

[1] TATLOW CREEK: PROJECT BACKGROUND

PROJECT BACKGROUND

Volunteer Park is the site of a historical stream that was covered when the city was developed. A small section of the stream still exists in Tatlow Park. The stream enters a culvert at Point Grey Road and discharges into English Bay via underground pipes. There has been long standing community and Park Board interest in recreating this buried stream above ground.

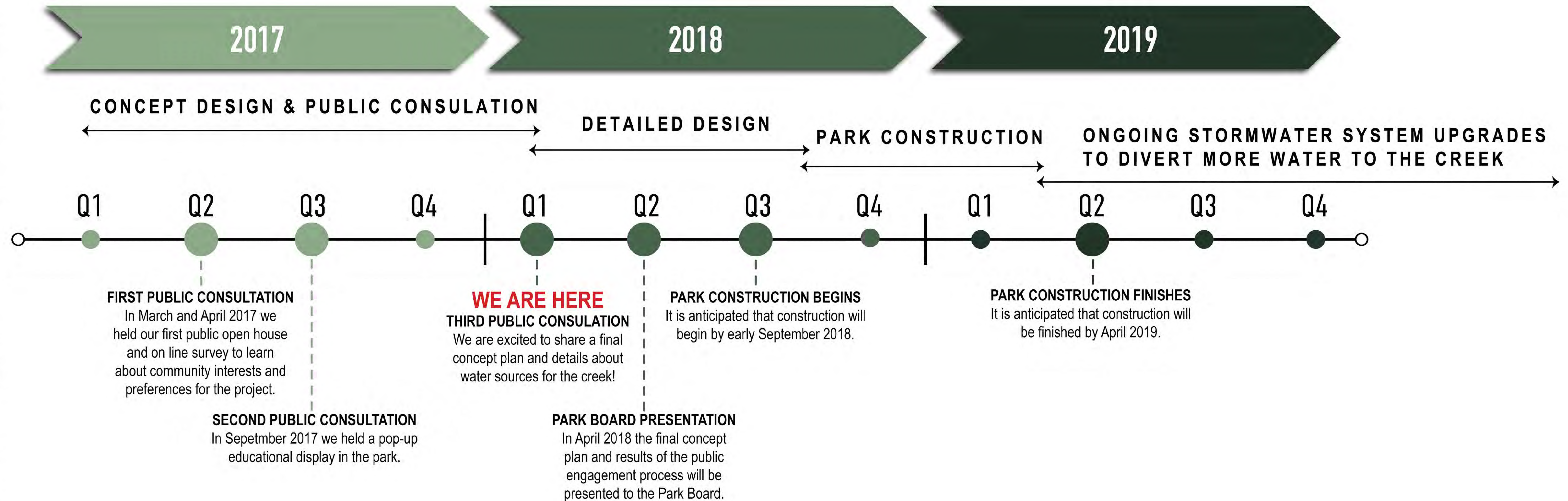
PROJECT SCOPE

This project involves restoring the stream through Tatlow Park and Volunteer parks to connect it with English Bay.

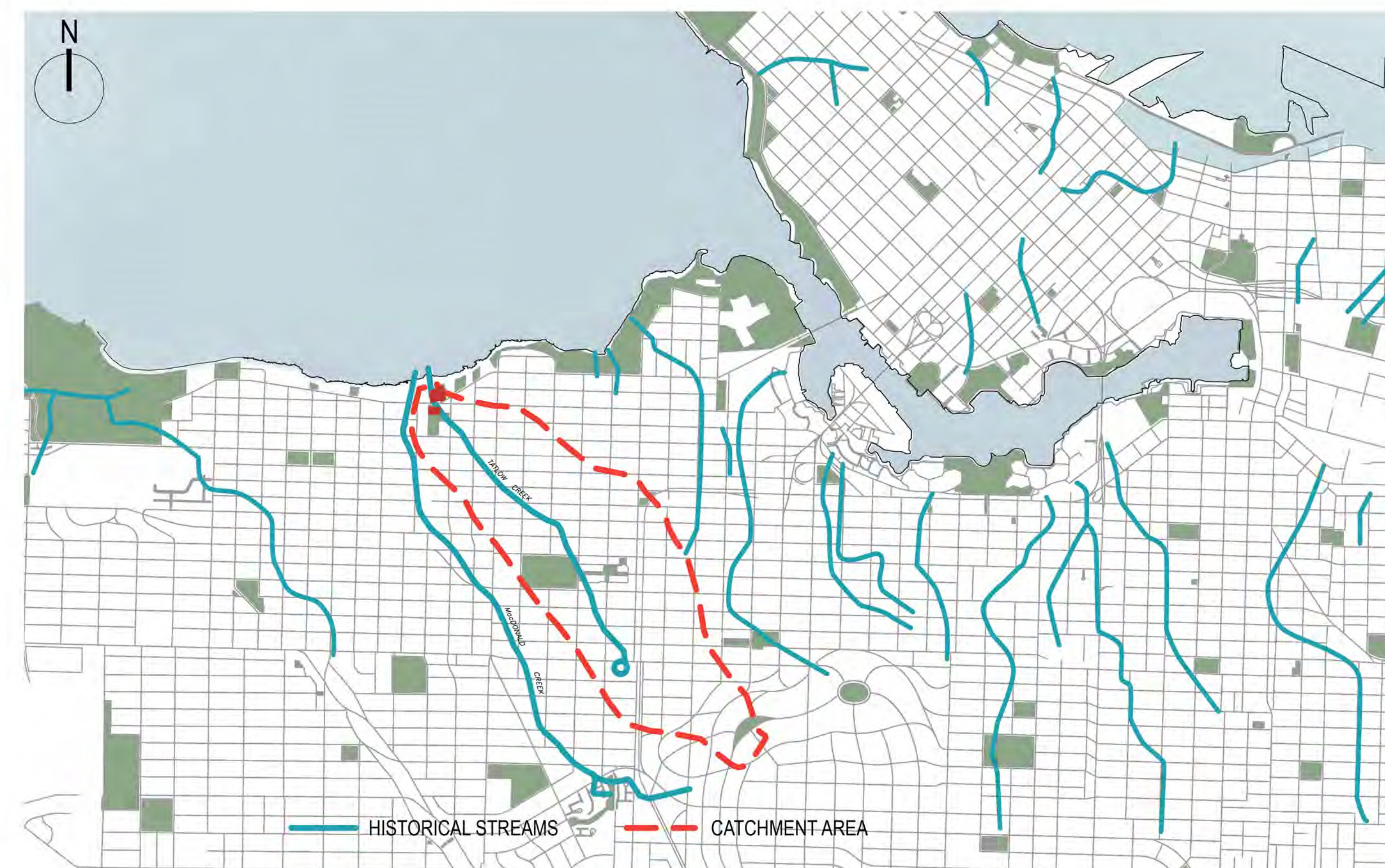
The restored stream will be fed with stormwater runoff from the adjacent neighbourhood, which will be cleansed through rain gardens, a series of pools along the stream, and engineered filtration before reaching the ocean.

The project will include improvements to Volunteer Park to create an ecologically diverse green space and accessible waterfront access for pedestrians. A City of Vancouver sewer separation project will happen concurrently to support this project.

PROJECT TIMELINE



HISTORICAL TATLOW CREEK WATERSHED



WATERSHED CONTEXT

The historical Tatlow Creek, previously known as First Creek, flowed through the west of Tatlow Park and Volunteer Park before entering English Bay. Groundwater in the area supplied the stream with a steady flow of water year round.

Due to urban development, the original Tatlow Creek was diverted and buried underground, and the natural watershed was replaced by underground pipes. This has resulted in a deeper water table and altered hydrological processes.

Currently the watershed is comprised of residential and commercial areas, with a high percentage of impervious surfaces such as roofs and roads. The storm water runoff from these surfaces is directed by underground sewer pipes to the Iona Wastewater Treatment Plant, partly as combined stormwater system and partly as a separate stormwater system.

[2] PUBLIC ENGAGEMENT: RESULTS

PUBLIC CONSULTATION

We held our first Public Open House on March 8, 2017 to present design options for the project. An online questionnaire was open for feedback through to April 3, 2017. Feedback gained from this process helped refine the final design concept. The following is a summary of what we heard.

