Project Status Report: CEEn-2016CPST-01: Development Accommodation Realignment Study

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1) Summary of technical/non-technical challenges encountered

- Hydrologic data to verify that the 500 cfs demand is accurate.
- HEC-RAS modeling to understand how the stream is flowing
- Create accurate cross sections of the existing section
- Create a good cross section for the design

2) Team approaches/resolutions to overcome challenges

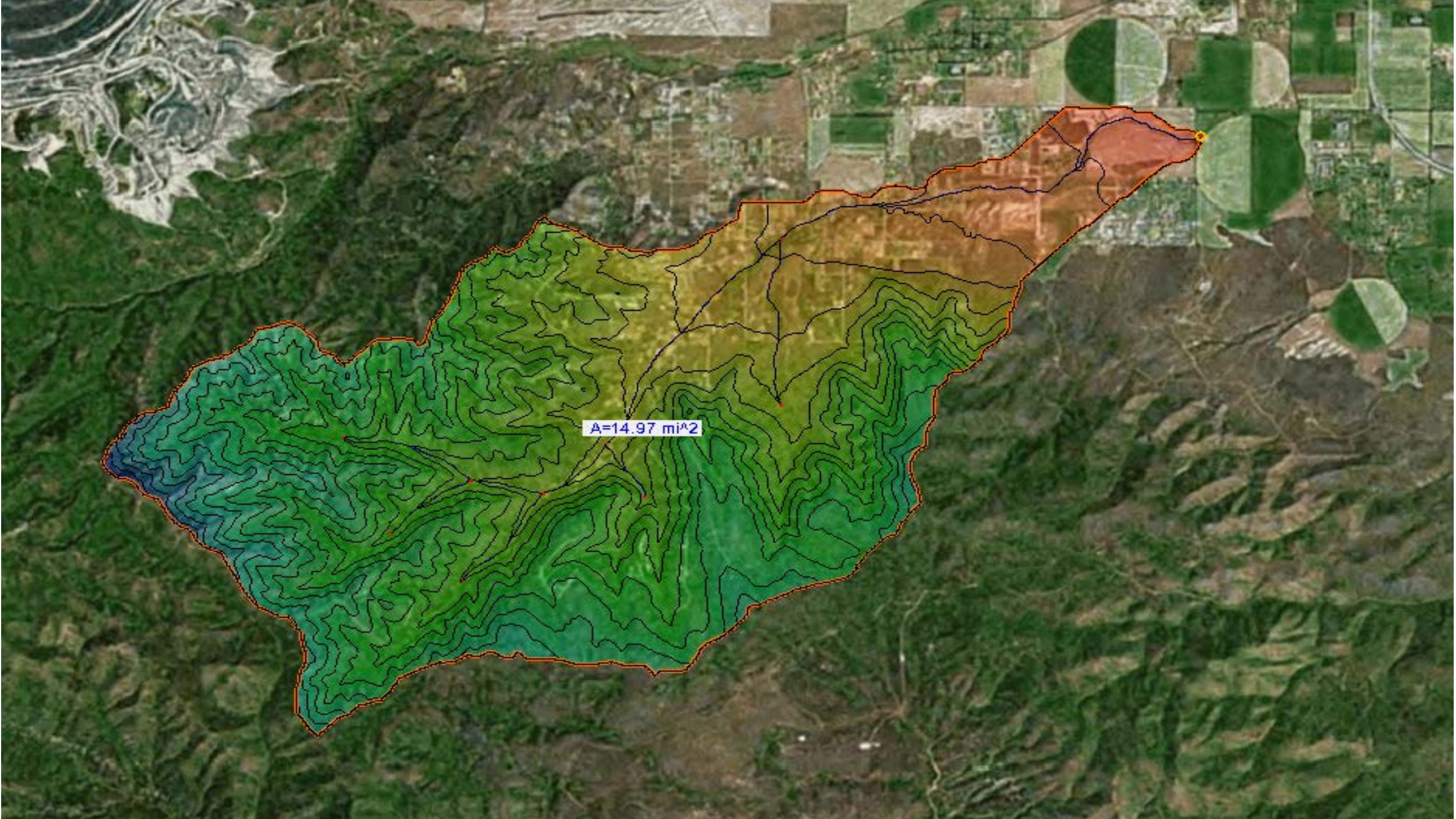
- Building off the work done previously to understand WMS, a model was created to determine the flow.
- Made another site visit to Riverton to take measurements of the stream.
- Met with Dr. Hotchkiss to discuss the progress of the design and cross section design.

