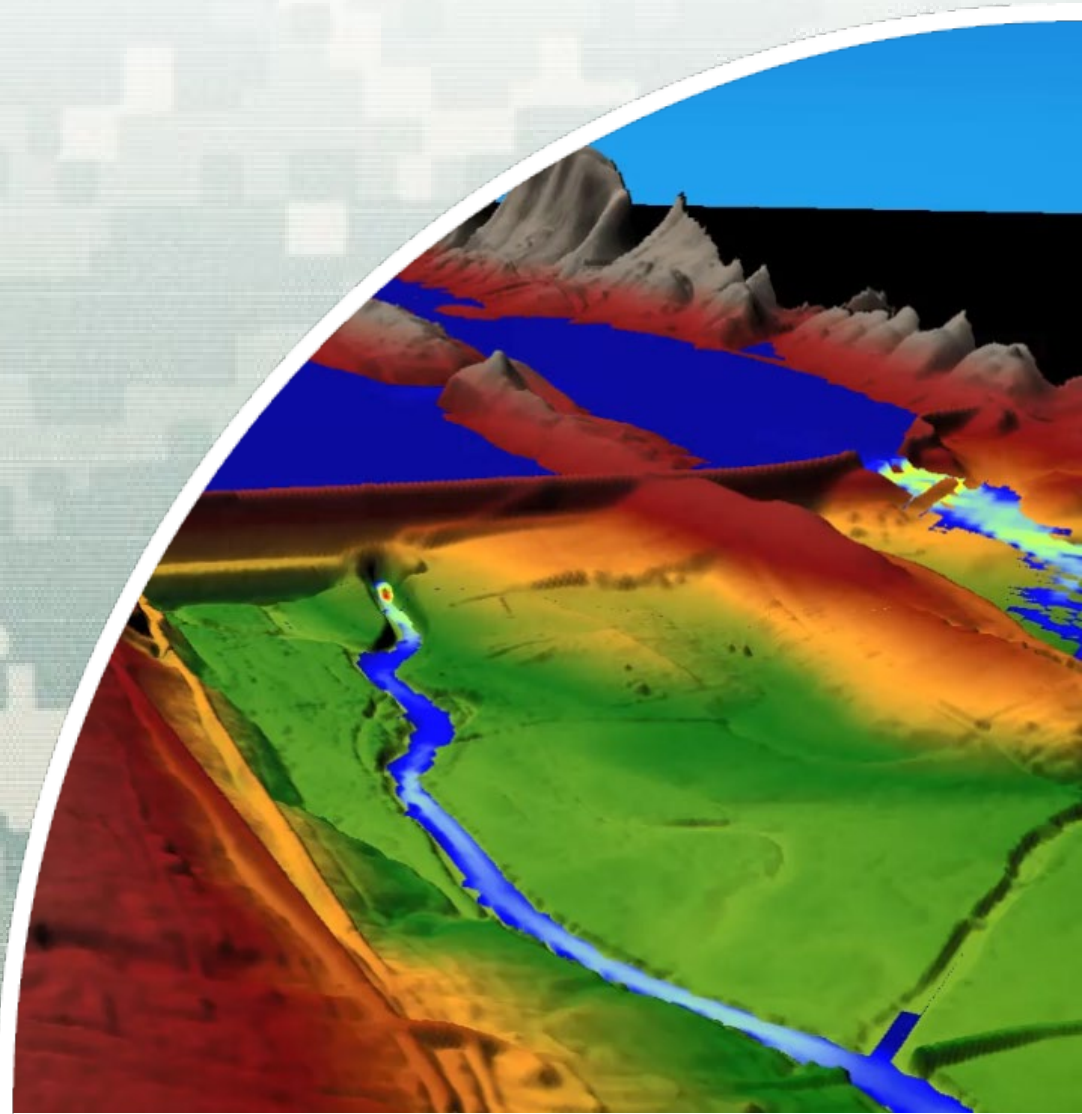
New RAS Mapper Capabilities 5.1

Cameron Ackerman, PE, D.WRE



US Army Corps of Engineers
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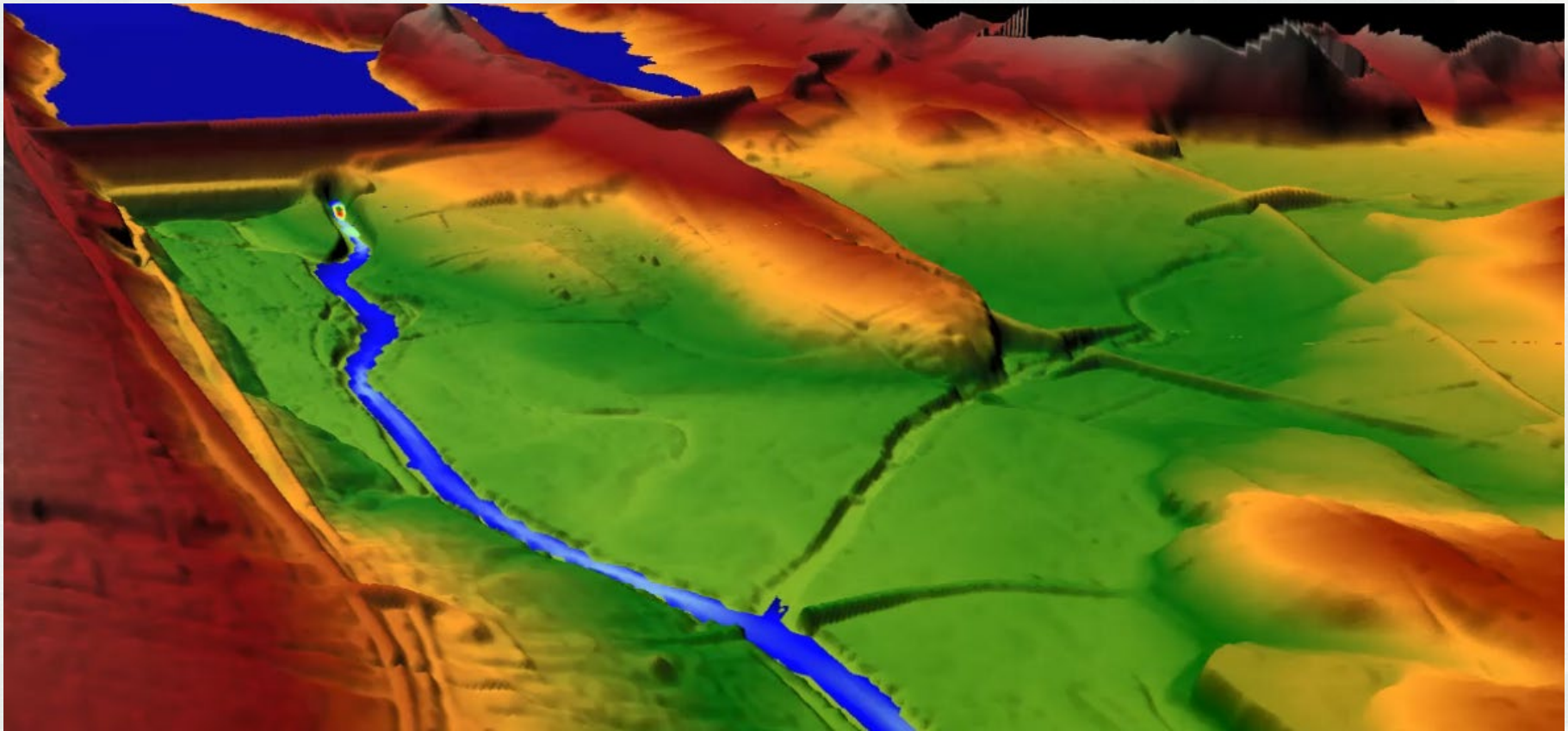
Overview

- Terrain Modifications
- Elevation Update Tool
- Watch Layer List
- RASter Calculator
- 3D KML Export

Terrain

- Development of a good 1D or 2D river hydraulics model starts with a terrain model representative of the ground surface elevations. Often we don’t have that …



Terrain Modification

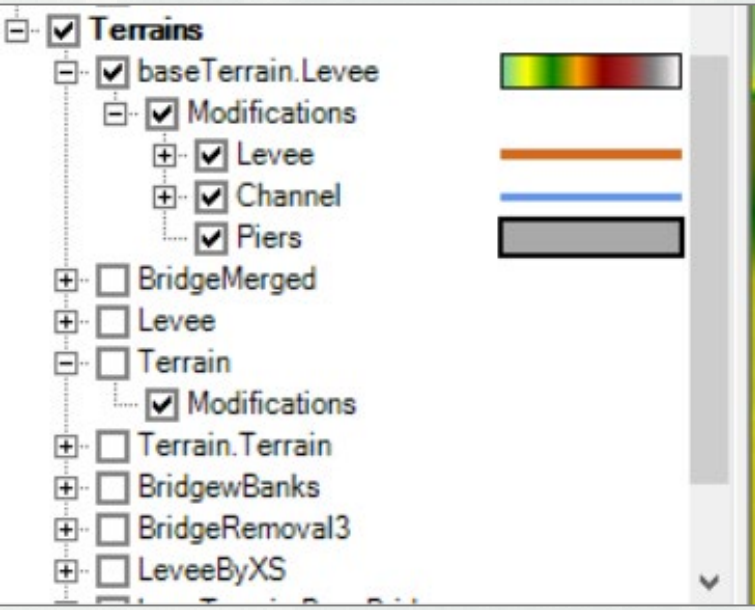
- Terrain Replacement Using RAS Cross Sections

- NEW Vector Overrides to Terrain Layer
  - ► Simple Shapes (Piers)
    - Circle, Rectangle, Ellipse
  - ► Line (Channel, Roads, Levees)
  - ► Polygon (Areas, Buildings)

  - ► Use existing Editing Tools!

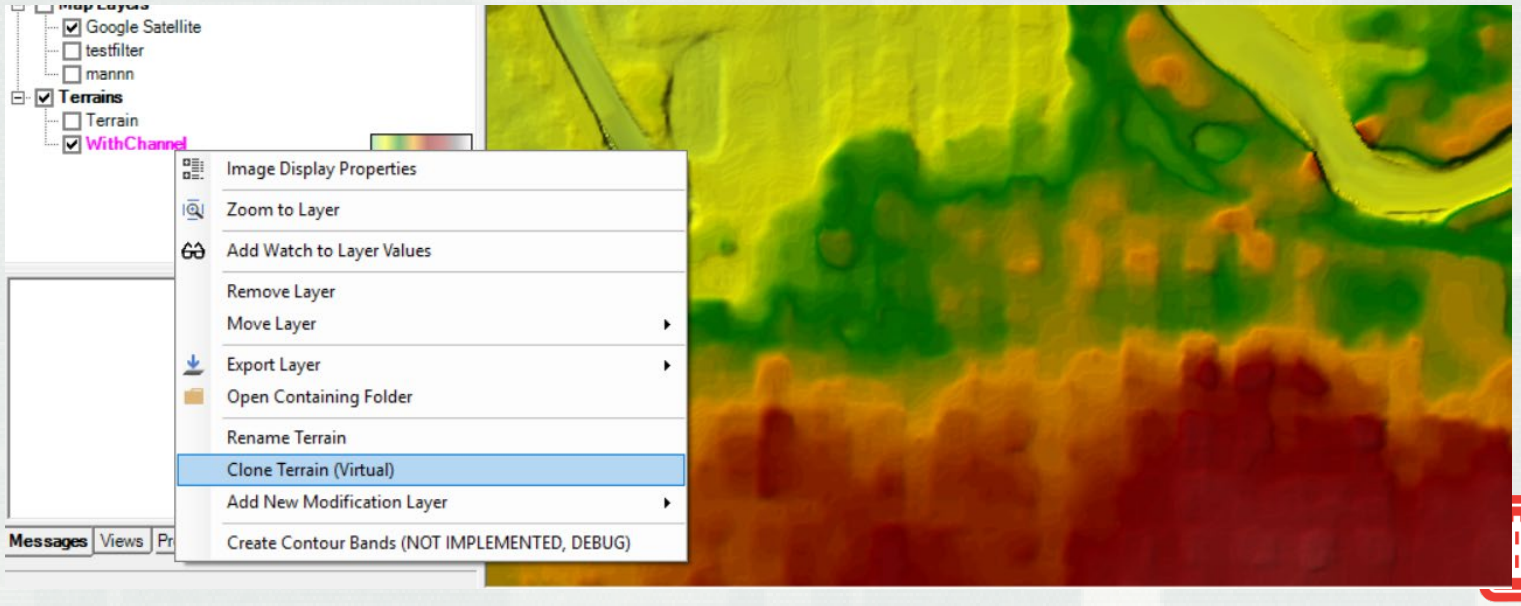
Vector Modifications

- Multiple Vector additions with a Terrain Layer
- Modifications are used for visualization and for all computations.
- Re-use Vector Features in other Layers

