

A photograph of a surveyor, Phillip R. Johnson, PE, PLS, working at a construction site. He is wearing a red jacket and a high-visibility yellow and orange safety vest. He is operating a yellow total station instrument mounted on a yellow tripod. The background shows a body of water, a tree stump, and a yellow caution tape. The text "2008 NCDOT Construction Engineer's Conference" is overlaid in blue. The text "Phillip R. Johnson, PE, PLS" and "Area Roadway Construction Engineer" is overlaid in blue. The text "Division 5 and 6" is overlaid in blue. The text "13" and "9:37 AM" is overlaid in red.

2008 NCDOT Construction Engineer's Conference

Phillip R. Johnson, PE, PLS

Area Roadway Construction Engineer

Division 5 and 6

13

9:37 AM

GPS Construction Surveys

- Where are we?
- Where do we want to be?
- How do we get there?

Where are we?

- Some RE offices use GPS daily.
- Some RE office use GPS occasionally.
- Some RE offices have never used GPS.

Where do we want to be?

- Every RE office with GPS survey capability.
- Every RE office with proper field and office software.
- Every RE office with proper training on GPS equipment.
- Every RE office with a support system (Location and Surveys) or a User Group.

How do we get there?

- New 2008 GPS survey equipment purchase.
- Training from Location and Surveys and the Construction Unit.
- Patience from RE to allow employees to learn and utilize new technology.

GPS Capabilities

- Horizontal accuracy is 0.03 (1 cm).
- Vertical accuracy is 0.10 (3cm+/-).

What types of NCDOT survey activities could a crew perform knowing these limitations?

13 1:44 PM



Survey Discussion Items

- Horizontal accuracy is good for any type survey, some discretion with structure layout.
- Vertical accuracy is not good for final pavement staking (blue-tops).

Questions?



Earthwork

- How does a Resident Engineer's office handle earthwork when Photogrammetry is not involved?
- Ask Santa?



