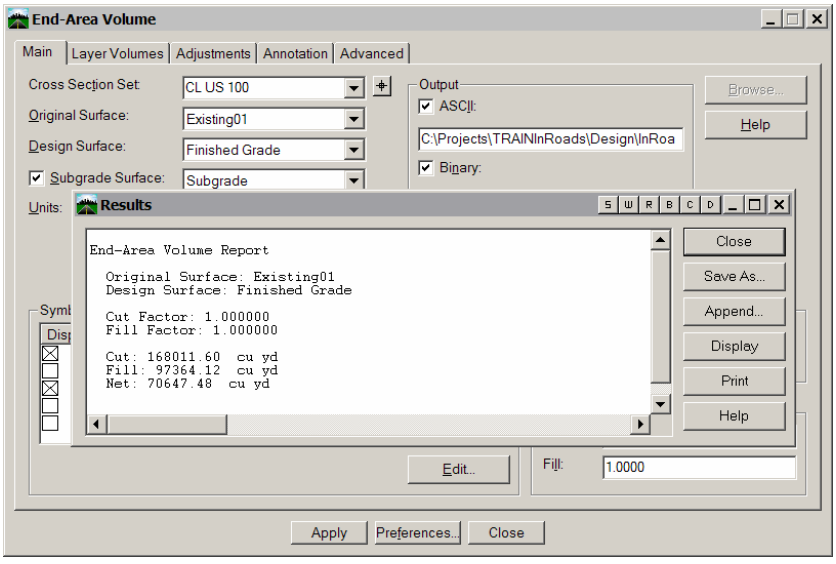
   - Toggle on **Subgrade Surface** and set to ***Subgrade***.
   - Under ***Output*** place a check in the **ASCII** checkbox.
   - In the field beneath the **ASCII** checkbox, *Navigate* and enter a file name of ***endvol.txt***.
   - Place a check in the **Binary** checkbox.
   - In the field beneath the **Binary** checkbox, *Navigate* and enter a file name of ***endvol.bin***.

7. To calculate additional sublayer volumes, select the ***Layer Volumes*** tab.



- Set the ***Top layer*** to **Finished Grade**.
- Set the ***Bottom layer*** to **Base Course Top**.
- Set the ***Closure*** to **Vertical Drop**.
- **<D> Add**.
- Set the ***Top layer*** to **Base Course Top**.
- Set the ***Bottom layer*** to **Subgrade**.
- Set the ***Closure*** to **Vertical Drop.**
- **<D> Add.**

8. Review the other tabs and make any changes you would like.
9. **<D> Apply** on the **End-Area Volume** dialog box



10. Record the results in the table provided

11. **<D> Close** to dismiss the **Results** dialog box
12. **<D> Close** to dismiss the **End-Area Volume** command

Note the difference in the volumes as the subgrade is removed from fill volumes and added to the cut volumes.