

DOWNTOWN SEATTLE

BARTON PUMP STATION

LINCOLN PARK

**16% OF THE BASIN'S
LAND AREA**

PROJECT AREA

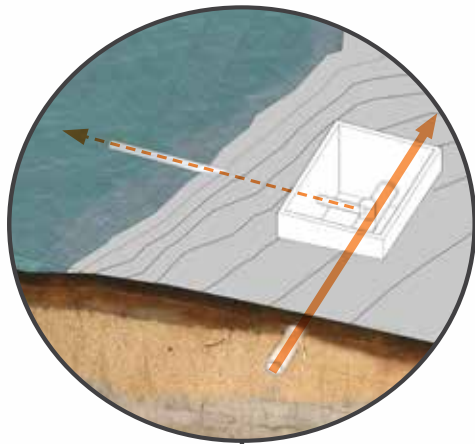
**45% OF THE BASIN'S POLLUTED
RUNOFF AND UNTREATED
SEWAGE VOLUME**

FAUNTLEROY FERRY TERMINAL

**BARTON PUMP STATION
COMBINED SEWER BASIN**

PUGET SOUND

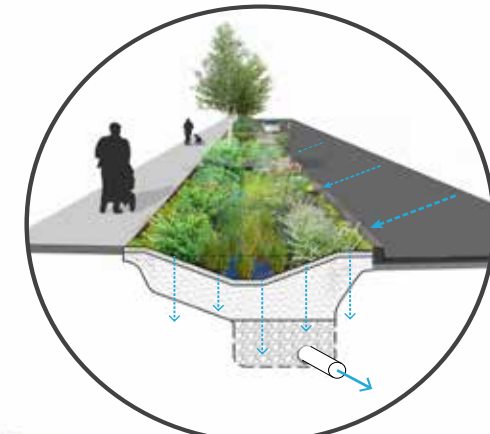
To stop the more than four million gallons of untreated sewage and polluted stormwater from being flushed into Puget Sound annually, King County targeted the residential Barton Basin neighborhood for roadside rain garden retrofits.



BARTON PUMP STATION
The Washington State Department of Ecology mandates less than one overflow into Puget Sound annually.

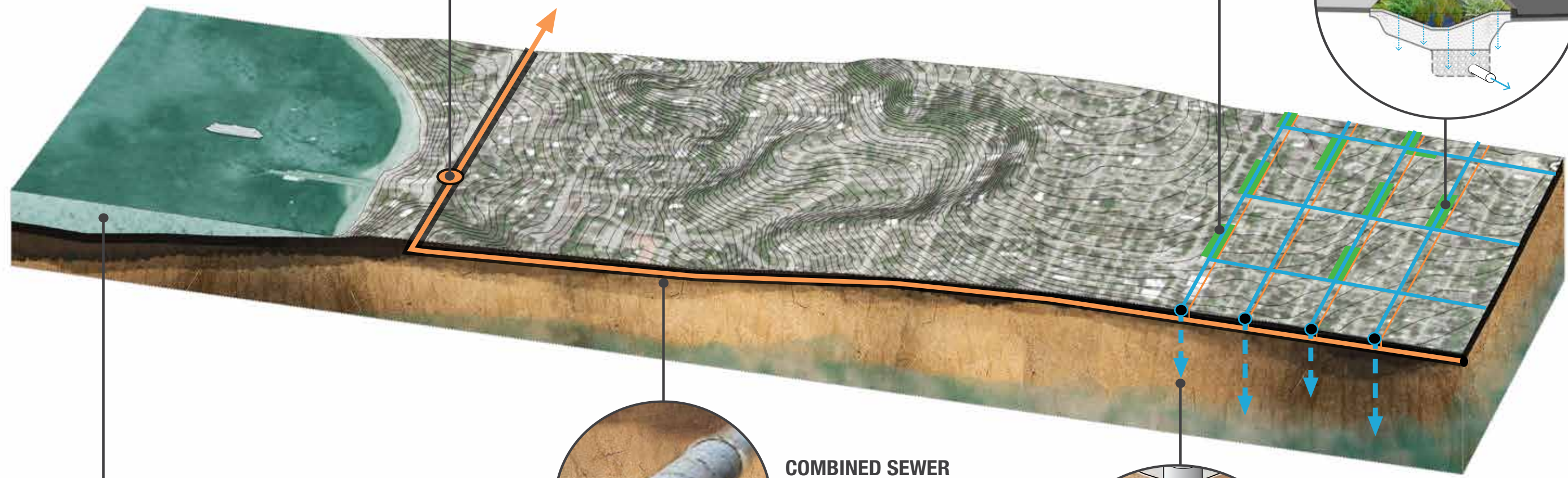


A DIVERSE MIX OF PLANTINGS
Provides habitat for pollinators and creates an enticing walking environment.