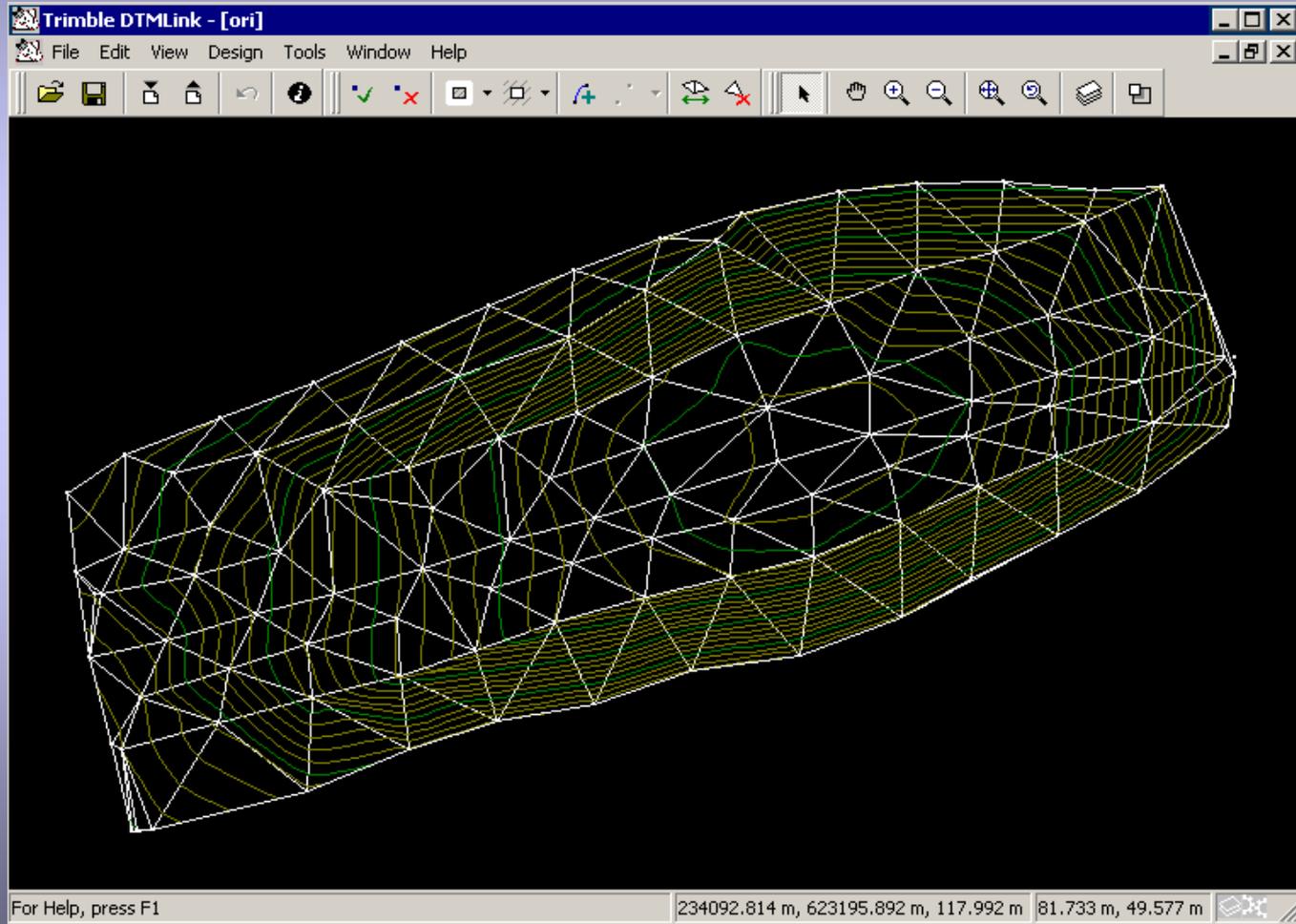
Several Options

- Average End Volume using Computation Sheets
- Trimble Geomatics Office
- Geopak

