

San Simon Barrier Dam Status Update 3

CENE 486C

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Introduction to Project

- Client is the Bureau of Land Management (BLM).
- Flood evaluation on the San Simon Barrier Dam near Safford, AZ.
- Determine if current FEMA Dam Safety rating needs to be raised.



Figure 1. Map showing Safford in reference to State of Arizona.

Location of Structure

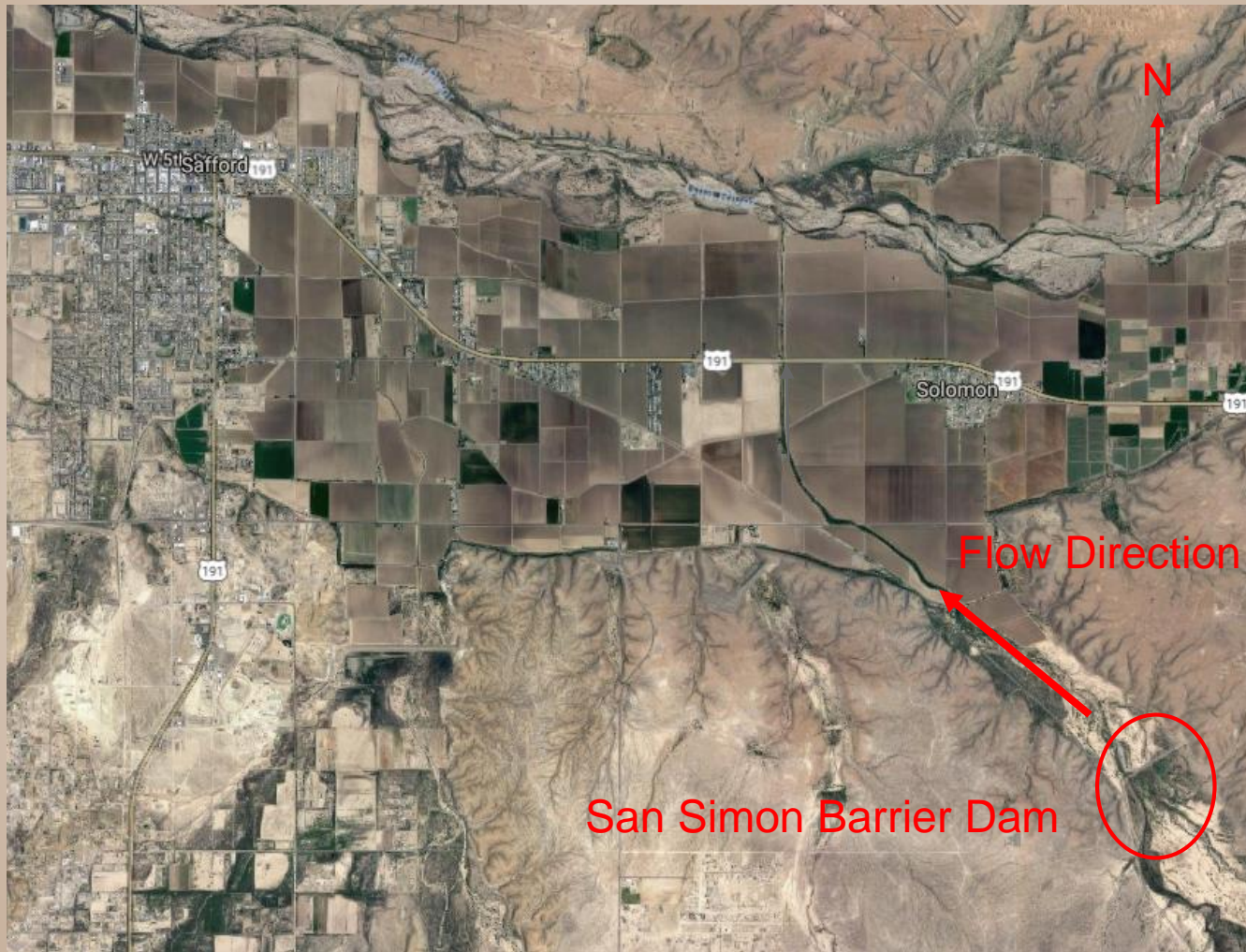


Figure 2. Location of San Simon Barrier Dam sediment structure in reference to Solomon and Safford Arizona.

