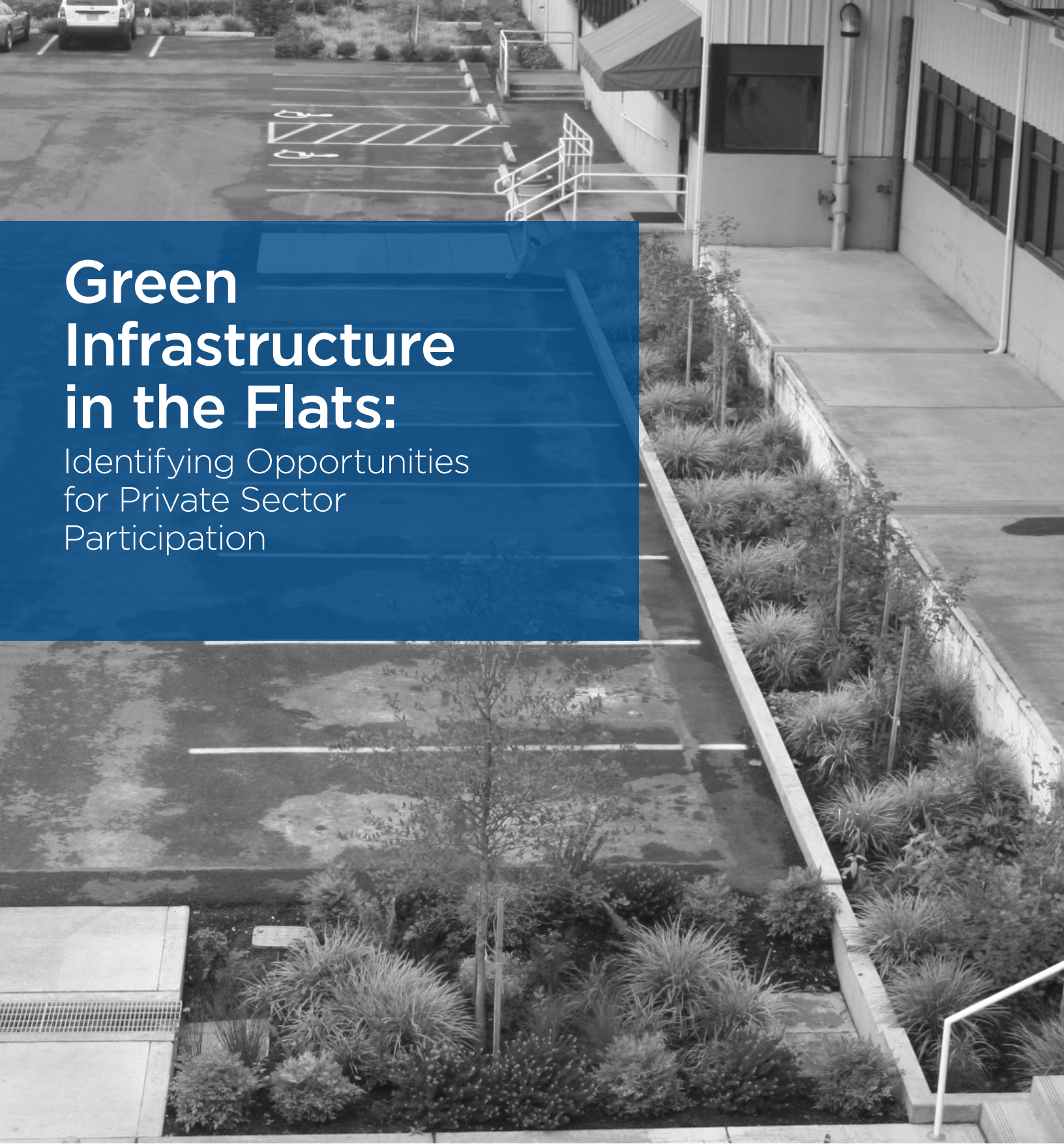

Green Infrastructure in the Flats:

Identifying Opportunities for Private Sector Participation

AUGUST 2018

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Cover image: City of Portland, courtesy Bureau of Environmental Services.

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What's Inside

background

Project Overview

In May of 2017, City Council adopted a new local area plan and economic development strategy for the False Creek Flats (the Flats). As part of the vision put forward for this central industrial district, the team proposed a major green infrastructure project called “Walk-the-Line”—an active transportation corridor that roughly follows the former shoreline of False Creek. The Walk-the-Line corridor is envisioned to be a demonstration of innovative green infrastructure that connects the Flats internally and to outlying neighbourhoods. Demonstration sites along the corridor offer the Flats an opportunity to showcase how central industrial districts can become agents of sustainability and economic resilience within cities.

This report aims to build upon the existing research and engagement work in the False Creek Flats and identify strategies and opportunities for private sector investment in green infrastructure and green technologies along the Walk-the-Line corridor. This report seeks to understand how green infrastructure is perceived by the business community in the False Creek Flats, including what are barriers to green investments and what are the drivers for current or planned green initiatives and projects. It aims to identity best practices in implementing green infrastructure from other cities—including their industrial centres—and assess how these strategies can be applied to the City of Vancouver. Lastly, it aims to identify opportunities for green investment in the Flats that address business needs, outlining the various roles the private sector might play in bringing the vision for this green infrastructure to life.

Methodology

Research Questions

The purpose of this report is to identify strategies for private sector investment in green infrastructure in the False Creek Flats, more specifically this report will seek to answer:

1. What is the current state of green investment in the False Creek Flats? What are the barriers to private sector investment and what are the drivers for investment?

2. What have other cities and designers done to engage businesses in green infrastructure development? How can the City of Vancouver encourage such investment in the False Creek Flats?

Research Approach

To answer the research questions listed above, this report will seek to understand the landscape of green infrastructure in the False Creek Flats and the landscape of green infrastructure in general through:

» Conducting stakeholder interviews with businesses in the Flats.

» Summarizing best practices in green infrastructure and green technology design from other cities.

» Proposing opportunities for private sector investment in green infrastructure in the False Creek Flats.

Research Limitations

This report seeks to build upon existing work of the City of Vancouver and the Vancouver Economic Commission, including engagement with businesses in the Flats and seeks to help direct future engagement with businesses. It is, however, important to acknowledge the limitations of this research, which include:

» The four-month time frame of this project allowed for limited interviews with stakeholders in the Flats. This report represents a sample of interviews of business stakeholders from the Flats, which contain more than 600 businesses and more than 8,000 employees.

» Limited time was available to conduct interviews with City staff due to staff workload and summer holidays.

