River walk

Urban Design and Open Space Master Plan

May 2022

BRAMPTON

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Acknowledgements

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The Riverwalk Urban Development Master Plan was made possible by the support, participation, and enthusiasm of Council, numerous stakeholder and community groups, and the members of the public.

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Executive Summary

The Brampton Riverwalk Open Space and Urban Design Master Plan highlights opportunities for an integrated landscape and provides a strong framework for the City and community to imagine new possibilities for its future growth. The result: A renewed physical and social relationship to the Etobicoke Creek through the creation of a series of connected open spaces, dynamic public areas and dramatic landscapes.

The Riverwalk Open Space and Urban Design Master Plan (UDMP) is borne out of a long-standing and collective vision for Downtown Brampton and recognizes the vital role that Riverwalk will play in the life of the City.

Watercourses and ravines are a defining landscape feature of the region and the Etobicoke Creek valley. The associated parks and open spaces will play a major role in organizing and establishing a healthy, sustainable and vibrant public realm for downtown Brampton. The Riverwalk area includes the Etobicoke Creek valley and adjacent lands extending between Vodden Street to the north, Clarence Street to the south, Centre Street to the east and the old Creek valley defining the west boundary of the site, which extends to Main street in some areas.

Riverwalk is transformative opportunity to revitalize Brampton's downtown and to make it healthy, sustainable and resilient. The Master Plan re-defines and reintroduces the Etobicoke Creek into the identity of the downtown, restore natural ecologies while enhancing social amenities and create new economic and development opportunities.

The Riverwalk Open Space and Urban Design Master Plan builds upon the Downtown Brampton Flood Protection Environmental Assessment (DBFP EA), that identified a Preferred Alternative to reduce flood risk and reduce the Special Policy Area (SPA) designation in the downtown core while considering opportunities for revitalization and ecological benefits. The completion of the DBFP EA is a critical step towards achieving the Riverwalk vision and to create a healthy, sustainable and resilient downtown Brampton.

The Master Plan establishes a strong vision that is based on the following objectives:

1. To **remove flood threat and reduced disaster risks** for the Downtown core and the most important areas for development and intensification, under the umbrella of the DBFP EA;
2. to **unlock the downtown development potential** by significantly reducing the Special Policy Area and its restrictions, in particular on the designated Urban Growth Centre;
3. to **significantly improve the downtown open space system** and provide major parks, squares, plazas and other amenities with broad programming for downtown residents, businesses, for the entire city, hosting activities and events for all, for equity, diversity and inclusiveness;
4. to significantly **improve the environment, liveability and sustainability** of downtown Brampton by integrating ecological improvements, climate change adaptation and mitigation measures, heat island reduction, stormwater management, the introduction of innovative LID features, contributing to public health, social sustainability and developing a flagship Eco Space;
5. to **improve the Downtown's sustainable transportation and mobility network** by developing a robust active transportation system focused on the Etobicoke Creek Recreational Trail and its connections, improving the walkability and accessibility of the area as well as supporting improvements to the local and higher-order transit system;
6. to become a landmark feature and **redefine Downtown and City's character and identity** based on the area's history and tradition, creating attractive, well designed landscapes and places, as well as an important attraction for the city's diverse residents and for visitors from the region and beyond.

The Riverwalk Open Space and Urban Design Master Plan is divided into 10 chapters that explore and outline existing conditions, associated opportunities and constraints and make recommendations for resilience, sustainability and public health, sustainable transportation and programming throughout the Riverwalk area. The vision is then illustrated in the concept design and demonstration plan, followed by an implementation framework that will guide the realization of these recommendations.

The Riverwalk Open Space and Urban Design Master Plan exemplifies City of Brampton's commitment to fostering healthy, resilient and environmentally sustainable communities. The Riverwalk Environment, Resilience, Sustainability and Public Health framework, outlined in **"Chapter 5.0 Environment, Resilience, Sustainability and Public Health"**, includes recommendations for resilience to climate change, improvements to ecology and natural habitat, stormwater management and public health.

The Environment, Resilience, Sustainability and Public Health framework is further supported in **"Chapter 6.0 Sustainable Transportation"**, which provides recommendations for sustainable transportation through active transportation, public transit, and accessibility.

The programming of open space within Riverwalk aims to engage Brampton's diverse community and strives for inclusiveness, diversity and equity for all ages and all abilities. **"Chapter 7.0 Programming"** outlines a number of recommendations for the creation of new flexible outdoor open space, active and passive recreation, inclusive children's play, seasonal programming as well as interpretation of the natural and cultural heritage of the Riverwalk area through educational programs, signage and public art.

The concept design and demonstration plan illustrated in **"Chapter 8.0 Concept Design and Demonstration Plan"** addresses the overall character and identity of Riverwalk and connections to the open space and urban context. The demonstration plan is a graphic representation of the vision and objectives as well as the recommendations set forth in **Chapters 5.0**, **6.0** and **7.0**. The plan illustrates a number of potential projects within the five unique Riverwalk character areas. These projects are not prescriptive and implementation will be subject to a detailed design process and review by the City of Brampton and TRCA and subject to identification of collective priorities, funding sources and regulatory and budget approvals.

In order to facilitate the implementation of the projects identified in the Riverwalk Open Space and Urban Design Master Plan, a number of processes, partnerships and funding considerations must be put in place. The implementation framework described in **"Chapter 9.0 Implementation Framework"** sets out a phasing strategy that takes into consideration, existing and future funding and priorities, as well as coordination with related or concurrent or projects. Projects are divided among short-term and DBFP-EA related projects, medium-term projects, long term projects and small-scale, incremental and supporting projects.

Riverwalk is a dynamic and flexible open space network that will transcend typical park boundary constraints and extend its operating networks, systems of connectivity, ecology, stormwater management and design excellence into the adjacent community. The aim of the Riverwalk Open Space and Urban Design Master Plan is to create a vibrant place for people to enjoy an important natural open space and resource that weaves through the City's core.

Table of Contents

Appendices

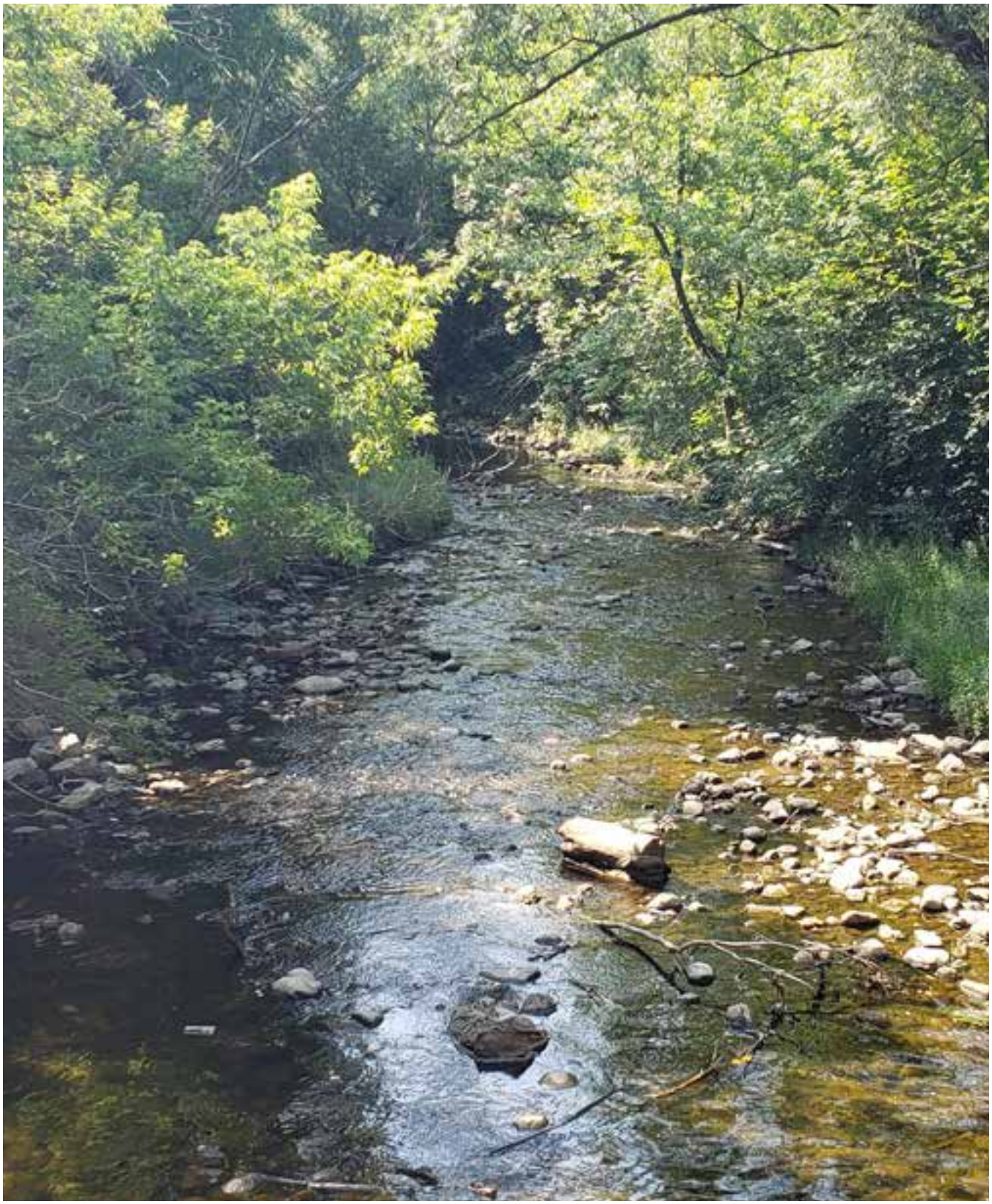


Fig. 1 Etobicoke Creek flowing through Duggan Park

1.0
Introduction

1.1 The Riverwalk Program: a Vision for Brampton's Future

The Riverwalk Urban Design and Open Space Master Plan is an unique opportunity to redefine and re-integrate Etobicoke Creek into Brampton's urban fabric.

Downtown Brampton was founded, settled and developed within the Etobicoke Creek floodplain. The city is intrinsically linked to the watercourse as it provided sustenance, transportation and a power source for local industry. The proximity of the creek also proved to be a challenge for Brampton and in response to frequent flooding, the creek was eventually diverted around the town through a concrete-lined bypass channel that has protected the area from flooding to this day.

Although it has allowed the city to grow and prosper, the channelization of the creek through the downtown core has also contributed to a physical and cultural detachment between Brampton and the watercourse that spurred its settlement.

Historic Flooding

Etobicoke Creek historically flowed through downtown Brampton and the area was subject to frequent flooding.

Much of the city's core was built up within the depression associated with the historic valley and local business owners within this historic valley described annual flooding reaching depths of several feet and causing significant property damage. In response to the frequent flooding, a concrete-lined bypass channel was constructed in 1952 between Church Street and Wellington Street to convey flood flows around the downtown area. The bypass channel facilitated further development of the downtown core and successfully protected the city from the devastating impact of Hurricane Hazel in 1954.

Growth and Flood Protection

The provincial government has designated downtown Brampton as a Special Policy Area (SPA). This designation recognizes that the area lies within the regulatory floodplain, but also that it represents the heart of Brampton and should be maintained as a place to invest and do business. The SPA is within the Toronto and Region Conservation Authority (TRCA) regulated floodplain, which is associated with a storm of the same magnitude as Hurricane Hazel. Under current and forecasted conditions, the bypass channel does not provide sufficient conveyance for the Regulatory Flood event leaving the downtown area vulnerable to flooding.

Fig. 2 Archival Postcard, Etobicoke River from Church Street Bridge, City of Brampton (cropped)

Fig. 3 Main Street North, March 1948. Russell Cooper Fonds, Region of Peel Archives/PAMA (cropped)

Fig. 4 Bypass Channel north of the CN Rail Bridge

The Riverwalk Program

The Riverwalk Urban Design and Open Space Master Plan (UDMP), together with the approved Downtown Brampton Flood Protection EA (DBFP EA), the Return on Investment (ROI) study, and the ongoing advocacy and funding initiatives outlined in **"Section 1.4 Engagement and Consultation Process"**, are the major components of the City of Brampton and TRCA's Riverwalk Program. The Riverwalk Program will:

- Bring a transformative infrastructure to Downtown Brampton.
- Bring together integrated flood protection, downtown revitalization, nature and open space, place making and public amenities.
- Transform the Etobicoke Creek from a liability into a sustainable asset and attraction for recreation and economic growth.
- Integrate with other strategic initiatives.
- Be a catalyst for downtown revitalization and development.

The Downtown Brampton Flood Protection EA (DBFP EA)

The potential for downtown Brampton to grow and intensify in the designated SPA is intrinsically linked to its relationship with the Etobicoke Creek and the approved flood solution identified in the DBFP EA.

The flood protection solution identified in the DBFP EA has shown that it is possible to reduce the flood hazard, which would, in turn, allow for the removal of the SPA designation north of Wellington Street. This will also unlock the potential for urban growth, urban development and the realization of Riverwalk, which will put the creek back at the heart of downtown. This will form a vibrant new space that provides a distinct identity for the city and make it healthy, sustainable and resilient.

The resultant Environmental Study Report (ESR), approved in 2020, sets out the parameters of the Preferred Alternative. The DBFP EA and the preferred flood protection solution is described in further detail in **"Section 2.1 Riverwalk in Context".**

Return of Investment Study (ROI)

Completed in December 2019, the ROI study identified extensive benefits from flood protection measures and the redevelopment of the Downtown SPA beyond the current limitations, the effect on the immediately adjacent areas as well as the positive impact of parks and open space development, the creation of a major attraction for downtown and the climate change mitigation benefits from Riverwalk.

The Riverwalk Urban Design Master Plan (UDMP

The City of Brampton has made significant progress toward revitalizing the City's downtown core and the Riverwalk UDMP is part of and contributes to, a greater planning vision for the City of Brampton. The Riverwalk UDMP builds on the DBFP EA and the resultant flood protection requirements. The purpose of the Riverwalk UDMP is to establish urban design concepts and guidelines for the downtown Brampton Riverwalk area. However, should there be any inconsistencies between the information set out in the approved ESR and the Riverwalk UDMP, the ESR will take precedence.

The Riverwalk UDMP provides direction for future uses, including parks and other public amenities, active transportation and sustainable development. Drawing upon numerous previous planning studies, the Riverwalk UDMP aims to create new open space links and to contribute to other city-building initiatives within the area. The Riverwalk UDMP will set out a framework for integrated design that delivers co-benefits to people, the economy and the environment.

This document presents a site inventory summarizing existing challenges and areas of concern and opportunities for enhancements in the Riverwalk area. The vision, design objectives and key components of the Riverwalk UDMP are described in detail, followed by chapters illustrating key urban design concepts and their implementation and phasing over time.

1.2 Riverwalk Area

Riverwalk traverses a number of neighbourhoods and urban conditions and includes parks and open space, streets and other publicly-owned land within the Etobicoke Creek valley and the area bounded by Vodden Street, Centre Street, Clarence Street and the western delineated area for Riverwalk. There are five distinct character areas identified within the Riverwalk area:

1. **Area 1:** The northernmost portion of Riverwalk, predominantly consisting of Duggan Park.
2. **Area 2:** The area including the Central Public School Art and Community Centre and associated fields, and the floodplain area north of Church Street.
3. **Area 3:** The central portion of Riverwalk, including Rosalea Park and other public lands north of the rail corridor.
4. **Area 4:** The most constrained portion of Riverwalk, consisting of the Etobicoke Creek Bypass Channel.
5. **Area 5:** The southernmost portion of the Riverwalk area is Centennial Park, which provides a counter-balance to the urban portions of Riverwalk and an opportunity to reconnect with the natural systems of the creek.

Fig. 5 Riverwalk UDMP Area

1.3 The Master Plan Process

Purpose of the Master Plan

The Riverwalk UDMP is intended to act as a guiding document and a framework for future design and capital investment initiatives as well as smaller projects completed in more localized areas.

Riverwalk UDMP Goals

The aim of the Riverwalk UDMP is to:

- Integrate the urban design vision for Riverwalk with the approved technical flood protection solution outlined in the DBFP EA;
- Create a landmark public space network of regional and international stature that significantly contributes to the revitalization of the downtown and provides a public amenity with a unique identity and;
- Address downtown revitalization through urban design master planning to generate development and investment opportunities (with the goal of attracting new office, residential, commercial and/or retail uses);
- Improve access and movement, with a focus on access to high order transit, active transportation, pedestrian movement and gatherings.

Riverwalk UDMP Objectives

The objectives of the Riverwalk UDMP are:

- To build upon and complement the DBFP EA;
- To update the area vision and principles;
- To establish the framework and design concepts for Riverwalk;
- To develop a strong public realm program;
- To communicate and engage with the public throughout the project and;
- To create a strong implementation plan including recommendations for policy updates, future Riverwalk projects, financial considerations and phasing.

Developing the Master Plan

The Riverwalk UDMP represents a collaborative effort between the City of Brampton, TRCA, community groups, residents, advocates and design professionals. The work was divided into key phases outlined below.

1. Background Analysis

After an extensive review of background documentation, related case studies, stakeholder meetings, a site inventory and a series of design objectives and principles were developed to support the vision for the Riverwalk UDMP.

2. Preliminary Vision and Concepts

The initial background analysis identified a number of opportunities and constraints which informed the preliminary design concepts and alternatives.

3. Draft Master Plan

The preliminary Riverwalk UDMP synthesized initial concepts and was presented to City and TRCA staff, advisory committees and the general public for feedback.

4. Final Master Plan

The final master plan was developed based on a synthesis of the draft explorations and in response to input received throughout the consultation process.

5. Implementation Plan

The implementation plan identifies the distinct projects recommended in the maste rplan and makes recommendations for phased implementation based on user needs, opportunities for coordination with other initiatives and funding availability.

1.4 Engagement and Consultation Process

Advocacy, Communication and Engagement

The Riverwalk UDMP has been initiated with a focus on engagement, continuing the years-long advocacy, communication and engagement process, including extensive consultation with city departments, key stakeholders such as TRCA and the Region of Peel, as well as engagement with key city committees and community groups, undertaken as part of the DBFP EA and the broader Riverwalk Program.

The City's extensive advocacy, communication and engagement work includes a successful application for a Federal Disaster Mitigation Fund grant.

Ongoing engagement initiatives also include information sharing, updates of communication materials, collaboration and partnership with key stakeholders including TRCA, Region of Peel and advocacy groups including the Regional Watershed Alliance and Citizen Advisory Committees such as Brampton's Environment Advisory Committee, Cycling Advisory Committee and others.

To ensure the relevance of the Riverwalk UDMP to the public and the local community, the development of this document included an interactive public consultation process. Public meetings were open to all members of the community and were promoted on the City's website and social media accounts. Notices were also sent to residents in the area.

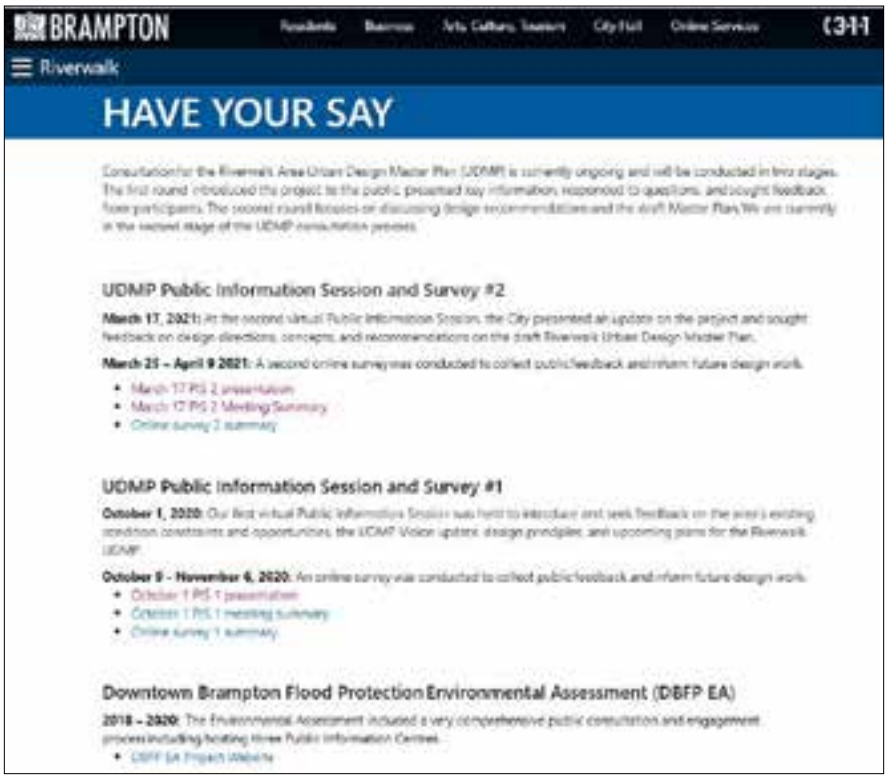


Fig. 6 City of Brampton Website "Have Your Say " Page

The consultation process for the Riverwalk UDMP followed the ample public consultation to ensure continuity in communications, with stakeholders and members of the public:

- Communication with Council, stakeholders, public , extensive advocacy at local and senior governments since 2013.
- Extensive engagement and communication undertaken for the DBFP EA, including three public information centres.
- Ongoing website updates with key information, providing an effective communication platform and tools including Have Your Say and FAQs pages.
- Presentations outlining the overview of the Riverwalk Program and key documents.
- Brampton's Geo Hub platform
- Continuous advocacy for support, grants, with Council, stakeholders, public, etc.

Among the key stakeholders that have participated in ongoing outreach are:

- Regional Watershed Alliance (RWA)
- Brampton Environment Advisory Committee (BEAC)
- Business Improvement Areas (BIA)
- Canadian Association for Retired Persons (CARP),
- Age-Friendly Brampton Advisory Committee (AFC)
- Brampton Heritage Board delegation
- Citizens and area residents

Riverwalk UDMP Stakeholder Consultation and Community Outreach

Comments and suggestions about the content of the Riverwalk UDMP were invited throughout it's development.

City staff from a variety of departments and divisions were consulted at regular intervals throughout the development of the Riverwalk UDMP, including but not limited to:

- Policy Planning
- Environment and Development Engineering
- Transportation Planning
- Parks Planning and Development
- Development Services
- Economic Development
- Strategic Communications
- Culture and Events
- Parks Maintenance and Forestry
- Recreation
- Urban Design
- Capital Works

Technical Advisory Team (TAT) Meetings

Four Technical Advisory Team meetings were held with the City of Brampton, TRCA and the Region of Peel, to provide comprehensive review and direction throughout the development of the Riverwalk UDMP.

Community Liaison Team (CLT) Meetings

A Community Liaison Team (CLT) was established to provide input, guidance and advice from community stakeholders. CLT meetings were held in September 2020 and in March 2021 in advance of public consultation sessions. CLT participants included key citizens committees, main area stakeholders and advocacy groups as well as area residents.

Public Information Sessions (PIS)

During the development of the Riverwalk UDMP, restrictions on public gathering were put in place due to the COVID-19 pandemic. As a result, a majority of the public consultation was conducted virtually, through online presentations, website updates and online surveys.

Two Public Information Sessions were held to present the project in its key stages. These sessions secured ample comments, diverse representation and were complemented by on line surveys using the communication tools available during the pandemic.

Public information sessions were hosted in October 2020 and in March 2021 to share information and gather feedback through the Riverwalk UDMP process.

Online Outreach and Consultation

For each public information session, online surveys were conducted through the City's project website, affording additional opportunities for input for those that could not attend the formal meetings and those who wished to provide more detailed comment or input.

Fig. 7 Riverwalk UDMP Engagement and Consultation Process

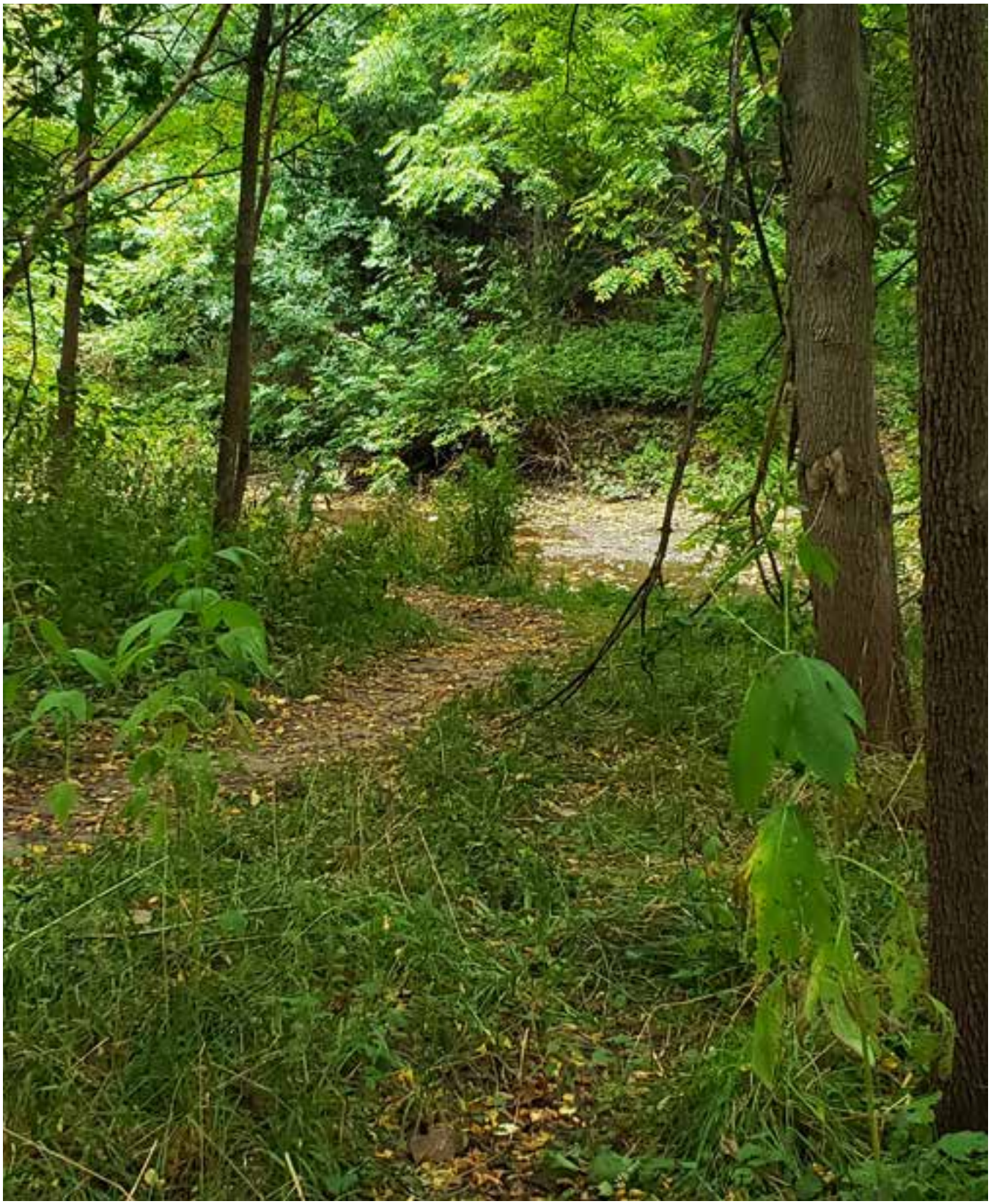


Fig. 8 Etobicoke Creek flowing through Centennial Park

2.0
Background Analysis

2.1 Riverwalk in Context

Riverwalk marks a key intersection between Brampton's historical downtown and future development lands, but the area is currently disconnected from its urban context.

The analysis of the site's existing conditions reveals a number of findings and opportunities, that will help to reimagine the Riverwalk area from a poorly-defined 'in-between' space to a destination in its own right.

Riverwalk occupies an important place at the centre of Brampton, parallel to the city's historic Main Street and crossing Queen Street, the city's primary east-west commercial street and future Urban Growth Centre (UGC).

Riverwalk also borders a number of established and emerging neighbourhoods including the Downtown Central Area Core / Four Corners at Queen and Main Streets, the Downtown Mobility Hub and the Health, Wellness and Innovation character area surrounding the Peel Memorial Health Centre.

The outer reaches of the Riverwalk area are bordered by historic neighbourhoods and vibrant residential communities.

Related Projects and Studies

The Etobicoke Creek has always been an important element of old Brampton. Although visually detached from the current downtown core, the Riverwalk area still plays an important role in many aspects of the City and intersects a number of infrastructure, transit and other projects that will require ongoing coordination efforts during detailed design and implementation. The projects identified in the Riverwalk UDMP were the ongoing projects at the time of this study and are subject to change.

Fig. 9 Riverwalk Urban Context

The Downtown Brampton Flood Protection Environmental Assessment

The DBFP EA, a Schedule C Municipal Class Environmental Assessment (Municipal Class EA), was initiated in 2018 as part of the Riverwalk Program to identify a Preferred Alternative to reduce flood risk to the downtown core while considering opportunities for revitalization and ecological benefits. This project was planned under Municipal Class EA and was approved in 2020, setting out the changes to infrastructure necessary to provide the required flood conveyance.

The DBFP EA planning process was complemented by extensive public and agency consultation. Council approved funding allocation and provided direction in November 2020 to proceed to the detailed design stage.

Once the flood risk is mitigated, an area of approximately 19 hectares will be removed from the floodplain, which would make it possible to reduce the Special Policy Area (SPA) designation in the downtown core. The completion of the DBFP EA is a critical step towards achieving the Riverwalk vision and to create a healthy, sustainable and resilient downtown Brampton.

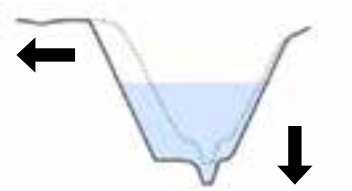


Fig. 10 Schematic Diagram Showing Bypass Channel Deepening and Widening, DBFP EA PIC#3, January 2019

Fig. 11 Preferred Alternative Design , DBFP EA, Final ESR Report, June 2020

GO Service Improvements and Potential 3rd Rail Project

The GO Service Improvements on the Kitchener Line will significantly improve regional transit and the local transit network, while creating new development opportunities. The potential 3rd rail will impact the downtown area in a positive way once built, but will also have some impacts to the Downtown rail crossings and transportation network.

Of particular relevance to Riverwalk are the Etobicoke Creek crossing, the recently completed James and John Street section of the Etobicoke Creek Recreational Trail around the at-grade rail crossing the Centre, Queen and Union Street underpasses that may also have some implications from an active transportation network perspective.

Queen Street Highway 7 Bus Rapid Transit

Metrolinx is leading the advancement of Bus Rapid Transit (BRT) on the Queen Street – Highway 7 corridor, with the Region of Peel, City of Brampton, Brampton Transit and York Region engaged as project stakeholders. The project will intersect Riverwalk along Queen Street East, between the rail underpass and Centre Street.

Hurontario LRT Extension EA

An update to the current EA study for light rail transit is underway that will explore a range of transit opportunities and elements of enhanced streetscaping where possible.

Ken Whillans Extension EA

A Class Environmental Assessment Study for the proposed extension of Ken Whillans Drive from Church Street East to Nelson Street East is currently being completed. The proposed road extension is being considered to accommodate increased traffic demands as a result of population and employment growth in the surrounding area and will be intrinsically linked with the Riverwalk UDMP.

Scott Street Bridge Assessment

The Scott Street bridge has reached the end of its service life and has been closed to vehicular traffic since 2020. The DBFP EA identified the Scott Street bridge as requiring complete replacement with a larger span in order to implement the recommended flood protection solution. The current bridge assessment is reviewing temporary solutions to provide connectivity to the area until detailed design and funding is in place for a complete replacement as part of the Downtown Brampton Flood Protection measures.

Region of Peel Watermain Replacement EA

The Region of Peel is undertaking an Environmental Assessment (EA) Study to select a preferred water main alignment in Brampton. The project is needed for future water demands and growth in Brampton's downtown core and Phase 3 of the initiative and the associated EA initiated in 2020 intersects the Riverwalk area.

Integrated Downtown Plan (IDP)

The City of Brampton has initiated its IDP, with the long term goal of providing a comprehensive Downtown Plan and an initial focus on the coordination of immediate capital projects. The IDP will be an overarching policy approach to infrastructure upgrades, urban design and the creation of new programs leading to employment opportunities, enhanced open spaces and the consideration of future transit projects for downtown Brampton.

Downtown Transit Terminal Study

In conjunction with the Hurontario LRT Extension EA and the Brampton Centre for Innovation, the new Downtown Transit Terminal will unlock the downtown and support the transit needs of Brampton residents. A Transit Hub Study will be initiated to determine the optimal configuration and location of the future transit hub.

Brampton Centre for Innovation

The Centre for Innovation will be an iconic gateway building that will offer a new central library, a downtown transit terminal and office space. It will be a landmark for train passengers entering or departing the city from the Brampton GO station.

Downtown Brampton Precinct Plan

The Downtown Brampton precinct falls within the Downtown Brampton Secondary Plan and encompasses the historic "Four Corners" commercial downtown and the surrounding residential neighbourhoods.

Queen Street East Precinct Plan

The Queen Street East precinct lies within the lands defined in the Queen Street Corridor Secondary Plan. The Queen Street East Precinct Plan is a development framework to transform Brampton's Urban Growth Centre into a vibrant mixed-use urban community based on a series of 20-minute walkable neighbourhoods with Urban Community Hubs as anchors.

Sustainable Community Development Guidelines and Sustainability Metrics

To guide and evaluate the sustainability performance of new development, the City of Brampton established Sustainable Community Development Guidelines (SCDGs) coupled with Sustainability Metrics.

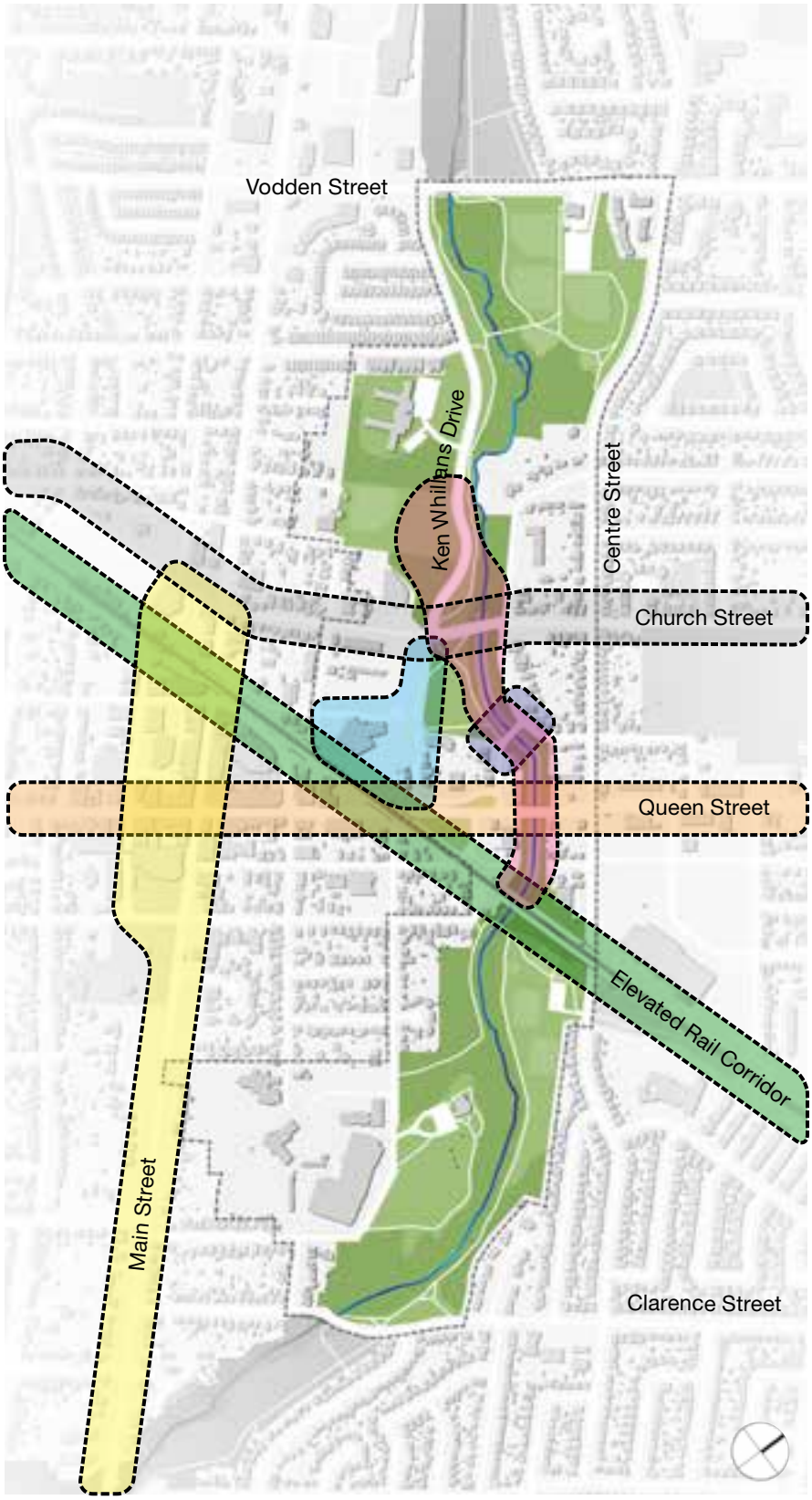


Fig. 12 Transit, Infrastructure and Other Projects within the Riverwalk Area

2.2 Open Space Network

Brampton's open space network includes its parks, squares and streets but the Etobicoke Creek valley represents the largest natural and open space amenity for the downtown and surrounding area. The downtown core has a well developed network of public spaces, connected by a rich public realm which includes the streetscapes along Main and Queen Streets, as well as a network of paths and laneways.

There are few direct connections between the downtown public open spaces and the Riverwalk area. The links that do exist do not provide a generous public realm and many streets lack adequate sidewalks, street trees and cycling facilities.