San Simon Barrier Dam

- Structure designed for sediment capture and control.
- Structure does not retain water but does direct water through the sediment capture structure.
- Lack of proper maintenance has led to concern about flood safety.

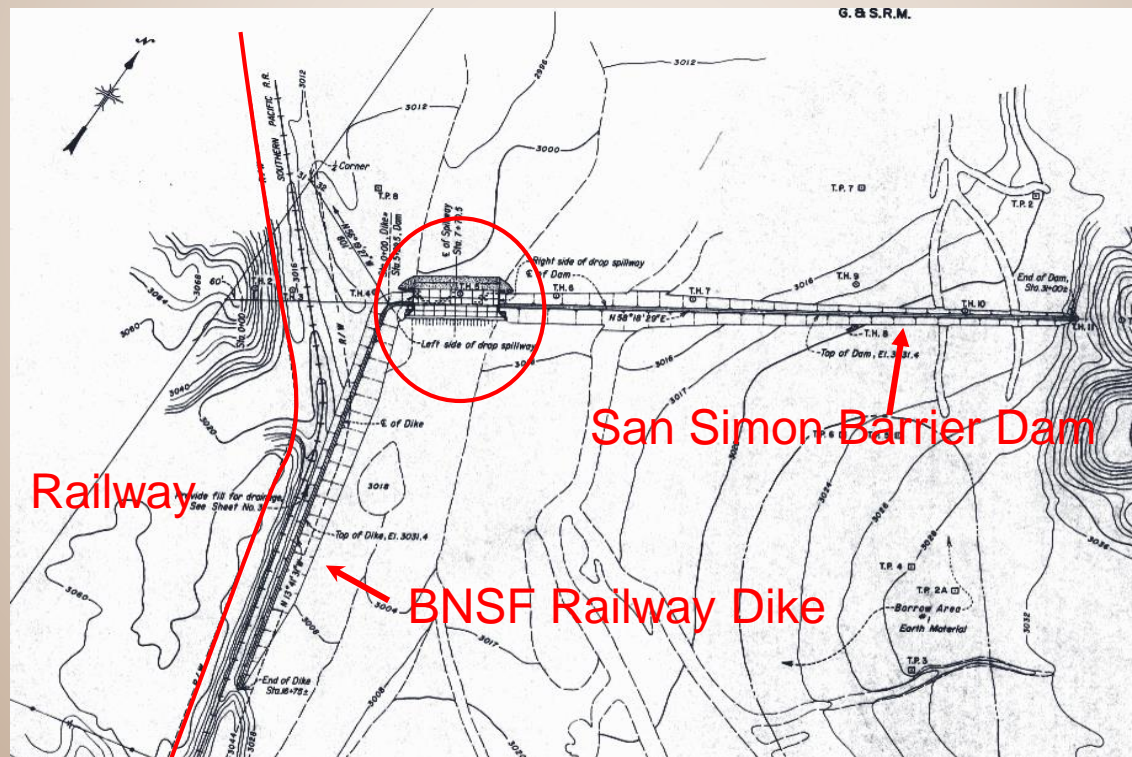


Figure 3. Original construction document of the General Plan for the San Simon Barrier Dam project, 1979.

FEMA Hazard Rating

- Structures current and historic FEMA rating is ranked as Low.
- Running a dam safety analysis to determine if Low hazard rating needs to be increased.

Table 1. Hazard Potential Classifications table for dam evaluation from Federal Guidelines for Dam Safety 2004.

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)

Schedule

Table 2. Project schedule for San Simon Barrier Dam team.

Task #	Task	Original		Actual	
		Start	Finish	Start	Finish
3.1	Geometric Parameters	1/22/18	3/1/18	3/1/18	3/10/18
3.2	Peak Flow Estimation	1/22/18	2/14/18		
3.3	Steady Flow HEC-RAS	2/15/18	2/22/18	3/1/18	3/16/18
3.4	Unsteady Flow HEC-RAS	3/1/18	3/19/18		
3.5	Sediment Transport Analysis	3/1/18	3/19/18		
3.6	Flood Map - Severtity Index	3/1/18	3/19/18		
4.0	Socio-Economic Impact	3/19/18	4/6/18		

Work Completed

- Design storm flow event was chosen to be design peak flow from dam construction documents.
- Field measured dimensions of sediment capture structure has been double checked against original BLM construction documents.
- Digital Elevation Model (DEM) data has been converted into ArcGIS map.

