

WELCOME

Ballard Natural Drainage Project Open House

What Is Covered At Today's Open House?

- Overview of the sewage overflow problem in Ballard
- Overview of natural drainage
- Results of recent soil testing and community survey
- Proposed approach and timeline for next steps



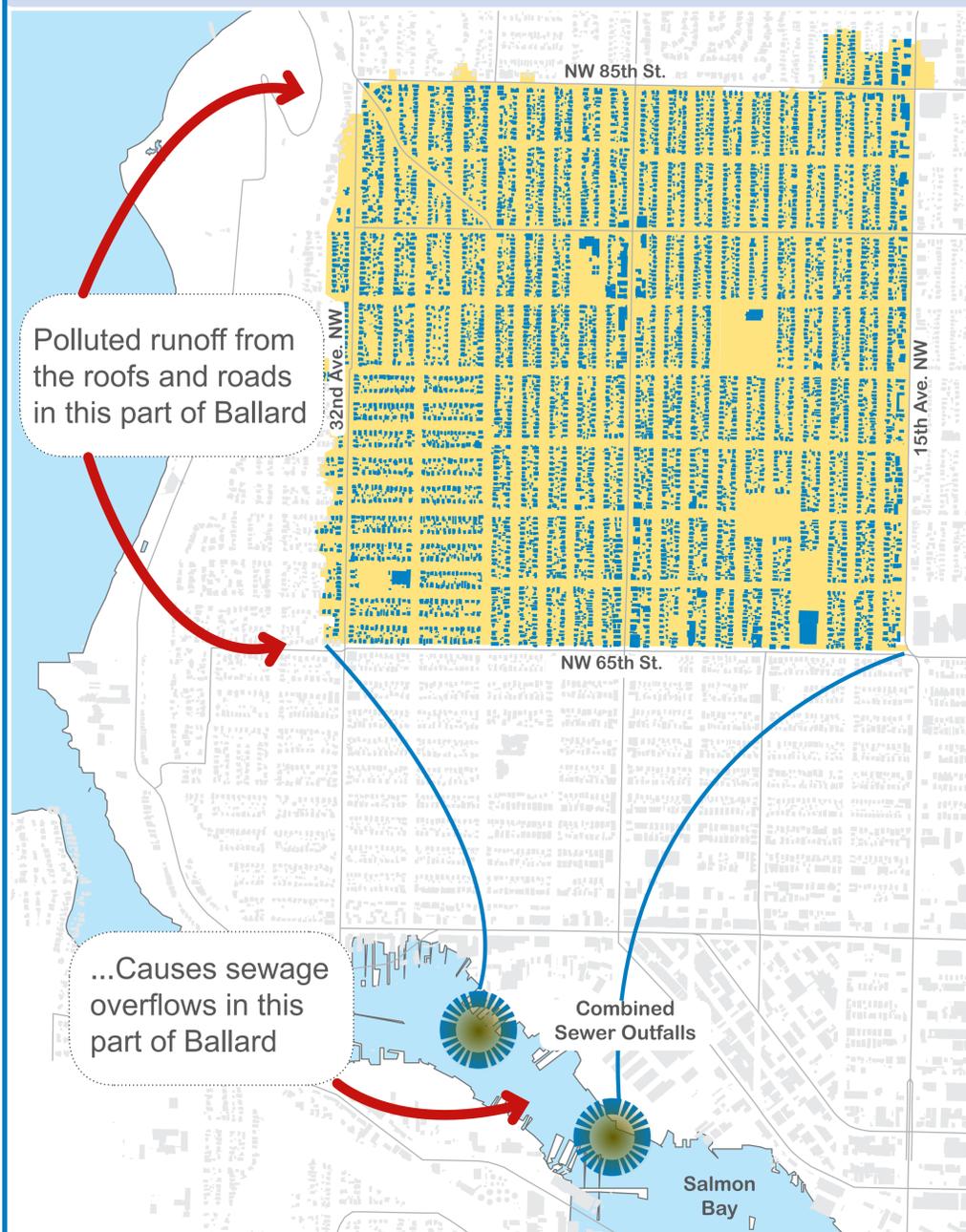
What Input Are We Asking You For Today?

Please give us your input about:

- Drainage problems on or around your property
- The process to select locations for natural drainage
- The opportunities to get involved
- The proposed project timeline

Overview: Sewage Overflows

How bad are sewage overflows in Ballard?