218

QUESTIONNAIRES
WERE COMPLETED

89%

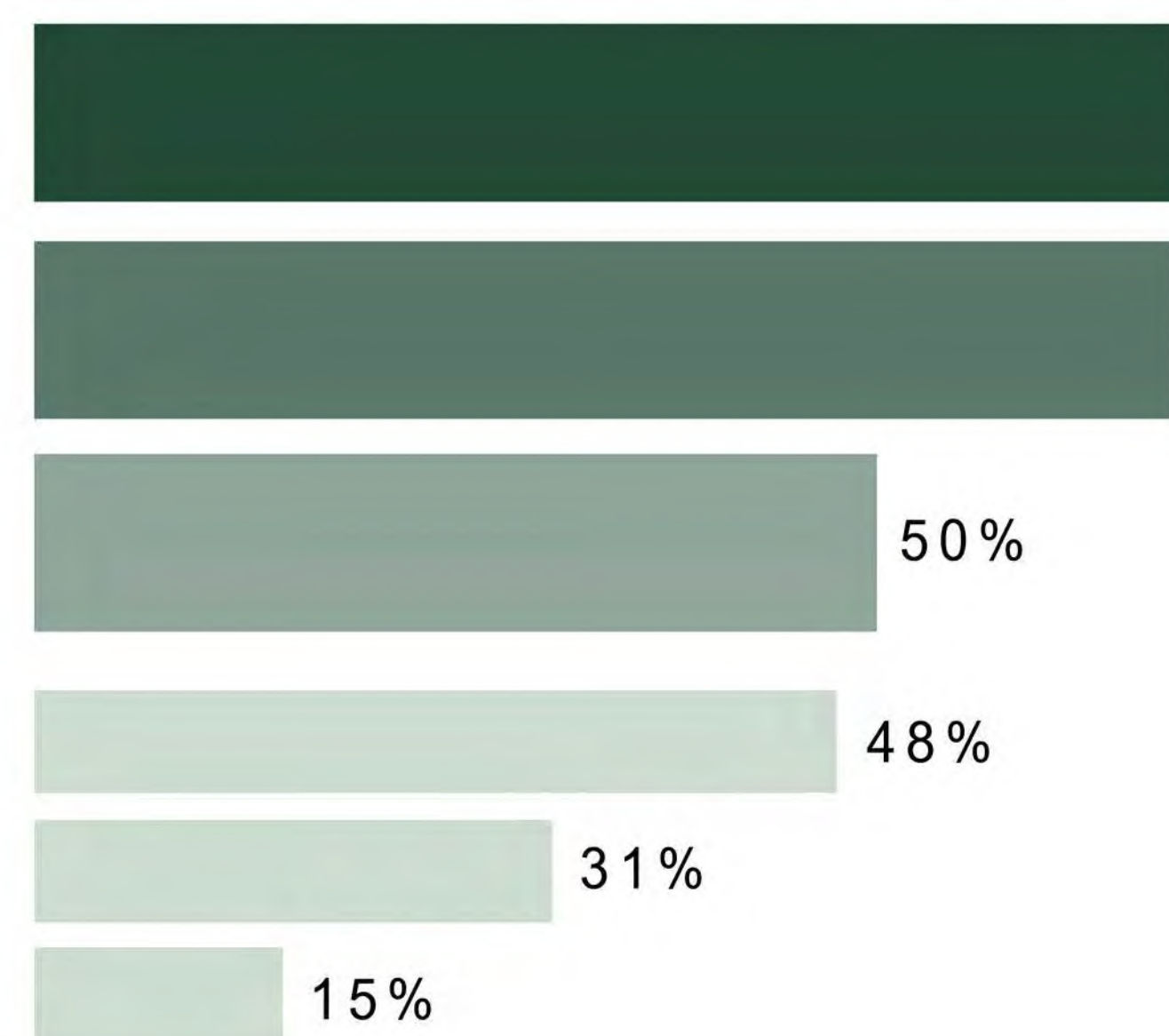
OF RESPONDENTS
LIVE IN KITSILANO

“THIS IS A GREAT IDEA AND INITIATIVE AND I'M VERY EXCITED BY IT!”

“IMPROVED RAMP ACCESS TO THE BEACH IS WELCOMED.”

WE ASKED:

WHAT DO YOU DO WHEN VISITING THE PARKS?



WE HAVE RESPONDED WITH:

SEATING AT THE
INTERTIDAL ZONE +
LOOKOUT BRIDGE

ACCESSIBLE RAMP +
ADDITIONAL STAIRS

BIKE RACKS +
PICNIC AREA

Stop while traveling along
Point Grey Road

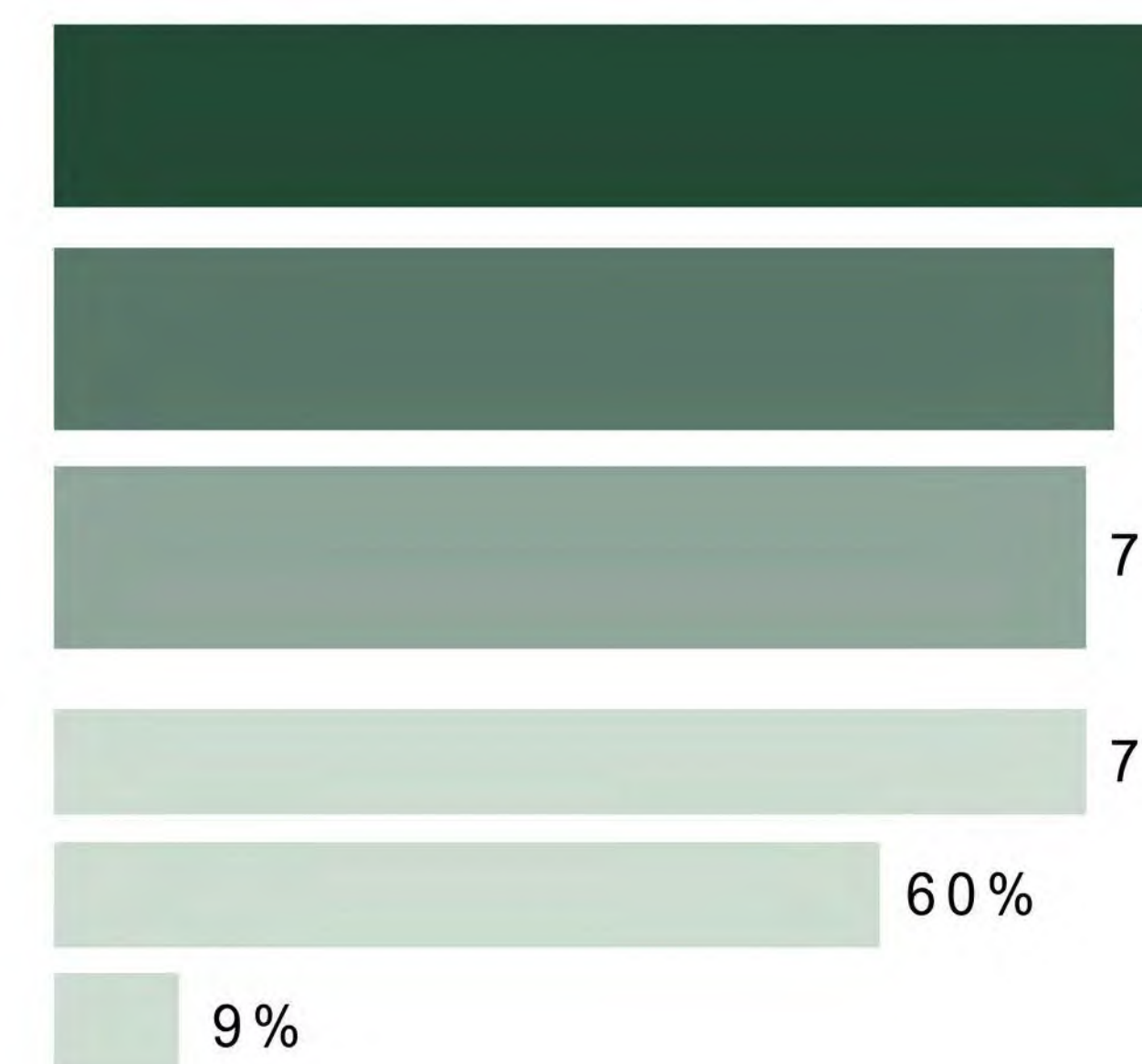
Relax in the park

Walk a dog

Play sports

WE ASKED:

WHICH BIODIVERSITY INITIATIVES DO YOU SUPPORT IN THE PARK?



WE HAVE RESPONDED WITH:

MEADOW IN WEST
SIDE OF PARK

POLLINATOR PLANTS
+ BIRD BOXES

FORESHORE
ENHANCEMENTS

Enhanced intertidal zone

Fish in the stream

Increase trees

Other



77%

OF PARTICIPANTS
SUPPORT INCLUDING
EDUCATIONAL FEATURES
IN THE PARK DESIGN

“KEEP THE SHORELINE
LOOKING NATURAL.”

“I'D LIKE TO SEE WILDFLOWERS
AND MILKWEED PLANTED FOR
BUTTERFLIES AND HONEYBEES.”

“THE PARK NEEDS MORE
BENCHES AND A PICNIC
TABLE OR TWO.”



