

# BEACON HILL INTERNATIONAL SCHOOL Teacher Guide

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## How to Use This Guide

This guide supports the Community Waters Science Unit Teacher Manual with information, maps, and images specific to your school and neighborhood. It is written for teachers; its goal is to provide a better understanding of what is happening with stormwater in and around your school. The points of interest and walking field trip route are suggestions and should be adapted as desired.

If you have any questions about these maps, accompanying lessons, or stormwater around your school, contact IslandWood staff at [communitywaters@IslandWood.org](mailto:communitywaters@IslandWood.org).



### Stormwater Schoolyard – Lesson 3

This map and points of interest (photos and info) can be used to guide your class' exploration of the schoolyard. You will find the student worksheet for this lesson following the teacher guide version. Please use the extra space on the pages to add your own notes and questions! ☺



**A. Slopes / surfaces**

Stormwater that can't absorb into the ground runs off it. The slope of the ground affects where this water flows and how fast. Consider the slope and surfaces of this area: where will the water end up? What kind of ground surface is on the slope (grass, bushes, dirt, gravel, concrete?) How do these surfaces and vegetation affect the stormwater runoff here? Think about the soil comparisons you studied in the models in class. Which does this type of soil most resemble? Hint: The dry, hard-packed soil probably does not hold much water compared to other surfaces like the woodchips and mulch areas. How pervious is this surface? Where does the rainwater go? What might be carried with it?

**B. Terraces**

Consider how stormwater flows from the schoolyard toward the street here. Can students recall what happens to steep slopes in heavy rain (erosion)? What function might these rock walls serve? What do you see that will help slow and sink stormwater? What might speed it up?

**C. Gutters and Downspouts**

Some downspouts drain into the ground near buildings, while others are attached directly to the buildings' sewer or stormwater pipes. These downspouts collect water from this roof, and send the stormwater into the ground. These are more intricate than the typical school building. Can students find these themselves? Where does the water come from and where do you think it might go?



**D. Storm Drain**

Storm Drains move water into underground pipes to take it somewhere else. Anything that gets carried into the drain may end up in a local stream, lake, or Puget Sound. Why do you think the drain was built in this location? Where does water come from that goes into this drain? Is the drain working properly? What is in the drain?

**E. Artificial turf**

Consider the different types of ground in your schoolyard (turf, asphalt, woodchips, grass). Why are each of them used? How does stormwater interact with them differently? Which kinds of surfaces do you think help stormwater the most? Which ones might have a negative impact and why? Hint: What is the artificial turf made of? Do you think any of these materials have an impact on stormwater runoff or other parts of the environment? How does it differ from living grass?

**F. Storm Drain**

Storm Drains move water into underground pipes to take it somewhere else. Anything that gets carried into the drain may end up in a local stream, lake, or Puget Sound. Why do you think the drain was built in this location? Where does water come from that goes into this drain? Is the drain working properly? What is in the drain?

How does this drain compare to the storm drain next to the playground?

**G. Trees**

Trees catch some rainwater in their leaves, releasing it more slowly to the ground. Tree roots hold soil in place so that it doesn't get washed away by runoff. Ask the students what they think trees do for stormwater. What would be different in this spot if these trees weren't there? What is around the tree(s)? What kind of ground are they growing in? Are there people or animals that would appreciate this tree being here? Do you like having trees in your neighborhood or your schoolyard? Why or why not?