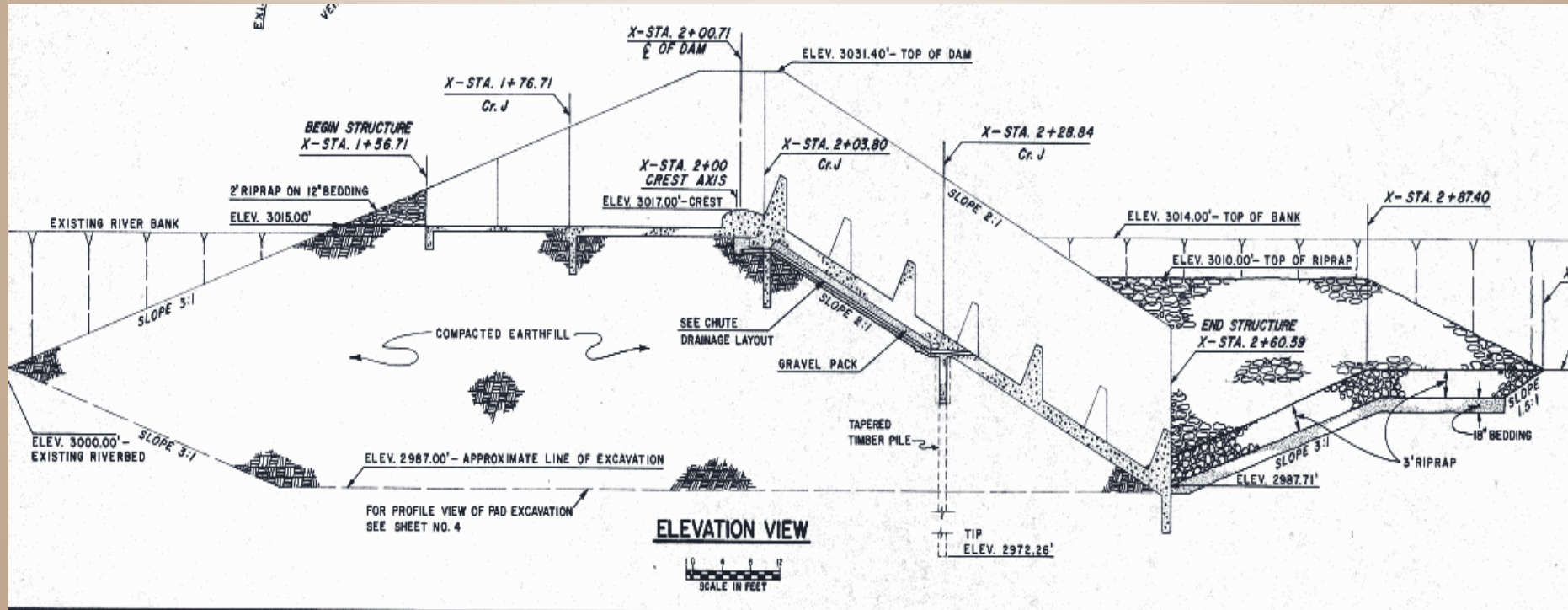


Figure 4. Elevation View of San Simon Barrier Dam from original BLM construction documents, 1979.

Hydrology Selection

- The peak flow event occurred in August, 1931 and was 27,400 cubic feet per second (cfs).
- Using the original peak flow will help determine if current low hazard FEMA rating is still accurate.