66%

OF PARTICIPANTS
BELIEVE THE PROPOSED
STREAM RESTORATION WILL
HAVE A POSITIVE IMPACT ON
THE USAGE OF THE PARK



PROPOSED SITE SECTION + TOPOGRAPHY

[3] DESIGN GOALS + INTENTIONS

PROJECT GOALS

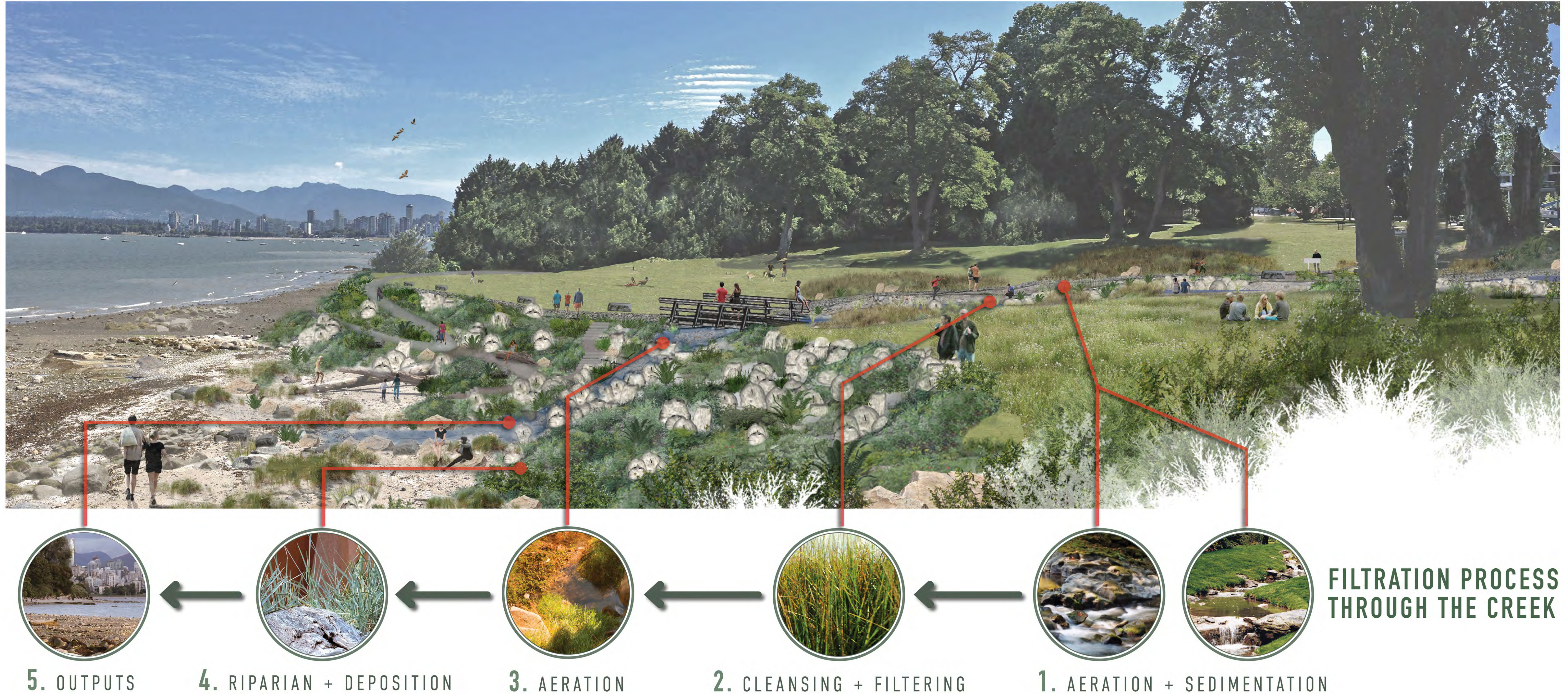
- Connect the existing stream in Tatlow Park to English Bay through Volunteer Park.
- Implement sustainable storm water management strategies.
- Improve the quality of water entering English Bay.
- Improve accessible pedestrian access to the shore.
- Increase biodiversity through the planting of native plants.
- Create habitat for bird and pollinator species
- Restore and enhance riparian and shoreline habitat.
- Provide educational opportunities for the community.
- Improve amenities including landscaping, pathways, benches, and picnicking areas.

WATER QUALITY

Rain that falls onto roads, parking lots, and other hard areas often picks up pollutants as it runs off these surfaces and flows into the city's drainage network, negatively impacting the water quality in nearby waterways and beaches.

To reduce this impact, water diverted to the creek from the separated stormwater system will be treated naturally and with engineered filtration prior to discharge.

CONCEPTUAL IMAGE OF RESTORED STREAM OUTFALL



WHY IS WATER QUALITY OF THE STREAM IMPORTANT?

- The creek and English Bay support sensitive aquatic species and wildlife, which would be affected by poor water quality.
- Adequate water quality will allow children to play around the creek and ensure that nearby beaches remain safe for swimming and boating.
- Improving the quality of water that flows into English Bay contributes to long-term goals to re-open closed shellfish beds and re-enable First Nations traditional cultural practices in parts of Burrard Inlet.

HOW WILL THE STREAM IMPROVE WATER QUALITY?

- Water in the restored stream will be naturally filtered by a series of pools and wetland areas before it enters English Bay, as shown in the diagram above.
- Green infrastructure such as swales and rain gardens are being incorporated into the design of the new park and boulevard areas. These features will also naturally filter stormwater runoff from the area before it reaches the creek or ocean.
- Sewer separation will occur to provide stormwater as the main source of water to the creek. As a result, the combined (sanitary and storm) sewer system will be less likely to overflow during heavy rains, reducing the likelihood of untreated sewage overflows to English Bay.

[4] WHERE WILL THE WATER COME FROM?

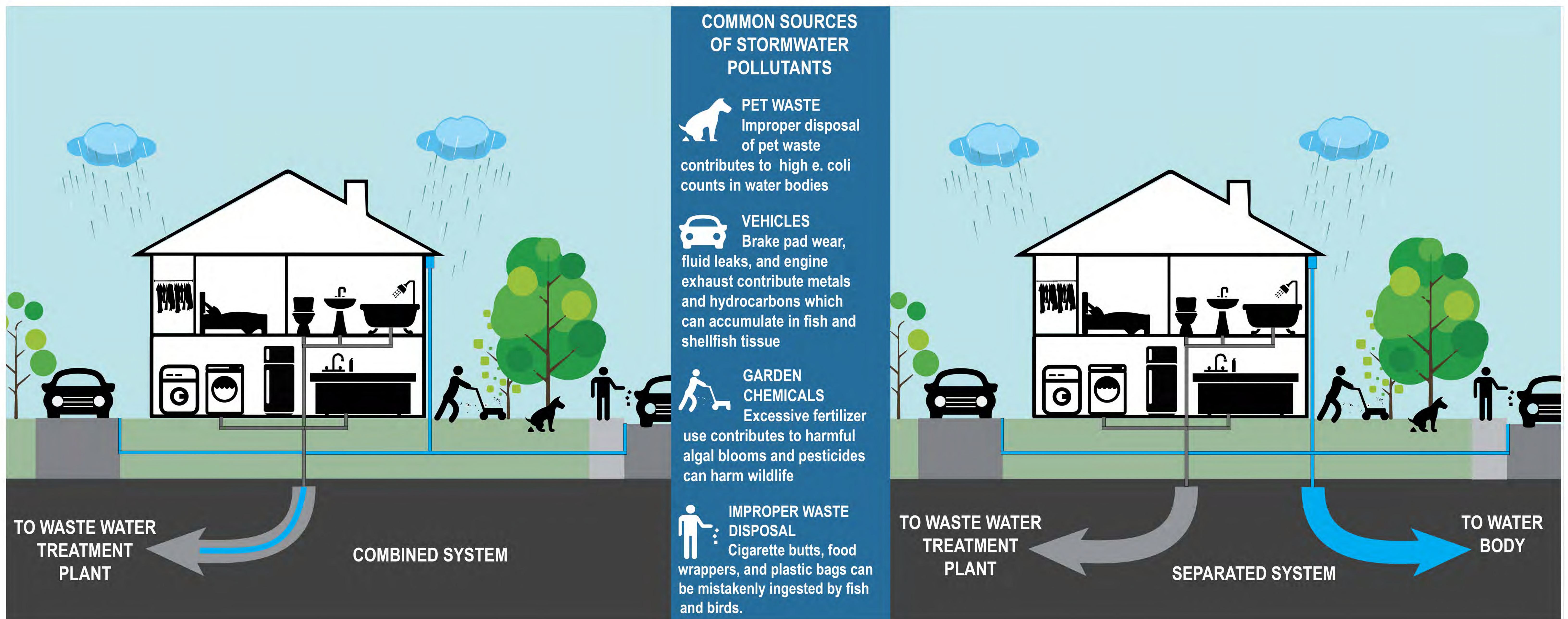
STORM SYSTEM

The City of Vancouver is working toward the Province of BC's environmental goal to eliminate sewage overflows by 2050 by replacing combined systems with separated systems.

