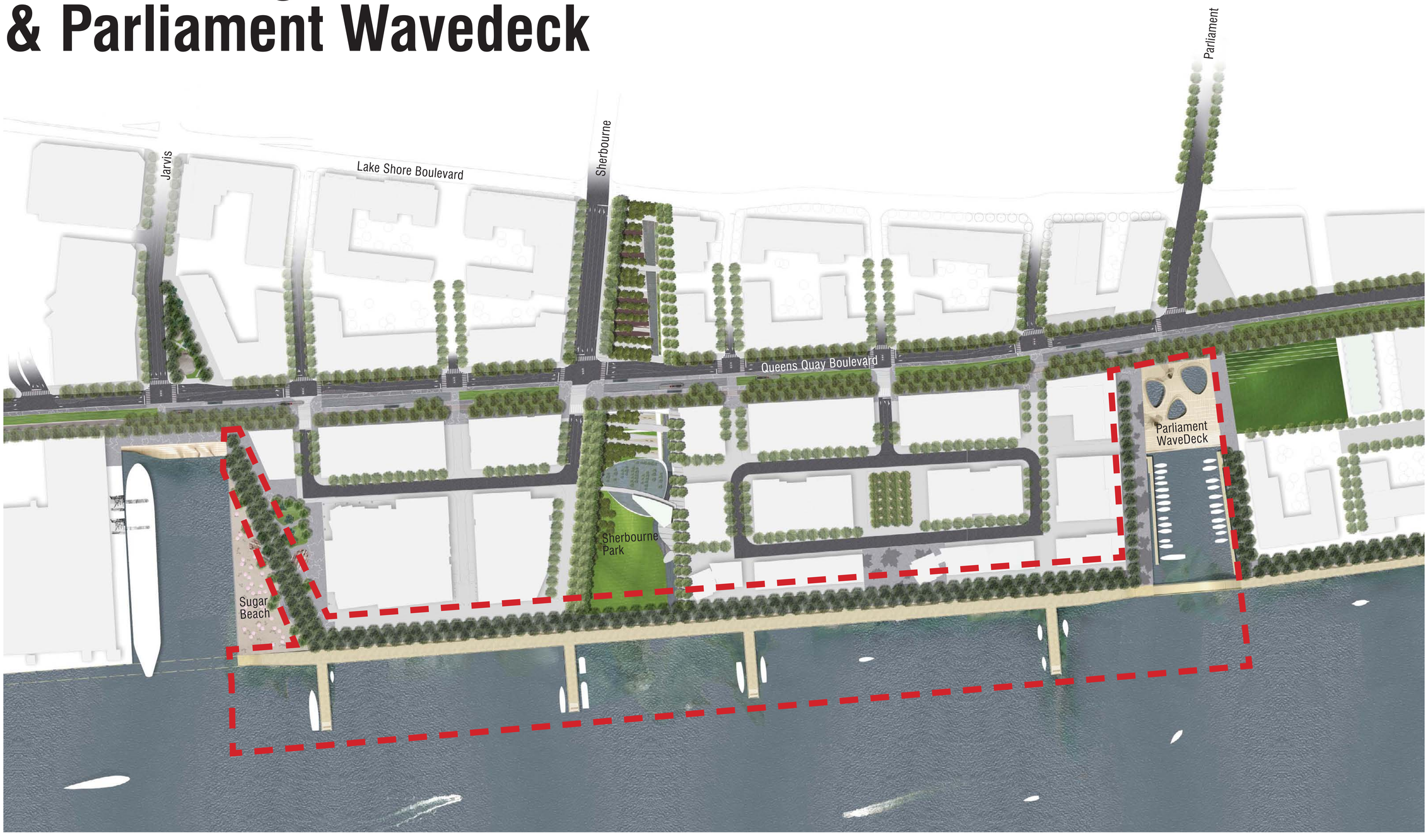
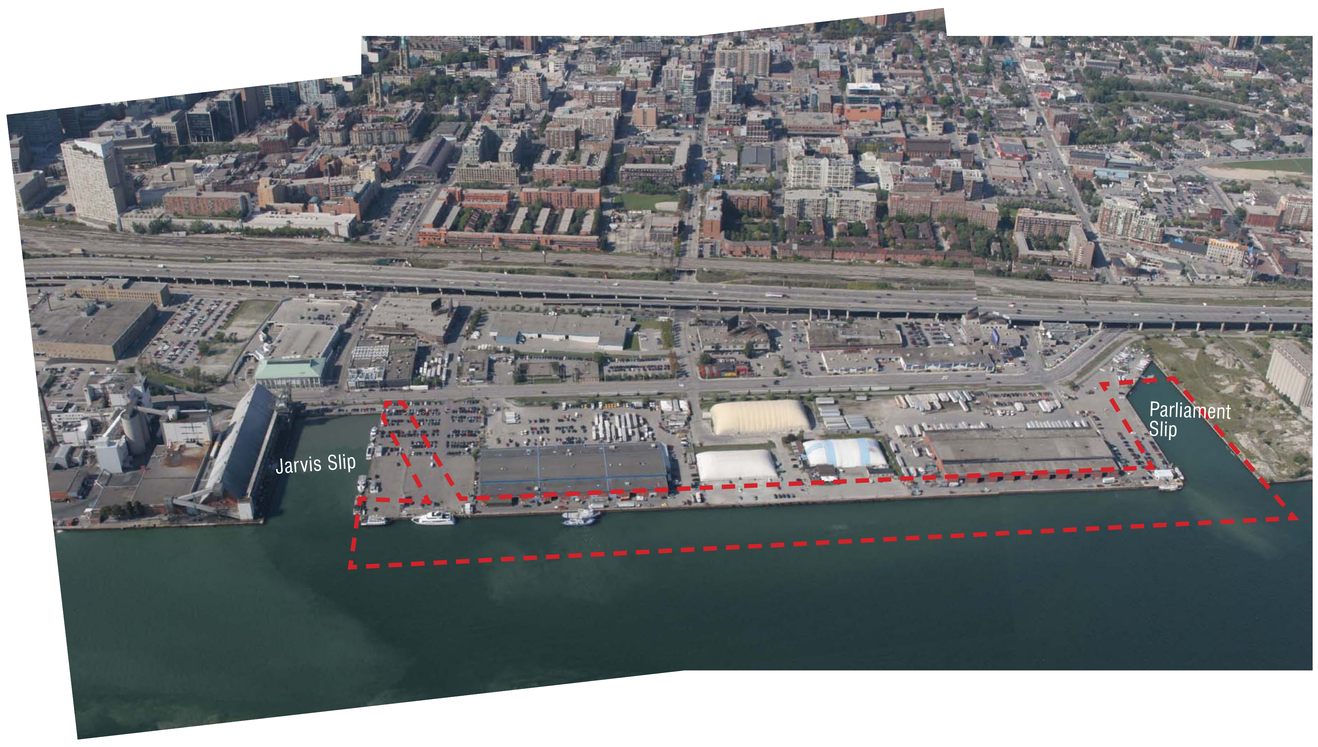
EAST BAYFRONT:
Water's Edge Promenade & Parliament Wavedeck



A New Relationship with the Water's Edge at East Bayfront

The East Bayfront precinct is the promise of Toronto's great neighbourhood on the Lake. No other district along the Central Waterfront has the unique position of being able to seamlessly relate itself to both the lakefront and the vibrant districts of the City of Toronto. As such, the East Bayfront represents the opportunity to establishing a positive and meaningful relationship with the city and its lakefront. The water's edge public realm is the primary component in defining this relationship.

The East Bayfront water's edge will establish the overall design language of the public realm, including the details and pallette of materials. With 800 linear meters of water's edge, the public realm of the primary waterfront will be created, offering Torontonians and visitors alike a clear, vibrant public desitination with a variety of experiences and amenities along its length.



Total area of water's edge public realm: approximately **2.5ha (6.25 acres)**
Total length of water's edge public realm: **800 linear meters**

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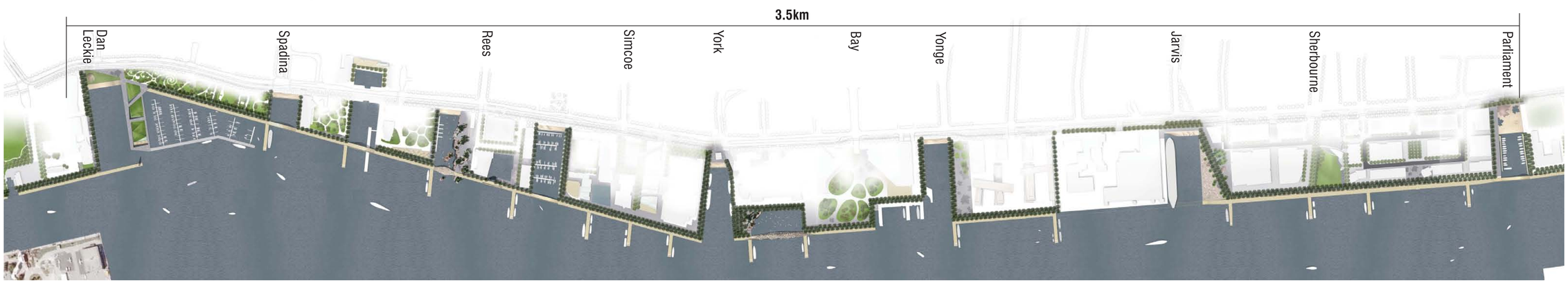
WATER'S EDGE:
The Primary Waterfront



The Promenade along the Lake
Most of all, Torontonians want to be at the edge where the city meets the lake.