BIORETENTION PLANTERS
Capture, treat, and infiltrate 6,000,000 gallons of stormwater from 32 acres.

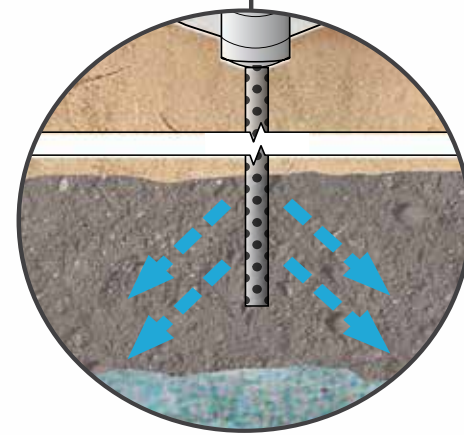
To Westpoint Wastewater Treatment Plant



HEALTHY AQUATIC ENVIRONMENT
In its first years, the Barton CSO retrofit has prevented nearly 4,000,000 gallons of polluted stormwater and untreated sewage from being discharged into Puget Sound.



COMBINED SEWER
Upstream interventions relieve excess pressure during storm events decreasing overflow events.



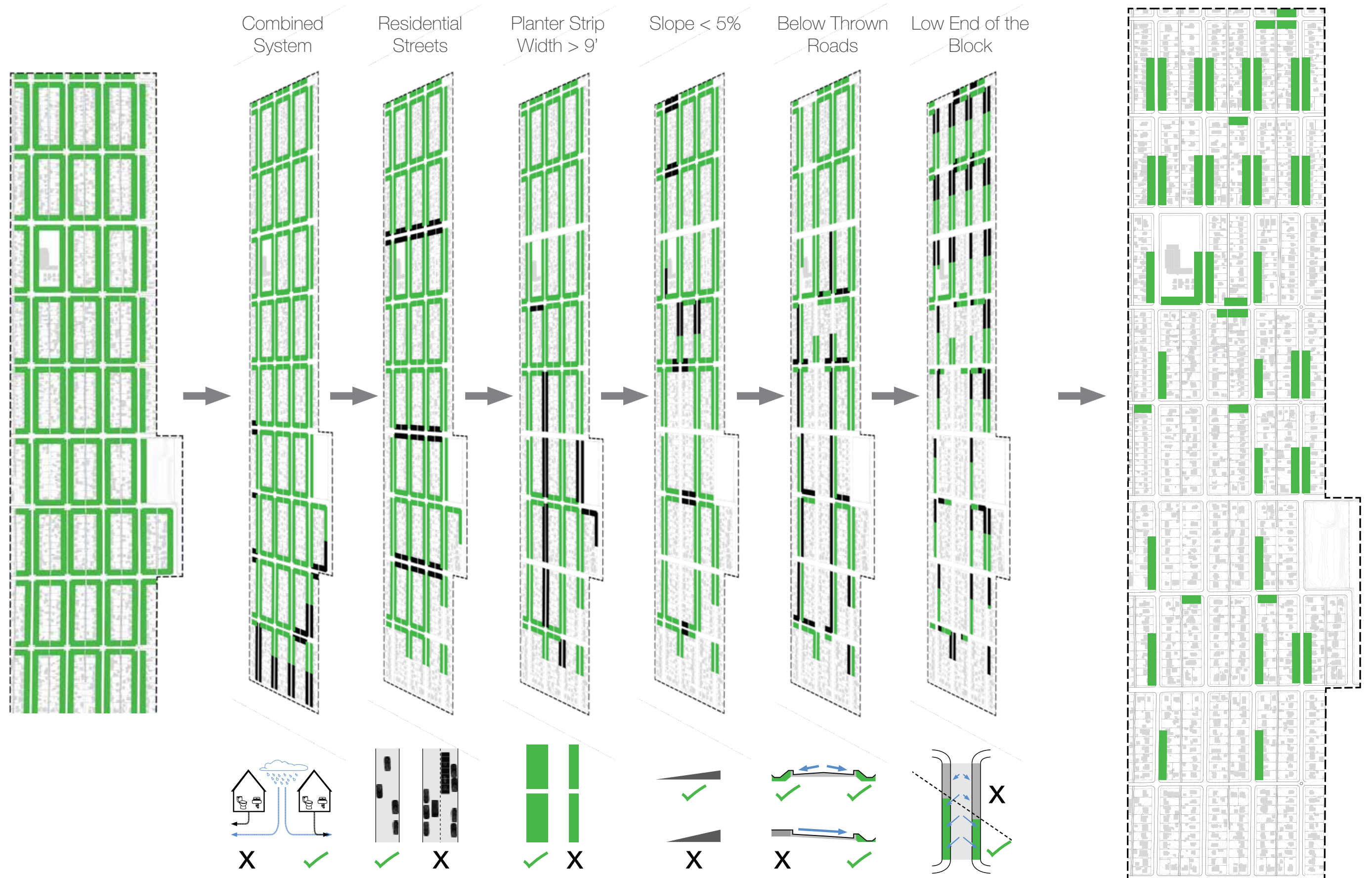
DEEP INFILTRATION WELLS
Due to the impermeable glacial till soils, 15 deep infiltration wells extending 60'-100' below ground remove water from the combined sewer system and recharge groundwater.