In a **combined system**, stormwater runoff is combined in a single pipe with wastewater from homes, businesses, and industry.

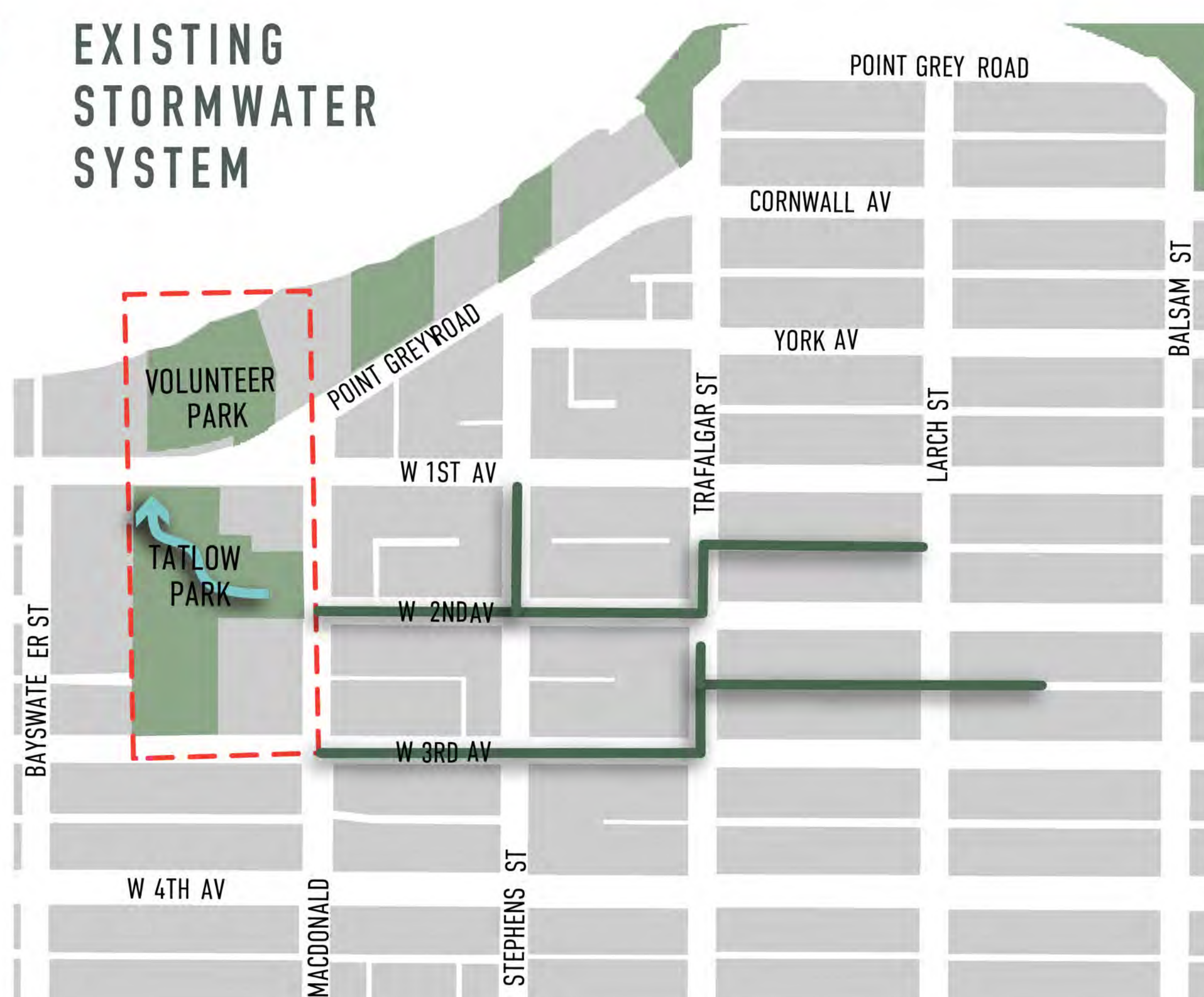
During heavy rains, high volumes of stormwater can exceed the capacity of a combined system causing untreated overflow to empty directly into waterways.

In a **two-pipe separated system**, stormwater is collected through storm drains and travels separately from household waste and other wastewater.



BENEFITS OF SEPARATION

1. Eliminates combined system overflow of wastewater.
2. Improves water quality by removing wastewater component.
3. Reduces risk of flooding by increasing capacity.
4. Provides an opportunity for stormwater to be utilized as a resource.

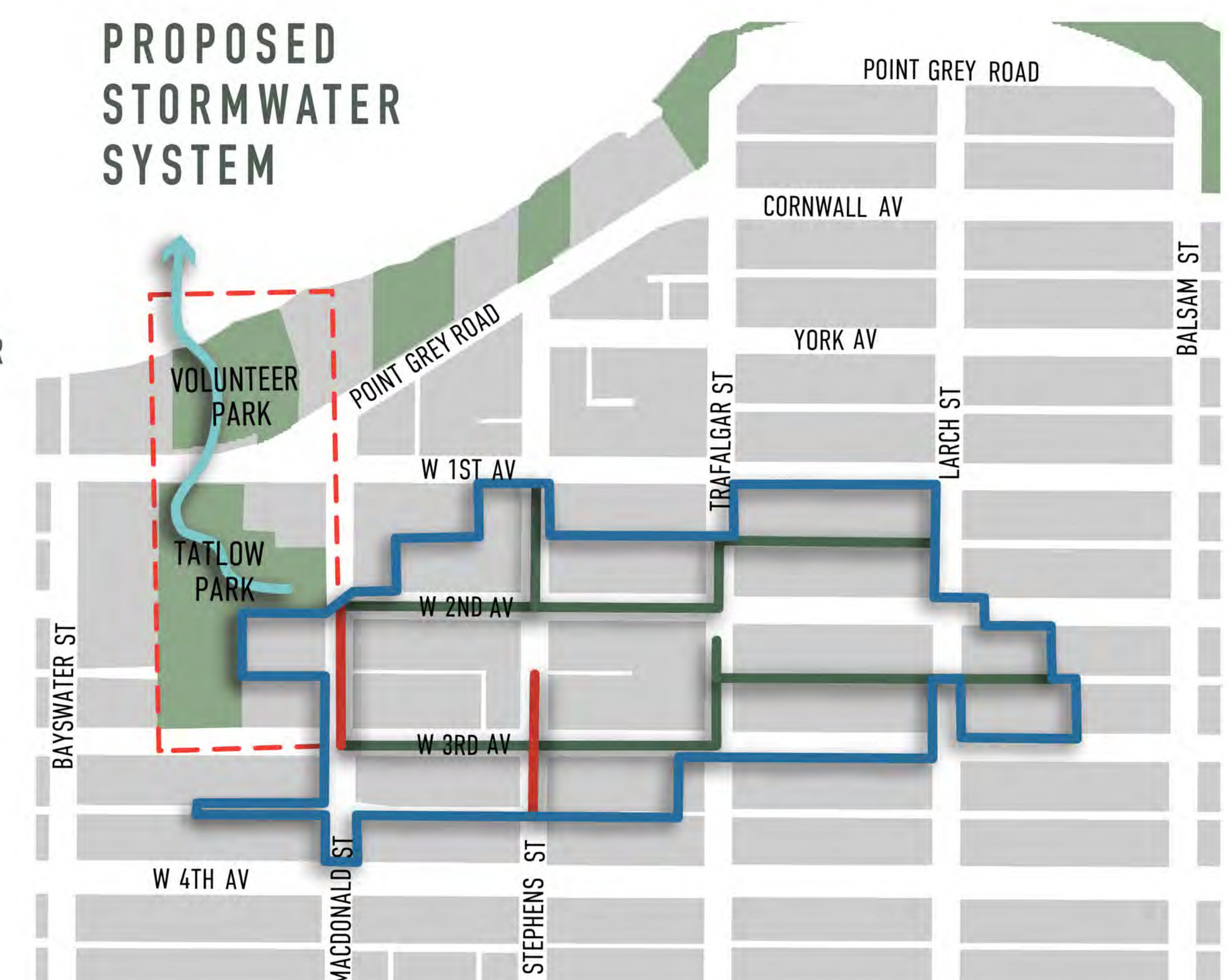


LEGEND:

- TATLOW CREEK
- PROPOSED 2019 STORM SEWER CONSTRUCTION
- EXISTING SEPARATED STORM SEWER
- CATCHMENT AREA (9.8 ha)

PROPOSED SEWER CONSTRUCTION

Water from the proposed catchment area (in dark blue) will be diverted to the creek once sewer system construction is complete in 2019. This process will rely on private home sewer separation as well as city construction to be successful. The size of the catchment area will gradually increase over a 15 year period as further sewer separation projects are completed.