Strategic Alignment

The strategies suggested in this report are informed by various local plans and strategies. The following plans and strategies provide the guiding framework for this project:

» Greenest City Action Plan

» Transportation 2040

» False Creek Flats Area Plan

» False Creek Flats Economic Development Strategy

» Citywide Integrated Rainwater Management Plan

Introduction to the Flats

Located within a kilometer from downtown and the Port, the False Creek Flats, one of Vancouver's central industrial districts, holds a significant geographic and economic position within the City of Vancouver. Comprised of a mix of industrial and commercial uses, the Flats is home to over 600 businesses, institutions and non-profits, employing approximately 8,000 people.[1]

While its prime location and older building stock offering lower rents attracts a variety of businesses from several sectors of the economy, light industrial and transportation-related uses occupy much of the area. The diverse tenant population is expected to expand as the Flats are earmarked for intensification, with the number of jobs in the area expected to grow from roughly

1 City of Vancouver. False Creek Flats Area Plan. Vancouver. Accessed July 20, 2018.https://vancouver.ca/files/cov/false-creek-flats-plan-2017-05-17.pdf.

8,000 today to over 30,000 by 2047.[2] The Flats is transforming to accommodate higher employment densities and more knowledge-based sectors, including biotech, the arts, digital media, and design.

This industrial development, however, did not always exist. Until the early 20th century the Flats were a tidal mud flat. The mud flats provided rich ecological habitat, supplying "diverse and abundant resources for the First Nations people of the area, including some of the largest salmon and trout runs in Vancouver."[3] However, as industry in Vancouver's downtown began to expand outward, the City looked towards the Flats to house new industrial buildings and additional rail terminals. In 1915 the filling of the Flats began using mostly contaminated industrial waste and land fill. The mud flats were covered with fill creating new industrial space, and the streams of False Creek were buried and enclosed within the city's stormwater and sewer network. After the False Creek Flats were filled, the district became home to what is now the Canadian National Railway's western terminus. Rail development positioned the Flats as a major transportation hub, laying the framework for the area as an industrial centre and influencing the street layout for years to come.

The Flats today remains predominantly employment lands, however shifting logistics models have altered the economic position of the district, making its proximity to the port and rail less significant for businesses. In this shift the Flats has seen a "broader collection of businesses in very diverse sectors of the economy,"[4] who value its proximity to downtown and public transit.

False Creek Flats Area Plan

To address the changing economic landscape of the False Creek Flats, the City of the Vancouver and the Vancouver Economic Commission—in consultation with many community members and stakeholders— created the False Creek Area Plan. The plan is a long-term vision to guide the area's growth and help the Flats "become more productive, sustainable and connected to the rest of Vancouver."[5]

The False Creek Flats Area Plan includes several principles, which form the framework of the plan. These principles outline key priorities to that will guide future development in the area. A sample of these priorities include:

» **PRINCIPLE 2:** Secure and intensify central industrial land for core back-of-house functions. Retain sufficient core light industrial land, free of residential uses, to continue to support the day-to-day function of the city and to ensure strategically located space to support future economic opportunities.

» **PRINCIPLE 4:** Establish an enhanced and expanded public space network to support economic life. Develop a hierarchy of public spaces to support a variety of activities from passive reflection and introverted idea generation, to social celebration, collaboration, and the spillover of ideas.

» **PRINCIPLE 8:** Reintroduce natural systems towards a resilient and healthy environment. Seek to re-establish natural systems, manage rainwater, address challenges of sea-level rise, and deal with

2 City of Vancouver. False Creek Flats Area Plan. Vancouver. Accessed July 20, 2018.https://vancouver.ca/files/cov/false-creek-flats-plan-2017-05-17.pdf.

3 ibid.

4 ibid.

5 ibid.

soil vulnerability to build a healthy and more resilient district.

» **PRINCIPLE 9:** Improve connections and mobility to and through the Flats. With transit on the periphery, high density neighbourhoods surrounding the area, and cultural assets throughout the Flats, seek to improve circulation with new streets, walking and cycling connections.[6]

These principles lay the foundation for Walk-the-Line, an active transportation and green infrastructure corridor, which supports public life and economic vitality in the Flats.

Walk-the-Line

Proposed in the False Creek Flats Area Plan, Walk-the-Line is envisioned as an active transportation and green infrastructure corridor, roughly tracing the old shoreline of False Creek. Walk-the-Line will bridge barriers to moving throughout the district (such as crossing rail lines) and connect public spaces across the Flats through a comprehensive cycling, pedestrian and ecological network. Key directions for Walk-the-Line include:

1. Connect various sub-areas together over rail and other barriers.

2. Improve public knowledge and understanding [of green infrastructure and ecological function] by animating and showcasing local technologies, green businesses and area artists.

3. Create opportunities for reconciliation [with local First Nations].

4. Present a strategic loop for green infrastructure and rain water management.

5. Provide opportunity for public art and creative display.

6. Establish critical links for ecological corridors.

7. Create a green canopy.

8. Contribute to unique places and memorable spaces.

9. Allow for the free movement of people without impacting the industrial functions around it.

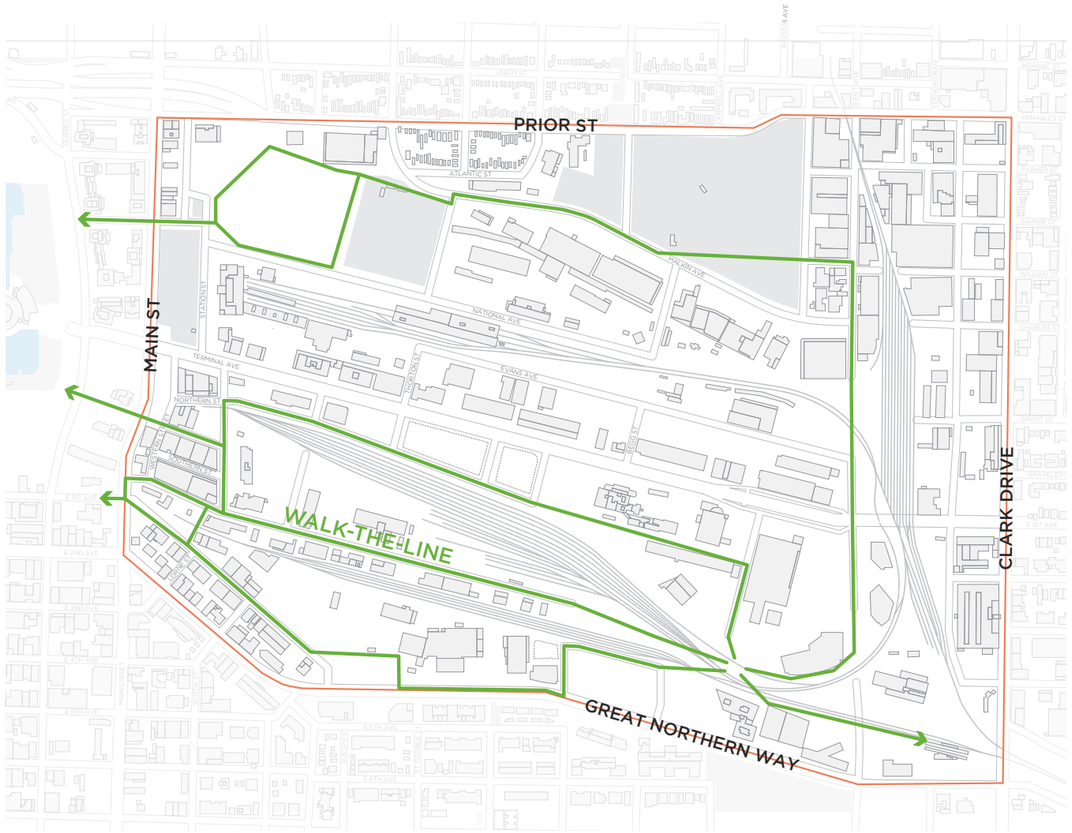
10. Create a five-minute amenity walk throughout the Flats and develop small pop-up business showcase/amenity nodes in gaps along Walk-the-Line to animate loop.