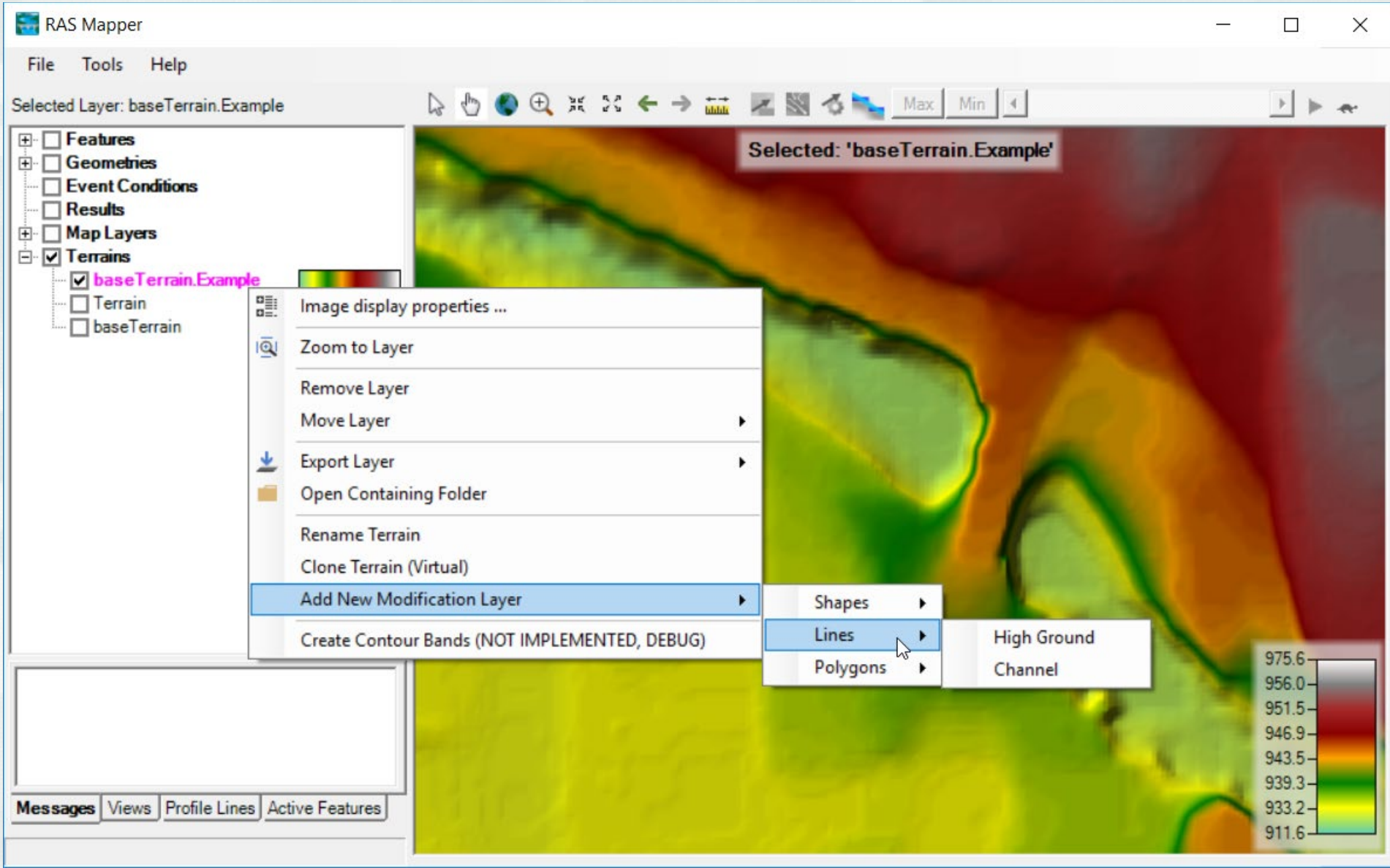


Step 1: Clone the Terrain!

- Virtual copy of the Terrain
- No duplication of large dataset
- Vector additions stored in a separate file



Vector Modifications

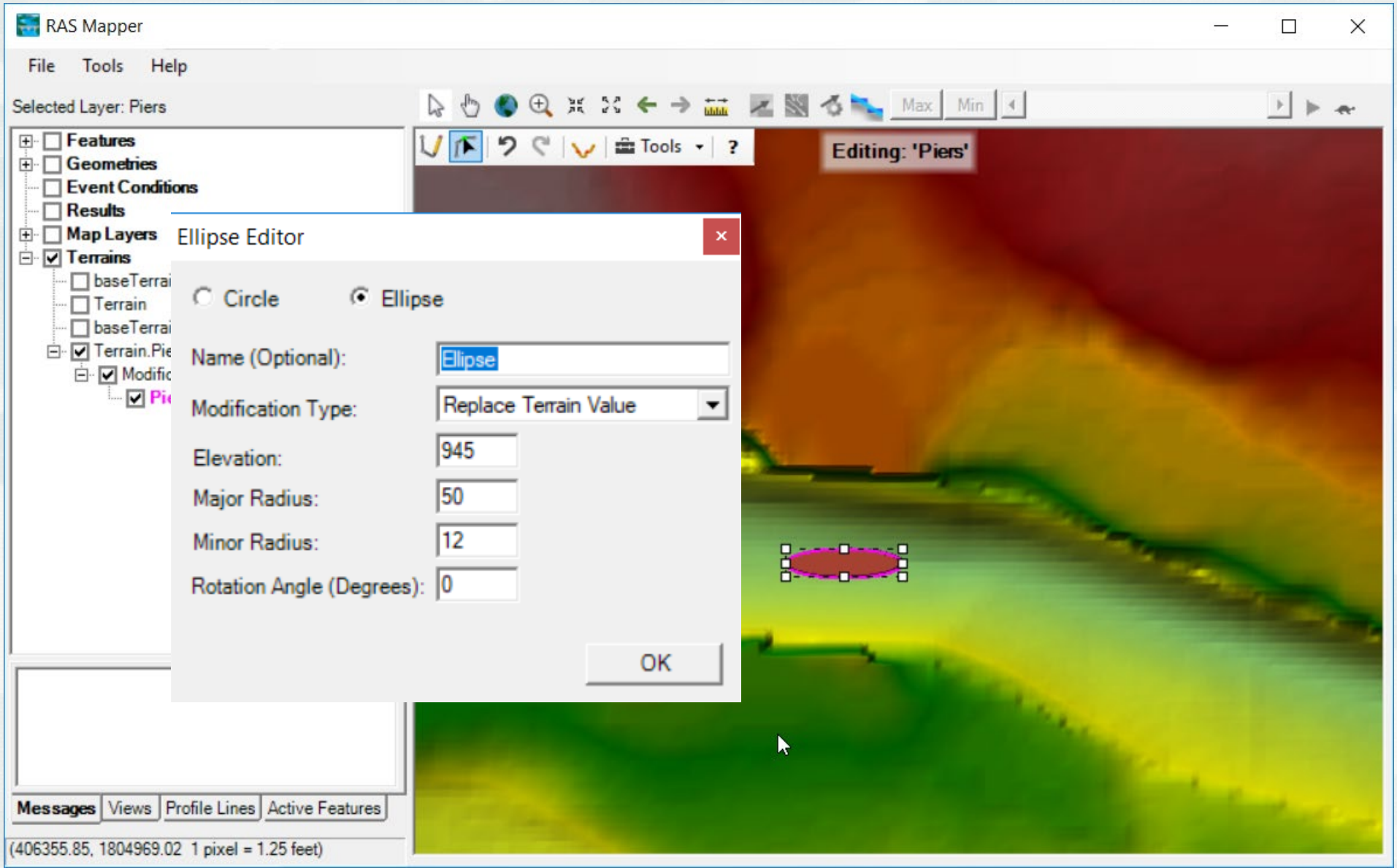


Vector Modifications

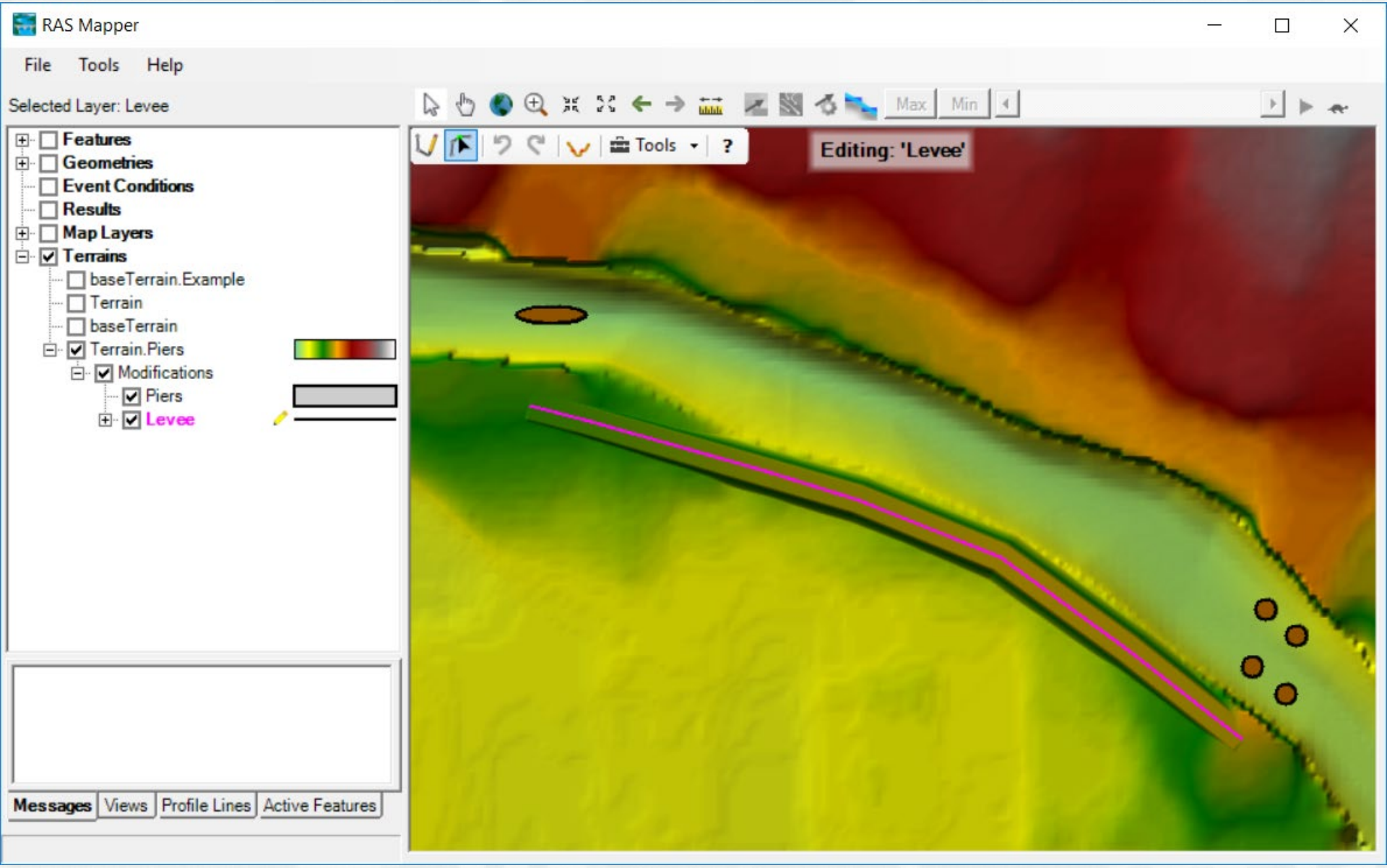
- Simple Shapes
  - Circle/Ellipse
  - Square/Rectangle
- Lines
  - High Ground/Levee
  - Channel
- Polygons
  - Free Hand
  - Rectangle

- Replace Terrain Value
- Higher of Terrain / User Value
- Lower of Terrain / User Value
- Replace NoData Values
- Add Value to Terrain