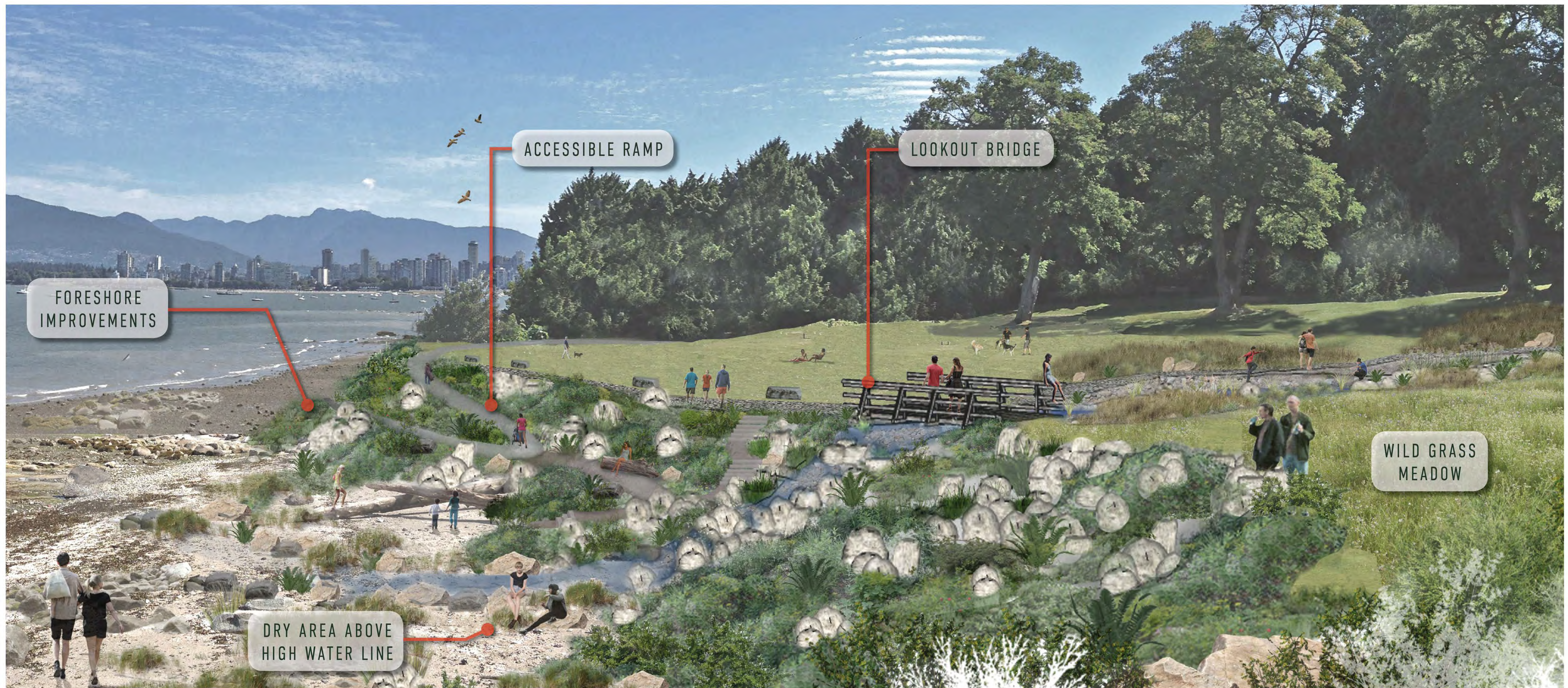
[5] ELEMENTS OF LANDSCAPE DESIGN



[6] STREAM + FORESHORE INTERACTIONS

DESIGN ELEMENTS

- **Foreshore improvements** including native planting and tombola structures that serve as wave breaks
- A **dry area above the high water line** to ensure beach activity at all times of the day
- An **accessible ramp** and improved stairs provide increased beach access for pedestrians
- A **lookout bridge** and **bench seating** above the beach provide places to rest with prime views of the ocean and city skyline
- A large **wild grass meadow** on the west side of the stream increases planting diversity and provides habitat for bird and pollinator species



CONCEPTUAL IMAGE OF ACCESSIBLE PATH AND SHORELINE EXPERIENCE

WATER VOLUME

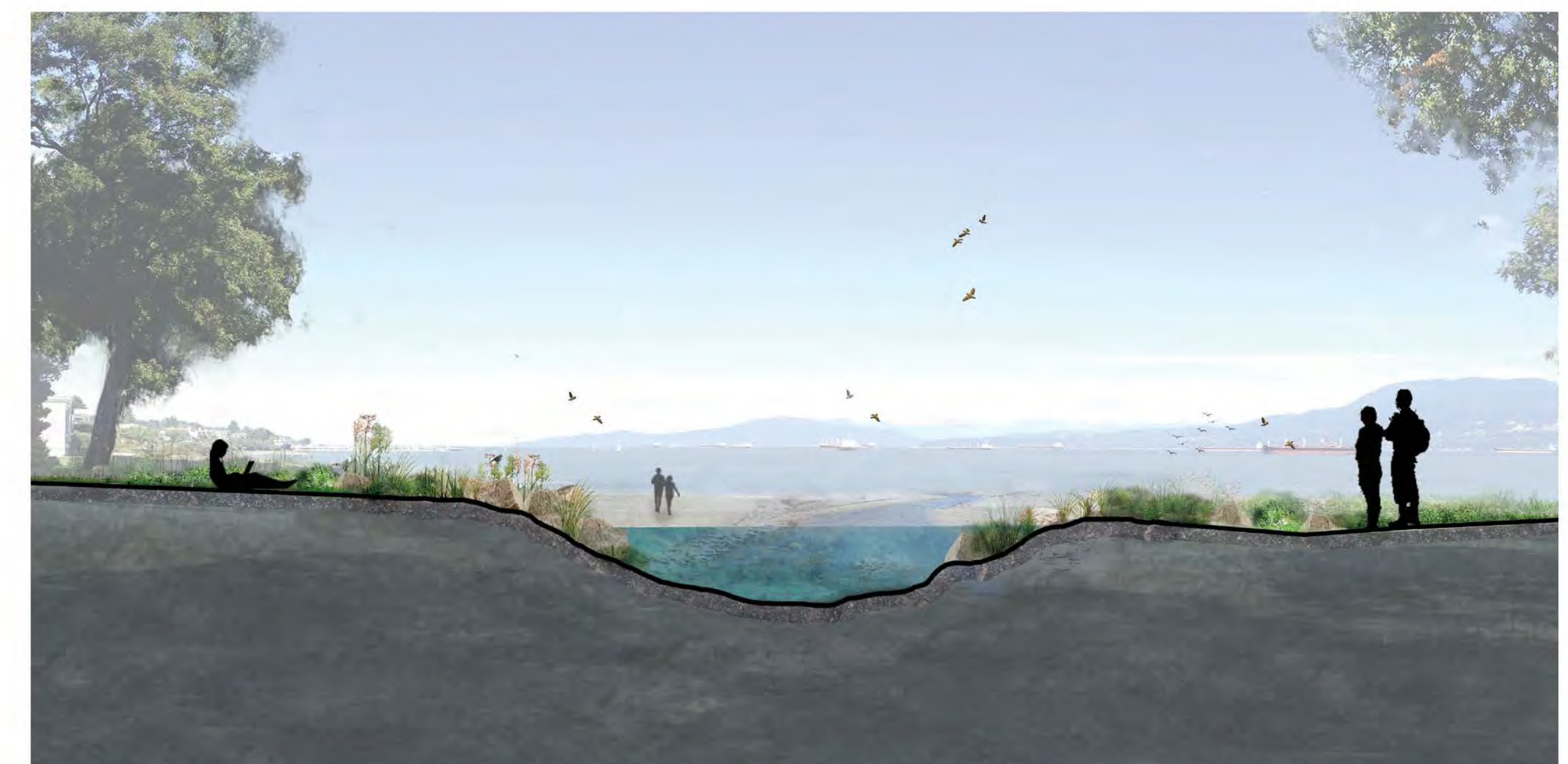
Water for Tatlow Creek will primarily come from the City's underground separated stormwater system. It is anticipated that up to 1500 L/s of stormwater may be diverted from the existing storm system, treated, and directed to the creek. The highest flows can be expected to occur in the fall and winter months when Vancouver receives the most rainfall. In the summer months when there is very little rain, there may be little to no flow in the creek.