11. Tie together the complete spectrum of public spaces on offer in the Flats to support a variety of business activities, from passive reflection to social interaction and networking. [7]

Walk-the-Line and the False Creek Flats Area Plan present the opportunity to transform the Flats into a more sustainable and resilient industrial district. Since much of the land in the Flats is privately held, support of property owners and local businesses will be needed to achieve the False Creek Flats Area Plan's vision for the Walk-the-Line green infrastructure corridor.

6 City of Vancouver. False Creek Flats Area Plan. Vancouver. Accessed July 20, 2018.https://vancouver.ca/files/cov/false-creek-flats-plan-2017-05-17.pdf.

7 ibid.



stakeholder interviews

Stakeholder Interviews

Business stakeholders were interviewed to understand how Walk-the-Line could support local businesses and how these stakeholders could contribute to the key directives of the corridor. Interview participants were selected based on their involvement in green initiatives (past, current or potential) and their participation in past community engagement. Participants included local business owners, property owners, landscape architects and developers. Key findings from stakeholder interviews are described below.

Barriers to investing in green infrastructure and green initiatives

During interviews we aimed to gain insight into what barriers exist for businesses to invest in green infrastructure and green technologies. We were interested in understanding how Walk-the-Line could overcome some of these barriers.

» **Businesses lack resources to explore green alternatives.** Many businesses expressed an openness to "going green" but cited a lack of knowledge or resources as a barrier to implementing green initiatives. These businesses are not able to dedicate staff time to investigate and champion these projects.

» **Inadequate space or infrastructure prevent the development green initiatives.** Several businesses expressed an interest in implementing green infrastructure—including green roofs, rain gardens, swales and rainwater harvesting—but cited a lack of space or inadequate infrastructure—including roofs with insufficient structural capacity to support a green roof retrofit—as a barrier to implementation. Some businesses expressed an openness to reducing parking space to accommodate green infrastructure but cited City parking requirements as a barrier to implementation. Other businesses have explored the possibility of rainwater harvesting but have an inappropriate roof type or do not have the space to include rain barrels on their site.

» **Building in the False Creek Flats can be difficult.** Site challenges in the Flats—including implementing flood construction levels, addressing subsurface drainage, and responding to other site conditions such as soil contamination—can exhaust development budgets and reduce a designer's ability to explore innovative green projects. Builders who usually try to exceed city policies in other areas of Metro Vancouver struggle to meet development requirements in the Flats. Addressing these site challenges can also mean civil and structural engineering issues will take precedence over environmental and/or design concerns.

» **Many businesses in the Flats lease their space, creating uncertainty of who should invest in green infrastructure.** Business owners are reluctant to invest in major retrofits on land they do not own while some property owners believe these investments should be spearheaded by businesses tenants.

» **Issues of theft, vandalism, and litter have pushed interest in green infrastructure and green initiatives to a lower priority.** Many businesses have cited an increase in theft, vandalism and litter in the Flats. Some businesses have reduced their front yard landscaping to bark mulch to manage litter in front of their businesses.

» **Implementation and maintenance of green infrastructure is seen as more difficult and costly.** Despite an interest in green initiatives many business owners are reluctant to invest in "going green" due to real or perceived difficulties and increased costs associated with permitting, construction and maintenance.

» **Cycling and green infrastructure is important but some businesses are concerned that it will impact industrial activity.** The Flat's lack of connectivity is considered a positive attribute to some businesses, limiting people who access the streets to only those affiliated with local businesses. These businesses are concerned that green infrastructure or increased pedestrian and cycling traffic may conflict with their industrial fleet. Other businesses have shown concern with creating conditions that encourage high speed cycling traffic, which will impact people visiting their businesses.

» **The low cost of water makes water-saving initiatives a low priority for many businesses.** Water saving initiatives do not reduce operational costs for most business owners, therefore many businesses are less likely to implement these projects over energy retrofits or fleet retrofits that can result in significant cost savings for the business over time.

Existing investment in green infrastructure and green initiatives

During interviews we sought to understand the drivers of current investments in green projects in the False Creek Flats. We were interested to learn what green initiatives currently exist and/or are planned for construction, to assess how Walk-the-Line may build upon existing interest and investment.

» **Leaders in the green infrastructure and green initiatives have an environmental focus in their company mission.** Businesses who have implemented green infrastructure or green technologies have stated a green company mission or a green agenda among their decision makers as primary drivers of these investments.

» **Green initiatives were implemented where grants were available and cost savings were clearly understood.** Many businesses stated they are not aware of green initiatives that are appropriate for their business. Businesses that have implemented green projects said they did so because they were aware of opportunities, often through a partner program, where benefits were clearly communicated and grants were made available.

» **New developments are the leaders in green initiatives.** Many developers and business owners have invested in green infrastructure and green initiative, during new facility construction, as they are required by building by-laws in the City of Vancouver.

case studies

RAIN RAVINE

photo: Jeremy Marshall

At a Glance

Location	Pittsburgh, PA
Building Type	Institutional
Date Completed	2016
Intervention	Public Art & Stormwater Management
Budget	$50,000[8] (fabrication & installation)
Key Players	Pittsburgh Parks Conservancy - Client City of Pittsburgh - Project Partner Stacy Levy - Artist Bohlin Cywinski Jackson - Architect La Quatra Bonci - Landscape Architect

Background

A joint project between the City of Pittsburgh and the Pittsburgh Park Conservancy, the Frick Environmental Centre is the first publicly-accessible, municipally-owned building in the U.S. to achieve the Living Building Challenge certification.[9] An objective set by the Living Building was to design the 16,000-square-foot building to serve as a net-zero waste facility. Contributing to the net-zero water imperative is Rain Ravine, a public-facing sculpture that directs water from the building site to

8 includes raw stone and stone masonry but does not reflect permitting and in-kind services of the engineers, architects and landscape architects.

9 Pittsburgh Parks Conservancy. “Frick Environmental Center.” The Mission, Vision and History of the Pittsburgh Parks Conservancy. Accessed July 09, 2018. https://www.pittsburghparks.org/frick-environmental-center.

adjacent wetlands for reuse. Rainwater from the building's roof and adjacent surfaces is collected and conveyed through a series of runnels and stone basins, flowing from the building site to a nearby wetland.[10]

What Makes this Project a Success?

Rain Ravine at the Frick Environmental Centre successfully integrates building and site functions with public facing artwork. The stone runnel serves a functional, aesthetic and educational role, collecting all runoff water on the site, revealing how much rain can be collected from a single rooftop and helping achieve the Living Building Challenge requirement of net-zero water flow.