In 2012, raw sewage combined with polluted runoff from roofs, roads, and parking lots overflowed a total of 89 times into Salmon Bay. In total, 57 million gallons were discharged, untreated.

This was about 37% of the total sewage overflow volume for all of Seattle.

Overflows are 90% polluted stormwater runoff and 10% raw sewage.



The sewage overflow pipes in Ballard extend out into Salmon Bay at the ends 24th Ave. NW and 28th Ave. NW.



Overview: Sewage Overflows

November 2012 Sewage Overflows in Ballard

| Date | Amount of Rainfall (inches) | Volume of Sewage Overflow (gallons) | Duration of Sewage Overflow (hours) |
|----------------------|-----------------------------|-------------------------------------|-------------------------------------|
| Nov. 2 | 0.12 | 1,445 | 0.42 |
| Nov. 4 | 0.63 | 74,192 | 5.00 |
| Nov. 11 | 0.57 | 92,388 | 7.50 |
| Nov. 13 | 1.03 | 344 | 0.50 |
| Nov. 16 | 5.04 | 15,236,505 | 119.0 |
| Nov. 18 | 5.23 | 2,801,959 | 74.47 |
| Nov. 23 | 0.99 | 1,128,452 | 15.57 |
| Nov. 23 | 0.99 | 22,572 | 17.58 |
| Nov. 28 | 3.71 | 7,157,117 | 148.58 |
| Nov. 30 | 3.81 | 524,425 | 97.67 |
| Monthly Total | | 27,039,399 | |

This chart shows the duration and volume of combined sewer overflows into Salmon Bay this past November. Note that two overflows lasted for five days each.



Overview: Sewage Overflows

The Problem Solving Approach

Seattle Public Utilities is working to prevent sewage overflows into Salmon Bay by:

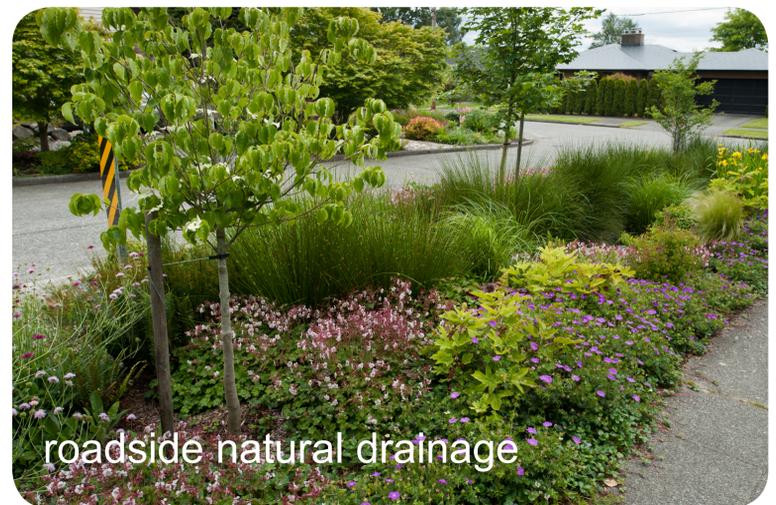
1

Disconnecting roof drains that are connected to the combined pipe and rebating homeowners who channel this runoff to a raingarden or stormwater cistern on their property. This is the RainWise program.



2

Building roadside natural drainage systems to intercept runoff from roads and sidewalks and allow it to soak into the ground instead of draining into the combined pipe.



3

Planning for a large underground storage facility to control the remaining volume. This facility will likely be located in the area of Ballard near the existing outfalls on Salmon Bay.