Toronto's new blue edge
The water's edge promenade is public and continuous. For the first time, it will allow Torontonians the chance to stroll across the entire 3.5km length of the Central Waterfront from Bathurst to Parliament Street. The vision is for the pair of promenades along Queens Quay Boulevard and the water's edge to become part of a sublime collective ritual: the city's classic leisure routes.

(above) Reviving the glory of Toronto's great boardwalks: This image c.1945 shows the popularity of the famed Sunnyside Boardwalk in the western beaches.

(right) The vision for the water's edge promenade and boardwalk, with the "Green Foot" double-row of Maple trees as the foreground for views to the lake.

View of water's edge public realm composed of promenade and boardwalk

Promenade in two Parts
The water's edge route in the East Bayfront district is composed of two principle parts: a 12m wide granite mosaic promenade along the existing quay wall that is planted with a double-row of Maple trees, and a slightly lowered 11m wooden boardwalk cantilevered over the water. These two parts work together to ensure that a generous dimension befitting the metropolitan scale of the city and its lakefront is established. They also offer two distinct atmospheres and experiences: shade and protection within the tree canopy along the quay wall and openess and expsure along the lake edge. Materials add a subtle and tactile dimension using a simple palette of robust and distinctly Canadian materials: wood and granite.

The patterned leaf mosaic creates a strong identity for the promenade.

The water's edge boardwalk will be detailed with a herringbone pattern. (Reference: Schouwburgplein, Rotterdam, West 8)

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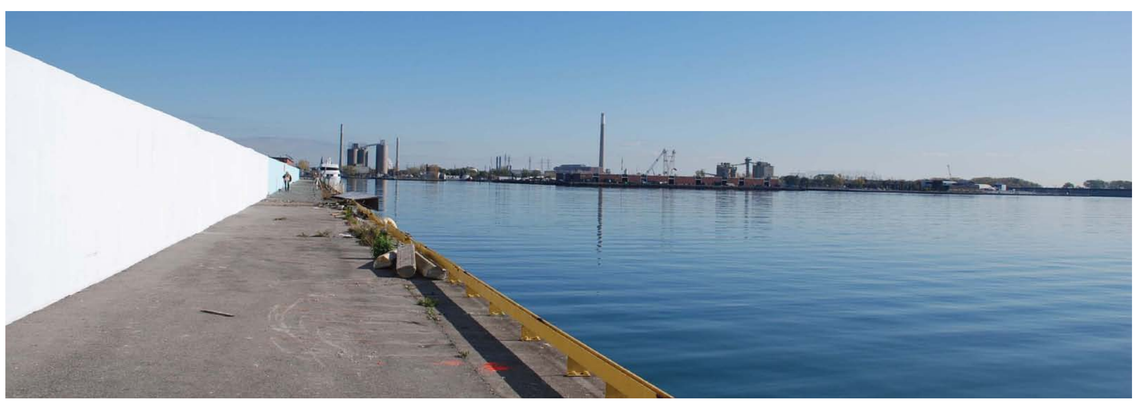
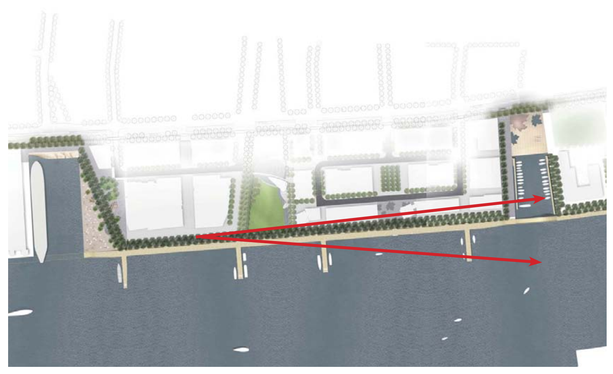
WATER'S EDGE:
Colonizing the Public Realm



(below) Impressions of the water's edge in different seasons, viewed from the promenade looking east:
(top) Summer
(middle) Autumn
(bottom) Winter

(left) Existing condition of the East Bayfront dockwall, looking east
(right) Key plan showing location of views



Seasonal Rhythms
A flexible configuration allows for diverse year-round programming of the water's edge promenade and boardwalk for different experiences on the lakefront.

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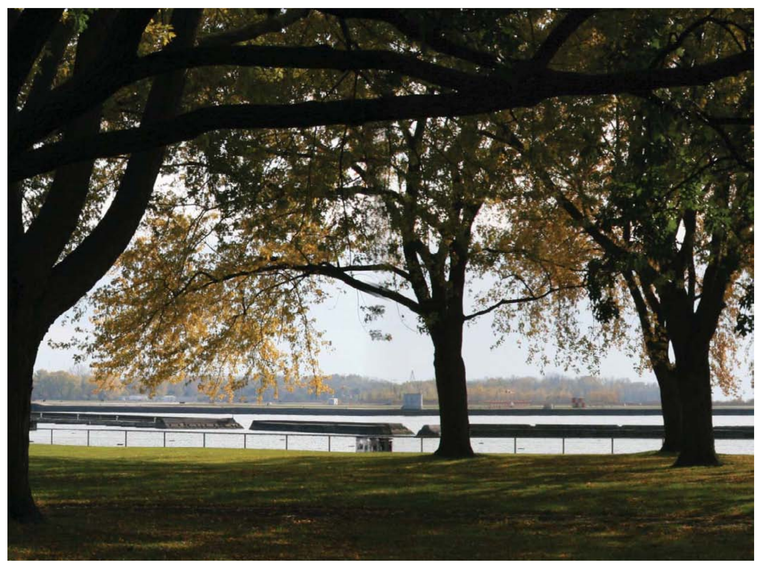
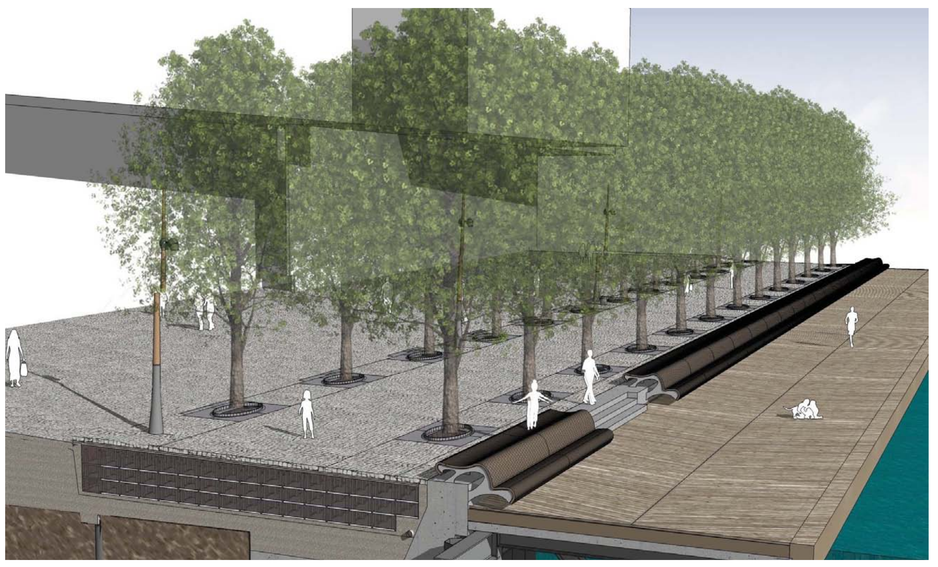
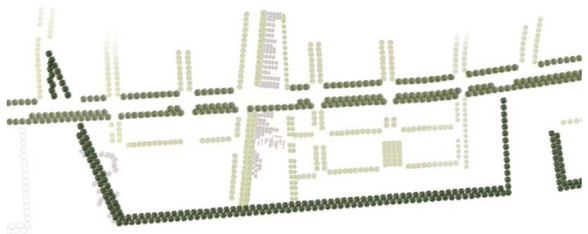
WATER'S EDGE:
Growing Big Trees, Leaf Mosaic, and Other Special Details

Planting the "Green Foot" of Toronto
Our ambition is simple: we want big trees. Native species. The kind where you feel the seasons. These are essential to defining the Canadian lakefront and unifying the waterfront. We must provide the proper conditions to allow trees to grow for 100 years on the waterfront — trees which will collect love letters in their bark.