What Made It Work?

Strong support from the client helped bring this project to life. The client brought the artist into the design team from the building concept phase. This allowed the artist to collaboratively develop a piece that integrated building and site functions with art.[11]

The project team received a grant which funded a multi-day charrette between the artist and the building design team. This allowed the artist to work with the project team to collaboratively identify opportunities to integrate artwork into the building and site design. The artist continued to work with the project team as the building design developed past the charrette, which allowed the artist to respond to building design changes.[12]

The artist was given direction but not told what to create. The project team was given the space and time to explore a variety of opportunities to showcase public art and contribute to the goals of the Living Building Challenge.[13]

Key Takeaways

» Public art should be integrated into the design concept phase to facilitate the integration of artwork into the building design. The artist should continue to work with designers, engineers, and maintenance team to refine the project past the design concept phase.

» Selecting an artist should be based on their qualifications, not their proposals. Development of artwork should be a collaborative effort, where opportunities are discussed with the building design team, including the architect, landscape architect and engineers. The proposal model limits the ability for this exploration with the project design team.

10 Levy, Stacy. "Rain Ravine." Stacy Levy | Environmental Artist. Accessed July 10, 2018. https://www.stacylevy.com/ravine-runnel-frick.

11 Levy, Stacy (Rain Ravine Artist), interviewed by Alicia Kingdon. July 10, 2018.

12 ibid.

13 ibid.


photo: Jeremy Marshall

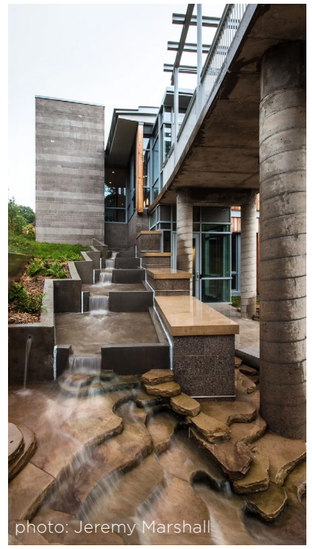


photo: Jeremy Marshall


photo: Jeremy Marshall


photo: Stacy Levy

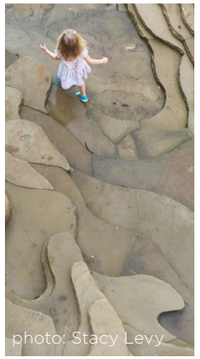


photo: Stacy Levy

VERTIGO LLC

At a Glance

Location	Portland, OR
Building Type	Industrial
Date Completed	2009
Intervention	Green Roof
Budget	$92,234.15 / $6.22 per sq. ft.
Key Players	City of Portland Vertigo LLC

Background

In response to the City's combined sewer overflow problem, Portland focused on a two-pronged investment strategy to manage stormwater: upgrading traditional grey infrastructure and pursuing site-level green infrastructure strategies.[14] Among these green infrastructure strategies, the City of Portland encouraged private businesses to invest in green roofs through financial incentives. Between 2008 and 2012 the City offered property owners and developers $5 per square foot to design and construct a green roof that also functions to manage stormwater. [15] In addition to the financial incentives, the City also provided outreach –including information seminars– and technical support to encourage participation in the program.

These funds were made available through the City of Portland's Innovative Wet Weather Program (IWWP). This program was created in response to the City's limited storm-sewer capacity and increased combined sewer outflow events. In 2002 the City of Portland applied for a U.S. Environmental Protection Agency (EPA) grant to help fund projects that leveraged

14 NRDC. Rooftops to Rivers II - Portland, Oregon. Accessed July 14, 2018 https://assets.nrdc.org/sites/default/files/RooftopstoRivers_Portland.pdf.

15 ibid.

green infrastructure to manage and filter stormwater at its source.[16] Between 2002 and 2009, the U.S. Environmental Protection Agency (EPA) granted the City $3.4 million, funding over 30 innovative public and private green infrastructure projects throughout Portland.[17]

In 2010, after learning about the program through an informational seminar, the business owner of Vertigo LLC, in Portland, took advantage of the City's green roof incentive and pursued the design and construction of a green roof on his facility. The company engaged an engineer and green roof specialist to assess the feasibility and costs associated with installing a green roof onto the existing structure.[18]

After learning a green roof could be installed without major modifications, the company pursued the project to achieve the following goals:

1. Reduce stormwater runoff, both peak and total, from a building which covers the entire footprint of the lot.
2. Increase the lifespan of the new roof beneath the soil.
3. Increase the aesthetic value of the roof and increase the habitat for bees and other insects and for birds.
4. Experiment by mixing a variety of perennials and small trees to the standard green roof plant mix.
5. Demonstrate a low cost, low tech design on a medium size commercial building, as an example to owners of similar buildings.[19]

The City of Portland worked with the green roof specialist to modify the design of the green roof to help achieve the goals 4 and 5 listed above.[20]

What Makes this Project a Success?

The City of Portland's green roof program provided $1.8 million in incentives ($2.07 million in 2018 dollars), which helped introduce over 130 green roof projects.[21] The green roofs created as part of this program helped to capture and absorb over 4.4 million gallons of storm water annually, increasing the City's stormwater efficiency.[22]

Vertigo LLC is an example of one of those projects and serves as a successful example of a low-cost industrial retrofit. The project helped to demonstrate to other medium-sized commercial businesses that a low-cost green roof can be implemented on existing roof structure.

What Made It Work?

Portland's green roof program received adoption from local businesses because they were provided support from the municipal government in funding the project. In addition to funding, the City of Portland also provided outreach and technical support. The City's outreach efforts included information seminars to help build awareness about the benefits of green roofs and connect green roof service providers with business owners and developers. Staff also developed technical resources, conducted researched and worked with business owners on individual projects to help achieve goals set by the City and the business owner.

Key Takeaways

» Investment in green infrastructure can help increase a city's stormwater management capacity.

» Providing funding, outreach, and technical support can encourage local businesses to implement green initiatives.

» By working with business owners, the City can also help develop demonstration sites, which will serve as a local example to other property owners on how to successfully implement green initiatives.

16 City of Portland. "Innovative Wet Weather Program." Reusable vs Disposable Dishware RSS. Accessed August 2, 2018. https://www.portlandoregon.gov/bes/35941.

17 ibid.

18 City of Portland. Vertigo LLC Green Roof. Accessed July 11, 2018 https://www.portlandoregon.gov/bes/article/324608.

19 ibid.

20 ibid.

21 ibid.

22 ibid.

PCC STORMWATER PLAZA

photo: © City of Portland, courtesy Bureau of Environmental Services.

At a Glance

Location	Portland, OR
Building Type	Institutional
Date Completed	2007
Intervention	Rain Garden
Budget	unknown
Key Players	City of Portland Portland Community College (PCC)

Background

Faced with limited stormwater capacity in Portland's Central Eastside Industrial District, the City of Portland needed to update the area's stormwater infrastructure. In addition to upgrading traditional infrastructure the City of Portland also invested in green infrastructure—including green streets and green roofs—to increase the storm-sewer's efficiency.