To protect the Puget Sound, retrofitted roadside rain gardens treat and remove polluted stormwater from the combined sewer system and infiltrate that stormwater into the outwash geology below the impervious cap of glacial till.

POTENTIAL SITES

FILTERING CRITERIA

RETROFIT SITES



All 93 blocks in the neighborhood were evaluated against filtering criteria, then the team conducted hydraulic/hydrologic modelling to arrive at 15 block faces that were most advantageous for retrofits.



To work through neighbors' concerns, the design team conducted intimate, block-by-block "Red Flyer Wagon" outreach meetings to answer questions about rain garden cross sections, curb bulb areas, and typical plantings.

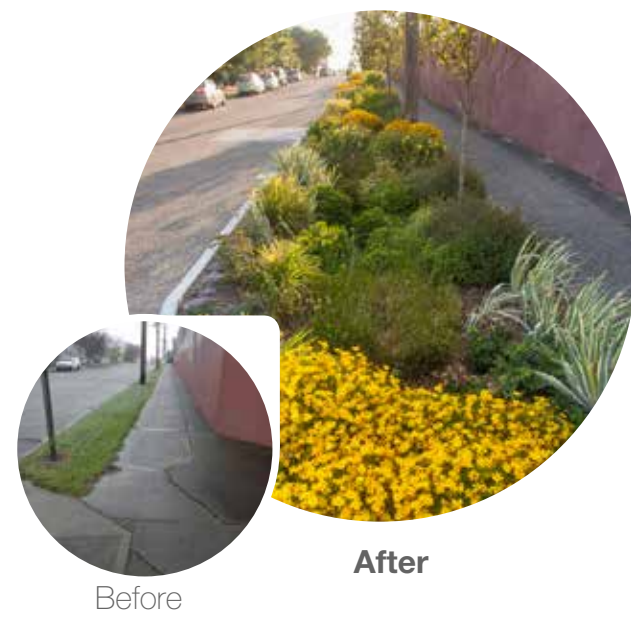
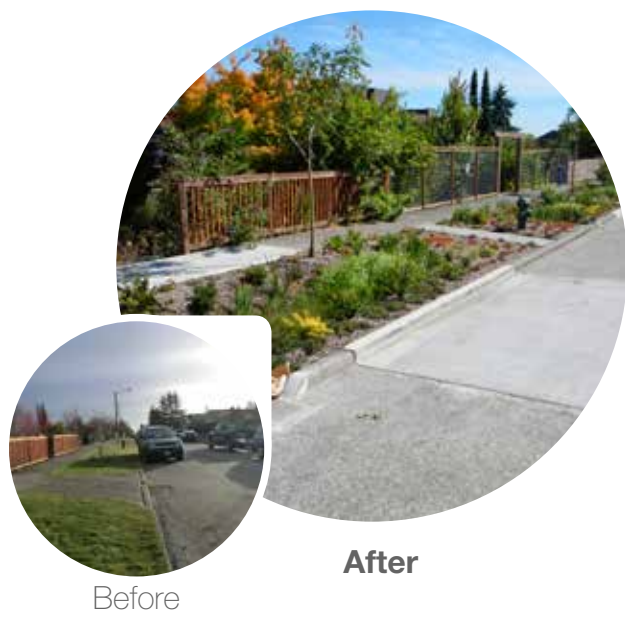
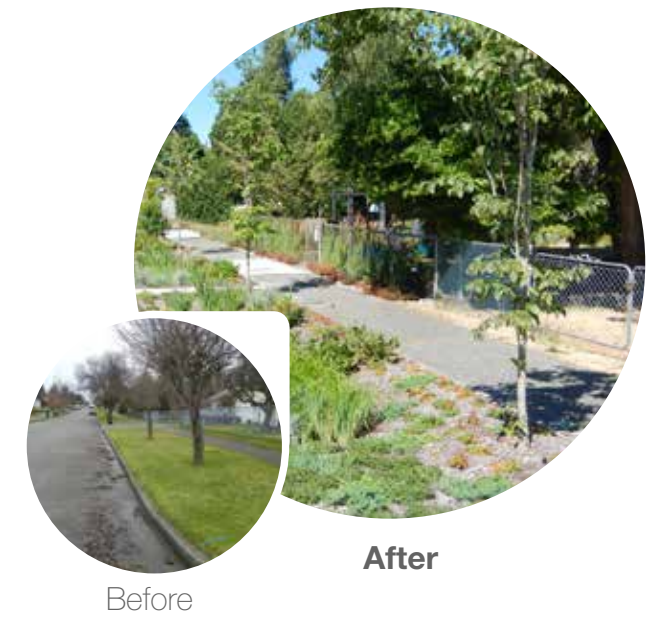
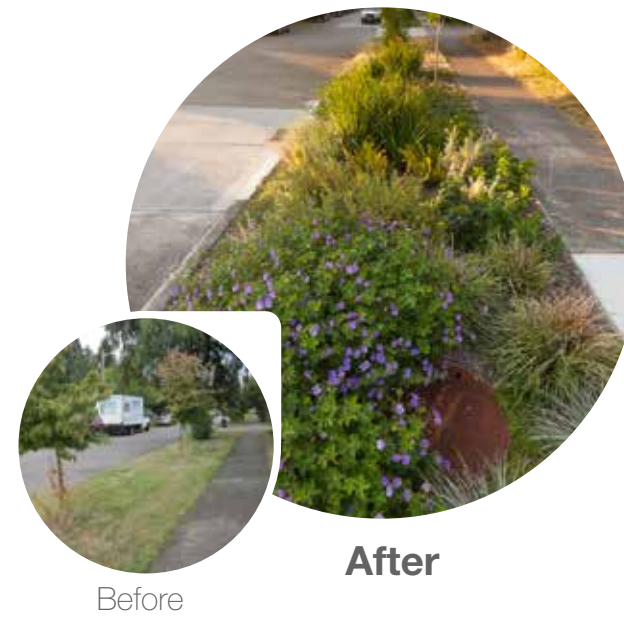
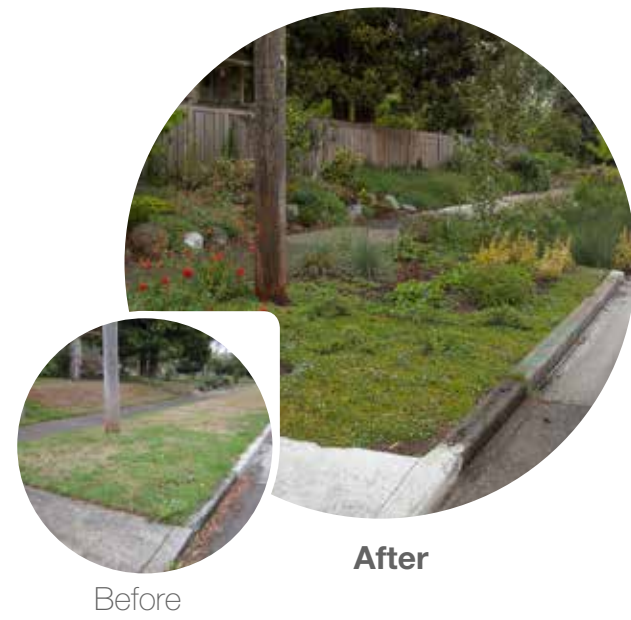
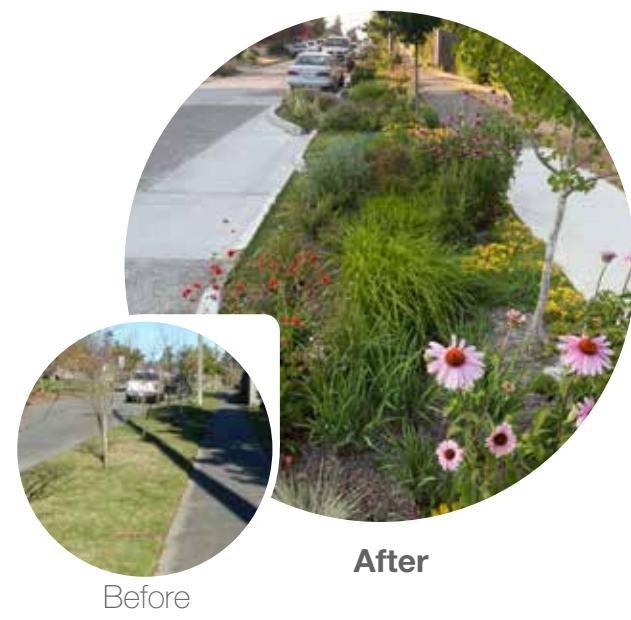
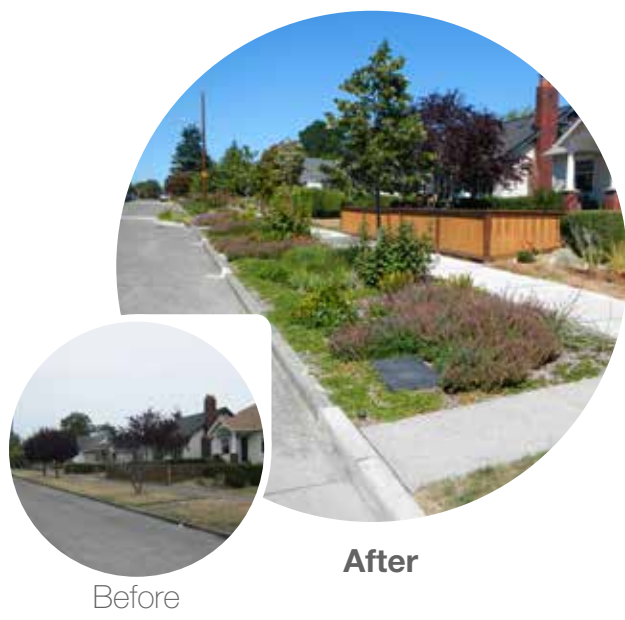


