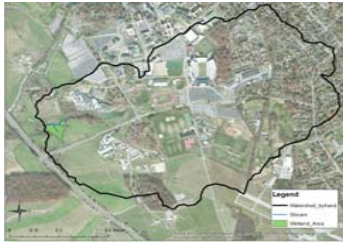


Yuya Ishizuka, Travis Moore, Sarah Nash

## BACKGROUND

Results of the TMDL study determined sediment as the primary cause of pollution for Stroubles Creek. In 2006 an Implementation Plan for the TMDL study performed on Stroubles Creek was developed to indicate how and where sediment reductions will occur. Combinations of best management practices will be used during implementation to address all possible sources of sediment loading to Stroubles Creek.



Cross-country watershed



Wetland area

## PROBLEM STATEMENT

Stormwater management currently in place is not serving its purpose. The purpose of this project is to design a constructed wetland to reduce sediment in Stroubles Creek in hopes of improving the benthic environment in the surrounding areas.

## OBJECTIVES

The main objective of this project is to reduce in-stream sediment loads in Stroubles Creek. In order to achieve this goal, the following must be accomplished:

- Divert a portion of the stream into the wetland area
- Increase residence time to promote settling
- Increase the performance of the existing wetland area in terms of sediment removal



Standing water in wetland area



Storm event

## CONSTRAINTS

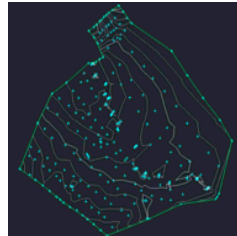
- Cost - Remain under the budget of \$15,940
- Maintenance - Ensure understanding and application of the plan for upkeep
- Permitting - Comply with Army Corp of Engineers and DEQ requirements
- Standards: Comply with Virginia regulations

## DATA ANALYSIS

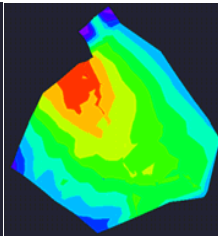
Over 240 points were recorded using a Topcon total station and then imported into AutoCAD to produce topography and surface visuals.



Travis surveying



Survey points in AutoCAD with 2 ft contours

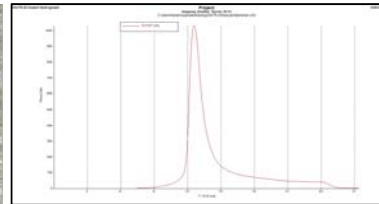


Slope gradient of land

GIS was utilized to determine necessary input for TR-55. Peak flow rates and hydrographs were produced for the 2-, 10-, and 100-yr storm events through the TR-55 software.



Impervious surfaces represented by hydrologic soil group



TR-55 hydrograph for a 10-year frequency, 24 hour storm event.

## STANDARDS

- 9VAC25-380 Wetlands Policy
- NRCS Conservation Practice Standard Constructed Wetland Code 656
- VA DEQ Stormwater Design Specification No. 13: Constructed Wetlands
- VA DEQ Stormwater Design Specification No. 14: Wet Ponds
- VA DEQ Stormwater Design Specification, Appendix D: Sediment Forebay

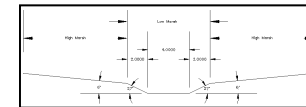
## ACKNOWLEDGEMENTS

A special thanks to our faculty adviser, Durelle Scott, our industry advisers Charles Dietz and Lauren Grimes, and Professor Cully Hession.

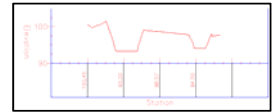
## FINAL DESIGN



Final layout for the forebay, channel, and wet pond.



Channel cross-section



Profile view of the final design

## COST ANALYSIS

Total	
Action	Total Cost (USD)
Construction	15650
Design	3036
Permitting	550
<b>Overall Total</b>	<b>19236</b>

## MAINTENANCE

During the first 6 months after construction, the site should be inspected at least twice after storm events that exceed 1/2 inch of rainfall. Vegetation may require support (watering, weeding, mulching, replanting) during the first 3 years. Water trees every three days for the first month and then weekly during the first growing season, depending on rainfall. Inspections should be performed including the following:

- Measure sediment accumulation levels in forebay and wet pond
  - Monitor the growth and survival of emergent wetlands and tree/shrub species.
  - Inspect the condition of inlets, banks, outfall, maintenance, access, and internal and external side slopes of the wetland.
  - Cleanups should be scheduled at least once a year
- Cleanout of the forebay should occur when inspections indicate that 50% of the forebay sediment storage capacity has been filled.