A Double Row of Maple Trees
The Water's Edge Promenade planting is a central component of what is described as the 'Green Foot' at the base of the city. The promenade will be experienced through a continuous double row of majestic maples - the ultimate Canadian tree. In selecting maples, local civic pride is conveyed through this iconic national symbol while the coherence of the project is reinforced as the maple leaf theme and iconography appear at various moments throughout the project.







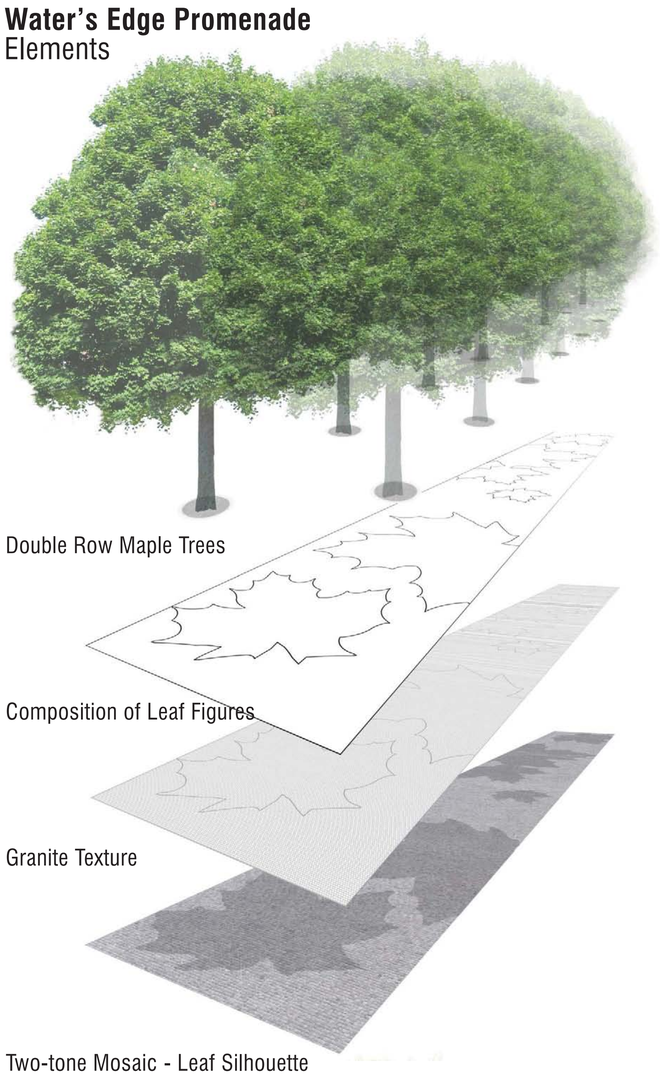
Diagnosis: Focus on the soil growing conditions
Aim for at least 30m³ soil volume per tree for water's edge promenade planting

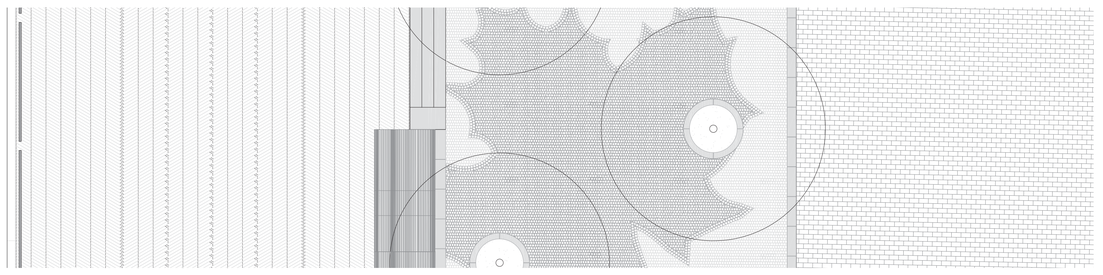
Foreground to the Lake
The concept of a foreground promotes comfortable microclimates that encourage four-season experiences on the waterfront. This highlights the experience of viewing the open water from within a canopy of enclosure.

(above) The Group of Seven: masters in composing foregrounds of the Canadian landscape on the lakefront

(above left) Mature tree at the Toronto Islands
(above right) Sidewalk tree at Queens Quay Boulevard west of John Street. According to the City of Toronto, the average lifespan of Toronto's sidewalk trees is only five years.

Water's Edge Promenade
Elements

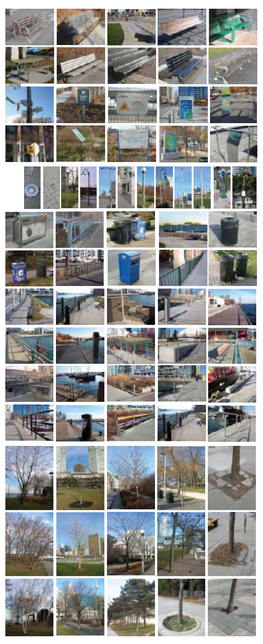




Scale of Leaf Silhouette Paving
"Places" along the promenade

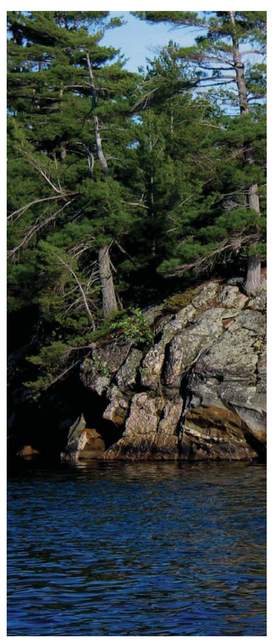
Building Coherence Across the Waterfront
For the first time, a consolidated approach can be taken to the design of materials, furniture and urban elements along the entire Central Waterfront that can be conceived in tandem with the character of the public realm.

A priority is placed upon developing a set of materials and furnishings for the East Bayfront water's edge public realm which will provide visual continuity and consistency across the entire Central Waterfront and reinforce the identity of the Canadian Lakefront.

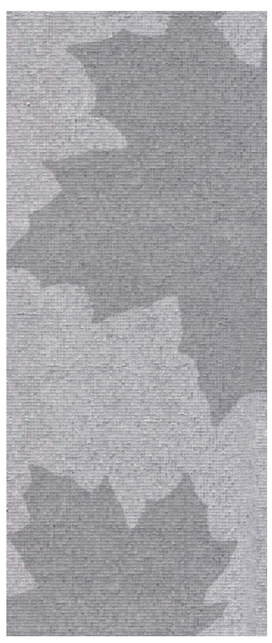


Today: Endless Difference
As observed on the waterfront today, each time a new design, a new language - again and again. The existing visual noise amounts to a weak sense of place and lack of identity.

Inspiration: Canadian Lakefront



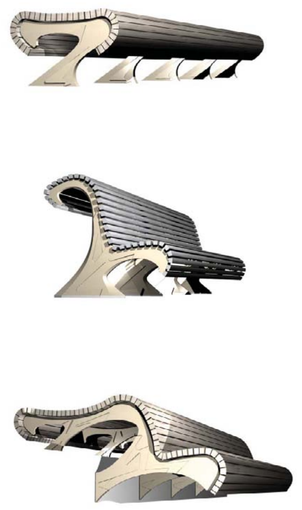
Granite mosaic paving with leaf motif



Timber detailing: WaveDecks

Timber detailing: Boardwalks

Family of Furnishings: benches



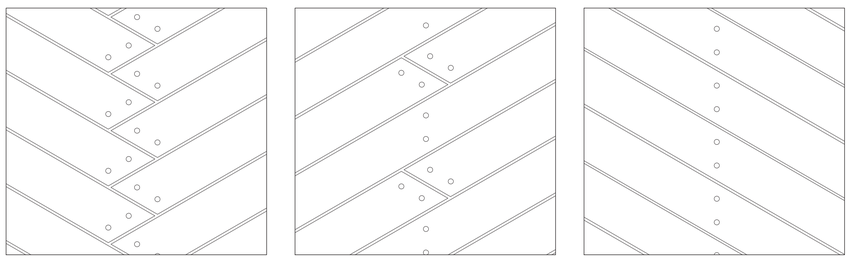
Family of Furnishings: lighting with timber mast

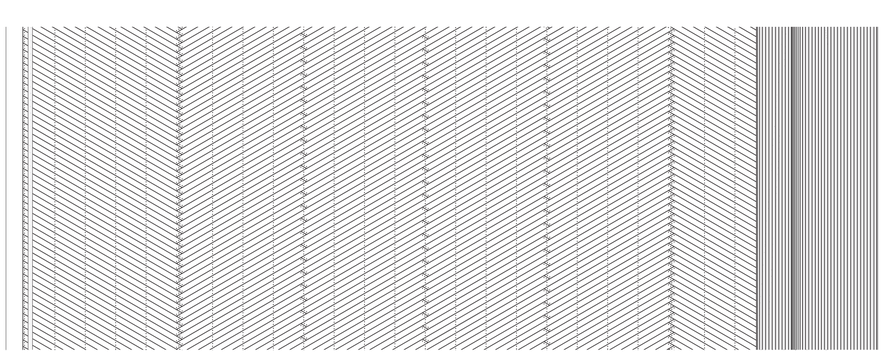
New Coherence through Materials of the Water's Edge Public Realm
A simple palette of materials is derived from the mythology of the Canadian outdoors: wood and granite. Each material is used expressively to build the identity of the East Bayfront within the overall Central Waterfront.

