VIEW RIDGE ELEMENTARY

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.

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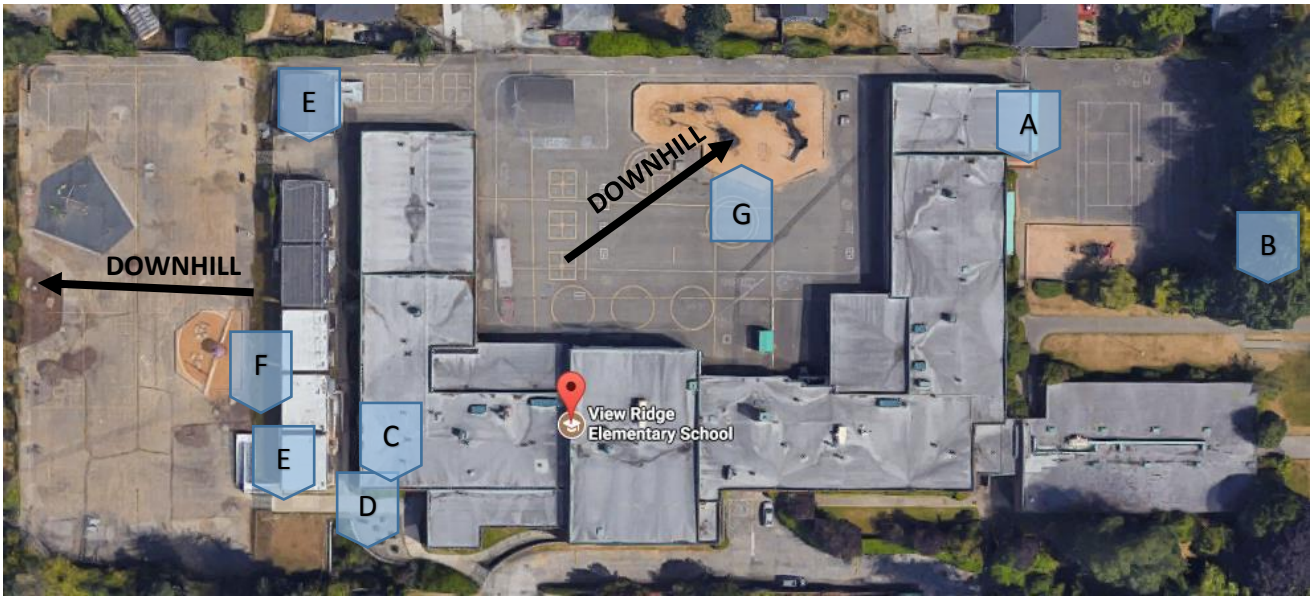
Stormwater in the School Schoolyard– Lesson 3

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. Gutters and Downspouts

Some downspouts drain into the ground, while others are attached directly to the buildings sewer or stormwater pipes. Some go to locations where the water can soak in while others drain to the street or sewer systems. Why do you think this drain is shaped the way it is? These downspouts collect water from this roof, and send the stormwater back into the school and sewer pipes. Can students find more of these themselves? Where do you think the water might go?

B. Storm Drain, paved surfaces and Trees

Where does water come from that goes into this drain? Why might it have been placed in this place? Does this drain work well? Look on the other side of the fence. Trees there 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? Are there people or animals that would appreciate this tree being here? What kind of ground are they growing in? Do you like having trees in your neighborhood or your schoolyard? Why or why not?

C. Gutters and Downspouts

This gutter system seems to work a little differently than the typical school or building system. Look around as you tour the playground—ask students to see if there are there any gutters or downspouts visible on the building? Can water be seen below next to the building where this downspout pours out? Do the drains above ever overflow? Where is the water going when it rains on the rest of the flat roof?

D. School Gardens / Slopes and Terraces

How do the gardens on the slopes here help with stormwater, or not? What would be different if they were not there? Consider that vegetation slows stormwater by helping it soak into the ground and holding soil in place with its roots. However, anything that is put in the garden or on the plants may be washed off—including chemicals or fertilizers, if they are used. Presumably, school gardens have few or no chemicals. Test out the many different surfaces in this area by pouring some water on it!

E. **Rain barrel/Cistern***

A Cistern, like a Rain barrel, collects water that flows off the roof of a building and can hold hundreds or even thousands of gallons. Are the students aware of this cistern and its purpose? Do they know if it is working or how it could be more effective (collect more water?) How is this cistern helping with stormwater? Is there something that could be done to make them catch more water? Ask students to walk through the portables and notice the gutters and downspouts that are not connected to the cistern. Where is the water going?