An example of such an initiative is the Portland Community College (PCC) stormwater plaza, where the City of Portland's Bureau of Environmental Services (BES) partnered with the PCC to create a combine green stormwater management facility and public plaza in the Central Eastside Industrial District.[23] The plaza, which sits on PCC's land filters water from the PPC building and stormwater runoff from the public right-of-way, combining placemaking and stormwater management.

The project includes an educational exhibit, public art and rain garden, which collects rainwater from the PCC

23 "Stormwater Plaza Partnership with Portland Community College." Reusable vs Disposable Dishware RSS. August 14, 2012. Accessed July 11, 2018. https://www.portlandoregon.gov/bes/article/406407.

roof and stormwater runoff from adjacent streets.[24] Rainwater from PCC's existing 5200 square foot roof was rerouted through a new, oversized downspout, directing water from the roof, through a concrete and steel slab water feature to a newly constructed rain garden[25]. Stormwater runoff from 3,000 square feet of nearby street was directed into the rain garden, flowing from the street, under the sidewalk, through a steel sidewalk grate.[26]

What Makes this Project a Success?

The PCC Stormwater Plaza successfully integrates placemaking and stormwater management in an industrial setting, showcasing how green street design can be planned and modified to suit an industrial area.

Located along a freight route, adjacent to industrial and commercial properties, private property land was utilized to maintain needed road space for freight traffic and truck turning radii. The plaza also serves as a successful example for how green infrastructure can straddle property boundaries to efficiently use space and achieve environmental objectives.

What Made It Work?

With limited space along the corridor for green street design elements, the City of Portland identified select sites that could accommodate green infrastructure to treat water from the public right-of-way. The City approached Portland Community College to propose the stormwater plaza. Grants were made available through the City of Portland's Wet Weather Program (IWWP). The City also developed a maintenance agreement that identifies the roles and responsibilities for each in maintaining the green infrastructure asset.

Key Takeaways

» Industrial sites pose many challenges to green infrastructure development. While turning radii from freight traffic may limit the ability to develop green street elements in the public right-of-way, leveraging land from private sites or public land may provide opportunities for green infrastructure.

» With limited green space in industrial districts, private land comprises a significant portion of the lands in industrial areas. Partnering with businesses to expand green infrastructure beyond the public right-of-way can advance a city's green infrastructure goals.

24 Corker, Alice (Environmental Specialist, City of Portland), interviewed by Alicia Kingdon. July 13, 2018.

25 "PCC CLIMB Storm Water Plaza Project." Storm Water Solutions. Accessed July 13, 2018. https://www.estormwater.com/pcc-climb-storm-water-plaza-project.

26 "Stormwater Plaza Partnership with Portland Community College." Reusable vs Disposable Dishware RSS. August 14, 2012. Accessed July 11, 2018. https://www.portlandoregon.gov/bes/article/406407.

photo: © City of Portland, courtesy Bureau of Environmental Services.

photo: © City of Portland, courtesy Bureau of Environmental Services.

OWENS CORNING RETROFIT

photo: © City of Portland, courtesy Bureau of Environmental Services.

At a Glance

Location	Portland, OR
Building Type	Industrial
Date Completed	2008
Intervention	Green Infrastructure - Parking Lot Retrofit
Budget	$125,000
Key Players	City of Portland Owens Corning Friends of Trees

Background

Located in Portland's Northwest Industrial District, Owens Corning is a roofing manufacturing facility. Heavy industry, like Owens Corning, dominates this district, a historically polluted industrial area.

In 2006, the City of Portland's Bureau of Environmental Services and Owens Corning partnered to retrofit Owens Corning's parking lot to filter stormwater runoff onsite through green infrastructure. The objective of the project was to treat rainwater on-site and reduce the volume of stormwater entering the city storm sewer, which was then discharged into the local Willamette River.[27] The project included downspout disconnection and construction of vegetated planters and swales, which manage all the stormwater runoff from the parking lot and the roof.

Given the site's location in a known contaminated industrial area, soil sampling and infiltration testing was undertaken to determine the level of contamination. Through the soil sampling it was determined that water

27 City of Portland. Owens Corning. Accessed July 11, 2018 https://www.portlandoregon.gov/bes/article/323151.

infiltration from the vegetated swale would not pollute soil or groundwater.[28]

The project was funded by Owens Corning and through federal and municipal grants made available through the City of Portland's Wet Weather Program (IWWP). In addition, volunteers from a local non-profit, Friends of Trees, participated in planting the vegetation on site.[29]

ACTIVITY	COST	FUNDING SOURCE
Design	$18,000	Owens Corning
Construction	$107,277	IWWP
Change Order	$4,5000	IWWP
Total Cost	$125,000 USD	
Volunteer hours	48.5	Friends of Trees

What Makes this Project a Success?

This project illustrates how to successfully retrofit a parking lot to sustainably manage stormwater in an industrial setting. The site added green infrastructure, while removing minimal parking spaces. The constructed site removed 3,010 square feet of impervious surface and replaced it with a sustainable stormwater management facility, which successfully filters and partially infiltrates stormwater runoff from 31,000 square feet of impervious surface. The project reduces the volume of stormwater leaving the site and reduces pollutants entering the public stormwater system, and local waterways.

What Made It Work?

The City of Portland was interested in forming a partnership with Owens Corning to use their facility as a demonstration site, illustrating how to successfully implement green stormwater infrastructure in a heavy industrial setting.[30] The City of Portland attributes the public-private partnership model to the success of this project. The City's Bureau of Environmental Services served as an important project partner, providing funding and technical assistance, while Owens Corning managed the design, construction and ongoing maintenance of the stormwater management facilities. This model helped achieve the goals set by Owens Corning and the City of Portland—to visually improve the building's exterior and manage stormwater sustainably.

Grants from the municipal and federal government and support from a local non-profit helped offset some of the costs, making this project financially viable for Owens Corning.

Key Takeaways

» Forming public-private partnerships to create a demonstration site can help create successful local examples, illustrating how to retrofit industrial sites.

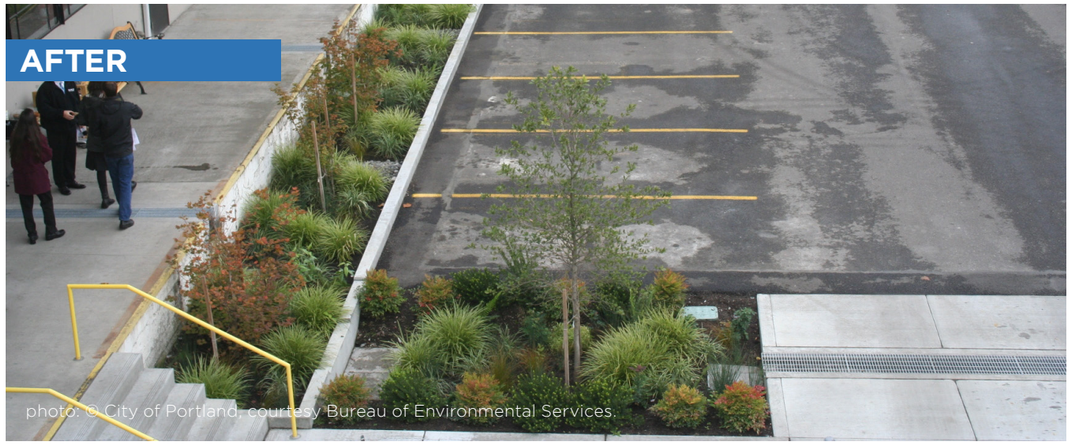
» Partnerships can generate buy in from businesses and help create demonstration sites for emerging technologies. Funding and technical support can help make these green projects viable for local businesses.