Overview: Natural Drainage Systems

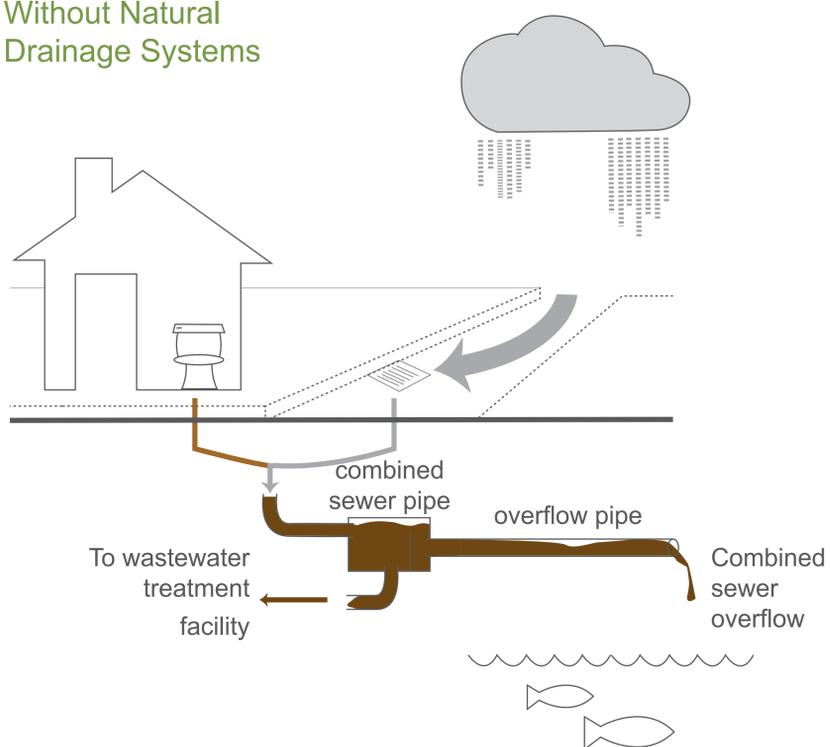
How do natural drainage systems help?

Natural drainage systems can be designed for a variety of stormwater management goals. In combined sewer areas, natural drainage systems are designed to capture (and clean) polluted runoff at its source.

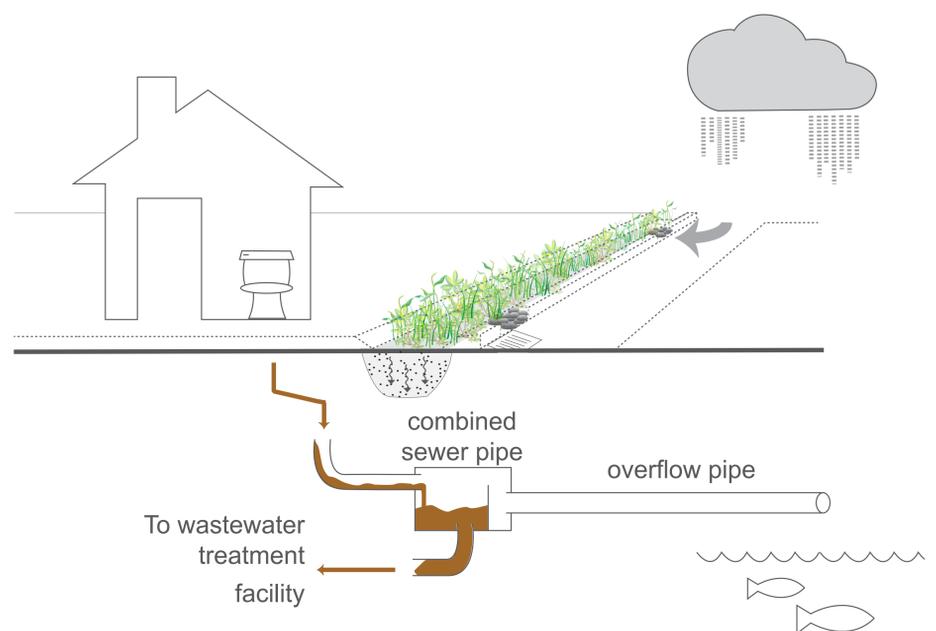
Runoff from roofs on private property and runoff from roads and sidewalks in the public right-of-way add up to too much water. This runoff overwhelms the capacity of the combined sewer pipe during storms and causes overflows. (Overflows are 90% stormwater runoff, 10% raw sewage.)

Removing a portion of this runoff volume from the combined pipe, or delaying when the runoff reaches the pipe, helps prevent overflows into Salmon Bay.

Without Natural
Drainage Systems



With Natural
Drainage Systems



Natural drainage systems can be applied on our own property -- to capture and clean the runoff from our roofs -- or in public spaces (like the planting strip next to the street) to capture and clean the runoff from the road.

Overview: Natural Drainage Systems

How could natural drainage systems affect the look and function of the street?

Short-term Changes (During Construction)



Potential Long-term Changes (After Construction)



Before and during construction, runoff from the street contributes to combined sewer overflows into Salmon Bay.

Runoff from the street no longer contributes to overflows.

