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Co-Design for second-order effects and institutional Change: A case study in sustainability

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Co-Design for Second-Order Effects and Institutional Change

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“Every action has consequences and those consequences have consequences which are called Second-Order Effects”

http://www.dubberly.com/articles/what-is-interaction.html
http://personalmba.com/second-order-effects/: Josh Kaufman quote
Wiener, Bateson, Mead
• **Weak Emergence**
  “effects you did not anticipate”
  Indirect effects

• **Strong Emergence**
  “connections between effects at different scales”

  Emergent effects
Goals at two scales

• Create a new course
  – Systems theory and design practice
  – Use campus as “living laboratory”
  – Authentic design experience
  – Support sustainability initiatives

• Emergent Goal
  Connect Institutions
In 2014, the Potomac Conservancy identified Washington, DC's aging sewer infrastructure as one of the top three threats to the Potomac River, due to frequent combined sewer overflow events that release raw sewage pollution directly into the river during even moderate rain storms. The local water authority, DC Water, has put forth an ambitious plan to mitigate this pollution in part through large-scale deployment of green infrastructure, which would provide triple-bottom-line sustainability benefits in priority combined sewer overflow (CSO) drainage areas.

Georgetown University's campus comprises significant acreage within priority combined drainage areas, thus offering the potential to play a key role in reducing runoff and mitigating overflow events. Our design plan leverages GU's location within the combined sewer area and capitalizes on the heavily visited nature of our campus to offer a 3-in-1 demonstration site for green infrastructure in the nation's capital.
Georgetown University

Rainwater Capture at Lauinger Library Site Detail

1 Million Visitors
Georgetown campus architects estimate that the central portion of historic main campus—including Healy Lawn, Lauinger Library, and Healy Hall—receive one million visitors each year. Tourists, faculty, staff, professors, and other scholars—from around the world—will have a chance to see what Georgetown University is doing to change the planet. In this prominent location, in the heart of our nation’s capital, our demonstration sites will not only change the quality of the Potomac’s waters, but also change the minds of all who see them.

HEALY LAWN
By removing decaying plant life and concrete drainage basins, we will open up the historic heart of campus. To capture rainwater runoff from the lawn and to create a natural 250 sq. ft. of bioretention at the site. Using the existing slope to create a terraced outdoor classroom and extending the recently planned permeable pavement “library walk” pathway, we will create a unique, accessible learning space for future generations of students.

Bioretention surrounds terraced outdoor classroom

Lush overhanging plants give a concrete cube new life and increase visibility from below

Educational placards by new benches describe the intervention

Bioretention strips replace existing concrete barriers

Bioretention strips replace existing concrete barriers

Permeable pavement continues from library walk

New bicycle rack for commuters

New seating areas and solar charging station.

Big Bluestem
Wild Hydrangea
Arbor Vitae

Bioretention Palette (Native Species)

Swamp Milkweed
New England Aster
Eco-Friendly Mulch

All plants are native to the Mid-Atlantic; recommended by Fairfax County Dept. of Public Works and Environmental Services

Green Roof manages 650 gal. of water

Student study lounge, library special collections, and library administration benefit from a new perspective

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Library Roof
This highly visible space is often criticized by students as “harsh” or “soulless.” This flat roofed building has a ballast surface which allows rainwater to flow directly to the downspout and into the sewer. By removing the ballast and replacing it with a multi-layered green roof structure including overhanging plants, we wish to brighten up the academic hub of campus and create a study space that serves to educate at the same time. Students, library administrators, and those on the lawn below will instantly recognize this key part of our initiative.

Lot Nine
This commuter lot is the last stop between campus runoff and the Potomac. By simply replacing the perimeter parking spaces with permeable asphalt pavement, we anticipate being able to collect 18,000 gallons of runoff during a 1.2” rainstorm. We will also add two bioretention strips where current concrete barricades stand.

3. Permeable pavement continues from library walk

4. New bicycle rack for commuters

5. New seating areas and solar charging station.

6. Big Bluestem

7. Wild Hydrangea

8. Arbor Vitae

9. Swamp Milkweed

10. New England Aster

11. Eco-Friendly Mulch

12. All plants are native to the Mid-Atlantic; recommended by Fairfax County Dept. of Public Works and Environmental Services

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Results

• Honorable Mention (3rd Place) in the Rainworks Challenge
• 9-month survey of CDAs and drainage system
• Green Roof to be installed 2017
• Modified Consent Decree for Long-Term Control Plan
• Ongoing talks re: MOU
Takeaways

• Institutional time scales are longer
• Students have no sense of how change happens
• Student have no sense of what they are actually learning
• Sacrifice managing complexity at one scale for managing complexity at another
Questions