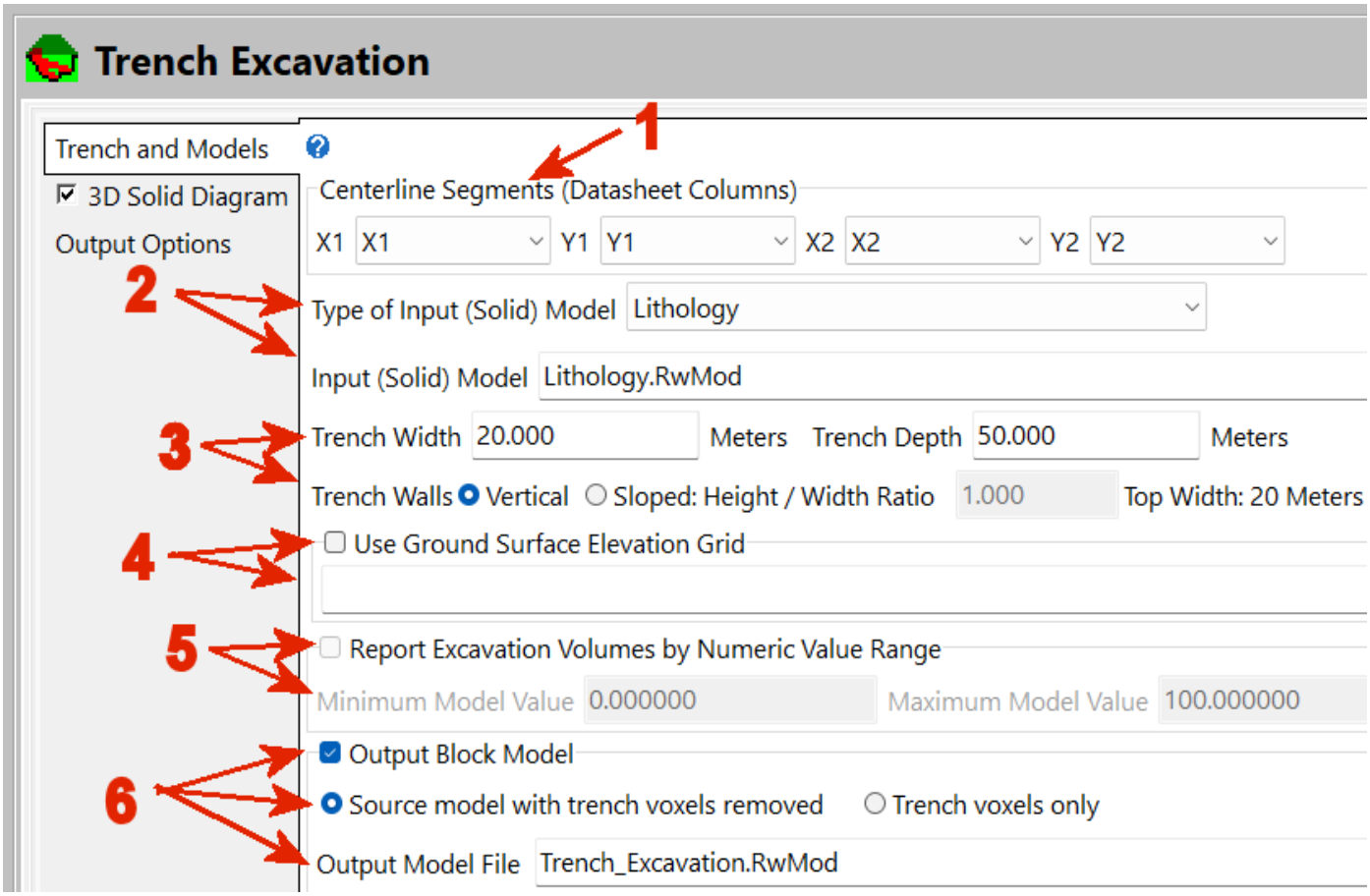
Trench Excavation: ModOps > Volume > Trench Excavation

This program estimates the volume and composition of material excavated along centerline segments defined within a Datasheet. Optionally save and display the excavated material or the model remaining after excavation. Inputs are not modified.

The numbered menu illustration corresponds to sections 1 through 6 below. The values shown are examples, not required settings.