Legend

- Public Parks and Open Spaces
  1. Calvert Park
  2. Duggan Park
  3. Central Public School Park
  4. Rosalea Park
  5. Scott Street Parkette
  6. St. Mary's Heritage Cemetery
  7. Centennial Park
  8. Meadowland Park
  9. Gage Park
  10. Ken Whillans Square
  11. Garden Square
  12. McLoughlin Park
  13. Earnie Mitchell Park
  14. Peel Memorial Trail
  15. Brampton Cemetery
  16. Sheridan Parkette
  17. Salisbury Circle Parkette
  18. English Street Park
- Etobicoke Creek Bypass Channel
- Trail and Pathway Connections
- Streets and Public Realm Connections

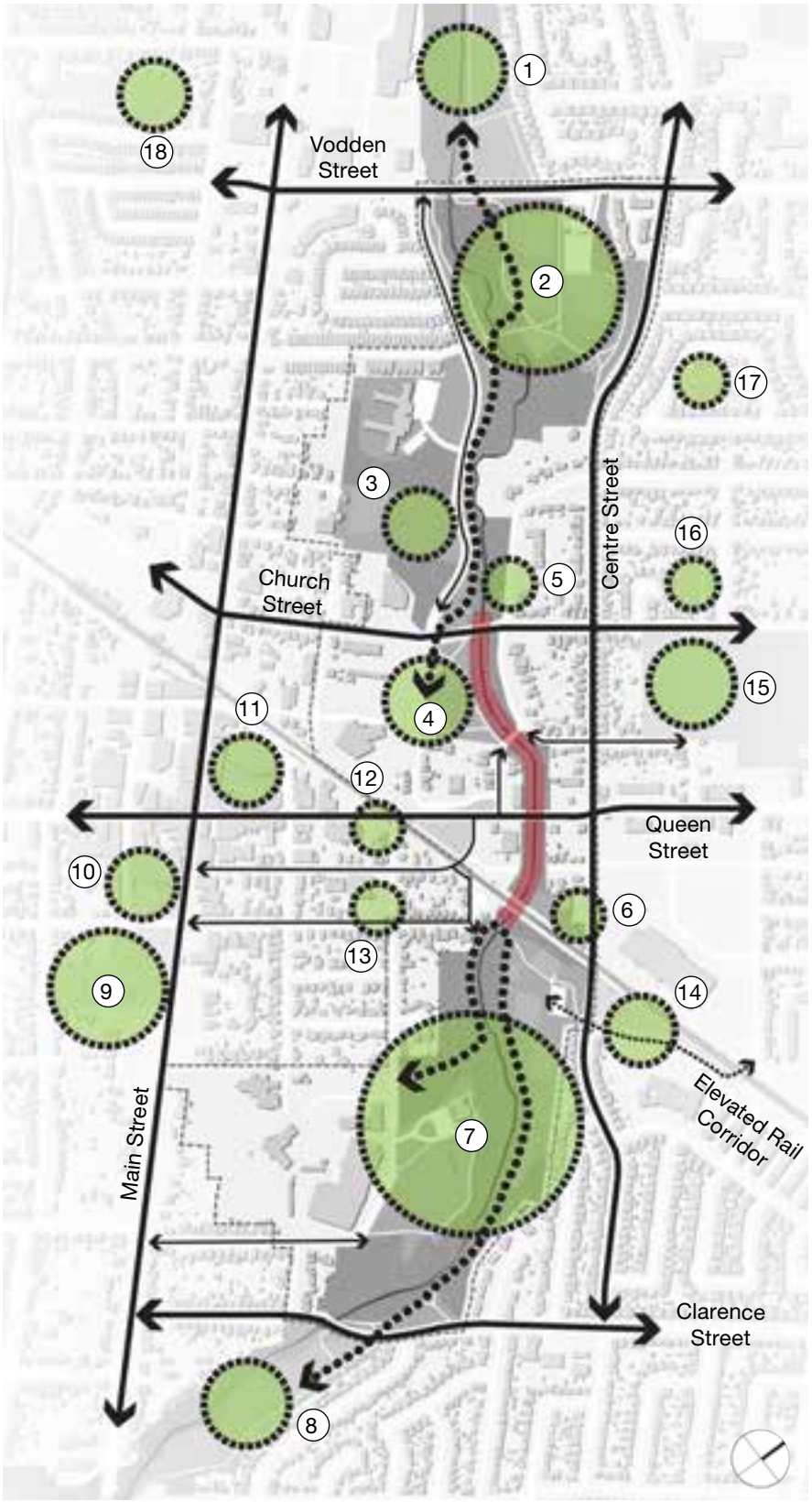


Fig. 13 Existing Open Space Network

Riverwalk Public Open Space

The Riverwalk area is composed of a series open spaces within the Etobicoke Creek valley that are linked along the Etobicoke Creek Recreational Trail and interrupted in the middle by the constrained, hardened bypass channel.

The major open spaces along Riverwalk are generally highly programmed public parks, with manicured lawns, sports fields and very little visual or physical connection to the Etobicoke Creek.

Duggan Park

Duggan Park is characterized by open lawn with sports fields or other programmed space, with meandering pathways and mature shade trees.

- The park borders the creek but there is no physical or visual access to the water.
- The majority of open space is occupied by sports fields or other programmed space including 3 baseball diamonds, a playground and a leash-free dog park.

Central Public School Fields

The Central Public School fields are characterized by a large open lawn and sports fields. The park borders Ken Whillans Drive and is flanked by mature wooded areas to the north and south.

Rosalea Park

Rosalea Park is characterized by open lawn and mature shade trees.

- The park borders the channelized portion of the creek but is separated by a heavily vegetated and fenced berm.
- Paved pathways meander through open lawn areas.

Etobicoke Creek Bypass Channel

This concrete lined channel is not accessible to the public, but is a distinctive part of the Etobicoke Creek through downtown Brampton. The channel currently represents the primary discontinuity in the Riverwalk public open space network between Church Street and the CN Rail bridge, interrupting parkland to the north and south of Queen Street, which is at the centre of the Riverwalk area.

- The impressive flood protection infrastructure has the potential to be an iconic urban connection to one of the City's primary connecting streets.
- The channel is fenced on both sides and is not accessible to the public.
- With the exception of the vegetated top of slopes, there is no continuity of natural systems within the channel.

Centennial Park

Centennial Park is characterized by open lawn, tennis courts, sports fields, a playground and shade trees.

- There is little physical or visual access to the water, with the exception of informal pathways.
- The Etobicoke Creek Recreational Trail bifurcates at the CN bridge and follows the creek on both sides.
- The John Arthur Carroll Memorial Arboretum occupies a large portion of the park on the west side of the creek.
- The City has undertaken a vegetation restoration in the park, on the east side of the creek.

Fig. 14 Garden Square, Downtown Brampton

Fig. 15 Central Public School Park Fields

Fig. 16 Centennial Park, East side of Creek

2.3 Transportation Network

The Riverwalk area is bordered by and intersects streets at numerous points along its length. However, with the exception of Ken Whillans Drive and segments of Centre, Clarence and Mary Streets, the majority of streets that border the Riverwalk area, have little relation to surrounding open spaces.

Streets and Intersections

Main Streets

The main streets surrounding Riverwalk area have a 4-lane cross section. These include

- **Main Street** and **Queen Street** have an urban 4-lane cross section with sidewalks adjacent to the street, minimal street trees and intermittent on-street parking in the Downtown Core.
- **Vodden Street** has a 4-lane cross section with temporary bike lanes. The street is intended to be a future designated cycling corridor and will be reduced to a 2-lane cross section to allow for permanent, protected cycling infrastructure.
- **Church Street** has a 2-lane cross section
- **Centre Street** and **Clarence Street** have a 2-lane cross section, with sidewalks, sodded boulevards and some street trees. Due to the limited number of controlled intersections, traffic moves at a high rate of speed making crossing at uncontrolled intersections difficult.
- **Ken Whillans Drive** is a meandering 2-lane street, with sidewalks, sodded boulevards and street trees that breaks free of the city's grid pattern and follows the edge of the creek at the northern end of the Riverwalk area.

Residential Streets

The residential streets within the surrounding neighbourhoods are primarily 2-lane streets, with narrow sidewalks on one or both sides. Some streets in the older residential neighbourhoods east of the creek have no sidewalks.

Intersections

Most major intersections surrounding the site are fully controlled by traffic signals or stop signs, however, a number of the smaller residential streets are only controlled in one direction, leading to higher speeds and limited pedestrian crossing opportunities.

Bridges

The bridges that cross the Etobicoke Creek are the primary points of connection between the city and the Riverwalk area.

The number of roadway crossings is limited and the presence of the creek valley below is barely perceptible from existing bridges, due to their elevation, use of solid outer bridge barriers and lack of defining features marking the crossings themselves.

Railway Crossings

The regular street grid is interrupted by the railway tracks that bisect the downtown core diagonally. The rail corridor is constructed on a berm and sits approximately 3-4m above streets and crosses the creek south of Queen Street.

Grade-separated Crossings

The majority of railway crossings within and surrounding the Riverwalk area are grade-separated crossings, where streets are depressed beneath the railway corridor. These underpasses are currently dark, loud and create a significant break in the downtown urban fabric.

The underpasses facilitate vehicular movement and provide limited space and comfort for pedestrians and cyclists. Grade-separated intersections include:

- Main Street
- Union Street
- Queen Street
- Etobicoke Creek CN Rail Bridge
- Centre Street

Fig. 17 Ken Whillans Drive

Fig. 18 Centre Street Rail Underpass

Level Crossings

John Street crosses the railway at the only level crossing within the Riverwalk area.

In 2018 the city undertook significant improvements to the James and John Street level crossing including realignment of the streets, streetscaping and new signalization that provided a new pedestrian and cycling crossing and an important new link for the Etobicoke Creek Recreational Trail between Centennial Park and Rosalea Park.

Recommendations related to the transportation network are described in **"Chapter 6.0 Sustainable Transportation"**.

Legend

- Public Streets
- Streets with Existing Park Frontage
- Controlled Intersections
- Bridges
  - 1. Vodden Street Bridge
  - 2. Church Street Bridge
  - 3. Scott Street Bridge
  - 4. Queen Street Bridge
  - 5. Clarence Street Bridge
- Elevated Railway Track
- Railway Crossings
  - A. Main Street Underpass
  - B. Union Street Underpass
  - C. Queen Street Underpass
  - D. John Street Level Crossing
  - E. Etobicoke Creek CN Rail Bridge
  - F. Centre Street Underpass

Fig. 19 Existing Transportation Network

2.4 Public Transit

Existing Public transit

The Riverwalk area is generally well served by both local and regional public transit. However, there is limited service to the south portions of the site and very few stops that serve the immediate Riverwalk area, as the local street network in the downtown core, and particularly to the east side of Main Street, is not suitable for regular transit operations.

All of the existing access points to the Etobicoke Creek Recreational Trail are within a 400m walk distance from existing conventional transit and local routes, and the majority of the study area is within an 800 meter walk from existing Züm/BRT stations. This level of service exceeds Brampton Transit's current service standard and the City's Official Plan objectives for route coverage.

Brampton Transit

Local Brampton transit bus routes flank the north, east and west edges of the Riverwalk area along Queen Street, Main Street, Vodden Street and Centre Street. Bus stops are located at approximately 300m to 500m intervals and the majority consist of a route marker and in some instances, seating and small shelters.

ZÜM Transit

The City's ZÜM high-capacity rapid transit BRT system serves the site along Main Street and crosses the Riverwalk area at Queen Street, connecting to the GO transit stop on Nelson Street, with buses currently operating in mixed traffic. Along with Züm service along Queen Street and Main Street, the study area is well serviced by six existing conventional/ local routes which operate along Queen Street and Vodden Street.

The ZÜM Downtown Terminal is located at Main Street and Nelson Street West, south of the railway tracks and is within 10 minute walk to the Riverwalk area. The Downtown terminal is also serviced by conventional/local routes and GO Transit buses, with direct access to the GO Train/ VIA Rail platforms adjacent to the terminal and the Züm Stations on Main Street.

ZÜM stops include shelters, seating, waste receptacles, increased lighting and security camera, wheelchair loading areas and an information centre that includes a detailed map, customer service information and route schedules. All Brampton Transit conventional and Züm buses are equipped with bike racks and bike shelters have been installed at a number of Züm Stations across the City.

Metrolinx GO Transit

GO buses serve the Downtown Terminal and Riverwalk area along Main Street and Queen Street. The rail corridor carries VIA Rail intercity service and GO train service along Metrolinx's Kitchener Line, which travels between Toronto and Kitchener-Waterloo stopping at the Brampton GO Station.

The Brampton GO station is located in proximity to the western boundary of the site, just west of Main Street and is within a 10 minute walk to the Riverwalk area. There is limited parking, but other than paid reserved spots, the parking is free.

Fig. 20 CN / GO rail bridge over the Etobicoke Creek

Future Higher Order Transit

Downtown Brampton has been designated as a mobility hub in the Region of Peel's Long Range Transportation Plan (2019) and in the City's Transportation Master Plan and Official Plan.

Mobility hubs are major transit stations and surrounding areas that are designed to support a high-level of transit use and facilitate seamless, efficient transfers between modes. Mobility hubs support multi-modal transportation, including transit and active transportation and support intensification of land use and density, high quality open space and improved accessibility and wayfinding.

Future higher order transit in the Riverwalk area is described in **"Chapter 6.0 Sustainable Transportation"**, under **"Section 6.2 Public Transit"**.

Fig. 21 Existing Public Transit Network

2.5 Active Transportation

Despite its proximity to Brampton's downtown core, active transportation connections to the Riverwalk area are lacking. Poor connectivity is one of the greatest challenge facing the Riverwalk.

Sidewalks and Public Realm

Downtown Brampton offers a very walkable scale of streets and blocks, however, as the street grid intersects with the creek valley and at the railway tracks, this pedestrian network starts to break down. As such, navigating the streets in a north-south direction is difficult without prior knowledge of the neighbourhood. There are no views and little access to the site from the east side of the creek and little indication that a public open space or trail network exists.

Pedestrians must cross the rail tracks at a level crossing at John Street and through underpasses at Main, Queen, Union and Centre Streets. In all cases, sidewalks and other sidewalks and cycling infrastructure are insufficient to provide a comfortable crossing experience. There are many streets adjoining the Riverwalk area, particularly on the east side, that do not offer sidewalks or crossings at controlled intersections.

Fig. 22 Sidewalk at Church Street Bridge

Cycling Network

There are generally few on-street or protected bike lanes on streets adjacent to the Riverwalk area, with the exception of a short segment of separated bike lane on James Street, with a dedicated bike crossing at Queen Street.

The City's Active Transportation Master Plan identifies a number of streets as future cycling corridors:

- **Vodden Street , Main Street** (north of Vodden) and **Queen Street** (east of Centre Street) is designated to be a future cycling corridor with permanent, protected cycling infrastructure. Temporary bike lanes were implemented in summer 2020.
- **Main Street** (south of Vodden), **Church Street, Centre Street and Clarence Street** and **Queen Street** (west of Centre Street) are designated to have future on-street bike lanes or buffered bike lanes.
- Smaller local streets including **Woodward Avenue** (east of the creek) and **Sproule Drive** (west of the creek) are designated to have shared roadway facilities.

Fig. 23 Bike Crossing at James and Queen Street

Bridges and Pedestrian Crossings

There are 5 vehicular bridges over the creek, at Vodden, Church, Scott, Queen and Clarence Streets.

- Sidewalks on the vehicular bridges, are generally narrow but in good condition.
- Sidewalks on the Scott Street bridge are very narrow and do not have a connecting sidewalk on the north east side of the creek, forcing pedestrians to cross an uncontrolled intersection to reach the nearest sidewalk.

There are two pedestrian bridges in the Riverwalk area, one in Duggan Park and the other south of the CN bridge, in Centennial Park.

- Pedestrian bridges are generous with high railings, connecting to asphalt pathways. The wood decking on the Duggan park bridge is deteriorating which may pose a tripping hazard.

The Etobicoke Creek Recreational Trail

The Etobicoke Creek Recreational Trail connects Caledon, Brampton and Mississauga, allowing users to walk, hike, or cycle continuously between the three communities. It provides a continuous off-road active transportation route that connects Lake Ontario and the Waterfront Trail to the Greenbelt Trail in Caledon.

Roughly 15 kilometers of trail follows the Etobicoke Creek through downtown Brampton. The trail is generally asphalt paved, but with no pavement markings and no separation of users on the trail.

The trail is well lit and benches are provided in public parks, but there is little signage to direct trail users and few access points to the trail. Access points are generally at controlled intersections, but not expressly defined as trailheads or as an important transition within the city and these are marked mostly with typical parks signage and often, with no signage at all.

- There are no wayfinding maps along the trail.
- There is on-street wayfinding signage between the disjointed segments of the trail.
- No emergency phones or washrooms are provided.

Recommendations for active transportation improvements in the Riverwalk area are described in **“Chapter 6.0 Sustainable Transportation”**, under **“Section 6.4 Active Transportation”**.

Legend

- Public Sidewalks
- Etobicoke Creek Recreational Trail
- Public Park Trails
- Existing On-Street Bike Lane
- Future On-Street Bike Facilities
- Bridges
  - 1. Duggan Park Pedestrian Bridge
  - 2. Centennial Park Pedestrian Bridge
- Controlled Intersection
- Railway Crossings
  - A. Main Street Underpass
  - B. Union Street Underpass
  - C. Queen Street Underpass
  - D. John Street Level Crossing
  - F. Centre Street Underpass

Fig. 24 Existing Active Transportation Network

Loops and Links

The current Riverwalk area is not well defined. The lack of connectivity and limited pathway system throughout the area does not offer significant variety in the experience of the site.

There are a number of loops that can be experienced within the Riverwalk area. These loops help to break down the scale of the site and allow users to travel continuously without retracing their steps and can be traveled as short, manageable walks, or combined to provide a longer, more varied experience of the site.

The loops travel along the current network of pathways, trails and sidewalks, but are not currently identified on any wayfinding signs or trail maps. Several of the loops, such as the Queen-CN Loop, are completely on public city streets, with little or no interaction with the creek valley.

1. Vodden Street Loop
2. Duggan Park Loop
3. Rosalea Park Loop
4. Scott Street Loop (on-street)
5. Queen -CN Loop
6. Centennial Park Loop
7. Arboretum Loop

Fig. 25 Existing Loops and Links

Riverwalk Area Loops

The **Vodden Street loop** is the northernmost pathway loop within the Riverwalk area and almost entirely within the open space trail system. Starting at Vodden Street, the loop follows the Etobicoke Creek Recreational Trail along the west bank of the creek, crossing at the pedestrian bridge and returning along the east bank and Ken Whillans Drive, to rejoin Vodden Street.

The **Duggan Park loop** connects the pathways in Duggan park, across the pedestrian bridge to the west bank of the creek and then south along Ken Whillans Drive, to Church Street, where pathway rejoins the street network to complete the loop along Scott and Centre Street. There are no sidewalks on the east side of Scott Street and very little visual connection to the creek, which makes the east portion of this loop difficult to decipher and navigate.

The **Rosalea Park loop** begins at Church Street and follows pathways south through Rosalea Park, to the Scott Street bridge, where it then follows Scott Street to the north to reconnect at Church Street. As with the Duggan Park loop, there is very little visual connection to the creek along the east portions, where the link between open spaces relies on the street network.

The **Scott Street loop i**s entirely within the street network. Leading from the Scott Street bridge, south along James Street to the Queen Street Bridge and then along Centre Street and back to Scott Street. Although identified as a loop, this route is not marked as a significant link to the creek and under existing conditions, is very difficult to decipher.

Similar to the Scott Street Loop, the **Queen-CN loop** is almost fully detached from the creek and entirely within the street network, with the exception of a portion of the trail that crosses the creek south of the CN tracks, connecting Centennial Park to the east and James Street by means of a public staircase to the west.

The **Centennial Park loop** follows the Etobicoke Creek Recreational Trail south from the Centennial Park pedestrian bridge, along the east bank of the creek until it joins Clarence Street. At this point the route follows local streets around the south limit of the Riverwalk area and north along local streets including Beatty, Guest and Mary Streets. The route rejoins the Centennial Park pathway system just north of Cardinal Leger Secondary School, however, these access points are not well marked and users can be easily misdirected toward the Royal Canadian Legion within Centennial Park.

The **Arboretum loop** is a short portion of trails and pathways leading from Mary Street, through the John Arthur Carroll Memorial Arboretum and connecting to the Royal Canadian Legion in Centennial Park East. The loop is not well marked and access points at the street are not clear. From the street, access into this short loop can be misinterpreted as a connection to the larger Centennial Park pathway system, however, no connection exists.

Brampton Trail Loop

In addition to the loops within the immediate Riverwalk area, connections into surrounding neighbourhoods, along public streets and to public spaced in downtown Brampton also exist.

A Brampton loop trail has been identified as a leading near-term priority. It includes trail connectivity and accessibility improvements between the Etobicoke Creek, Chinguacousy Recreational Trail and Esker Lake Recreational Trail. The loop would link to amenities within Brampton and be promoted and marketed by the City and Regional partners as a safe, user friendly route for riders of all ages and abilities.

The Riverwalk area is one of the portions of the Brampton Trail loop that remains to be completed.

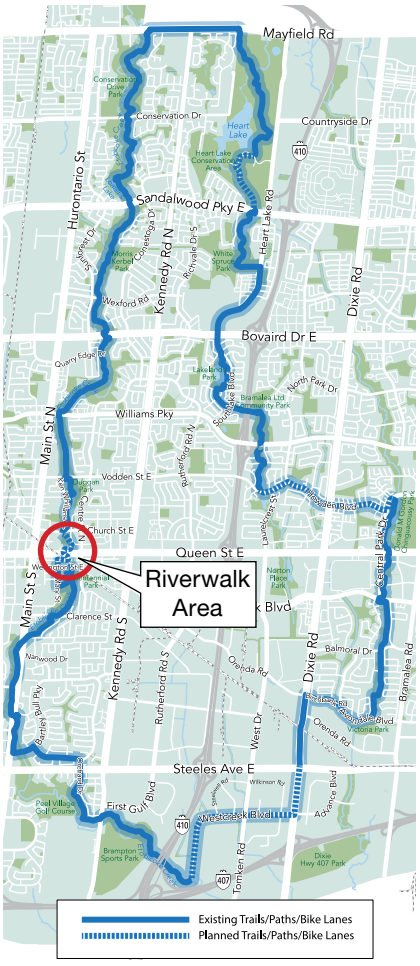


Fig. 26 Brampton Trail Loop, City of Brampton Active Transportation Master Plan, 2019

2.6 Built Form Context

The Riverwalk area is first and foremost an urban landscape that is intrinsically linked to Brampton and its built form. Just as the city evolved around the waterway, the creek has been shaped by development and its character is defined by the adjacent neighbourhoods and communities.

Existing Built Form

The existing built form adjacent to the Riverwalk area is primarily comprised of low density residential neighbourhoods with detached housing and fenced yards loosely fronting the Riverwalk area. A number of institutional buildings such as schools, seniors residences, churches and hospitals also help to frame and give character to the existing public open space network.

The adjacent built form creates a porous edge, allowing the open space to extend beyond the Etobicoke Creek valley and creating a public open space network that is integrated into adjacent neighbourhoods.

Downtown Brampton

The central portion of the Riverwalk is more spatially defined by adjacent built form as it crosses the Downtown Core. The natural topography of the Etobicoke Creek valley gives way to the constrained, man-made bypass channel and larger multi-storey residential, commercial and institutional buildings frame the open space.

Downtown Brampton is organized as a fine grain grid of streets and blocks subdivided in small lots with pockets of open spaces and laneways. The junction of Queen Street and Main Street, the 'Four Corners,' marks the symbolic heart of the historic downtown.

Buildings in the commercial centre of the downtown are typically 3-4 storey commercial buildings with retail or commercial uses at grade and minimal or no setbacks. Several businesses have parking in the front, with narrow sidewalks and multiple curb cuts creating an overall disconnected sidewalk.

Main Street North Character Area

Main Street North has been identified as a distinct "Character Area" within the Downtown Brampton precinct of the Central Area. It acts as the entry point into the historic Downtown Brampton and the Central Area as a whole.

It is a unique and historical area, based on the lot pattern, the presence of older historical dwellings and remaining mature tree canopy. Originally a residential area, there has been a gradual and ongoing transition of the area to more commercial type uses. There has been a desire to properly capture its characteristics within the planning framework and set in place policies that would help the revitalization and respectful transformation of the area.

Fig. 27 Main Street South

Queen Street Corridor / Downtown Brampton Urban Growth Corridor

The Brampton 2040 Vision identifies the Queen Street Corridor as Brampton's grand urban boulevard, hosting full provisions for comfortable, sustainable living. The corridor is a focus area for intensification and urbanization and is a key connection across the Etobicoke Creek to downtown Brampton.

Ultimately, the vision for the Queen Street Corridor is to develop a place with an enhanced public realm that integrates safe, comfortable and complete streets to support a diversity of movement through the Corridor, including public transit, pedestrians, cycling, goods movement and vehicles.

A portion of the Brampton Queen Street Corridor is also classified as the Downtown Brampton Urban Growth Centre (UGC) with Downtown Brampton being one of twenty-five UGCs in the Greater Golden Horseshoe.

City of Brampton Urban Character Areas

The Riverwalk area forms the boundary between the Brampton's historical downtown to the west and future development lands to the east. Key urban character areas surrounding the site include:

A. Downtown Brampton
B. Main Street North Character Area
C. Queen Street Corridor / Urban Growth Corridor

Key Built Form Features Adjacent to Riverwalk

1. Four Corners / Queen and Main / Garden Square
2. Brampton City Hall
3. Ken Whillans Square
4. Rose Theatre
5. Gage Park
6. Alderlea
7. Carnegie Library
8. Old Fire Hall
9. Armoury
10. Brampton YMCA
11. Brampton Tennis Club
12. Brampton Fire Station 207
13. Peel Memorial Hospital
14. Cardinal Leger Secondary School
15. St. Mary Elementary School
16. Sir Winston Churchill Public School
17. Revera Retirement Residence
18. Grace Court Seniors Residence
19. St. Mary's Place Retirement Residence
20. St. Mary's Church
21. First Baptist Church
22. St. Paul's' United Church
23. St. Andrews Presbyterian Church
24. Grace United Church
25. Central Public School Recreation and Art Centre
26. Peel Art Gallery and Museum Archives
27. Royal Canadian Legion Br. 15

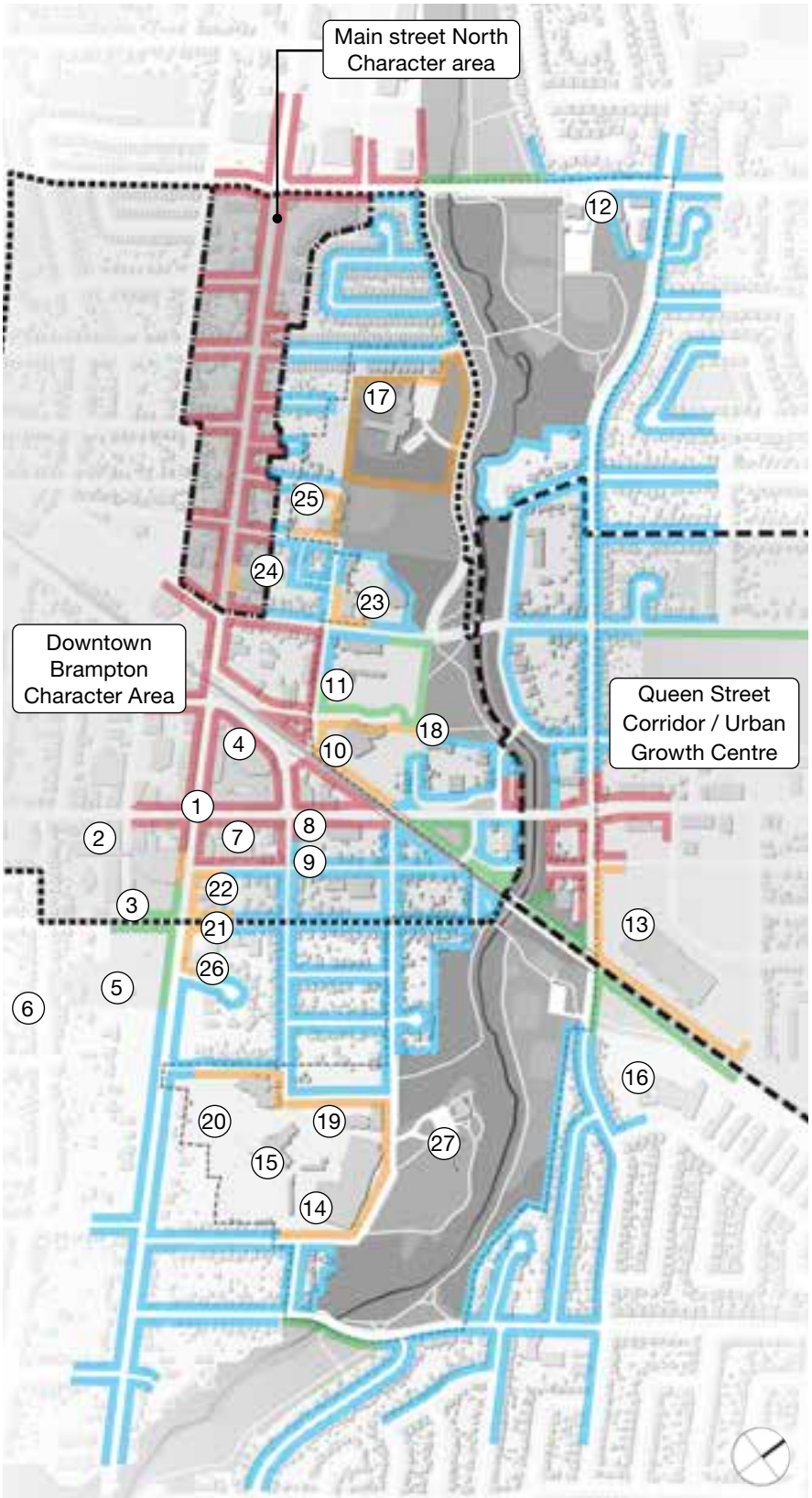


Fig. 28 Built Form Context

2.7 Natural Heritage

Etobicoke Creek Watershed

The Brampton Riverwalk area is located on the Etobicoke Creek West Branch, which flows from the headwaters in Caledon, receives flow from other tributaries as it flows through the cities of Brampton, Mississauga and Toronto, and then confluences with the Etobicoke Creek Main Branch south of Highway 407.

The Etobicoke Creek has a total length of 23.6 km and the Etobicoke Creek watershed has a draining area of 211 km^2.

Land use in the watershed has been dramatically altered over the past 200 years and rapid changes continue today.

Much of the Riverwalk area was originally cleared for agricultural purposes and over the last several decades the majority of these agricultural lands have been converted to urban development.

The Etobicoke Creek watershed is now home to approximately 286,361 people and currently consists of three major land uses, including: 27% rural, 68% urban and 5% urbanizing. The vast majority of natural cover in the watershed is located within river valleys or stream corridors. Only 12.4% natural cover remains in the Watershed. Habitat patches tend to be small, isolated and disconnected.

Etobicoke Creek Hydrology

Throughout the year the watershed demonstrates a typical “peakiness of flows” or “flashy nature” characteristic of urbanized watersheds. This is due to a higher level of imperviousness within the urbanized watershed, which reduces the time period between rainfall reaching the ground and entering the Creek and limited to no control of stormwater. For example, there is no infrastructure in place to control stormwater runoff that flows from the surrounding neighbourhoods to the Creek in the Riverwalk study area..

The Creek displays the typical hydrology of a developed watershed, with annual peak flows occurring mainly in the spring. However, there are also very high flows observed in the fall seasons associated with storm events[i].

Fig. 29 Etobicoke Creek Watershed

i Source: TRCA Website: https://trca.ca/conservation/watershed-management/etobicoke-mimico-creek/watershed-features/

Aquatic Habitat

The aquatic habitat within the Riverwalk area is compromised due to ongoing development, loss of vegetative cover and the diversion and channelization of the creek.

Natural Creek Channel

The Etobicoke Creek flows in its natural channel through the majority of the Riverwalk area, with the exception of the portion between Church Street and the CN rail bridge. The natural portions of the creek are gently meandering with a shallow, rocky bottom that creates natural pools and riffles that aerate the water, shaded by dense riparian vegetation.

Channelized Creek

Within the Etobicoke Creek bypass channel, the watercourse flows through a straight, smooth concrete structure with 2:1 sloped sides and a box-shaped low-flow channel. The channel was designed to convey flood waters with minimal friction and to drain as quickly as possible to prevent flooding within the Downtown Core.

The ecological impacts of channelized watercourses include the removal of natural substrate and riffle-pool sequences that are important components of fish habitat, lack of in-stream cover, shallow depths and low baseflow conditions. Challenges to fish species in the Riverwalk area also include the weir at the south end of the bypass channel, at the CN Rail bridge, that prevents fish passage upstream.

Previous fish sampling collected 13 fish species in the Etobicoke Creek. No cold water species, endangered species or species of concern were identified

Ongoing Impacts and Considerations

- Adjustments in the low flow channel through the bypass channel that are more representative of riverine conditions provide a significant improvement in upstream species abundance and diversity.
- Hydraulic changes due to ongoing development and land clearing within the watershed area.
- Increased flow velocity during storm events because of channelization and its contribution to accelerated erosion processes downstream.
- Barriers to fish passage or lack of fish habitat from the lack of structure in the channelized section, coupled with velocity.
- Industrial/agricultural chemicals, metal and other contaminants, water temperatures, erosion.
- Spread of invasive species.
- Climate change.[ii]

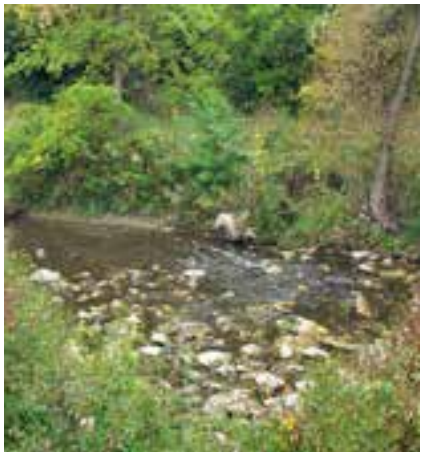


Fig. 30 Natural Creek Bed in Centennial Park

Fig. 31 Bypass Channel Weir at CN Rail Bridge

Fig. 32 Concrete Bypass and Low Flow Channel

ii Source: TRCA Etobicoke and Mimico Creeks Watersheds Technical Update Report, 2010 and DBFP Environmental Study Report, 2020

Terrestrial Habitat

The Etobicoke Creek and its valley forms a significant part of Brampton's Natural Heritage System and with the exception of the bypass channel, the majority of the Riverwalk area still retains good riparian vegetation cover.

Although the system is degraded, the Etobicoke Creek valley continues to provide important ecological functions and the remnant habitat patches help to provide a stepping stone effect allowing species to move north and south. Impacts to riparian vegetation, valley lands around Ken Whillans Drive, and vegetation at the top of the bypass channel resulting from the approved flood protection solution are discussed in the DBFP EA.

Riparian Vegetation

The Etobicoke Creek is bordered by mature riparian vegetation that protects the creek banks from erosion, shades the water and provides food and cover for small mammals, birds and amphibians. In some portions, the riparian vegetation is dense enough to completely block views to the creek from adjacent parks and open spaces.

Fig. 34 Riparian Edge in Centennial Park

Of concern in these landscapes, is the proliferation of invasive species that threaten native species and weaken the local ecosystem.

Forest and Wooded Areas

The Riverwalk area includes a number of wooded areas that provide important habitat within the urban environment. Centennial Park has large areas of mixed deciduous-coniferous forest that create a buffer between the park and surrounding neighbourhoods. One of the two woodlands bordering the Central Public School fields and the trees areas at the top of the bypass channel will be disturbed by the flood protection solution identified in the DBFP EA.

Meadow

There is a small area of open meadow surrounded by forest in Duggan Park, which has been left in it's naturalized state. In 2019, the City began establishing a naturalizing area on the east side of the creek in Centennial park.

Wetlands

There is a small wetland area in Centennial Park, on the west side of the creek that can be observed from the plateau in the park above. There are very few remaining natural wetlands within the Riverwalk area and this important habitat should be protected and enhanced where possible.

Manicured Lawn

The landscape within the Riverwalk area is dominated by manicured lawns, mowed boulevards and sports fields. Although some of these spaces are well used by the community for organized sports and other community events, these high-maintenance landscapes provide little ecological benefit and do not encourage users to engage with the natural environment.

Etobicoke Creek Bypass Channel

This segment of the creek provides almost no terrestrial habitat for either flora or fauna. There is some vegetative cover at the top of the concrete slopes and sparse vegetation that has taken root in accumulated sediments, but in general, the channel is barren of vegetation. Although there is little vegetative cover within the channelized portion of the creek, the channel does act as a wildlife corridor for species moving along the watercourse, between the parks to the north and south.

Etobicoke Creek Valley Topography

One of the defining natural features within the Riverwalk area are the Etobicoke Creek valley slopes. The steep slopes can be experienced on the east edge of Duggan Park and Centennial Park and at the west edge of the Central Public School fields. Although much of the creek was rerouted into the bypass channel and erased from the Downtown Core, remnant traces of the creek valley can still be observed in the landforms surrounding Rosalea Park and in the residential neighbourhoods west of Centennial Park.

Fig. 35 Meadow in Duggan Park

Ongoing Impacts and Considerations

- Predominance of high-maintenance, water-intensive , low ecological value landscapes such as mowed lawns and sports fields
- Loss and fragmentation of cover due to past and current urbanization
- Incompatible uses such as camping, dumping and proliferation of informal trails
- Spread of invasive species
- Climate change

Recommendations related to natural heritage in the Riverwalk area are described in **"Section 7.8 Discovering Natural Heritage"**.

Fig. 36 Riverwalk Natural Heritage System

2.8 Cultural Heritage

Indigenous History

The Etobicoke Creek derives it's name from the Ojibwe word "Wah-do-be-kaung" meaning "the place where the alders grow".

The Credit River (west of the Etobicoke Creek) watershed has a well-documented ancestral Huron-Wendat settlement sequence dating from the beginning of the fourteenth century until the mid-sixteenth century.

The Humber River (east of the Etobicoke Creek) watershed exhibits two ancestral Huron-Wendat settlement sequences, one in the middle Humber River area spanning the fifteenth century and one in the area of the Humber River headwaters spanning the mid-fifteenth century to late sixteenth century.

Unfortunately, information regarding the Etobicoke Creek watershed specifically is especially limited. The Etobicoke Creek watershed would have been utilized by Indigenous peoples for settlement and subsistence, however it may have been a liminal territory between the former two settlement sequences.

By the turn of the seventeenth century, Indigenous peoples in the Credit River and Humber River watersheds are believed to have relocated to join either the Huron-Wendat Nation or perhaps more likely the Tionontaté Nation. Indigenous peoples in the Etobicoke Creek watershed likely had a similar trajectory.

Early European Settlement

European settlers began arriving in Ontario by the early 1780s. Surveyors described the region as low, swampy and covered with dense hardwood forest. Brampton was officially named in 1834 in honour of the early settler's English home town.

The historical heart of Brampton has always been the intersection of Queen and Main Streets, later known as the "Four Corners", which has existed since the 1820s. The irregular flow and low speed of the Etobicoke Creek prevented the development of large milling operations, but was still advantageous for smaller industries. As human settlement in the area increased, forests were cleared, wetlands were drained and land contours altered, all of which increased water runoff to the creek and raised the risk of flooding.

Recent History

In the late 1940s and 1950s, the automobile began to change the landscape, as did rapid urban growth in the region. In March 1948, Brampton endured another devastating flood when Etobicoke Creek overflowed its banks.

The event triggered an ambitious civil engineering project to channelize and divert the creek away from the downtown. The channel was officially completed 1952, just in time for Hurricane Hazel that hit Ontario in 1954.

The Etobicoke Creek diversion and channel continues to provide important flood protection to Downtown Brampton and a defining feature of the relationship between the creek and the City to this day.