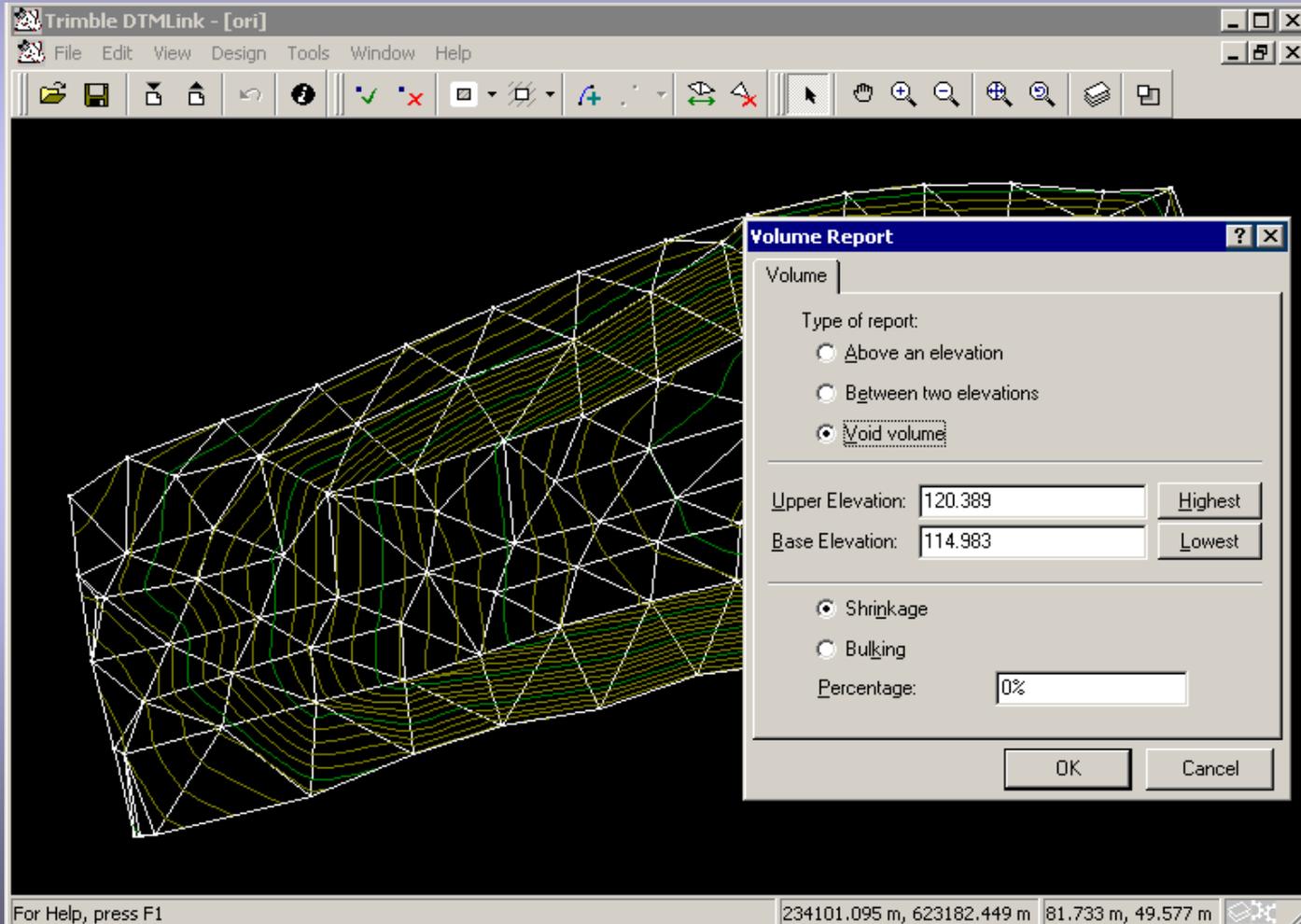
Trimble Geomatics Office

- Graphic view of surface.
- Calculate volumes for borrow or