F. Bioswale (stormwater ditch)

Can you see it? Have students notice where water can enter the stormwater ditch from the slopes above the playground. What happens if it fills up? What types of plants are living here, and how do they compare to the plants found on the banks of the gardens nearby -- Why would they be different?
Note: stormwater ditches are not listed on the BINGO sheets, but function much like bioswales the types of plants and soils involved).

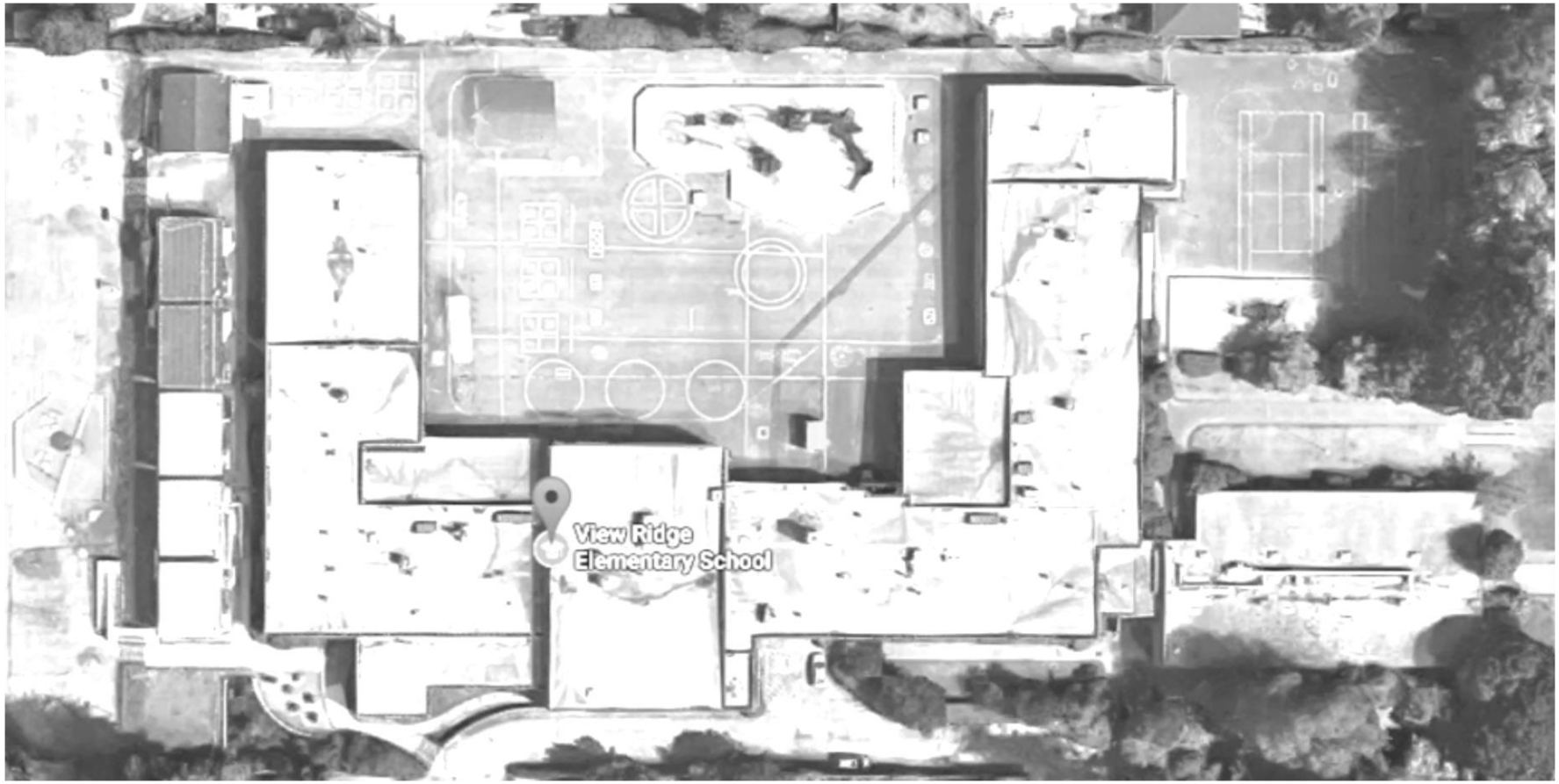
G. **Storm drain and Paved/ground surfaces***

Here is a good spot to consider the different types of surfaces used in the schoolyard. How does water move differently on asphalt, woodchips, dirt? Where does the drain take the water?

Have students pour water on these surfaces and later compare it to the pervious sidewalk when they are on the Walking Field trip.

Mapping Your Schoolyard – View Ridge

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.

