

The Problem

The City of Riverton, Utah has embarked on a project to realign 3500 feet of a natural stream to support future development as part of an agreement with landowners. For the Development Accommodation Realignment Study, our team has analyzed Rose Creek that runs through the city of Riverton and determined the best possible path to realign the stream in order to accommodate the future development. The goals of this realignment were to create the necessary space for new development while also improving the conditions of stream flow. Current problems with stream conditions included heavy erosion, minor flooding, and super critical flow.

Watershed Model

The watershed for Rose Creek was determined using WMS watershed modeling software and is seen in the figure below. The watershed was found to be 14.97 square miles with an outlet point on the west end of the lot in study. The watershed model was used to verify the given 500 cfs flow used for design. Since a portion of the watershed is urbanized, a national urban regression equation from the U.S. Geological Survey (USGS) was used with data developed in WMS to confirm the design flow. The 100-year recurrence flow from the urban regression equation was 413 cfs. This verified that 500 cfs design was sufficient for the given realignment.

The Solution

The new path of the stream was chosen by looking through maps of Salt Lake County before it was moved in the 1960's. A line was drawn in ArcMap, and the topographical profile was determined. The new path has a constant two percent slope across the design area.

The new design of the stream is close to the layout of the natural stream. The cross section is based off a trapezoidal channel with a flood plain about half way up. The lower trapezoidal cross section can handle about 200 cfs. A flow of 500 cfs gives a total depth of 6 feet, which is well within the boundaries of the stream. The stream bed will consist of the existing soil across the entire design. This will minimize the cost of relocating the stream.