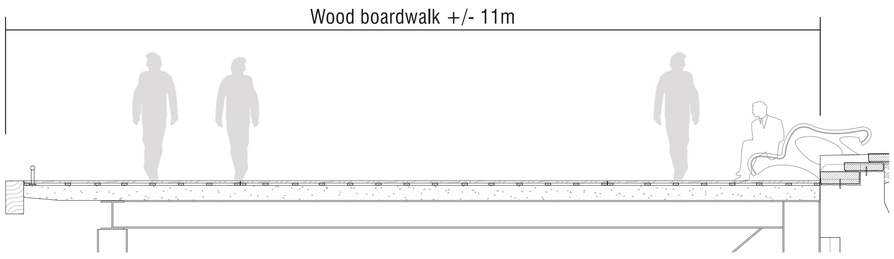
WATER'S EDGE BOARDWALK AND PARLIAMENT BRIDGE:
Continuity across the Central Waterfront

(above) Impression of the water's edge boardwalk looking east. The water's edge bench and the moveable wooden seats offer generous places to sit and enjoy the views.

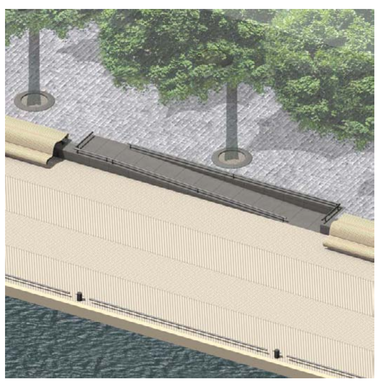
Herringbone Boardwalk Details
Three Connection Types

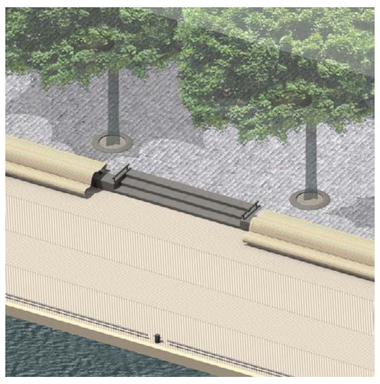




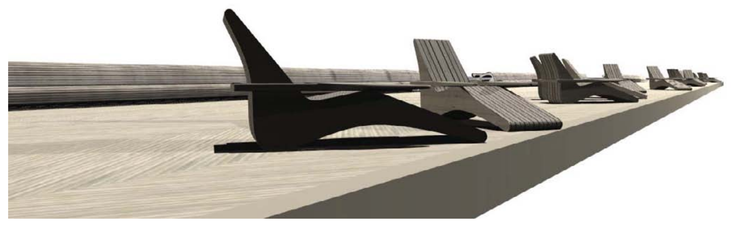


Basic boardwalk section





Connections between the water's edge promenade and the wooden boardwalk are made through gently sloping ramp and stair linkages located at gaps between the water's edge bench.



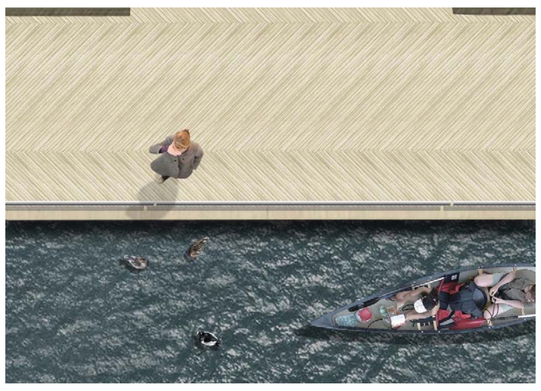
Inspired by the classic Muskoka Chair, these over-sized wooden seats offer visitors to the East Bayfront water's edge boardwalk a most memorable place to lounge by the lake.

Surfaces of the Water's Edge
The experience of moving along the water's edge involves a series of encounters with special natural materials and textures.
On the promenade, the granite mosaic surface featuring the leaf motif on the water's edge mixes with the shadows of the maple trees. From there, one meets the warmth of the wooden boardwalk next to the spectacular expanse of the lake. Running parallel along the dockwall, these two lines of movement in granite and wood function as a civic wayfinding device to indicate the primary routes along the waterfront. The granite mosaic of the promenade is always linked to the planting of trees. The transition between the promenade and cantilevered boardwalk features a long wooden bench that offers a place to rest facing either the lake or the promenade.

Stepping onto the water's edge promenade - encounter with the granite mosaic featuring leaf forms

Water's edge promenade - under the shade of a double row of Maple trees

Stepping onto the water's edge timber boardwalk from the promenade



Water's edge boardwalk - on the timber herringbone pattern next to the lake

Parliament Pedestrian Bridge
To ensure connectivity across the jagged structure of slip basins, timber pedestrian bridges rise out of the wooden boardwalk along the water's edge promenade to leap over slips, ensuring continuity of the route.

The form and material of the Parliament bridge will shape an iconic image for the East Bayfront. Simple, robust, yet elegant timber construction define these unique structures that will bind the Central Waterfront together.

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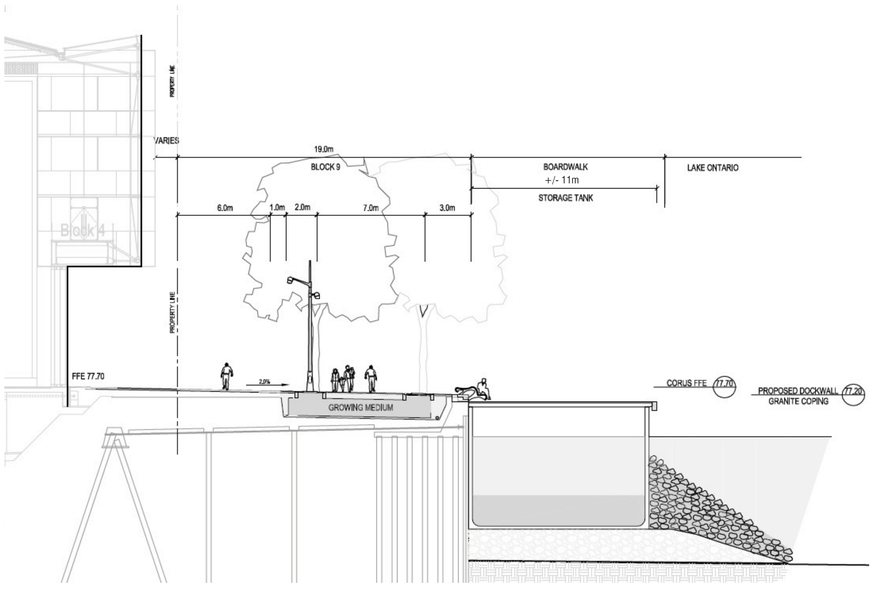
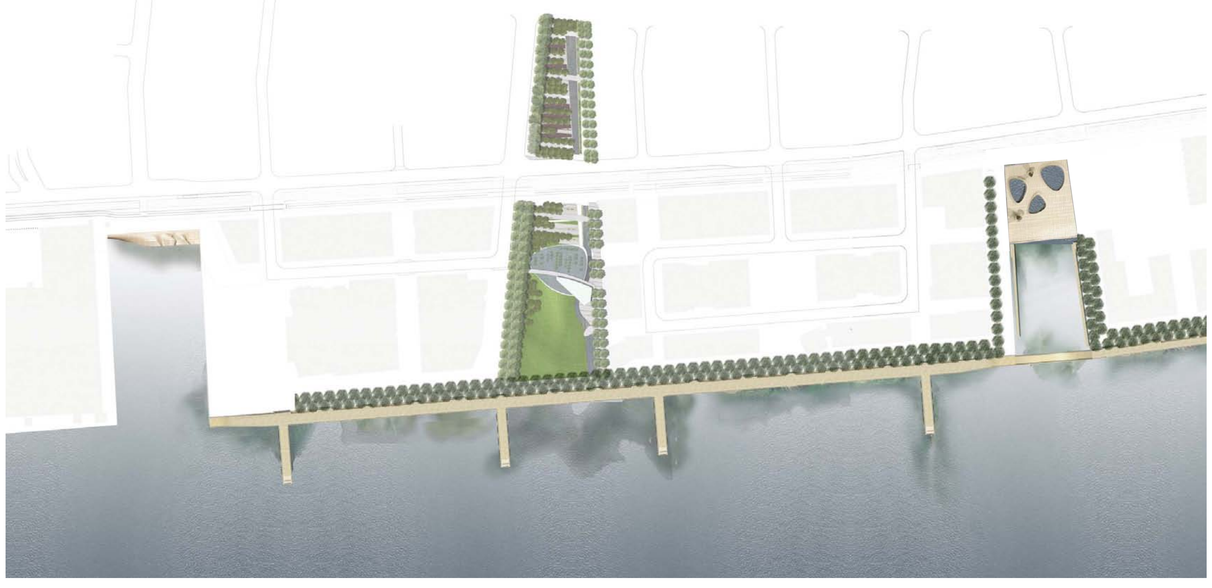
WATER'S EDGE:
Integrated Stormwater Management with Creation of Aquatic Habitat