Map Key

Add your own symbol here!

Direction of water flow

Pervious Surface

Impervious Surface

Storm Drain

Local Stormwater Systems – Lesson 5

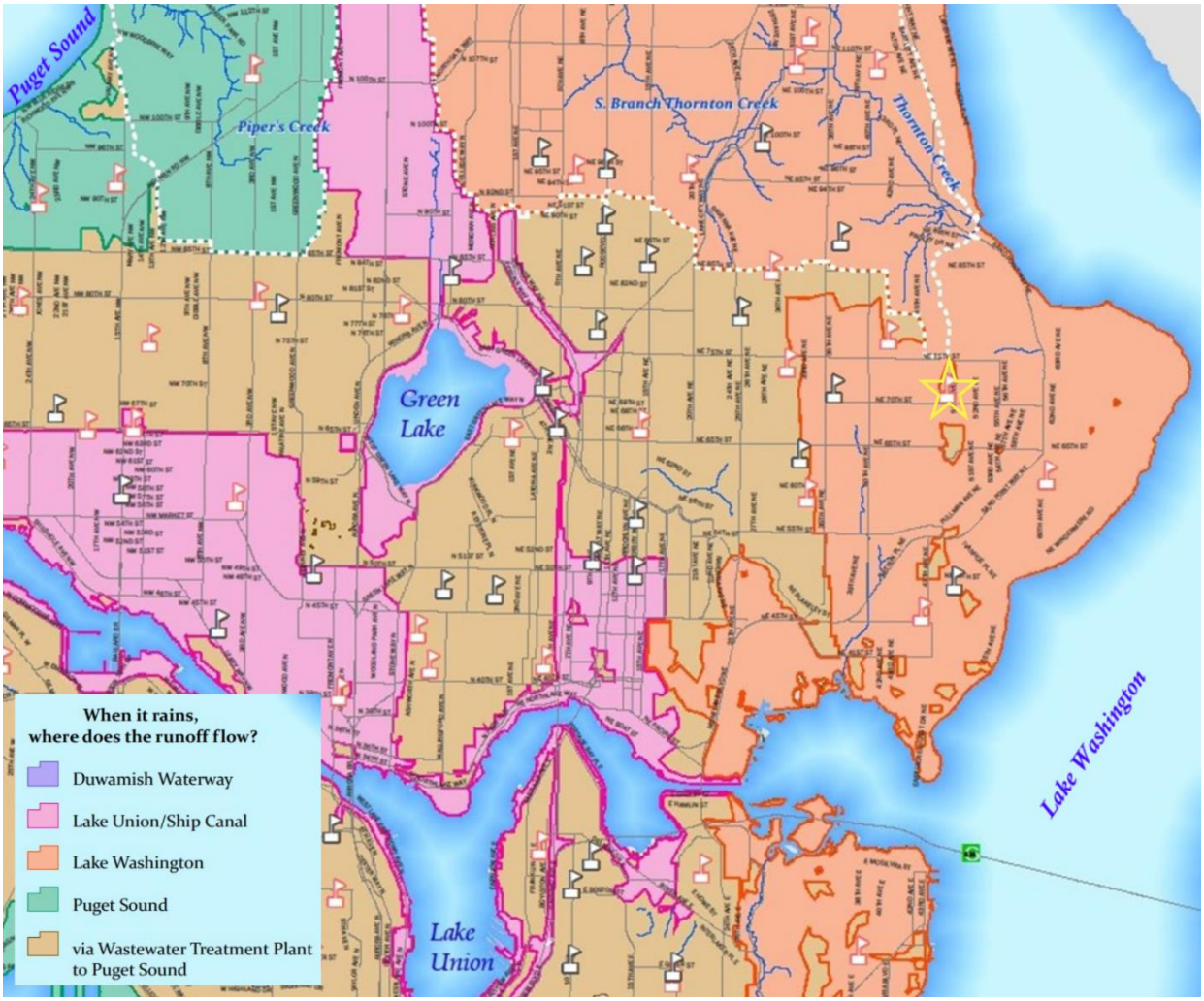
What happens with the Stormwater Pipes around your school?

- The stormwater pipes around your school are slightly complicated. To the best that we can tell water to the north of your school flows downhill until it hits the drains on NE 73rd St and 52nd Ave NE. To the south of the school, water enters the storm drains which flow into the stormwater pipe (green line with inset arrows) located on 50th Ave NE. The north and south water routes connect at NE 70th St and 52nd Ave NE where they continue east until they reach Sand Point Way NE. Stormwater pipes then empty into Lake Washington just north of Warren G. Magnuson Park.
- Stormwater west of your school enters the stormwater pipes (green lines with inset arrows) where it flows south and enters Union Bay.
- Given the complexity of stormwater flow around your community, it might be beneficial to focus on the slope of the land around your school that the students can see. Look at how the water flows in your playground and connect that back to the pipes you see on the map. Alternatively, if your students are exploring the WaterMaps application, assigning a group to a specific pipe, as opposed to looking at the flow in the entire area, may assist in clarifying their understanding of how and where stormwater moves.