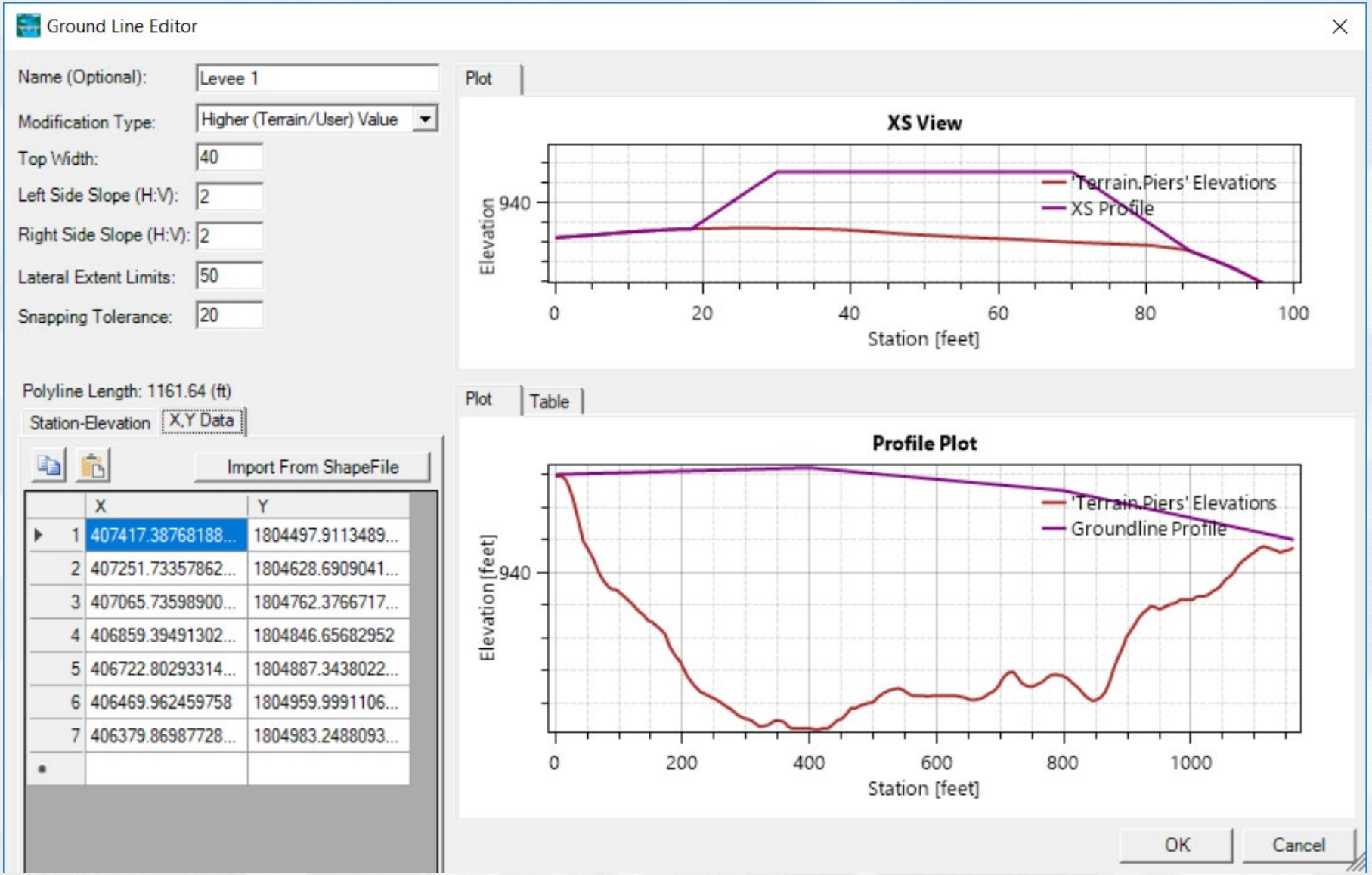
Shapes - Piers



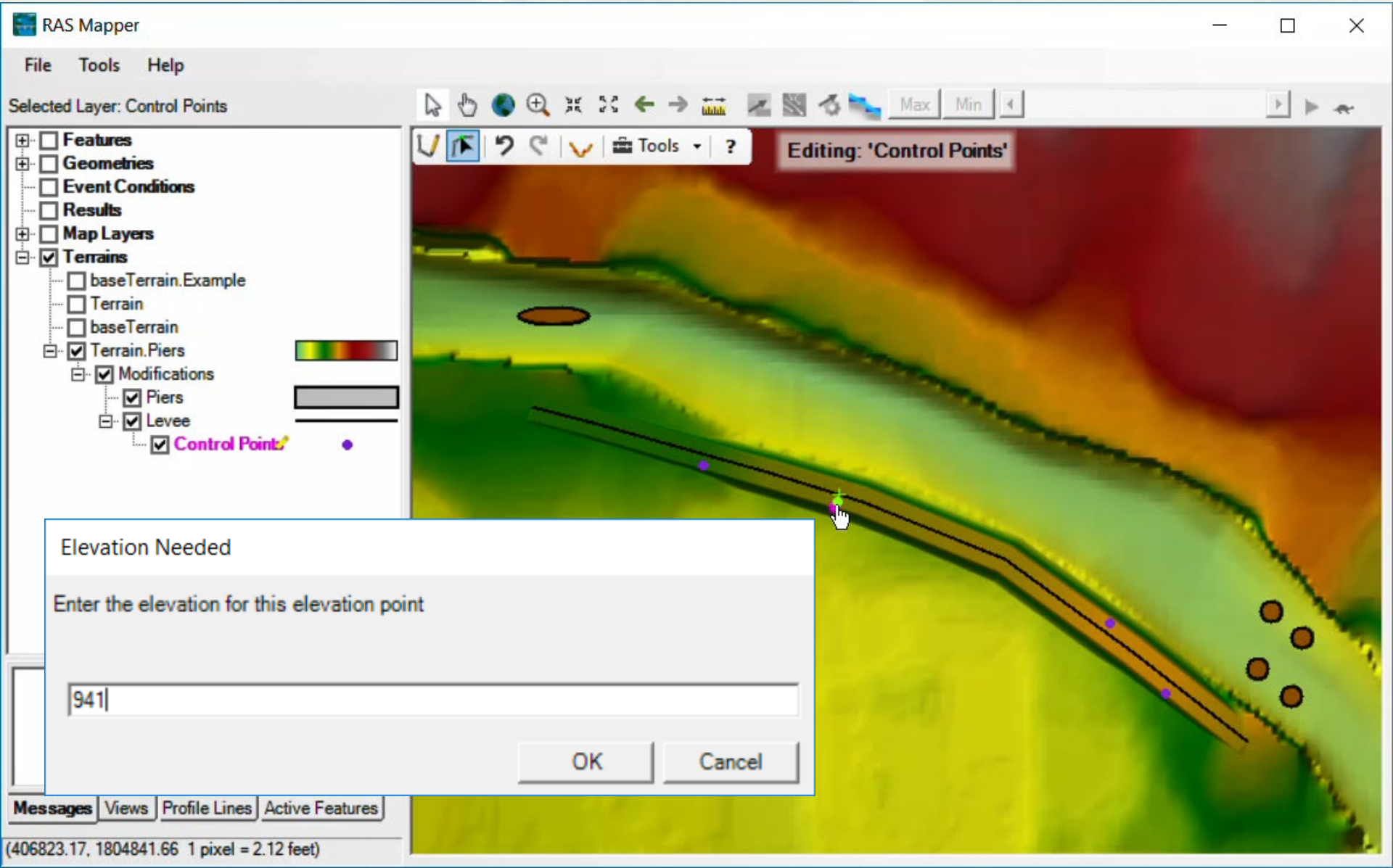
Lines – High Ground



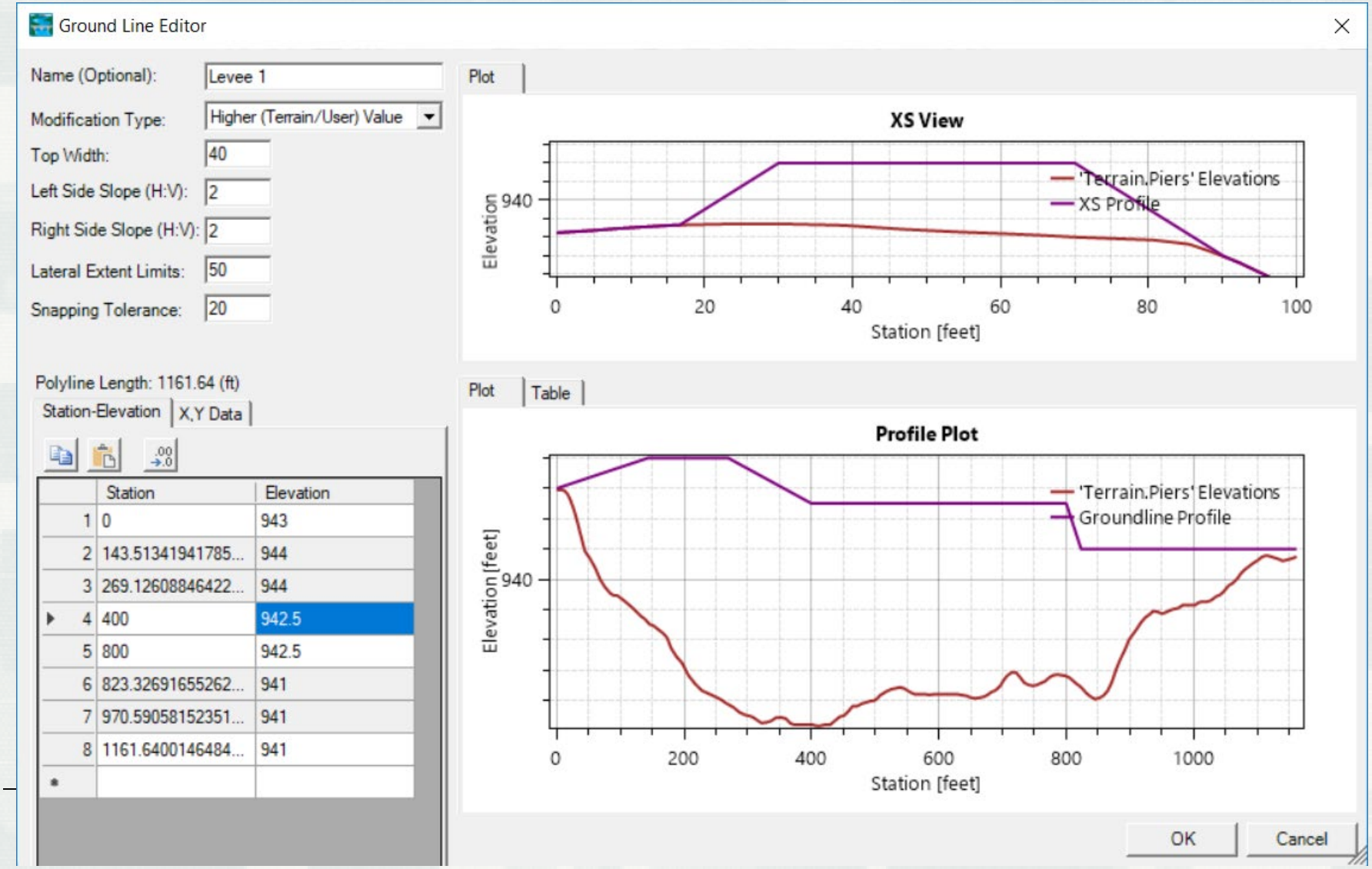
Lines – High Ground



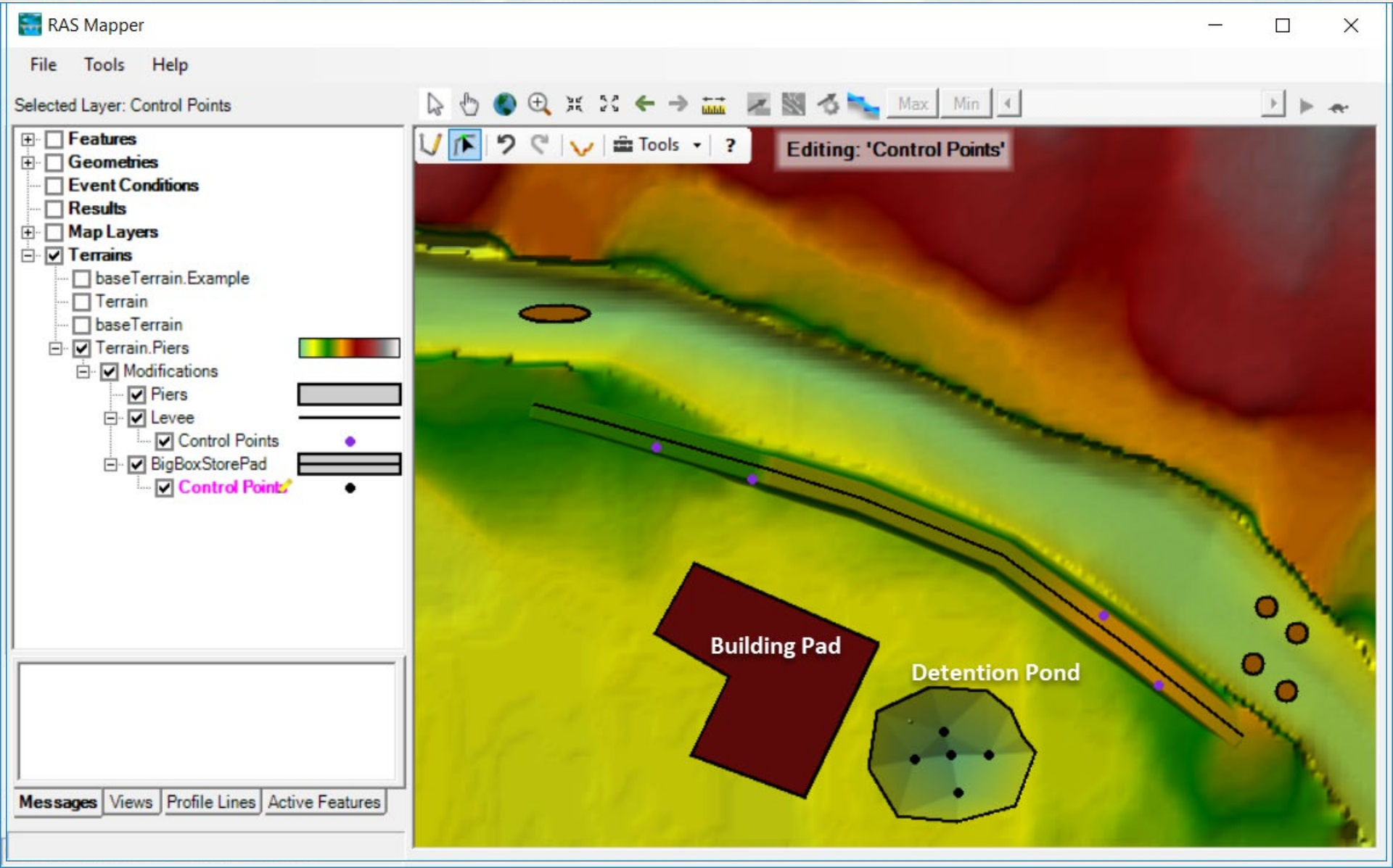
Lines – Elevation Control Points



Lines – Elevation Control Points



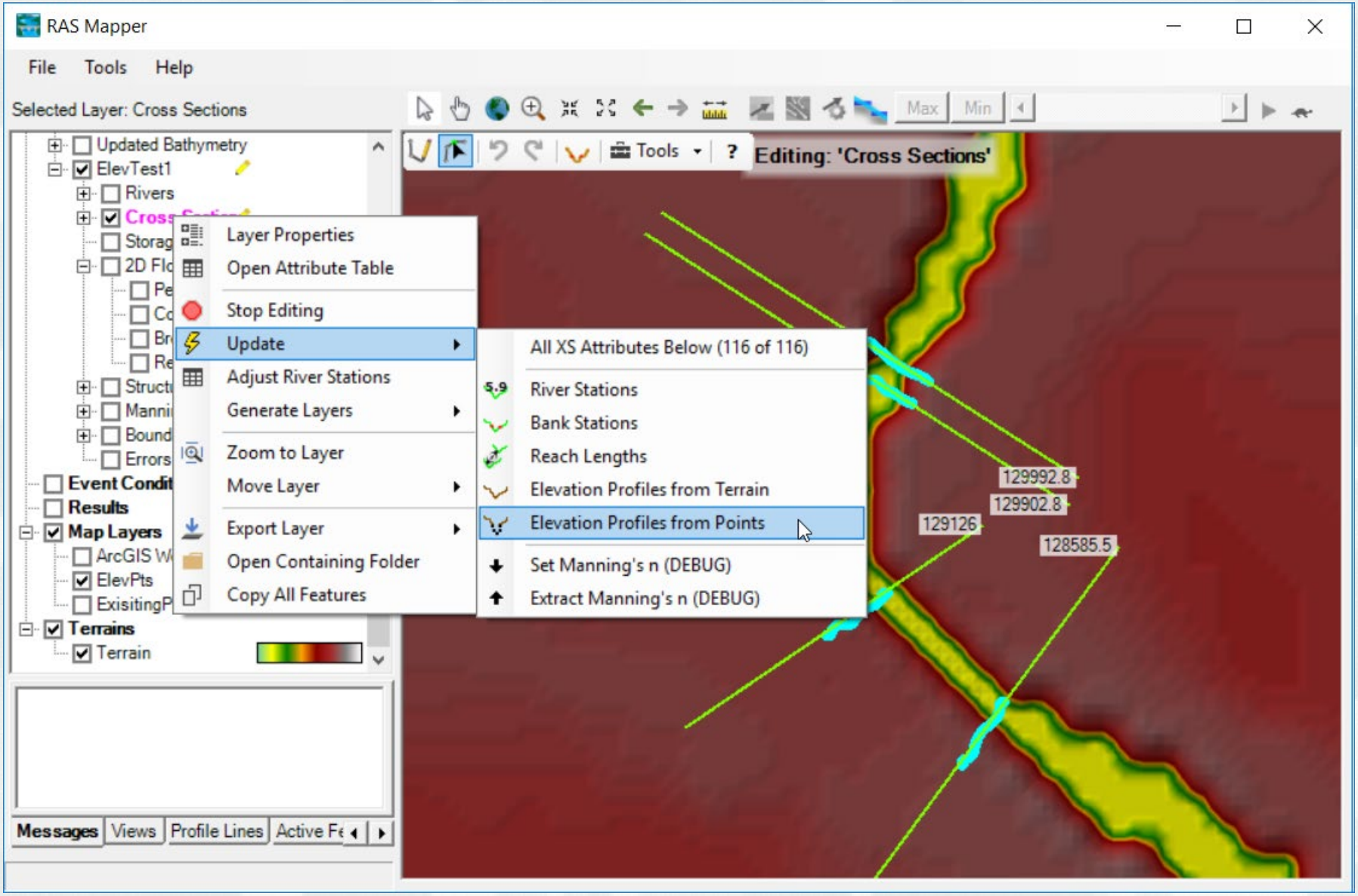
Polygons


RAS Mapper
File
Tools
Help
Selected Layer: Control Points
Features
Geometries
Event Conditions
Results
Map Layers
Terrains
baseTerrain.Example
Terrain
baseTerrain
Terrain.Piers
Modifications
Piers
Levee
Control Points
BigBoxStorePad
Control Points
Messages
Views
Profile Lines
Active Features
Max
Min
Tools
?
Editing: 'Control Points'
Building Pad
Detention Pond

XS Elevation Update

- Update of Cross Sections using Elevation Point Data.
- Allows for merging of bathymetric survey data and LiDAR data collection.
- Important for mobile bed river systems.
- Easy method for combining point data without requiring use of GIS.