CROSS-SECTION THROUGH STREAM - LOW FLOW

DURING SUMMER,
THE ESTIMATED
WATER FLOW
THROUGH THE
STREAM WILL BE
ABOUT **2L/s**

DURING WINTER,
THE ESTIMATED
WATER FLOW
THROUGH THE
STREAM WILL BE
ABOUT **1500L/s**



CROSS-SECTION THROUGH STREAM - AT FORESHORE

[7] GREEN INFRASTRUCTURE

GREEN INFRASTRUCTURE

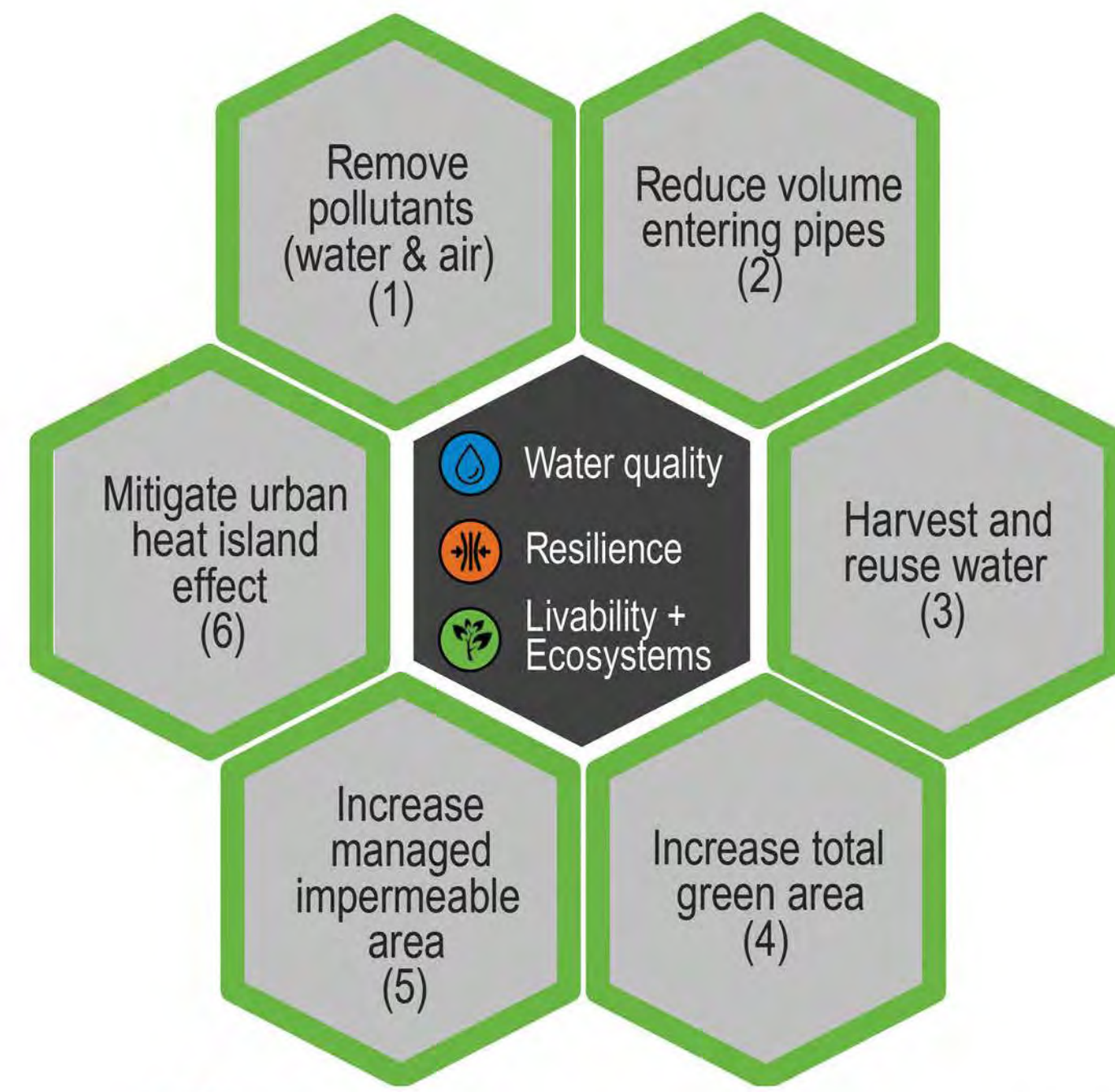
- Green infrastructure is an approach to water management that protects and restores the natural water cycle.
- It uses built structures such as green roofs, wetlands, and rain gardens to capture, store, and clean rainwater before returning it to our waterways.

GOALS + BENEFITS

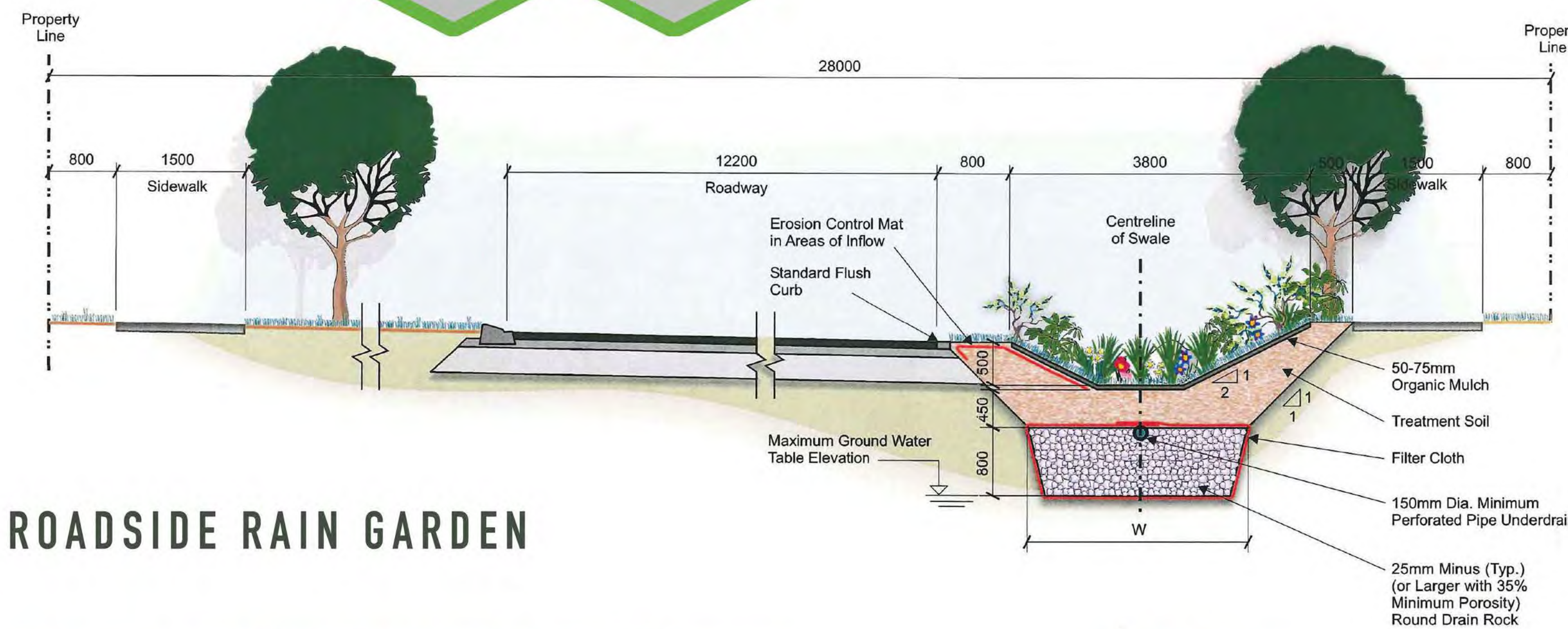
- Improve water + air quality
- Enhance species biodiversity
- Increase aesthetic value and livability of the neighbourhood
- Reduce water volume entering the sewer system
- Reduce stormwater pollution
- Increase the city's resilience to climate change