unclassified excavation.
- Generate volume report for file.

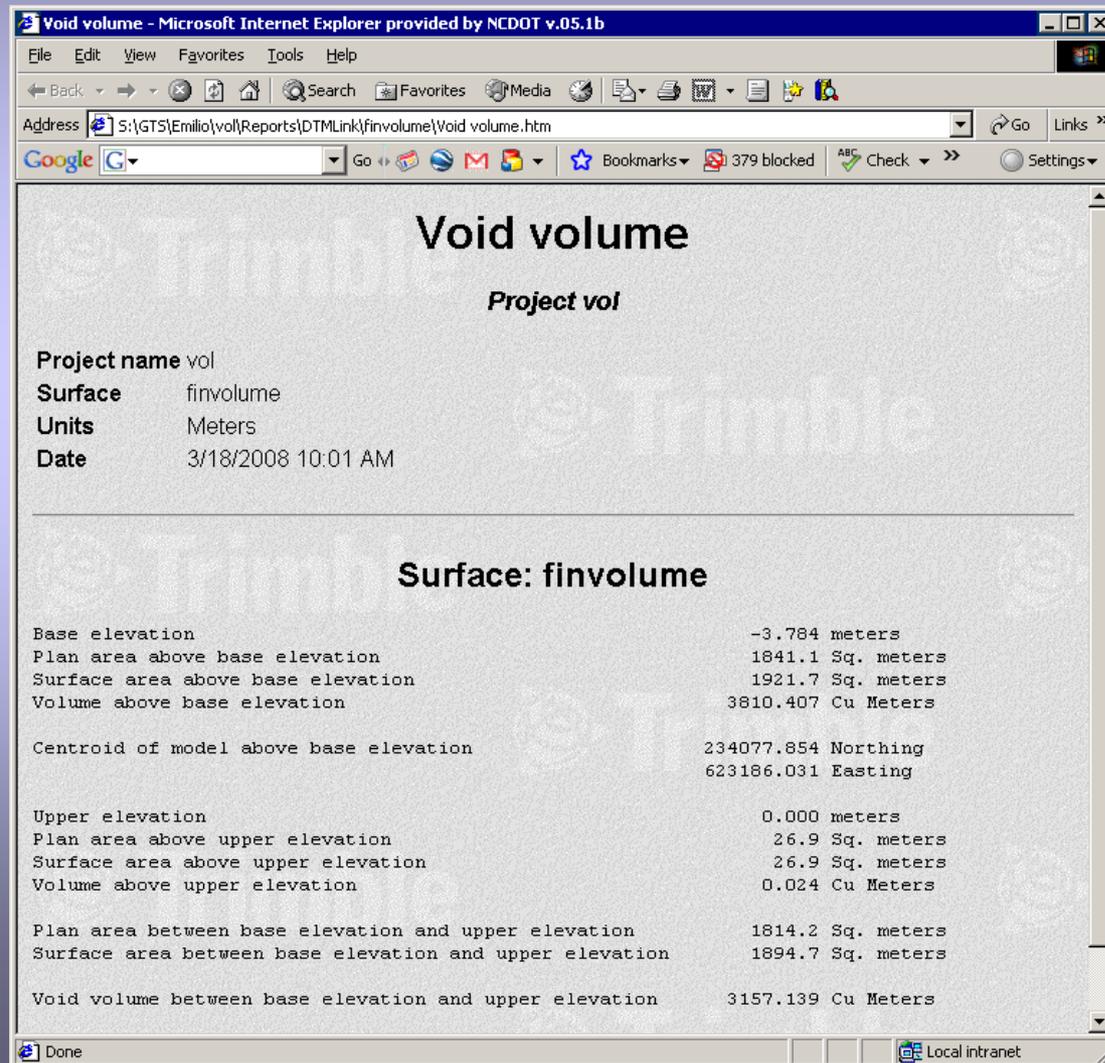
Graphic view of surface.