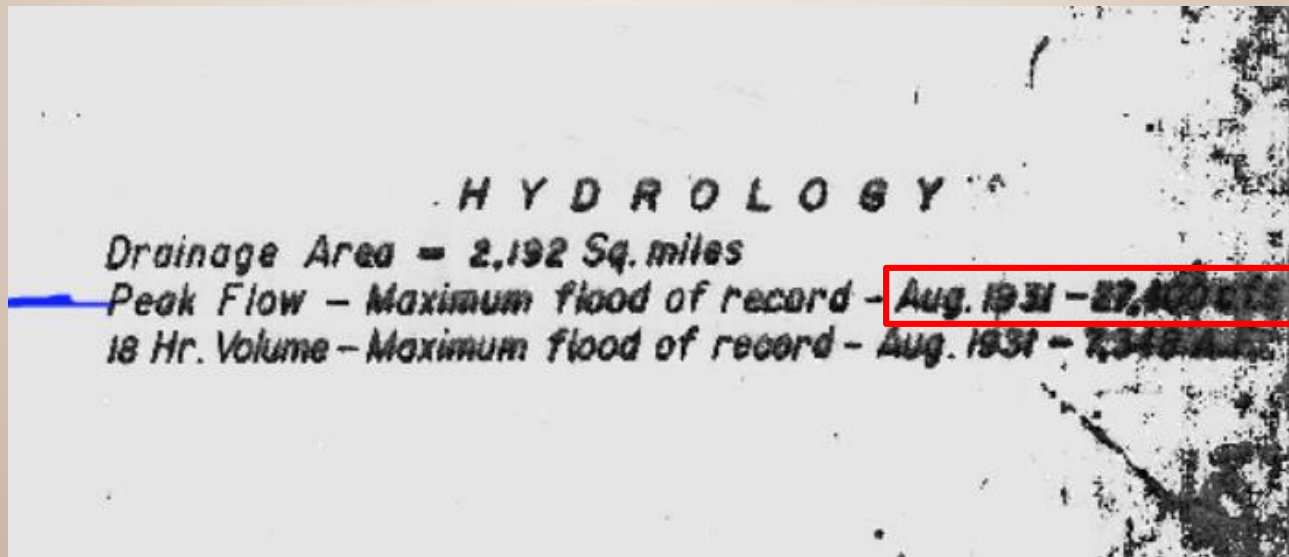


Figure 5. Original hydrology information located on BLM construction documents.