3) Status of challenge resolutions & potential project impacts

- One model was created, but the window was too small. A second model was created that accurately depicted the watershed. After talking with Dr. Nelson, the appropriate equation was selected to model the stream flow.
- The stream was visited and measurements were taken. More pictures were taking of the stream to better understand the cross section. Locations of the cross sections were determined as well.
- After meeting with Dr. Hotchkiss, it was determined that the natural stream design is having a trapezoid channel base with floodplains. The floodplains reduce the speed of the stream and reduce the amount of erosion.

4) Project Status & Summary

- The flow was modeled, and the 500 year flow is well below the design parameters given to us by Riverton City.
- A background knowledge on how HEC-RAS works was obtained. The next step is creating the model and putting cross sections and flow data into the program.
- The updated cross sections have been calculated and have been placed into Hydraulic Toolbox. The cross sections will also be used in HEC-RAS
- Floodplain modifications have been made to the stream design. The new cross section have been placed in Hydraulic Toolbox. The new cross sections will be used in HEC-RAS.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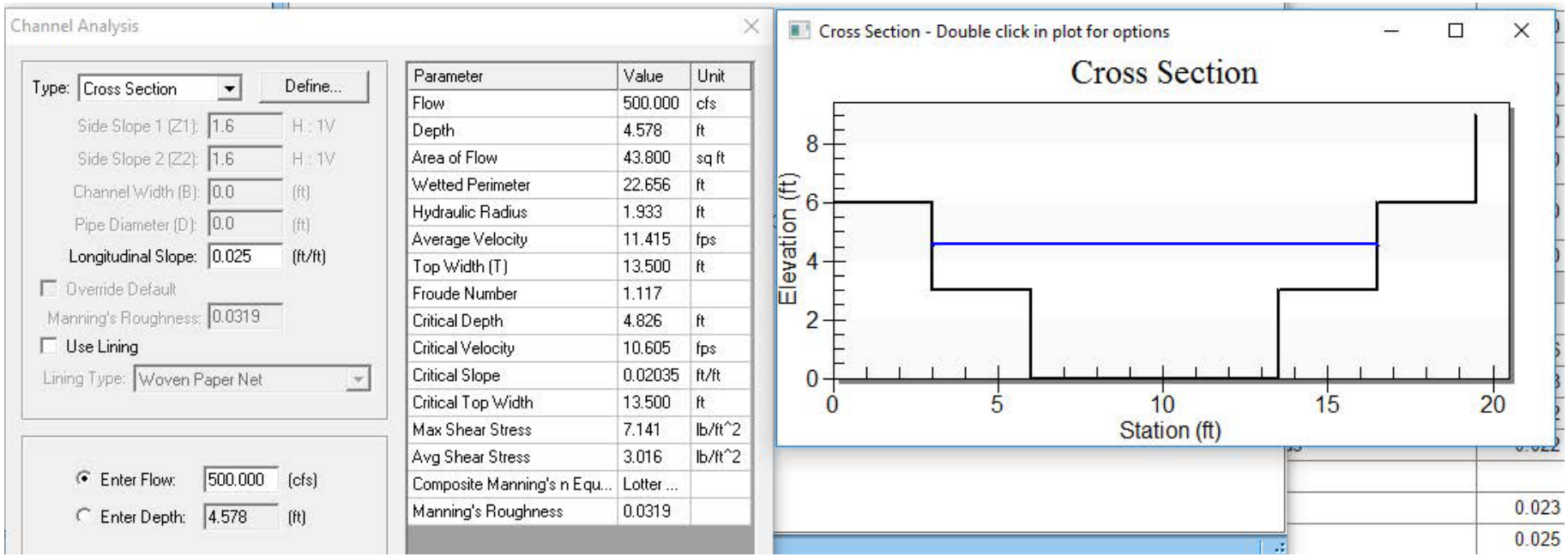
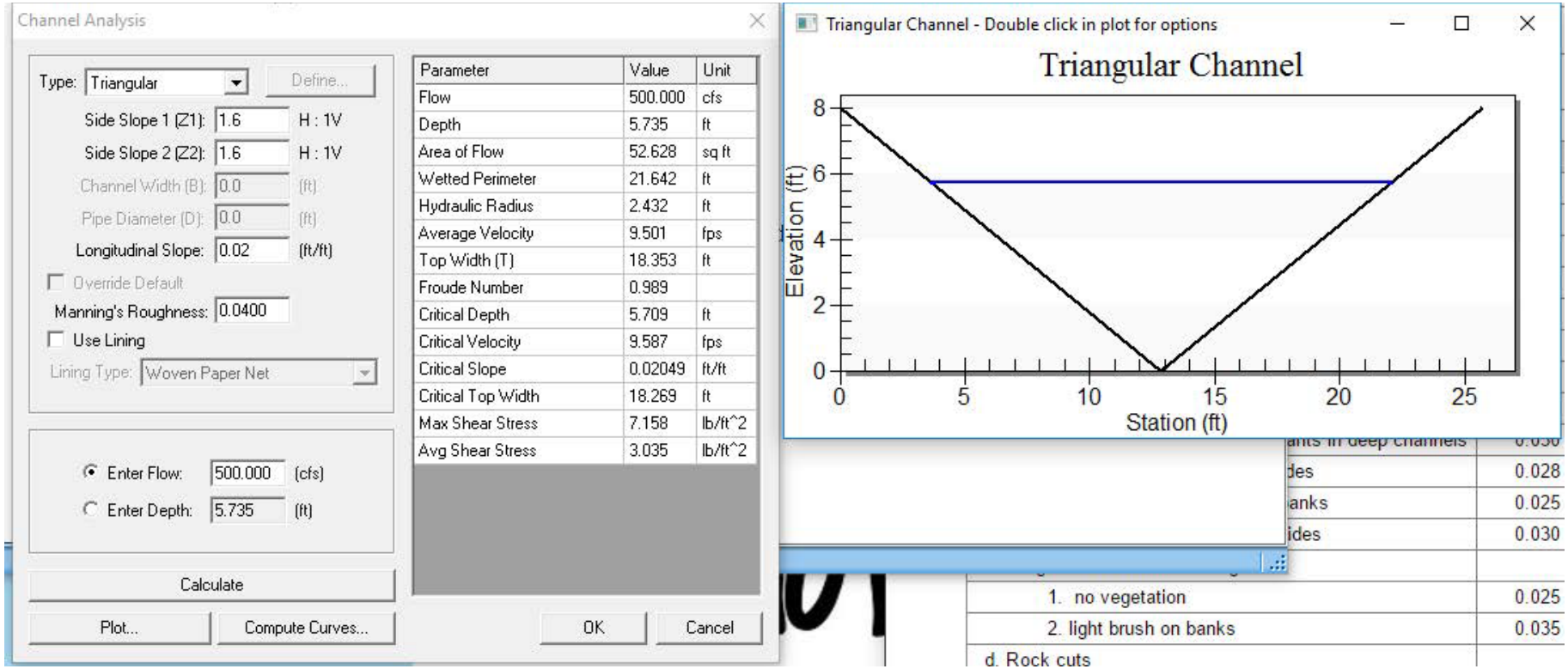
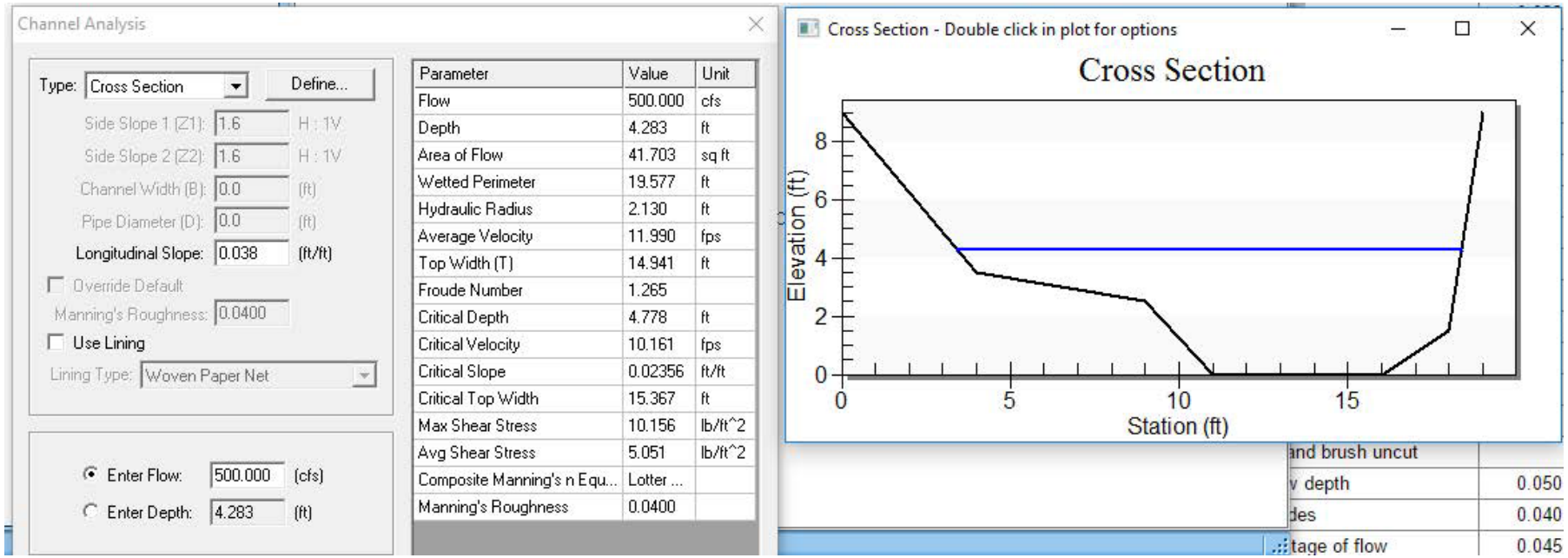