Natural drainage systems change over time as plants mature

January



October



May



Overview: Natural Drainage Systems

Roadside Natural Drainage History 2001-2012



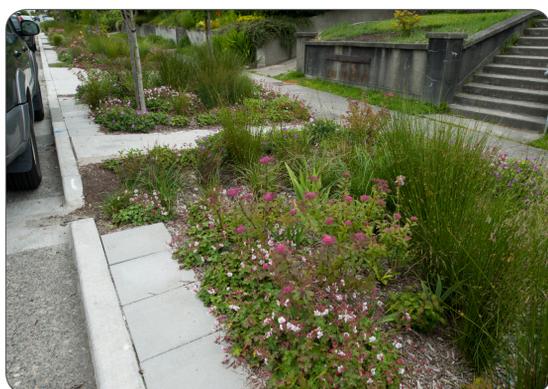
110th St. Cascade



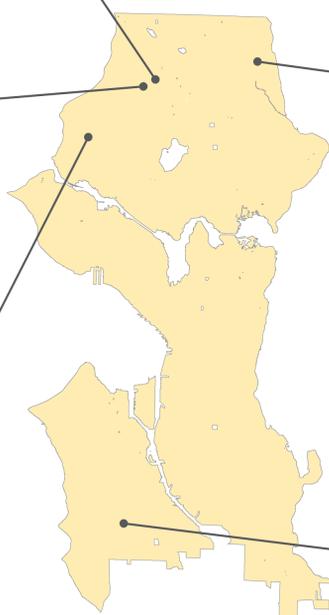
SEA Streets



Pinehurst Green Grid



Ballard 2010 -- Retrofit Design



Highpoint Natural Drainage

| Project | Drainage Area | Effectiveness |
|--------------------------------------|----------------------|--|
| SEA Streets | 2.3 acres | 99% reduction in runoff volume |
| NW 110th Cascade | 28 acres | 48-74 % reduction in runoff volume |
| Broadview Green Grid | 32 acres | 70% reduction in runoff volume |
| Pinehurst Green Grid | 49 acres | 82% reduction in runoff volume (design estimate) |
| High Point Natural Drainage | 129 acres | Without NDS approach, project would have required detention pond 5x as big |
| Ballard Natural Drainage 2010 | 1.4 acres | 38000 gallons of control volume removed |

Overview: Natural Drainage Systems

Ballard Natural Drainage 2010: Lessons Learned and New Approach

The purpose of the Ballard Roadside Raingardens Pilot Project (2009-2011) was to test how well roadside raingardens help prevent sewage overflows into Salmon Bay. The project includes collecting and analyzing performance data to measure results.

Three designs were piloted:

1) working fully within the existing planting strip 2) curb extensions 3) full-block curb shift

The pilot led to important lessons learned and informed significant changes in the way Seattle Public Utilities develops and implements similar projects.

Learned

Looking Forward

TAKE YOUR TIME

Allow sufficient time for project scoping, meaningful community engagement, site selection, design, construction, and monitoring.

Build in time to respond to community input and technical analysis.

DO YOUR HOMEWORK

Conduct wet-weather soil testing and groundwater monitoring a full year in advance and validate test results with outside geotechnical experts.

Conduct additional tests to assess soil conditions and measure how well water soaks into/through the soil.

LISTEN TO THE COMMUNITY

Gather information from residents about what they know about soil conditions, drainage, and groundwater in their neighborhood.

Engage residents early in siting and design discussions.

Identify locations and designs that provide opportunities to improve community safety and livability.

Overview: Natural Drainage Systems & Neighborhood Greenways

What is the potential connection?

Neighborhood Greenways are residential streets designed to improve bicycle & pedestrian travel for people of all ages and abilities. They usually have lower traffic volumes and vehicle speeds.

SPU and SDOT are exploring how natural drainage systems may enhance Neighborhood Greenways and vice versa.

