

Volumes From Two Grids

The following instructions will guide you through calculating volumes based on two grid files. Carlson modules are displayed as {**Civil-Design**}, main menus are displayed as [**Points**], and submenus and menu commands are displayed as <**Edit Points**>.

- 1) In Carlson, open the drawing that has the two grids you want to find the volume between (typically existing and final grids)
- 2) Make sure both grids are created. If not, create them.
- 3) Check to make sure an inclusion line for the calculation area is drawn. Many times this will be a "PAD" line created in the design functions. If one does not exist, create one using polylines or the Shrink Wrap Entities function.
- 4) Run the two surface volumes function: {**Civil - Design**} → [**Grading**] → <**Volumes by Grid Surface**> → <**Two Surface Volumes**>
 - a. Select the "**Inclusion Perimeter**" and press "**Enter**"
 - b. Press "**Enter**" for no exclusion perimeters
 - c. In the "**Select the Base Grid File**" dialog box that appears, navigate to and double click the existing grid file
 - d. In the "**Select the Final Grid File**" dialog box that appears, navigate to and double click the proposed grid file
- 5) The "**Volume Report Options**" box appears. The following is a summary of the commonly used options:
 - a. **Draw Difference Contours**: This will create a contour map of the difference or depth between the two grid files. Useful for visualization and error checking.
 - b. **Draw Volume in Each Cell**: This will plot the calculated volume for each grid cell and is a good way to verify the volume calculation.
 - c. **Calculate Elevation Zone Volumes**: Calculates the cut and fill between different elevation ranges.
 - d. **Draw Cut/Fill Color Map**: This will fill each grid cell with different shades based on the average cut or fill in the cell. Red shades are used for cut and blue for fill. Useful for visualization and error checking.
 - e. **Cut/Fill Swell Factors**: This value is multiplied by the cut/fill volumes in the report. Typically both are "**1.0**"
 - f. **Report Tons**: This option allows you to enter the material density and the program will report the cut and fill tons

- 6) Check the options that you want. No options are required to be checked but it is a good idea to use one of the visualization aids as a check. The following uses no options checked:
 - a. Leave cut/fill swell ratio as "**1.000**"
 - b. Press "**OK**"
- 7) The "Volume Report" displays
 - a. Save it to file by hitting the "**Save**" button
 - b. Print for your records using the "**Print**" button
- 8) Press "**Exit**" when done

Draw Difference Contours

- 9) If this option was checked, the "Contour Options" box appears after hitting "**Exit**". Select the options desired the same as when contouring.
 - a. Change the layer name (i.e. **CTR – Difference**)
 - b. Click "**OK**" once options are set
- 10) Inspect the contours

Draw Volume in Each Cell

- 11) If this option was checked, the command line asks for a series of input after hitting "**Exit**".
 - a. Number of rows to group: press "**Enter**" for 1
 - b. Number of columns to group: press "**Enter**" for 1
 - c. Enter "**F**" for cubic feet or "**Y**" for cubic yards
 - d. Enter the text height (remember, scale x 0.125)
 - e. Press "**Enter**" for 1 decimal place or change the number
 - f. Enter layer name for cut values: **DSGN – CUT**
 - g. Enter layer name for fill values: **DSGN – FILL**
 - h. Press "**Enter**" to highlight zero cut/fill values
 - i. Enter layer name for zero values: **DSGN – ZERO**
- 12) Inspect the values

Calculate Elevation Zone Volumes

- 13) If this option was checked, the command line asks for a series of input after hitting "**Exit**".
 - a. Staging Direction Up/Down: Press "**Enter**" for Up
 - b. Starting Elevation: "Press "**Enter**" for detected value or enter own
 - c. Staging Interval: Enter interval for calculations: (i.e. **0.25, 0.5, 1.0**)
- 14) The Volume by Elevation Report displays
 - a. Save, print and exit like the Volume Report above

Draw Cut/Fill Color Map:

- 15) If this option was checked, the "**Cut/Fill Color Map Options**" box appears after hitting "**Exit**". Select the options desired the same as when contouring.
 - a. Change the layer name (i.e. **DSGN – Cut/Fill**)
 - b. Click the "**Auto Set**" button for automatic interval calculations or click "**Set By Interval**" to set the interval
 - c. Uncheck "**Draw Legend**" if you do not want one
 - d. Click "**OK**" once options are set
- 16) Select a spot for the legend and click it
- 17) Enter the legend size in terms of text height
- 18) Select "**Summary**" for display
- 19) Inspect the map