To respond to neighborhood concerns about the look and feel of the rain garden plantings throughout the year, the design team developed summer and winter renderings of typical planting schemes.

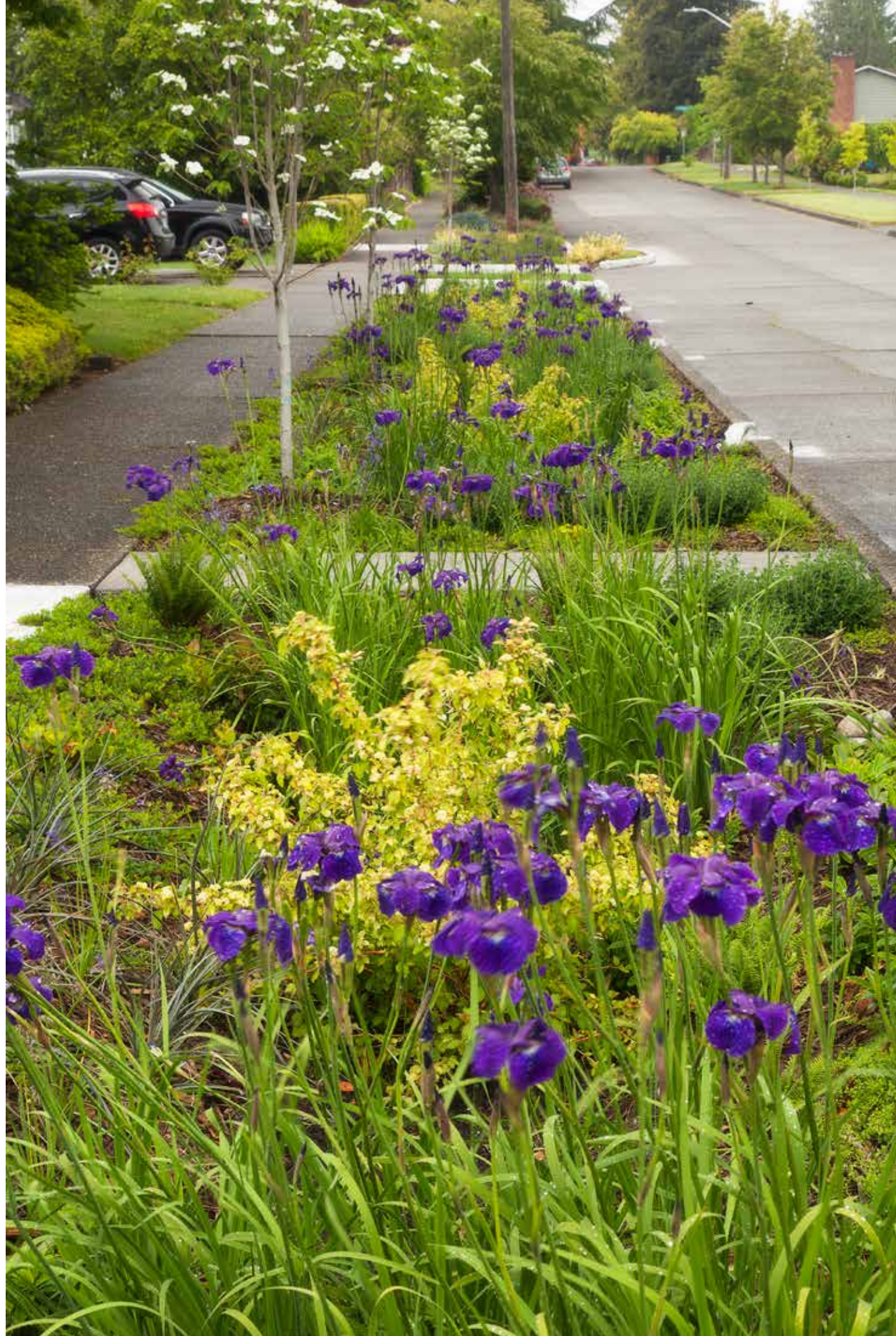


SYMBOL	ZONE	PLANT TYPE	LOCATION	FUNCTION	PLANT HT.	DECIDUOUS / EVERGREEN
	1	Emergents, Perennials & Low Shrubs (sedges, rushes, grasses, irises)	Swale Bottom / Lower Slope	Water Quality Treatment	36" max.	Mix
	2	Steppables / Groundcovers	Crossing / Overflow / Curb Strip / Upper Slope	Steppable	6" +/-	Evergreen
	3	Groundcovers / Low Shrubs	Driveway / Intersection	Sight Clearance / Durable	24" max.	Evergreen
	4	Groundcovers / Shrubs	Sidewalk / Upper Slope	Accent / Border / Anchor	6"-36"	Mix
	4	Tall Accent Shrubs	Sidewalk / Lower Swale	Accent	4'-6' +/-	Mix
	2 + 4	Tree	Crossing / Sidewalk / Upper Slope	Shade / Water Quality	20'-50' - varies based on power line location	Mix