Centennial Park

Centennial Park offers large areas of naturalized parkland and space for organized sports. Part of the park's history lies beneath the surface as it was built over two former landfills. Waste has been detected at depths ranging from surface to a maximum depth of 6.1m and includes ash, coal, brick, glass fragments, wood, paper, plastic and metal. The presence of semi-volatile organic compounds (SVOCs) / PAHs, polyhalogenated compounds (PHCs) and VOCs was detected in the west landfill.

Proposed Main Street South Heritage Conservation District

The proposed Main Street South Heritage Conservation District is a predominantly residential neighbourhood directly south of Brampton's historic downtown core. It consists of properties along Main Street, between Wellington Street to the intersection of Main Street South and the Etobicoke Creek.

The area is a historic residential neighbourhood, set within a park-like landscape that acts as a "green procession" into Brampton's historic core and exhibits evidence of its evolution over time, as seen in its shifting lot patterns and diverse architectural styles.[i,ii]

i Sources: City of Brampton, Municipal Register of Cultural Heritage Resources Designated under the Ontario Heritage Act, Updated 2021.& City of Brampton, Municipal Register of Cultural Heritage Resources, Updated July 2021

ii ERA, Main Street South Heritage Conservation District Plan, City of Brampton, Draft Updated January 2018

St. Mary's Roman Catholic Cemetery

The St. Mary's Roman Catholic Cemetery is small sawtooth shaped property located west of the Etobicoke Creek and north of the CN rail track. Associated with the early Irish Catholic community, St. Mary's cemetery once contained the Guardian Angel's Church which stood on the property from 1865 to 1878.

Riverwalk Cultural Heritage Resources

The city of Brampton maintains a Register of properties designated under the Ontario Heritage Act, as well as Municipal Register of Cultural Heritage Resources, which is a City-wide record of properties listed as exhibiting cultural heritage value or interest. Among these, a number of cultural heritage resources are of particular relevance and interest to the Riverwalk area[i]:

1. Remains Etobicoke Creek Wall (Listed)
2. Remains Etobicoke Creek Wall (Listed)
3. Etobicoke Creek Bypass Channel, 1952 (Listed)
4. St. Mary's Heritage Roman Catholic Cemetery, 1865 (Listed)
5. Centennial Park Cemeteries

Recommendations related to cultural heritage in the Riverwalk area are described in **"Section 7.7 Celebrating Cultural Heritage"**.

Fig. 38 Riverwalk Cultural Heritage

2.9 Programming

Programmed Space and Organized Sports

Sports Fields

There is a variety of amenities for organized sports within the Riverwalk area, such as baseball fields, soccer fields and tennis courts, primarily clustered in Duggan Park and Centennial Park.

Playgrounds

There are two small playgrounds within the Riverwalk area consisting of play structure and swings with sand surfacing. Playgrounds are located in proximity to the sports fields in Duggan park and centennial Park.

Dogs Off-Leash Area

The Duggan Park off-leash dog area is located on the east side of Etobicoke Creek in Duggan Park. The area is fenced and includes a separate space for small dogs.

Passive Recreation and Flexible Space

Unprogrammed Open Space

The majority of the Riverwalk area is comprised of unprogrammed open space, primarily characterized by large areas of mowed lawns with shade trees. This includes Rosalea Park, Duggan Park and Centennial Park, as well as the areas that connect these spaces. Although the area available for use is significant, there are few amenities that encourage people to make prolonged use of the space.

Pathways and Trails

The pathways and recreational trails throughout the Riverwalk area provide a flexible means of experiencing the site. Pathways are typically asphalt and connect the major parks within the creek valley, however, there are limited trail options that do not rely on adjacent City streets for continuity.

Forested and Naturalized Areas

Some of the most underutilized spaces within the Riverwalk area are the forested and naturalized spaces. These areas provide a rich diversity of experiences, but are difficult to access from the more manicured portions of the site. Key naturalized areas include the riparian areas along the Etobicoke Creek, the wooded area adjacent to the Central Public School fields and the naturalized areas in Centennial Park.

Recommendations related to active and passive recreation in the riverwalk area are described in **“Chapter 7.0 Programming”.**

For a detailed analysis of existing programming in the Riverwalk area, see **“Appendix 2: Existing Open Space, Facilities & Programs Report”.**

	Programmed Space and Organized Sports	Flexible Space	Amenities
Area 1: Duggan Park	▪ Ball diamonds (lit x2, unlit x1) ▪ Off-leash park ▪ Small playground	▪ Forested areas ▪ Unprogrammed open space along Ken Whillans Drive	▪ Seating along paths ▪ Direct connection to Etobicoke Creek Recreational Trail ▪ Vehicular parking
Area 2: Rosalea Park North / Central Public School Fields	▪ Ball diamond backstops ▪ Central Public School Recreation and Art Centre	▪ Forested areas ▪ Unprogrammed open space	▪ Seating along paths ▪ Direct connection to Etobicoke Creek Recreational Trail
Area 3: Rosalea Park	▪ Lit tennis courts (club x7) ▪ Brampton YMCA (adjacent)	▪ Unprogrammed open space and special event area	▪ Seating along paths ▪ Direct connection to Etobicoke Creek Recreational Trail ▪ Vehicular parking
Area 4: Bypass Channel	▪ n/a	▪ n/a	▪ n/a
Area 5: Centennial Park	▪ Rectangular fields (x2) ▪ Tennis courts (x3) ▪ Small playground ▪ Lit horseshoe pits (club x6) ▪ Royal Canadian Legion Br. 15	▪ Forested areas ▪ John Arthur Carroll Memorial Arboretum	▪ Picnic shelter ▪ Seating along paths ▪ Direct connection to Etobicoke Creek Recreational Trail ▪ Vehicular parking

Fig. 39 Existing Programming for Each Character Area

Amenities

The existing amenities within the Riverwalk area are minimal and do not greatly enhance the experience of the space. These include seating along pathways / trials, site lighting and waste receptacles.

Seating and Shelter

There is one picnic shelter located adjacent to the horseshoe pits at the Legion in Centennial Park.

Parking

There is accessible public parking within the Riverwalk area at Duggan Park, Rosalea Park and Centennial Park.

Event Space

Rosalea Park offers an unprogrammed event space with temporary power, however the space is underutilized and not inviting when not in use.

Recommendations related to public amenities in the Riverwalk area are described in **"Section 7.10 Open Space Amenities".**

Legend

- Accessible Public Parking
- Walking Paths / Trails
- Cycling Paths / Trails
- Seating
- Baseball Diamonds
- Sports fields
- Tennis Courts
- Playground
- Horseshoe Pit
- Naturalized Area
- Forested Area
- Dogs Off-Leash Area
- Indoor Recreation / Arts Centre
- Indoor Pool

Fig. 40 Existing Programming

2.10 Accessibility and Safety

Existing Accessibility Challenges

Accessible design barriers were identified at various locations within the Riverwalk area and along the primary Etobicoke Creek Recreational Trail. The central portion of the site in particular, presents challenges to accessibility and wayfinding.

Sidewalks, Pathways and Trails

- There is inconsistent provision of sidewalks on streets adjacent to the Riverwalk area. In particular, along Ken Whillans Drive and in the in the central portion of the site, sidewalks are provided on one side of the street.
- The Etobicoke Creek Recreational Trail is generally accessible, however, it is interrupted through the central part of the Riverwalk area and pedestrians must navigate city streets to rejoin the trail.
- Some parts of the street grid are irregular, making navigation difficult in the central portion of the area.
- Asphalt trail surfaces are cracked and uneven in many areas.
- Trails and pathways are generally flat or gently sloped.
- Some stream bank erosion in close proximity to trail edges is visible in Centennial Park, riparian vegetation is sparse and there is no other form of edge protection.
- Generally, sufficient clear width is provided for mobility device users to pass each other.
- Accessible parking is available at Duggan Park, Rosalea Park and Centennial Park.

Stairs

- Stairs are located at the corner of Wellington and James Streets, on the west side of the creek, leading down to the Etobicoke Creek Recreational Trail in Centennial Park.
- Stair treads are concrete but with no colour-contrasted nosings.
- Handrails are provided.

Railway Crossings

- The elevated railway corridor is an impediment to north-south movement along the Riverwalk area.
- Pedestrians must cross the railway at underpasses on Main Street, Union Street, Queen Street and at Centre Street
- Pedestrians must cross tracks at a level crossing at John Street.
- Underpasses are loud and dark, with minimal sidewalks and no provisions for cycling.

Signage and Wayfinding

- Several generations of signage is present; it is often vandalized and has no accessibility features
- Some signs provide distances to upcoming access points.
- Some signs are located high on poles and use small text.
- There are no trailheads or key wayfinding maps along the trail.

Lighting, Safety and Sight-Lines

- There are poor sight lines where the trail turns at a right angle to cross the pedestrian bridges at Duggan Park and in Centennial Park.
- The trail is generally visible from the road or public parks as it travels along Ken Whillans Drive and through Rosalea Park.
- The trail is isolated and not visible from City streets as it travels along the west side of the creek in Centennial Park.
- The trail also travels through an isolated wooded area at the south end of Centennial park and is not visible from the road.
- The trail is lit from poles in the parks, as well as from adjacent street lights, however light levels are typically insufficient to provide adequate nighttime visibility.
- There are no emergency stations along the trail.

Emergency Flood Response

The TRCA monitors and maintains the existing flood control bypass channel within the Riverwalk area. The TRCA provides local agencies and the public with notice, information and advice so that they can respond during severe rainfall events with the potential for flooding and during flood related emergencies.

The City of Brampton's Emergency Management Office advises residents of the risk of flooding however, there are no visible signs posted in the vicinity of the creek, or at the entry points to the bypass channel, advising of the risks and recommended exit procedure, should someone become trapped in the channel during a flood event.

Fig. 41 Wayfinding signs along the Etobicoke Creek Recreational Trail

Fig. 42 Etobicoke Creek Recreational Trail along Ken Whillans Drive

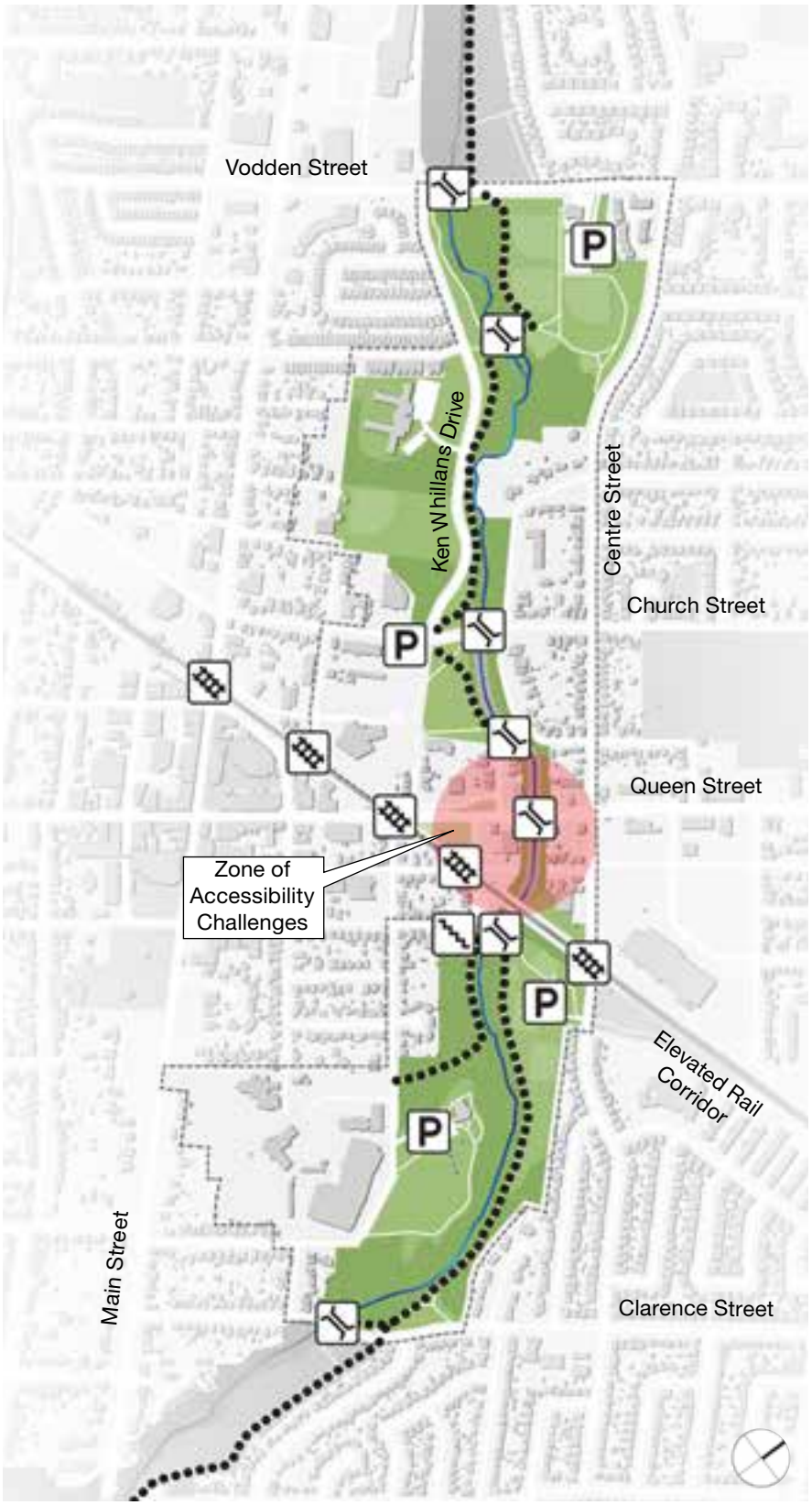


Fig. 43 Existing Accessibility Issues

Fig. 44 Natural Cover and Riparian Edge in Duggan Park

3.0
Constraints and Opportunities

3.1 Riverwalk Area Constraints and Opportunities

Riverwalk is an important opportunity within Brampton to trigger downtown revitalization, redevelopment and intensification.

The Riverwalk area is defined by a number of unique qualities, including its proximity to Brampton's downtown core, a diverse open space network and the presence of the Etobicoke Creek that weaves through the center of the site. Many of these qualities are also challenges as the pressures of intensification and the threat of flooding overlap.

The majority of the Riverwalk area is characterized by a broad creek valley with adjacent public parks and open space while the central portion of the Riverwalk area is characterized by a channelized watercourse in a very deep and narrow valley.

Riverwalk will become one of Brampton's primary open spaces, complementing downtown development with additional opportunities for attraction, expression and enhancement of the character and identity of the city as a whole.

The proximity to the downtown core and potential connections to adjacent neighbourhoods is one of the Riverwalk's greatest strengths. The variety of landscapes and spaces that frame and border the site are a great opportunity to create distinctive destinations and unique experiences.

The potential riverine flood risks and Special Policy Area put in place to protect downtown Brampton are important constraints within the Riverwalk area.

The DBFP EA sets out a number of requirements for flood conveyance and roughness coefficients that must be adhered to in the execution of the Riverwalk vision.

Further constraints include existing utilities, the narrow corridor and adjacent property ownership through the central portion of the Riverwalk area, may also constrain certain opportunities for connectivity and improvements to the aquatic and riparian conditions of the creek.

Fig. 45 Etobicoke Creek bypass channel looking toward the Queen Street Bridge

Etobicoke Creek and Riparian Edges

The Etobicoke Creek is a small watercourse with a low baseflow condition and peak flows that increase seasonally. In the naturalized portions of the Riverwalk area, the creek is typically characterized by shallow, slow moving waters bordered by thick riparian vegetation and shaded by a mature tree canopy.

In the central portion of the site, the creek is diverted from its natural course to flow through a concrete bypass channel with smooth sloping edges and a shallow, straightened low-flow channel. The tops of the banks are bordered by a mature tree canopy and dense understorey vegetation.

Within the naturalized portions of the Riverwalk area, there are opportunities to improve aquatic and riparian habitats through the removal of invasive species and re-introduction of native plants along the creek banks.

The channelized portion of the creek offers opportunities to improve water quality and habitat availability within the low-flow channel and along the sloped edges of the channel, by introducing pools and riffles. However, the flood conveyance requirements of the TRCA-led DBFP EA will determine the extent and type of vegetation that may be planted within the bypass channel.

Floodplain and Open Space

At the north and south ends of the Riverwalk area, the flood plain is broad and gently sloping. These spaces are typically occupied by public parks with wooded areas, manicured lawns and fields with shade trees. Open spaces within the Riverwalk area are typically programed for active recreation, with very little naturalized meadows and wetlands.

The approved DBFP EA contains commitments with respect to tree compensation, ecological enhancements and ecological monitoring that must be adhered to. There are a number of opportunities to improve the ecology within the floodplain, particularly through naturalization and reinstatement of woodlands in some areas.

Recommendations for enhancing the natural environment are described in **“Section 5.3 Ecology and Habitat”.**

Fig. 46 Etobicoke Creek in its natural channel seen from the Clarence Street Bridge

Fig. 47 Wildflowers in Centennial Park

Transportation

The Riverwalk area is centrally located within the city core, in close proximity to the Brampton GO station, with public transit access from Main Street, Queen Street, Vodden Street and Centre Street.

The street network is characterized by a fine grain grid of streets and blocks subdivided in small lots with pockets of open spaces and laneways. This regular grid is interrupted by the elevated railway tracks and further disrupted as it meets the Etobicoke Creek Valley.

One of the greatest opportunities lies at the intersection of Queen Street and the Etobicoke Creek. This is the primary urban connection between the city and the Riverwalk and although currently a nondescript bridge, this space could become the major urban plaza and transit node linking the downtown with the Queen Street corridor. Further opportunities exist to enhance the pedestrian network by adding sidewalks and cycling lanes to routes surrounding the Riverwalk with recommendations described in **"Section 6.0 Sustainable Transportation"**.

Fig. 48 Pedestrian Bridge In Duggan Park

Connections and Accessibility

The Etobicoke Creek Recreational Trail stretches over a length of 15 km, connecting Brampton through Mississauga and Toronto along the creek valley and is an important connection to the city and to open spaces beyond.

The trail is discontinued through the central channelized portion of the Riverwalk area, forcing recreational users out of the creek valley and onto residential streets.

One of the greatest weaknesses of the site as it currently exists, is the almost complete lack of visual connection and relationship to the watercourse from surrounding streets, pathways and parks.

Heavily vegetated edges and privately owned properties adjacent to the watercourse contribute to the lack of visual connection and inaccessibility of the creek to recreational users.

Not only is the Etobicoke Creek mostly invisible within the City centre, there are few opportunities to approach the water's edge or to create new crossings, despite the proximity of pathways and trails to the watercourse.

Reconnecting the Etobicoke Creek Recreational Trail through Brampton's downtown core, providing new physical and visual access to the water would be important steps toward fulfilling the Riverwalk vision.

Fig. 49 Etobicoke Creek Recreational Trail Through Centennial Park

Outdoor Amenities and Programming

Three major parks are located within the Riverwalk area, these include Duggan Park to the north, Rosalea Park and Centennial Park to the south. These City parks are well programmed, offering numerous sports fields, playgrounds, leash-free dog park, seating, lighting and recreational trails.

Although temporary washrooms are provided in Duggan and Centennial Parks, there is a notable lack of public washroom facilities.

There are opportunities to introduce new, more passive recreation and educational activities related to the ecology of the creek, or even to the flood protection structures.

There is also great potential for additional features, such as boardwalks, look-out points and public art installations that would add interpretive qualities to the Riverwalk experience and enhance public engagement in ongoing flood protection and environmental stewardship efforts.

Any programming will require consideration of potential flood events and the threat of interruption of recreational activities or access restrictions.

Recommendations for programming are described in **"Chapter 7.0 Programming".**

Socio-Economic and Cultural Considerations

The Riverwalk has a strong presence in the public consciousness as an aspirational public space that integrates the social and cultural life of Brampton with an ecologically conscious revitalization of the Etobicoke Creek.

The location of the Etobicoke Creek makes it an important green space in the city. Open spaces surrounding the Riverwalk area are well-used for organized sports, summer camps and informal recreational activities.

An enhanced connection to this important urban watercourse and the implementation of Riverwalk will act as a catalyst for development facing the creek, create vibrant public spaces and activate park edges and street level activity with the potential to increase investment in properties in proximity to the Riverwalk area.

The cultural heritage of the Riverwalk area also presents numerous opportunities for programming and interpretation and recommendations are described in **"Section 7.7 Celebrating Cultural Heritage".**

Fig. 50 Summer Camps in Rosalea Park

Fig. 51 Pathway through Centennial Park

3.2 Riverwalk SWOT Analysis

	Strengths	Weaknesses	Opportunities	Threats
Etobicoke Creek and Riparian Edges	▪ Established riparian vegetation on creek banks ▪ Important wildlife corridor ▪ Important natural space in city	▪ Maturing and dying tree cover on stream banks, tree falls causing obstruction of creek ▪ Low flow in creek, poor water quality and habitat availability ▪ Erosion of creek banks in natural portions of the site ▪ Invasive species ▪ Lack of aquatic and riparian habitat in channelized portions of the creek ▪ Interrupted fish passage at south end of bypass channel	▪ Improve water quality ▪ Improve aquatic and riparian habitat ▪ Improve quality of natural cover through management of invasive species and planting of native vegetation ▪ Introduce new types of aquatic habitats and vegetation communities, offline pools, temporary wetlands, etc. ▪ Remove in-stream barrier at bypass channel to improve fish passage ▪ Provide education through information signage about natural heritage features, native vegetation, aquatic habits, etc. ▪ Create a low flow channel through the bypass channel that is more representative of riverine conditions to improve fish habitat	▪ Encroachment of urban development and increased surface runoff ▪ Seasonal flooding and erosion of creek banks ▪ Sedimentation and obstruction of low flow channel ▪ Maintenance costs of an enhanced creek and bypass channel ▪ Hydraulic changes due to ongoing development and land clearing within the watershed area ▪ Climate change
Floodplain and Open Space	▪ Established woodland vegetation at top of banks ▪ Existing wooded area west of Ken Whillans Drive ▪ Important wildlife corridor ▪ Important natural space in city	▪ Large areas of manicured lawn ▪ Invasive species ▪ Interruption of open space network at bypass channel	▪ Improve natural cover ▪ Improve and expand wooded areas ▪ Introduce new vegetation communities, native species, pollinator meadows, etc. ▪ Create continuous open space network ▪ Provide education through information signage about Etobicoke Creek's flood history	▪ Encroachment of urban development and increased surface runoff ▪ Seasonal flooding and damage to public infrastructure ▪ Contaminated soils in public parks could limit opportunities for improvements ▪ Hydraulic changes due to ongoing development and land clearing within the watershed area ▪ Climate change ▪ Regional Flood event could overtop the existing floodplain

	Strengths	Weaknesses	Opportunities	Threats
Transportation	▪ Central location in city ▪ Fine grid of streets and blocks ▪ Direct street connections between Riverwalk and important city neighbourhoods	▪ Limited bridges and crossings interrupts the city grid ▪ CN rail further breaks down the city grid ▪ Level crossing at Queen Street is a barrier in the continuity of the system	▪ Create an urban plaza at the intersection of queen street and the Riverwalk ▪ Enhance sidewalk, streetscaping and active transportation infrastructure to support Riverwalk's role in the enhancing the Downtown ▪ Improve connections to current and future transit routes, including the Queen Street BRT ▪ Improve pedestrian and cycling connections at railway crossings	▪ Property ownership adjacent to the channelized portions of the creek may limit opportunities for public space and transit plaza ▪ Potential impacts of rail corridor expansion on streets and active transportation network
Connections and Accessibility	▪ Public transit access from Main Street, Queen Street, Vodden Street and Centre Street ▪ Proximity to Brampton GO station ▪ 15km long Etobicoke Creek Recreational Trail follows the creek from Brampton to Mississauga	▪ The Etobicoke Creek Recreational Trail is discontinued through the channelized portions of the creek ▪ Poor physical and visual connections to the creek and watercourse ▪ Limited crossings ▪ Minimal wayfinding	▪ Create a continuous recreational path along the length of the Riverwalk ▪ Reconnect the Etobicoke Creek Recreational Trail through downtown Brampton ▪ New pathways through forested areas and boardwalks through wetland areas ▪ New pedestrian crossings ▪ Create lookouts and improve views to the water ▪ Improved wayfinding	▪ Property ownership adjacent to the channelized portions of the creek may limit opportunities for a continuous trail ▪ Maintenance and liability for access into bypass channel ▪ Possible design restrictions because of flood protection requirements
Outdoor Amenities and Programming	▪ Existing parks have active recreation and programming including playgrounds, sports fields, a leash-free dog park ▪ Cultural heritage sites within the Riverwalk area (the Dale Estate)	▪ Limited programming / activities that engage the creek ▪ Limited facilities, such as washrooms, trash receptacles, drinking fountains, etc.	▪ New spaces to pause or rest ▪ New active recreation programming ▪ New educational programming ▪ Improve 4-season programming	▪ Safety issues related to access to the waters edge, particularly in the vicinity of the bypass channel ▪ Possible activity restrictions during high water levels
Socio-Economic and Cultural	▪ Proximity to Brampton downtown core ▪ Integrated into public parks and residential neighbourhoods	▪ SPA restricts development in downtown Brampton ▪ Limited type of use of public open space - primarily organized active recreation	▪ Introduce social / cultural activities to open spaces ▪ Introduce educational and interpretive amenities ▪ Connect Riverwalk to downtown amenities and public spaces	▪ Restrictions on programming within the channelized portions of the creek due to flood protection requirements ▪ Activity restrictions during high water levels

3.3 Area 1: Duggan Park

Site Characteristics

The northernmost character area of Riverwalk, Area 1 is defined by Vodden Street to the north, Ken Whillans Drive to the west, Centre Street North to the east and a pedestrian bridge to the south:

- The area is bordered by low density residential neighbourhoods, with a Seniors' residence on the west side of Ken Whillans Drive.
- The Etobicoke Creek flows in its natural channel, typically shallow water with heavily vegetated banks and mature tree cover.
- The Etobicoke Creek Recreational Trail runs along the west side of the creek, with numerous pathways through Duggan Park, on the east side of the creek.
- The landscape bordering Ken Whillans Drive is characterized by open lawn and mature shade trees.
- Duggan Park, on the east side of the creek is characterized by open lawn, sports fields, playgrounds, a leash-free dog park and mature shade trees.
- There are few views to the creek from the Vodden Street bridge due to dense vegetation, however there are some openings in the undergrowth that offer views from the pathways on either side of the creek.
- No formal physical access to the creek exists, although some informal pathways have been created to the waters edge.

Constraints:

- Existing sports facilities occupy the majority of public open space.
- Increased pedestrian access may threaten existing riparian and woodland habitats.

Opportunities:

- Provide new viewpoints and lookouts to the creek.
- Create new pathways through forested areas and boardwalks through naturalized meadow / wetland areas in Duggan Park.
- Address the vertical clearance issue under Vodden Street along the Etobicoke Creek Recreational Trail.
- Improve 4-season programming within the park and along Ken Whillans Drive.
- Provide new crossings and new access to the water's edge.
- Restore and/or increase native vegetation cover.
- Improve terrestrial habitat quality and connectivity.
- Improve aquatic habitat (e.g. fish spawning habitat).
- Improve water quality.
- Improve signage and wayfinding.
- Incorporate educational and interpretive signage.
- Investigate opportunities for offline stormwater management.
- Introduce temporary and permanent public art opportunities.

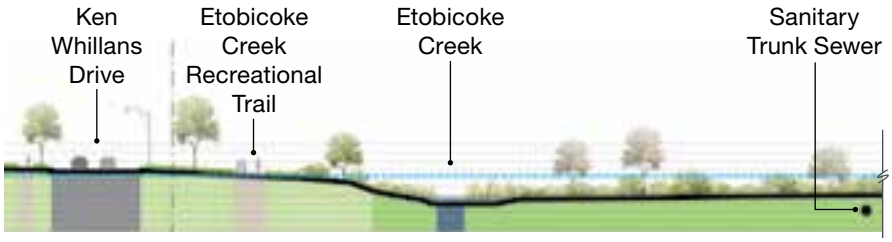


Fig. 52 Area 1 - Section A-A

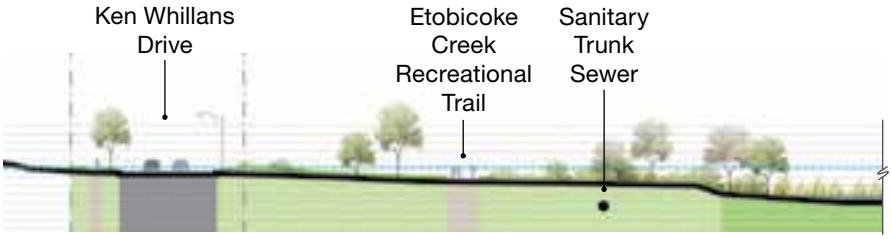


Fig. 53 Area 1 - Section B-B

Fig. 54 Area 1 Key Plan

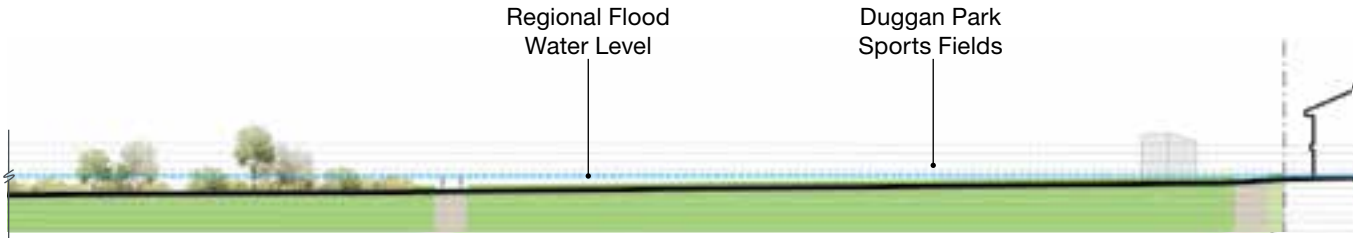


Fig. 55 Area 1 - Section A-A (continued)

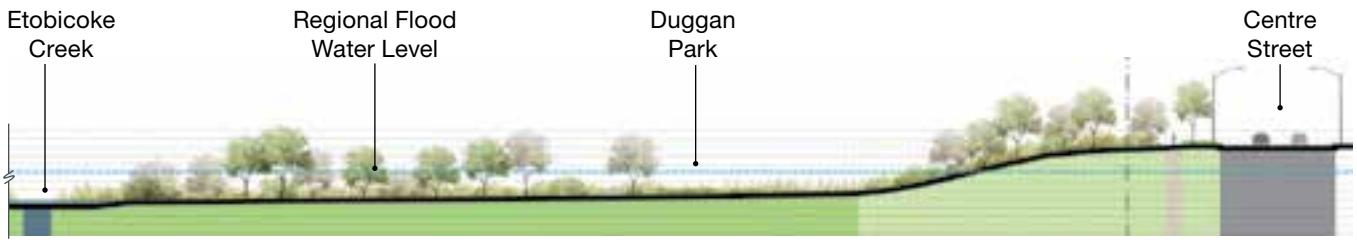


Fig. 56 Area 1 - Section B-B (continued)

3.4 Area 2: Central Public School Fields / Rosalea Park North

Site Characteristics

Area 2 is defined by the Duggan Park pedestrian bridge to the north, Ken Whillans Drive to the west and Church Street to the south and is bordered by low density residential development on east and institutional and residential uses on the west.

- This segment is within the study limits of the DBFP EA and will be modified in accordance with the conveyance requirements established in the final ESR report.
- Ken Whillans Drive will be realigned to expand the floodplain in this area as a part of the recommended alternative for the DBFP EA. The preferred flood protection alternative is illustrated conceptually and will be developed through the detailed design process.
- The Etobicoke Creek flows in its natural channel, typically shallow water with heavily vegetated banks and mature tree cover
- The existing concrete bypass channel, to be widened and deepened as part of the flood protection solution identified in the DBFP EA, begins at the south end.
- The Etobicoke Creek Recreational Trail follows the west side of the creek.
- The landscape bordering Ken Whillans Drive is characterized by open lawn and mature shade trees.
- Central Public School Park fields, located west of Ken Whillans Drive are characterized by open lawn, sports fields and mature shade trees.
- There is a wooded area to the west of Ken Whillans Drive that will be impacted by the roadway realignment.
- There are few views to the creek due to dense vegetation, however there are some openings in the undergrowth that offer opportunities for views from the multi use path on the west side of the creek.
- Informal pathways have been created to the waters edge.

Constraints:

- The depth of the existing trunk sewer in the vicinity of Ken Whillans Drive may prevent regrading to allow meaningful visual and physical connection between the floodplain and the creek.
- Increased pedestrian access may threaten existing riparian and woodland habitats.
- The realignment of Ken Whillans Drive as part of the DBFP EA will require the removal of trees.
- Limited publicly owned land on the east side of the creek may limit opportunities for continuous public access.

Opportunities:

- Provide new viewpoints and lookouts to the creek, in particular from the elevated east bank of the creek
- Provide cycling infrastructure along Ken Whillans Drive as an alternative to the Etobicoke Creek Recreational Trail.
- Improve 4-season programming.
- Create new access to the water's edge along the trail.
- Create new crossings.
- Restore and/or increase native vegetation cover.
- Improve terrestrial habitat quality and connectivity.
- Improve aquatic habitat (e.g. fish spawning habitat) .
- Improve water quality.
- Improve fish passage at the mouth of the bypass channel and create new fish spawning habitat opportunities.
- Improve signage and wayfinding.
- Incorporate educational and interpretive signage.
- Introduce temporary and permanent public art opportunities.

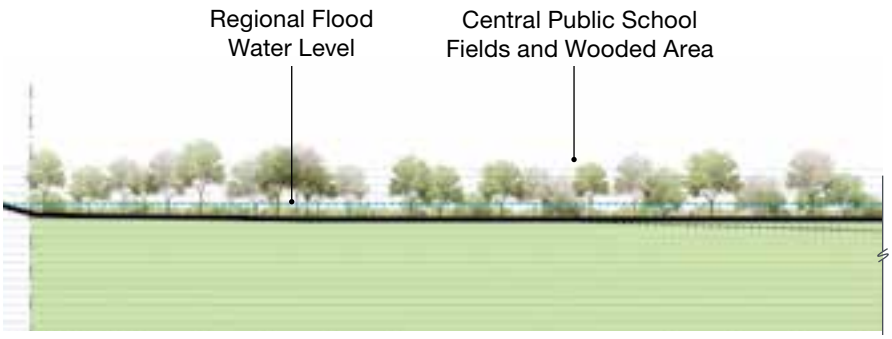


Fig. 57 Area 2 - Section A-A

Fig. 58 Area 2 Key Plan

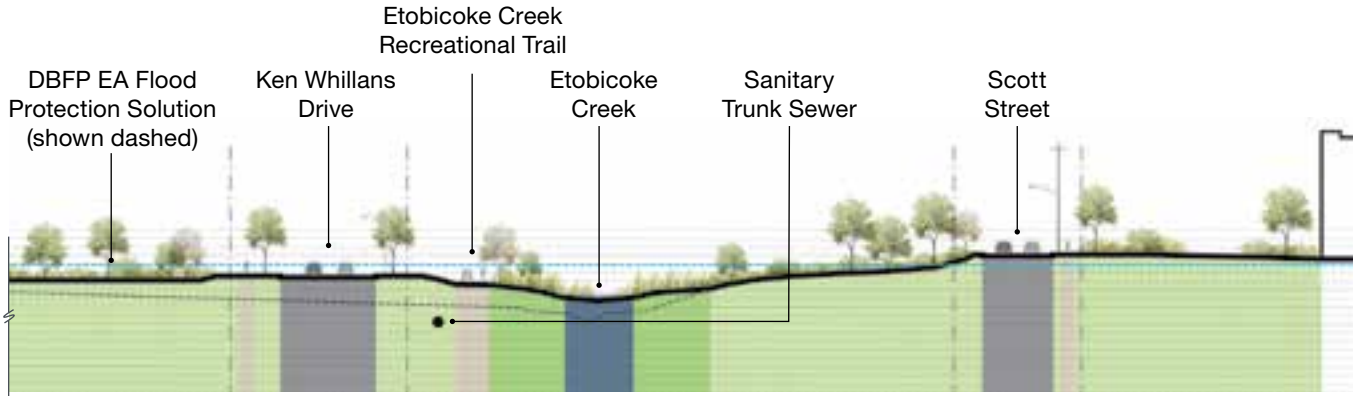


Fig. 59 Area 2 - Section A-A (continued)

3.5 Area 3: Rosalea Park

Site Characteristics

Area 3 is defined by Church Street to the north and the Scott Street bridge to the south and is bordered by detached dwellings on Scott Street to the east and Rosalea Park and YMCA parking lot to the west.

- In this segment, the Etobicoke Creek is diverted from its historic natural course and channelized into a concrete bypass channel and low flow channel.
- This segment is within the study limits of the DBFP EA and will be modified in accordance with the conveyance requirements established in the final ESR report. The preferred flood protection alternative is illustrated conceptually and will be developed through the detailed design process.
- Rosalea Park is characterized by open lawn and mature shade trees.
- The public park is separated from the creek by fences and a vegetated berm.
- There is no physical access to the channel in this segment due to fencing and dense vegetation.
- Viewing opportunities of the creek are limited to the bridges at Church and Scott Streets.
- There is an existing sanitary trunk sewer beneath the vegetated berm between Rosalea Park and the west side of the channel.

Constraints:

- The depth of the existing trunk sewer in beneath the berm at Rosalea Park may prevent regrading to allow meaningful visual and physical connection between the floodplain and the creek.
- Steep grades at the west and south edges of Rosalea park may impact potential connections to the city context.
- Limited publicly owned land on the east side of the creek may limit opportunities for public access.
- The existing tennis club at Union and Nelson Streets leases and occupies a large portion of publicly-owned open space west of Rosalea Park.

Opportunities:

- Provide new viewpoints and lookouts to the creek, in particular from the elevated east bank of the creek along Scott Street.
- Visually and physically connect Rosalea Park with the creek.
- Improve water quality through the creation of a more naturalized low flow channel and introduction of pools and riffles.
- Consider future public open space or development opportunities west of Rosalea Park, including the existing parking lot and existing tennis club, pending potential relocation.
- Investigate modifications to bypass channel side slopes, if possible, in accordance with the conveyance requirements, to allow low planting and physical access.
- Improve 4-season programming.
- Restore and/or increase native vegetation cover.
- Improve terrestrial habitat quality and connectivity.
- Improve fish passage and aquatic habitat.
- Incorporate signage and wayfinding.
- Incorporate educational and interpretive signage.
- Introduce temporary and permanent public art opportunities.