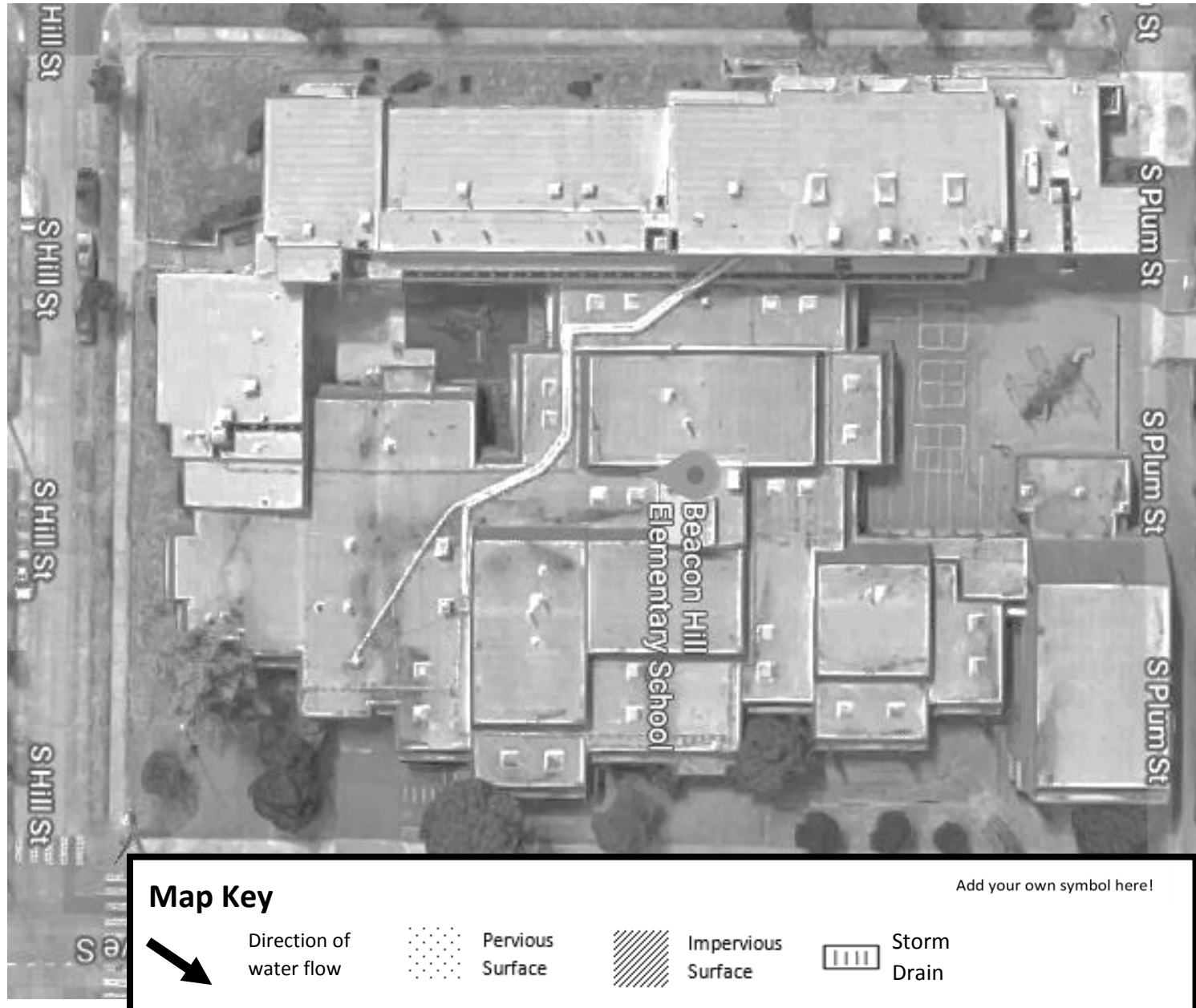


# Mapping Your Schoolyard – Beacon Hill Int'l

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Include on your map:

- Symbols from the Key including flow of water, surfaces, and storm drains.
- Partially pervious surfaces can be shown with less dots.
- Label locations of litter, pollution and places where puddles form.
- Sketch any specific **stormwater problems** you see or are aware of.
- Sketch larger plants and bushes.



## Lesson 5: Local Stormwater Systems

### Student Maps

Color maps have been created for use with your students (provided and/or available on [communitywaters.org](http://communitywaters.org)). We suggest students work through them in the following order:

1. Beacon Hill Elementary Storm Drains Map – This map helps students see that the storm drains around their school connect into stormwater pipes.
2. Beacon Hill to Duwamish Pipes – Students can follow the path of the stormwater pipes to find out that it drains into the Duwamish.
3. Seattle- Elliot Bay Map – This shows your school in relation to Elliot Bay so the students can see where their water ends up.