	4	Smalls Trees / Large Shrubs	Sidewalk / Upper Slope	Shade / Water Quality	25' max.	Mix

The typical retrofit creates a lush, layered garden with plant communities calibrated to the hydrologic conditions of the rain gardens. At intervals, higher soil berm afford crossing opportunities for residents parked along the curb.



After only a year of plant growth, the neighborhood feels significantly different, offering untold co-benefits to the West Seattle community that would not have been realized with a traditional, bottom-of-pipe grey infrastructure solution.



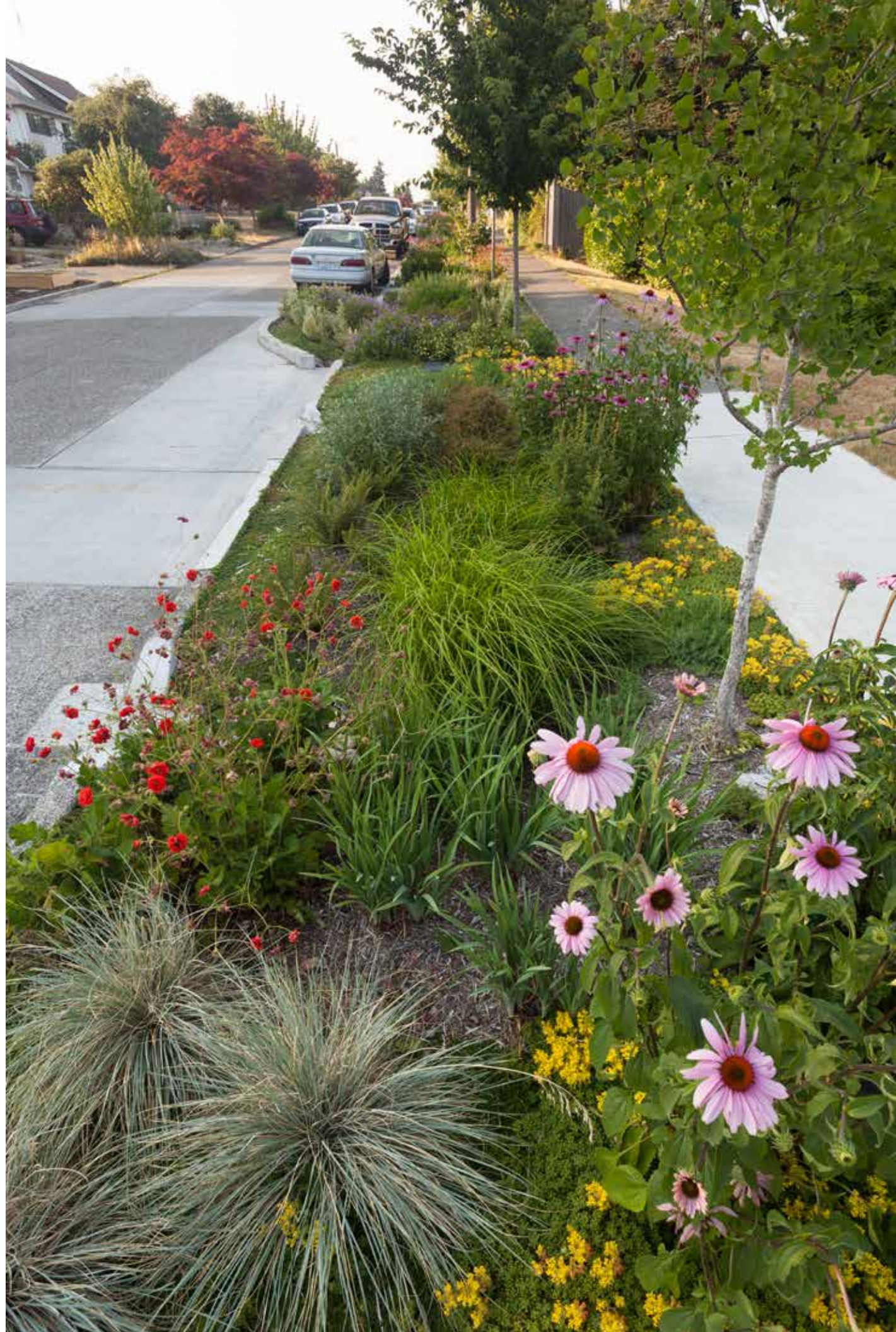
During the first growing season, ruffled velvet iris, sunshine bluebeard, and beaked sedge caused one resident to exclaim, "all of my neighbors ... talked about how astounded they are with the sheer beauty of these well-designed, well-planted areas."