Where does the stormwater runoff end up?

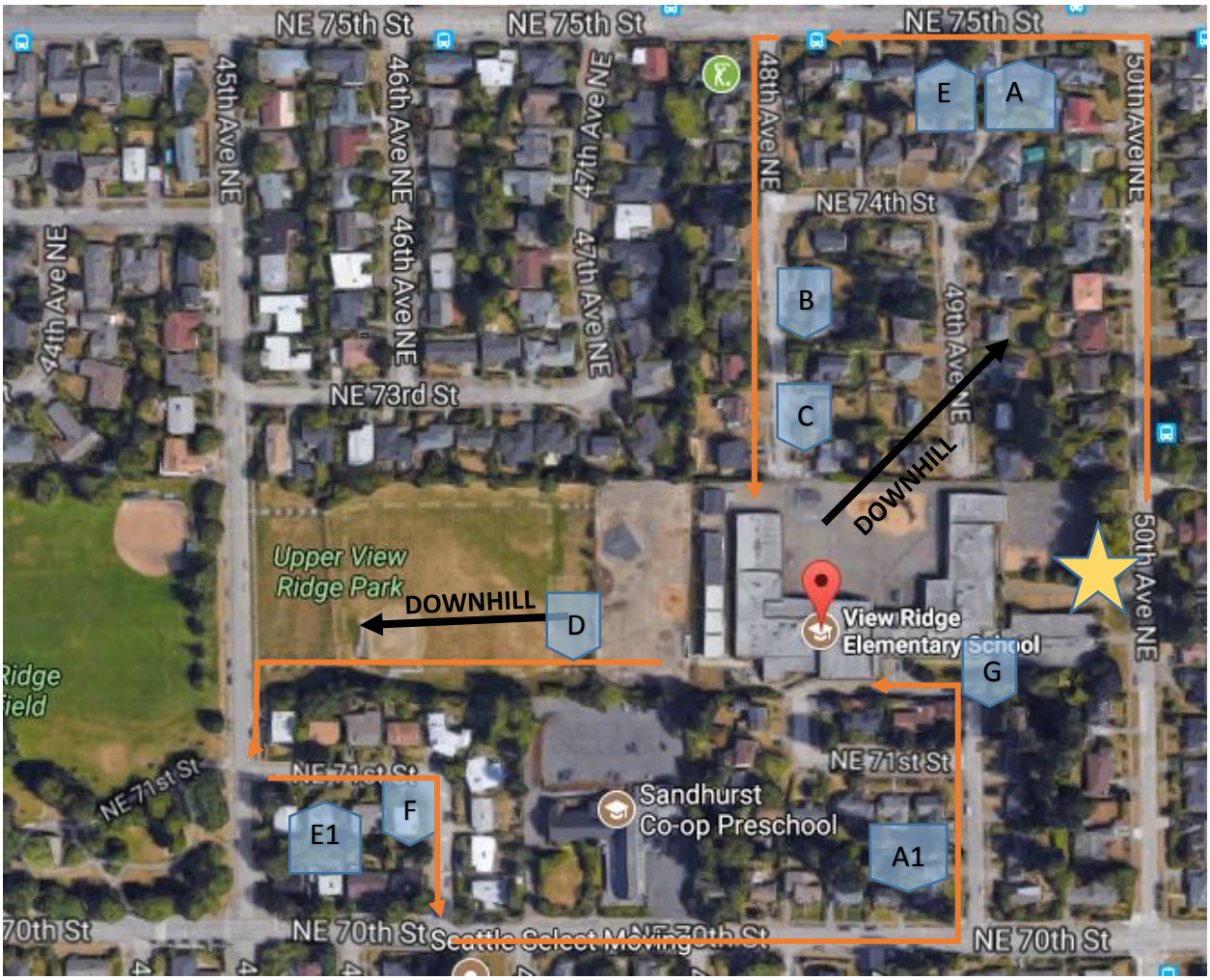
- The map on the next page shows where the runoff from different parts of the city ends up.
- Water from Lake Washington flows through the Montlake Cut into Lake Union and then through the Chittenden Locks into Puget Sound.
- **Video:** We suggest watching the "**Drained: Urban Stormwater Pollution**" video (OPTION B) from 0:00 to 2:11 during Lesson 5. The video focuses on the Puget Sound but you can point out to students that it has a similar impact on lake organisms. You can find this video linked on communitywaters.org or at https://vimeo.com/51603152.