#### Quick Summary:

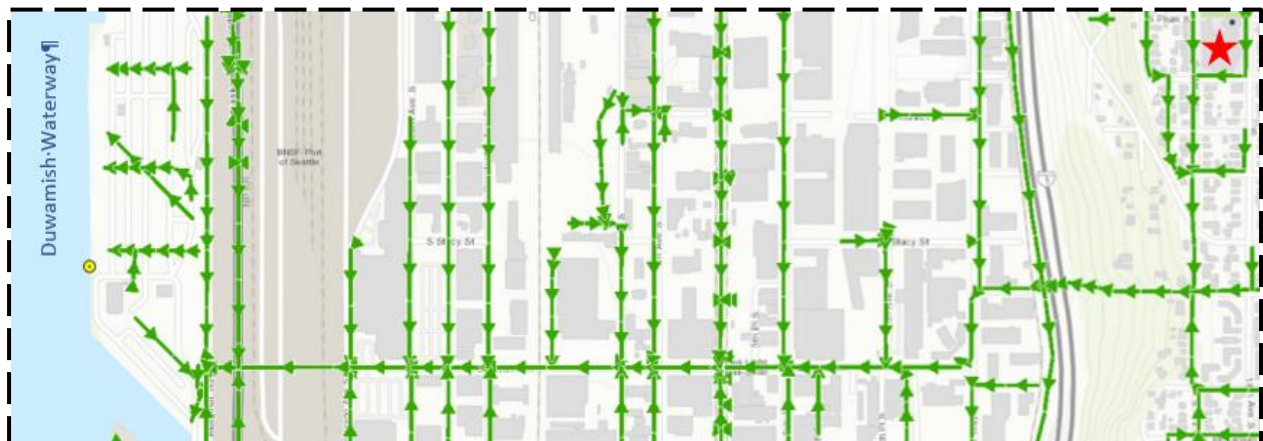
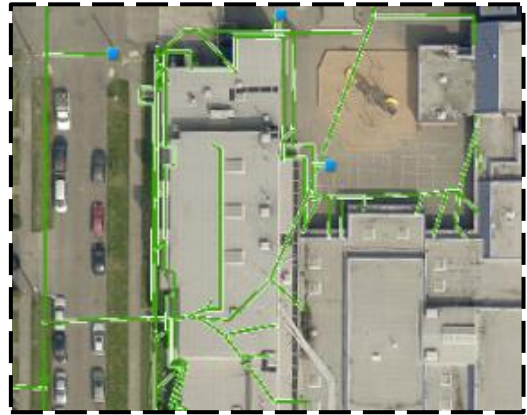
Your school's stormwater travels through stormwater pipes into the Duwamish and from there into Elliot B.

Use Video Option B  
**(Drained Urban Stormwater Pollution).**

### Teacher Overview

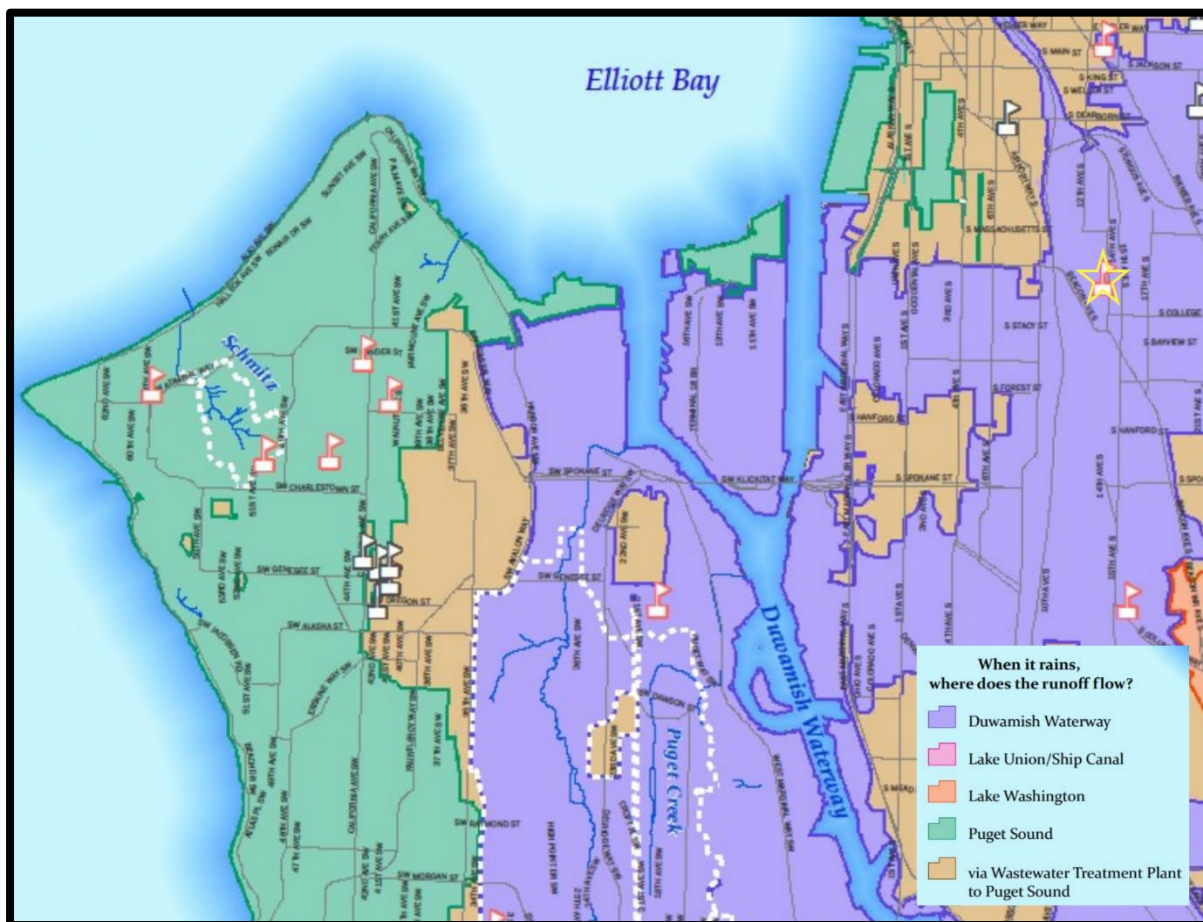
#### What happens with the Stormwater Pipes around your school?