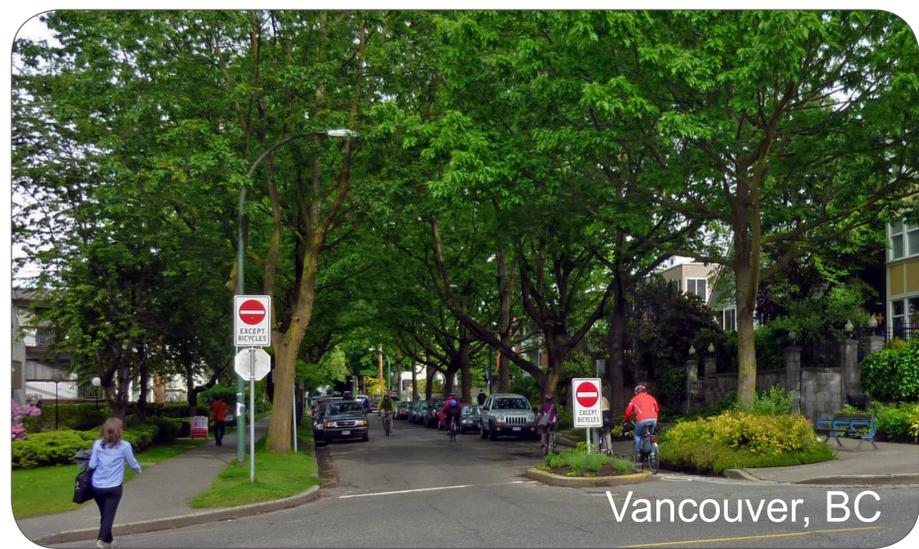


Photo courtesy of Payton Chung

Vancouver, BC

Common elements found along Neighborhood Greenways:

- Pavement markings to alert drivers that they are entering a Greenway
- Traffic calming elements such as traffic circles, speed humps, or curb bulbs
- Improved crossings with crosswalks, curb ramps, median islands, or signals
- Stop signs for the residential streets crossing the Greenway to provide priority to Greenway users
- Signs that point you to the parks, schools and other destinations
- **Natural drainage systems**



Portland, OR

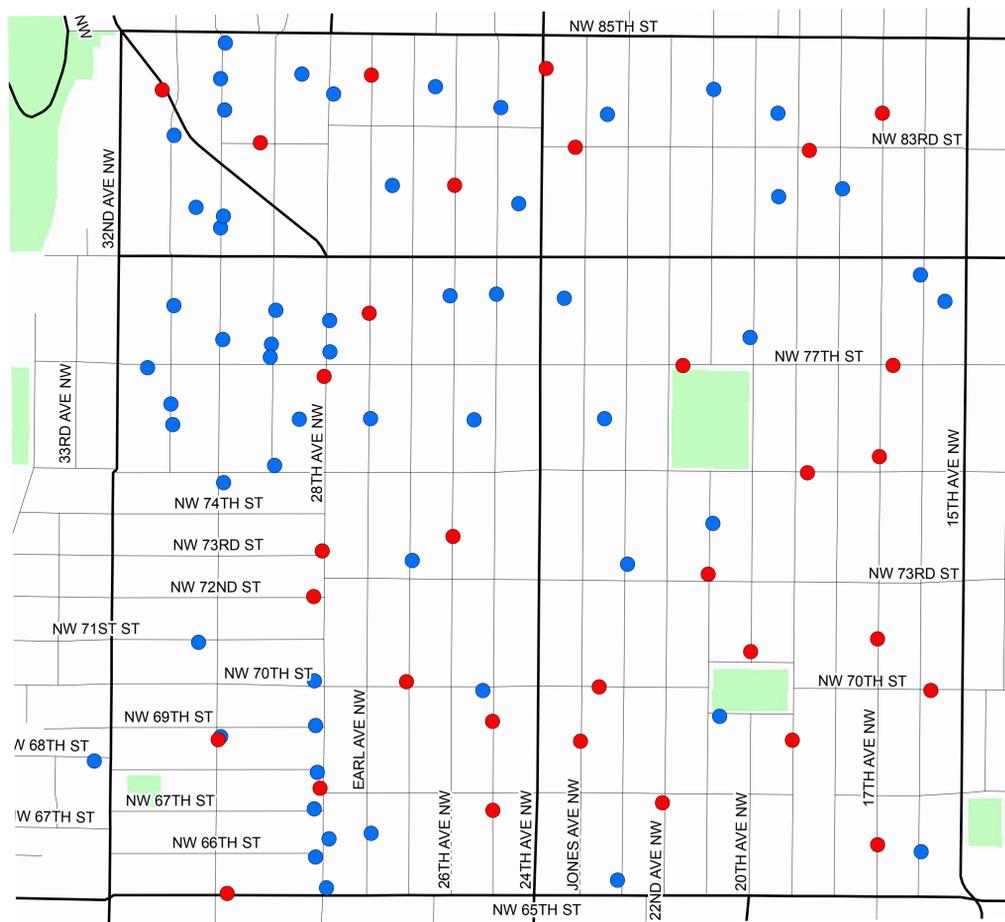


Portland, OR

Results: Soil Testing

Where were soil tests performed in the fall of 2012?