Channel Analysis
Type: Cross Section
Define...
Side Slope 1 (Z1): 1.6 H : 1V
Side Slope 2 (Z2): 1.6 H : 1V
Channel Width (B): 0.0 (ft)
Pipe Diameter (D): 0.0 (ft)
Longitudinal Slope: 0.025 (ft/ft)
Override Default
Manning's Roughness: 0.0319
Use Lining
Lining Type: Woven Paper Net
Enter Flow: 500.000 (cfs)
Enter Depth: 4.578 (ft)
Parameter | Value | Unit
Flow | 500.000 | cfs
Depth | 4.578 | ft
Area of Flow | 43.800 | sq ft
Wetted Perimeter | 22.656 | ft
Hydraulic Radius | 1.933 | ft
Average Velocity | 11.415 | fps
Top Width (T) | 13.500 | ft
Froude Number | 1.117
Critical Depth | 4.826 | ft
Critical Velocity | 10.605 | fps
Critical Slope | 0.02035 | ft/ft
Critical Top Width | 13.500 | ft
Max Shear Stress | 7.141 | lb/ft^2
Avg Shear Stress | 3.016 | lb/ft^2
Composite Manning's n Equ... | Lotter ...
Manning's Roughness | 0.0319
Cross Section - Double click in plot for options
Cross Section
Elevation (ft)
Station (ft)
0
2
4
6
8
0
5
10
15
20
0.023
0.025


Channel Analysis
Type: Triangular
Define...
Side Slope 1 (Z1): 1.6 H : 1V
Side Slope 2 (Z2): 1.6 H : 1V
Channel Width (B): 0.0 (ft)
Pipe Diameter (D): 0.0 (ft)
Longitudinal Slope: 0.02 (ft/ft)
Override Default
Manning's Roughness: 0.0400
Use Lining
Lining Type: Woven Paper Net
Enter Flow: 500.000 (cfs)
Enter Depth: 5.735 (ft)
Calculate
Plot...
Compute Curves...
OK
Cancel
Parameter | Value | Unit
Flow | 500.000 | cfs
Depth | 5.735 | ft
Area of Flow | 52.628 | sq ft
Wetted Perimeter | 21.642 | ft
Hydraulic Radius | 2.432 | ft
Average Velocity | 9.501 | fps
Top Width (T) | 18.353 | ft
Froude Number | 0.989
Critical Depth | 5.709 | ft
Critical Velocity | 9.587 | fps
Critical Slope | 0.02049 | ft/ft
Critical Top Width | 18.269 | ft
Max Shear Stress | 7.158 | lb/ft^2
Avg Shear Stress | 3.035 | lb/ft^2
Triangular Channel - Double click in plot for options
Triangular Channel
Elevation (ft)
Station (ft)
0
2
4
6
8
0
5
10
15
20
25
1. no vegetation 0.025
2. light brush on banks 0.035
d. Rock cuts


Channel Analysis
Type: Cross Section
Define...
Side Slope 1 (Z1): 1.6 H : 1V
Side Slope 2 (Z2): 1.6 H : 1V
Channel Width (B): 0.0 (ft)
Pipe Diameter (D): 0.0 (ft)
Longitudinal Slope: 0.038 (ft/ft)
Override Default
Manning's Roughness: 0.0400
Use Lining
Lining Type: Woven Paper Net
Enter Flow: 500.000 (cfs)
Enter Depth: 4.283 (ft)
Parameter | Value | Unit
Flow | 500.000 | cfs
Depth | 4.283 | ft
Area of Flow | 41.703 | sq ft
Wetted Perimeter | 19.577 | ft
Hydraulic Radius | 2.130 | ft
Average Velocity | 11.990 | fps
Top Width (T) | 14.941 | ft
Froude Number | 1.265
Critical Depth | 4.778 | ft
Critical Velocity | 10.161 | fps
Critical Slope | 0.02356 | ft/ft
Critical Top Width | 15.367 | ft
Max Shear Stress | 10.156 | lb/ft^2
Avg Shear Stress | 5.051 | lb/ft^2
Composite Manning's n Equ... | Lotter ...
Manning's Roughness | 0.0400
Cross Section - Double click in plot for options
Cross Section
Elevation (ft)
Station (ft)
0
2
4
6
8
0
5
10
15
and brush uncut
v depth 0.050
des 0.040
tage of flow 0.045