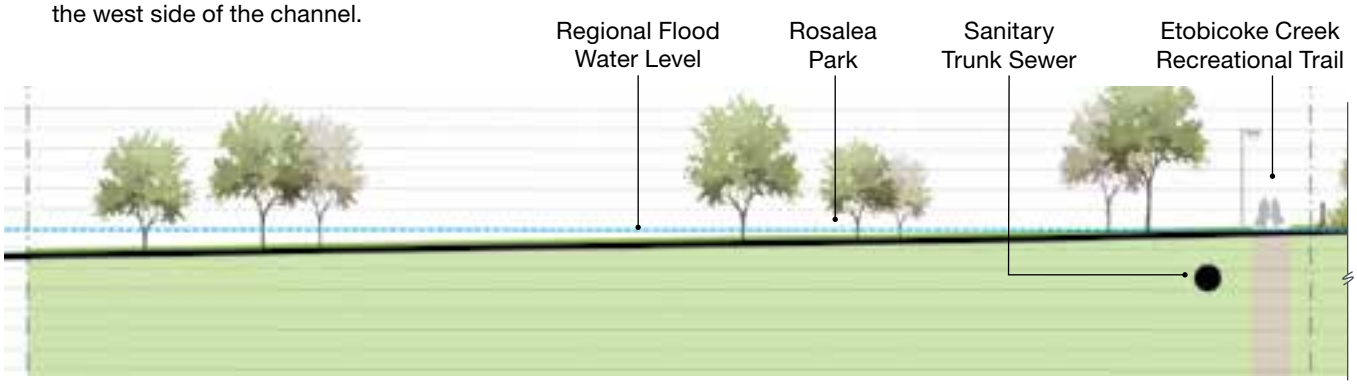


Fig. 60 Area 3 - Section A-A

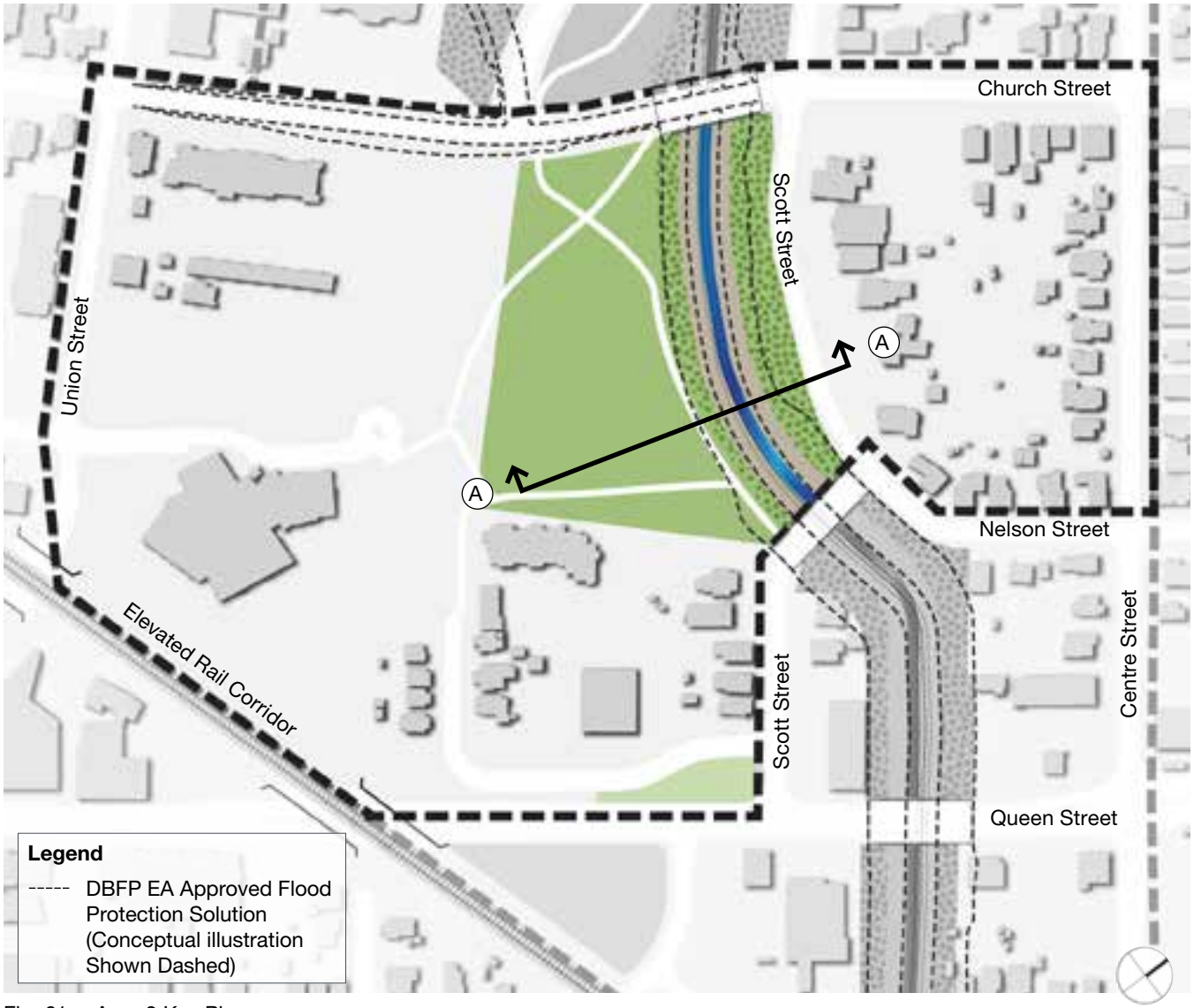


Fig. 61 Area 3 Key Plan

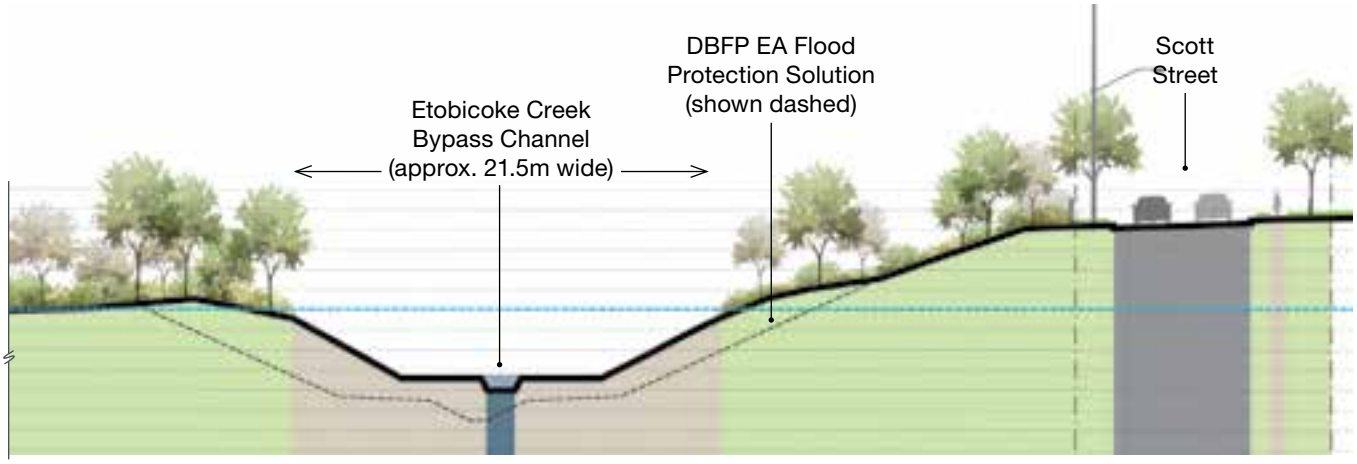


Fig. 62 Area 3 - Section A-A (continued)

3.6 Area 4: Etobicoke Creek Bypass Channel

Site Characteristics

Area 4 is defined by the Scott Street bridge to the north and the CN Rail tracks to the south, with single family residential to the east and mixed commercial and low density and high-rise residential to the west, this segment is the most constrained within the Riverwalk area.

- Similar to Area 3, the Etobicoke Creek is diverted from its historic natural course and channelized into a concrete bypass channel and low flow channel.
- This segment is within the study limits of the DBFP EA and will modified in accordance with the requirements established in the final ESR report. The preferred flood protection alternative is illustrated conceptually and will be developed through the detailed design process.
- Queen Street crosses the channel at the mid-point of the segment.
- The Downtown Brampton GO station is approximately one block to the west of the site.
- There is no physical access to the channel in this segment due to fencing and dense vegetation.
- The southern end of the bypass channel features a weir and approximately 2m vertical grade change.
- Viewing opportunities of the creek are limited to the bridges at Scott and Queen Street.
- The sanitary trunk sewer crosses beneath the bypass channel, below the existing CN rail bridge.
- There is a historical cemetery to the north east of the CN rail bridge.

Constraints:

- The depth of the existing trunk sewer beneath the CN rail bridge will limit the grade change at the foot of the bypass channel.
- Limited publicly owned land on the east and west sides of the creek may limit opportunities for public access.

Opportunities:

- Provide new viewpoints and lookouts to the creek from John and Queen Streets.
- Potential new pedestrian crossing at John Street.
- Improve water quality through the creation of a more naturalized low flow channel and introduction of pools and riffles.
- Reduce the in-stream barrier at the weir by creating a sloped fish passage or fish ladder.
- Investigate modifications to bypass channel side slopes, if possible, in accordance with the conveyance requirements, to allow low planting and physical access.
- Restore and/or increase native vegetation cover.
- Improve terrestrial habitat quality and connectivity
- Improve fish passage and aquatic habitat.
- Incorporate signage and wayfinding.
- Incorporate educational and interpretive signage.
- Introduce temporary and permanent public art opportunities.

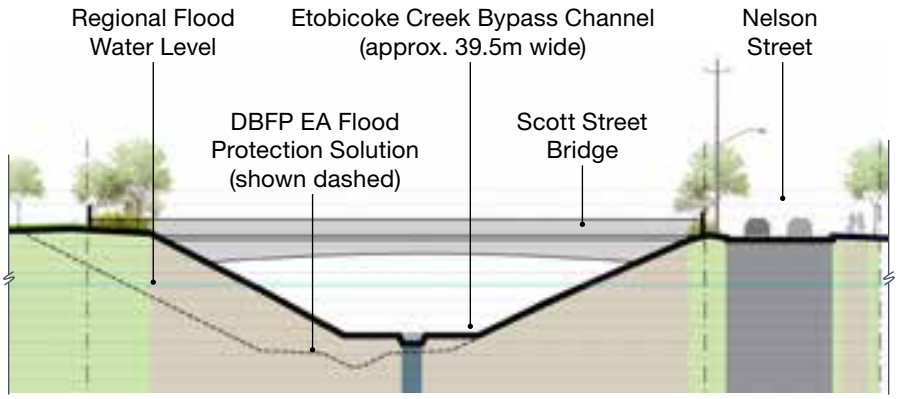


Fig. 63 Area 4 - Section A-A

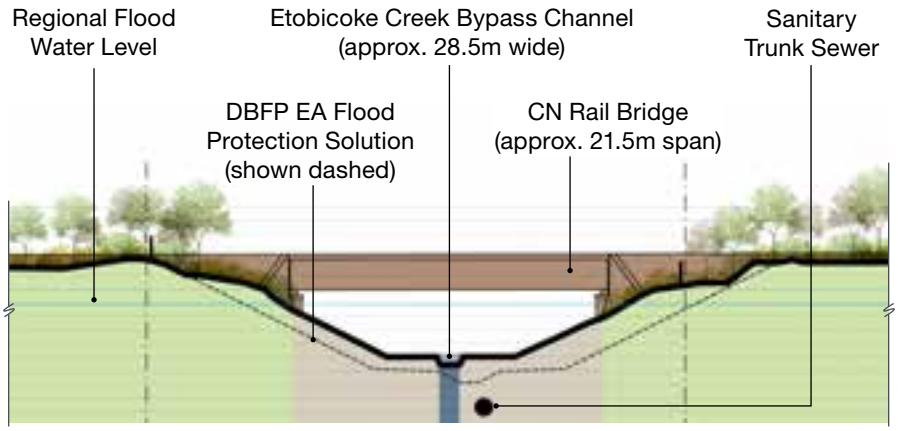


Fig. 64 Area 4 - Section B-B

Fig. 65 Area 4 Key Plan

3.7 Area 5: Centennial Park

Site Characteristics

The southernmost character area of the Riverwalk, Area 5 is defined by the CN rail bridge to the north, Clarence Street to the south, bordered by low density residential development to the south and east and by schools and dwellings to the west.

- South of the rail bridge, the Etobicoke Creek rejoins its natural channel, with typically shallow water and heavily vegetated banks and mature tree cover.
- The Etobicoke Creek Recreational Trail runs along the east side of the creek, with numerous pathways through Centennial Park, on the west side of the creek.
- Recreational trails are discontinuous on the west side of the creek, forcing users onto adjacent residential streets.
- Centennial Park, on the east side of the creek is characterized by open lawn, sports fields, playgrounds and mature shade trees.
- The park covers an old landfill and gas monitoring pipes are visible on the east side sports fields.
- There are few views to the creek due to dense vegetation, however there are some openings in the undergrowth that offer views from the pathways on either side of the creek.
- No formal physical access to the creek exists, although some informal pathways have been created to the waters edge.

Constraints:

- Increased pedestrian access may threaten existing riparian and woodland habitats.
- Contaminated soils may limit opportunities for grade changes and landscape improvements.

Opportunities:

- Provide new viewpoints and lookouts to the creek from the trail and along Clarence Street.
- Create new pathways through wooded areas and boardwalks through naturalized meadow areas in Centennial Park.
- Improve 4-season programming, increase use of the existing open space along the trail west of the creek.
- Provide new crossings and new access to the water's edge.
- Restore and/or increase native vegetation cover.
- Improve terrestrial habitat quality and connectivity.
- Improve aquatic habitat (e.g. fish spawning habitat).
- Improve water quality.
- Improve signage and wayfinding
- Incorporate educational and interpretive signage.
- Introduce temporary and permanent public art opportunities.

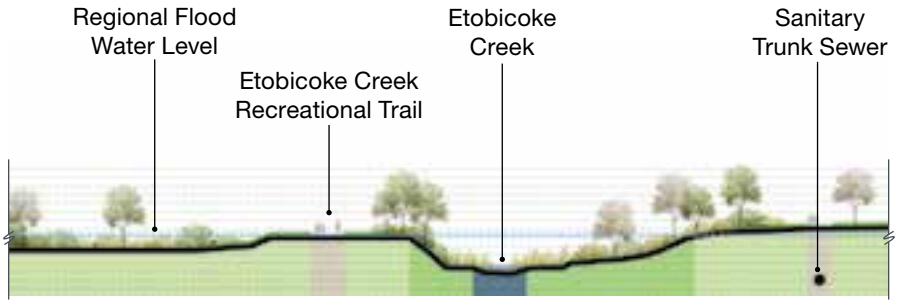


Fig. 66 Area 5 - Section A-A

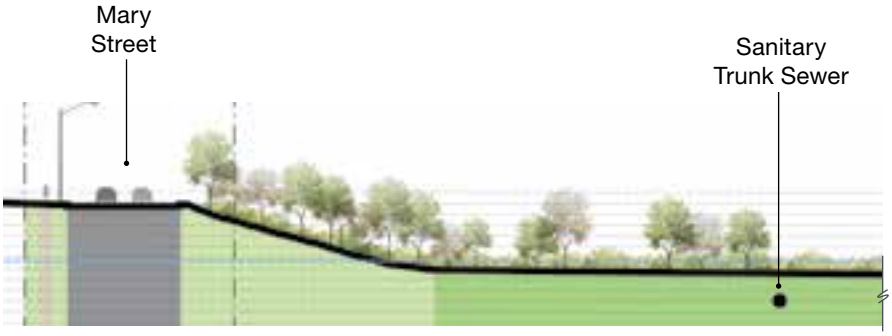


Fig. 67 Area 5 - Section B-B

Fig. 68 Area 5 Key Plan

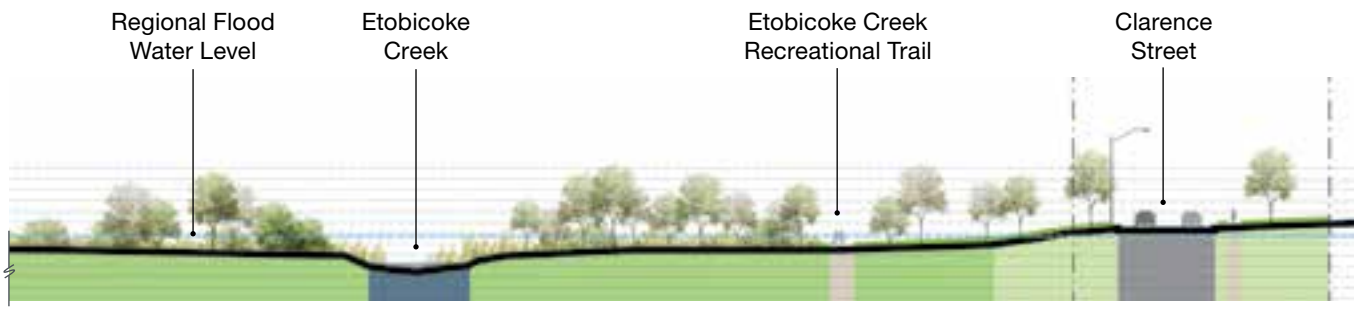


Fig. 69 Area 5 - Section B-B (continued)

Fig. 70 Native Wildflowers in Centennial Park

4.0
Vision and Guiding Principles

4.1 An Evolving Vision for Riverwalk

Riverwalk is Brampton's new riverfront, a continuous ribbon of open space that weaves through and intersects with the city's urban fabric.

The City Faces the River / The City Rediscovers the River

In 2011, in response to the designation of Downtown Brampton as an Urban Growth Centre under the Province's Places to Grow, the Growth Plan for the Greater Golden Horseshoe, Brampton Council committed to exploring measures to reduce the Etobicoke Creek floodplain Special Policy Area designation to unlock potential opportunities for development within the Downtown.

Through a Joint Steering Committee with TRCA, two concurrent studies were commenced by the City in 2012 as the Downtown Etobicoke Creek Revitalization Study. In 2013, Council endorsed the vision and directed staff to commence the series of studies which would form the Downtown Etobicoke Creek Revitalization program.

The vision was expanded beyond urban design in 2014 to incorporate ideas of placemaking, the use of infrastructure in city building, a reinterpretation of Brampton's historic relationship to Etobicoke Creek and the future of Riverwalk as a catalyst to reinvigorate the city. This was supported by the creation of ten key urban design principles.

This expansion of the Riverwalk vision was endorsed by Council and formed the basis for the Phase 2 Feasibility Studies, being further refined to align with City-wide policies outlined in the City of Brampton Official Plan and Brampton 2040 Vision. In 2018, the DBFP EA commenced to find a flood protection solution to reduce flood risk to the downtown core and this solution was approved in 2020.

Downtown Etobicoke Creek Revitalization Study - Phase 1
Urban Design Principles

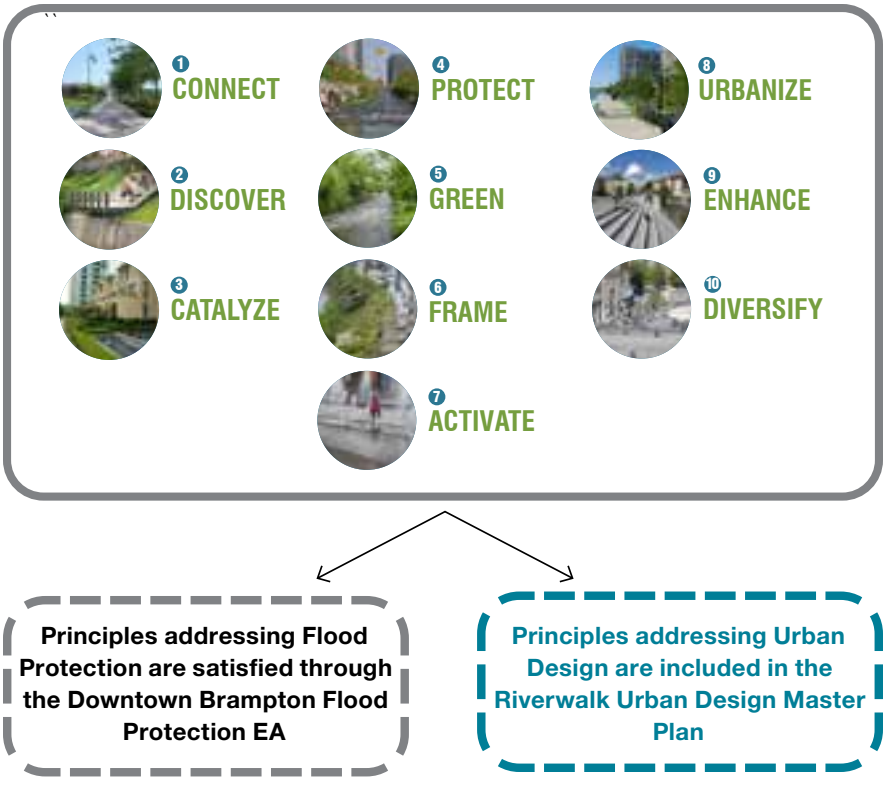


Fig. 71 Evolution of Design Principles

Key Messaging

Through development of the supporting studies, the City of Brampton has refined key project messaging to include the following summary:

Riverwalk will be a transformative opportunity to help revitalize Brampton's downtown and make it healthy, sustainable and resilient.

It starts with engineering an innovative long-term solution to the flood risk, which will unlock the potential for urban growth and development. In turn, it will put the creek back at the heart of downtown, creating a vibrant new space that provides a distinct identity for the city.

Integrating City-wide Policies

A number of documents have come together to describe and illustrate a collective vision for Downtown Brampton and recognize the vital role that Riverwalk will play in the life of the City and it's emerging downtown core. These include the City of Brampton Official Plan (2015), Brampton Transportation Master Plan (2015), Brampton Active Transportation Master Plan (2015), Brampton Parks and Recreation Master Plan (2017) and Brampton Vision 2040 (2017).

Jointly, these studies bring forward a strong vision for the City's downtown core and provide an holistic framework for the Riverwalk area which has been outlined in detail in the Phase 2 Feasibility Urban Design Study.

Refined Urban Design Vision

The urban design vision for Riverwalk has been updated to capture both the spirit of the original mandate and the potential for the future of Brampton.

Through the seamless integration of the Riverwalk UDMP principles and the preferred flood protection solution detailed in the DBFP ESR, Riverwalk aims to meet the needs of the region, city, neighbourhood and site collectively.

Riverwalk's continuous network of open spaces will allow for a range of social and programming activities to be used throughout the year and during all seasons. These linked and integrated spaces will redefine the relationship of the existing built form, create new thresholds and transitions and aid in the identification of new opportunities for development and city building initiatives.

Fig. 72 Rendering showing an aerial view of the vision for Riverwalk from the The Downtown Etobicoke Creek Revitalization Study, 2014

4.2 Objectives and Guiding Principles

Goals and Objectives

As part of any Downtown Revitalization initiative, the Riverwalk UDMP program will play an important role in achieving the following goals and objectives:

1. to **remove flood threat and reduced disaster risks** for the Downtown core and the most important areas for development and intensification, under the umbrella of the DBFP EA;
2. to **unlock the downtown development potential** by significantly reducing the Special Policy Area and its restrictions, in particular on the designated Urban Growth Centre;
3. to **significantly improve the downtown open space system** and provide major parks, squares, plazas and other amenities with broad programming for downtown residents, businesses, for the entire city, hosting activities and events for all, for equity, diversity and inclusiveness;
4. to significantly **improve the environment, liveability and sustainability** of downtown Brampton by integrating ecological improvements, climate change adaptation and mitigation measures, heat island reduction, stormwater management, the introduction of innovative LID features, contributing to public health, social sustainability and developing a flagship Eco Space;
5. to **improve the Downtown's sustainable transportation and mobility network** by developing a robust active transportation system focused on the Etobicoke Creek Rectrational Trail and its connections, improving the walkability and accessibility of the area as well as supporting improvements to the local and higher-order transit system;
6. to become a landmark feature and **redefine Downtown and City's character and identity** based on the area's history and tradition, creating attractive, well designed landscapes and places, as well as an important attraction for the city's diverse residents and for visitors from the region and beyond.

Guiding Principles

The following principles support the urban design goals and objectives of the Riverwalk UDMP, building upon the foundation set out in the Downtown Etobicoke Creek Revitalization Study and the subsequent City-wide policies and Brampton 2040 Vision document:

1. Sustainability and Resilience
2. Links and Connections
3. Programming and Recreation
4. Protect, Preserve and Enhance
5. Discovery, Education and Interpretation
6. Safety and Accessibility
7. Integration and Intensification
8. Character and Identity

Fig. 73 Conceptual Aerial Rendering

Sustainability and Resilience

Riverwalk is a sustainable and resilient landscape that contributes to community and public health.

Riverwalk will:

- Exhibit **sustainable** best practices and climate change leadership through innovative design, robust materials and low maintenance and cohesive management frameworks.
- **Foster equity** through project planning, design, community engagement and access to funding.
- Improve **climate change resiliency**.
- Exemplify the principles of Brampton's Eco Park Strategy and provide a **demonstration EcoSpace**.

Links and Connections

Riverwalk is a continuous network of public open spaces intrinsically linked into the urban fabric.

Riverwalk will:

- **Connect** major destinations along and adjacent to the Riverwalk area, while promoting the Riverwalk as a destination unto itself.
- **Link** trails to existing infrastructure including other trails, bike lanes, streets and transit.
- **Integrate** the trail into the life of its surrounding neighbourhoods, through signage and public realm improvements.
- Establish a hierarchy of **pathways and trails** that are accessible, safe and understandable.
- Establish a series of **loops and links** to provide a flexible and varied experience.
- Improve connections within the area through rehabilitated and new **bridges and boardwalks** that are both accessible and safe.

Programming and Recreation

Riverwalk will provides accessible programming for all ages and all abilities.

Riverwalk will:

- Provide **active and passive recreation** through programmed and flexible open space.
- **Increase recreational opportunities** while protecting natural heritage features and functions.
- Encourage **physical activity and wellness** through outdoor programming.
- Provide **new pedestrian experiences** of open spaces and at the water's edge.
- Improve and enhance the overall **public realm and functionality** of the Riverwalk area.
- Develop multiple options for **movement and recreation routes**.
- Encourage **nature-based play** and exploration.
- Provide enhanced of **programs and amenities** (e.g. benches, lookouts, water's edge access).

Fig. 74 Sustainability and Resilience

Fig. 75 Links and Connections

Fig. 76 Programming and Recreation

Protect, Preserve and Enhance

Riverwalk is and will remain a vibrant green ribbon weaving through downtown Brampton.

Riverwalk will:

- Identify opportunities to **celebrate, enhance, create and integrate ecological spaces** and habitat.
- Expand and enhance terrestrial and aquatic habitat for **native flora and fauna**.
- **Increase biodiversity** through the creation of new meadows.
- **Protect native ecologies** through the control of invasive species.
- Enhance aquatic habitat and **improve water quality** in the Etobicoke Creek.
- Ensure responsible **interaction with the natural environment**.
- Protect and preserve the most **sensitive natural areas**.
- Protect, enhance and establish new **view corridors, vistas and visual connections** from surrounding streets, bridges and neighbourhoods.

Discovery, Education and Interpretation

Riverwalk will reveal and express its natural and cultural heritage, both past and present.

Riverwalk will:

- Showcase the **rich natural and cultural heritage** associated with Downtown Brampton and the Etobicoke Creek.
- **Share the story** of the Etobicoke creek through **public art** and other installations.
- Support guided and self-directed **discovery walks**.
- Provide clear and consistent **wayfinding signage**, particularly around major trail entry points and nodes.
- Integrate i**nterpretive and educational** signage and features and art installations.
- Provide **opportunities for public art** and other interpretive installations.
- **Foster partnerships** with agencies, organizations and local community groups to provide ongoing educational and interpretive programming.

Safety and Accessibility

Riverwalk is a safe and inclusive place for everyone to experience and enjoy.

Riverwalk will:

- Provide clear and safe access to the trail for **different levels of mobility and ability**.
- Implement a **unified wayfinding and signage system** for parks and trails to provide consistent identification, orientation and navigation through the Riverwalk area.
- Provide **accessible pick-up and drop-off locations and parking**.
- Improve **public transit access** to all areas.
- Create a **lighting strategy f**or the precinct that will address public safety objectives while achieving the highest standards of habitat protection, reduction of light pollution and energy efficiency.
- Create a continuous trail to with numerous entry points that provides a **clear, safe and intuitive route** through the Riverwalk area.

Fig. 77 Protect, Preserve and Enhance

Fig. 78 Discovery, Education and Interpretation

Fig. 79 Safety and Accessibility

Integration and Intensification

Riverwalk will activate and animate the open space network and provide enhanced public amenities for the growing downtown population.

Riverwalk will:

- **Integrate** with surrounding neighbourhoods.
- Create **strong connections** to downtown Brampton and the downtown public open space network.
- Create a **vibrant waterfront space** by building upon the flood protection measures.
- Enhance open spaces to provide **increased public amenities** and expanded programming
- **Redefine and urbanize** edges to create a vibrant downtown open space network.
- **Foster partnerships** with local community groups, schools and the local business community.
- **Diversify open space use** by incorporating flexible, multi-use recreational space.
- **Support co-programming** with adjacent private and public organizations.

Fig. 80 Integration and Intensification

Character and Identity

Riverwalk is a unique and distinct and landscape within Downtown Brampton. Each portion of Riverwalk maintains a site-specific character, within an overall unified identity and sense of place.

Riverwalk will:

- Establish a new **destination identity** within downtown Brampton and the region.
- Strengthen the **downtown and area character**.
- Create a range of distinctive **natural to urban** spaces.
- Create a **sense of place** that will contribute to a unified open space network.
- Introduce distinct **signature landscape features** that establish a spatial identity for the area.
- Support community stewardship and ownership and encourage **expressions of cultural identity** within public open spaces.
- Establish a **public art program** that includes temporary and permanent installations that can express significant aspects of the landscape, history and culture of the site.
- Create an interpretive and educational **signage and wayfinding strategy** that is distinct, yet integrated into the city's overall signage programs.
- Use **place-making techniques** including space definition, scale, edges, landmarks, scale, texture, views.

Fig. 81 Character and Identity

Fig. 82 The Etobicoke Creek, Brampton, ON

5.0
Environment, Resilience, Sustainability and Public Health

5.1 Riverwalk Framework for Sustainability and Resilience

The Riverwalk UDMP is fundamentally based on sustainability and resiliency. Its primary focus is to integrate and blend natural and built spaces, urban and natural systems, and to ensure longevity and sustained function in a changing environmental and social context.

The City of Brampton is committed to fostering healthy, resilient and environmentally sustainable communities.

The Riverwalk UDMP is an ideal opportunity to advance the City's goals by prioritizing resilience, sustainability and public health, identifying specific actions and integrating them into the broader planning and design framework.

While the DBFP EA managed the flood risk associated with riverine flooding, as well as environmental and ecological improvements, the Riverwalk UDMP will address treatment and integration of the flood protection solution with sustainable open space, built form and mobility. The Riverwalk area has the potential to become a world class demonstration project and to initiate the efforts of bringing the resilience, sustainability and public health work in Brampton and the region to the next level.

Fig. 83 Brampton Eco Park Strategy (2020)

Resilience in the Public Realm

Resilience is the capacity of cities, communities and individuals, to survive, adapt and grow, despite chronic stressors or acute shocks they may experience.

Shocks are defined as sudden sources of stress to a city, including floods, earthquakes, extreme weather, civil unrest, etc. Chronic stressors are defined as evolving sources of stress, including poverty, food insecurity, drought, etc. Although shocks and chronic stressors can have negative effects, they can also be catalysts for change. A robust resilience strategy and systemic changes can guide holistic recovery toward achieving sustainability and economic goals.

Equity and Resilience

Without equity, there can be no true resilience. Marginalized communities are often disproportionately affected by the impacts of climate change and have not historically had access to the resources necessary to plan for and recover from stressors. An approach to resilience planning that puts a focus on equity will protect the most vulnerable populations, including low-income and minority communities from the adverse effects of climate change.

Equity is a complex and overarching goal that is difficult to achieve purely through an infrastructure-based process; it must be built into the City-wide decision-making process and incorporated into the strategic, tactical and operational levels of the City. Achieving true equity in the public realm requires a long-term vision and consideration of all aspects of a project, from planning to implementation and beyond.

Brampton City Council has approved the creation of an Equity Office in 2021, that will focus on identifying and removing barriers in the workplace and community regardless of race, ancestry, place of origin, colour, ethnic origin, disability, citizenship, creed, sex, sexual orientation, gender identity, same sex partnership, age, marital status, family status, immigrant status, receipt of public assistance, political affiliation, religious affiliation, level of literacy, language and/or socio-economic status.

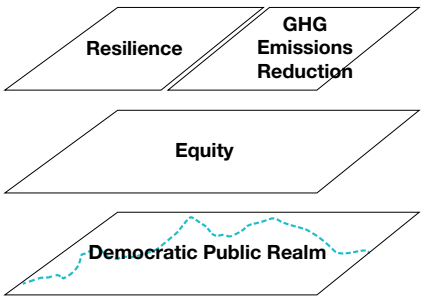


Fig. 84 Riverwalk Sustainability Framework

As part of these efforts, consideration should be given to how infrastructure projects and the built environment can foster equity:

- Consider opportunities to bring equity to procurement and training practices. How can the project contribute to the local and regional economy?
- Consider equity in how we plan community and business engagement, how we provide access to funding, for groups and communities.
- Consider the shifting demographics, at-risk population and 'undesirable' activities within Riverwalk. How can design improve conditions without using hostile design, or further marginalizing at-risk populations?

Resolving the complex social issues impacting downtown Brampton and Riverwalk is beyond the scope and ability of the Riverwalk UDMP, however, Riverwalk can contribute to social justice through the creation of democratic and accessible spaces, for all.

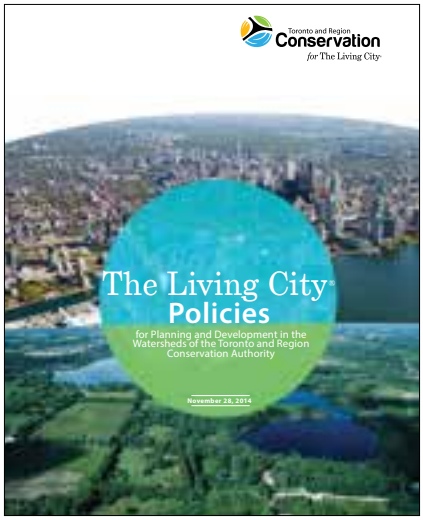


Fig. 85 TRCA The Living City Policies (2014)

Policies and Programs

The groundwork for the Riverwalk Resilience, Sustainability and Public Health framework has been established through many previous municipal, regional and provincial studies, planning initiatives, public outreach programs and funding opportunities.

City of Brampton Initiatives

- Brampton Eco Park Strategy (2020)
- Brampton One Million Trees Initiative (2020)
- Brampton Vision 2040 (2018)
- Nurturing Neighbourhoods Program (2019)
- Community Energy and Emissions Reduction Plan (2019)
- Active Transportation Master Plan (2019)
- Brampton Parks and Recreation Master Plan (2017)
- Downtown Etobicoke Creek Revitalization Study (2015)
- Brampton Official Plan (2020 Office Consolidation)
- Transportation Master Plan (2015)
- Brampton Grow Green Environmental Master Plan (2020)
- Sustainability Metrics Program (2015)
- Sustainable Community Design Guidelines (2013)
- Stormwater Management Master Plan (2009)
- Community Gardens Program

TRCA Initiatives

- The Living City Policies (2014)
- TRCA Stormwater Management Guidelines (latest version)
- Sustainable Neighbourhood Action Program (SNAP)
- Partners in Project Green (PPG)
- TRCA Trail Strategy (2019)
- TRCA Research Agenda
- TRCA Community Engagement and Citizen Science
- TRCA Education and Community Learning Programs
- TRCA Ecological Restoration, including tree and shrub planting
- TRCA's Etobicoke Creek Watershed Plan (2022)
- TRCA's Restoration Opportunities Planning Database
- TRCA's Integrated Restoration Prioritization Database
- Updated Natural Heritage System
- Water Resource System Mapping

Region of Peel Initiatives

- Peel Climate Change Master Plan (2019)
- Peel Community Climate Change and Flood Resiliency Strategy (2019)
- Peel Green Natural Infrastructure Strategy
- Peel Sustainable Transportation Strategy (2018)
- Peel Region Urban Forest Strategy (2011)
- Peel Climate Change Strategy and Partnership (2011)
- Funding Support and Partnerships

Federal Programs

- Federal Disaster Mitigation and Adaptation Fund (DMAF)
- Green Municipal Fund
- Natural Infrastructure Program
- Federal Clean Water and Wastewater Fund (CWWF)
- Federal Funding Website: https://www.canada.ca/en/environment-climate-change/services/climate-change/adapting/funding.html

5.2 Climate Change

Climate Change Adaptation

Resilience to climate change depends upon infrastructure system's ability to anticipate, absorb, adapt to and/or rapidly recover from a potentially disruptive event. The importance of having resilient infrastructure will continue to rise as the potential impacts of climate change increasingly affect water and weather patterns and test communities' ability to adapt to changing conditions.[1]

Adapting to climate change means taking action to prepare for and adjust to both the current effects of climate change and the predicted impacts in the future. It includes proactively planning to reduce impacts from hazards such as flooding, extreme temperatures, drought and severe weather.

In addition to building on the flood protection solution developed through the DBFP EA, Riverwalk will include features that can provide relief from the heat. These include design of the public realm to decrease heat absorption, retention and release through tree planting, minimizing concrete surfaces and introduction of green roofs, as well as design solutions to mitigate thermal pollution of the Etobicoke Creek.

From a practical perspective and given the spatial context of Riverwalk as being adjacent to a watercourse, one of the primary resiliency strategies involves maximizing the conveyance capacity of the watercourse corridor to minimize the risk of riverine flooding which is the purview of the DBFP EA.

The Riverwalk UDMP builds on the DBFP EA which developed the preferred flood protection solution to convey the regulatory flood plus 25% to account for uncertainties around climate change including potentially larger storm flows from more intense storm events under future climate conditions. Incorporating Low Impact Development (LID) measures into planned/existing developments can be considered to avoid chronic high flows from lower intensity storms.

The bypass channel must meet conveyance requirements identified in the DBFP EA. At the same time, the design of the channel should contribute to the City's sustainability objectives for greening, water quality and habitat enhancements and open space connections.

Opportunities to further advance resiliency to climate change through stormwater management within Riverwalk include intercepting uncontrolled stormwater, reducing impermeable surfaces and integrating LID practices as part of the design.

Riverwalk can also support community and social resilience and reduce vulnerability and risk in surrounding neighbourhoods and the broader community through increased open space connections, platforms for resilience education, increased community ownership and stewardship, improved community health and well-being, or even function as a designated emergency meeting area. These opportunities can be explored in next phases of community engagement.

