LESSON 5
Case Studies: Analyzing GSI Projects Near Us

Problem Statement: How can I apply the practices of engineering design to recommend the best green stormwater infrastructure (GSI) applications for a high priority site in my neighborhood?

Subject: Human Geography, Science, Engineering, Math, Civics, Common Core
Grade Level: Middle School or High School

DESCRIPTION

It is extremely useful to have an interesting model to study when you are trying to understand how a system works so you can adapt and apply what you learn from the model to your own problem solving challenge.

HOW TO USE A CASE STUDY

"A case study is a research approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context."

The case studies selected in this series of GSI Lessons are **real-world projects** already completed or in development that provide a range of unique ecological, engineering, policy, and equity challenges and benefits.

When you compare one case study to another you will notice that the available reports, webpages, photos, or videos are not always of the same quality, quantity, or style. You might consider these documents like chapters in a "Living Textbook" where the case studies shared have been written up for different real audiences for different purposes.

YOUR TASK

As you analyze the content provided in the links below for a particular case study, you will need to sharpen your ability to discern how each of them in some way applies the practices of engineering design. You will need to do this by thinking backwards.

The final "preferred" solution is before you. Use the framing questions listed under the Eight Science and Engineering Practices to guide you. It may not work for you perfectly in every situation, but you will learn alot by applying this backwards design methodology.

CASE STUDY A: [Barton Roadside Rain Gardens](), West Seattle

As a part of their CSO control project, King County constructed 91 **Roadside Rain Garden**s to control stormwater around the **Barton Basin**. During rain events, the stormwater in this area picks up pollutants from our impervious surfaces and transports them right into the Puget Sound. These rain gardens will capture, filter, and infiltrate stormwater down into the ground to reduce the amount of pollution draining into the Sound.

CASE STUDY B: [High Point Neighborhood Redevelopment](), West Seattle

The **High Point Neighborhood Redevelopment Project** transformed this area into one of the biggest natural drainage systems in the country. The neighborhood is located in Longfellow Creek's subbasin, as one of the most productive salmon spawning streams in Seattle, this is critical to keep our pollution out of their habitat. This redevelopment used a variety of GSI solutions to control their stormwater and protect salmon from polluted, toxic runoff.

CASE STUDY C: [Thornton Creek Water Quality Channel](), Northgate, Seattle

Thornton Creek forms where two streams converge in the Northgate Neighborhood of Seattle. Intense urban development around this area has polluted the southern head of the creek. To clean the pollution out of this section of the stream Seattle Public Utilities and environmental groups constructed a **Water Quality Channel,** in place of an old mall parking lot. This is where the creek is slowed and GSI strategies are used to filter out pollutants from the water before it continues downstream, and into Lake Washington.

CASE STUDY D: [Tukwila Modular Wetlands System](), City of Tukwila

The City of Tukwila has identified four roadway sites along the Duwamish River that are main sources of urban stormwater runoff. This polluted runoff can harm fish, namely salmon, when it enters the River. The city plans to construct **Modular Wetlands Systems**, which filter out toxins, heavy metals, and other physical debris from stormwater. These are small and compact solutions that can fit right on the side of a roadway.

CASE STUDY E: [Residential Rain Gardens and Cisterns](), King County

All around King County residents have taken personal responsibility for their stormwater runoff and partnered with the County or engineering firms to build their own GSI Solutions. Residential stormwater can accumulate pollutants and harm our ecosystems the same way that major roadway runoff can. Read through these three residential examples of **Cisterns and Rain Gardens** to understand the small-scale but equally important projects.

SHOW WHAT YOU KNOW

Okay, so what are the main ideas here? How would you summarize the key takeaways from this case study? How would you compare the GSI design elements used at this site to two or three other case studies? Be ready to take part on a student panel of "GSI experts" or pick a partner to produce a mock podcast, or some other presentation format you want to try.

WHAT CAN WE DO?

1. Help plant 3 Million Trees
2. Switch to these strategies for Natural Yard Care (in 15 different languages!)
3. Take personal action at Puget Sound Starts Here
4. Don't Feed the Tox-Ick Monster - 7 Simple Actions
5. See playlist of 20 King County informational videos on Yard Talk
6. Build a Rain Garden at 12,000 Rain Gardens
7. Advocate for Green Stormwater Infrastructure around your school neighborhood
8. Follow the indicators that scientists track on the dashboard Puget Sound Vital Signs

HELP IMPROVE THIS LESSON

1. What advice do you have for making this lesson better?
2. How would you teach parts of this lesson to younger students?
3. Are there broken links that we need to know about?
4. Did you find even better links in your research?
5. Would you like to share examples of your work so that other classrooms can learn by your example?

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