View Ridge on the map has a yellow star around it.



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: Start at corner of playground facing East walk North along 50th to NE 75th St; LEFT to 48th Ave NE, Back into school yard past portables and down the play field stairs, LEFT on 45th Ave NE, LEFT on NE 71st St LEFT on NE 70th Street, LEFT on 49th Ave NE and back to school.

Points of Interest

Items E1 and F are down the steep stairs to the west of the school; you may want to divide the walk into two parts or choose items A-D and G or D, E, F, A1, G. Note: the best example of a raingarden (E1) is at the bottom on NE 71st street.

A. Pervious surfaces and Disconnected Downspout

This downspout looks different – and is in a different place – than many "regular" downspouts. Why might that be?

The driveaway is paved differently than the driveways students passed on the way here, and adjacent to it. Pour some water on it and see what happens.

A1. Disconnected Downspout

This downspout looks different – and is in a different place – than many "regular" downspouts. Why might that be?

B. Erosion and different surfaces

Look how water has created its own path to the street. Where is this water draining from? Is this a "problem", and if so, to whom? Why might the water not soak into the grass in this area?

Compare the surfaces at this site to the neighboring houses, with paths built of stones and gravel. How well does this surface prevent run off and erosion into the street and storm drains?

C. Sidewalk, surfaces and Downspouts

Take time to have students check it out by pouring water on the pervious sidewalk, the stones, and then compare it to the regular sidewalk. Where is the water going? How is this different than yards with plants or Raingardens?

There are downspouts (on right of garage) directed into the stormdrains below the house. Where is the water going?

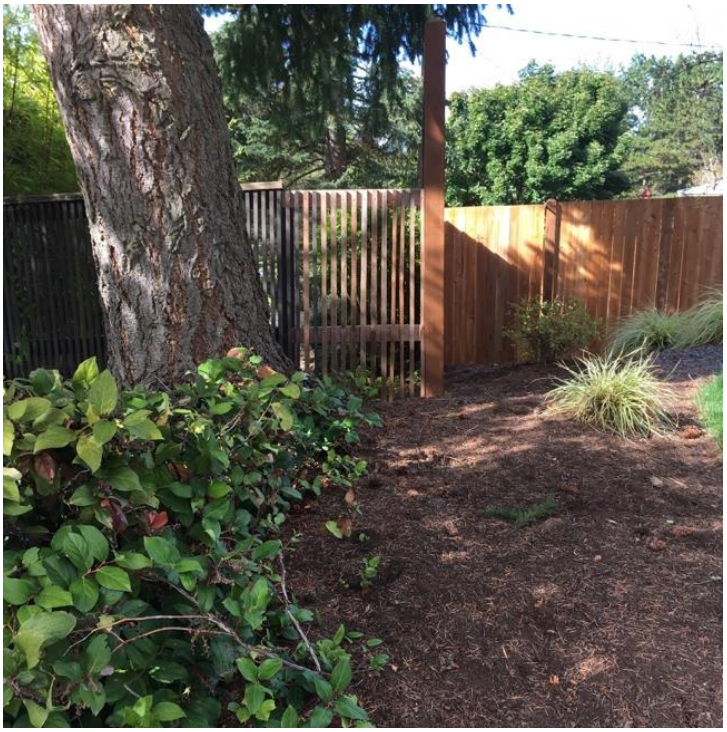
D. Steep Slopes and Stairs.

As students walk up (or down) the stairs, have them think about how the grass and plants on this hill might be working to slow down or absorb stormwater from the top of the hill. What if this area had no plants? How might that affect the school below? Have students pour water to the side of the stairs and note how fast it travels (or not).

(E.) and (E1) Raingardens

This Raingarden (E1) was put in to prevent water running off the into the neighboring property and View Ridge playfields below (they often flood still as it was once a marshy lowland). How well is this working as a solution to keep stormwater from going to the neighbor and to the View Ridge playfield? Compare this to the grassy slopes where the upper playfields are. Where do you think rain water goes there?

Raingarden (E) on 75th street, has an extensive drip irrigation system as well. Why is that needed? Where is the water coming from? Where is it going to?



F. Slopes and Plants

The plants in these two adjacent yards look very different. One was recently scraped clean of topsoil and replanted. The other has native plants and a large tree. The slope causes rain to slide downhill. Which plants will help retain rain water?

G. Artificial turf

Consider the different types of ground near here (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?