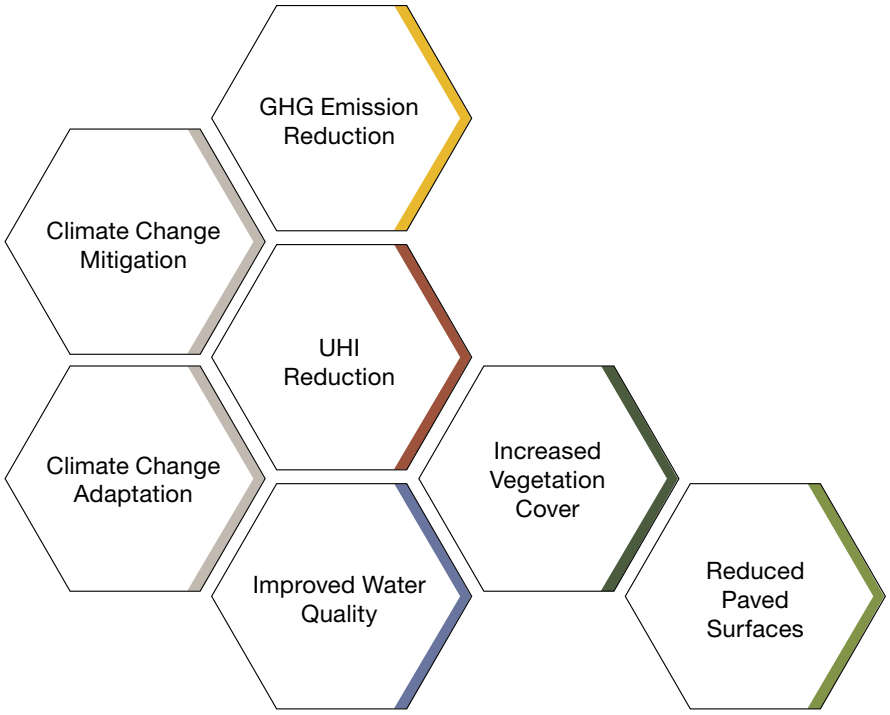


Fig. 86 A Framework for Climate Change Resilience

1 *Source: TRCA, The Living City Policies, for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority, November 28, 2014.*

Reducing the Urban Heat Island Effect

The Urban Heat Island (UHI) effect can exacerbate the health impacts of extreme heat. It is the phenomenon where urban temperatures can be several degrees warmer than surrounding non-urbanized areas and is attributed to the solar heat gain from rooftops and hard surfaces and the reduction in cooling provided by evapo-transpiration from plants and soil due to reduced natural land cover.

Mitigating the UHI effect can help to combat local increases in temperatures by creating a cooler micro-climate. Providing a combination of built and natural shading, including architectural shade structures and increased vegetative cover can contribute to reducing heat-health risks by improving public amenity spaces where people can go to keep cool.

Although the majority of Riverwalk is comprised of open parkland, there are significant opportunities to reduce UHI effect caused by hard surfaces, including the reduction of paved impervious surfaces, where possible and the use of permeable paving materials in parking lots and plazas to cool surface and subsurface temperatures through evapo-transpiration. Preference should be given to pavement materials that have a high albedo and solar reflectance to reduce surface and subsurface temperatures.

Increasing Vegetative Cover

A key strategy within the Riverwalk UDMP to reduce the UHI effect is to increase vegetative cover throughout Riverwalk and to contribute to meeting the targets for Brampton's One Million Trees Program, including the provision of compensation for trees impacted by the Ken Whillans Drive realignment and trees impacted by the widening and deepening of the by pass channel, increasing street tree planting on streets adjacent to the Riverwalk area and on streets identified as green corridors, supporting healthy street trees by integrating them with stormwater management systems where feasible, connecting the City's network of green spaces and increasing tree planting in parking lots within and surrounding Riverwalk.

The Riverwalk UDMP also proposes to increase the vegetative cover on valley slopes in Duggan Park, restore the wetland in Centennial Park and introduce stormwater management facilities in Duggan Park. In addition to tree planting in public open spaces, the Riverwalk UDMP proposes to increase shading and vegetative cover within the low-flow channel to cool surface water.

Green and Blue Roofs and Vertical Greening

New structures within the Riverwalk area should incorporate green roof systems to reduce the UHI effect, to reduce stormwater runoff and to support local biodiversity. Green roofs are one tool within the toolbox of climate change mitigation and adaptation measures and are encouraged in the City's Grow Green Environmental Master Plan, Sustainability Metrics Program and the City's Stormwater Management Master Plan.

Consideration should also be given to introducing blue roofs on structures that cannot support a full green roof. Blue roofs are designed to store rainwater and can provide a number of benefits including temporary storage of rainfall to reduce or delay stormwater runoff, reducing flow rates from roofs and storage for reuse such as irrigation.

Vertical greening, or green walls should be integrated where there is insufficient space for more substantial plantings. This includes bridge abutments, retaining walls and large building facades.

Fig. 87 Mature Shade Trees on City Streets

Fig. 88 Vertical Greening, Toronto, Ontario. Image © Tamara Urben-Imbeault

Reducing Water Temperatures and Improving Water Quality

Elevated water temperatures under future climate conditions can degrade water quality and aquatic habitat. The Riverwalk project can mitigate these impacts in a number of ways.

Long term improvements in the vegetation canopy along Etobicoke Creek north of Church Street and south of the railway will shade the watercourse and help cool water as it flows through Riverwalk.

Planting shade trees at the top of the bypass channel slopes between Church Street and the railway can also contribute to reducing temperatures in the areas below.

The reconstructed bypass channel itself should integrate innovative features to enhance water quality. These include low maintenance low-lying vegetation incorporated into the slopes within the low flow channel to trap and remove pollutants, and a more natural low flow channel material incorporating embedded stones of varying sizes to enhance aeration of the flow in the creek.

Any material within the channel itself must not reduce the required conveyance capacity of the channel as outlined in the DBFP EA.

Intercepting and treating stormwater runoff from the local storm sewer systems discharging to Etobicoke Creek will enhance water quality, offsetting some of the impacts of a changing climate on water quality.

Incorporating LID practices can further mitigate water quality and temperature impacts as they can infiltrate and filter runoff. Infiltrated runoff returns to the watercourse further downstream as cooled filtered groundwater discharge. Filtering runoff can also capture pollutants such as sediments and nutrients.

Practices such as stormwater tree trenches and rainwater harvesting are well suited to the Riverwalk area. Stormwater can be directed into tree soil cells to passively irrigate street trees. Rainwater harvesting and reuse systems can be implemented during site design to reduce the volume of stormwater runoff into the environment and improve groundwater recharge, where reused for irrigation.

Stormwater management facilities can also further mitigate water quality impacts of climate change by capturing sediments in settling basins.

Fig. 89 Bus Shelter Green Roof, Manchester, UK

Fig. 90 Liupanshui Minghu Wetland Park, China

Climate Change Mitigation

Climate change mitigation includes measures to reduce or capture greenhouse gas (GHG) emissions to slow future climate change.

In keeping with the City's 2019 Community Energy and Emissions Reduction Plan (CEERP), one of the most important contributions to the reduction of GHG emissions within Riverwalk will be the improvements to the active transportation network.

The creation of a continuous, safe and accessible trail system, with green corridor connections to downtown Brampton and surrounding neighbourhoods, will encourage a shift from automobile access, to transit and active transportation.

Throughout implementation of the Riverwalk UDMP, preference should be given to materials that have a low carbon footprint from harvesting and extraction, through fabrication, transportation and installation. Where possible, materials for new construction should be sourced locally and the life cycle costs of natural and recycled materials should be considered.

Operations and maintenance requirements can be reduced by selecting robust and durable materials that require minimal refinishing over time, and by incorporating renewable energy sources, including wind and solar power.

Recommendations

1. Include GHG emissions reduction requirements in the procurement of products and services.
2. Request GHG emissions estimates associated with products or services used on Riverwalk.
3. Implement measures to reduce UHI throughout the Riverwalk area.
4. Increase vegetation cover where possible.
5. Implement green and blue roofs in new construction within the Riverwalk area and in surrounding areas, through development agreements.
6. Reduce impermeable surfaces.
7. Implement measures to improve water quality and reduce water temperatures in the Etobicoke Creek.
8. Develop the current environment, resilience, sustainability and public health framework into a plan complete with targets and indicators.

Fig. 91 Bicycle Snake Bridge , Copenhagen

Fig. 92 Protected Bike Lanes, Vancouver, BC

5.3 Ecology and Habitat

An important objective set forth in the Riverwalk UDMP is the protection of existing habitat and ecologies, as well as the rehabilitation of degraded systems and the creation of new habitats and ecologies to support native flora and fauna. The DBFP EA sets out mitigation and monitoring commitments with respect to ecology and habitat that must be adhered to for the design, construction and establishment of the new flood protection works.

The Etobicoke Creek

All interventions to the creek should aim to reduce erosion and improve water quality and aquatic habitat in the upstream and downstream reaches of the site and beyond, without affecting the function of the flood protection measures. This includes incorporating well vegetated stream banks, riffle/ pool sequences and resting habitats to provide a high diversity of in-stream aquatic habitat for a range of fish and other aquatic species, where possible. Any potential for floodplain wetland restoration and groundwater infiltration into the creek should be exploited to enhance the base-flow within the channel and to increase downstream cooling.

In addition, opportunities to control water quantity to mitigate watercourse erosion caused by rapid runoff from urban areas, which can in turn impact stream function, infrastructure and habitat, will be investigated.

Where possible, the natural creek channel should be maintained and enhanced. Interventions along the naturalized banks of the creek should aim to improve the vegetative cover, while controlling invasive plant species. A minimum 25% vegetated cover over the creek should be targeted for naturalized portions of the creek. For degraded portions of the natural stream, or areas that will be disturbed by other construction, the creek bed should be restored to incorporate gravel beds, riffle-pool sequences, in-stream cover in the form of woody debris and floodplain habitat (e.g. wetlands).

Water Quality

Water quality in the creek can be improved in a number of ways including reducing pollutants by intercepting stormwater runoff from adjacent streets using LID strategies (e.g. stormwater tree trenches, bioretention, bioswales and permeable pavement) and conventional end-of-pipe facilities (e.g. ponds, constructed wetlands). In certain areas, LID features should be designed as demonstration landscapes that can contribute to the signature landscapes at the main gateways to Riverwalk.

Water Temperature

Water temperature may be reduced by increasing the vegetative cover over the naturalized portions of the creek, retaining or filtering stormwater runoff, using LID strategies and mitigating thermal pollution from new conventional end-of-pipe facilities (e.g. ponds, constructed wetlands).

Reducing water temperatures within the bypass channel is critical as the water conditions in the channel have impacts downstream. The Riverwalk UDMP proposes tree planting along the upper edge of the widened and deepened channel, which can provide some benefits to water temperatures within the channel itself.

Introducing riffle structures within the creek and in the low flow channel can also improve water quality through aeration and reduction of turbidity from suspended solids by encouraging the deposition of silt. However, in an urbanized system like this, such structures may have too much sedimentation from upstream erosion and this could blanket important fish habitat.

Fig. 93 Riparian Vegetation, Shaws Creek, Alton, ON

Fig. 94 Basking Turtles

The Bypass Channel

Low Flow Channel

The low flow channel in the channelized portion of the creek should be designed to encourage fish passage to the more naturalized reaches upstream of the channel. The low-flow channel itself should be designed to meander within the bottom of the larger bypass channel, to have changes of width and depth, to incorporate riffle-pool sequences and features such as boulders or overhangs to provide in-stream cover. Elements within the low flow channel should be well anchored to prevent dislodging during storm events.

Fish Passage

As part of the DBFP EA, the barriers to fish passage at the south ends of the channel will be removed or modified. At the north end, the transition from the creek's natural channel to the bypass channel will be marked by a rocky ramp or cascade, that will contribute to water quality for the reach below. The grade change at the south end of the bypass channel will be modified. Should a vertical drop remain, the termination of the bypass channel will be designed to facilitate fish passage upstream.

Wetlands and Stormwater Management Facilities

There is an existing wetland at the south end of Centennial Park. This area should be protected and enhanced by controlling invasive plant species. Logs or boulders could be introduced into these areas to provide basking and refuge for turtles and frogs.

The new intermittent wetland and wet meadows proposed in Duggan Park should be designed to include a diversity of native emergent and floating vegetation that support a higher diversity and abundance of wildlife, as well as habitat features that attract birds, turtles and frogs.

Controlled access to natural wetlands and stormwater management facilities could be provided by the careful placement of raised boardwalks and lookout platforms that would allow users to observe wildlife, provide interpretation and outdoor education opportunities, while having little physical impact on these sensitive habitats.

Riparian Habitat

The naturalized portions of the Etobicoke Creek have a robust riparian edge that provide habitat and cover over the water. In these areas, invasive plant species should be controlled to allow native species to flourish, which will help stabilize, creek banks and enrich aquatic and riparian habitat.

Where formal and/or informal trails cause trampling of vegetation and erosion of the stream bank, access should be provided by means of raised boardwalks. Placement of boardwalks should follow desire lines, where possible, to reduce impacts.

Fig. 95 Riffle structures, Morningside Creek, ON

Fig. 96 Rocky Cascade, Jock River, ON

Fig. 97 Open Water Pond and Wetland, Alton, ON

Woodland Habitat/Reforestation

The Riverwalk UDMP proposes a number of areas for reforestation, including the steep slopes in Duggan Park, portions of Central Public School and Rosalea Parks and the unprogrammed lawn areas and the Arboretum in Centennial Park. The DBFP EA commits to compensation for the loss of vegetation associated with the realignment of Ken Whillans Drive and the widening and deepening of the bypass channel. Reforestation should also be undertaken to meet Brampton's One Million Trees targets for the short and long term.

New and existing wooded areas can be enhanced to improve habitat for migrant and breeding birds and increase the overall biodiversity within Riverwalk. Interventions should include improvements to existing soil conditions in areas where tree planting is proposed, planting a diversity of native tree and shrub species that are tolerant of urban conditions, controlling invasive tree and shrub species that may prevent the successful establishment of planted trees, and reducing damage to trees by park users by restricting access to restored/planted areas.

Fig. 98 Rocket Bat Houses, Lick Creek Park, College Station, TX. Alexey Sergeev, 2018.

Meadow Habitat

Maple and Oak Savannah

Savannah landscapes are characterized by native grasses and wildflowers with 10-35% tree cover. Savannah landscapes should be introduced at the Rosalea Park North meadow and at Central Public School fields.

Site appropriate habitat structures for bats and songbirds should be included in these landscapes to mitigate the loss of habitat in surrounding developed land.

Pollinator Meadows

A diversity of native pollinator species should be introduced in the signature landscapes along Ken Whillans Drive and at key entrance points to Riverwalk. Pollinator species should also be included in horticultural beds at Central Public School, Rosalea Park and in the Rosalea Park North meadow and Centennial Park naturalization areas.

Manicured Lawns

The total area of manicured lawn and sodded areas within Riverwalk should be reduced significantly and limited to sports fields and programmed space. Open fields should be allowed to evolve to naturalized meadows, with regular maintenance to prevent growth of woody vegetation and to control invasive plant species.

Naturalized meadows should be complemented with interpretive elements and signage to educate visitors about the intention of these landscapes.

Management and Stewardship

The Etobicoke Creek valley will continue to face significant impacts from its dense urban context, including the preponderance of invasive plant and animal species, water and air pollution, illegal dumping, erosion of slopes and banks, and damage caused by increasing use of pathways and trails. To maintain and continue to enhance the natural environment within Riverwalk, consideration should be given to introducing a management and stewardship strategy.

The management of naturalized spaces is especially important as it relates to the threat of non-native and invasive plant species. Invasive plants can quickly outcompete native vegetation and take over naturalized sites, so annual maintenance is required.

Certain recreational activities may also have unintended environmental impacts, including trampling sensitive vegetation and habitats. Therefore, careful consideration must be given to ensure the protection of natural spaces, while providing access to these valuable amenities. Recreational use should be managed so that natural areas can be enjoyed without exacerbating natural hazards or threatening the integrity of natural features and functions. This may entail seasonal closure of boardwalks or wetland lookouts during nesting seasons and selective park closures to allow reforestation, rehabilitation and establishment of impacted landscapes.

A stewardship strategy can also help to reflect the contributions of the community (e.g. the establishment of a citizen science volunteer group to report plant and wildlife observations) which not only helps land managers, but also empowers the community to embrace Riverwalk.

Recommendations:

1. Expand natural heritage restoration efforts within the valley.
2. Increase the area of woodland habitat.
3. Reduce areas of manicured lawn in favour of naturalized meadows.
4. Increase riparian cover and structural diversity.
5. Provide opportunities for reproduction and foraging for birds and wildlife.
6. Intercept and control stormwater before it discharges to the creek using LID and conventional methods, where possible, to improve water quality and water temperature in the creek.
7. Incorporate riffle/pool sequences, cobbles or boulders, woody debris arrangements and resting habitats upstream and downstream of the bypass channel to provide a diversity of in-stream aquatic habitat for a range of fish species.
8. Incorporate gravel beds in the shallows or in close proximity to areas of groundwater upwelling for fish spawning.
9. Improve connectivity to floodplain and associated features, where possible
10. Introduce logs or boulders to provide basking and refuge for turtles, frogs and waterfowl.
11. Increase emergent vegetation and nesting opportunities for birds.
12. Create nodes of pollinator meadow restoration areas.
13. Plant a diversity of native trees, shrubs, wildflowers and grasses that tolerate urban conditions and reflect a changing climate.
14. Create site appropriate habitat features for wildlife.
15. Improve existing soil conditions where tree planting is proposed.
16. Manage invasive plant species.
17. Promote community engagement, education and stewardship.

Fig. 99 Riverwalk Ecology, Terrestrial and Aquatic Habitat

5.4 Stormwater Management

Riverwalk Stormwater Management Strategy

Stormwater, also called runoff, is the rain and melted snow flowing from rooftops and parking lots onto streets and ultimately into the Etobicoke Creek. The stormwater management strategy for the Riverwalk area will reduce runoff volumes, peak flows, pollutant loads and thermal impacts from Riverwalk, as well as runoff from the neighbourhood that is conveyed through Riverwalk to Etobicoke Creek via existing storm sewer systems. Stormwater management herein refers to controlling local runoff caused by small rainfall events (i.e. 27 mm) in the Riverwalk area before it reaches the creek and is distinct from the riverine flooding managed by the DBFP EA which considered large rainfall events (e.g. over 250 mm).

The stormwater management strategy will consist of design approaches based on best practice that support the general aesthetic principles of Riverwalk.

The emphasis of the strategy should first focus on LID practices that reduce the volume of stormwater runoff reaching Etobicoke Creek and then focus on both traditional and innovative approaches to enhance the quality and attenuate peak flows of the remaining runoff discharging to Etobicoke Creek in the Riverwalk area. The strategy will comply with the latest version of applicable stormwater criteria and guidelines.

The stormwater management strategy should also include opportunities to incorporate LID elements (stormwater tree trenches, bioswales, rain gardens, etc) adjacent to trails and active transportation corridors, to help manage stormwater.

Low Impact Development

LID refers to stormwater management practices that protect, restore, or mimic the natural water cycle and works to capture and store precipitation near where it falls so it can be managed in a way that delivers environmental, social and economic benefits. LID practices include street trees, stormwater tree trenches, rainwater harvesting, green roofs, bioswales, permeable pavement and many others.

The primary opportunities for stormwater management are intercepting community storm sewer outfalls before discharge to the creek, harvesting rainwater for irrigation, integrating street trees with the stormwater system for passive irrigation with road runoff, introducing bioretention and vegetated features to treat runoff from adjacent streets, maximizing low maintenance vegetation and introducing porous pavements in parking lots and plazas.

Redevelopment of the parks, open spaces and roads in the Riverwalk area should minimize reliance on traditional stormwater management infrastructure and pipes to handle stormwater flow and instead, focus on distributed LID practices that can be implemented to manage precipitation where it falls.

This is especially important for the proposed reconstruction and reconfiguration of Ken Whillans Drive. The stormwater peak flow, volume and quality control for the reconstructed section of roadway should be achieved through the use of stormwater tree trenches and other LID practices within the interface between the roadway and park areas to the east.

Fig. 100 Retrofitted Roadside Biofiltration Swale, Brampton

Minimizing Impervious Surfaces

One of the primary interventions proposed in the Riverwalk UDMP is the greening of the bypass channel slopes where and to the extent possible with low, non-woody vegetation that will significantly reduce one of the largest areas of paved, impervious surfaces and contribute to the reduction of the UHI within the Riverwalk area.

Although infiltration is a very limited treatment mechanism for most areas in Brampton due to the prevalent Halton Till soils, the Riverwalk UDMP also encourages the use of permeable materials for new surfaces, such as parking areas and roads where possible, to promote the infiltration of stormwater into the ground and to reduce erosion associated with overland flow.

Where possible, the use of durable precast concrete pavers or porous pavements can contribute to the reduction of overland flow while providing usable surface for programming. The selection and placement of permeable surfaces will require coordination with snow removal as well as the maintenance and operations requirements specific to these installations including periodic cleaning to maintain permeability. See **“Climate Change Mitigation”**, in **“Section 5.2 Climate Change”.**

Bioretention, Bioswales, Planting Islands and Stormwater Tree Trenches

To the extent feasible, runoff from the Riverwalk area should be redirected and integrated into the landscape to enhance water quality through infiltration and filtration.

LID solutions may include:

- The use of stormwater tree trenches, bioswales and biofiltration, particularly adjacent to all vehicular access routes and incorporated into parking layout;
- Stormwater runoff should be directed into continuous soil trenches, including along all streets and in the Rosalea Park Plaza, to provide adequate soil volume and irrigation for trees;
- Tree trenches and rain gardens, should be integrated into the landscapes bordering Ken Whillans Drive, as well as in open meadow areas in Duggan Park and Centennial Park;

Rainwater Harvesting

Architectural improvements within Riverwalk should be tied into an overall stormwater management strategy and consideration should be given to educational opportunities relating to the innovative approaches and green design initiatives.

New and existing buildings and structures within and adjacent to open spaces can implement strategies to intercept rainfall and to reduce surface runoff. These include green/blue roofs as well as rainwater harvesting for irrigation and use in occupied buildings. Sub-surface storage for infiltration and attenuation of storm runoff can also be implemented below new sports fields, urban plazas and parking areas, where possible. See **“Climate Change Mitigation”**, in **“Section 5.2 Climate Change”.**

Fig. 101 Integrated Bioswale, Banff Centre for the Arts, Banff, BC

Fig. 102 Rainwater Harvesting at Confluence Park, Image © Casey Dunn

Interception of Existing Storm Sewers

There are a number of storm sewer systems that flow through the Riverwalk area before discharging to Etobicoke Creek without providing treatment of stormwater runoff. The contributing drainage areas to the existing outfalls range from 1 hectare to over 40 hectares.

The range of LID solutions available to manage runoff from external areas will be limited by the capacity of such solutions driven by local constraints such as available space, proximity to groundwater and soil conditions.

A combined approach of using LID, where feasible, as well as conventional end-of-pipe facilities are expected to enhance the sustainability of the system and mitigate future potential climate change impacts by reducing runoff volumes and improving water quality and the health of aquatic habitat in Etobicoke Creek.

The potential to intercept the flows from these systems and integrate them into the Riverwalk are identified in the Riverwalk UDMP and include a range of integrated, landscape-based solutions that can be an engaging, interactive learning and interpretive opportunity.

Landscape Bioretention Facilities

Although the physical design of bioretention facilities may vary, the typical construction profile consists of a gravel storage layer, a choker layer, a bioretention media layer, a mulch layer and a vegetation layer.

Variations, such as tree trenches that integrate stormwater with street trees, will be integrated to support tree health and minimize maintenance relative to other types of bioretention practices, such as swales and planters.

The following locations should be considered for bioretention facilities:

- Incorporate stormwater tree trenches or bioswales adjacent to trails and multi-use path corridors, if space permits
- Integrate stormwater tree trenches or bioswales into demonstration landscapes to manage stormwater from the Mara Crescent storm sewer system
- Ensure passive, vegetation-based treatment is integrated into meadow and wetland landscapes to manage runoff from storm sewer systems west of the realigned Ken Whillans Drive
- Provide linear stormwater tree trenches or bioswales along Mary and Guest Streets to capture and treat stormwater before it flows to the Centennial Park Wetland

Stormwater Management Facilities

Stormwater management ponds and wetlands can passively treat urban stormwater in permanent open water pools and extended detention storage.

- There is an opportunity for potential SWM ponds and/or wetlands in Duggan Park on the east side of the Etobicoke Creek

Rooftop Rainwater Harvesting

Rainwater harvesting and collection of rainwater from a roof or other surfaces can be used to augment freshwater supplies. Water collected is typically used as a non-potable source for uses such as toilet flushing, urinals and irrigation. The following locations should be considered for rooftop rainwater harvesting:

- Central Public School rooftop rainwater harvesting for irrigation of community garden plots and terraced landscape
- Future opportunities for rainwater harvesting in development parcel at Rosalea Park for irrigation of the park landscapes

Underground Storage Units

On-site, underground storage units capture stormwater collected from surrounding impervious areas and can either be used for landscape uses such as irrigation or released slowly to infiltrate and to recharge groundwater. The following locations should be considered for underground SWM storage units:

- Beneath the proposed Rosalea Plaza and water features
- Beneath reconfigured Duggan Park parking lot

Water Quality Units (OGS)

Water Quality Units, also known as oil-grit separators capture pollutants such as sediment, trash and oil in stormwater at the point of entry into the stormwater system. The following locations should be considered for water quality units:

- Vodden Street and Ken Whillans Drive
- Scott Street, north of Church Street East
- Church Street East and Ken Whillans Drive
- John Street Pedestrian Bridge
- James Street Cul-de-sac
- Mary Street, south of Armstrong Street
- Centennial Park parking lot

Recommendations

1. Develop a stormwater management strategy that is integrated into the broader stormwater management system and based on an assessment of feasibility, considering constraints such as groundwater proximity and infiltration rates.
2. Minimize reliance on traditional stormwater management infrastructure and pipes .
3. Implement LID solutions, where possible.
4. Where possible, intercept and control community storm sewers before water reaches the creek.
5. Where possible, implement rainwater harvesting for irrigation.
6. Integrate street trees with the stormwater system, or other bioretention and vegetated features to treat runoff from adjacent streets.
7. Maximize low maintenance vegetation.
8. Utilize low maintenance and durable materials.
9. Introduce porous pavements and stormwater retention in parking lots and plazas, where possible.
10. Reduce standing water to decrease mosquitoes and vector borne diseases.

Fig. 103 Rainwater Harvesting Canopy, Rio Olympics, Rua Arquitetos, 2016

Fig. 104 Concept for Riverwalk Stormwater Management Strategy (to be assessed in future feasibility study)

5.5 Public Health and the Built Environment

The Riverwalk UDMP emphasizes resilience, sustainability and public health as it relates to the built environment.

Be it through rehabilitation, enhancement or interpretation, the principles of Riverwalk aim to create a place for people to enjoy important natural features and green spaces that weave through Brampton's core. The Etobicoke Creek valley and Riverwalk area are an important amenity for local and regional communities and the implementation of the Riverwalk UDMP will contribute to a number of the principles related to community health also identified in Brampton's Eco Park Strategy.

Providing a variety of opportunities for nature-based recreation experiences is key to building healthy communities, as inequitable access, over-use and subsequent degradation of an urban open space system are risks inherent in rapidly urbanizing centres.

The Riverwalk UDMP aims to facilitate active lifestyles by providing a variety of experiences, safe places to congregate and opportunities to engage with nature that will foster, community involvement, physical activity, healthy diet and social engagement. The Riverwalk UDMP also recommends and supports the creation of potential partnerships with neighbouring institutions (e.g. hospitals, school boards, research institutions, senior homes) and community organizations for novel use of space such as pop ups, art displays, community events, festivals, programs/classes and research.

Active Living

Riverwalk includes an important open space network that will accommodate active living and physical health. It will create a walkable, accessible open space network that serves the community and promotes social connectedness for users of all ages and all abilities.

Active Transportation and Recreation

Brampton's Active Transportation Master Plan promotes the integration of complete streets and the expansion of the recreational trail network throughout the city to increase connectivity and walkability within the City.

Building on this framework, the Riverwalk UDMP promotes active transportation and recreation within Riverwalk and surrounding communities through the creation of a connected and continuous active transportation network with new connections to surrounding communities.

The Riverwalk UDMP will support active living by:

- Providing accessible spaces for events, programs and classes;
- Providing spaces for organized sports programs and for unstructured sports, including grassy fields, slopes, recreational trails, discovery walks, etc.
- Creating new plazas, picnic spaces and family areas;
- Promoting all-season outdoor activities that include seasonal programming and provision for year-round maintenance and accessibility;
- Providing outdoor amenities including lighting, shelter, washroom facilities, etc.
- **"Chapter 7.0 Programming"** outlines recommendations for active use of public open space that contributes to resilience and public health.

Fig. 105 The Etobicoke Creek Recreational Trail, Bike Brampton

Transportation Resilience

The Riverwalk UDMP endeavours to create redundancy within the transportation network. Although transportation resilience is a city-wide and even regional concern, the Riverwalk UDMP supports a more robust, resilient and multi-modal transportation network that can withstand localized disruptions. As outlined in **"Section 5.2 Climate Change"**, under **"Climate Change Adaptation"**, transportation resilience is an important component in creating a strong emergency safety and exit strategy for flood and other extreme events, using trails as alternative routes if overland flooding creates impasses in the surrounding road network. Strategies for transportation resilience include:

- Creating multiple access and egress points at roads, pathways and recreational trails;
- Ensuring that all areas of Riverwalk are easily accessible by public transit;
- Improving local cycling infrastructure and supporting amenities;
- Providing additional crossings of the Etobicoke Creek to create redundancy;
- Introducing controlled intersections and protected bike lanes connecting to downtown Brampton and to adjacent neighbourhoods.
- **"Chapter 6.0 Sustainable Transportation"** outlines recommendations for active use of public open space that contributes to resilience and public health.

Fig. 106 Brampton Community Garden, Flower City Seniors Centre, Brampton, ON

Fig. 107 Brampton Tree Lighting Ceremony, Garden Square

Fig. 108 Brampton Farmer's Market, Main Street, Brampton, ON

Social and Mental Health

Green spaces offer opportunities for interaction with the natural environment and provide ecosystem services that contribute to positive health outcomes. Such opportunities include children's play, physical exercise and athletic activities, quiet relaxation and meditation, social engagement and reprieve from urban noise and heat (WHO, 2016). Opportunities for passive, social, recreational, health and cultural/ community activities, programs and/ or services through the utilization of natural and environmentally sustainable mechanisms are proposed within the Riverwalk UDMP, these include:

- Access to water in all its forms – physical, visual and auditory access to the creek, use of water in public amenities, stormwater facilities, water features, seasonal interaction with ice and snow in the winter;
- A continuous, safe and accessible recreational trail system;
- New seating and gathering spaces;
- Public art that reflects the local community, landscape and culture;
- Community event space;
- Nature-based play and fitness equipment;
- Community gardens and urban agriculture;
- Outdoor winter activities including, tobogganing and skating, snow shoeing, etc.

The proposed infrastructure noted above provides for social and cultural programming including health and fitness classes, art workshops, community events and outdoor education.

Fig. 109 Lookout over the marsh at the head of Poole Creek, along the Trans Canada Trail just west of Stittsville. Photo by Glen Gower.

Fig. 110 Nature-based playground, Zucker Natural Exploration area, Prospect Park, NY

Connection to Nature

Making nature visible though experiential design and art can provide a way for visitors to reconnect with the land and water, feel and understand that they are a part of nature and interact with ecological systems.

The Riverwalk UDMP has identified a number of ways for users to interact with and learn from the natural systems within Riverwalk.

- Strategically placed trails, resting spots, or outlooks overlooking vistas or oriented to draw the attention to key ecological features;
- Introduction of demonstration landscapes that illustrate ecosystem services and ecological functions and processes in an interesting, experiential manner;
- Creating discovery walks including educational signage, maps and interpretive panels;
- Integrating playgrounds or nature based play into natural landscapes and topography.

Interpretation, Education and Stewardship

The Riverwalk UDMP looks to give users the tools to discover and understand the natural heritage features within Riverwalk including:

- A signage and wayfinding system that incorporates educational and interpretive possibilities.
- Public art placed along trails and within landscape settings;
- Places for nature observation, including pollinator meadows, wetland boardwalks and places for bird watching;
- Opportunities for meaningful interactions and experiences between people and nature;
- Promoting opportunities for urban agriculture;
- Actively striving to achieve the seven guiding Eco Park principles;
- Providing opportunities for local businesses and community groups to take stewardship of open spaces;
- Providing opportunities to showcase novel green technologies.
- Additional recommendations are included in **“Chapter 7.0 Programming”.**

Seasonal Safety and Accessibility

The Riverwalk UDMP also aims to extend the use of open space beyond daytime use and during all seasons. This requires special consideration for safety and comfort including:

For winter use, wind breaks and warming huts can be provided, but the key to ensuring active use of open space in winter time, is programming that engages the community and embraces the season. This can include tobogganing hills, ice skating, outdoor winter markets, winter festivals that include food and Christmas markets, etc.

- Amenities should be provided for comfort during extreme heat events, including splash pads, drinking fountains and water bottle filling stations, seating and shade structures.
- Wind and rain shelters should be provided throughout, as well as improved lighting to extend the hours of use due to limited daytime sunlight
- Lighting shall be dark sky compliant and certain sensitive habitat areas, such as the riparian edges and Centennial Park wetland could be dark at night.

Fig. 111 Shade Canopy

Fig. 112 Winnipeg Warming Huts Competition Winner, 2010

Fig. 113 Bottle Filling Station, Sault St. Marie, ON

5.6 Riverwalk Eco Spaces

Brampton's Eco Park Strategy

Riverwalk is uniquely positioned to exemplify the principles of Brampton's Eco Park Strategy. By its very nature, the Riverwalk aims to connect a series of open spaces, to celebrate the natural features of the Etobicoke Creek valley and to connect people to natural systems and processes.

Defining Brampton Eco Park

Brampton Eco Park is made up of a network of Eco Spaces. Eco Spaces are the building blocks of Brampton Eco Park.

Eco Park Principles

1. Maximize ecological value
2. Provide opportunities for social services
3. Make nature visible
4. Design with nature
5. Integrate with the surrounding community
6. Support innovation
7. Reflect local identity

The Eco Park Spectrum

All Eco Spaces fall within a spectrum of "green". They can be highly naturalized systems that permit gentle human interactions to highly functioning social landscapes, developed to engage visitors and readily activate human-nature interactions. The spectrum reflects the different forms Eco Spaces may take, emphasizing that there is no one Eco Space design.

On the other end of the spectrum, a park promoting passive activities among pollinator meadows may be present. Art could be displayed along wooded trails and an area provided that displays different types of sustainable gardens.

There may be a technology zone constructed with permeable material for residents to congregate, relax, or bring work to that includes lighting, WiFi and electrical outlets sourced by solar panels placed throughout the Eco Space. See **"Climate Change Mitigation"**, in section **"Section 5.2 Climate Change".**

Eco Spaces

An Eco Space is a green area within Brampton that strengthens the coexistence of people and the environment by:

- Enhancing and maintaining natural systems and processes;
- Integrating opportunities for meaningful social and environmental interactions and experiences and;
- Actively striving to incorporate the seven guiding Eco Park principles.

Fig. 114 The Eco Park Spectrum, Excerpt from Brampton's Eco Park Strategy

Riverwalk: Eco Spaces within an Eco Space

The entire Riverwalk area could be considered an Eco Space in itself, spanning the entire natural-social spectrum and exemplifying the principles of Brampton's Eco Park Strategy.

Within the broader Riverwalk open space network, the Riverwalk UDMP has identified three smaller, more discrete areas that could be implemented as pilot projects for the Brampton Eco Park Strategy. Each of these three areas also contain components that fulfill all of the principles of the Eco Park Strategy. The suggested pilot projects are identified as follows:

1. Eco Space: Rosalea Park
2. Eco Space: Centennial Park Wetland and Arboretum
3. Eco Space: Duggan Park

The features and character of each Eco Space pilot project are outlined in the following pages and while each could be experienced independently, their implementation ultimately will contribute to the greater Riverwalk Eco Space.

To develop each Riverwalk Eco Space, the community should be closely engaged in both the immediate and longer term through the detailed design process and installation of certain community features like community gardens, tree planting and gathering areas, to build long-term ownership and stewardship. Engagement should also help identify local leaders for a potential future SNAP in the surrounding neighbourhoods.

Fig. 115 Riverwalk Eco Spaces

Riverwalk Sustainable Neighbourhood Action Program (SNAP)

A new Riverwalk SNAP could complement the Riverwalk UDMP initiative by including emergency preparedness and resilience plans; identification of candidate community and public realm benefits projects/programs which these large infrastructure projects could contribute; and LID and other climate action implementation projects on surrounding public and private land. It would also help support community-led projects and ownership and the Stewardship Strategy.

In the medium to long term, TRCA could lead the development of the new Riverwalk SNAP action plan and initial implementation in surrounding residential neighbourhoods, pending confirmation of resources and fees for service arrangements.

In the shorter term the City and TRCA, in collaboration with local groups and agencies, could play a role in helping to advise or host residential engagement with the goal of fostering positive relationships with emerging local leaders and support them to champion longer term sustainable action in the adjacent residential neighbourhoods.

Fig. 116 Evolution of the Brampton Eco Park, Excerpt from Brampton's Eco Park Strategy

Eco Space: Rosalea Park

Rosalea Park is envisioned to become an engaging public space that is integrated into the surrounding topography of the creek and flood protection infrastructure.

This area falls into the more urbanized end of the Eco Space spectrum, but the space created by the realignment and extension of Ken Whillans Drive, including the proposed new plaza, gathering space and meadow will easily embody all seven principles of Brampton's Eco Park strategy.

Principle 1: Maximize ecological value

- Introduce a pollinator meadow adjacent to the channel in Rosalea Park and into Rosalea Park North;
- Introduce greening within the bypass channel through terracing, to improve terrestrial and aquatic habitat.

Principle 2: Provide opportunities for social services

- Provide programmable community space at the new Rosalea Park Plaza;
- Providing opportunities for education and interpretation of the site's natural and cultural heritage.

Principle 3: Make nature visible

- Use the water feature and associated LID in Rosalea Park to showcase the movement of water through the site in an interactive and engaging way.
- The design of the bypass channel and associated structures through Rosalea Park will be an important element to illustrate the riverine processes at work.

Principle 4: Design with nature

- Use natural and human-made topography, native plants and striking planting arrangements to create signature landscapes and to introduce new ecologies;
- Provide new lookouts and views with opportunities for education and interpretation.

Principle 5: Integrate with the surrounding community

- Provide opportunities for new mixed-use development sites along the west side of the Ken Whillans Drive extension;
- Integrate and engage with the local business community to activate the new Rosalea Plaza;
- Design the Ken Whillans Drive extension as a pedestrian-priority street.

Principle 6: Support innovation

- Exemplify best practices for sustainable design, including LID practices, innovative materials and renewable energy sources in Rosalea Park and along Ken Whillans Drive.