Elevation Update



Elevation Update Editor

Cross Section Update by Elevation Points

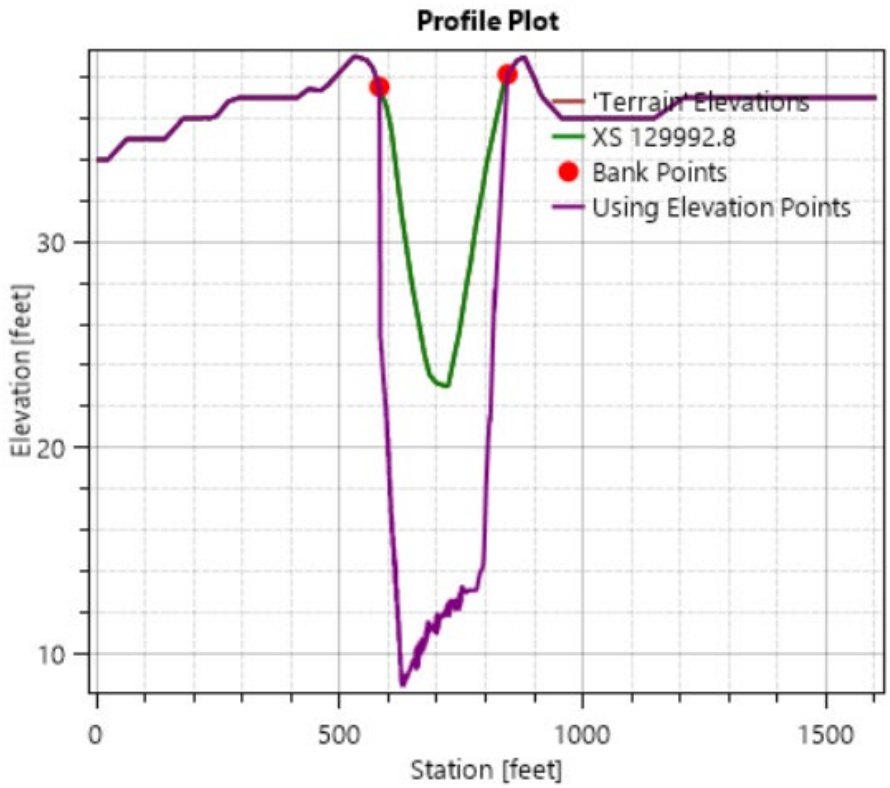
Elevation Point Layer: ElevPts

Update Cross Sections: Channel Only

Selected Area Edits

	River	Reach	RS	Elev Pt Tol (ft)	#Points	Update
1	Sacramento	Main	129992.8	100	187	☑
2	Sacramento	Main	129902.8	100	195	☑
3	Sacramento	Main	129126	100	88	☑
4	Sacramento	Main	128585.5	100	92	☑
5	Sacramento	Main	127252.7	100	122	☑
6	Sacramento	Main	125931.5	100	114	☑
7	Sacramento	Main	124679.7	100	104	☑
8	Sacramento	Main	123372.7	100	125	☑
9	Sacramento	Main	122044.5	100	106	☑
10	Sacramento	Main	120729.1	100	119	☑
11	Sacramento	Main	119404.5	100	107	☑
12	Sacramento	Main	118104.7	100	236	☑
13	Sacramento	Main	116750.2	100	121	☑
14	Sacramento	Main	115661.4	100	118	☑
15	Sacramento	Main	113070.7	100	143	☑
16	Sacramento	Main	111993.1	100	108	☑
17	Sacramento	Main	110681.8	100	133	☑
18	Sacramento	Main	109379.1	100	119	☑