28 City of Portland. Owens Corning. Accessed July 11, 2018 https://www.portlandoregon.gov/bes/article/323151.

29 ibid.

30 ibid.

photo: © City of Portland, courtesy Bureau of Environmental Services.



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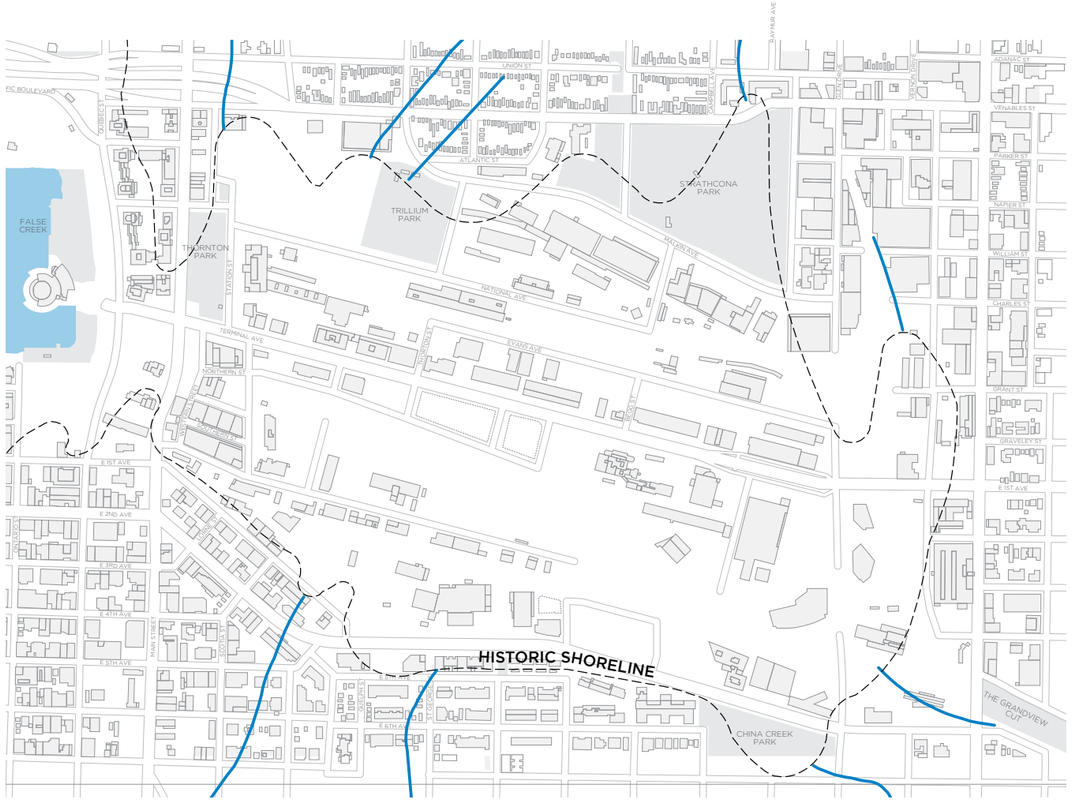
recommendations

Salmon Safe Corridor

The Challenge

Vancouver City Council is pursuing the waterfront initiative with the goal of making False Creek swimmable by then 2018.[31] However, recent reports illustrate that pollution levels in False Creek are four times the level considered safe for swimming.[32] Once teeming with aquatic life—including salmon, seals and whales—this pollution has also contributed to in deteriorated ecological habitat in False Creek.[33]



31 City of Vancouver. "Vancouver Waterfront Initiative". Accessed: https://council.vancouver.ca/20170530/documents/motionb1.pdf

32 Lazaruk, Susan. "Call for Clean Swimming Water in Vancouver's False Creek Falls Flat." Vancouver Sun. July 17, 2018. Accessed August 1, 2018. https://vancouversun.com/news/local-news/call-for-clean-swimming-water-in-vancouvers-false-creek-falls-flat.

33 Adams, M. A., B. G. Wernick, and L. H. Nikl. "Reclamation of ecological functions within a marine ecosystem: redevelopment of the Southeast False Creek lands in Vancouver, Canada." WIT Transactions on Ecology and the Environment 162 (2012): 339-348.

These pollution levels are caused in part from polluted stormwater runoff from industrial lands and combined sewer outflow events, entering False Creek from a stormwater outflow. Historically the False Creek Flats was home to two major waterways in Vancouver—Brewery Creek and China Creek. As Vancouver began to develop, these creeks were buried, and stormwater runoff was directed away from our natural systems, through subsurface pipes, to False Creek. Natural systems filter pollutants from runoff, while pipes carry unfiltered stormwater to our waterways, compromising the biodiversity of the region. This pollution in False Creek is likely to increase as average annual rainfall in Vancouver is anticipated to rise by the effects of climate change and employment density and uses in the nearby Flats will intensify, increasing the amount of polluted runoff entering False Creek.

Investing in green infrastructure could help divert water away from entering the stormwater system, helping to reduce these combined sewer overflow events. Green infrastructure could also filter out pollutants so stormwater that does enter the system is of the highest quality, improving water quality and ecological diversity. The Salmon-Safe Certification Standards offers a framework for how to clean our waterways "by minimizing the impacts of development on sensitive aquatic and upland resources and enhancing salmon habitat."[34] "Salmonid species are key indicator species in the Pacific Northwest and their conservation is entwined with the health of ecosystems that include a variety of aquatic and upland wildlife species."[35] Buildings that achieve this certification will not only help improve water quality and habitat for salmon but will also improve water quality in our waterways for Vancouverites and their visitors. MEC is the first building in the Flats to take up the challenge to achieve Salmon Safe Certification on their site, "but the impact of this leadership will be limited if it is not complemented by other biodiversity and green infrastructure initiatives in the area."[36] The False Creek Flats presents the opportunity to work towards the goals outlined by the Salmon-Safe certification through interventions at the site level—including green buildings retrofits and green infrastructure demonstration projects—and interventions at the street scale.

34 Salmon Safe. "SALMON-SAFE URBAN STANDARDS". Retrieved from: https://salmonsafe.org/wp-content/uploads/2018/03/Urban-Standards-Version-2.0-May-2018-2MB.pdf

35 Ibid.

36 City of Vancouver. False Creek Flats Area Plan. Vancouver. Accessed July 20, 2018.https://vancouver.ca/files/cov/false-creek-flats-plan-2017-05-17.pdf.