RAIN GARDENS

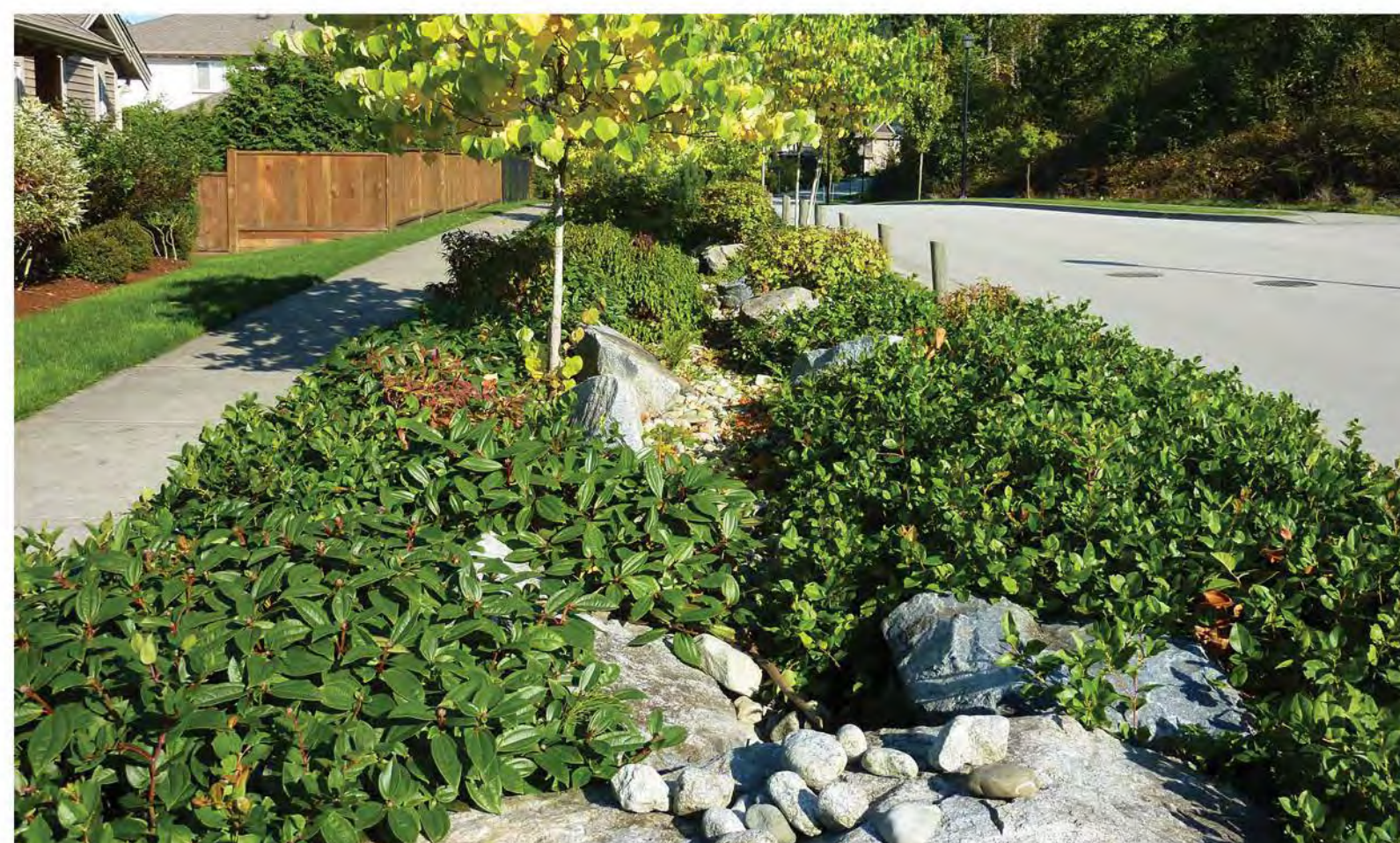
- Rain gardens are planted areas used for capturing and cleaning urban runoff which often contains pollutants.
- Water is intercepted by the upper layer of soil in the garden which filters out pollutants. It then percolates through to the underlying rock trench and enters the perforated drain which conveys treated water away from the rain garden – in this case to Tatlow Creek.
- This process helps divert urban runoff from the stormwater system and improve the water quality.



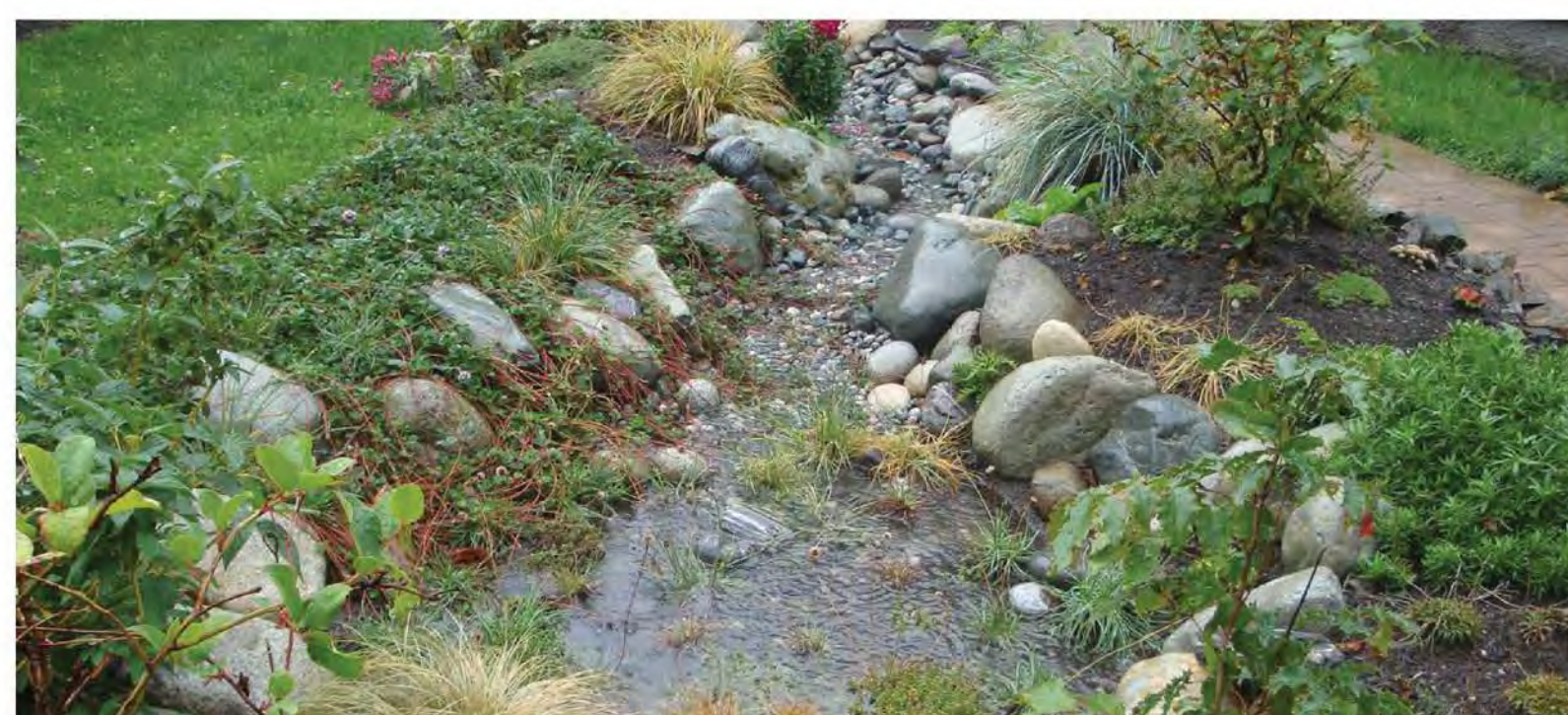
This project supports the City of Vancouver objectives for using green infrastructure in the city.