San Simon Basin ArcGIS Map

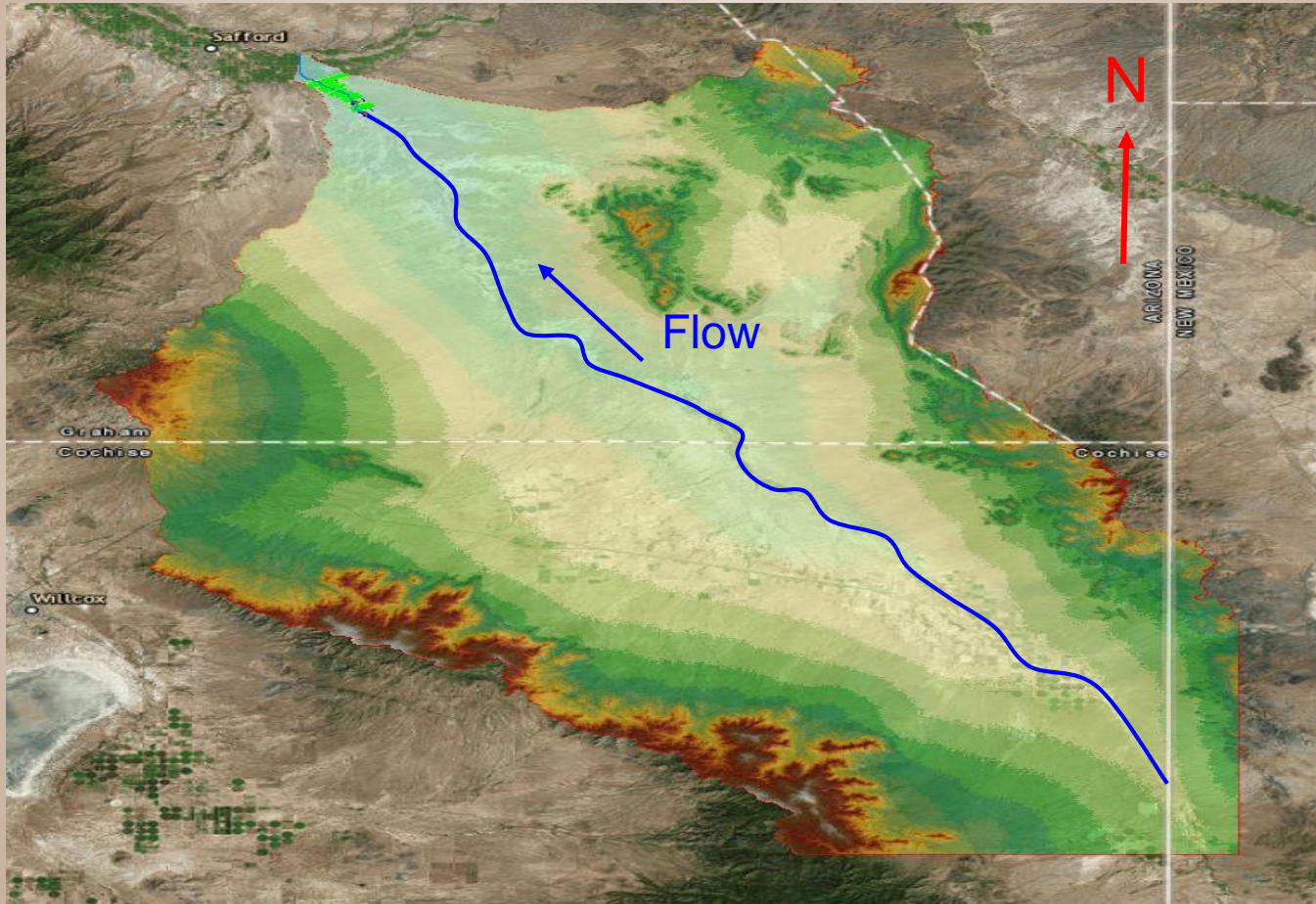


Figure 6. ArcGIS map of San Simon Basin created using HEC-geoRAS extension.