A new public amenity
Along the dockwall of East Bayfront, a series of storage tanks collect and filter stormwater from the district. This water treatment infrastructure is capped with a timber boardwalk, creating both a public amenity and a water-cleaning machine. A new aquatic habitat is created at the footing of this infrastructure.



Typical section: water's edge promenade and boardwalk over integrated stormwater storage tank



All stormwater management infrastructure is accompanied by the creation of a new aquatic habitat along the shoreline.

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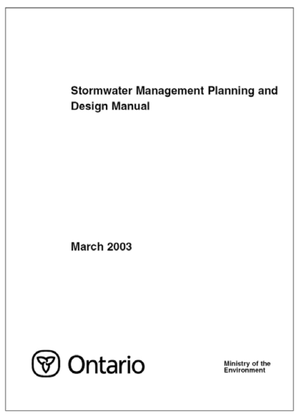
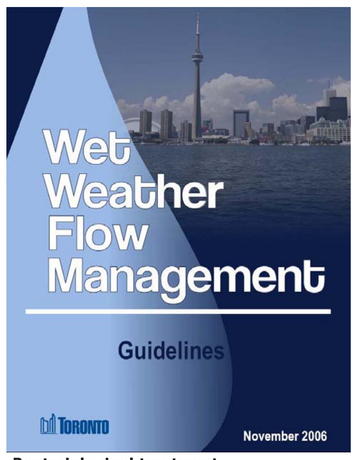
WATER'S EDGE:
Integrated Stormwater Management

Objectives
Guiding documents from local and provincial agencies govern the capture, treatment, and management of stormwater runoff

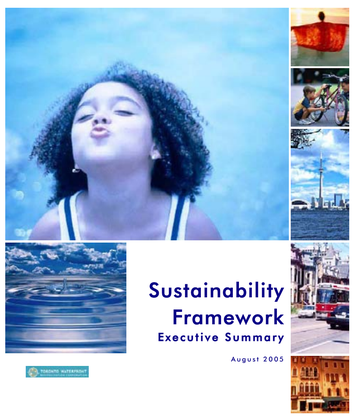


Water quality treatment
Provide Enhanced water quality control, equivalent to a minimum removal of 80% of suspended solids before discharging to Lake Ontario



Bacteriological treatment
Disinfect runoff to reduce E.coli concentrations to a maximum of 100 counts per 100ml, the threshold for safe human contact and recreational activity

Runoff reduction
Maximize local / on-site measures to reduce runoff quantity, and minimize downstream infrastructure requirements



Utilize stormwater as a resource
Explore opportunities for innovation, and reduce potable water consumption

Mechanisms and strategy
Rainfall runoff can be treated where it falls (at the source), en route (via a collection system), or just before discharging to a lake or stream (known as 'end of pipe' treatment). The stormwater strategy for East Bayfront will incorporate all of these, as well as bacteriological treatment.

East Bayfront concept showing extent of green roof coverage

On site control with low impact development technologies
Each building and development parcel will incorporate low impact and sustainable development technologies to reduce runoff quantity, reduce potable water consumption, and reduce downstream infrastructure requirements. These include green roofs, harvesting rooftop rainwater for building systems (flushing toilets), and harvesting rainwater for the irrigation of planted areas

Conveyance controls
Water quality manholes, placed throughout the storm sewer network, will provide on-line treatment of stormwater by removing oil, grit, and other debris material that wash off the streets when it rains

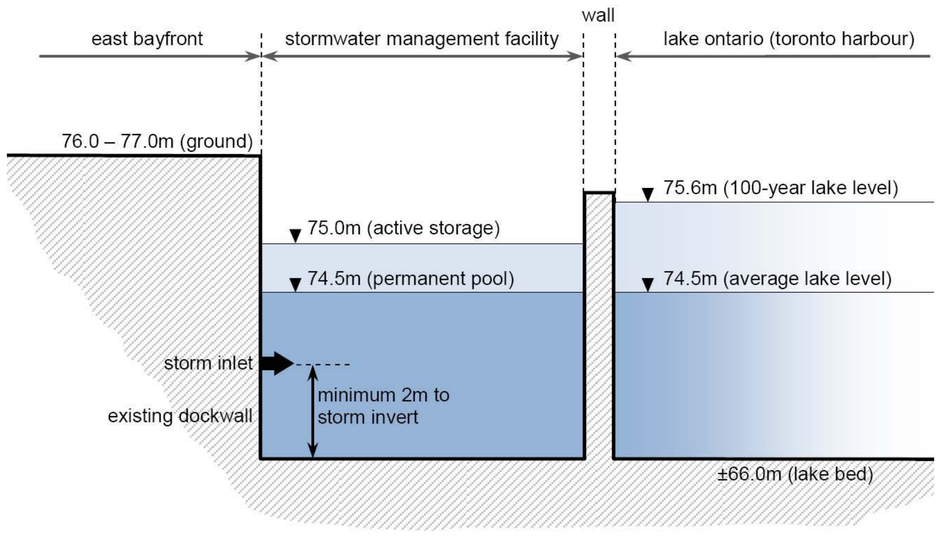
A typical water quality manhole (oil-grit separator)

Traditional end of pipe control
A reservoir, pond, or tank is needed to store captured runoff and provide enough time for solids and associated contaminants to settle. In cases where subsequent bacteriological treatment is required, this settlement time also generates water of sufficient clarity for these processes to be effective.

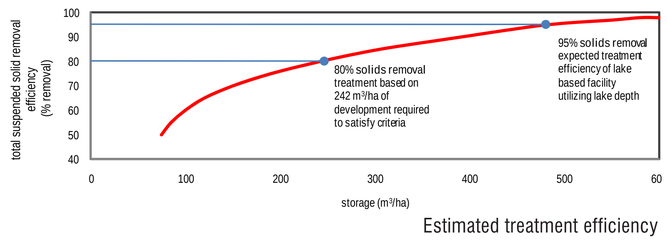
Some traditional stormwater management ponds used elsewhere

Lake-based end of pipe facility
In lieu of a traditional pond, it is proposed to use a long linear tank system on the lake side of the existing dockwall. This system will serve several functions:

1. support for and integration with the proposed boardwalk that will characterize the central waterfront
2. structural reinforcement of the existing and aged dockwall structure, and
3. stormwater attenuation that exceeds provincial water quality treatment objectives
4. allows usage of lake depth for 'permanent pool', a static volume of water that receives incoming runoff and further encourages settlement of solids and contaminants



Conceptual lake based end of pipe facility cross section.



Estimated treatment efficiency

Bacteriological treatment
Ultraviolet (UV) irradiation is needed to reduce the concentrations of E.coli and similar pathogens that may be present in stormwater runoff to acceptable levels.

Ultraviolet disinfection system

Proposed public art water features in Sherbourne Park utilizing treated stormwater

Sherbourne Park water channel - looking south from Queens Quay

WATERFRONTtoronto

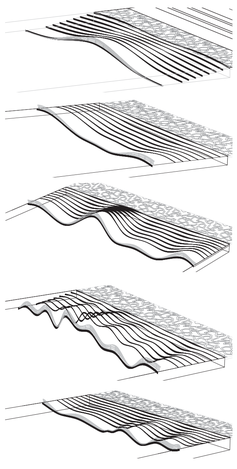
PARLIAMENT WAVEDECK:
The WaveDeck in Context

WATERFRONToronto

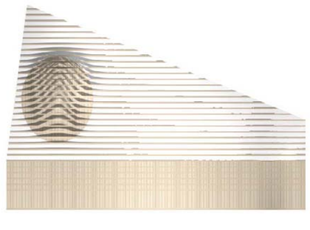
PARLIAMENT WAVEDECK:
An Organic Surface to Celebrate the Water-Cleaning Process

Coherence across the lakefront
A cross between bridge and boardwalk, the Wavedecks are a series of timber structures that build a coherent identity across the Toronto Central Waterfront. Each wooden structure offers a new waterside gathering place in areas that formerly had narrow sidewalks and lacked public access to the lake. With playful undulating geometry, the Wavedecks create flexible public spaces at the terminus of key north-south streets leading to the waterfront - some of the most heavily used parts of the Toronto shoreline.