Curb bulbs allow for polluted stormwater to enter the rain gardens from the curb line while increasing the planting area and calming traffic.



Lavender, sedum, flax and grasses combine to create a richly textured, gardenesque palette for one neighbor within the Barton Basin.

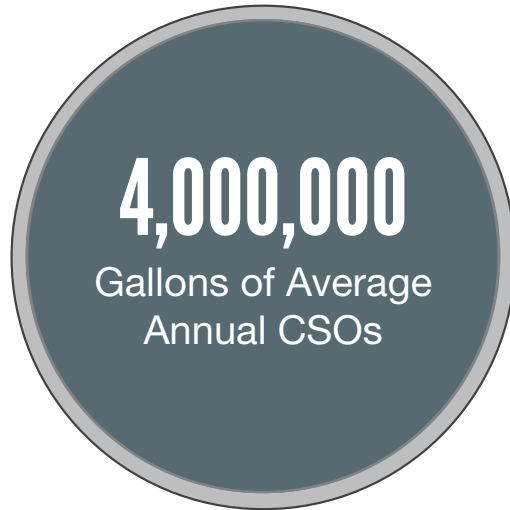


Coneflowers, blue oat grass, coreopsis, and geraniums combine in enticing drifts of lush plantings creating new sources of delight and interest for the community. Neighbors report increased sociability as people explore the blooms and buds of each rain garden.

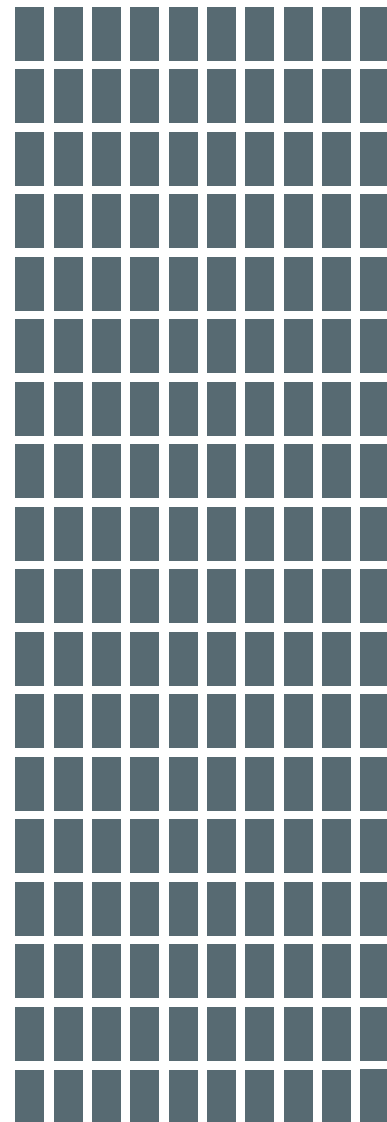


With the new plantings, the streets within the Barton Basin are now calmer, making it more inviting for people of all ages and abilities to walk and bike around the neighborhood.