Principle 7: Reflect local identity

- Provide opportunities for temporary and permanent public art in the new Rosalea Park Plaza and in Rosalea Park North;
- Provide opportunities for seasonal events and installations in Rosalea Park Plaza.

Fig. 117 Rosalea Park Eco Space

Eco Space: Centennial Park Wetland and Arboretum

The arboretum, located on the west plateau in Centennial Park, overlooks a natural wetland on the west bank of the creek. As part of the Riverwalk UDMP, both the arboretum and the wetland would be rehabilitated and enhanced through planting of native species and reorganizing views and access.

The Centennial Park wetland and arboretum are at the more naturalized end of the Eco Space spectrum but together, fulfill all the principles for Eco Spaces.

Principle 1: Maximize ecological value

- Restoration and expansion of the existing wetland west of the creek by controlling invasive plant species, planting native species and treating stormwater runoff;
- The expansion and enhancement of the arboretum by planting native trees that exemplify regional, historical and heritage landscapes will contribute to the habitat potential of the site while providing additional educational opportunities.

Principle 2: Provide opportunities for social services

- The revitalized arboretum is an opportunity to partner with schools and community groups to offer outdoor education programs.

Principle 3: Make nature visible

- Introduce interpretive signage in the arboretum and surrounding the wetland;
- Place pathways and boardwalks to create viewing opportunities of habitat and native vegetation, while protecting sensitive areas from informal foot traffic.

Principle 4: Design with nature

- Introducing new bridges and boardwalks to provide new viewing and interpretive opportunities for the existing wetland;
- Use the site's natural topography to create a lookout from the arboretum to the wetland below.

Principle 5: Integrate with the surrounding community

- Provide new crossings to connect communities on the east and west sides of the creek;
- Provide new opportunities for organized and informal nature-based educational activities at the wetland and arboretum;
- Find opportunities to integrate with and involve the local business community.

Principle 6: Support innovation

- Exemplify best practices for sustainable design, including LID practices, innovative materials and renewable energy sources in all aspects of Centennial Park.

Principle 7: Reflect local identity

- Provide opportunities for public art and installations within the arboretum;
- Provide opportunities for community, business and school engagement and stewardship.

Fig. 118 Centennial Park Eco Space

Eco Space: Duggan Park Demonstration Landscapes

Duggan Park spans the entire Eco Park spectrum, with portions of the park having a very naturalized character and others being highly programmed community spaces.

The combination of ecological enhancement community amenities proposed within Duggan Park create a space that meets the 7 principles needed to create an Eco Space.

Principle 1: Maximize ecological value

- Restore riparian vegetation and creek banks by controlling invasive plant species and planting native species;
- Introduce new meadow and stormwater management landscapes along Ken Whillans Drive.

Principle 2: Provide opportunities for social services

- Provide improved programming and recreation facilities including walking trails, boardwalks, nature-based playground, reconfigured dogs off-leash area, sports fields and new community gardens;

Principle 3: Make nature visible

- Create demonstration landscapes along the west side of Ken Whillans Drive that exemplify natural processes and stormwater management;
- Realign the Etobicoke Creek Recreational Trail and introduce new pathways and boardwalks to provide a rich experience of the riparian landscape while reducing damage from informal foot traffic in sensitive areas;
- Provide new lookouts and views to the creek with new interpretive and educational opportunities.

Principle 4: Design with nature

- Integrate stormwater management facilities within the demonstration landscapes along Ken Whillans Drive and in Duggan Park;
- Use the natural topography of the creek valley to create a nature-based playground in Duggan Park.

Principle 5: Integrate with the surrounding community

- Promote active transportation and public health through the reconfiguration of Ken Whillans Drive to incorporate protected bike lanes;
- Introduce pedestrian-priority intersections to adjacent neighbourhoods and to the nearby senior's residence;
- Repurpose some of the existing play fields for community gardens or urban agriculture that will engage the community.
- Find opportunities to integrate with and involve the local business community.

Principle 6: Support innovation

- Exemplify best practices for sustainable design, including LID practices, innovative materials and renewable energy sources in Duggan Park and along Ken Whillans Drive.

Principle 7: Reflect local identity

- Introduce community gardens and urban agriculture and foster opportunities for engagement and stewardship with local community groups;
- Provide opportunities for temporary and permanent public art in Duggan Park and within the demonstration landscapes along Ken Whillans Drive.

Fig. 119 Duggan Park Eco Space

Recommendations

1. Where possible, complementary projects should be implemented concurrently to achieve complete Eco Spaces as identified in the City's Eco Park strategy. See **"Chapter 9.0 Implementation Framework"**
2. Create a Framework for implementation of priority Eco Spaces within the Riverwalk area.
3. Establish a Riverwalk Eco Space signage and wayfinding strategy, including education, interpretation and branding.
4. Promote community integration and partnerships and foster ongoing community and business engagement.
5. Create a Riverwalk Stewardship Strategy.
6. Explore the opportunity to establish a Riverwalk Sustainable Neighbourhood Action Program (SNAP).
7. Where possible, implement complementary projects concurrently to achieve complete Eco Spaces.

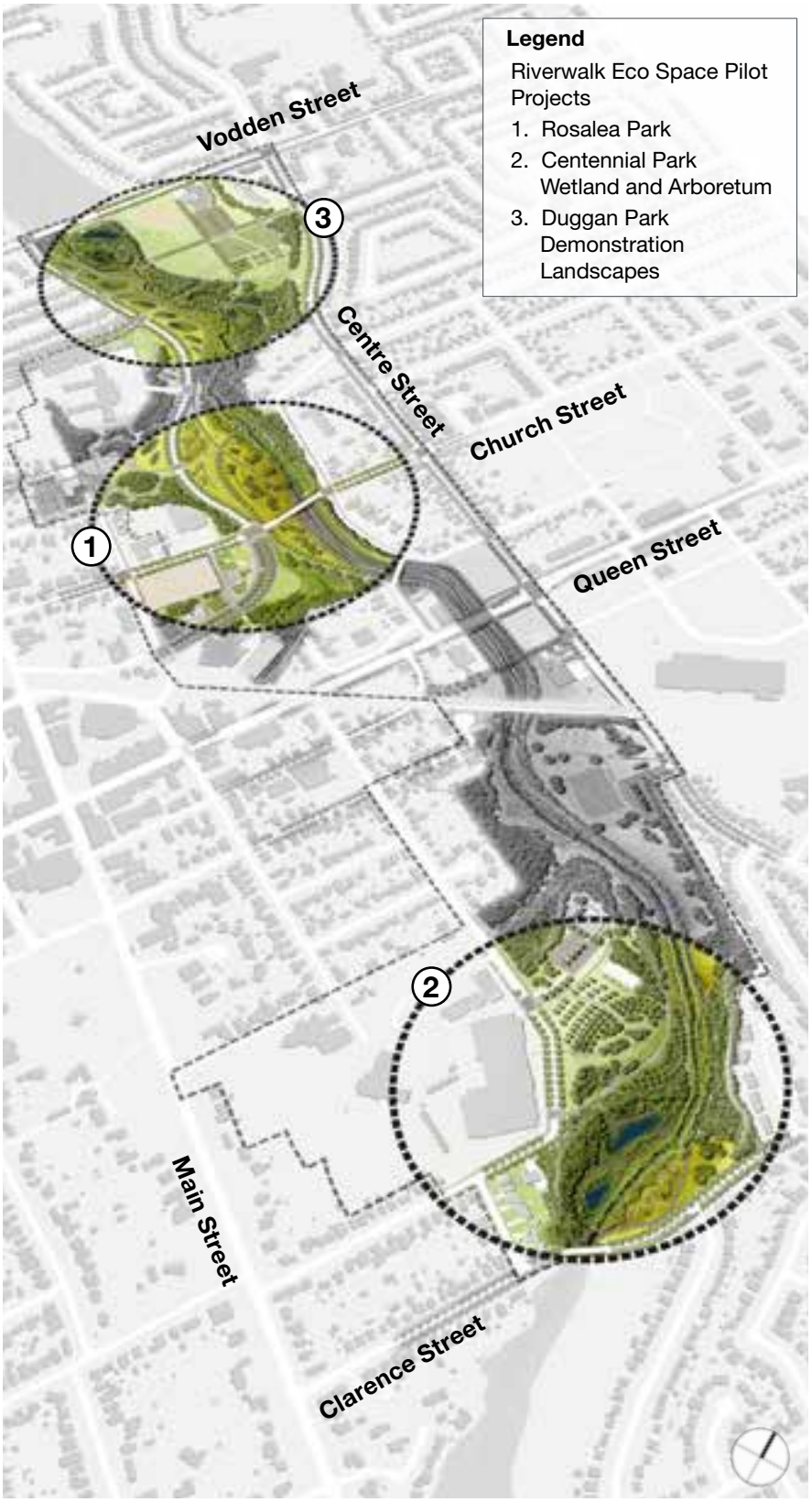


Fig. 120 Riverwalk Eco Space Pilot Projects

Fig. 121 Mature Willow on the Bank of the Etobicoke Creek, Duggan Park

6.0
Sustainable Transportation

6.1 Integration with the Downtown Transportation Network

Downtown Transportation Network Context

Located at the heart of the City, Riverwalk is well integrated into the City's transportation network, with a number of major streets crossing though and running adjacent to the site.

Proximity to downtown and to the major local and regional transit stations, make Riverwalk an integral part of the transportation network and the Riverwalk UDMP proposes to build upon these strengths by increasing connections from the Riverwalk area to downtown destinations and surrounding open spaces, improving the site's walkability and overall accessibility.

Riverwalk is well positioned to be one of the principle drivers for Brampton's growing downtown active transportation network, including key cycling routes, the Etobicoke Creek Recreational Trail and the introduction of new pathways, trails and crossings that will connect neighbourhoods to a broader open space network.

The Riverwalk UDMP proposes to strengthen the north-south connections between residential neighbourhoods and the downtown east-west corridors, including Vodden, Church, Queen and Clarence Streets.

New connections are also proposed to strengthen the active transportation network in the central Riverwalk area, including a new crossing beneath the rail corridor at Centennial Park and a new pedestrian crossing at John Street.

Streets and Sidewalks

To fully integrate Riverwalk into the fabric of the city, it is important to strengthen existing and create new connections within the Riverwalk area, to downtown Brampton, surrounding neighbourhoods and to the broader open space network.

Pedestrian Priority Streets

Consideration should also be given to creating pedestrian priority streets and crossing zones at major community spaces along the Riverwalk. These include the Ken Whillans Drive extension through Rosalea Park and at the Queen Street channel crossing.

Additional opportunities exist to create pedestrian priority zones on Union and Nelson Streets, to improve the connection between the Rosalea Plaza and Garden Square.

Street Crossings

Traffic calming measures should be located at key intersections to provide safe and inviting access between Riverwalk and surrounding neighbourhoods. Key crossings should be improved to include:

- Clearly marked, widened crosswalks, with bicycle crossings;
- Controlled intersections (4-way stop or signalized);
- Reduced corner radii and crossing distances;
- Tabletop/raised intersections.

Green Corridors

Key streets should be enhanced to become green corridors that provide intuitive, accessible and identifiable connections to Riverwalk, including:

- Widened/enhanced sidewalks;
- Safe, continuous bike lanes;
- Street tree and well planted boulevards;
- Low Impact Development (LID) practices, where possible, including integration of stormwater management with street trees;
- Pedestrian-scale lighting;
- Public transit access.

Green corridors should exemplify the City's sustainability and resilience objectives and extend beyond the Riverwalk area to become city-wide connections linking the open space network and outdoor destinations in downtown Brampton.

Fig. 122 Shared Street, Market Street, Toronto, ON

Recommendations

1. Introduce pedestrian priority streets and flexible spaces at major community spaces int he Riverwalk area.
2. Improve street crossings at all intersections adjacent to Riverwalk.
3. Create pedestrian priority zones at key intersections.
4. Create green corridors to surrounding neighbourhoods and open spaces.
5. Improve walkability and accessibility by enhancing streets and sidewalks, providing controlled intersections in the Riverwalk area.
6. Improve connections and access to transit from Riverwalk
7. Create new east west and north-south crossings to improve accessibility, walkability and connectivity within the site and to surrounding neighbourhoods.

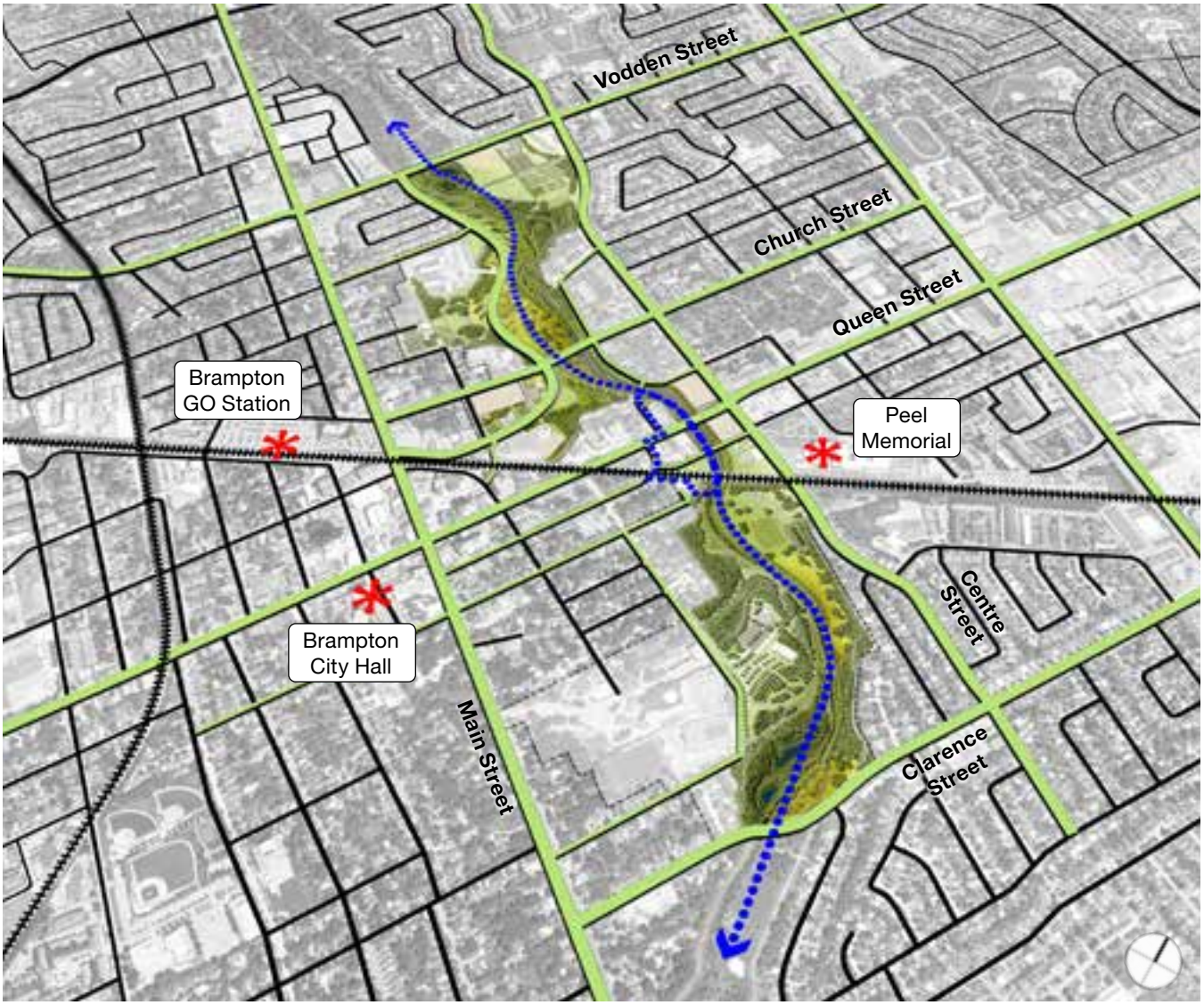


Fig. 123 Riverwalk Transportation Network

6.2 Public Transit

Connections to Existing Local Transit Routes

The Riverwalk area is generally well served by local and regional transit, however, clear signage and access to Riverwalk should be provided in coordination with an integrated wayfinding and signage strategy.

Existing Brampton Transit stops at Riverwalk gateways should be expanded and enhanced to provide additional shelter, pedestrian-scale lighting, seating and wayfinding specific to Riverwalk. Enhanced stops could be implemented at the three recommended locations, as well as at other stops within the study area, providing that there is available land and ROW on which to install the enhanced amenities. The Riverwalk UDMP recommends enhanced stops at:

- Vodden Street and Ken Whillans Drive
- Centre Street and Beech Street
- Centre Street and Church Street

Future Higher-Order Transit

The Main and Queen Street corridors have been identified in the City's Transportation Master Plan, as routes for higher-order transit that may operate in partially or completely dedicated rights-of-way, outside of mixed traffic and therefore can achieve levels of speed and reliability greater than mixed-traffic transit.

Downtown Transit Hub

The City plans to initiate a study for Downtown Transit Hub that will offer enhanced capacity, quality, and connectivity to the local and higher order transit services in downtown Brampton.

The Downtown Transit Hub facility will consider amenities such as waiting areas, concessions and washroom facilities. Future proofing the facility for possible switch to electric buses will also be considered.

Queen Street Bus Rapid Transit and MTSAs

Major Transit Station Areas (MTSA) are defined as "the area including and around any existing or planned higher order transit station or stop within a settlement area; or the area including and around a major bus depot in an urban core".[1]

ZÜM is the city's first step towards high order transit offering frequent rapid transit service on high capacity routes. An extension of the Queen Street Bus Rapid Transit led by Metrolinx, with support from the City of Brampton, the Region of Peel, and York Region, would operate in exclusive lanes with a high level of priority at crossing intersections. BRT stop locations will be informed by the MTSA recommendations and confirmed through Metrolinx's Transit Project Assessment Process (TPAP).

Queen Street Transit Plaza

The transit stop at the intersection of Queen and Centre Street has been identified as an MTSA. The Riverwalk UDMP has also identified this as a possible location for a transit plaza that could become a key destination at the centre of Riverwalk.

The development of a transit plaza at this intersection is dependent on development agreements with adjacent property owners, but its central location at the junction of Riverwalk and the City's main east-west transit route will make this the signature Riverwalk transit stop.

The transit plaza should be well integrated with the new development frontage and offer amenities such as seating, pedestrian-scale lighting, shade trees, enhanced pavement and site furnishings, as well as wayfinding and signage specific to Riverwalk.

Future Main Street LRT

Brampton City Council approved staff recommendations to update the Hurontario-Main LRT environmental assessment study to include the option to extend light rail transit from Brampton Gateway Terminal to Brampton GO station in downtown Brampton. In June 2021, Council recommended that staff move forward with the preferred surface and underground alignments for the 30% preliminary design and draft environmental project report. Council unanimously supported the tunnel option as the preferred alignment to advance funding advocacy with the current provincial and federal governments.

Regional Transit and Future Widening of Rail Corridor

Metrolinx is currently undertaking an expansion of GO service in the region, which may impact the rail corridor the bisects the Riverwalk. To provide more frequent train service outside the rush hours, the Kitchener GO expansion is anticipated to transform the line into a true frequent rapid transit experience. The expansion of the rail corridor within the Riverwalk area is proposed to add a 3rd and potentially a 4th track. The relationship between the expanded rail corridor and the Etobicoke Creek and Riverwalk will be redefined, as the CN bridge will require reconstruction.

1 *Government of Ontario, A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2019.*

The Brampton GO station is located within a 10 minute walking distance from the Riverwalk area and the Riverwalk UDMP recommends improvements to pedestrian connections where Riverwalk intersects with the rail corridor. Improvements should include enhanced grade separated crossings and pedestrian underpasses that could be implemented in conjunction with the rail expansion project.

Recommendations

1. Improve accessibility to Riverwalk from Regional transit stops.
2. Consider enhanced transit stops at Riverwalk Gateways.
3. Consider new local transit routes and transit stops to serve the Riverwalk area.
4. Consider a new transit plaza at Centre Street.
5. Plan future transit amenities to include accessibility to Riverwalk.
6. Implement an integrated wayfinding and signage program that includes transit stops adjacent to Riverwalk.
7. Coordinate new and enhanced connections and rail crossings in coordination with the GO Service Improvements and potential 3rd line project.

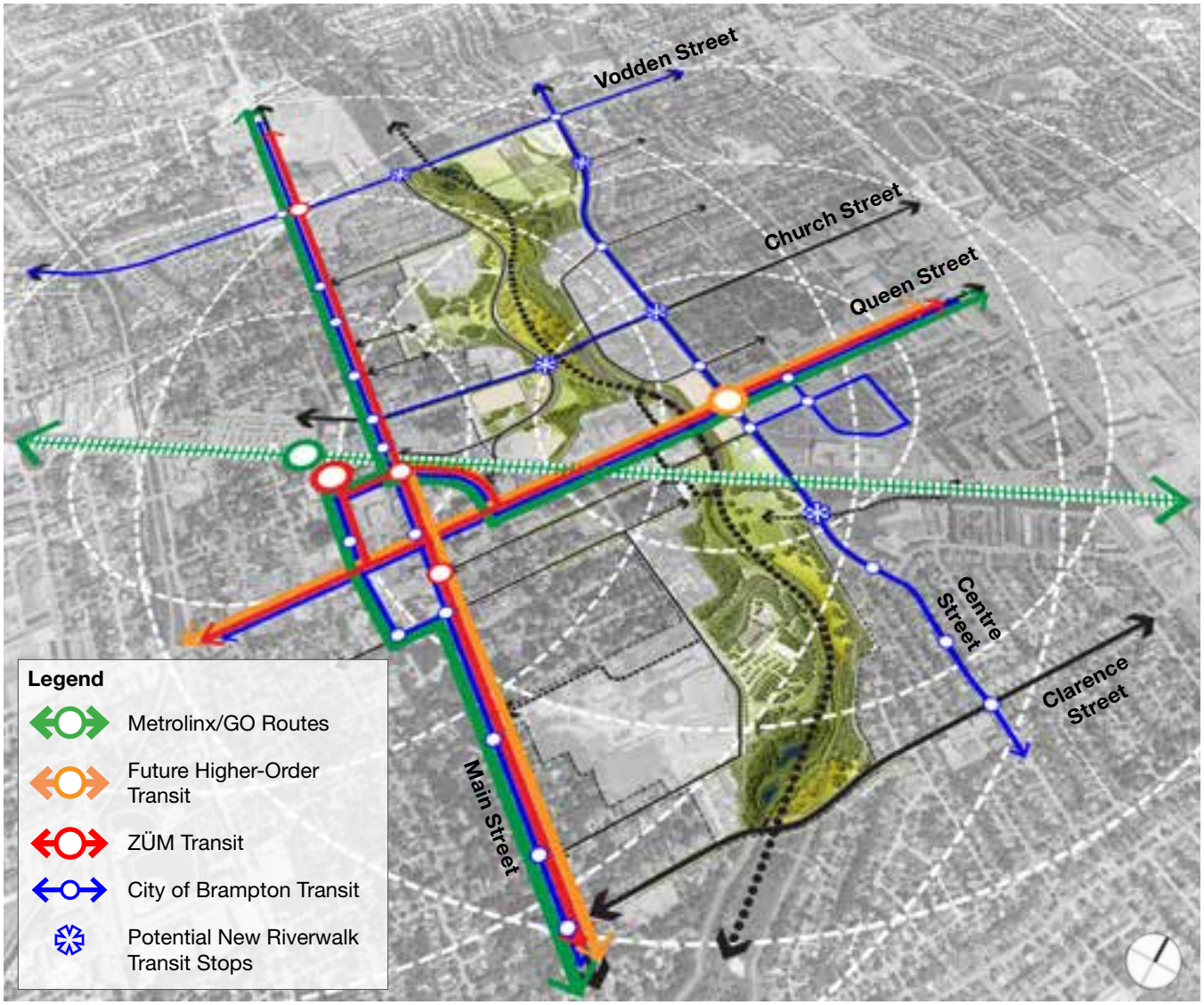


Fig. 125 Riverwalk Transit Network

6.3 Vehicular Access and Arrival

Vehicular Access

The Riverwalk UDMP proposes a number of improvements to existing streets, however, vehicular access within Riverwalk parks and open spaces themselves should remain limited to maintenance and emergency use.

Ken Whillans Drive

The realignment of a portion of Ken Whillans Drive north of church Street will contribute to the flood protection solution identified in the DBFP EA, as well as creating a framework for the new Rosalea Park North meadow and reconfigured Central Public School Park fields.

The Riverwalk UDMP is also supportive of the City's ongoing Ken Whillans Drive Extension EA, which will extend the street from it's southern limit at Church Street, to create a new connection to downtown Brampton. The Riverwalk UDMP has proposed an alignment that will curve through Rosalea Plaza and along the existing YMCA driveway to meet Nelson Street and to connect to Main Street. However, the final design of the street will be determined through a separate Environmental Assessment and detailed design process.

Ken Whillans Drive, from Vodden to the southern limit of the extension, should be redeveloped as a complete street, providing safe pedestrian, cycling and vehicular access.

The south extension of Ken Whillans Drive, through Rosalea Park, should be designed as a flexible surface that can be converted to a pedestrian priority space, with enhanced paving materials, bollards and rolled curbs, to provide a seamless extension of the Rosalea Plaza that can be closed to vehicular traffic during community events.

Maintenance Access

Routes for service vehicles are to be coordinated with parks maintenance and operations staff to ensure the dimensions of vehicles and turning radii can be accommodated on all recreational paths and specified service/ bridge crossings.

Emergency Access

Primary circulation routes and bridges are to be designed to accommodate emergency fire and ambulance vehicles loading and dimensional requirements.

Pick-Up/Drop-Off

The Riverwalk UDMP recommends the introduction of accessible pick-up and drop-off locations or lay-bys at the following locations:

- Duggan Park parking lot
- Central Public School
- Rosalea Park Plaza
- Centennial Park North
- Centennial Park Legion

Pick-up/drop-off locations should include seating, shelter, waste receptacles and pedestrian scale lighting and be configured for universal access.

Vehicular Parking

Ample on-street and off-site parking is available in the downtown core and as such, the Riverwalk UDMP does not propose to introduce any new or significantly expanded vehicular parking lots in the Riverwalk area.

Parking Lots

The existing parking lots at Duggan Park, Central Public School and Centennial Park should be reconfigured and enhanced to provide additional bike parking facilities and to create flexible surfaces that can serve multiple uses, to include greening and sustainable features including:

- Tree planting
- Bioretention planters with curb cuts
- Permeable paving for underground stormwater storage.

On-street Parking and Lay-bys

The reconfigured Ken Whillans Drive should incorporate space for new on-street parking, as well as accessible pick-up and drop off spaces in the vicinity of Rosalea Park and at the Rivera Senior's residence.

Fig. 127 Parking Lot Greening

Recommendations

1. Ensure the process of getting to Riverwalk is accessible for all modes of transportation.
2. Optimize public safety by minimizing potential conflicts between vehicles, cyclists and pedestrians.
3. Reduce vehicular circulation routes within Riverwalk.
4. Configure adjacent parking lots layout and design to provide flexible amenity space if required.
5. Improve emergency access to heavily used or programmed spaces.
6. Reduce paved impervious surfaces where possible.
7. Incorporate low-impact development (LID) and best management practices for stormwater management into the design of roadways, parking lots and other paved surfaces.

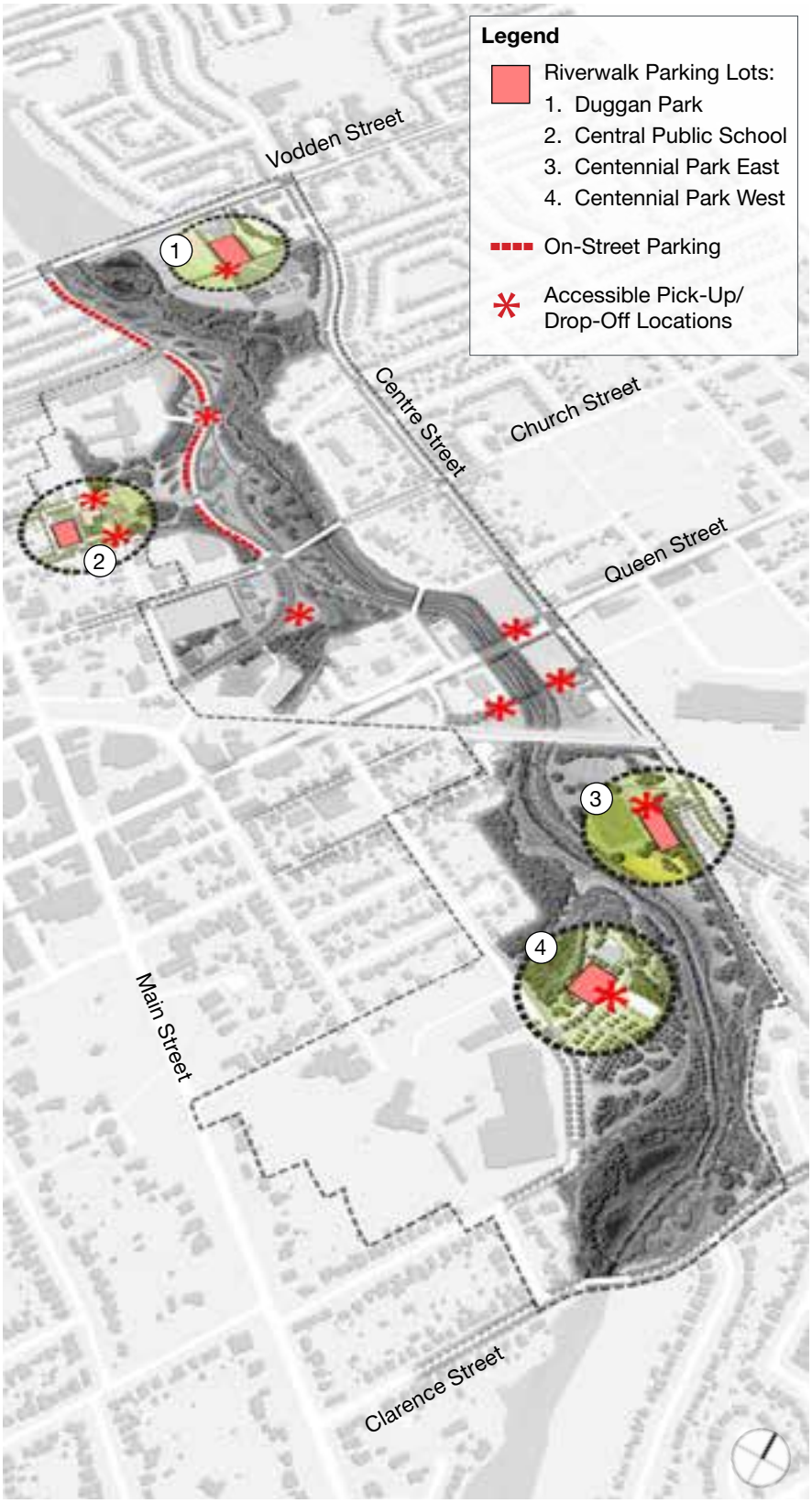


Fig. 128 Riverwalk Parking, Drop Off and Arrival Spaces

6.4 Active Transportation

Etobicoke Creek Recreational Trail

The Riverwalk UDMP promotes sustainable mobility and a robust active transportation network in the area, in particular the regionally significant Etobicoke Creek Recreational Trail. The trail will provide an important north-south active transportation connection adjacent to downtown Brampton, making active transportation a comfortable, seamless and attractive mode of transportation for people of all ages and abilities supported by best practices in urban design.

The recreational trail is proposed to be realigned in Duggan Park and Centennial Park, to provide opportunities for new naturalized landscapes. It will follow landforms and provide a more integrated experience of the creek valley. Through Rosalea Park, the trail will follow the crest of the berm and new gathering space, marking the boundary between the rough and naturalized channel landscape and the urban landscape of Rosalea Plaza.

The Riverwalk UDMP proposes to connect the trail from north to south along a series of elevated boardwalks that overlook the channel. These boardwalks lead from Rosalea Park, across Queen Street to the new John Street pedestrian bridge and finally through a new pedestrian tunnel beneath the CN tracks that connects the trail to the existing segment in Centennial Park. The design and configuration of access along the channel must be considered in coordination with the detailed design for the flood protection solution and will be dependent on funding, and ongoing coordination and consultation with stakeholders.

Where regrading and realignment occurs, the Etobicoke Creek Recreational Trail should be widened to a minimum of 4m, to allow separation of pedestrian and cyclist users.

Connections to the Broader Cycling Network

As the Etobicoke Creek Recreational Trail spans the entirety of Brampton from north to south, a focus on safe east-west connectivity to this important corridor is needed. This includes new trail connections, improved dedicated or separated cycling facilities via arterial, collector and local streets and signalized crossings of streets where warranted.

Special treatments should be considered when the proposed trails intersect with the road network, including:

- Curb cuts for easy connection to crossed streets.
- Placement markings to clearly identify crossing, controlled with signals and pedestrian crossovers (PXO) to improve safety.
- Wayfinding signs and lookout areas to improve to visibility and access to the trail.
- Improving conditions (e.g. widening, repaving, or introduction of new cycling facilities) of the existing road or bridge crossing locations.

Pedestrian and Cyclist Priority Trail Crossings

The Riverwalk UDMP recommends improvements at the following bridges and crossings:

A. Vodden Street Bridge

- Widen sidewalks and include bike lanes across the bridge with traffic calming measures.
- Include open railings, lookouts or places to stop to improve visual connection to the creek.
- Include gateway condition and better wayfinding to encourage use of the trail.

B. Ken Whillans Drive Crossings at Sproule Drive and at Central Public School

- Include signage, curb cuts and pavement markings to allow safe, convenient and visible crossing.

C. Ken Whillans Extension Crossing

- The proposed Ken Whillans Extension will be a pedestrian priority street with enhanced streetscaping and bike lanes.
- Provide dedicated signal crossing with pavement markings, signage, cross rides and curb cuts to allow easy transition to the street.

D. Church Street Bridge

- Widen sidewalks and include bike lanes across the bridge.
- Investigate if sufficient clearance to connect the Etobicoke Creek Recreational Trail under the bridge is possible.

E. Scott and Queen Street Bridges

- Widen sidewalks and include bike lanes across the bridges.
- A signalized crossing with a cross ride is recommended to provide a more direct route to downtown.

- Install wayfinding signs and improve visibility of the trail and improve connections for people accessing downtown, including transit users taking the Queen Street BRT.

F. Mary Street Crossing

- Include curb cuts and pavement markings to allow convenient and visible connection to Mary Street.

G. Clarence Street Crossings

- There are three crossings at Clarence Street, one underneath the Clarence Street bridge and two further east with on-street access.
- For the crossings at street level further east, curb cuts, signalized crossings with a cross ride or PXO, signs and pavement markings are recommended to provide users safe and convenient access to the trail.

H. Centre Street Crossings

- There are two access locations from Centre Street to the trail, one south of Duggan Park and one at the north end of Centennial Park.
- Both crossings require the curb cut, sings, pavement markings and installation of PXO in order to allow safe and convenient connections to nearby residential neighbourhoods.

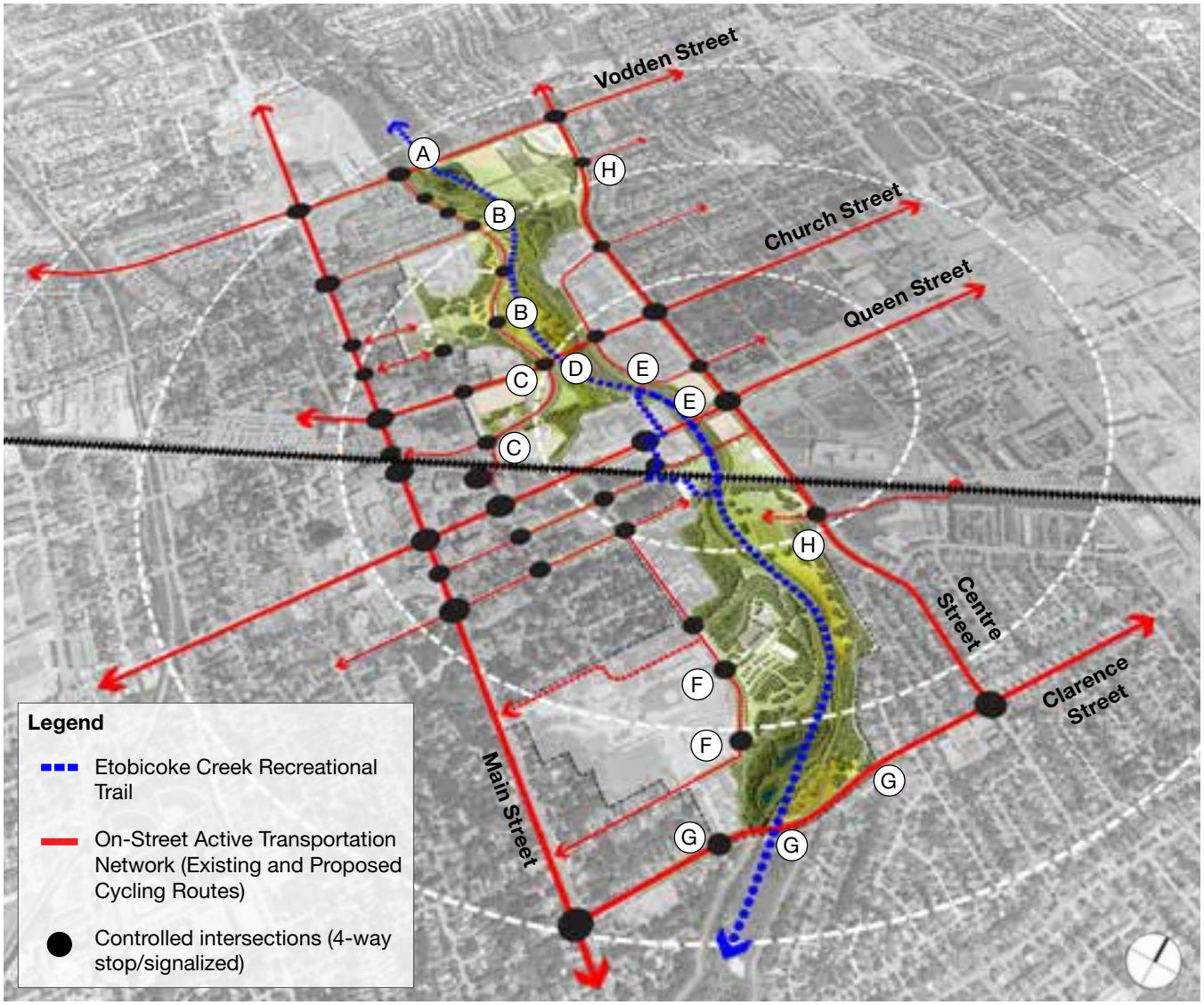


Fig. 129 Riverwalk Active Transportation Network

Riverwalk Pathways and Trails

Pathways should be laid out to provide a unique experience of the changing landscape of the creek valley, taking advantage of topographic, hydrological and vegetation features.