In the fall of 2012, Seattle Public Utilities performed 32 soil boring tests to build on the results of tests done in 2009 & 2010. The purpose of this testing is to better understand soil conditions below the surface and to help identify areas in the neighborhood where outwash soils are likely to be located.



● 2009 and 2010 soil borings and test pits

● New soil tests done in 2012 (Fall of 2012 soil borings)



This drill rig was used in October and December to explore the condition of the soil beneath the surface

Glacial Till soils have been tightly packed and densified by the weight of 3000-foot-high glaciers. Glacial till is also referred to as “hard pan” and does not allow stormwater to soak into it (or flow through it).

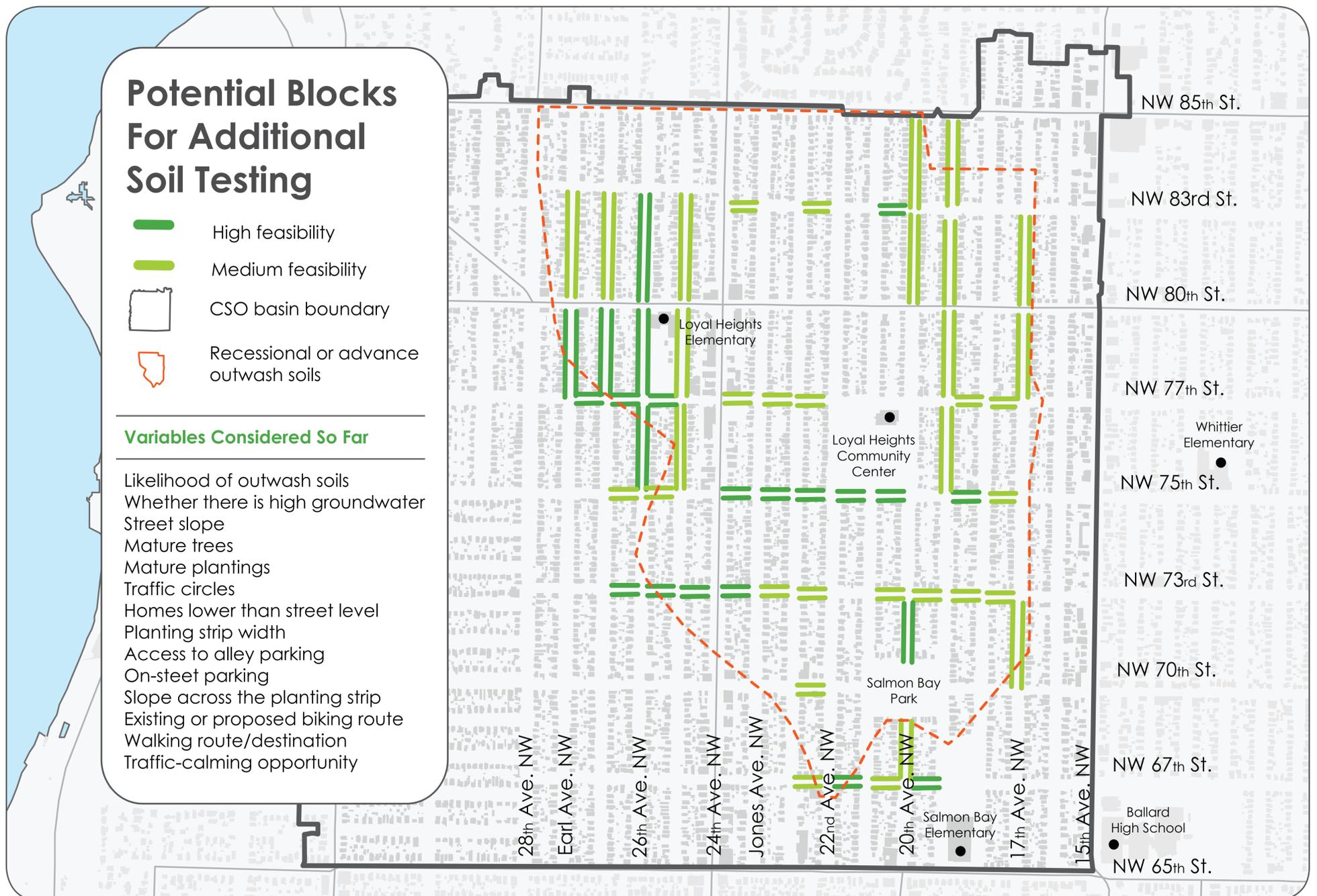
Outwash soils are sandy soils that were deposited in streams in advance of glaciers and during their retreat. These soils do allow stormwater to soak in (or flow through).