Plot | Table

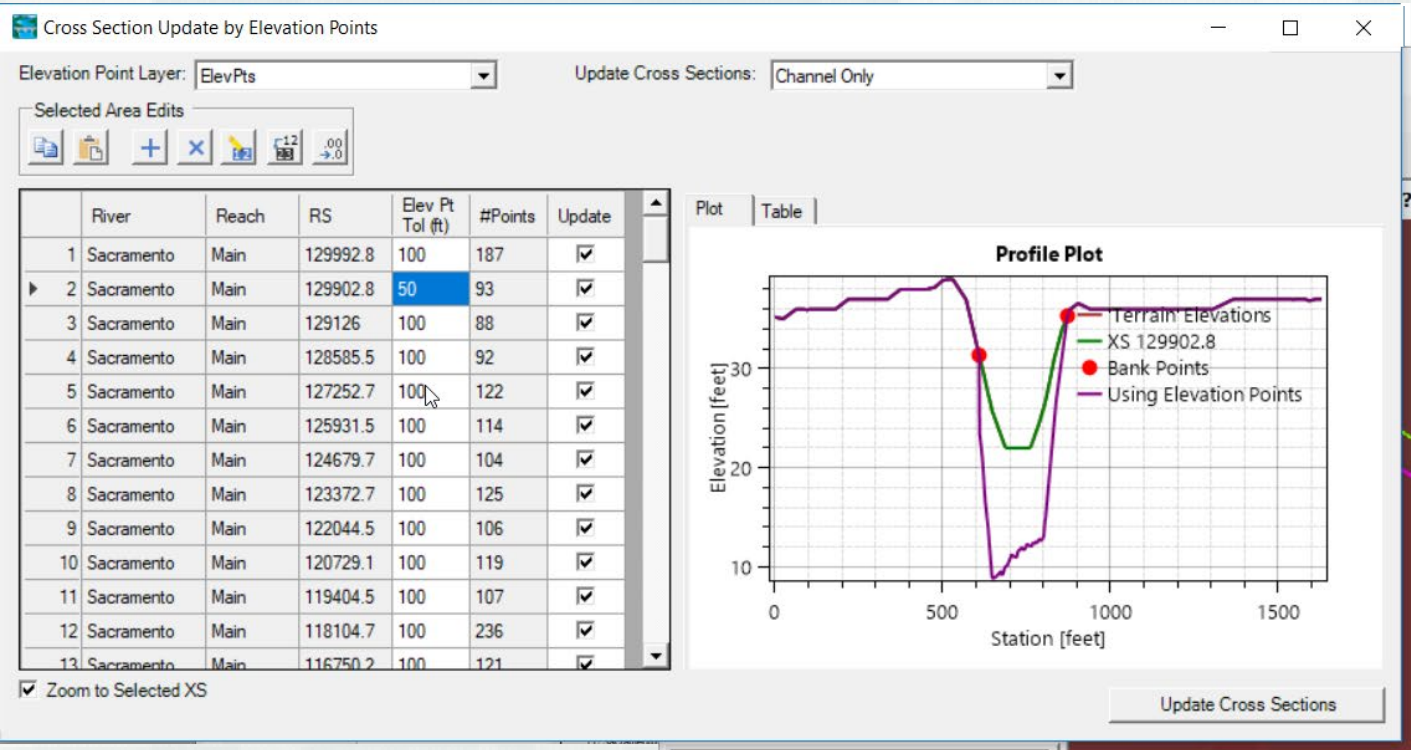


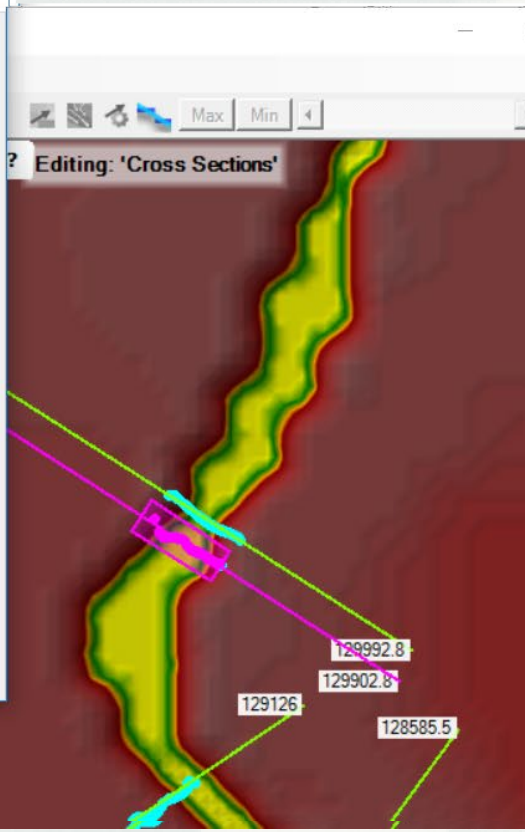
Zoom to Selected XS

Export Points Used

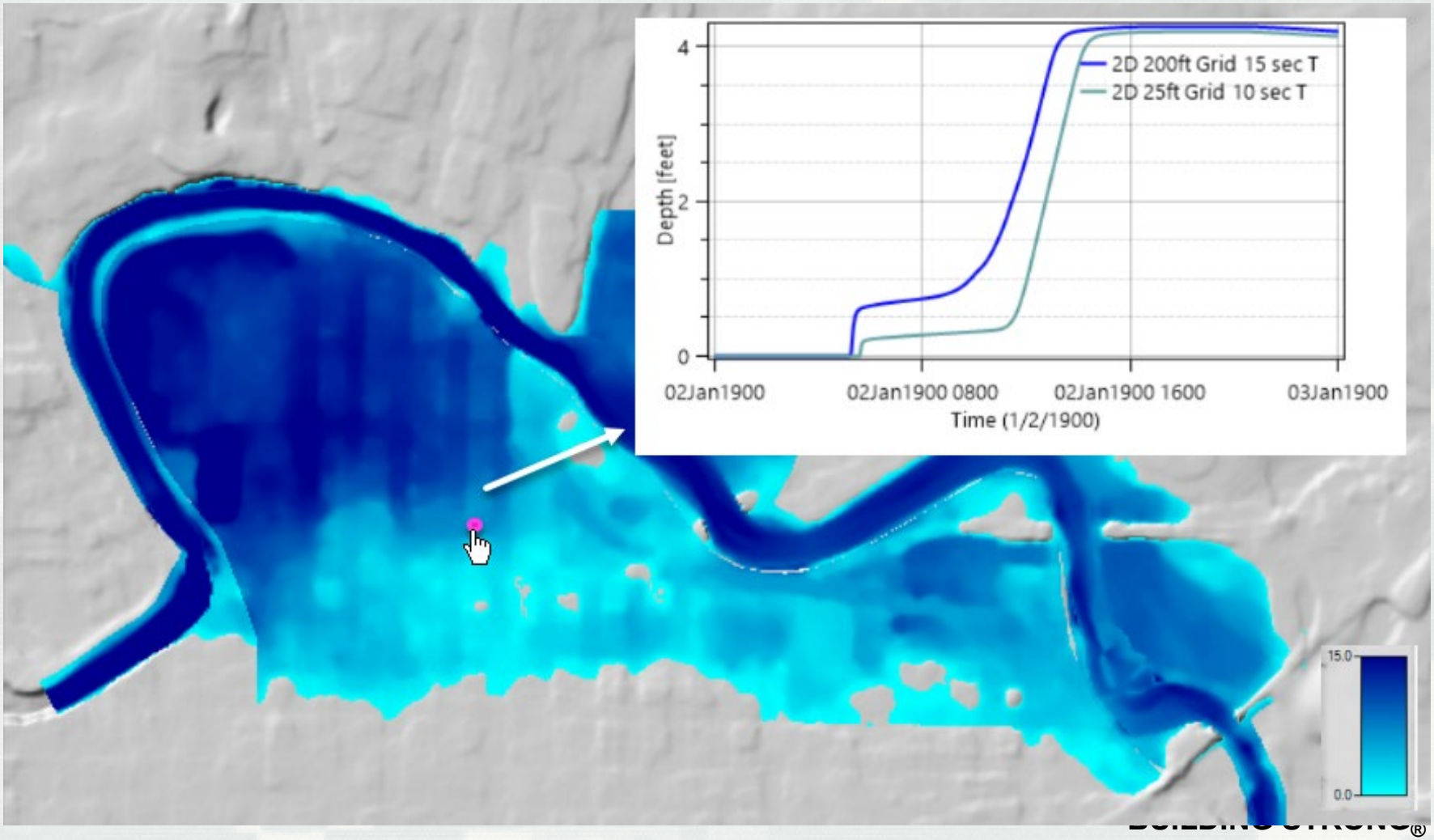
Update Cross Sections

Elevation Update Editor

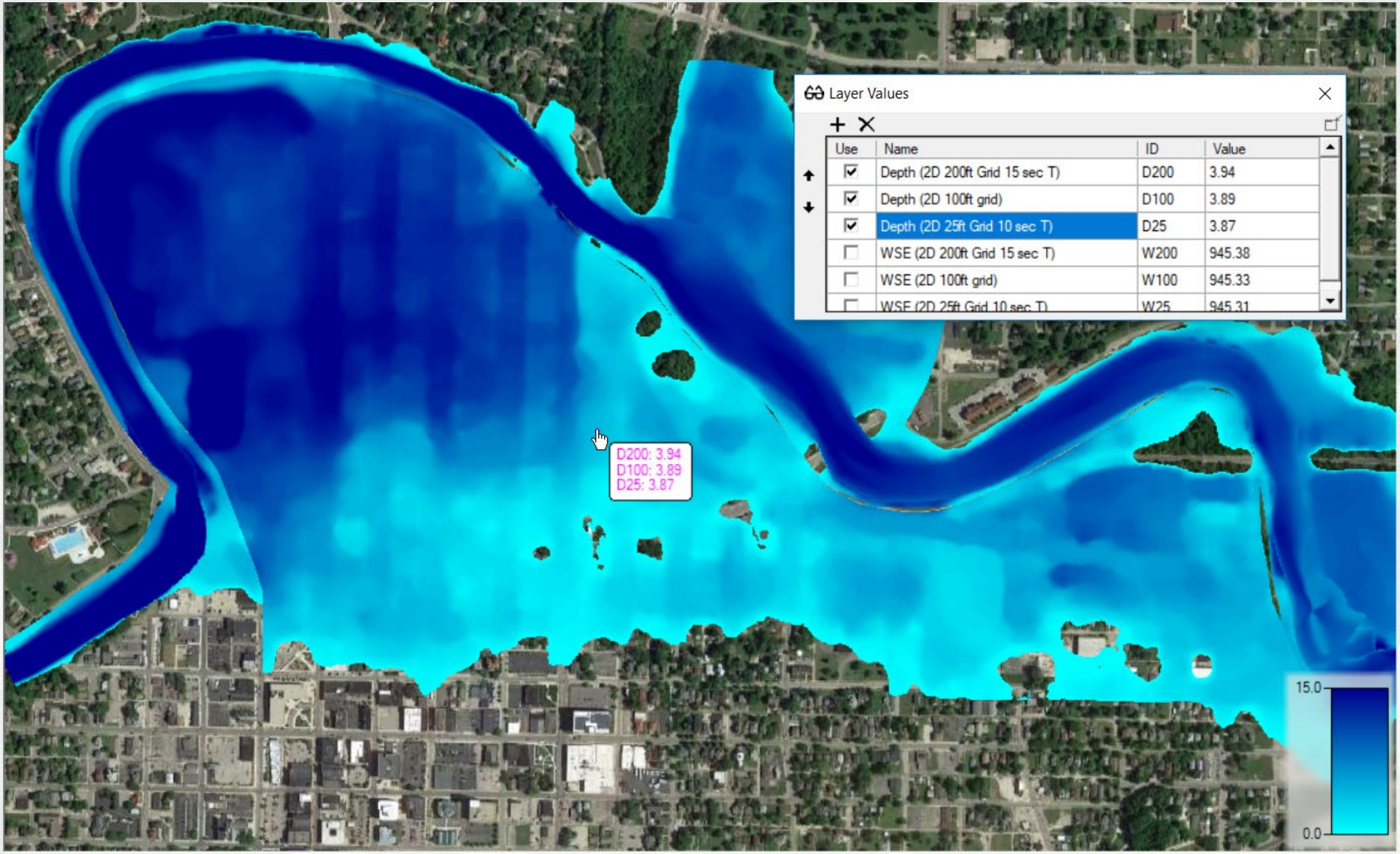




Results Analysis



Layer Watch List

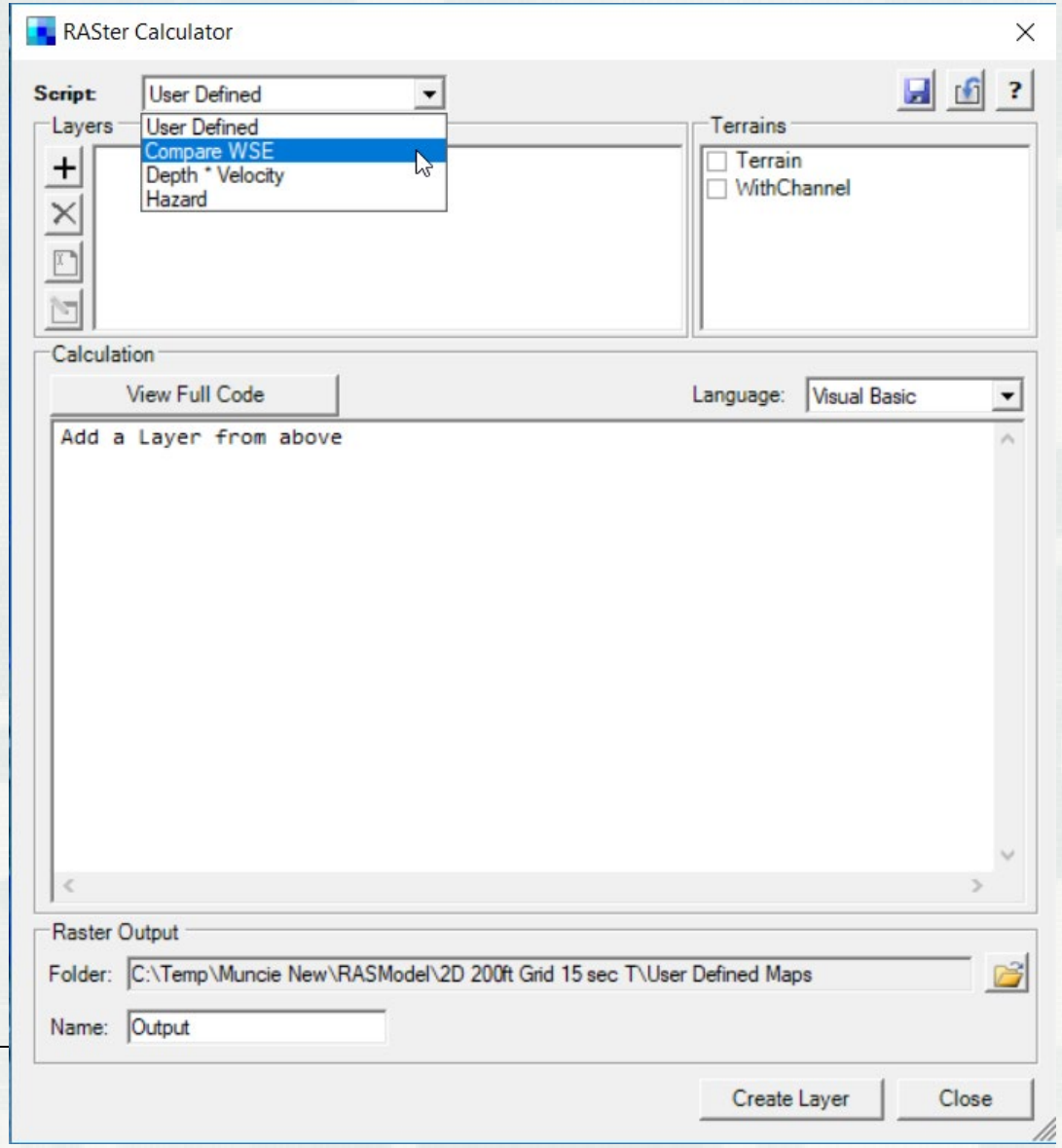


RASter Calculator

- The RASter Calculator is intended to allow users to perform mathematical and logical operations on HEC-RAS spatial results.
- User-defined variables are used in scripts to evaluate raster data.
- Variables defined by
  - Plan, Map Type, Animation Behavior, Profile
- Scripts can be saved/loaded