Trail Continuity

One of the most important interventions proposed in the Riverwalk UDMP is to provide continuity of the Etobicoke Creek Recreational Trail across Queen Street and the under the Brampton GO/CN Rail corridor. Etobicoke Creek Recreational Trail users today are required to divert to the City's street network and across Queen Street before reconnecting with the off-road trail system. Riverwalk provides an opportunity to relink the disconnected north and south portions of the Etobicoke Creek Recreational Trail.

Trail Hierarchy

Recreational trails throughout the Riverwalk should be upgraded to provide a trail hierarchy comprised of primary, secondary and tertiary trails and boardwalks, allowing safe access, while preserving the unique character of the site.

The primary trail through Riverwalk is the Etobicoke Creek Recreational Trail, which is paved and traces a simple route that leads along the length of the Riverwalk.

Secondary trails will also be paved in asphalt and generally provide east-west connections across the Etobicoke Creek Recreational Trail or lead to the various amenities within the open space system.

Tertiary trails include wetland boardwalks and informal limestone or mulch pathways surrounding the playgrounds. These pathways are a means of discovering the natural features that occur at a smaller scale within the Riverwalk area.

Trail Safety and Accessibility

Trails throughout the Riverwalk area should meet accessibility requirements for surfacing, width and height for any trail underpasses. Where possible, provide separation between cyclists and pedestrians with physical separation or pavement markings. Signage should be provided to limit speed on shared pathways and to provide clear direction and wayfinding. All trails should be lit at night to provide clear visibility and increased lighting should be provided at gateways, trailheads and pathway intersections.

Special care should be taken when lighting trails in or adjacent to natural heritage features to minimize negative impacts on flora and fauna. Lighting should also be Dark Sky compliant.

Best practices in trail design and active transportation planning are required to ensure that the trail system is a comfortable and attractive mode of transportation for people of all ages and abilities. This includes best practices such as the 8-80 approach, A Complete Streets and Crime Prevention Through Environmental Design (CPTED).

Bike Parking and Amenities

Provide bike parking along Riverwalk-adjacent streets and within all major park nodes.

Install bike racks at trail access points, install bike shelters and repair stand close to major attractions along the trail, such as Duggan Park, Centennial Park and downtown/ Queen Street

Bike parking should be incorporated into the parking lots in Duggan and Centennial Park and Central Public School as well as in the new design for Rosalea Park.

Bike Repair Stations

The Riverwalk UDMP recommends providing bike pump and repair stations at major bike parking locations along the Etobicoke Creek Recreational Trail, in Centennial Park, Rosalea Park and Duggan Park.

Bike Sharing and Other Modes

Consideration should be given to introducing a bike share program with stations in Duggan, Rosalea and Centennial Parks and providing charging station for E-bikes and other modes of alternative transportation.

Fig. 133 Bike Pump and Repair Station

Recommendations

1. Provide safe and accessible pedestrian amenities on adjacent streets and bridges including widened sidewalks, tabletop and raised crossings and pedestrian priority signalization.
2. Provide safe cycling infrastructure on Riverwalk-adjacent streets, including buffered or protected bike lanes.
3. Create a continuous independent trail system.
4. Clearly identify access points, stops and parking for alternative modes of getting to the park.
5. Provide sufficient parking spaces for bikes in proximity to amenities within the park.
6. Consider implementing a public bike share program within the Riverwalk area.
7. Design all pathways and trails according to Crime Prevention Through Environmental Design (CPTED) principles.
8. Improve accessibility utilizing ramps or sloped trails (as opposed to stairways) wherever possible. Stairways should be robust and safe for a wide range of users, including handrails and landings with rest areas and bike troughs.
9. Consider alternative means of sustainable mobility and provide infrastructure to support these modes.

Fig. 134 Riverwalk Pathways and Trails

6.5 Loops and Links

Supplementing the key north-south function of the Etobicoke Creek Recreational Trail and proposed east-west connectivity, a series of circulation loops are proposed which will increase options for movement and allow for a range of experiences and activities accessible to all users.

Building new trail segments, ramps, bridges and boardwalks will add dimension to the creek valley and allow the public to use it in different ways. In addition to the traditional linear 'through' hiking or cycling experience, users should be able to experience the Riverwalk area as a series of links and loops.

Rethinking movement along the lines of these shorter and perhaps more thematic, routes, opens up opportunities for different levels of ability. Loops can be more welcoming to children, the elderly or disabled, or anyone looking to experience the Valley while making a lesser time commitment.

In order to achieve this finer network of loops and links, several new creek crossings should be considered. The Riverwalk UDMP identifies new pedestrian crossings in Rosalea Park North, at John Street and in Centennial Park.

Each route should be named in wayfinding, subscribe to a posted level of difficulty and express a theme: for example, a particular natural or historic narrative, a tour of specific landmarks, or a curated sequence of public art installations. The following identified loops represent options that could be further expanded and integrated with other interpretive opportunities

Etobicoke Creek Loops

Duggan Park Wetland and Riparian Loops

Using new trail connections and wetland boardwalks, the Duggan Park Loop includes several smaller loops that can provide opportunities for engaging with the landscape and exploring Etobicoke Creek for people of a variety of ages and abilities. The full loop is 1100m long and includes the new natural play space and opportunities for seating and interpretation.

Rosalea Park Channel Loop

The Rosalea Park Channel loop connects Rosalea Park Plaza to Rosalea Park North. The loop follows the Etobicoke Creek Recreational Trail and rises to the top of the Rosalea Park berm and joins street level at the Scott Street Bridge. The loop then crosses over the bridge and follows Scott Street along the top of the valley, back toward Church Street where it slopes down again along the east bank of the creek. The loop finishes by crossing the new pedestrian bridge and rejoining the trail at Ken Whillans Drive. This 900m loop has several significant grade changes that allow users to experience a wide range of Riverwalk landscapes and viewpoints and could be considered one of the signature Riverwalk routes.

Queen Street Boardwalk Loop

This 550m long loop follows the top of the bypass Channel and introduces new mid-block connections from Scott Street to John Street on both sides of the channel. Pedestrians can choose to cross Queen Street to complete a full circuit or complete a smaller loop.

Centennial Park Wetland and Riparian Loops

The River loop is a 1800m long circuit that includes boardwalks, wetlands and naturalized planting. Users can opt to shorten the circuit by crossing at the mid-point bridge, resulting in an 800m north loop and 1000m south loop.

Riverwalk Park and Neighbourhood Loops

In addition to trails within the immediate Riverwalk area, connections into surrounding neighbourhoods and downtown Brampton are proposed. Providing safe and accessible connections to these external loops and pedestrian connections should be a priority.

Duggan Park Loops

Easily accessible from the parking lot, the network of trails within Duggan Park provides opportunities for access to sports fields, playgrounds and to the boardwalks along the east edge of the creek.

Central Public School Loop

The Central Public School loop connects the community centre and adjacent senior's residence to the broader trail system, while creating a circuit for outdoor fitness and wellness.

Rosalea Park Loop

The Rosalea Park loop includes both upland and lowland options. Each loop is approximately 900m long. The upland loop allows for a mid-point connection along Church Street, while the lowland loop travels under the Church Street bridge.

Centennial Park Arboretum Loop

The Arboretum loop is a 600m long interpretation route, integrating signage and seating to enhance the experience and provide opportunities to educate the public.

Centennial Uplands Loop

The upland loop provides a 1000m long circuit around sports fields and meadows in the eastern section of Centennial Park. It connects directly to the updated parking lot and includes opportunities for ecological interpretation and theming. The loop can be shortened to 800m by using a trail connection at the mid-point of Centennial Park.

Ken Whillans Loops

Straddling the east and west sides of the realigned Ken Whillans Drive, this loop connects directly to an existing long-term care facility and offers opportunities for residents to enjoy walking routes that are further away from busy roadways. The full loop is 900m long with a mid-point connection that allows for two 500m loops. The midpoint also includes a seating area for resting while enjoying the full loop circuit.

Recommendations

1. Increase options for circulation within the open space network.
2. Provide circuits and loops rather than point-to-point pathways.
3. Provide routes of varying length and difficulty to accommodate users of all abilities.
4. Provide integrated signage and wayfinding that indicates pathway options, milestones and features.
5. Provide time and distance markers for individual loops.

Fig. 136 Riverwalk Loops and Links

6.6 Crossings and Bridges

Rail Crossings

A large portion of Riverwalk is separated from downtown Brampton by the elevated railway corridor that bisects the city diagonally. To create a continuous and accessible open space network, key rail crossings should be upgraded to provide enhanced pedestrian and cycling connections, as well as opportunities for gateway and identity signage and public art.

Centennial Park Pedestrian Underpass

The proposed new pedestrian rail underpass at Centennial Park is a critical link in the new Riverwalk trail system that would allow north-south connections to follow the creek without the need for diversions onto city sidewalks. The pedestrian underpass should be a well-lit, wide passage with good visibility at both ends to ensure safe and accessible travel. The walls and approach of the underpass will also provide opportunities for trail mapping, interpretive panels and/or public art.

John Street Level Crossing

The level crossing at John Street is one of the main north-south active transportation connections across the railway. The intersection should be designed to provide clear pedestrian direction to Queen Street and toward the new John Street Pedestrian bridge using pavement markings, pavement materials and signage.

Grade Separated Road Crossings

The Union Street, Queen Street and Centre Street underpasses should be upgraded to provide an enhanced pedestrian and cyclist experience, with widened sidewalks and separated bike lanes. Pedestrian and cyclist facilities should also be elevated above the roadway, to minimize the grade change for these users.

Pedestrian Bridges

Pedestrian bridges are a key component of the paths and trails in the Riverwalk area. Upgrades to existing pedestrian bridges in Duggan Park and Centennial Park should include an audit of bridge structures and replacement/improvement of bridge decking and lighting.

All bridges should be designed to meet accessibility requirements and structurally capable of supporting maintenance and emergency vehicle loading and new bridge design should have a clean, minimalist appearance and be compatible with existing structures within the parks.

Rosalea Park North Pedestrian Bridge

A new pedestrian bridge is proposed in Rosalea Park North, to allow a mid-point connection between the Duggan park bridge and the Church Street bridge.

John Street Pedestrian Bridge

A feature pedestrian bridge is proposed at John Street, marking the southern end of the Queen Street boardwalk overlook. John Street marks the southernmost connection before the CN tracks and is an important link in the Riverwalk open space network.

The proposed John Street pedestrian bridge and associated improvements to John Street will create an important new east-west connection across the creek and to downtown Brampton's active transportation network. The new bridge will also facilitate north-south connections along Riverwalk by allowing a smooth off-street connection between the Etobicoke Creek Recreational Trail and the proposed pedestrian underpass under the CN rail corridor.

Centennial Park Pedestrian Bridges

Two new pedestrian bridges are proposed in Centennial Park, one near the existing Legion building and a second at the Clarence Street bridge. These bridges will serve to increase the links and to allow users to explore the park fully without having to retrace their path.

Roadway Bridges

The existing bridges at Vodden, Church, Scott and Clarence Streets should be upgraded to provide more generous pedestrian connections, safe cycling routes and lookouts over the Etobicoke Creek. Reconfigured sidewalks, with integrated lookouts will help to establish a presence for the creek and strengthen the identity of Riverwalk along streets that currently have very little connection to the site.

Fig. 137 Signature Bridge with Enhanced Sidewalks, Burgoygne Bridge, ON

Fig. 138 Pedestrian Rail Underpass, Lower Don, Toronto, ON

Protected cycle lanes should be provided on all bridges and railings should be designed to provide views to the creek valley below. Vertical markers or identity signage should be provided at bridge landings to mark the presence of the creek and as landmarks for the Riverwalk area.

Scott Street and Church Street Bridges

The Scott Street and Church Street bridges will require replacement to accommodate the widening and deepening of the bypass channel required in the DBFP EA. These bridges should be upgraded to provide enhanced pedestrian and cycling facilities, as well as lookouts and sufficient span to accommodate a lower level passage if required.

Queen Street Bridge

The Queen Street bridge also requires replacement to accommodate the widened and deepened channel and should be further upgraded to create wide decks overlooking the channel below and creating a new public space that celebrates the intersection of the Riverwalk with one of the City's main streets. The Queen Street bridge should have a strong visual presence, with open railings and above-deck structure, if possible, to mark the presence of the creek below.

Recommendations

1. Enhance existing vehicular and pedestrian bridges.
2. Provide new pedestrian bridges for increased connectivity across Etobicoke Creek.
3. Provide a new pedestrian underpass beneath the rail corridor.
4. Enhance level and grade-separated rail crossings.
5. Provide enhanced views to Etobicoke Creek.
6. Upgrade existing structures to meet current accessibility standards.

Fig. 139 Riverwalk Bridges and Crossings

Fig. 142 Cyclist on the Etobicoke Creek Recreational Trail, Brampton, ON

7.0
Programming

7.1 Programming for All

The programming of open space within Riverwalk aims to engage Brampton's diverse community and strives for inclusiveness, diversity and equity for all ages and all abilities.

The Riverwalk Urban Design Master Plan includes recommendations for public open space programming throughout the Riverwalk area. These recommendations will address both active, passive recreation and seasonal programming and the supportive amenities and infrastructure required to support these activities.

Brampton's 2040 Vision forecasts a population increase of approximately 55,000 people in downtown Brampton by 2040. Programming for Riverwalk is intended to serve both the current and future population of downtown and the city as a whole and to complement the City of Brampton Parks and Recreation Master Plan, Culture Master Plan and Active Transportation Master Plan, as well as a number of Toronto and Region Conservation Authority and Region of Peel plans and policies for community health and recreation.

The programming initiatives outlined in this chapter will also support the community resilience and public health recommendations outlined in **"Section 5.5 Public Health and the Built Environment"**, by providing programming and spaces that support community connections, supporting the design and implementation of community-based projects and fostering long term-community involvement and stewardship.

Fig. 143 Brampton Farmers Market, Brampton, ON

Fig. 144 Shade Sails over Multi-use Lawn, Bonaroo Festival, TN

Fig. 145 Sloped Lawn, Corktown Commons, Toronto, ON

7.2 Flexible and Multi-Use Space

One of the more fundamental recommendations in the Riverwalk UDMP is the creation of more flexible, multi-use open space that will allow informal and passive recreation, in addition to the existing dedicated sports facilities within the Riverwalk Area.

Providing flexible and unprogrammed space, such as open meadow landscapes, multi-use lawns and urban plazas, new recreational trails and lookouts allowing the community to use the space according to their needs. These spaces also provide important space for community and cultural events, markets, outdoor classes, children's camps, and other informal gatherings.

Duggan Park Open Lawn

The reconfiguration and relocation of some of the Duggan Park baseball diamonds will create new flexible recreational space on the east banks of the creek. These spaces will become available for informal recreation, sports and passive park use such as picnicking, family and community gatherings.

Duggan Park Nature Tails and Boardwalks

The new trails and boardwalks on the east bank of the Etobicoke Creek will provide access to the previously inaccessible riparian and forested landscapes adjacent to the creek, as well as views to the new stormwater ponds in Duggan Park. This new trail system will provide a more intimate and quiet experience, for discovery and observation in the north portion of Riverwalk.

Rosalea Park

A bowl-shaped lawn should be carved into the existing site topography of Rosalea Park, with integrated stepped seating sloping down to a multi-use open space that can host small community events and summer camps.

The sloping lawn should blend into the savannah landscapes of Rosalea Park North with a naturalized meadow and shade trees. There should be provisions made for temporary power, event lighting and sufficient space for temporary stage and shade structures to provide opportunities for theatre and dance performances and concerts that will bring people to the area, encourage community gathering and promote a sense of ownership and belonging for local residents.

Topographical changes must not interfere with the flood protection infrastructure or compromise the structural integrity of the berm. Lighting and sound should be designed to avoid negatively impacting the existing residential communities and wildlife surrounding the park.

Rosalea Plaza

The Riverwalk UDMP proposes that the area west of the new Ken Whillans Drive extension, be developed as an urban plaza, with flexible space that can accommodate outdoor cafes, small gatherings and events. The plaza should include space for public art, horticultural plantings and children's play.

In addition, the Ken Whillans Drive extension, south of Church Street is proposed to be a flexible, shared-use street, that can be closed to vehicular traffic to provide an extension to the plaza itself, to accommodate larger public events or markets. The plaza and roadway should be paved with enhanced materials and have barrier-free access and curbs. A kiosk with public washroom facilities should also be incorporated into the plaza to support public use and events.

Fig. 146 Yoga in Rosalea Park, Brampton, ON

Central Public School Park Fields and Rosalea Park North Meadow

The Central Park School fields will be reconfigired to provide a balance between active and passive recreation, with new trails through expanded wooded areas, and flexibleopen space that connects across Ken Whillans Drive to the new Rosalea Park Meadow.

The Rosalea Park North Meadow will become a new open savannah landscape, lending itself to passive recreational activities, including access to the banks of the Etobicoke Creek, nature observation and views to the new rocky cascade at the transition to the north end of the bypass channel.

Etobicoke Creek Bypass Channel

The proposed enhancements and upgrades to the Etobicoke Creek bypass channel aim to provide new access to public open space along the previously inaccessible banks of the channel. The upper-level boardwalks and bridge upgrades will also provide new viewing opportunities toward the creek and space for outdoor activities and events.

New access along the channel must be considered in tandem with the detailed design for the flood protection solution outlined in the DPFP EA and will be contingent on funding, and ongoing coordination and consultation with stakeholders.

Queens Street Plaza and Bridge

The Queen Street and Bridge is the symbolic intersection between Riverwalk and the city. The Queen Street Bridge should be designed as a signature structure that enhanced public open space in this otherwise constrained location. The bridge deck should be designed to support widened sidewalks or decks on either side that can serve as an extension of the public realm, celebrating the crossing of the Etobicoke Creek. These plaza spaces can serve as informal lookouts, as well as a key gateway to the City and space for public events.

Centennial Park Forest and Meadows

Centennial Park is home to an existing forested landscape and naturalized meadow that will continue to provide space for leisurely walks, exploration and discovery. These landscapes will be protected and enhanced to create a more complete trail network that will open the park up to more informal recreation and outdoor enjoyment.

Fig. 147 Nature Trails, Dufferin Islands, Niagara, ON

Fig. 148 Multi-use Lawn and Market, Public Square, Nashville, TN

Centennial Park Wetland Boardwalk and Lookouts

The Centennial Park wetland is one of the most sensitive landscapes within the Riverwalk Area. The previously inaccessible wetland will be expanded and enhanced through the addition of new boardwalks, lookouts, pathways and crossings, that should be developed in consultation with the TRCA to provide an intimate nature experience, while protecting sensitive existing habitats.

Recommendations

1. Create social places for people to meet and congregate.
2. Provide programming that promotes equity within public spaces.
3. Promote interaction with nature.
4. Promote active living, active transportation accessibility, recreation.
5. Create new connections to the surrounding community.

Fig. 149 Spadina Wavedeck, Toronto, ON

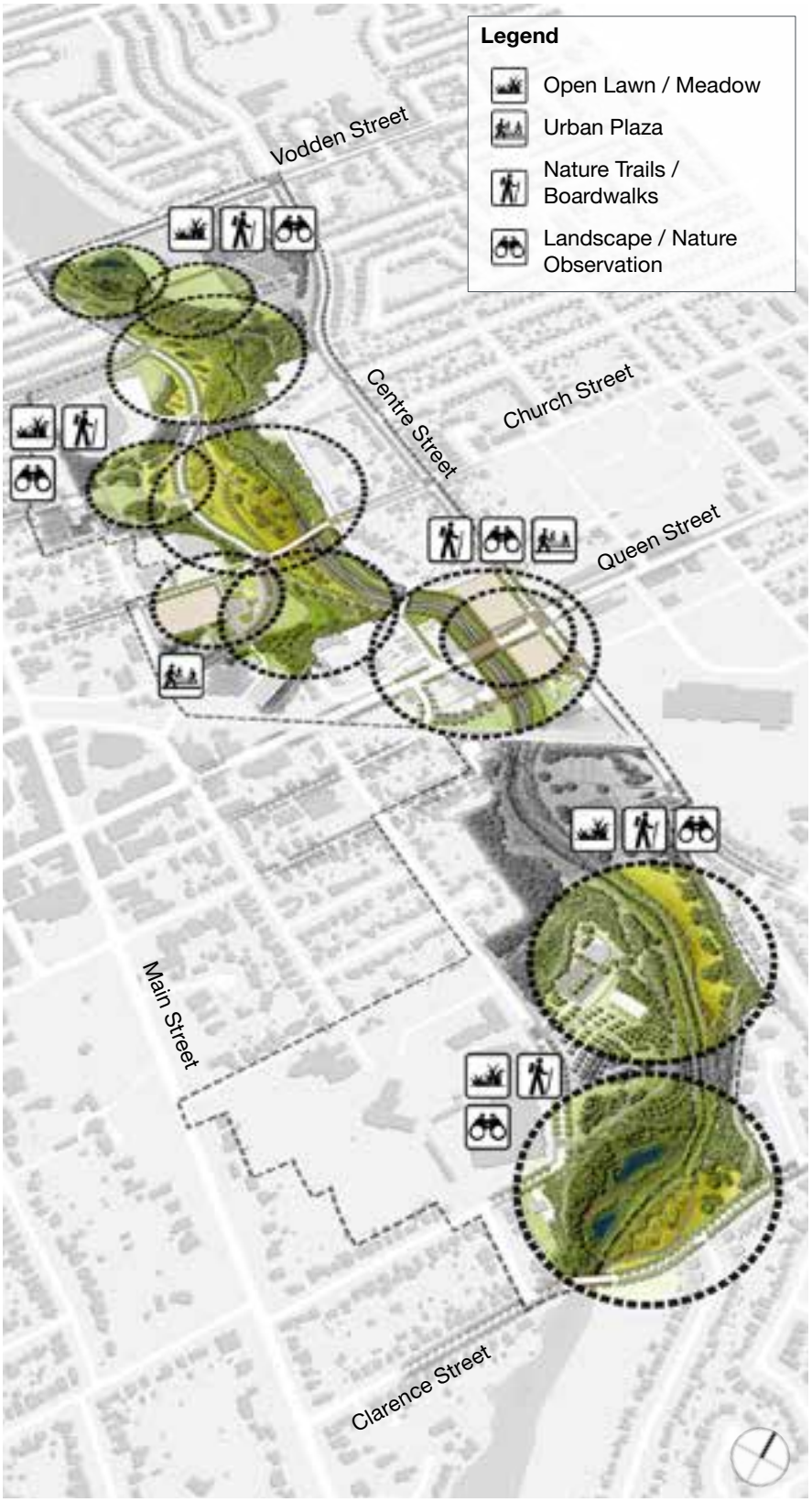


Fig. 150 Riverwalk Flexible Space and Unprogrammed Recreation

7.3 Organized Sports and Active Recreation

The Riverwalk area offers a broad range of organized sports and active recreation programming that is an important component of the Riverwalk UDMP contributing to public health.

The Riverwalk UDMP proposes to create a balance between dedicated sports facilities and more flexible space for active recreation. Select sport fields and courts in the Riverwalk area should be retained and upgraded to enhance usability and flexibility of open space within Riverwalk.

Where dedicated sports facilities are required, consideration should be given to creating multi-use fields that can accommodate multiple sports, thereby increasing the range of uses that can be accommodated.

The provision of programming and outdoor fitness equipment for adults and seniors, promotes active living and will be an important component of programming for all age groups.

Supporting infrastructure including seating, shelter, washrooms and drinking fountains or water bottle filling stations should also be provided in proximity to all sports fields.

Recreational Trails and Walkways

The Riverwalk active transportation network includes the Etobicoke Creek Recreational Trail and all pathways, trails and connecting sidewalks, as described in detail in **"Section 6.4 Active Transportation"**.

The creation of a complete and continuous active transportation network can be used for recreational events and competitions and will also serve as a framework for all programming initiatives in the Riverwalk Area.

Duggan Park Baseball Diamond

The Riverwalk UDMP proposes to retain one baseball diamond in Duggan Park and relocate the remaining two fields to other City-owned parks where tournament-scale facilities are more appropriate.

The space created through the relocation of these sports fields will increase the amount of flexible park space and space for stormwater management in Duggan Park to provide a broader range of services and a more diverse range of community activities.

Central Public School Fitness Trail

The Riverwalk UDMP proposes the integration of a new fitness trail, with exercise equipment integrated into the landscape of the Central Public School fields. The circuit is an opportunity for co-programming with the Central Public School Recreation and Art Centre, as well as the adjacent senior's residence and nearby schools.

Centennial Park Tennis, Pickleball and Basketball Courts

The existing courts in the north portion of Centennial Park should be upgraded to enhance the usability and flexibility of open space within Riverwalk and marked to accommodate multiple sports, including pickle ball and Tennis. If demand exists, these courts could be expanded to accommodate some of courts relocated from Rosalea Park.

The introduction of basketball facilities in this area could further increase the flexibility of these dedicated courts and offer an amenity not currently available in the Riverwalk area.

Fig. 151 Flexible-use sports fields

Fig. 152 Louise Moore Park Fitness Trail, Moore Park, PA

Fig. 153 Centennial Park Pickle Ball and Tennis Courts

Centennial Park Sports Fields

The Riverwalk UDMP recommends that the number of dedicated sports fields in Centennial Park be reduced to provide a better balance of manicured lawn and naturalized landscape. A further review of the use and demand for these sports fields should be undertaken before relocation occurs.

Centennial Park Legion Horseshoe Pits

The existing horseshoe pits at the Legion in Centennial Park should remain and be upgraded as needed. Additional pickle ball courts should also be considered in this area, to take advantage of co-programming opportunities with the legion, to provide programming and amenities for adults and seniors.

Recommendations

1. Relocate regional-scale facilities out of the Riverwalk area and provide sports facilities to accommodate local community needs.
2. Convert sports facilities to accommodate multiple sports and minimize single-use, dedicated facilities within Riverwalk.

Fig. 154 Waterfront Trail, Mississauga, ON

Fig. 155 Riverwalk Organized Sports and Active Recreation

7.4 Inclusive Play Spaces

The design of playgrounds in Riverwalk should be inclusive and accessible for children of all ages and abilities. Play equipment, structures and facilities should be designed to provide a variety of experiences and challenge levels and features that encourage imaginative and interactive play and designed to meet or exceed best practices for safety and accessibility. Playgrounds can be a playful expression of the Riverwalk vision and preference should be given to designs that are integrated into the natural features of the site, incorporating natural topography, vegetation and include themes of nature, water and movement.

Duggan Park Nature-based Playground

The playground in Duggan Park should be upgraded to provide nature-based play, integrated into the woodland, riparian and stormwater management landscapes. In consultation with the TRCA, the playground and associated boardwalks in Duggan Park should be reconfigured to take advantage of the of the site's natural topography to provide an engaging, challenging and integrated experience, that integrates themes of ecology, habitat and wildlife, to complement the character of the site.

Rosalea Plaza Playground and Splash Pad

A play area should be incorporated into the design of Rosalea Plaza and should provide a range of experiences and challenges that will appeal to a wide age-range. In addition to interactive and stimulating play equipment for small children, consideration should be given to providing facilities for older children and youth such as climbing or skateboarding facilities. Interactive music-based elements such as outdoor chimes, xylophones, drums, etc. can also help create intergenerational opportunities for play that enhance the natural setting.

Due to its proximity to Downtown Brampton and the YMCA, consideration should be given to creating a play area that is large enough to accommodate school groups and summer camp activities, with supporting infrastructure including seating, shade structures, drinking fountains and washrooms or change rooms. The Rosalea Plaza playground should also include a water feature, or splash pad that will allow physical interaction with water as an important aspect of Riverwalk, that will serve to activate the plaza during the summer months.

Centennial Park Playground

A new playground should be integrated into the signature landscapes and topography at the north end of the Centennial Park. The playground should be designed to accommodate a range of ages and abilities, with access to transit and parking and connections to the trail network in Centennial Park. Consideration should be given to creating a children's garden in this area.

Centennial Park Sensory Trails

Sensory trails are spaces where sound, touch, sight and even smells are emphasized as one moves through the landscape. Sensory trails can be very interactive, with activity stations that promote engagement with the landscape, or they can be a more passive experience that simply integrates highly sensory plants along a trail. The nature trails on the east and west banks of the Etobicoke Creek in Centennial Park should be developed as sensory trails, that are less physically challenging, but provide a rich tactile, auditory and visual experience of the landscape that can be enjoyed by all ages and abilities.

Fig. 156 Seebachtal Sensory Trail, Switzerland

Fig. 157 Nature-based play, Oregon Parks and Recreation

Fig. 158 Inclusive Play Equipment, Landscape Structures

Recommendations

1. Provide play spaces that encourage interaction with nature.
2. Provide inclusive and accessible play spaces, with range of options and challenge levels.
3. Provide play activities for all age-ranges with special consideration for youth activities in the central portion of the Riverwalk area.
4. Provide for water-play or splash pads and required support infrastructure within the Riverwalk Area.
5. Provide public washrooms, shelter and other site furnishings in proximity to play areas.
6. Provide interactive sensory trails that will engage users of all ages.
7. Incorporate natural mateirials into playground design.

Fig. 159 Splash Pad at Corktown Common, Toronto, ON

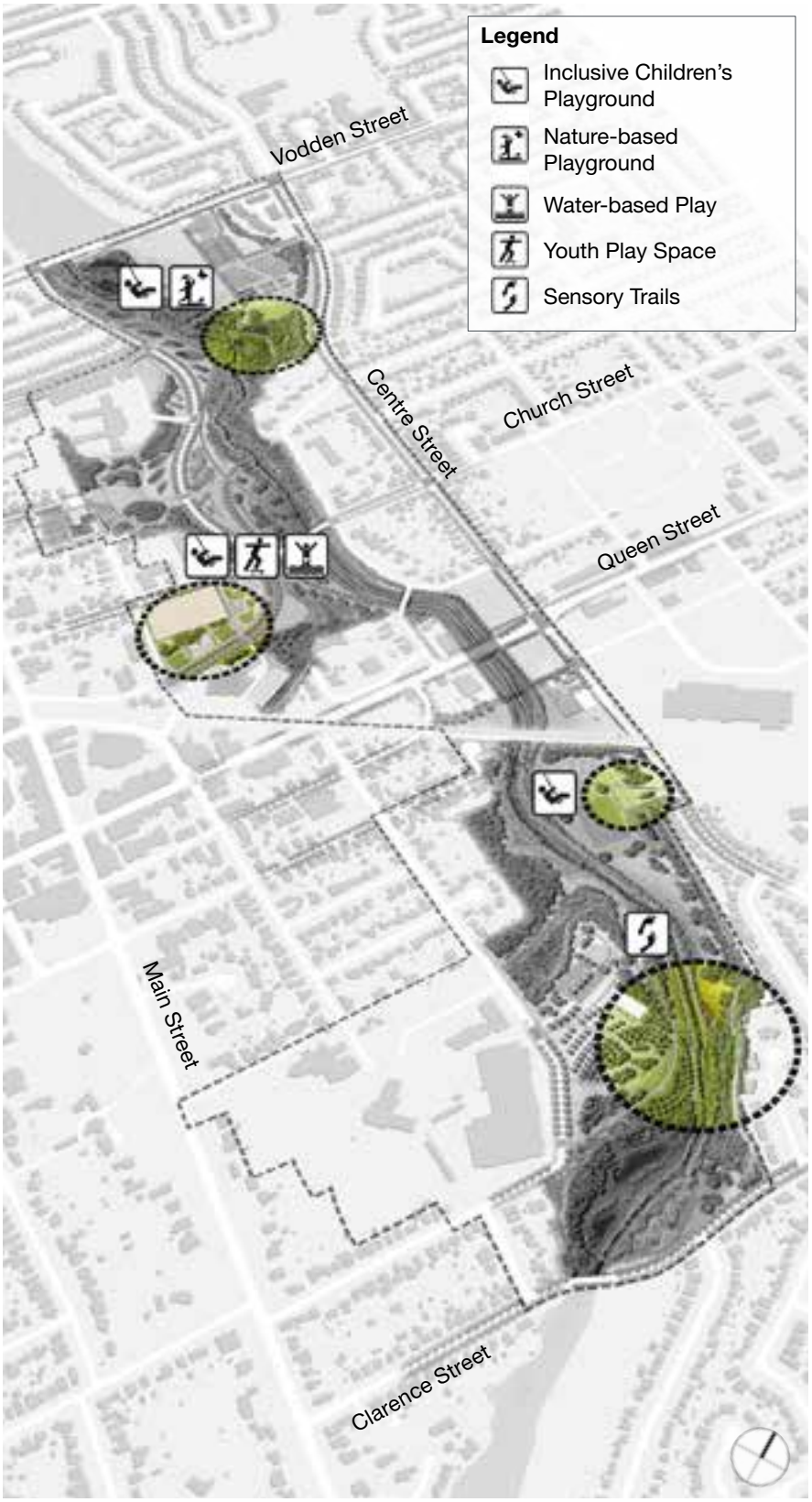


Fig. 160 Riverwalk Inclusive Play Spaces

7.5 Seasonal Programming and Amenities

The provision of programming and supporting infrastructure in winter will contribute to increasing the use of public open space in the colder months, which will also contribute to improving year-round community and public health. Key to these activities, will be the provision of informational and directional signage and supporting infrastructure such as warming huts and access to public washroom facilities.

Skating Loops and Rinks

The Riverwalk UDMP recommends incorporating a skating loop into the design of the planting areas in Rosalea Plaza. Temporary skating or hockey rinks could also be constructed over the sports fields in Duggan Park and Centennial Park, to increase winter programming in those areas.

Tobogganing / Snowshoeing / Cross Country Skiing

When weather conditions allow, tobogganing hills in Rosalea Park and Rosalea Park North should be groomed, to provide safe sledding surfaces and paths. The secondary pathways and boardwalks in Duggan and Centennial Parks can be opened for cross country skiing and snowshoeing.

Seasonal Markets and Celebrations

The Plaza at Rosalea Park should be designed to accommodate seasonal events such as winter markets, light displays public art, design or other events that celebrate the colder months. The integration of feature lighting, warming huts and vendor kiosks into the Plaza will encourage extended public use of the spaces after dusk. Similar events occur elsewhere in the City, including Brampton's annual Winter Lights Festival.

Seasonal Nature Walks

A series of organized nature walks and seasonal sightseeing tours could be hosted in Riverwalk through partnerships between the City, TRCA, schools and community groups.

The nature trails around the stormwater ponds in Duggan Park and the Centennial Park arboretum and wetland boardwalks would be particularly well suited to seasonal walks as the changing colours and migrating wildlife will provide a dramatic experience of the seasonal changes that occur in Riverwalk.

Shade Structures

Shade structures should be provided in the major public spaces within the Riverwalk area. These include Duggan Park, Rosalea Plaza and Centennial Park sports fields. Shade structures can be permanent or temporary and event-based. For event spaces, consideration should be given to integrating foundations and footings to support temporary structures, as well as supporting infrastructure such as power and potable water.

Windbreaks and Warming Huts

The Riverwalk UDMP recommends providing windbreaks in exposed areas, near sports fields and at lookouts to enhance public comfort and extend the use of outdoor public space during shoulder seasons.

In order to create a year-round open space network, consideration should be given to providing warming huts in Duggan Park, Rosalea Plaza or Rosalea Park North and Centennial Park. Warming huts spaces provide opportunities for co-programming with outdoor winter activities, such as tobogganing or cross-country skiing and can be catalyst for the introduction of seasonal public art or design installations.

Fig. 161 Outdoor Skating Trail, Riverdale Park, Toronto, ON

Fig. 162 Tobogganing in Rosedale Valley Ravine, Toronto, ON

Fig. 163 Winnipeg Skating Shelters, Patkau Architects

Recommendations

1. Provide programming to encourage all-season outdoor activity.
2. Provide shelter from the elements to support outdoor activity in the colder months.
3. Provide facilities and amenities to support a range of outdoor winter activities including lighting, warming huts, change rooms, etc.
4. Provide shade and cooling during the summer months.
5. Provide interpretive signage that highlights the seasonal features of Riverwalk.

Fig. 164 Shade Canopies, MPavilion, A. Levete, Melbourne, AUS

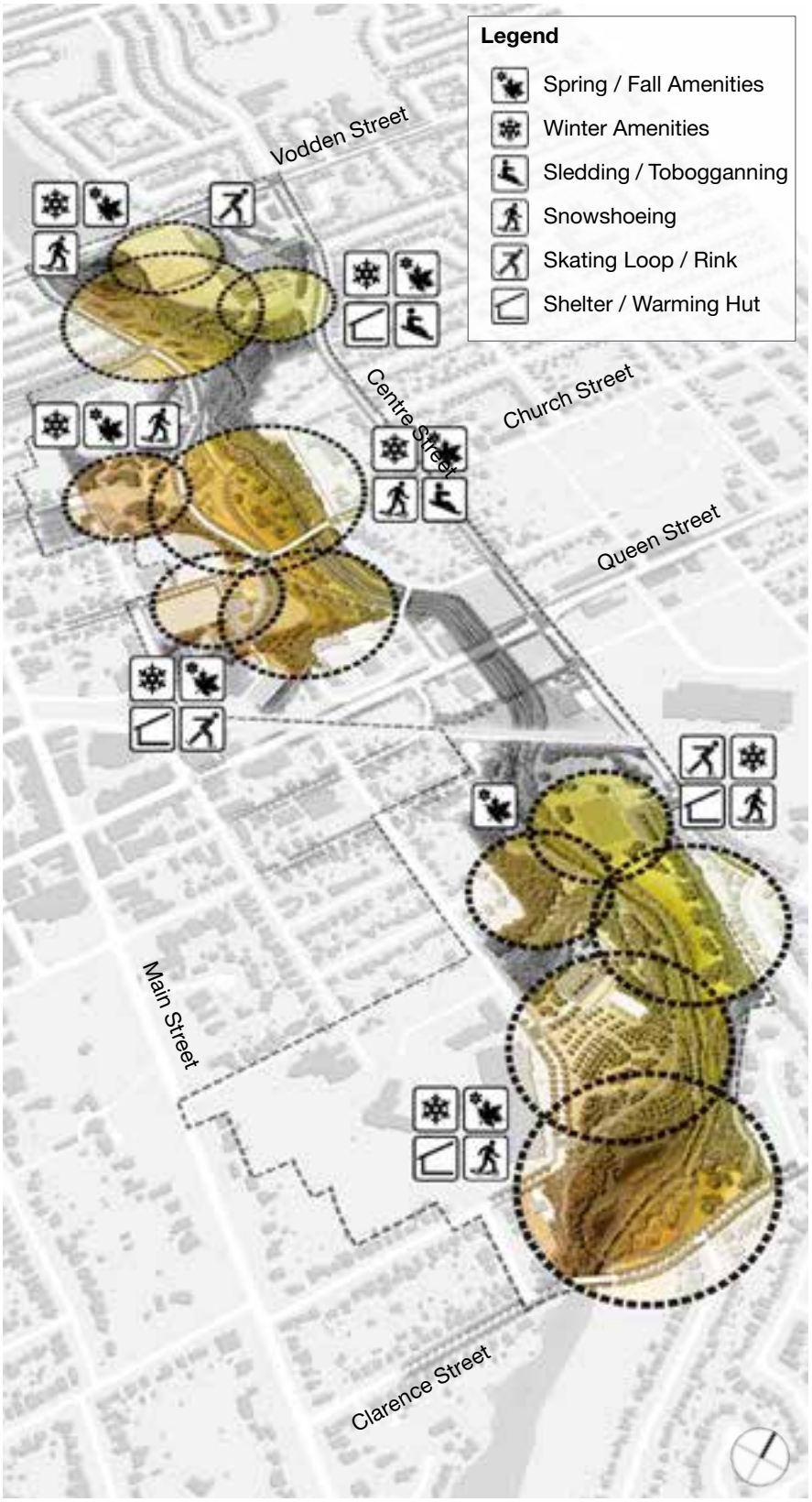


Fig. 165 Riverwalk Seasonal Programming and Amenities

7.6 Horticulture , Community Gardens and Urban Agriculture

The City of Brampton, historically known as the “Flower Town of Canada”, has a long history of horticultural practice, including the Dale and Jennings greenhouses that once stood on the site of Rosalea Park. There are a number of opportunities in the Riverwalk area, to reintroduce horticulture and gardening that can also enhance public space and create programming opportunities to benefit the community and environment.