The Parliament WaveDeck uses simple yet surprising forms to allow unique programming possibilities and interactions with both the lake, ecology, and the urban streetscape. It combines innovative geometry, careful use of materials and detailing, unique lighting effects, and integrates an exciting water treatment and aquatic habitat component within its scope. Parliament WaveDeck introduces a form of public space new for the city of Toronto which promotes new interactions with people and the organic timber landscape — making more space for pedestrians and building the character and identity of the Central Waterfront public realm. This deck will define the transformation and activity possible in the East Bayfront.



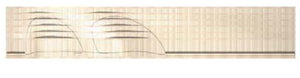
(above) Organic, sinuous forms of the Canadian Shield
(below) Schematic family of WaveDeck forms proposed for the heads of slips along the Central Waterfront.



Portland WaveDeck

Spadina WaveDeck
(Opened September 2008)

Rees WaveDeck
(Opens July 2009)

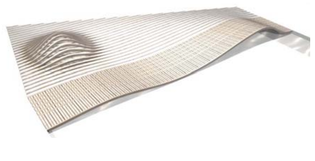


Simcoe WaveDeck
(Opened June 2009)

Yonge WaveDeck

Jarvis WaveDeck

Parliament WaveDeck



(above) Impression of Parliament WaveDeck looking south towards Parliament Bridge. The openings in the deck allow natural UV light to enter the stormwater tanks to enhance the water-cleaning process; they also offer people views into water-gardens.

WATERFRONToronto

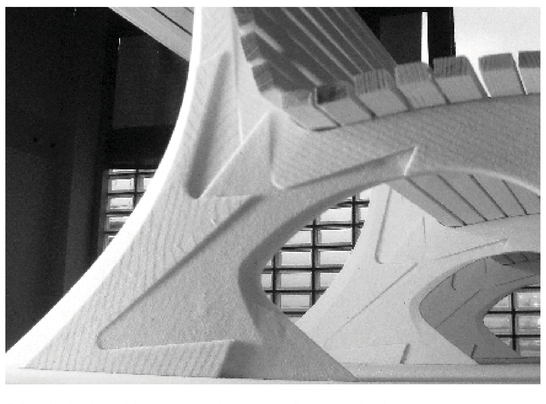
WATER'S EDGE BENCH:
A Mock-up demonstration of the proposed Water's Edge Bench - Have a Seat

A bench with two-orientations
The water's edge bench is designed to mediate the transition between the water's edge promenade and wooden boardwalk. It allows people to take a rest along the water's edge facing either the promenade or the lake. Running along the entire length of the dockwall at East Bayfront, this will become the longest bench in the city, a real peice of civic furniture.

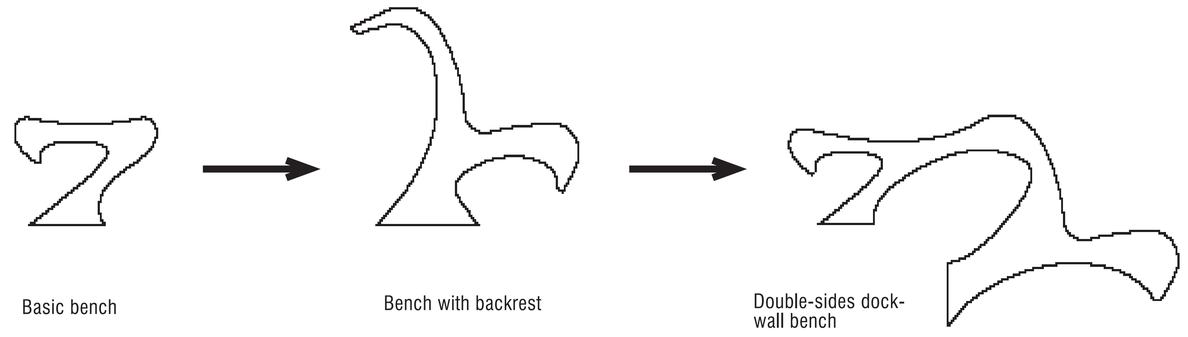
Try the Water's Edge Bench
In order to test how the water's edge bench element would look and feel, this full-size mock-up of a small part of the bench was built. We encourage you to sit down and try it out to get a sense of how the finished project will feel. The mock-up will allow the design team to make adjustments prior to the final implementation.

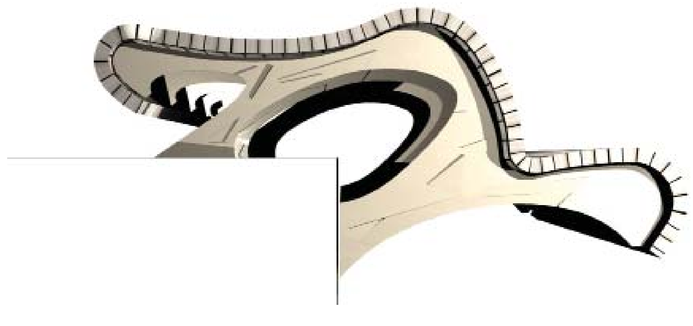
(above) Concept for the placement of the water's edge benche within the typical section of the water's edge boardwalk and promenade in the East Bayfront.

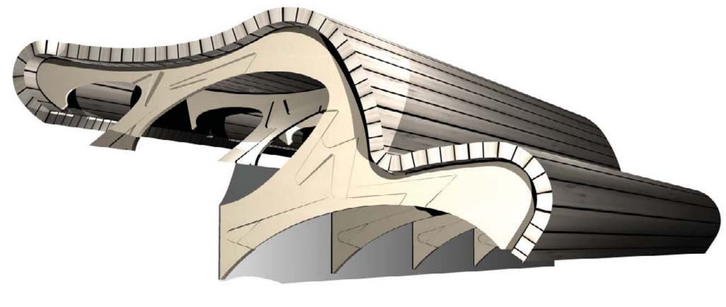
Cast Aluminum Leaf Motif Bench Support



3D relief of leaf integrated into cast footing design.







Part of a family of benches
The simple bench without backrest was included in the first implementation project at Spadina Wavedeck. Its supports are designed to be laser cut steel or cast alluminum with hardwood rails. With this bench, the language of the future family of waterfront bench types was inaugurated.

View south of the lakeside bench from Spadina Wavedeck

The water's edge dockwall bench located at the transition from water's edge boardwalk to promenade. The supports are designed to be cast alluminum, the bench slats are hardwood (Ipe) selected for durability and resistance to vandalism.

The bench's low profile preserves open views towards the water. Its dual-orientation allows people to sit on the bench in different ways.

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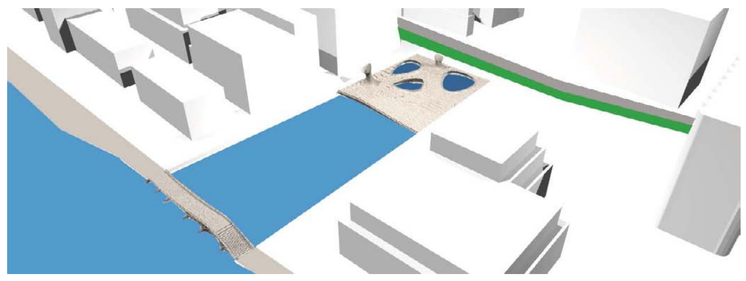
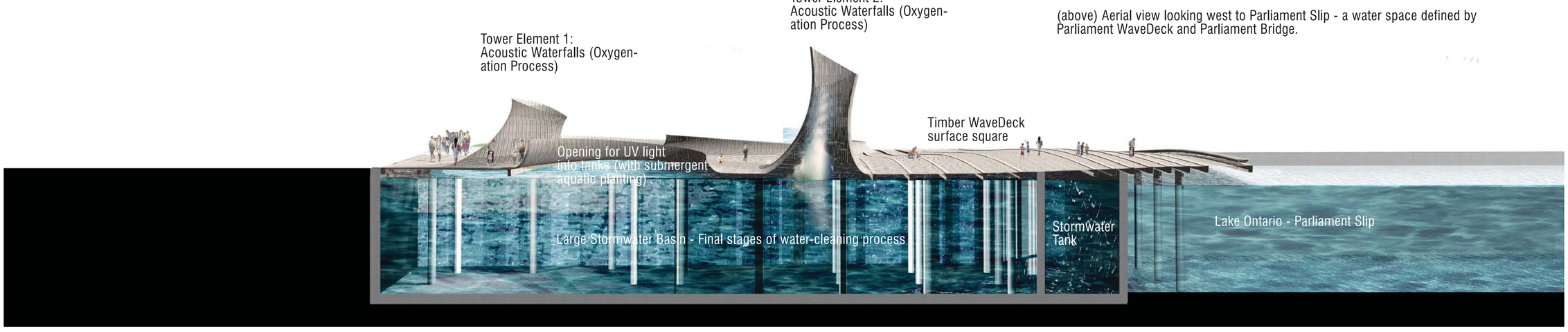
PARLIAMENT WAVEDECK:
A Timber Square Above A Wetland

(above) Impression of Parliament WaveDeck looking west towards East Bayfront West Precinct. The WaveDeck has the potential to host diverse types of public gatherings at a range of scales; it will also function more informally as a kind of timber beach where people can sit on a blanket, or lie on the timber curves.