PRE-RETROFIT



Enough to Fill 180 Backyard Swimming Pools



ROADSIDE RAINGARDEN RETROFIT

6 Community Meetings



24 "Red Flyer Wagon" Block Meetings



93 Rain Garden Cells Totaling 36,600 Square Feet



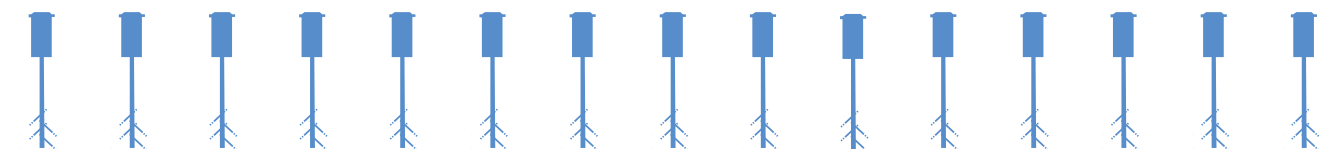
117 New and Transplanted Trees



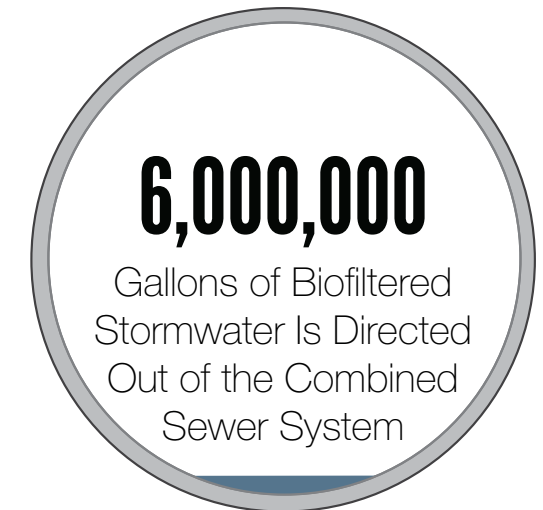
Over 40,000 Understory Plants



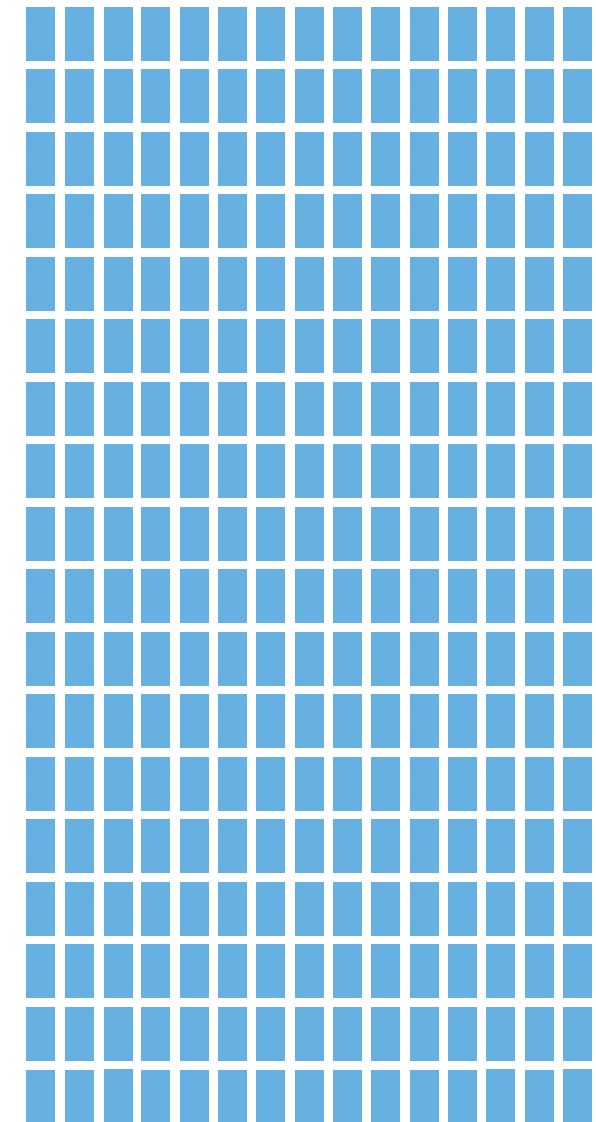
15 Deep Infiltration Wells



POST-RETROFIT



Enough to Fill 270 Backyard Swimming Pools



As the thousands of trees, shrubs and soils mature, the social and environmental performance of the basin's roadside rain garden will only grow in this deep, green retrofit.



These rain gardens' sights, smells, and sublime sensory stimuli will become a part of these kids' everyday experience, teaching that stewardship of the Puget Sound can happen throughout the watershed.