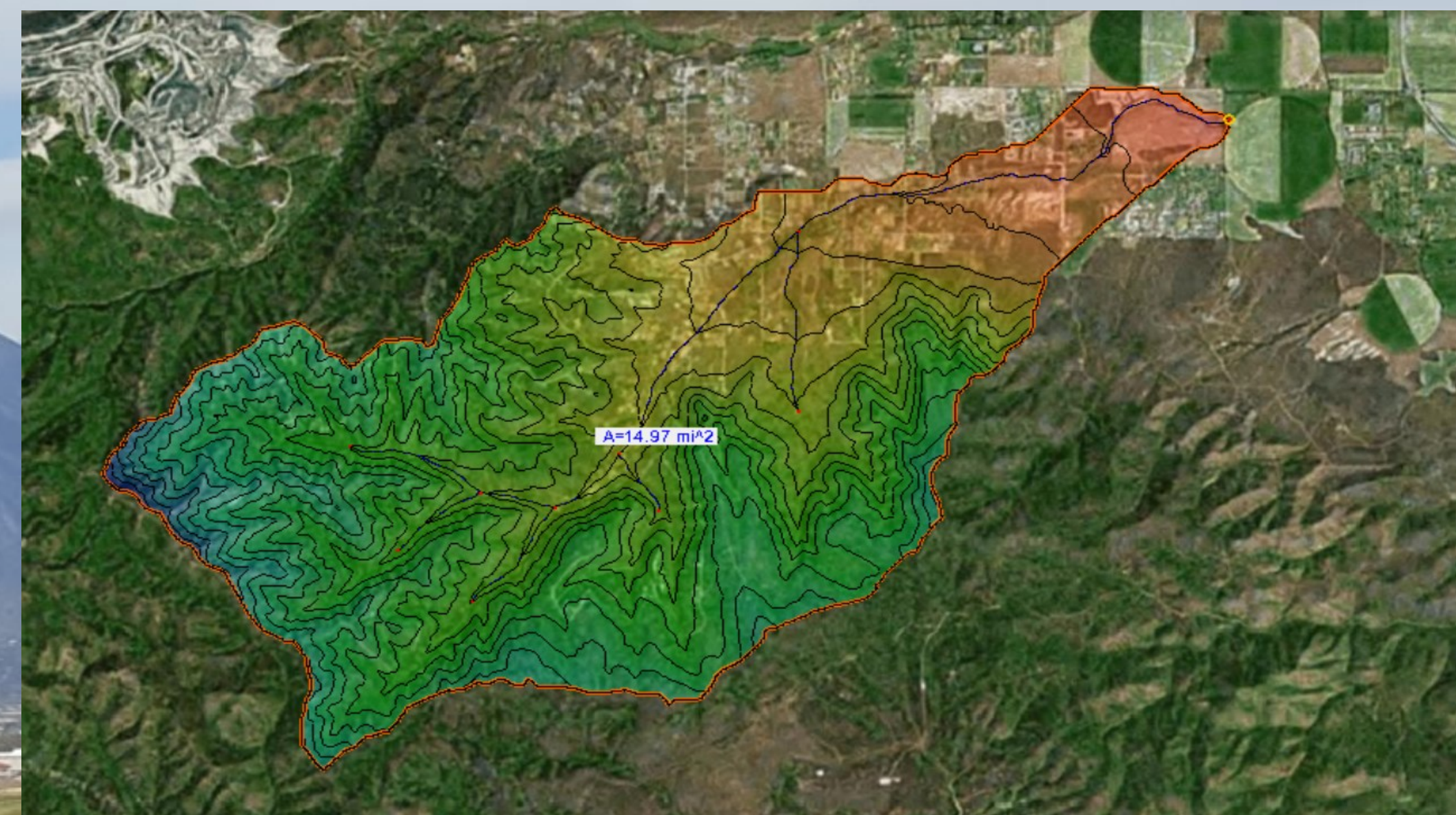
Original Path of Rose Creek



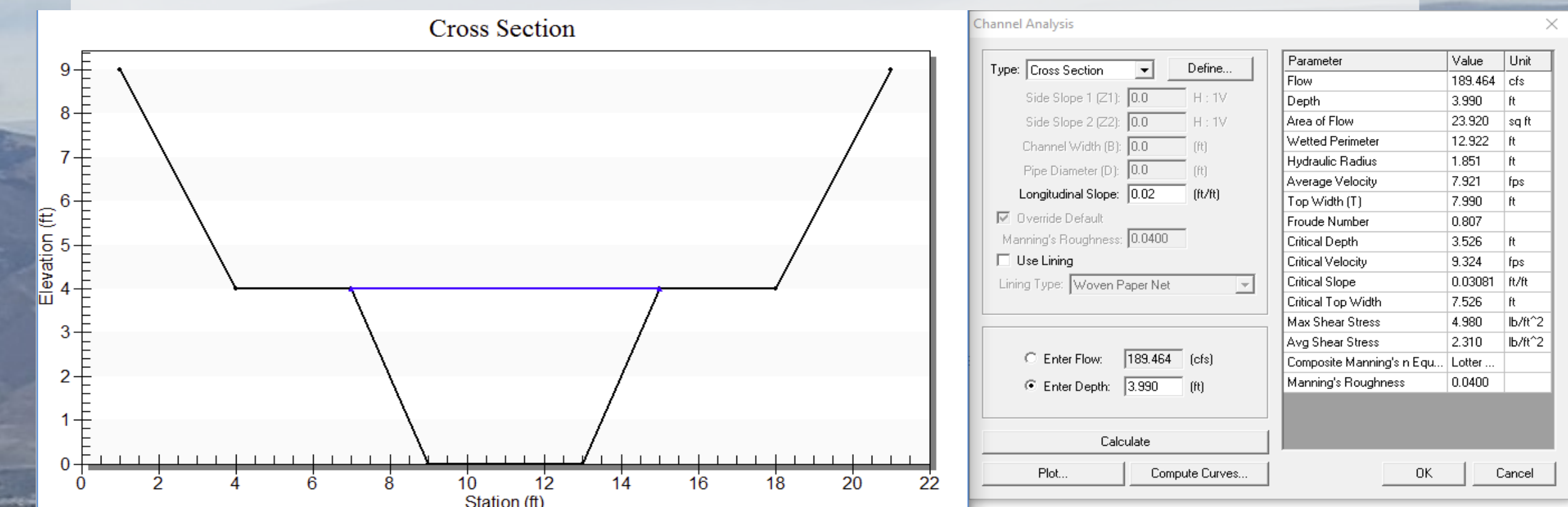
Proposed Path of Realignment for Rose Creek



WMS Watershed Model at Rose Creek



The Proposed Path Cross Section and Flow Data



Why is this better?

Rose Creek had been previously realigned from its original path for agricultural purposes. From site visits, heavy erosion on the south side of the creek is clear as the creek appears to be moving back towards its original path. The elevation profiles of the new path show a more consistent drop in elevation throughout. This slope maintains a sub critical flow which will prevent erosion. The natural soil bed will help to restore Rose Creek to flow as it did before, as opposed other solutions. With the solution mentioned above, Rose Creek will be returned to a more natural state and prevent further maintenance that may be required if erosion persists.

3D Rendering of Proposed Stream Path in HEC-RAS