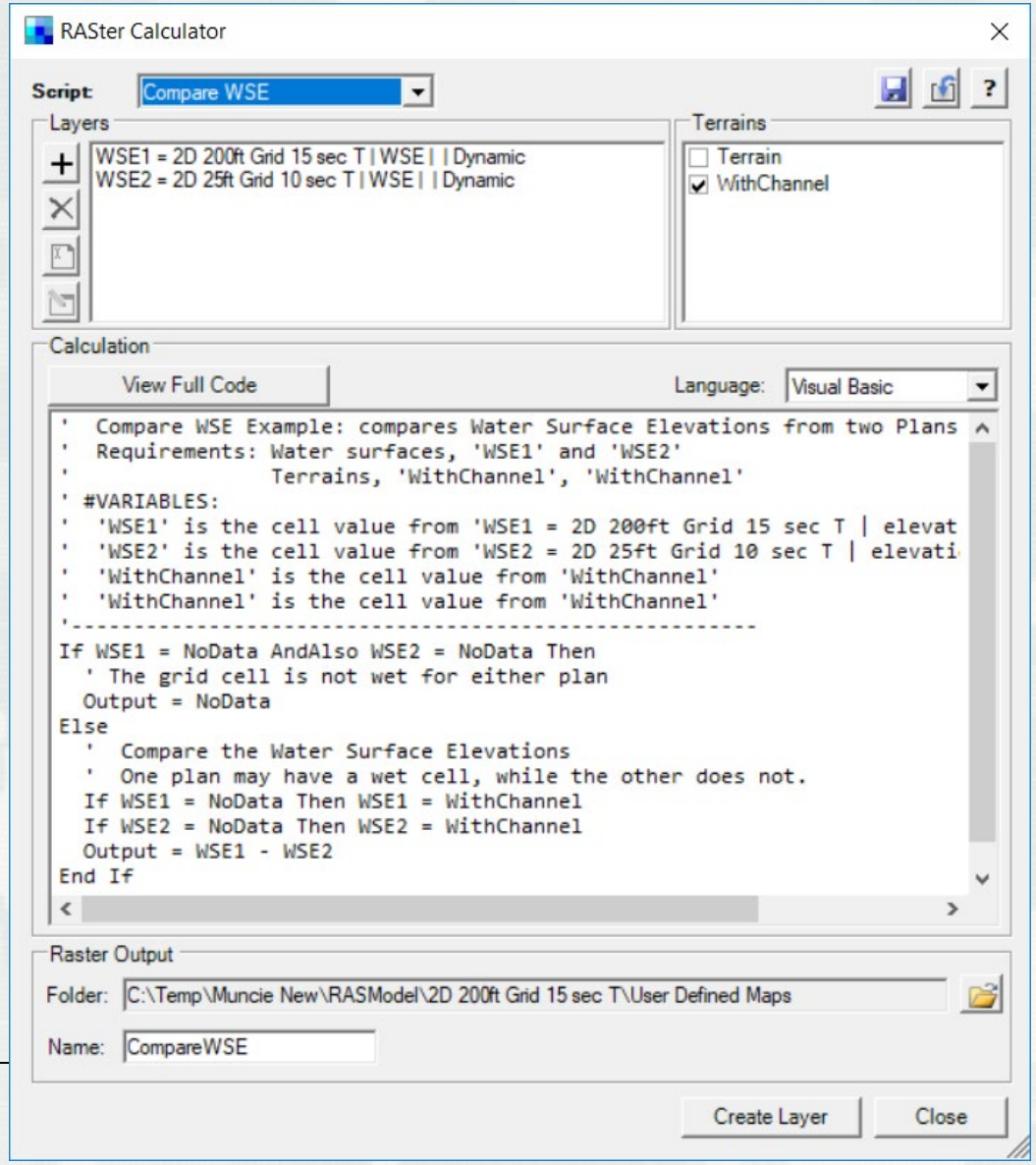
RASter Calculator

- Scripts
- Save/Load
- Variable Definition (Layers)
- Code



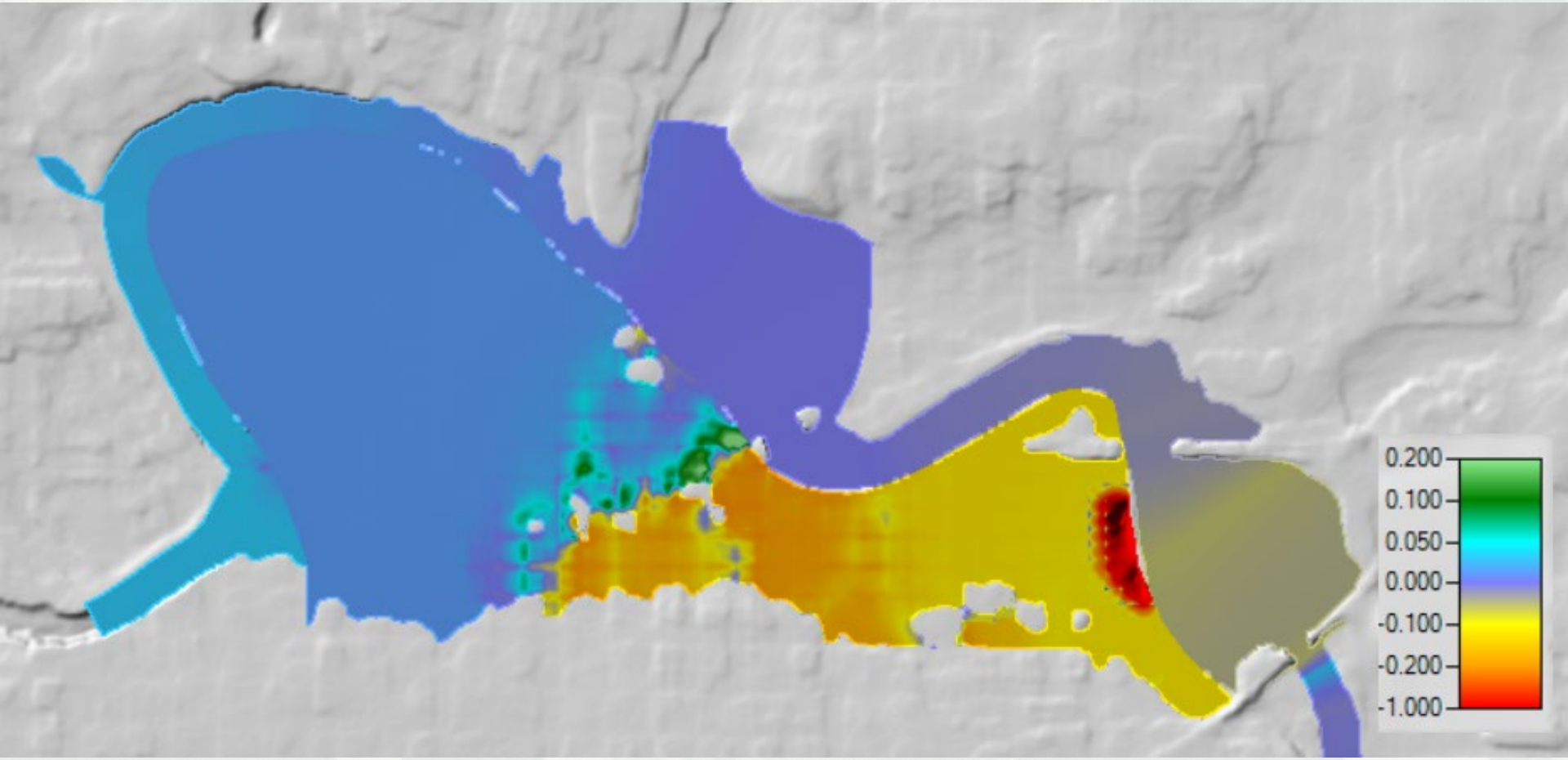
RASter Calculator

- Predefined Scripts
  - Compare WSE
  - Depth*Velocity
  - Hazard



Water Surface Elevation Comparison

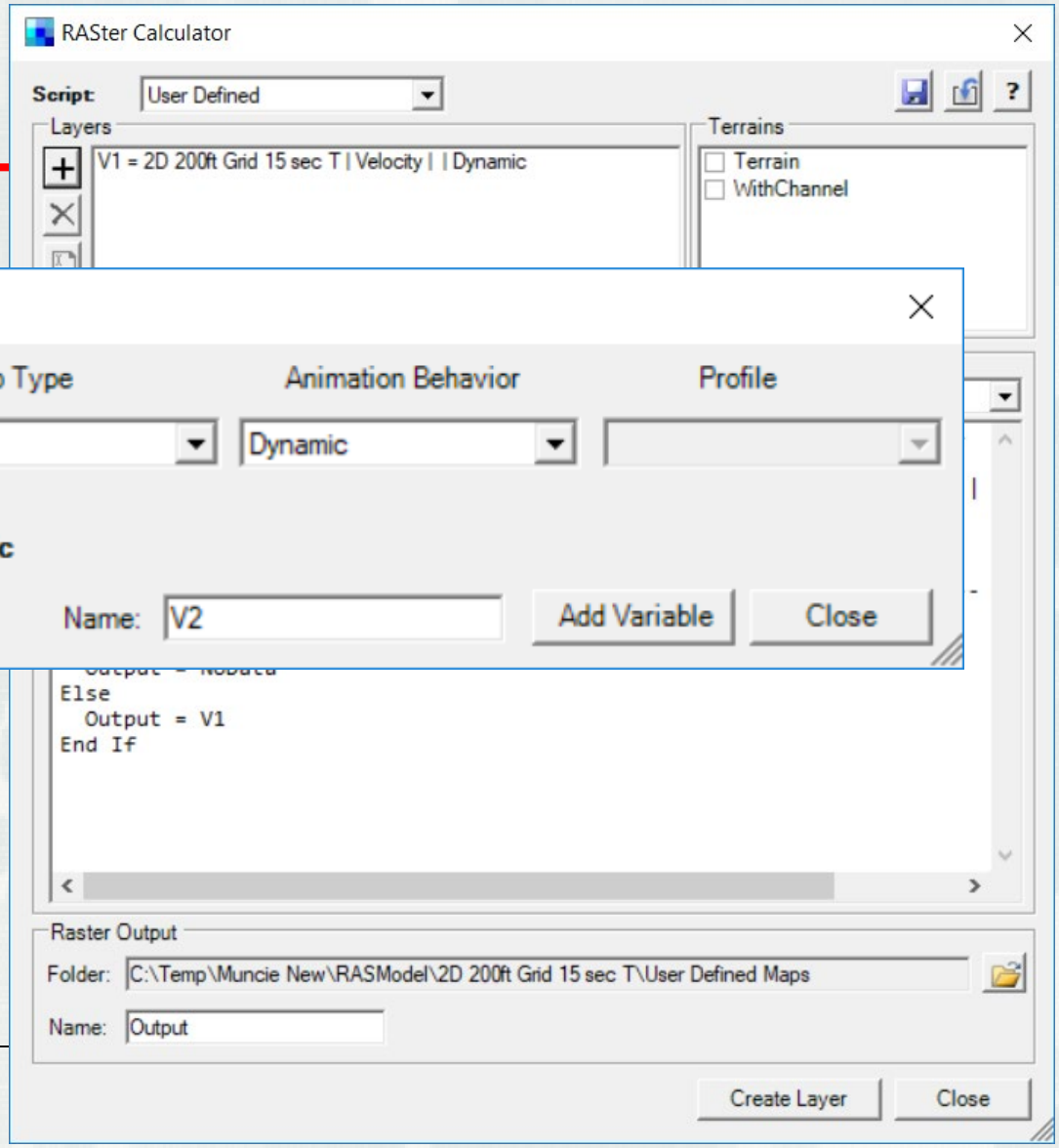
- Levee Breach WSE: WSE_Mesh200ft - WSE_Mesh25ft