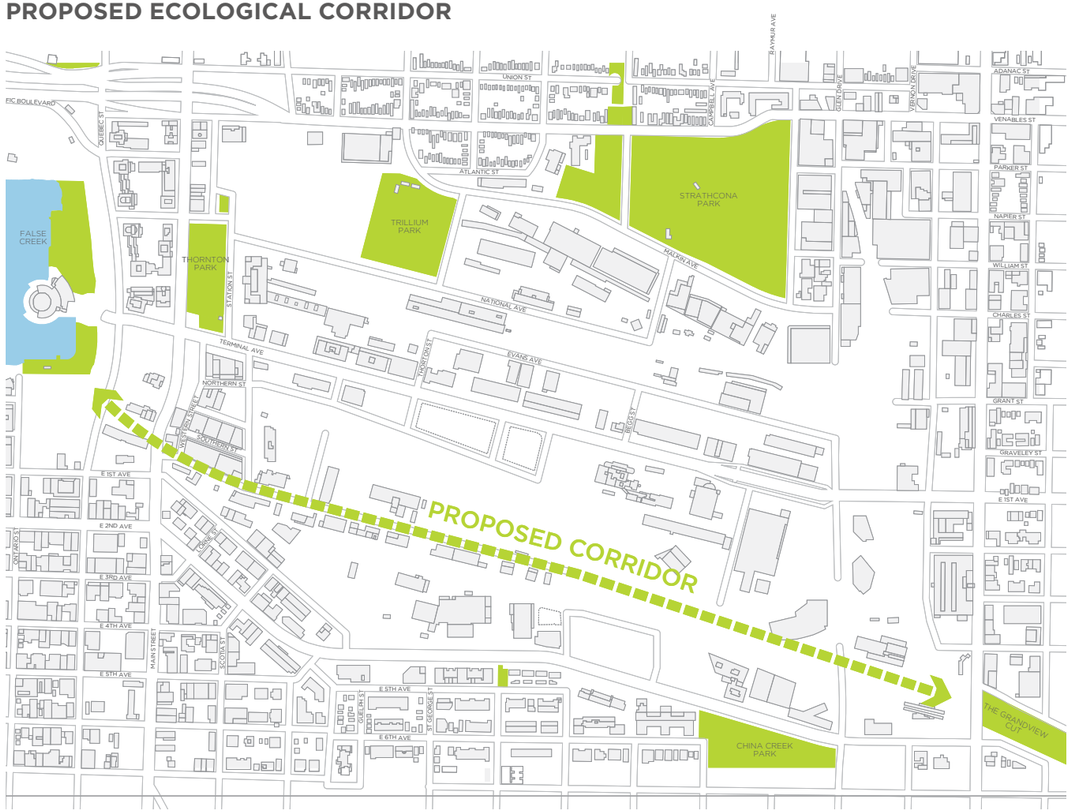
The Opportunity

Encourage businesses to retrofit aging industrial sites with green infrastructure, working towards Salmon-Safe Certification.

While new developments in the Flats have started to build this green infrastructure as part of their redevelopment efforts, a significant portion of the building stock in the False Creek Flats is comprised of aging industrial buildings, with large swaths of impervious surfaces and surface parking lots. These building types create opportunity for green retrofits and green infrastructure development.

Businesses along Industrial Avenue are ideal candidates for green retrofit projects. Many businesses along this route are comprised of aging industrial buildings and are projected to remain undeveloped for the next two or three decades.[37] Several business owners expressed a hesitancy to opening this corridor to cycling traffic due to potential conflicts with industrial fleets, therefore Industrial Avenue presents the opportunity to serve primarily as an ecological corridor in the Walk-the-Line infrastructure route. With little green space in the Flat's central district,

PROPOSED ECOLOGICAL CORRIDOR



37 Coriolis. "The Future of False Creek Flats: An Economic Vision to Guide a New Area Plan." 2016.

Industrial Avenue can be leveraged to create this critical ecological connection between the Grandview Cut and False Creek, enlarging habitats for birds, pollinators, wildlife and other fauna and improving the biodiversity and resiliency of the district.

A community grant funding program could be applied to retrofits along this corridor, whereby businesses can apply for funding to kick-start green retrofit projects in the district that help achieve Salmon Safe Certification, including projects that focus on creating sustainable strategies to manage stormwater and water-use. Providing outreach and technical assistance could also could assist businesses in implementing green retrofits that work towards Salmon Safe Certification and help create an ecological corridor between the Grandview Cut and False Creek.

Strategies for assisting businesses in achieving Salmon Safe Certification could include:

» Encouraging property owners to install green roofs. Vertigo LLC's Green Roof retrofit (mentioned in the previous section) illustrates the opportunity for creating a low-cost industrial green roof retrofit, while reducing pollution, increasing habitat connectivity, managing stormwater and reducing urban heat island impacts.

» Encouraging property owners to implement rainwater harvesting systems. Providing a rebate or grant and technical support for rainwater harvesting systems will help businesses overcome financial barriers and knowledge barriers.

» Encouraging business owners to install "rain gardens in a box." Above ground, biofiltration cells, Rain Gardens in a box, offer low-tech, low-cost rainwater management solutions for property owners and businesses who are not able to implement sub-surface green infrastructure. Placed under downspouts to filter out contaminants, "rain gardens in a box" are well-suited to sites where financial resources are limited, the property owner will not allow for sub-surface interventions or where land contamination may limit other interventions.[38]

GREEN ROOF

photo: Newtben33 / Public Domain

RAINWATER HARVESTING

photo: Michael Coghlan, Flickr

RAIN GARDEN IN A BOX

photo: Port of Vancouver USA

38 Heisler et. al. "Getting Green to Work in the Northwest Industrial District." Portland State University. 2015

The Opportunity

Partner with local Flats businesses to create demonstration sites of how to sustainably manage stormwater on an industrial site.

The False Creek Flats has limited areas of permeable surface. High levels of impervious surface from parking lots, industrial rooftops and streets can contribute to flooding, increase the volume of polluted stormwater runoff into our waterways, and contribute to the heat island effect. With much of the Flats privately-owned, there are few opportunities to reduce impervious surface on public land.

There are limited examples of how to sustainability retrofit parking lots in industrial districts. Many businesses in these districts—including the False Creek Flats—are unaware of the costs and space required to retrofit an industrial parking lot. Within the Flats there exists an opportunity to partner with local business owners to retrofit industrial parking lots to serve as a demonstration site, illustrating how to retrofit industrial sites to reduce the risk of flooding, decrease the volume of water entering the City's stormwater system and alleviate the urban heat island effect. Owens Corning (mentioned in the previous section) provides a framework for a successful private-public model, where the City identified a partner, approached a local business and provided funding and technical assistance.

OPPORTUNITIES FOR PARKING LOT RETROFITS

The Opportunity

Leverage green infrastructure in the public right-of way to collect and filter stormwater runoff from adjacent sites.

Several sites in the Flats have high water usage, using water to wash tour buses and commercial fleets, where untreated water is deposited directly into storm drains. In addition, several property owners have expressed an interest in green initiatives, including sustainable stormwater management, but do not have the space on site to accommodate rain gardens or other stormwater infrastructure.