Calculate volumes for borrow or unclassified excavation



Generate volume report for file



The screenshot shows a web browser window titled "Void volume - Microsoft Internet Explorer provided by NCDOT v.05.1b". The address bar displays the local file path: "S:\GTS\Emilio\vol\Reports\DTMLink\finvolume\Void volume.htm". The browser interface includes standard navigation buttons (Back, Forward, Home, Stop, Refresh) and a search bar. The main content area displays the following report:

Void volume

Project vol

Project name vol
Surface finvolume
Units Meters
Date 3/18/2008 10:01 AM

Surface: finvolume

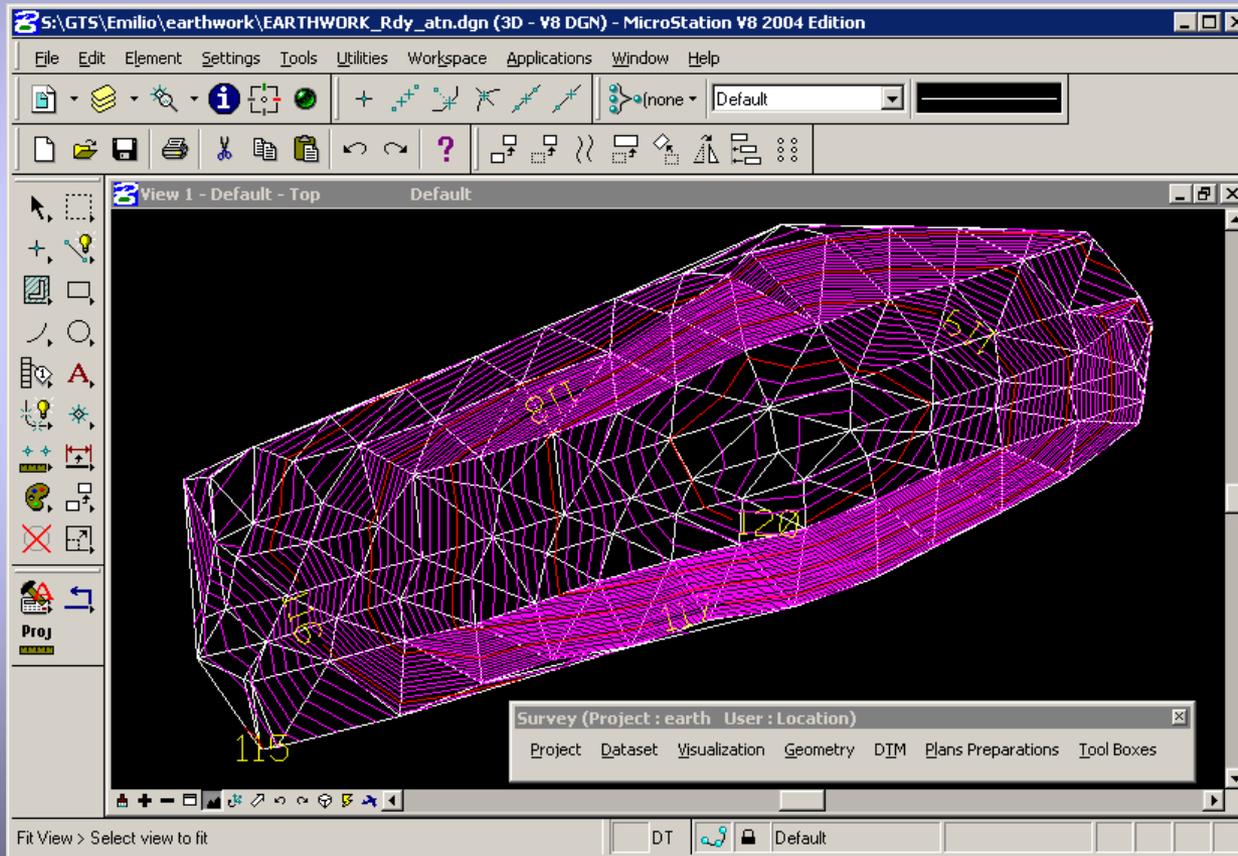
Base elevation	-3.784 meters
Plan area above base elevation	1841.1 Sq. meters
Surface area above base elevation	1921.7 Sq. meters
Volume above base elevation	3810.407 Cu Meters
Centroid of model above base elevation	234077.854 Northing 623186.031 Easting
Upper elevation	0.000 meters
Plan area above upper elevation	26.9 Sq. meters
Surface area above upper elevation	26.9 Sq. meters
Volume above upper elevation	0.024 Cu Meters
Plan area between base elevation and upper elevation	1814.2 Sq. meters
Surface area between base elevation and upper elevation	1894.7 Sq. meters
Void volume between base elevation and upper elevation	3157.139 Cu Meters