Results: Soil Testing

Potential Locations for Additional Soil Testing

Focusing in on the area with outwash soils, Seattle Public Utilities staff walked many of the blocks inside that area and assessed additional variables that influence the feasibility of a roadside natural drainage project. (These are listed below.)

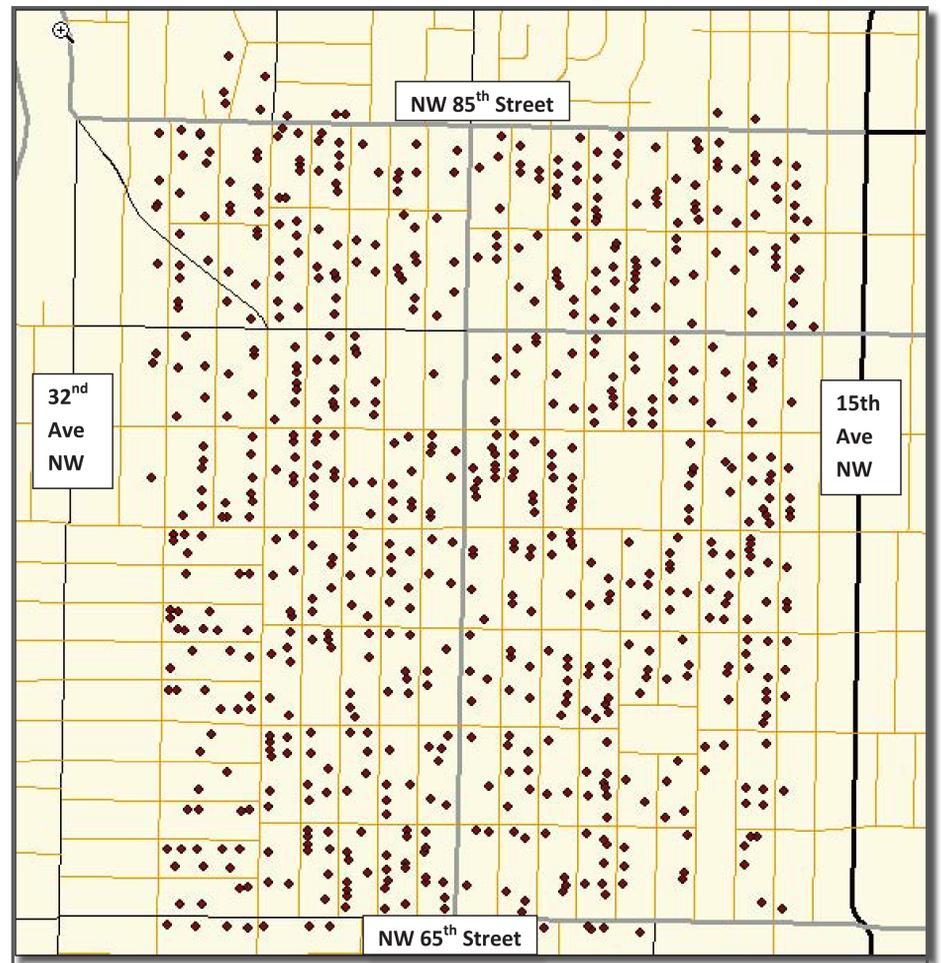
The purpose of this was to help SPU narrow the focus of potential projects and identify blocks where it makes sense to continue with additional soil testing. The results of this field analysis will be combined with drainage question results from the community survey and input from this Open House to determine where to do additional soil testing.



Results: Community Survey

Who answered the survey?

789 Ballard residents answered the community survey sent to residents in December 2012. The map to the right shows the distribution of respondents. The summary below shows the results of questions related to drainage problems in the neighborhood. The survey results are still being analyzed and will inform where SPU decides to do additional testing.