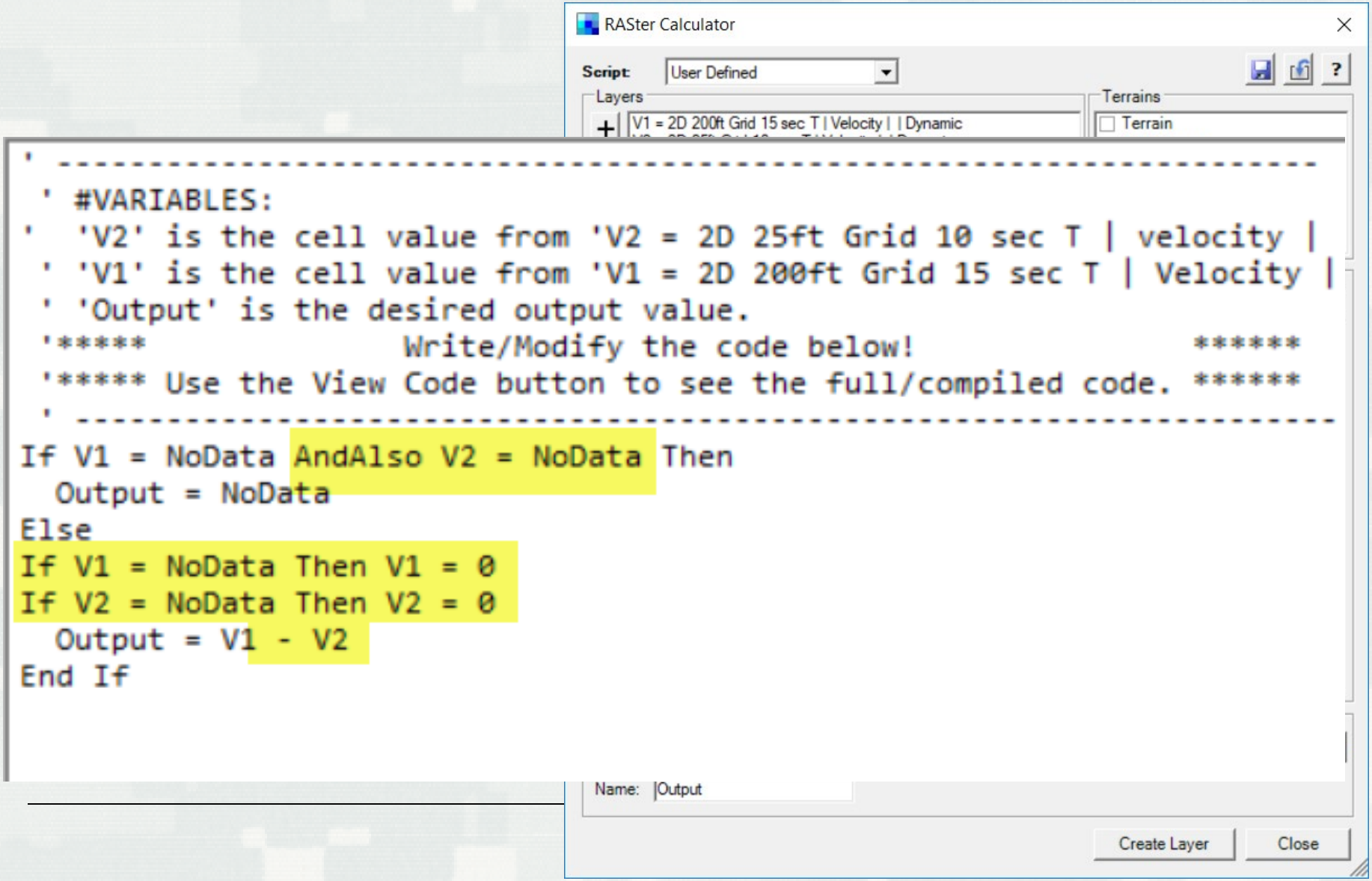
Velocity Comparison Example

1. Add a Layer 1

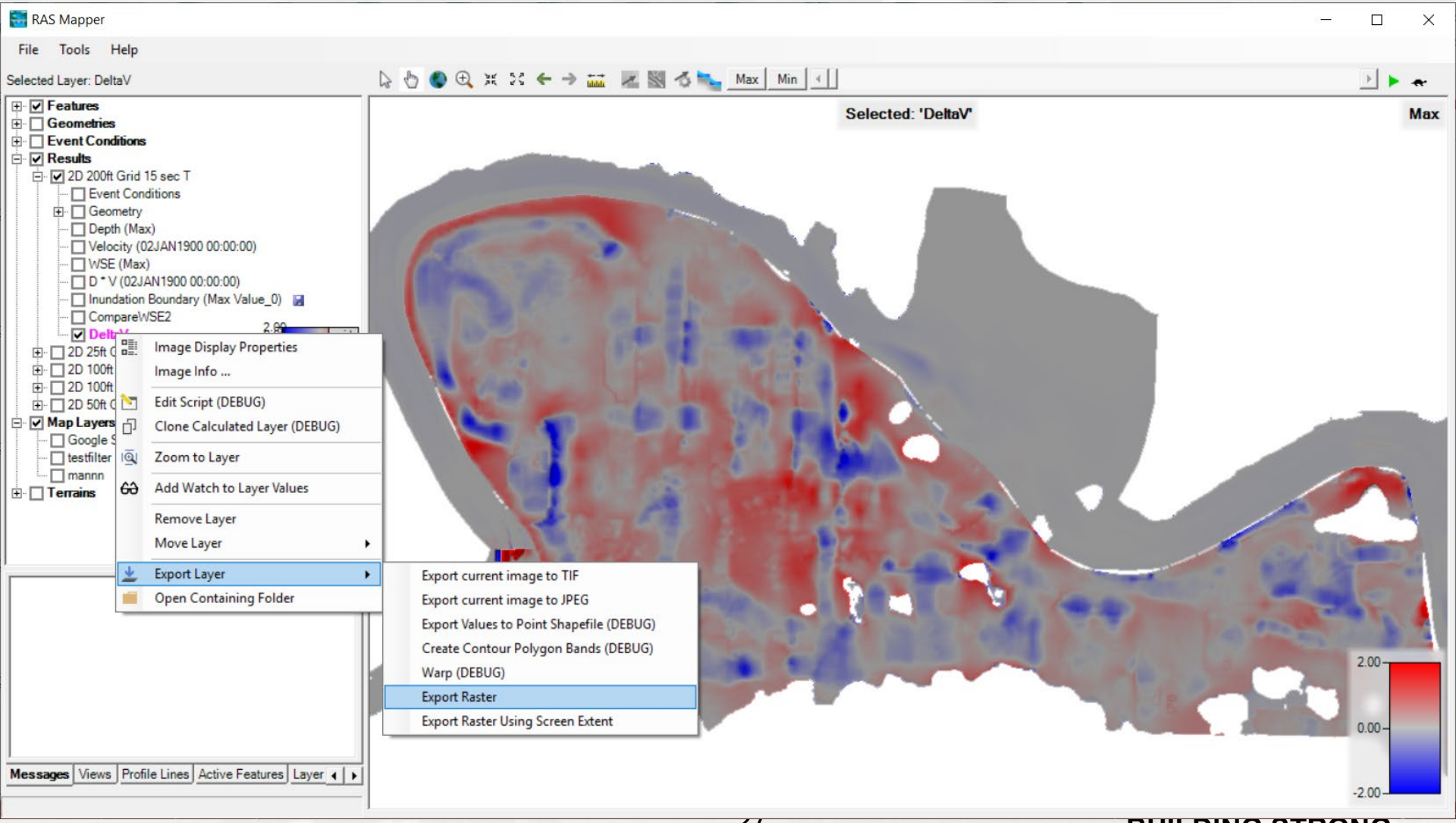
2. Add Layer 2



Velocity Comparison Example

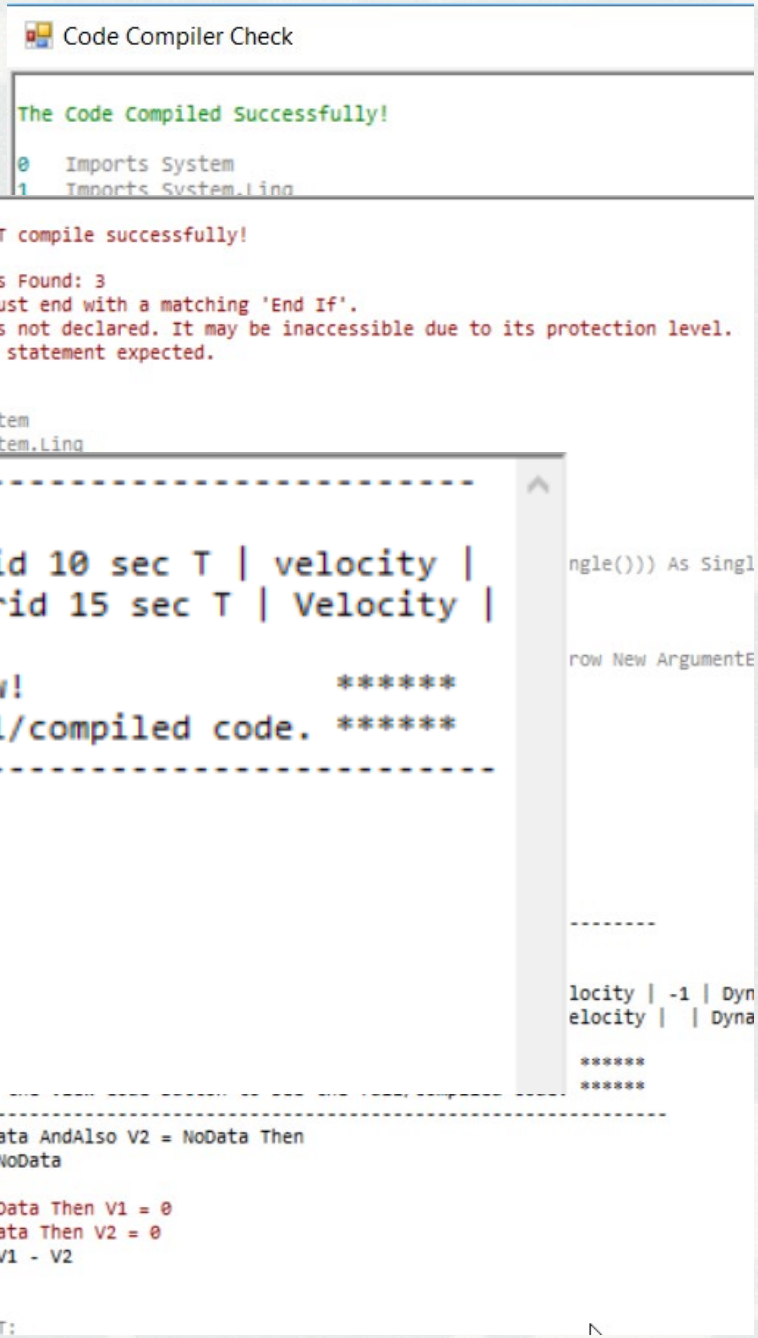


Velocity Comparison Example



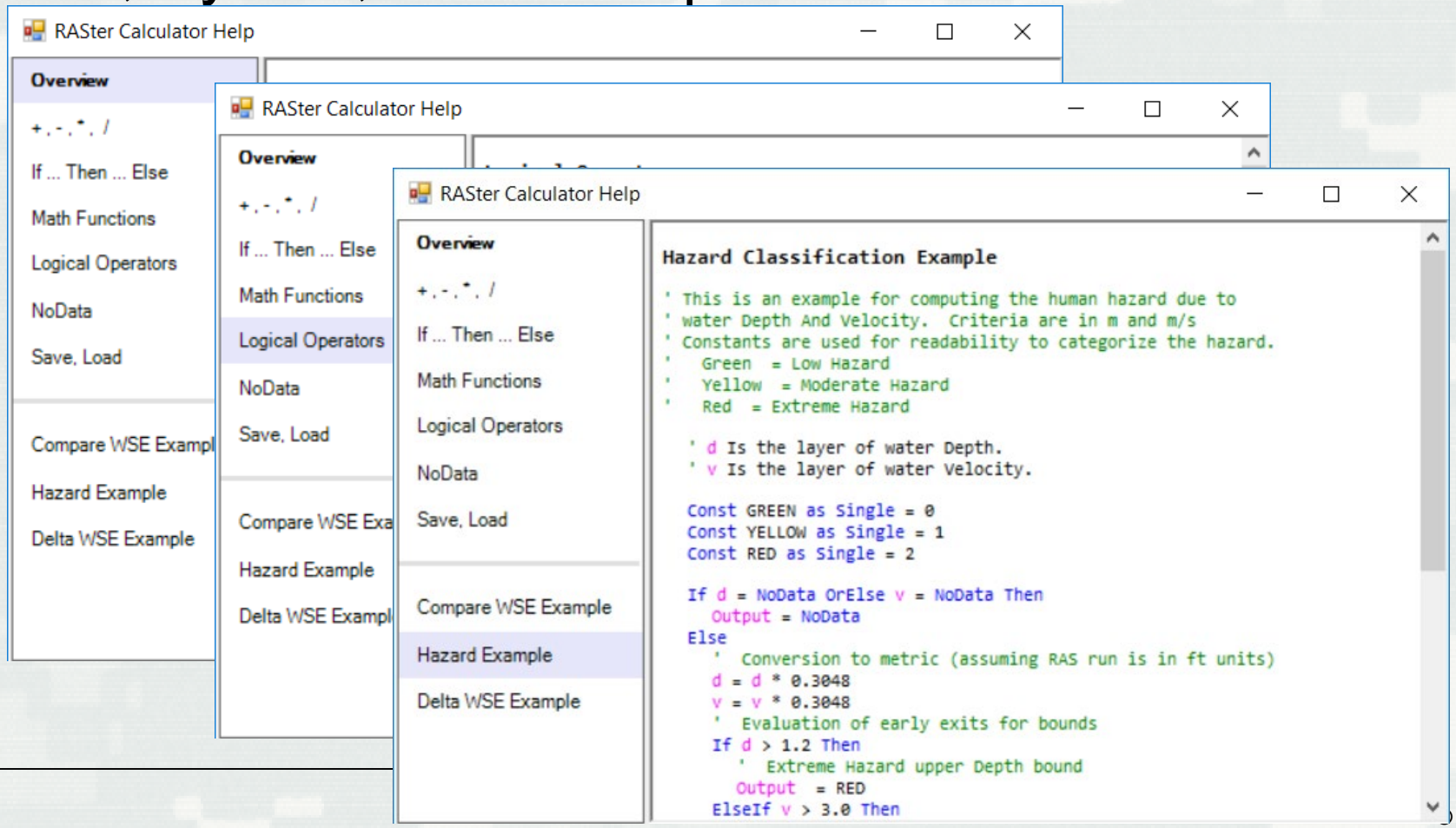
RASter Calculator

- Code Compiler Check



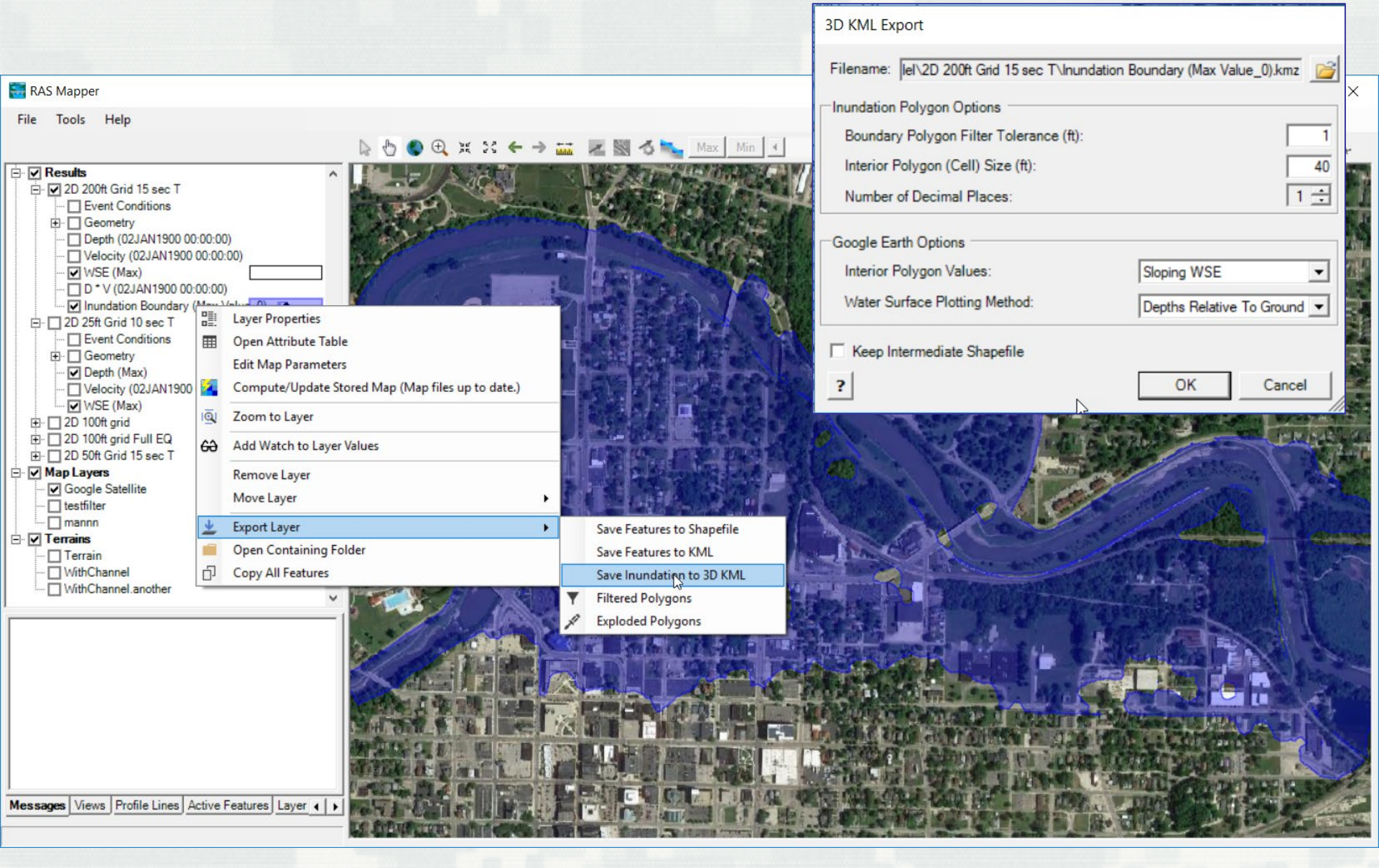
Scripting Help

- Use, Syntax, and Examples



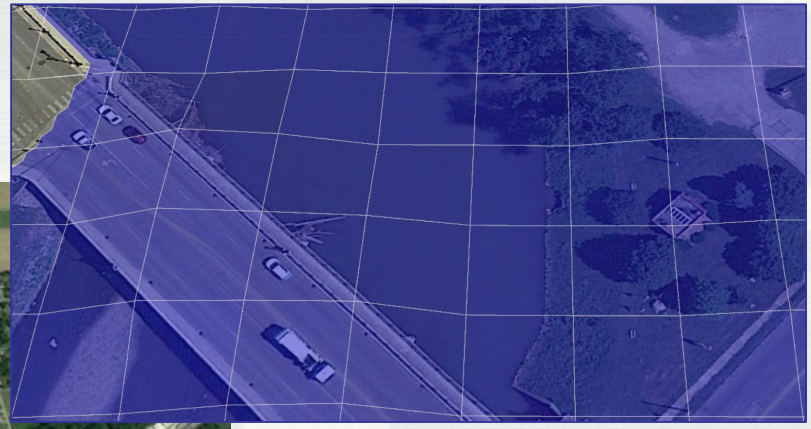
Visualization in Google Earth

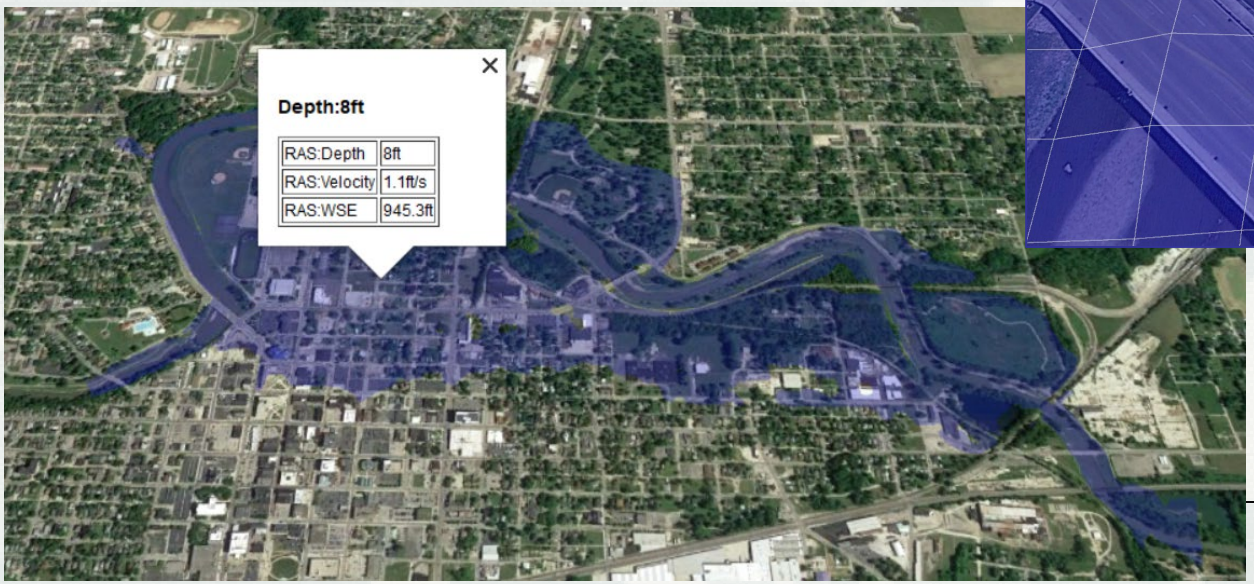
3D KML Export



Parameters/Options – Output File

- KMZ file
- Filter – Boundary
- Polygon Size
- Decimal Places





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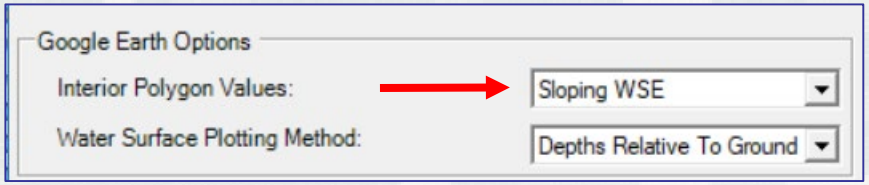
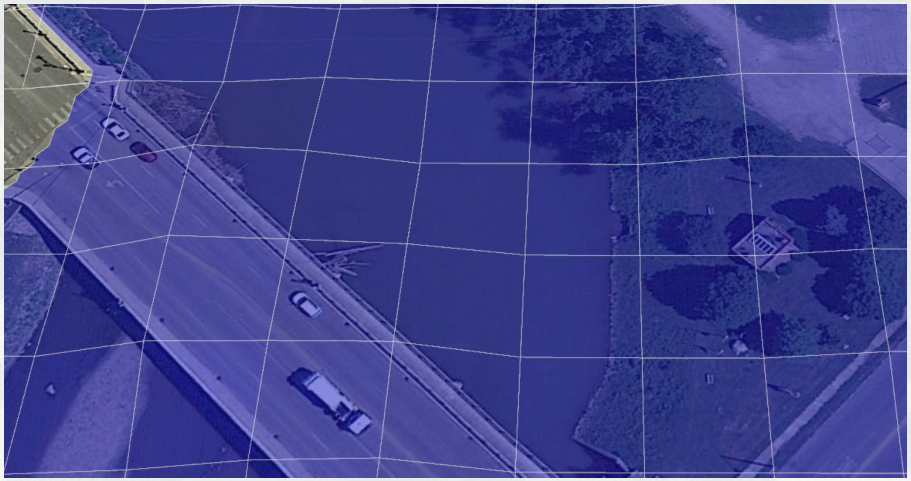
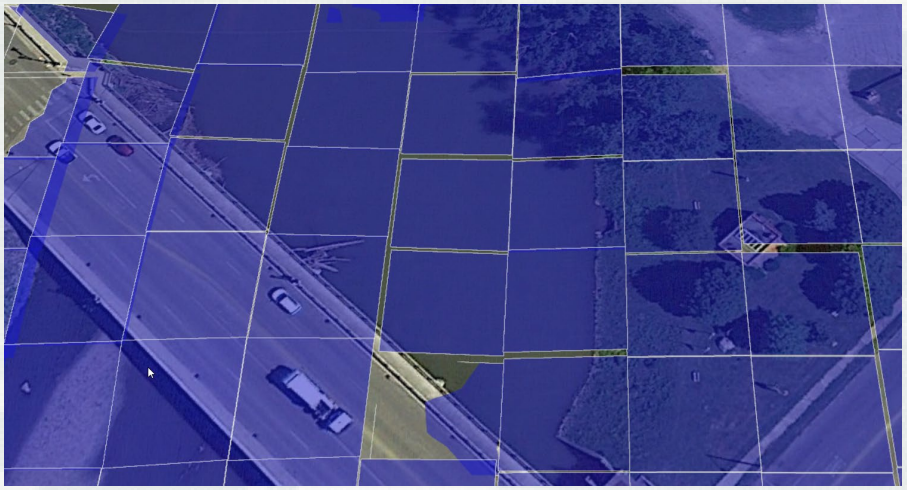