HEC-RAS Input Basin

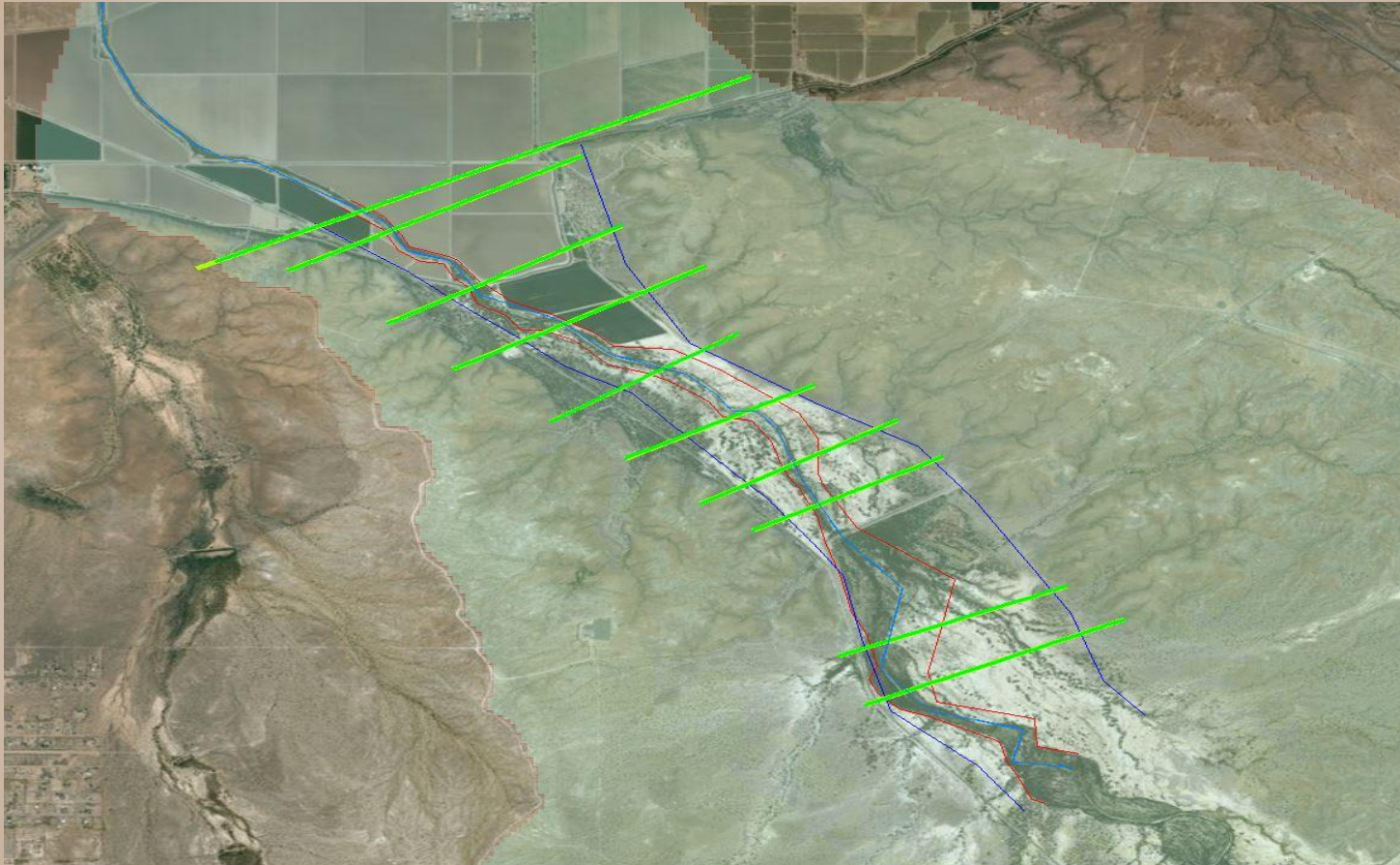


Figure 7. HEC-geoRAS input map for simulating flood events in HEC-RAS with contour lines, river banks, and floodpath defined.

Contour Lines

- Contours have been created in HEC-RAS using HEC-geoRAS file.
- Experiencing initial errors due to reach lengths and contour lengths being too short.

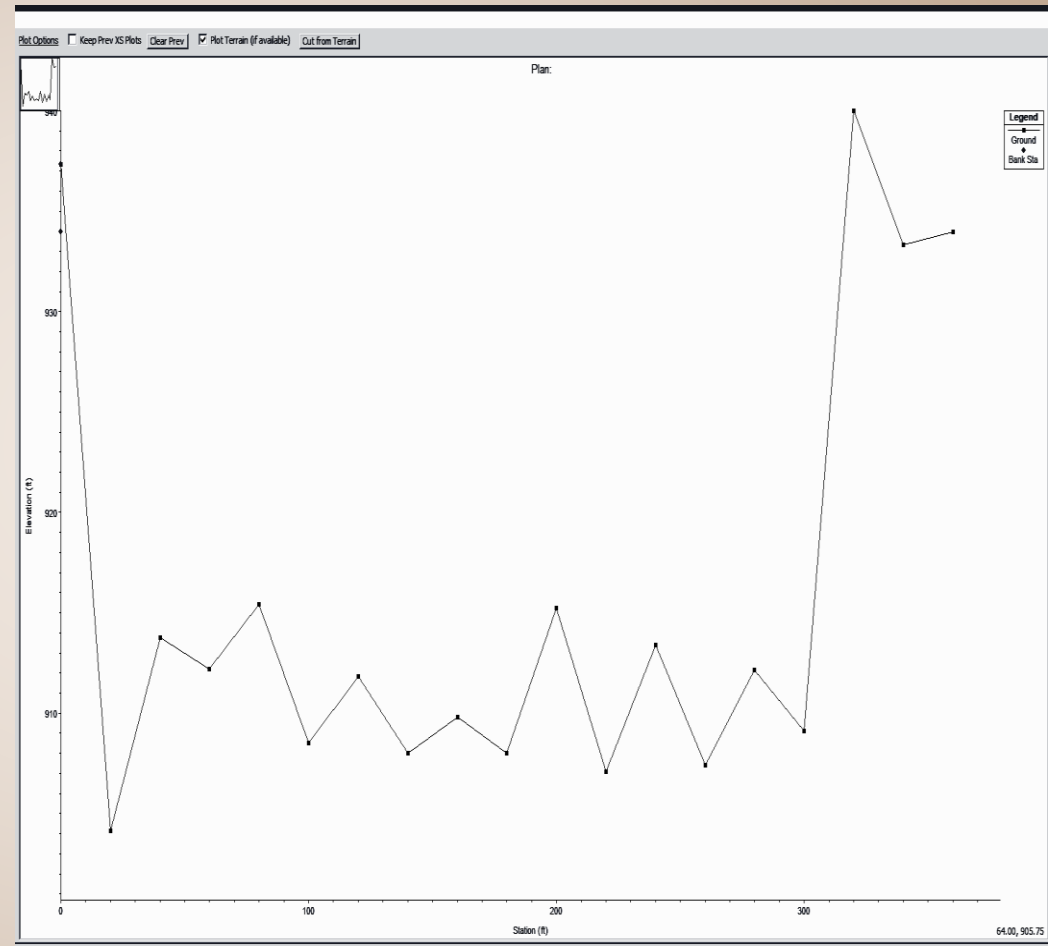


Figure 8. Second to last cross section before entering agricultural valley near Solomon, AZ.