Many buildings along Industrial Avenue are built to or near the lot line, adjacent to the public right-of-way. While small sites and large building footprints result in limited space for green infrastructure development, it also offers the opportunity for buildings to connect into a public green infrastructure network. Rain gardens in the public right-of-way could be leveraged to filter stormwater runoff from streets, and serve as green infrastructure facilities for neighbouring buildings. Possible interventions include:

» Buildings that are deemed not appropriate for green roof investment could have downspouts directed into rain gardens in the public right-of-way.

» Sites that accommodate bus and commercial fleet washing offer the opportunity to serve as a demonstration site for how to filter contaminated water through bio-filtration.

Following the example created by PCC's Stormwater Plaza (mentioned in the previous section) the City of Vancouver has the opportunity to develop an innovative and collaborative green street—along the Walk-the-Line route—where a city-owned swale can be designed to collect stormwater from the street, to manage runoff from partner's rooftops and to filter runoff from business operations.

PARKING LOT RETROFITS

DOWNSPOUT DISCONNECTION

photos: © City of Portland, courtesy Bureau of Environmental Services.

Green-tech Public Art District

The Challenge

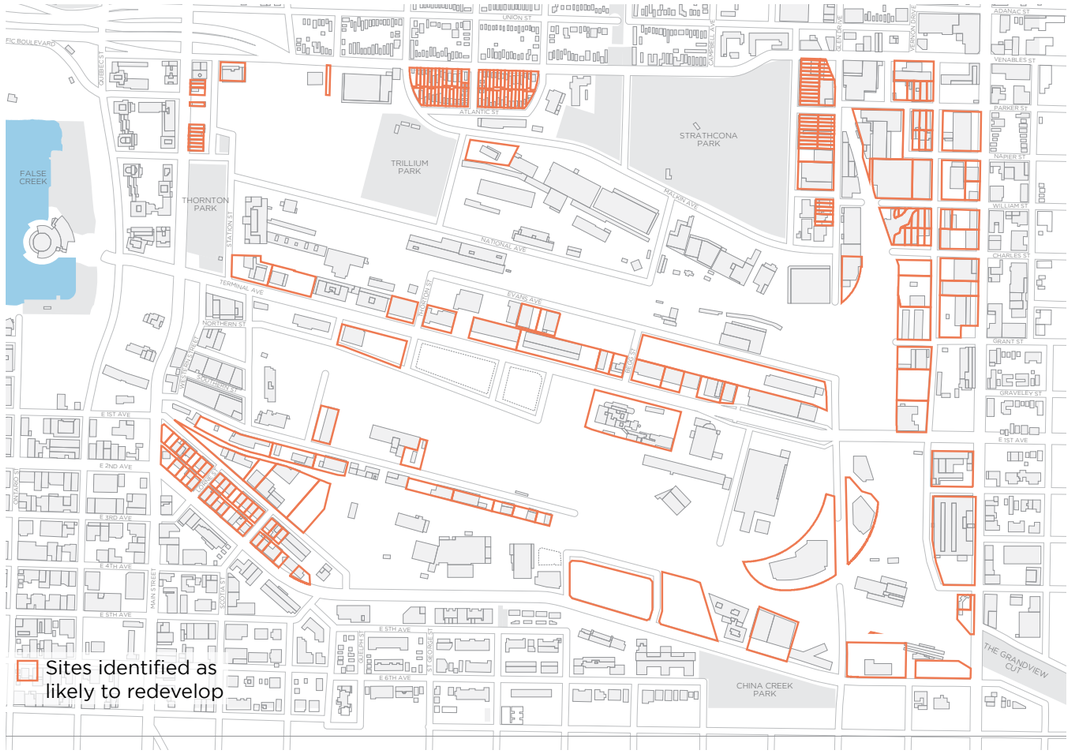
Developers and property owners in the Flats have stated that site challenges in the False Creek Flats—including implementing flood construction levels, addressing subsurface drainage, and responding to other site conditions—can exhaust development budgets, creating less interest in green investments.

The Opportunity

Use development funded on-site artwork budgets to fund the creation of site integrated public art.

Public artwork offers the unique opportunity to integrate building and site functions, helping achieve False Creek Flats Area Plan's vision of making it the greenest place to work in the world and supporting the goals of the Walk-the-Line corridor.

FLEXIBLE SITES WITHIN THE FLATS



Several sites within the False Creek Flats are poised for redevelopment.[39] As rezoning projects in Vancouver require a developer contribution for on-site artwork (or cash-in-lieu equivalent), redevelopment in the False Creek Flats creates the opportunity engage public artists to identify and design opportunities for green infrastructure and/or green technology development. Rain Ravine (mentioned above) provides the framework for how to successfully integrate public art into the building design phase to achieve sustainability goals. This framework includes:

» Selecting an artist based on their qualifications, not their proposals. Development of artwork should be a collaborative effort, where opportunities are discussed with building design teams, including architects, landscape architects and engineers. The proposal model limits the ability for this exploration with the project design team.

» Engaging an artist early in the design phase. Public art should be integrated into the design concept phase to allow for a meaningful integration of artwork into the building design. After the design concept phase the artist should continue to work with designers, engineers and the maintenance team to refine the project.

» Defining a list of criteria and identifying what sustainability goal or goals the artwork must achieve. The artist should be allowed to explore and identify the best opportunities for the integration of public art and sustainability goals.

» Facilitating collaboration between the artist and the building design team, allowing for an exploration of the possible opportunities. Leverage a portion of the "developer contribution for on-site artwork" budget to be used upfront to fund a design charrette with the artist and the building design team.

39 Coriolis. "The Future of False Creek Flats: An Economic Vision to Guide a New Area Plan." 2016.

The Opportunity

Support art projects along the Walk-the-Line corridor that integrate green technologies, creating a "green-tech art walk."

Interviews with businesses stakeholders revealed an interest and/or opportunity in investing in public art that supports green infrastructure, demonstrates green technologies or contributes to the cycling infrastructure along Walk-the-Line.

Several businesses along the proposed Walk-the-Line corridor identified a need for infrastructure in their community—including street lighting, opportunities for public recreation and increased bicycle parking—that could be achieved through the implementation of public art.

Public art projects—locally and across the world—demonstrate art's ability to contribute to a region's environmental goals. Encouraging the development of this type of public art could help create green-tech art walk along the Walk-the-Line corridor and work towards achieving the City's vision to make the Flats the "greenest place to work in the world."

Strategies for encouraging this type of public art investment in the Flats includes:

» Working with private corporations, foundations, and local Flats businesses to fund sustainable public art projects along the Walk-the-line corridor.

» Encourage all developer funded public art in the district to incorporate green technologies, green infrastructure and/or support sustainable modes of transit.

Examples of public art that incorporate green initiatives include:

CYCLING INFRASTRUCTURE

Photo Credit: Jack Flanagan, Flickr (Pump track - Nathanial)

GREEN INFRASTRUCTURE

Photo Credit: Peg Butler, Buster Simpson

GREEN TECHNOLOGIES

Photo Credit: PECHET STUDIO

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