(above) Aerial view looking west to Parliament Slip - a water space defined by Parliament WaveDeck and Parliament Bridge.



(above) Section of Parliament WaveDeck looking east.
The WaveDeck is a timber square with openings to allow natural UV light to penetrate into the stormwater tanks as part of the final stages of the water-cleaning process. Two tower elements in the WaveDeck create special sensory experiences as water falls from the dockwall stormwater tanks into the lower stormwater basin. This produces oxygenation to help clean the water, as well as an special acoustic atmosphere.

(above) Section of Parliament WaveDeck looking east in Context.

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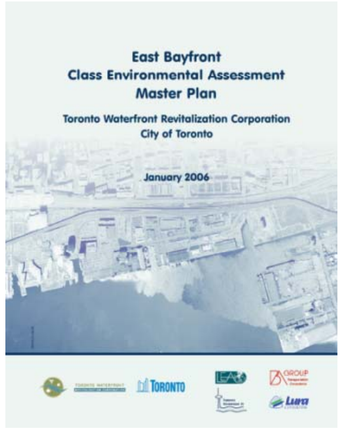
WATER'S EDGE:
Integrated Stormwater Management



East Bayfront Class Environmental Assessment Master Plan (2006)

East Bayfront Class Environmental Assessment Master Plan (2006) EA was approved in 2006 and established servicing principals in support of the proposed East Bayfront community, including sanitary, potable water, and stormwater management infrastructure. Evaluation of stormwater alternatives considered two aspects: alternatives for the overall stormwater system, and alternatives for the end-of-pipe treatment system

Stormwater system alternatives considered

Do Nothing

A. Rebuild

B. Use as Resource

C. Infiltrate

D. End-of-Pipe

E. Combination

Stormwater end-of-pipe alternatives considered

A. No Treatment and Direct Discharge to City Stormwater System

B. Stormwater Management Ponds (Quality)

C. Sedimentation Tanks

D. Sedimentation Tanks with Filters and UV Disinfection

Preferred stormwater system alternative per the 2006 EA Master Plan: Alternative E, Combination

- combination of source, conveyance, and end-of-pipe controls
- utilize as far as possible existing drainage system
- mandated use of source controls (e.g. green roofs, rainwater harvesting, etc.)
- separate conveyance systems for clean (rooftop) and dirty (surface) runoff
- dirty runoff conveyed to two collection points for end-of-pipe treatment
- clean water to be treated at source, utilized at source as much as possible, with remainder conveyed via surface architectural features

Preferred stormwater end of pipe alternative per the 2006 EA Master Plan: Alternative D, Sedimentation Tanks with Filters and UV Disinfection

- sub-surface sedimentation tanks with filters and UV disinfection
- clean runoff to be contained, reused, and treated at source as much as possible
- UV treated dirty runoff combined with remaining clean runoff for filtration prior to discharge to Lake Ontario
- total sedimentation tank volume of approximately 8,300 m3 for capture of a 50mm event
- first tank to be located within Sherbourne Park, with second tank to be located within and at top end of Parliament Slip

Refinements to EA alternatives necessary for feasibility, long term sustainability, and to address implementation challenges, including:

- Unfavorable soil and water table conditions increase risk and effort associated with tank installation
- Facility configuration requires filtration and UV treatment of peak flows, yielding high operations and maintenance effort
- Relies on capacity of constrained sanitary services to accept accumulated sediment from within tanks
- System partially relies on existing storm sewer network, which is lacking in capacity, aged, and presently connected to existing combined sewer overflows (CSO's)
- Prevailing flat topography constrains surface conveyance methods

An addendum to the Class Environmental Assessment is presently underway to document these refinements to the stormwater management and end-of-pipe systems for East Bayfront

A thorough evaluation of new alternatives has yielded key refinements of the 2006 EA Master Plan

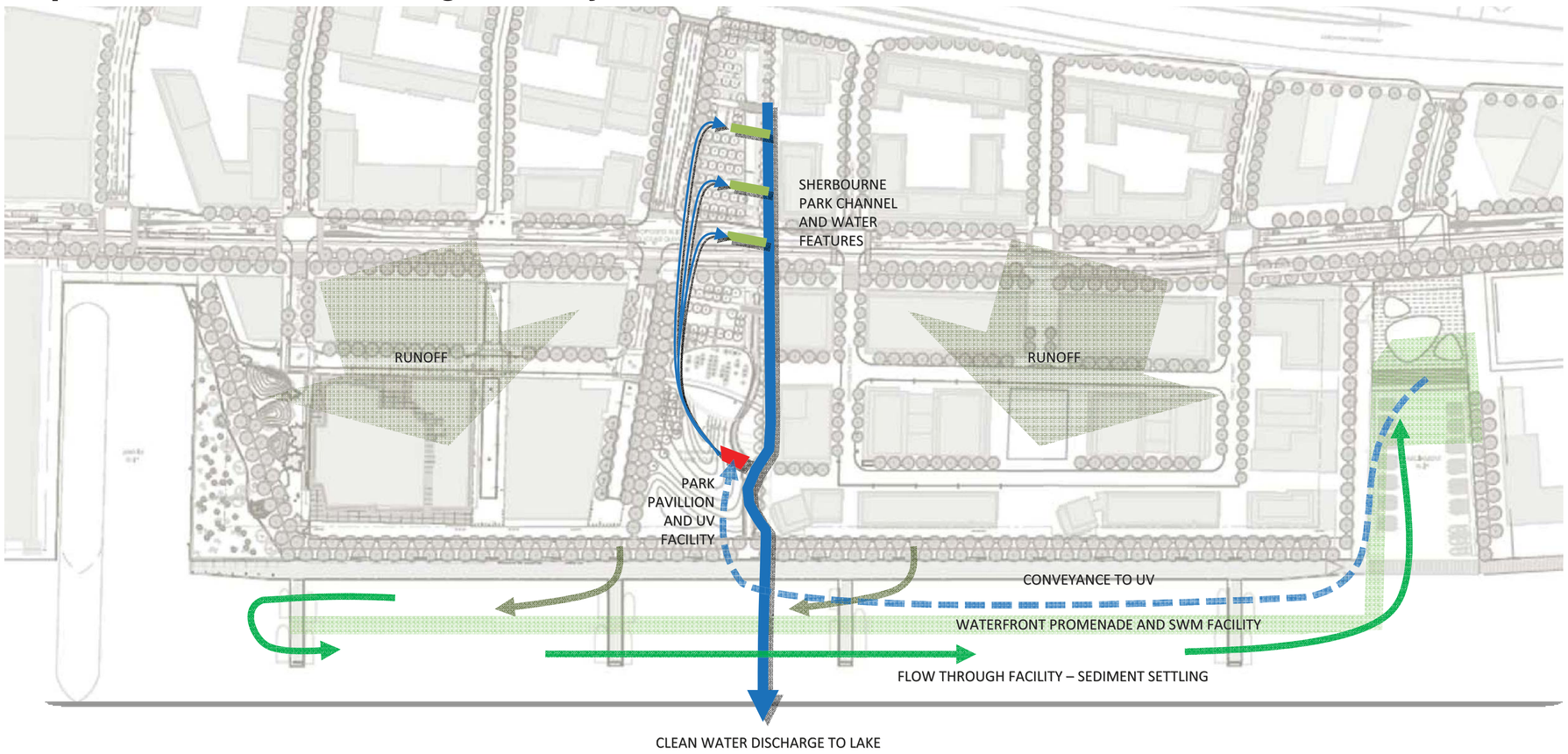
STORMWATER SYSTEM COMPARISON

2006 MASTER PLAN FEATURES	2009 MASTER PLAN ADDENDUM FEATURES
Combination of source, conveyance, and end-of-pipe controls	Yes, source controls, conveyance via oil-grit separators, and end-of-pipe controls
Utilize as far as possible existing drainage system	No, recommended replacement of storm sewer network using a minimum 2-year standard, and upsizing where necessary based on hydraulic capacity to reduce roadway flooding
Separate conveyance systems for clean (rooftop) and dirty (surface) runoff	No, single (traditional) storm sewer conveyance system to reduce maintenance, operations, and capital costs, but minimizing annual volume of 'clean' runoff through source controls
Provide two runoff collection points for end-of-pipe treatment	Yes, collect runoff at two collection points, east and west of existing Sherbourne CSO
Clean water to be treated and utilized at source as much as possible, via mandated use of source controls	Yes, established targets of 15mm runoff capture and reuse south of Queen's Quay, 5mm north of Queen's Quay
Remaining clean water conveyed via surface architectural features	No, using single collection system to avoid surface discharge of untreated water