ROADSIDE RAIN GARDEN



ROADSIDE RAIN GARDEN

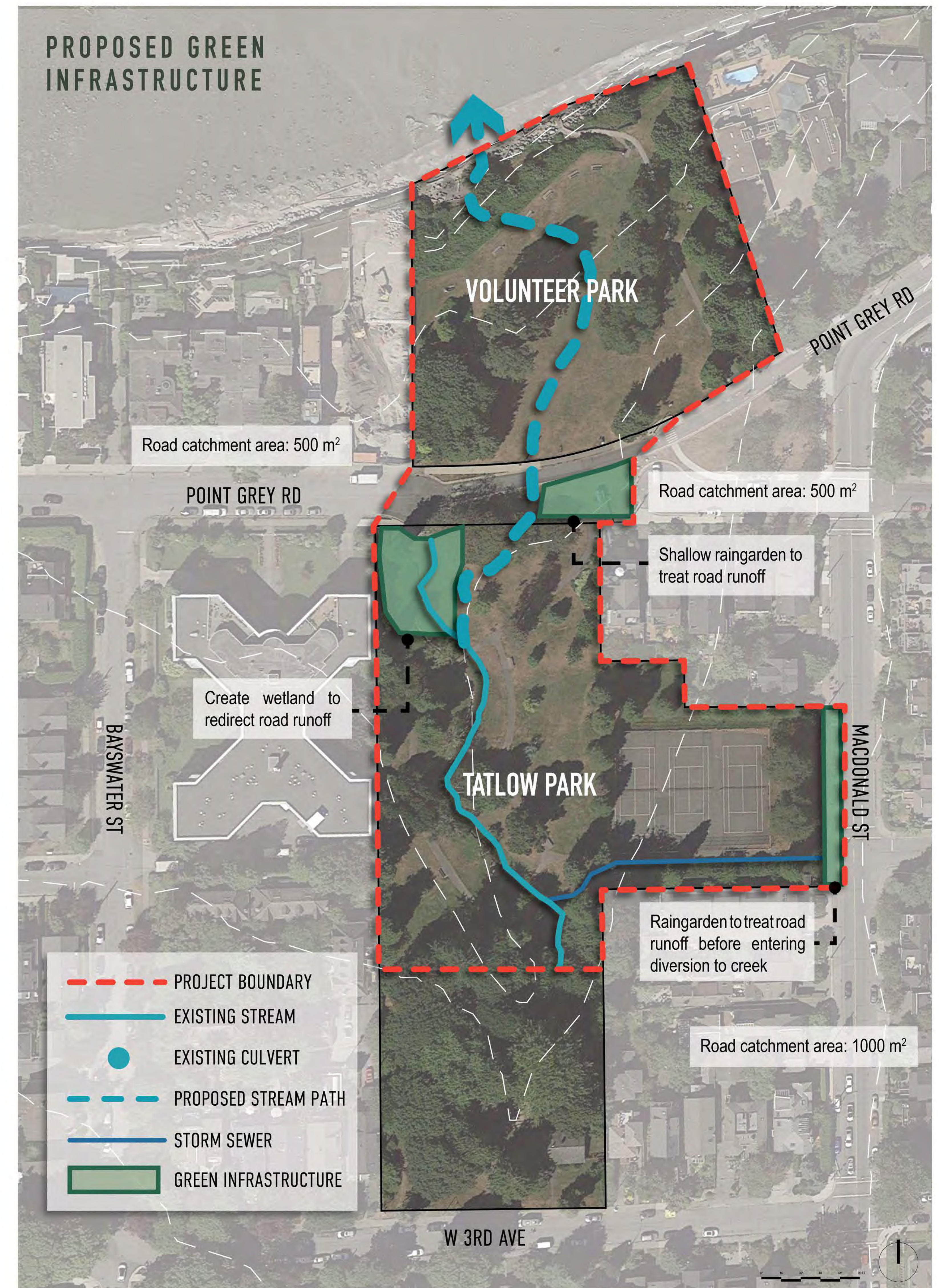


RAIN GARDEN DURING A STORM



CONSTRUCTED WETLANDS

- Constructed urban wetlands capture, store, and treat excess urban runoff by filtering out contaminants and consuming nutrients.
- Wetlands facilitate evapotranspiration, the process by which plants store and release water back into the atmosphere.
- Other benefits include providing habitat for birds and insects, enhancing the aesthetic environment, and cooling the surrounding area.



[8] WHAT ABOUT WILDLIFE?

WILL THERE BE FISH IN THE STREAM?

It's very unlikely that the restored stream will support salmon and trout. Small urban streams are inhospitable to fish for many reasons:

- low summer flow
- poor water quality from urban runoff
- intense water flows during heavy rain storms

While some of these challenges can be addressed through design such as increased water quality treatment, it is very difficult to restore a healthy stream in a dense, urban area that will support fish. There are no precedents in Metro Vancouver for successfully restoring fish in streams like the proposed Tatlow Creek.

Fish populations also require a minimum amount of habitat to sustain populations over the long-term. Research has shown that the size of coho salmon populations is related to stream length: the longer the stream, the more fish that are produced.

The restored Tatlow Creek will be about 175 m long and about 1 m wide for a total amount of stream habitat of 175 m². It will have pools and riffles with boulders and logs to create a more natural stream channel. But 175 m² is not enough habitat to sustain a coho salmon population even with regular releases of salmon fry by schools or other groups. For comparison, Spanish Bank Creek is about 1,050 m long and has about 1,500 m² of stream habitat, and Musqueam Creek is 2,750 m long with about 4,950 m² of stream habitat.



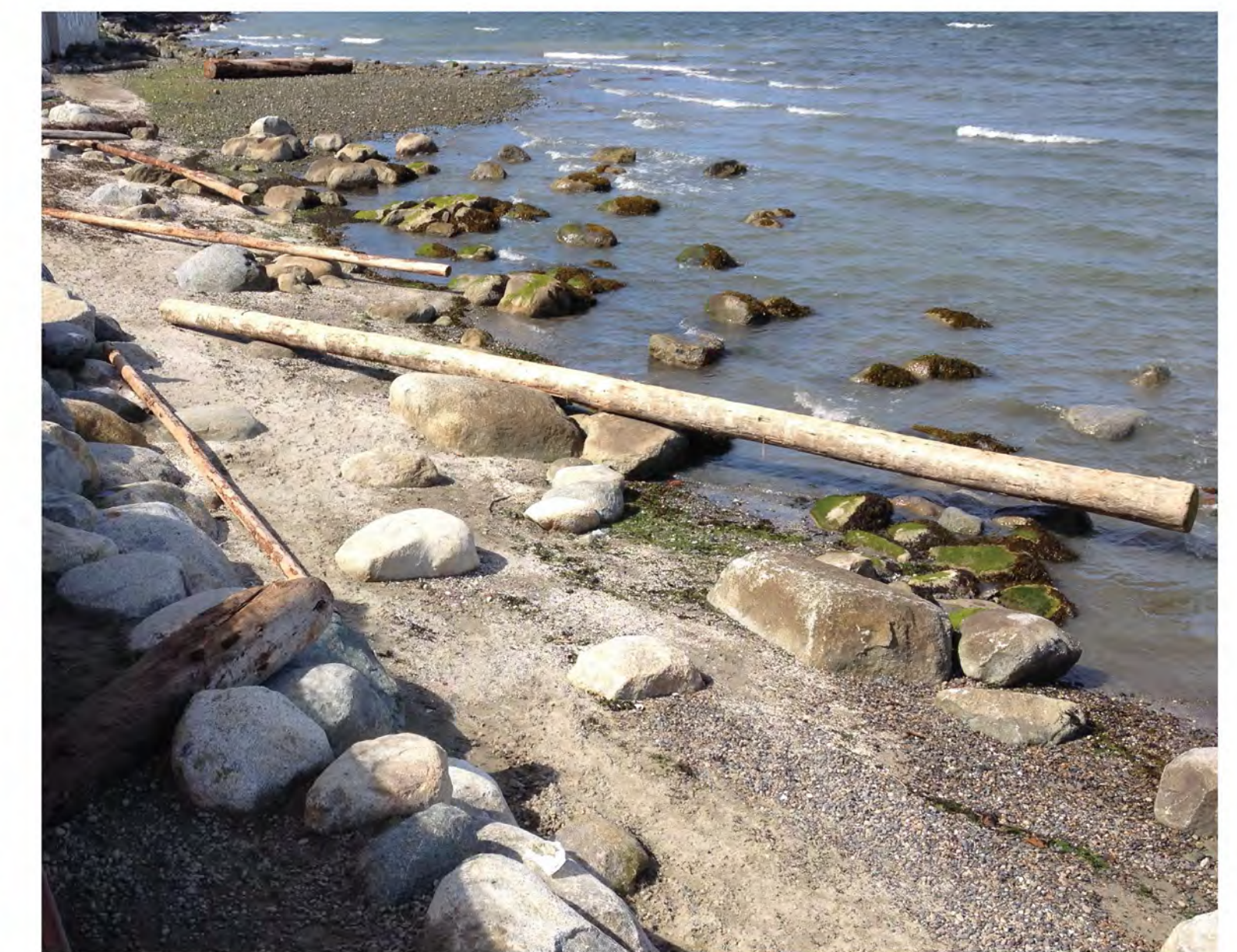
FLOWERING PLANTS FOR POLLINATORS



FORAGING + NESTING HABITAT FOR BIRDS



SPAWNING AREAS FOR FORAGE FISH



TOMOLO STRUCTURES (WAVE BREAKERS)

STREAM BIODIVERSITY

Even if we don't have fish in the stream, the restored Tatlow Creek will be a hot-spot for biodiversity:

- **Pollinators:** Native plant communities with flowering shrubs and wildflowers for bees and other insects will replace parts of the mowed lawn.
- **Birds:** Beachgrass meadows and shrub thickets along the shore and stream will provide foraging and nesting habitat for birds like sparrows, towhees, and chickadees.
- **Native Plants:** Native plants such as sword fern, salal, Oregon-grape, and Nootka rose that are no longer common or present in Kitsilano will be replanted.
- **Forage Fish:** The addition of large boulders in the intertidal zone will trap sandy sediments and provide spawning areas for surf smelt and Pacific sandlance.

INTERTIDAL FISH HABITAT

One of the benefits to fish habitat will be for forage fish (surf smelt and Pacific sandlance) that use sandy gravel beaches for spawning. The beaches of English Bay once supported a huge number of surf smelt but the population has declined precipitously. One of the actions that can support forage fish is to restore spawning beaches. We propose to add large rounded boulders to the intertidal zone in front of Volunteer Park to create a low energy environment that traps sand and small gravel that is used for spawning.

STREAM GRADIENT

Channel gradient is also a limitation for fish populations. Salmon and trout prefer channel gradients under 2% (2 m of elevation change in 100 m of stream length), and can tolerate channels in the 5% to 10% range. But steeper channels make upstream migration difficult, and limit the amount of pool habitat that can be created. The section of Tatlow Creek in Volunteer Park will have an average slope of around 12% which is very difficult for fish to ascend.