- The storm drains (blue dots) at your school empty into the stormwater pipes (green lines) that join together on the West and East sides of your school.
- The stormwater pipes (green lines) then run south down 13<sup>th</sup> Ave S until they reach S Bayview St and turn west. From there, the stormwater continues west until it is released into the Duwamish Waterway near the Port of Seattle Terminal 25.



### Where does your stormwater runoff end up?

- The stormwater around your school enters into Puget Sound through the Duwamish Waterway.
- Below is another great map for seeing where the runoff from different parts of the city ends up (Beacon Hill has a yellow star around it on the map). Stormwater from the tan areas on the map is combined with Wastewater and piped to a treatment plant but overflows into the Duwamish Waterway and Elliot Bay when there is too much rain entering the system (a “combined sewer overflow”).



**Video:** Since the stormwater from your community ends up in Puget Sound, we suggest watching the “**Drained: Urban Stormwater Pollution**” video (OPTION B) from 0:00 to 2:11 during Lesson 5. You can find this video linked on [communitywaters.org](http://communitywaters.org) or at <https://vimeo.com/51603152>.

- **Please Note:** The pipes information provided here is our best estimate of the stormwater flow in your community based on the information we have currently. If you encounter more information in the course of your investigation please let us know so we can update future versions of this document.



## Stormwater in Our Community – Lesson 6

Please use this map and points of interest as suggestions for your walking field trip, recognizing there may be other things of importance to note in other areas. It may be useful to bring the stormwater pipes map with you for reference. Questions posed are intended to be posed to students as desired.



**Suggested Route:** Exit the school and begin walking WEST on S Hill St; cross 13<sup>th</sup> Ave S; RIGHT on 12<sup>th</sup> Ave S; cross street to give students a view toward the Puget Sound; continue walking NORTH on 12<sup>th</sup> Ave S; RIGHT on S Plum St; RIGHT on 13<sup>th</sup> Ave S; return to school.

### Points of Interest



#### A. Slopes / surfaces

Stormwater that can't absorb into the ground runs off it. The slope of the ground affects where this water flows and how fast. Consider the slope and surfaces of this area: where will the water end up? What kind of ground surface is on the slope (grass, bushes, dirt, gravel, concrete?) How do these surfaces and vegetation affect the stormwater runoff here? Have students observed stormwater runoff here? How pervious is this surface? Where does the rainwater go? What might be carried with it? Does water collect here in a heavy rain? Does it cause any flooding problems or large puddles?



### B. Storm Drain in alley

Storm Drains move water into underground pipes to take it somewhere else. Anything that gets carried into the drain may end up in a local stream, lake, or Puget Sound. Why do you think the drain was built in this location? Where does water come from that goes into this drain? Is the drain working properly? What is in the drain?



### C. Artificial turf

Consider the different types of ground in this neighborhood (turf, asphalt, woodchips, grass). Why are each of them used? How does stormwater interact with them differently? Which kinds of surfaces do you think help stormwater the most? Which ones might have a negative impact and why? Hint: What is the artificial turf made of? Do you think any of these materials have an impact on stormwater runoff or other parts of the environment? How does it differ from living grass?



### D. View toward the Puget Sound

This can be a great opportunity to visualize how stormwater would move over a landscape on a large scale. Consider how much stormwater that falls on this area ends up in the Sound. What is up the hill from here? Who or what might be impacted by stormwater down the hill? If it helps, you can remind students of the models they made in class. How did the water move through the model? What is similar about the model and this landscape?





#### E. Cracks in sidewalk

Here is an opportunity to explore how surfaces interact with stormwater. How does water move differently on the smooth pavement versus the cracked pavement? Note: The idea behind permeable pavers is that the water can seep through the space in between the pavers. These cracks may actually serve the same function, so it might enable students to grasp the idea of the pavers when you study solutions later on. Why are these cracks here? How might they affect the movement of



#### F. Disconnected Downspout

This downspout has been “disconnected” from the underground pipes so that the roof water drains into ground instead of into sewer system. How does this help with stormwater runoff problems?