Current Tasks

- Correct HEC-geoRAS input file to properly reflect contour characteristics.
- Run a steady flow state in the HEC-RAS model to ensure model is working correctly.
- Run unsteady flow state models and complete sediment flow analysis.
- Compile resulting flood waters into a severity index flood map.

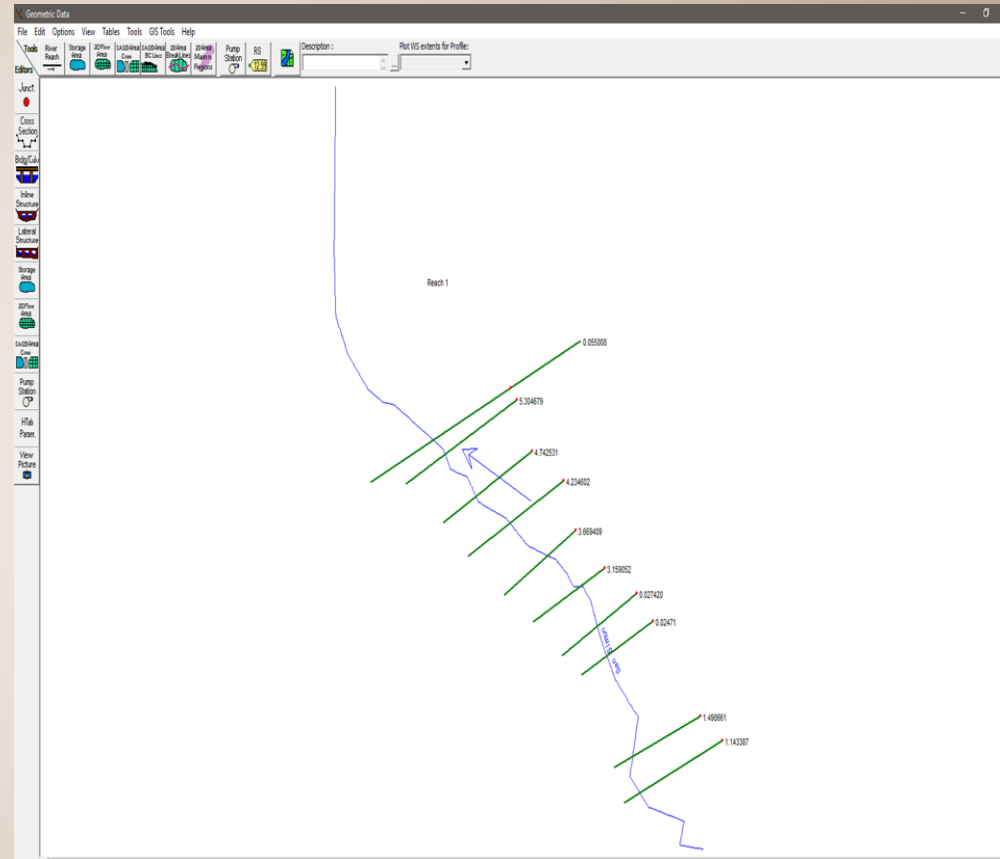


Figure 9. Initial HEC-RAS basin input in blue with contour lines represented in green.

References

[1] Mike Gallio, San Simon Barrier Dam Images. 2018.

[2] "USDA:NRCS:Geospatial Data Gateway:Home", Datagateway.nrcs.usda.gov, 2018. [Online]. Available: <https://datagateway.nrcs.usda.gov/>. [Accessed: 06- Mar- 2018].

[3] "Map of Safford, Arizona", Google.com, 2018. [Online]. Available: <https://www.google.com/maps/@33.8326798,-110.0191407,7.34z>. [Accessed: 11- Mar- 2018].

[4] "BLM Data Sets", Safford, Arizona, 2018.

[5] "Federal Guidelines for Dam Safety - Hazard Potential Classification System for Dams", Fema.gov, 2018. [Online]. Available: <https://www.fema.gov/media-library-data/20130726-1516-20490-7951/fema-333.pdf>. [Accessed: 01- Mar- 2018].

Questions?