1. Centerline Segments (Datasheet Columns)

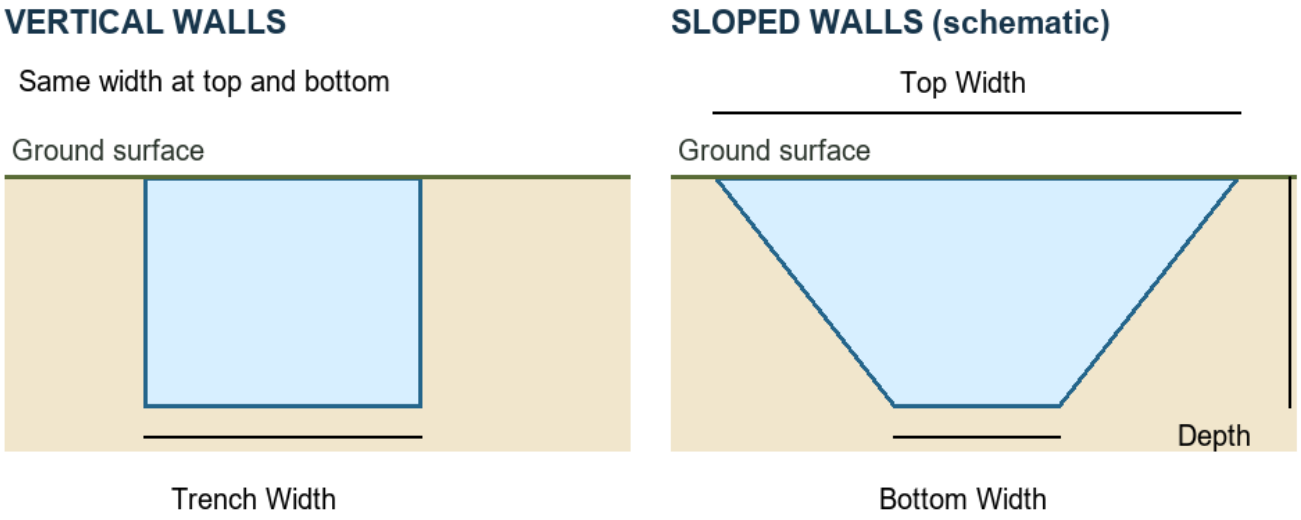
Each enabled Datasheet row defines one segment with X1, Y1, X2 and Y2 coordinates. Select those four columns in Centerline Segments. Coordinates must use the project/output coordinate system. Segments may connect, branch or cross. Their overlapping excavation volumes are counted only once. Entirely blank rows are ignored; incomplete or zero-length segments must be corrected.

2. Type of Input Model and Input Model

Select Lithology, Stratigraphy, Hydrostratigraphy or Numeric, then select one input solid model. Categorical reports use names from the corresponding current-project type table. Numeric models can represent geochemistry or other measured values. Model coordinate and elevation units must match project/output units.

3. Trench Width, Trench Depth and Trench Walls

Trench Depth is vertical depth below the selected ground surface, in the displayed project elevation units. Width uses project horizontal units. Vertical Walls is the default. For Sloped Walls, width becomes Bottom Width. Enter horizontal distance per unit vertical depth: enter 2 for 2:1, 0.5 for 0.5:1. The ratio represents horizontal widening per unit vertical depth (H:V); use that definition even if a menu caption describes the ratio differently. The same side slope is used on both sides; it is a geometry setting, not an assessment of soil stability.



Top Width = Bottom Width + 2 x Trench Depth x Side Slope, after converting depth to horizontal units. Example: bottom width 4 m, depth 3 m and slope 2:1 gives top width 16 m. Top Width updates in the menu. Ends and joins are rounded, so a simple length x cross-sectional-area calculation does not include all end volumes.

4. Use Ground Surface Elevation Grid

Check Use Ground Surface Elevation Grid to select an elevation grid. Uncheck it to use the top face of the highest non-null voxel in each source-model column. Model-derived ground is stepped. Trench depth follows the selected surface; the bottom is not a single fixed elevation. Empty columns along the trench have missing coverage. The input model must cover the full excavation footprint and depth, including sloped-wall widening.

5. Report Excavation Volumes by Numeric Value Range

For a numeric model, enable the value-range group and enter a minimum and maximum. The report summarizes volumes below, within and above that inclusive range. Undefined values are reported separately. Numeric means are volume-weighted and retain the source model value units; no density weighting or mass conversion is implied.

6. Output Block Model

Enable Output Block Model and choose Source Model with Trench Voxels Removed or Trench Voxels Only. Specify a new .RwMod filename. Original model values, dimensions and units are retained. To display the result, enable/configure 3D Solid Diagram. Configure report display, saving and export under Output Options, then click Continue. Menus and Playlists retain these settings.

Accuracy and interpretation

Reports estimate partial boundary-voxel excavation volumes using automatic geometry sampling. Output block models include or remove whole intersected voxels, so their volumes can differ from the report and their edges can appear stepped. Geometry sampling does not increase the geological resolution of the input model. Use suitably fine models for narrow trenches. Missing coverage and invalid settings are checked before replacing output.

Worked example: Samples project

Open Trench_Excavation_Test.RwDat from the Samples folder. It contains five enabled segments with bends, branches and a crossing, plus a disabled duplicate. Select X1, Y1, X2, Y2; choose Lithology and Lithology.RwMod. Start with width 10 m, depth 10 m, Vertical Walls, and model-derived ground (ground-grid checkbox off). Save to a new output filename and run. Compare Trench Voxels Only with the remaining-model option.

Next select Sloped Walls and try a 0.5:1 side slope: bottom width 10 m and depth 10 m give top width 20 m. Compare the report and shape with the vertical result. Enable the duplicate segment to confirm it does not double the excavated volume. This is a workflow/geometry example, not a known-volume benchmark. Any coverage error must be resolved before an output is produced.