The DWRC UD WATER Program: Silver Brook Watershed Plan

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Figure 6.Norma Brasure (left) and Gemma Antoniewicz (right) observing the low flow and high flow drainage system at STAR campus. (Photo credit Clare Sevcik)

What is UD WATER?

The UD WATER Project (Watershed Action Team for Ecological Restoration) is a university-wide initiative which seeks to develop management techniques to minimize the environmental impacts of stormwater runoff from campus. For more information, visit our website at www.udel.edu/water.

Project Objectives

1. Delineate storm watershed for Silver Brook.
2. Analyze the runoff within Silver Brook storm watershed by modeling its drainage system through use of the Environmental Protection Agency's Storm Water Management Model (EPA SWMM).
3. Propose a plan to decrease flooding on UD Campus and surrounding City of Newark.
4. Assess reduction in flooding by modeling a stormwater park at the Rodney Dorms, replacing pipes, and daylighting Silver Brook on STAR campus.

Figure 1. Possible Silver Brook stream corridor through STAR campus.

Figure 2. City of Newark proposed plan for stormwater park on the site of Rodney Dorms.

Figure 3. Proposed landscape of daylighting.

Methods

1. Delineate watershed boundary for Silver Brook
   - Map based on flow directions, topography, and stormwater drainage systems from GIS.
2. SWMM Modeling - Current Conditions
   - Enter the Newark stormwater drainage system.
   - Enter precipitation data for selected storms.
3. SWMM Modeling - Future Conditions
   - Add stormwater park to replace Rodney Dorms, daylighting of Silver Brook, and enlarge pipe sizes.
   - Re-run model simulations to obtain results of modifications and determine where flooding occurs as compared to original model.

Results

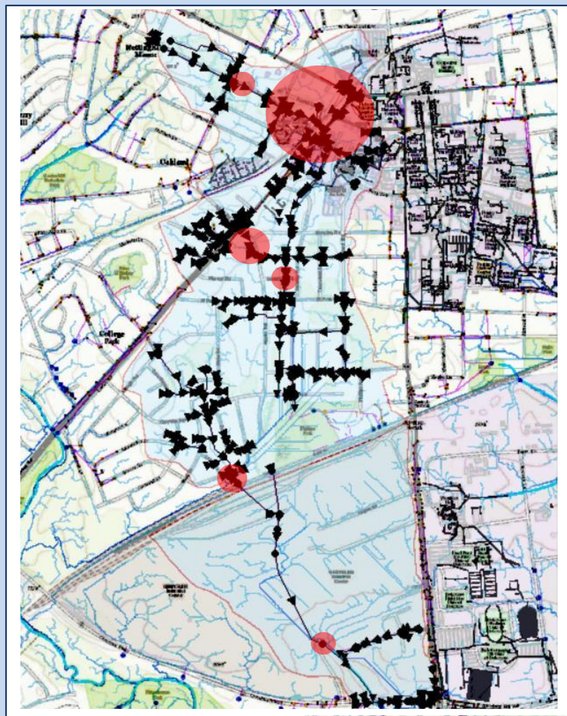

Figure 4. The Silver Brook storm watershed with flooding during a 10-year storm with the size of the red highlight corresponding to the number of nodes that are flooded.

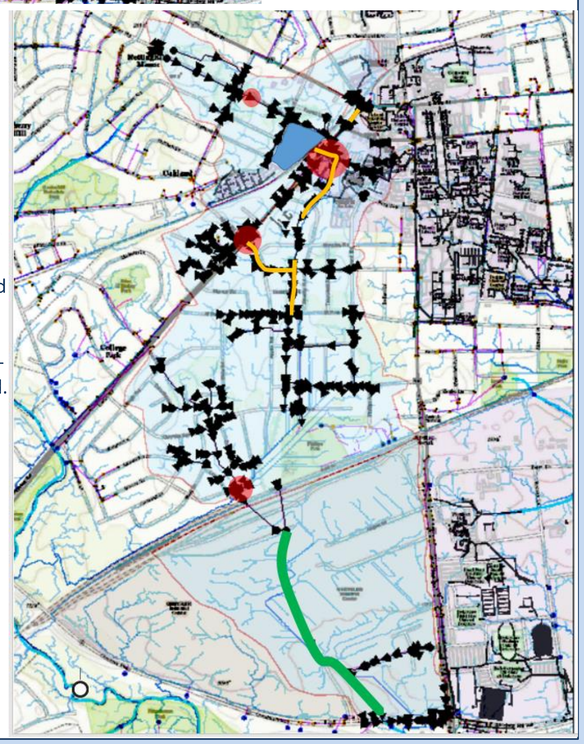

Figure 5. The Silver Brook storm watershed with a proposed stormwater park (blue), enlarged pipes (orange), and daylighted stream (green) on the STAR campus. Flooding areas for a 10-year storm are highlighted in red.

Conclusions

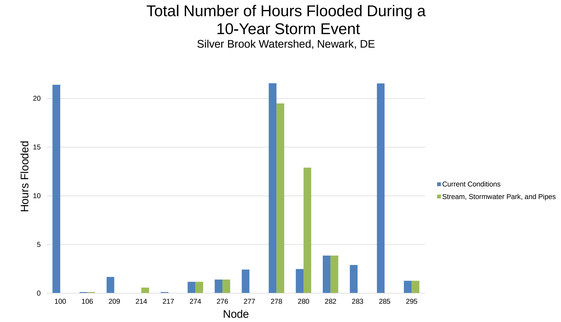

Figure 7. Hours of flooding during 10-year storm event in the Silver Brook storm watershed.

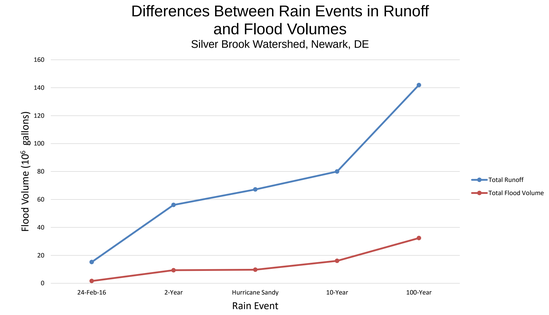

Figure 8. Total volume of runoff and flood volume from the 15 subcatchments within Silver Brook storm watershed for various flood events.

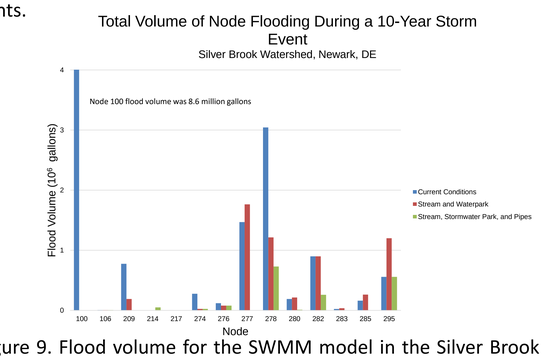

Figure 9. Flood volume for the SWMM model in the Silver Brook storm watershed.

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