The status bar at the bottom shows "Done" and "Local intranet".

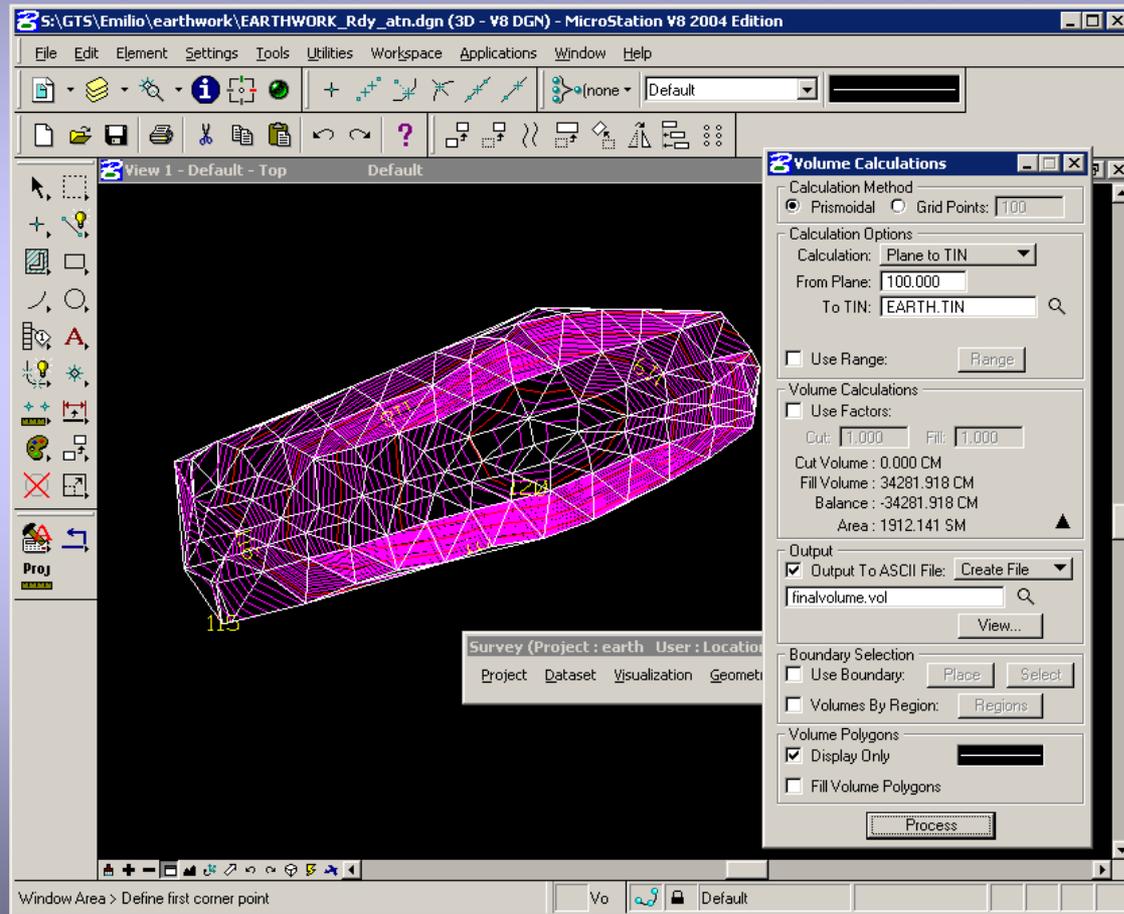
Geopak

- Graphic view of surface
- Calculate volumes for borrow or unclassified excavation.
- Generate volume report for file.
- Ability to cut x-sections.