Results

14% of respondents reported having problems with surface water on their property

34% have had problems with groundwater in their basement or crawl space

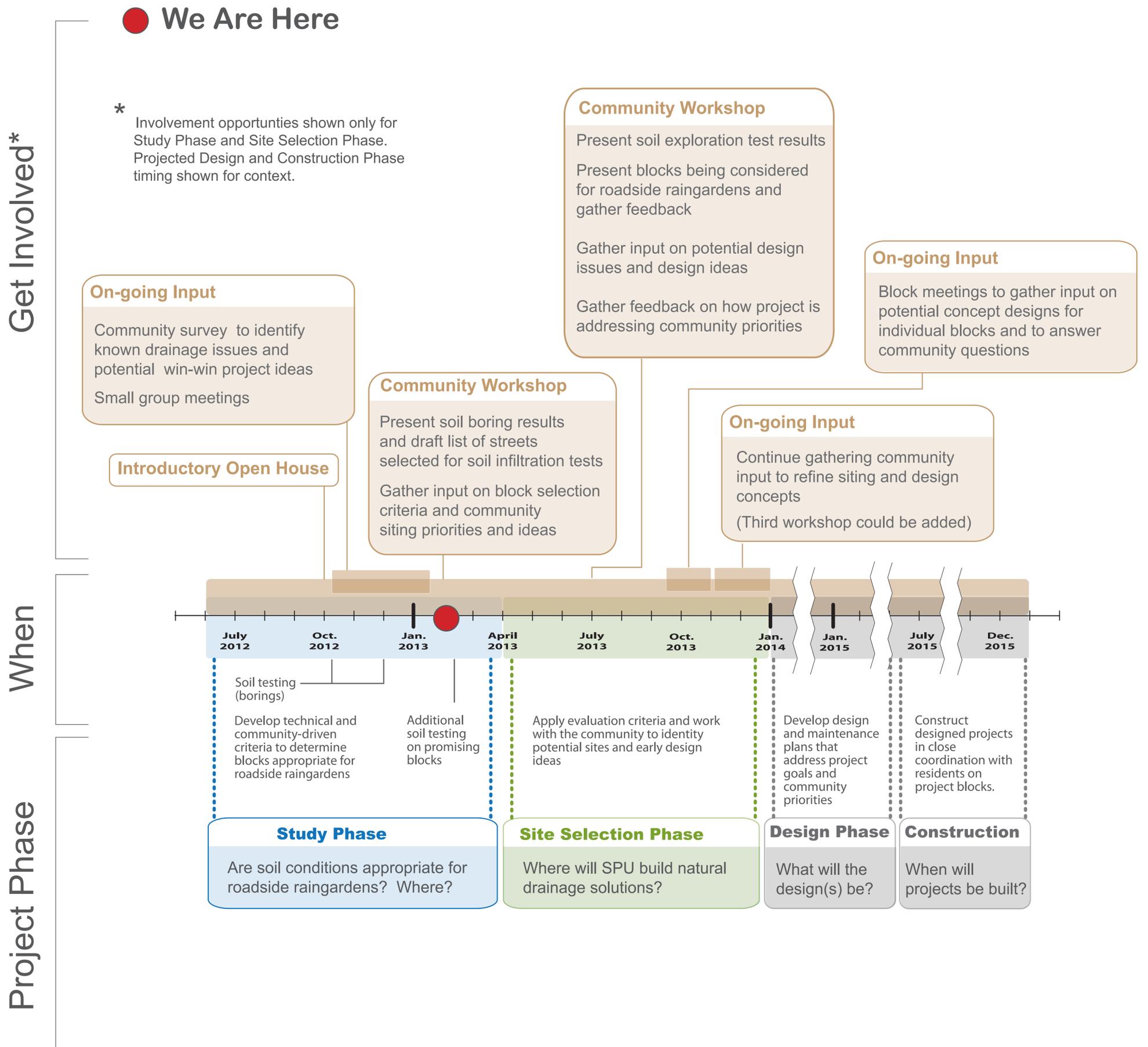
50% indicated they have some type of drainage system on their property

7% reported a natural spring on their property or block

45% reported that their favorite thing about the neighborhood is the landscape, gardens, and trees

33% said the most important improvement to the neighborhood would be slower traffic speeds

Next Steps



Next Steps

Before you leave...

- Please complete a community survey if you haven't already
- Provide your e-mail address on the sign-in sheet so we can keep you updated
- Give us information about where drainage problems exist on the table top maps or on a comment form
- Tell us about specific areas that would benefit from slower traffic and other safety improvements for drivers, pedestrians, and bicyclists -- mark your suggestions on the table top maps
- Discuss your questions and express your concerns with any of the Seattle Public Utilities present here tonight

THANK YOU
for coming tonight!