Parameters/Options – Polygon Values



- Sloping WSE

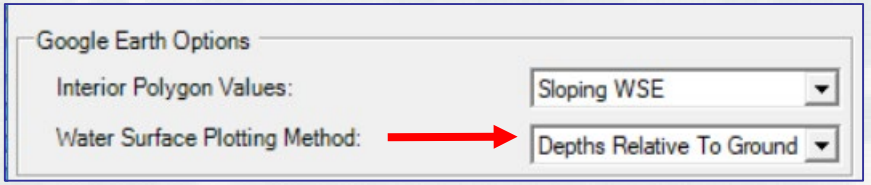


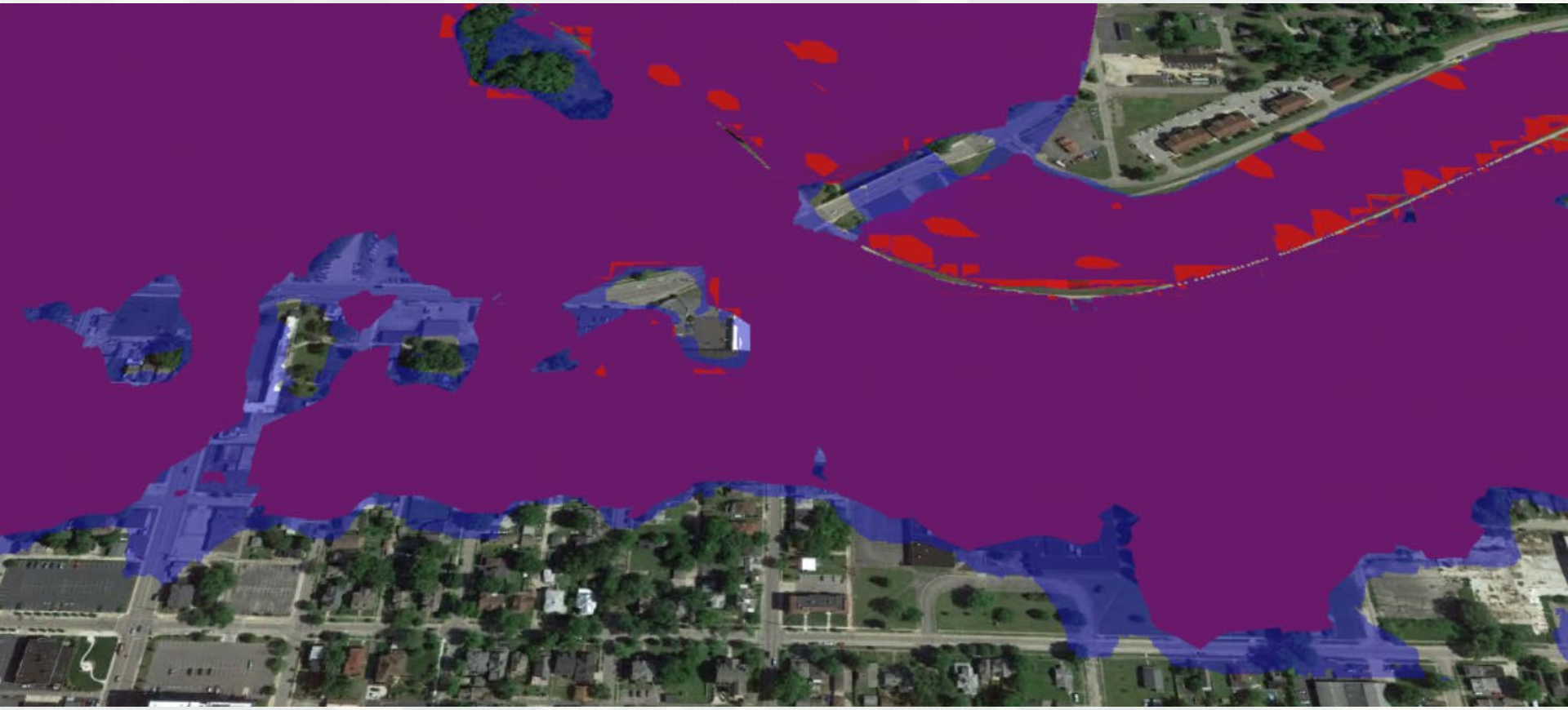
- Horizontal WSE



Parameters/Options – Plotting Method

- Depths Relative to Ground
- Computed WSE





Visualization in Google Earth Street View

- How bad is the flooding at your favorite Gas Station / BBQ joint?

Google Earth Visualization
3D Building

Summary

- Geospatial editing tools in HEC-RAS make modeling building and refinement more efficient.
- Terrain modification tools in HEC-RAS will improve the modeling process.
- RASter Calculator will simplify model evaluation for model improvement and refinement.
- RASter Calculator should result in more effective communication of model results.
- Google Earth export will allow visualization of model results to larger audience.