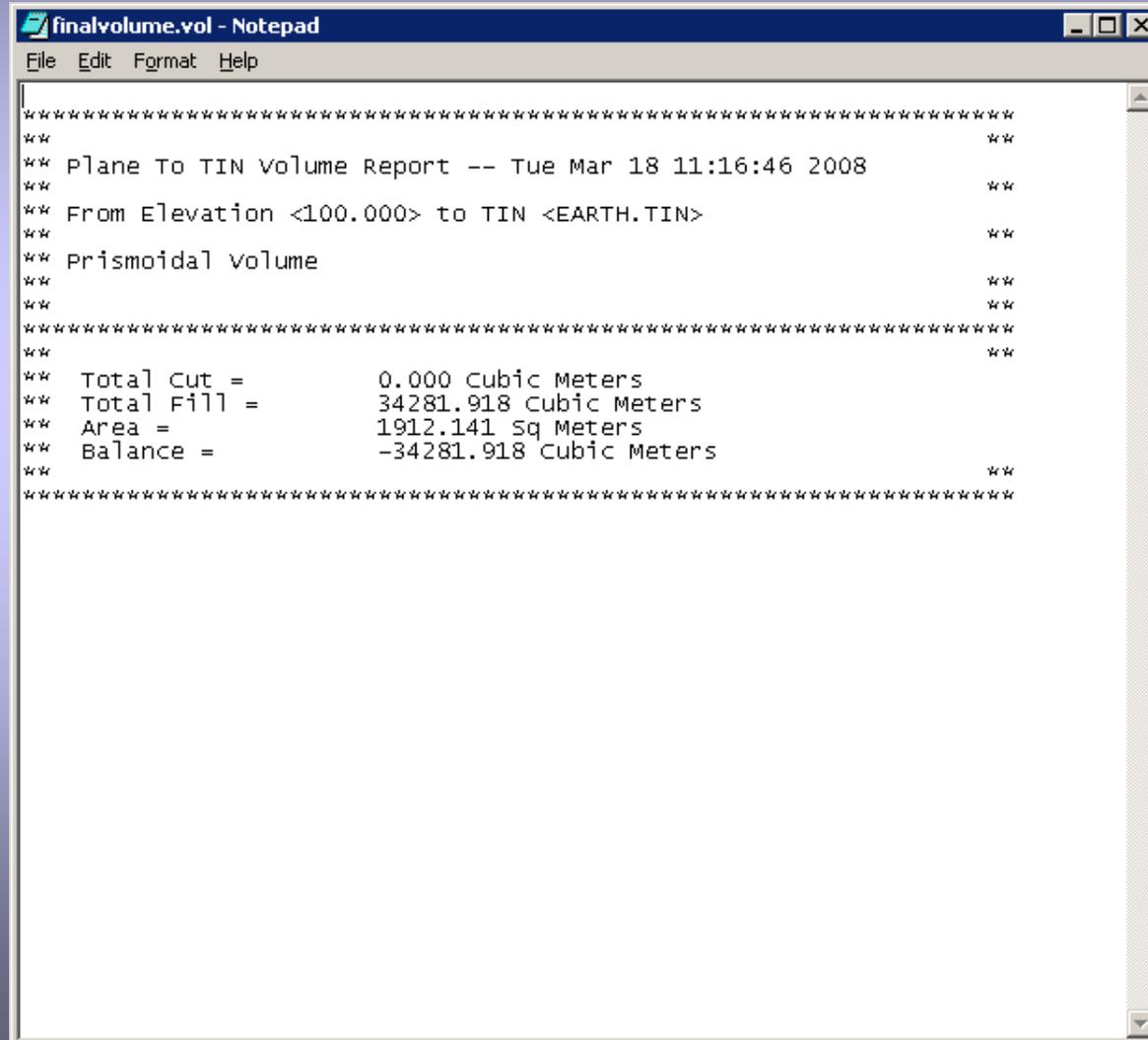
Graphic view of surface



Calculate volumes for borrow or unclassified excavation

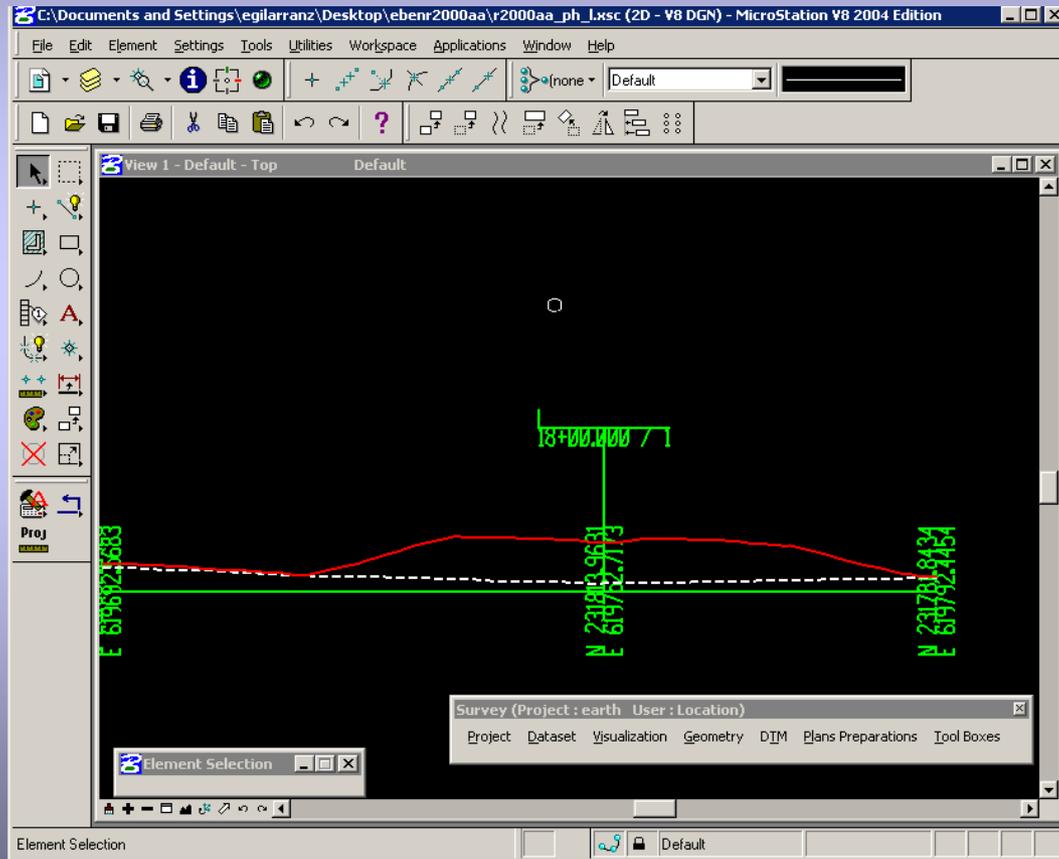


Generate volume report for file



```
finalvolume.vol - Notepad
File Edit Format Help
*****
**                                     **
** Plane To TIN Volume Report -- Tue Mar 18 11:16:46 2008                 **
**                                     **
** From Elevation <100.000> to TIN <EARTH.TIN>                             **
**                                     **
** Prismoidal volume                                                       **
**                                     **
**                                     **
*****
**                                     **
** Total Cut =          0.000 Cubic Meters                               **
** Total Fill =         34281.918 Cubic Meters                           **
** Area =              1912.141 Sq Meters                               **
** Balance =           -34281.918 Cubic Meters                           **
**                                     **
*****
```

Ability to cut x-sections



Summary

- Trimble Geomatics Office and Geopak have similar capabilities in regard to earthwork.
- Geopak requires additional training provided by IT Cadd Services.
- Trimble Geomatics, DTM function is very efficient for borrow pits.

Questions?