STORMWATER END-OF-PIPE COMPARISON

2006 MASTER PLAN FEATURES	2009 MASTER PLAN ADDENDUM FEATURES
Sub-surface sedimentation tanks	Yes, sedimentation tanks, but revised location and configuration
Filtration and UV disinfection	Filtration not required due to treatment via proposed sedimentation tanks, reducing maintenance, operations, and capital costs while providing greater TSS removal. Resulting clarified runoff to be conveyed to UV disinfection facility within Sherbourne Park.
Clean runoff to be contained, reused, and treated at source as much as possible	Yes, at source measures maximized via mandated 15mm containment for lands south of Queens Quay and 5mm containment for lands north of Queens Quay.
Total sedimentation tank volume of approximately 8300 m^3 for capture of 50mm event	Sedimentation tanks provide total active volume of 4200 m^3 for capture of 25mm (first flush) event, and greater than 50,000 m^3 of permanent pool more than 95% TSS removal)
First tank to be located within Sherbourne Park, second tank within and at top end of Parliament Slip	Tanks to be located within the lake, integrated with water's edge boardwalk. Allows for utilization of lake depth for permanent pool. Tanks extend from Jarvis Slip in the west, along the frontage of East Bayfront and into Parliament Slip, ending in wet cell at the head of slip.

Proposed stormwater management system



Next steps in EA Amendment Process:

1. Finalize EA Addendum Report

2. Issue public notice of report completion for 30 day review

3. Advise all agencies and stakeholders of the change

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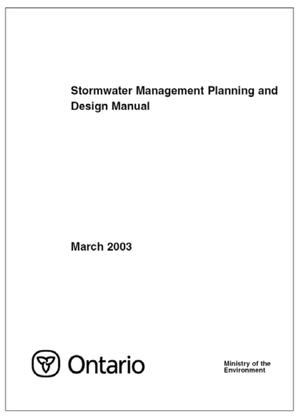
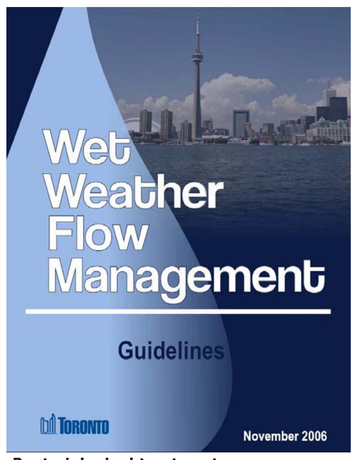
WATER'S EDGE:
Integrated Stormwater Management

Objectives
Guiding documents from local and provincial agencies govern the capture, treatment, and management of stormwater runoff

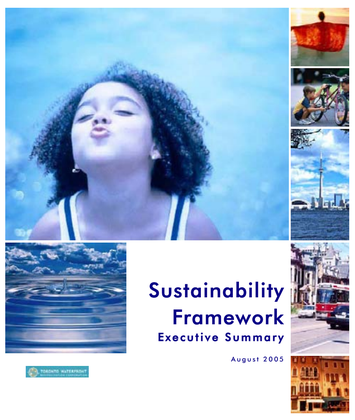


Water quality treatment
Provide Enhanced water quality control, equivalent to a minimum removal of 80% of suspended solids before discharging to Lake Ontario



Bacteriological treatment
Disinfect runoff to reduce E.coli concentrations to a maximum of 100 counts per 100ml, the threshold for safe human contact and recreational activity

Runoff reduction
Maximize local / on-site measures to reduce runoff quantity, and minimize downstream infrastructure requirements



Utilize stormwater as a resource
Explore opportunities for innovation, and reduce potable water consumption

Mechanisms and strategy
Rainfall runoff can be treated where it falls (at the source), en route (via a collection system), or just before discharging to a lake or stream (known as 'end of pipe' treatment). The stormwater strategy for East Bayfront will incorporate all of these, as well as bacteriological treatment.

East Bayfront concept showing extent of green roof coverage

On site control with low impact development technologies
Each building and development parcel will incorporate low impact and sustainable development technologies to reduce runoff quantity, reduce potable water consumption, and reduce downstream infrastructure requirements. These include green roofs, harvesting rooftop rainwater for building systems (flushing toilets), and harvesting rainwater for the irrigation of planted areas

Conveyance controls
Water quality manholes, placed throughout the storm sewer network, will provide on-line treatment of stormwater by removing oil, grit, and other debris material that wash off the streets when it rains

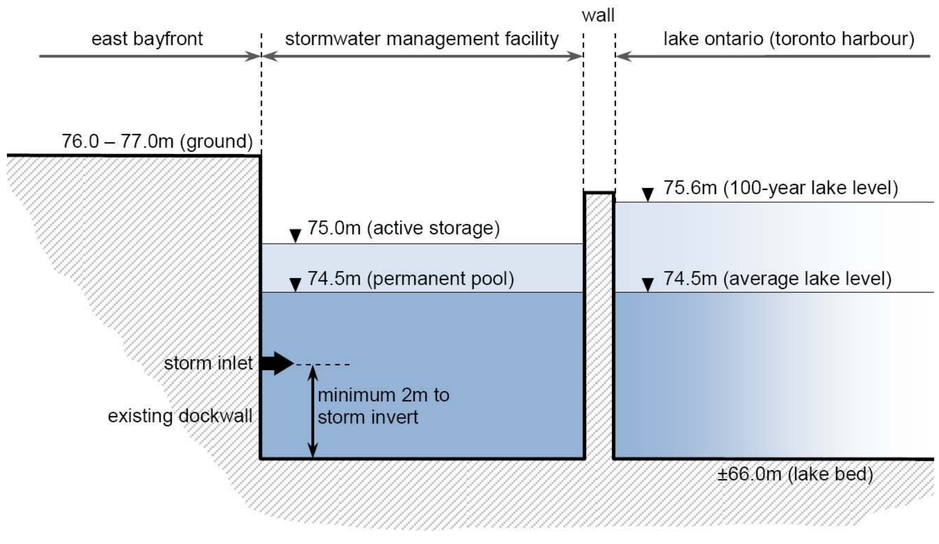
A typical water quality manhole (oil-grit separator)

Traditional end of pipe control
A reservoir, pond, or tank is needed to store captured runoff and provide enough time for solids and associated contaminants to settle. In cases where subsequent bacteriological treatment is required, this settlement time also generates water of sufficient clarity for these processes to be effective.

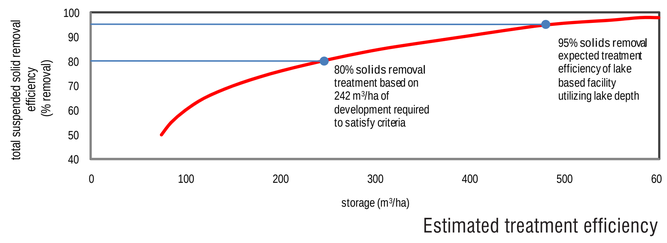
Some traditional stormwater management ponds used elsewhere

Lake-based end of pipe facility
In lieu of a traditional pond, it is proposed to use a long linear tank system on the lake side of the existing dockwall. This system will serve several functions:

1. support for and integration with the proposed boardwalk that will characterize the central waterfront
2. structural reinforcement of the existing and aged dockwall structure, and
3. stormwater attenuation that exceeds provincial water quality treatment objectives
4. allows usage of lake depth for 'permanent pool', a static volume of water that receives incoming runoff and further encourages settlement of solids and contaminants



Conceptual lake based end of pipe facility cross section.



Estimated treatment efficiency

Bacteriological treatment
Ultraviolet (UV) irradiation is needed to reduce the concentrations of E.coli and similar pathogens that may be present in stormwater runoff to acceptable levels.

Ultraviolet disinfection system

Proposed public art water features in Sherbourne Park utilizing treated stormwater

Sherbourne Park water channel - looking south from Queens Quay

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