Duggan Park Urban Agriculture

The spaces created through the relocation of some of the existing sports fields in Duggan Park should be used to create community gardening plots. The flatter areas in the creek valley along Centre Street may also be suitable for larger-scale urban agriculture and potentially orchard-type tree planting.

If a Riverwalk SNAP is initiated, TRCA could also help support neighbourhood-based programming that would relate to and support community gardens and other urban agriculture activities (i.e. food sharing with local partners), potentially through a neighbourhood urban agriculture strategy in collaboration with local groups and NGOs.

Fig. 166 Black Creek Community Farm, Toronto, ON

Central Public School Community Gardens

The existing parking lot at Central Public School Recreation and Art Centre should be reconfigured to provide greening opportunities and also space for community garden plots for public use, or for school or summer camp partnerships.

Central Public School Horticultural Terraces

The terraced landscapes leading from the community centre down to the Central Public School fields could also be programmed as community gardening spaces, or educational horticultural programming. Due the location of Riverwalk along a watercourse, horticultural planting beds should avoid the use of non-native invasive species and native cultivars to reduce the threat of hybridization with native species.

Rosalea Plaza Horticultural Display

The new plaza at Rosalea Park should include space for more formal horticultural displays and seasonal colour. Horticultural planting beds should be integrated into the design of the plaza and should exemplify a clean and contemporary design that will complement the new urban space.

Centennial Park Arboretum

In 1967, the Brampton Horticultural Society commenced an arboretum in Centennial Park. The John Arthur Carroll Memorial arboretum should be expanded and enhanced to include a broader range of native tree species that tell the story of the local landscape. The arboretum should be curated to develop a strong spatial geometry that responds to the natural site topography of the creek valley and table lands, with planting arrangements and new pathways that further emphasize these forms.

Fig. 167 Laking Garden, Royal Botanical Gardens, Hamilton, ON

The Brampton Horticultural Society should be engaged in the arboretum enhancement. A dedicated space for memorial trees and benches should be integrated into the arboretum as a way to foster community ownership and stewardship of these spaces. New connections and lookouts should be established toward the Centennial Park wetland and into the more naturalized portions of Centennial Park, providing important educational and interpretive amenities for local schools and community groups as well as a signature landscape feature for Riverwalk itself.

Recommendations

1. Provide space for community gardens in locations adjacent to residential communities.
2. Implement urban agriculture in Duggan Park.
3. Provide spaces for horticultural displays in the signature landscapes in Rosalea Plaza.
4. Enhance the arboretum in Centennial Park in consultation with the Brampton Horticultural Society and establish partnerships for stewardship and educational programs with community groups and schools.

Fig. 168 Community Garden, Signal Hill, Weyburn, SK

Fig. 169 Riverwalk Horticulture, Community Gardens and Urban Agriculture

7.7 Celebrating Cultural Heritage

The Riverwalk UDMP seeks to provide opportunities to identify, express and interpret the cultural heritage of the Riverwalk area through a landscape narrative that incorporates public art, education and interpretive elements.

The expression of cultural heritage in Riverwalk should be consistent with the goals set out in Brampton's Vision 2040 and Eco Park strategy and in coordination with the City's heritage resources, including the Peel Art Gallery + Archives (PAMA).

Indigenous and Pre-Colonial Heritage

The cultural heritage of Riverwalk is closely tied to the Etobicoke Creek and valley, where water and watercourses were essential livelihood, transportation and cultural resources for Indigenous peoples.

The City should seek opportunities to collaborate with Indigenous communities to create meaningful and informative interpretive experiences within the Riverwalk area. Interventions should highlight the rich heritage of Indigenous peoples within southern Ontario and the Etobicoke Creek watershed.

Consultation with Indigenous communities should be undertaken to identify locations for meaningful commemorative and interpretive installations. Indigenous elders, community leaders and artists should be engaged to develop terms of reference, to conceptualize and when possible to participate in the construction or installation of Indigenous heritage interpretive features or public art.

Colonial Heritage and Recent History

The Etobicoke Creek was a key attraction for initial colonial settlement and the main crossroads of the town were established in close proximity to the watercourse. Although the meandering course did not provide sufficient water to sustain large scale milling operations, the river was still at the heart of the town of Brampton. Frequent floods impacted the early town and measures were taken as early as the 1870s to channelize the watercourse through the Four Corners area.

A major flood in 1948 was landmark event, that triggered the construction of the modern bypass channel and rerouting of the creek from its original course, to its current location, east of the city centre. The Etobicoke Creek bypass channel, completed in 1952 is closely tied to the city's history and should be acknowledged as an important piece of infrastructure that has allowed the city to develop and prosper.

Fig. 170 Create spaces for Indigenous Celebration and Ceremony

Fig. 171 Fire Pit in Trillium Park, Toronto, ON

Fig. 172 Mocassin Identifier Project, Philip Cote, Trillium Park, Toronto, ON

The proposed overlooks at Scott Street, John Street and Queen Street channel should provide interpretation of the history and evolution of the channel and the natural processes that spurred it into existence. Few remnants of the old watercourse remain near church Street and along Main Street, but the topography of the creek valley is still present.

There are a number of cultural heritage resources in the area including remnants of the homes of the flower industry leaders (e.g. Jennings residence) near Rosalea Park, “the Crescent“ at Scott Street south of Church Street and Central Public School. Rosalea Park also has an important role in the cultural and sports history of the town.

The City’s more recent cultural history is one of diversity. Brampton is home to a very culturally diverse population and the design of public open space should provide opportunities for cultural expression and celebration of the cultures that have shaped the City of Brampton.

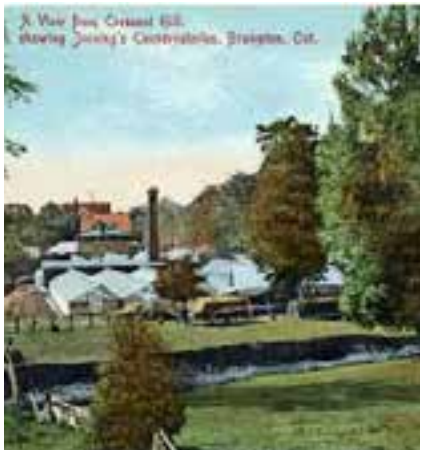


Fig. 173 Jennings Conservatories, c. 1910 (cropped)

Recommendations

1. Promote understanding of how the Etobicoke Creek helped to shape Brampton through the use of narrative plaques and integrated interpretive elements.
2. Share the history of Etobicoke Creek flooding and channelization.
3. Express the history of the Etobicoke Creek and surrounding landscapes in the design of Riverwalk landscapes.
4. Facilitate the expression of local Indigenous history through landscape and built form.
5. Ensure Indigenous consultation for further stages of design development and implementation.
6. Consider historical features, including greenhouses and other civic amenities that were present in the Riverwalk area.
7. Provide spaces and amenities for cultural expression and consider new Canadians and the multicultural evolution of the City.
8. Facilitate organized and self-guided walks in partnership with Indigenous groups and with local heritage organizations.
9. Explore opportunities to celebrate City’s cultural diversity by organizing events and festivals throughout the year.

Fig. 174 Gilbert F. White Memorial Flood Level Marker, Boulder, CO

Fig. 175 Interpretive Window, Burgoygne Bridge, ON

Fig. 176 Brampton’s Multicultural Festival, Carbaram 2011

7.8 Discovering Natural Heritage

The Etobicoke Creek valley has a rich natural history that can be seen in the natural topography of Riverwalk and downtown Brampton, through the remnants of valley slopes and vegetation communities.

Riverwalk's natural heritage should be celebrated and enhanced through thoughtful landscape design and interpretive elements including signs interactive installations and public art and discovered through programming and education.

Landscape Design

The landscape of the Peel Plain prior to settlement was historically characterized by forests and Black Oak savannah, typical for Southern Ontario.

The savannah landscape should be reinstated in open areas such as Rosalea Park North and portions of Duggan Park and the Central Public School fields. Savannah landscapes provide a range of meadow species and shade trees that will strengthen the identity of Riverwalk. In addition to naturalized landscape types, more formal and ordered landscapes may be used to emphasize certain elements, including topography or plant species. Mass plantings of grasses, perennials and trees can create a strong narrative that references the historic riverine landscapes of the creek valley.

The design of the rocky cascade at the upper end of the bypass channel is a great opportunity to draw attention to the creek and the transition from the natural channel to the man-made bypass. This area should be enhance the view and the sound of falling water.

Nature Observation

Nature observation is a rare amenity in most urban city centres and Riverwalk offers a great opportunity for residents to experience flora and fauna within walking distance from Downtown.

A number of boardwalks, lookouts and viewpoints have been identified in the Riverwalk UDMP, that will provide access to remote or intimate spaces and allow for quiet observation of natural processes. These include the open meadow and intermittent wetland in Duggan Park, the pollinator meadow and savannah landscapes and rocky cascade at the north end of the bypass channel in Rosalea Park North and the naturalization area and wetland in Centennial Park.

Lookouts along the creek valley, new pedestrian bridges, trails, signage, viewing platforms, seating and potentially shelters for bird watching should further serve to bring people into the landscape and encouraging users to discover the natural features in Riverwalk.

Fig. 177 Church Street Bridge, c. 1910 City of Brampton (cropped)

Fig. 178 Nature Discovery and Education

Fig. 179 Shaar's Bluff Educational Panel, Spring Lake Park Reserve, Hastings, MN

Outdoor Education and Interpretation

The location and rich natural amenity of Riverwalk lends itself well to educational or interpretive programming. This can include independent and self-directed exploration, online programs or more formal organized programs.

A number of locations within Riverwalk could become outdoor classrooms that allow exploration and understanding of the landscape, including the Centennial Park arboretum and wetland and the landscapes in Rosalea Park North and Duggan Park.

In coordination with the signage and wayfinding strategy for Riverwalk, an education and interpretive signage program should be implemented, to tell the story and narrative of the landscape, flora and fauna and its relationship to the city. These signs will provide interpretive information at lookouts, view points and significant places of natural, historical or cultural interest within the park.

Recommendations:

1. Consider the species of flora and fauna that used to inhabit the site.
2. Provide educational and informational programming within Riverwalk to help the community interact with nature.
3. Support stweardship of the landscape including community plantings in areas where manicured turf will be converted to savannah or meadow.
4. Facilitate organized or self-guided nature walks.
5. Ensure that restoration efforts are complimented with interpretive signage to inform the public about ongoing activities and, where possible, invite their participation.
6. Educational signage near habitat areas should not be visually dominant and should allow adequate separation of users and habitat for observation.

Fig. 180 Heine Jones Interpretive sign at Fotheringham Reserve, Dandenong, AUS

Fig. 181 Humber Bay Shores Butterfly Garden, Toronto, ON

Fig. 182 Interactive and Educational Play Structures

Fig. 183 Viewfinders at Salt Marsh Farm Interpretation Centre, Île d'Oléron, FR

Fig. 184 Integrated Educational Panels, Longwood Gardens, Longwood, PA

7.9 Riverwalk Landmarks and Public Art

Landmarks

The Riverwalk area will include a number of landmarks that are recognizable on a City-wide scale and at a smaller scale of the Riverwalk open space network.

Landscapes

The Riverwalk public open space network and Etobicoke Creek valley should become a strong landmark within the city centre.

The Riverwalk UDMP recommends the introduction of signature Riverwalk landscapes that exemplify topography and plant species specific to the valley. These signature landscapes should feature strong seasonal colour and emphasize topography while emphasizing the movement of water through the landscape. In instances where these signature landscapes also function as stormwater management features, additional interpretive and demonstration elements should be included to emphasize this function.

Riverwalk Bridges and Structures

As part of the downtown flood protection solution identified in the DBFP EA, the bridges spanning the widened and deepened bypass channel must be reconstructed. The key bridges across the Etobicoke Creek should be designed as landmark structures and provide enhanced pedestrian amenities including lookouts and widened sidewalks. Consideration should be given to including above-deck support structures such as stays or arches that can help to mark the crossings.

The existing rail underpasses should also include landmark features such as lighting and public art, to mark the important passage between Downtown Brampton and the into the Riverwalk area.

New buildings, pavilions and kiosks within Riverwalk should also be designed as landmarks within the open space network. They should exemplify design excellence and include sustainable green building design.

Public Art

Public art is an important interpretive element of Riverwalk, helping to bridge the perceived gap between urban / human spaces and park / natural spaces. Given the size of the Riverwalk area, the diversity of spaces and sequence of thresholds and range of landscapes, there are great opportunities to integrate public art throughout the site. Locations for public art should take into consideration the scale of the site, integration with topography and relationship to existing features natural processes and habitat, in addition to access for maintenance.

Public art can be used to explore Indigenous themes, the natural and human history of the valley and the experiences of the multicultural and varied neighbourhoods that surround it. Public art should respond to the temporal and seasonal nature of Riverwalk. The city should consider programming in partnership with the Peel Art Gallery + Archives (PAMA) to curate a public art and heritage program within Riverwalk, as well as the potential for public art exhibitions, or rotating public art loan programs.

Fig. 185 Griffiths Pedestrian Bridge, Burnaby, BC

Fig. 186 Landmark topography, University of Cincinnati, OH

Fig. 187 Landmark Pavillions, Parc Des Rives, Yverdon-Les-Bains, VD

Integrated Public Art

Public art can take infinite forms. It can stand alone, as a sculpture or mural, or it can be integrated into the fabric of Riverwalk, through the design of public infrastructure such as walls, bridges, underpasses, site furnishings and landform.

Stand-alone works of art, that are commissioned to express a theme or concept related to Riverwalk would be considered integrated art, as the design and placement of these pieces would be done in a context-sensitive manner, responding to the landscape and contributing to the rich narrative of Riverwalk.

Temporary Public Art

Themed and seasonal temporary public art installations can elevate the experience of Riverwalk by introducing more ephemeral and changing public art. Art installations can span the entire Riverwalk area, or be done on a smaller scale and are a great opportunity to engage the community and support local artists on an ongoing basis. These art-based events also encourage the continual rediscovery of existing public open spaces during the day and night and year-round.

Fig. 188 The Stone Wave by Sean Donnelly, Alton Mill Arts Centre, Caledon, ON

Recommendations

1. Implement a Public Strategy for Riverwalk as described in **“Section 9.2 Policy Recommendations”**.
2. Develop a longer term strategy for culture, interpretation and public art in the area as part of the broader Integrated Downtown Plan implementation strategy, including funding, processes and resources.
3. Introduce a program of permanent, integrated public art.
4. In addition to freestanding works of art, opportunities should be explored for integrated public art including park shelters, site furnishings, lookouts, water features, feature lighting, etc.
5. Provide opportunities to host temporary, seasonal or event-based public art events along the Riverwalk.
6. Incorporate public art in the design of the engineering aspects of the bypass channel, bridges and other structures to tell a story about the hydrology of the creek.
7. Select ecologically sustainable materials and locate public art with consideration to natural habitat.
8. Collaborate with Peel Art Gallery and Museum Archives (PAMA)
9. Create new signature places and landmarks within Riverwalk.

Fig. 189 Field of Light, Bruce Munro, Paso Robles CA

Fig. 190 Hoarding, Gareth Lichty, Nuit Blanche, 2019, Toronto, ON

Fig. 191 Public Bench with Integrated Art

7.10 Open Space Amenities

Boardwalks and Lookouts

The Riverwalk UDMP recommends a number of new access and vantage points that offer a variety of experiences of the creek and the downtown.

Providing improved access to the creek and its surroundings, both physical and visual, is an important element in the understanding and interpretation of the site.

A number of locations have been identified that could be reconfigured to provide improved physical access to the banks of the creek, from the Etobicoke Creek Recreational Trail through trail realignments and selective vegetation clearing, where impacts to the natural creek edge and ecology can be controlled.

A new access to the creek is also recommended in Rosalea Park, where the Etobicoke Creek Recreational Trail is proposed to pass beneath the Church Street bridge. A new access could be provided, linking the west end of the bridge down to the trail below, through the introduction of a stairway down the bank of the Rosalea Berm.

Duggan Park Boardwalks

As it flows through Duggan Park, the Etobicoke Creek and potential new stormwater management ponds will provide a rich riparian edge that can only be viewed in from a low elevation. In these areas, boardwalks should be developed as interpretive and educational trails, meeting all accessibility requirements and providing all-season access.

Centennial Park Wetland Boardwalks

The Centennial Park wetland is a unique natural feature that provides important educational and interpretive opportunities. Accessible boardwalks that meander through the wetland can provide an intimate new experience as well as access for nature observation and education while protecting sensitive habitat from physical damage.

Bypass Channel Boardwalks

The 2014 Vision for the Riverwalk recommended improved public access to the Creek in the channelized portions of the site. The Riverwalk UDMP proposes a redefined vision that will protect for public access along the the bypass channel while adhering to the requirements and constraints of the flood protection solution outlined in the DBFP EA.

Between Scott Street and John Street, access to the water's edge, within the bypass channel is difficult and potentially hazardous. In these areas, a high-level boardwalk is proposed, that will overlook the channel, offering views into the deep chasm and providing opportunities for public art and water features. These overlook boardwalks should provide a generous public promenade that incorporates tree plantings, lighting and seating.

Bridge Lookouts

The bridges at Vodden, Church, Scott, Queen and Clarence Street provide an important opportunity for lookouts to the creek and bypass channel below. These lookouts can be built into the abutments of bridges and should be designed to incorporate seating, pedestrian-scale lighting and interpretive signage.

Fig. 192 Wetland Boardwalk, Kerncliff Park, Burlington, ON

Fig. 193 Bridge Lookout, Flora Footbridge, Ottawa, ON

Etobicoke Creek Valley Lookouts

Additional lookouts should be integrated into pathway design and layout, to take advantage of significant landscape features along the creek valley. Locations include the riparian edge in Duggan Park, the high bank along Scott Street, the pathway overlooking the wetland in Centennial Park.

These lookouts will take a number of different forms that will be designed to be site specific to the landscape condition, access requirements, safety and desired experience or views.

Recommendations

1. Provide safe and accessible routes through ecological landscapes, while minimizing negative impacts to the natural heritage features.
2. Provide enhanced views to Etobicoke Creek and creek valley landscapes.
3. Design all boardwalks and lookouts according to Crime Prevention Through Environmental Design (CPTED) principles.
4. Utilize sustainable materials for all look outs.
5. Maximize opportunities for unique experiences at each of the lookouts.
6. All platforms and lookouts are to be integrated with a minimal impact to the site and habitat.

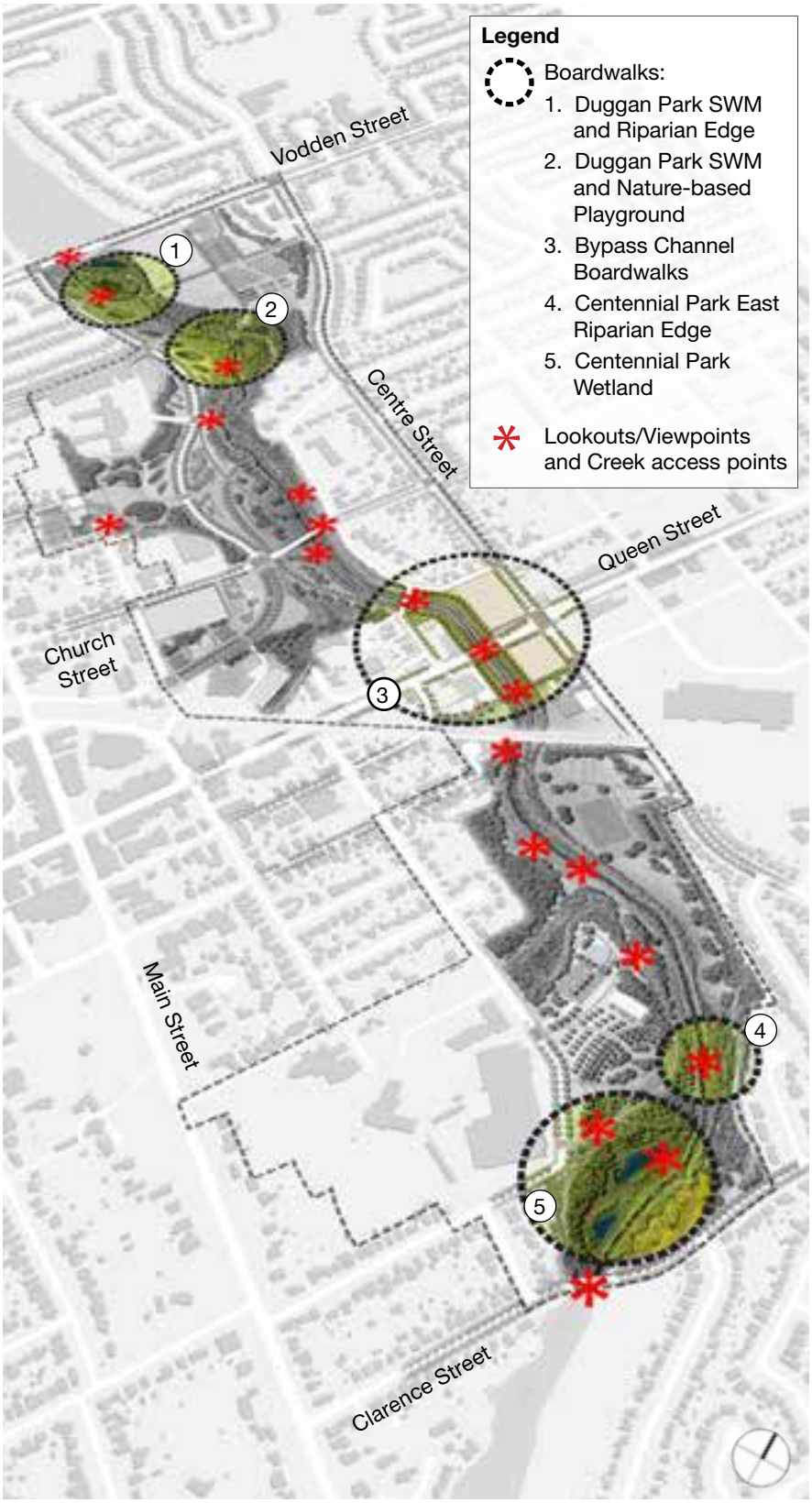


Fig. 194 Riverwalk Boardwalks and Lookouts

Site Furnishings and Other Amenities

Open space amenities include site furnishings and other public infrastructure that support the public use of parks in the Riverwalk Area. These amenities serve to provide rest, enhance comfort and extend the amount of time spent using outdoor public spaces. Providing outdoor public amenities such as drinking fountains, public washrooms and ample seating is also an important part of accessible and equitable public spaces in the Riverwalk area.

Site Furnishings

Benches should be distributed along all pathways and trails, at key gathering places and lookout locations. Benches can be free standing or integrated into seat walls and can be a design feature or opportunity for public art installations. The range of seating should include benches with armrests and back rests to meet current best practices for accessibility.

Waste and recycling receptacles must be located along routes that are accessible by waste management or parks maintenance vehicles, but located frequently enough to discourage littering.

Picnic Spaces

The Riverwalk UDMP proposes picnic areas in the Rosalea Park North meadow, in the open lawn areas in Duggan Park and along forested paths in Centennial Park. Picnic areas should include seating, shelter and other amenities and should be flexible enough to allow gatherings of various sizes. Picnic areas should be well integrated into the landscape when not in use.

Water Features

A water feature should be integrated into the design of the plaza at Rosalea Park. The water feature should integrate movement and sound and provide opportunities to touch and interact with water. This water feature could also be connected to, or associated with a play area and splash pads in Rosalea Plaza, with future consideration for using treated rainwater and integration with LID features in the plaza.

Bottle-filling stations

Water bottle-filling stations should be provided at the sports fields in Duggan Park and Centennial park, as well as in the Plaza at Rosalea Park. A bottle-filling station should also be provided at the dogs-off-leash area, that can also accommodate dogs.

Public Washrooms

Public washrooms are an important amenity to ensure accessibility and equity in public space. Washrooms should be should be integrated into the design of the kiosk in Rosalea Plaza, as well as in Duggan and Centennial Parks, as supporting infrastructure for sports fields, tennis and pickle ball courts as well as the nature trails and the less urban spaces in the Riverwalk Area.

Access to public showers should be made possible through partnerships and through co-programming with adjacent community centres and the YMCA.

Dogs Off-leash Areas

Dogs off-leash area in Duggan Park should be reconfigured to provide enhanced habitat and improved separation between dogs and naturalized areas. The off-leash area should maintain separate large and small dog areas and incorporate natural features where possible.

An additional off-leash area should be considered in the north portion of Centennial Park, however the location should be selected to minimize impacts on existing naturalized areas and sensitive habitats.

Fig. 195 Integrated Serpentine Seating

Fig. 196 Public Washrooms, Assiniboine Park, SK

Fig. 197 Dogs Off-leash Area

Any future improvements or additional off-leash area should be developed in coordination with local community groups and is subject to City approvals and funding.

Recommendations

7. Provide public amenities, site furnishings, lighting to encourage prolonged use of outdoor spaces.
8. All furniture should be accessible, functional and constructed of high quality, robust material, with consideration given to vandal-resistant materials and finishes.
9. Allow additional amenities to be added as required by park user needs.
10. Rationalize and improve relationships between programmed spaces, transit, parking and pathways.
11. Select ecologically sustainable materials for site furnishings.
12. Locate site furnishings with consideration to natural habitat.
13. Select site furnishings to meet ongoing operational needs, while minimizing maintenance requirements.
14. Provide required utilities for programed activities by ensuring appropriate location and design integration.

Fig. 198 Diana Memorial Fountain, Hyde Park, London, UK

Fig. 199 Riverwalk Open Space Amenities

7.11 Wayfinding and Signage

Central to improving wayfinding in the Riverwalk area is the implementation of a unified signage and wayfinding strategy. Riverwalk signs should have a strong graphic identity that is identifiable throughout the site.

All signs and markers should include features for universal accessibility, including text, symbols or pictographs with adequately contrasting backgrounds, raised tactile or Braille language characters and where applicable, interactive digital or auditory information.

The placement of signage within Riverwalk should also be coordinated with the lighting strategy and informational, directional and regulatory signage should be well illuminated at night.

Riverwalk Gateway Identity Signs

Gateway signs can take many forms, they should be easily identifiable as entry features for Riverwalk. Located at the main entrances to each character area, these large signs will establish a presence on adjacent roadways and provide an opportunity to incorporate public art and design.

Gateway signs should include a map of Riverwalk as well as information on important natural and cultural features, rules and regulations and emergency contact information. These signs should be visible from a distance and be clearly legible and accessible.

Gateway signs are recommended at the Vodden Street and Ken Whillans Drive intersection, at the Centre Street entrance to Duggan Park, at the Church Street and Ken Whillans Drive intersection, at the Queen Street channel crossing, at the Centre Street entrance to Centennial Park and at Clarence Street.

Information and Wayfinding signs

Major Wayfinding Signs

Major wayfinding signs should be located at significant places such as path intersections and pedestrian access from parking areas. These signs should provide directional information, locations of dedicated sports and multi-use facilities and playgrounds as well as an added level of interpretive and interactive information about Riverwalk. Signs should also include distance and time to the next park feature (e.g. wetland, bridge, plaza) and information related to trail etiquette, accessibility and difficulty level for each route.

Minor Wayfinding Signs

Minor wayfinding signs should be located at trail entrance-exit points and/or related to memorable places such as bridges and tunnels and at on-street segments of trails. These markers should provide trail identification as well as directions, distance and time to the next park feature (e.g. wetland, bridge, plaza), trail etiquette, accessibility/route difficulty levels.

Regulatory Signage

Regulatory signage should be posted at all park entrances and throughout the park as required to inform visitors of a required code of conduct and to deter illegal activities. Any regulatory signs must be reviewed and approved by the City and TRCA for applicable regulations and by-laws and in the context of available resources for enforcement. In addition to regulatory signs, there may be locations within the Riverwalk area that require additional guidance to indicate site-specific requirements, warn of seasonal closures, hazards or other important public safety information. These signs should be easily identifiable and placed highly visible locations.

Fig. 200 Inlaid Bronze Map, Fundy National Park, New Brunswick

Fig. 201 Park Identity Sign, Munmorah State Conservation Area, NSW

Educational Signs and Interpretive Signs

These signs provide interpretive information at lookouts, view points and significant places of natural, historical or cultural interest within the park.

Educational and interpretive signs should be integrated into their settings. These signs can range widely in size, they can be static, or interactive, contain detailed descriptions and facts, or be more brief and thought-provoking, akin to public art. Educational and interpretive signs can be site-specific, describing a single important feature, or they can describe a narrative through space and be placed along trails where users are encouraged to explore and discover the Riverwalk landscape.

Integrating interactive technology should be considered to complement the signs, or be included a special installation, to tell the story of Riverwalk. A cohesive visual identity should be developed for these signs so that trail users can easily identify them and differentiate them from wayfinding signage.

Trail Markers

One of the key principles of the Riverwalk UDMP is to establish a network of trails that can be experienced as a series of loops and links, allowing users to explore Riverwalk according to their interests and abilities.

Trail markers can assist in navigating the trail system and establish an trail identification system that is complimentary to the City's overall wayfinding system, while establishing an identity for Riverwalk.

Trail markers should be very simply designed and provide identification, distance, direction and difficulty level for each segment of trail. Trail markers should be placed at each intersection where trails or pathways meet and along trails, at frequent intervals.

Recommendations

1. Develop a parks signage and wayfinding strategy for Riverwalk as described in **"Section 9.2 Policy Recommendations"**.
2. Establish an identity for Riverwalk through a site -specific signage strategy.
3. Encourage visiting, exploring and appreciation of Riverwalk and its natural features.
4. Through the wayfinding strategy, raise awareness of what the Riverwalk has to offer.
5. At main entrances, establish a stronger presence and a visual identity for the park.
6. Improve visitors' confidence to walk/explore by providing information on distances, circuits and loops.
7. Ensure a variety of signage types are available to address navigation throughout Riverwalk and programming elements, as well as safety and restricted access.
8. Establish key messages to remind users of Riverwalk objectives and principles.
9. Ensure all signage relating to new facilities, park amenities and trails and pathways is accessible.

Fig. 202 Interpretive Posts, Cassiobury Park Nature Trail, Watford, UK

Fig. 203 Pathway Distance Marker, Parc Riu Llobregat, Barcelona, Spain

Fig. 204 Brisbane Rail Trail Information Pillar

Fig. 205 Snowshoeing in Collingwood, ON

8.0
Concept Design and Demonstration Plan

8.1 Riverwalk and the Downtown Open Space Context

The Riverwalk area creates a distinctive break in the city's downtown streets and blocks pattern but it also represents an important link between adjacent neighbourhoods and to Brampton's broader open space network.

The Riverwalk open space network is a series of connected public spaces and distinct character areas traversing a number of diverse urban neighbourhoods. The Riverwalk UDMP proposes to build upon these strengths by increasing connections from the Riverwalk area to downtown destinations and surrounding open spaces, improving the site's walkability and overall accessibility. Riverwalk will become one of the primary and central public open spaces within the downtown core. Key to integrating Riverwalk into the broader downtown context, is for connections to reach outside of the Riverwalk area. Many of these connections can be made physically, through enhanced streetscaping, improved street crossings and the expansion of the active transportation and public transit networks, as outlined in **"Chapter 6.0 Sustainable Transportation"**.

In many cases, physical connection to public parks and open spaces beyond Riverwalk is not possible due to distance, accessibility or space constraints within the public right-of-way. In these cases, integration must be done with a high-level design and programming approach as described in **"Chapter 7.0 Programming"**. Riverwalk should be integrated as a space to expand existing cultural and community events and as a venue for new programming.

Gateways and Feature Landscapes

Riverwalk gateways should be located at each of the major open spaces within the Riverwalk area, including Duggan Park, Rosalea Park, the Bypass Channel and Centennial Park. Gateways should create a well-defined identity for Riverwalk and should include integrated wayfinding and signage elements, seating, lighting and could include sculptural elements to create a strong visual presence. Gateways are an opportunity to integrate public art and heritage and could be incorporated into broader City initiatives.

Riverwalk feature landscapes that evoke the creek and its riverine processes will mark the places where Riverwalk engages the city. These landscapes will feature topography, plantings and water to create a strong visual and spatial moments that anchor the key gateways into Riverwalk.

Recommendations

1. Create a continuous network of open space within the Riverwalk area.
2. Connect the open spaces within Riverwalk to downtown Brampton through an integrated signage and wayfinding strategy.
3. Open spaces in the Riverwalk area should complement the programming that occurs in nearby downtown open spaces.
4. Create gateways and feature landscapes at key connection points.
5. Introduce strong landscape features, mass planting, topography and other identifying features to create signature landscapes throughout the site.
6. Introduce public art and heritage interpretation to strengthen the landscape narrative of the site.

Fig. 206 Gateway Feature, Burgoygne Bridge ON

Fig. 207 Granite Inlay Pavement, Baltimore's National Aquarium, Baltimore, MA

Legend

- Etobicoke Creek Recreational Trail
- Riverwalk Gateways
- Streets and Public Realm Connections
- Open Spaces Within and Adjacent to Riverwalk Study Area

1. Calvert Park
2. Duggan Park
3. Rosalea Park North
4. Central Public School Park
5. Scott Street Parkette
6. Rosalea Park
7. Rosalea Plaza
8. Etobicoke Creek Promenade
9. John Street Crossing
10. St. Mary's Heritage Cemetery
11. Centennial Park North Gateway
12. Centennial Park
13. Centennial Park Arboretum
14. Centennial Park Wetland
15. Meadowland Park
16. Gage Park
17. Ken Whillans Square
18. Garden Square
19. McLoughlin Park
20. Earnie Mitchell Park
21. Peel Memorial Trail
22. Brampton Cemetery
23. Sheridan Parkette
24. Salisbury Circle Parkette
25. English Street Park

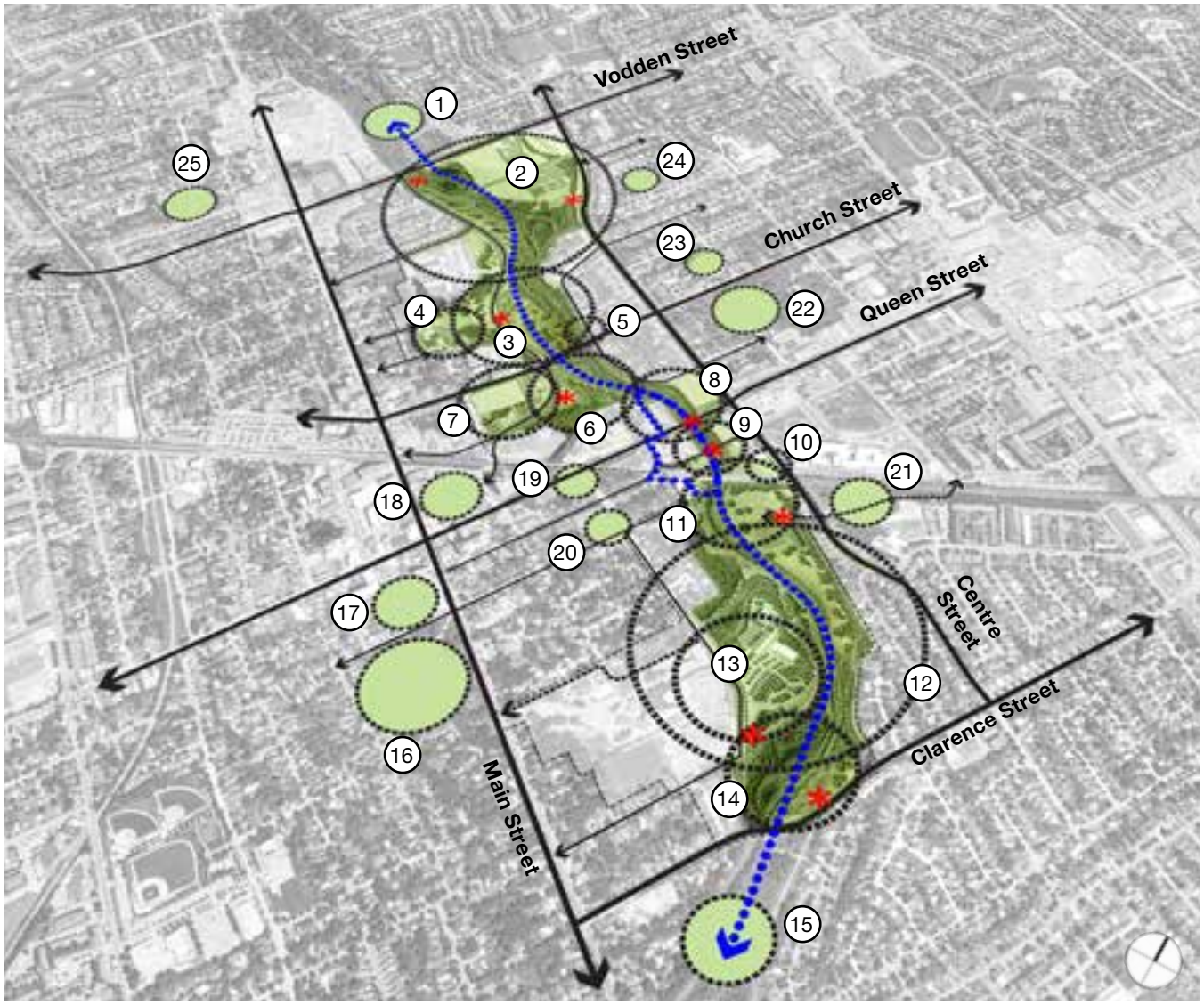


Fig. 208 Riverwalk in the Open Space System

8.2 Placemaking, Character and Identity

The Riverwalk UDMP sets out provisions and recommendations that aim to express and enhance the existing character of the site and that will also shape and redefine a new identity for Riverwalk within the context of Brampton's revitalized downtown core.

Riverwalk will become a prominent, human-scaled, attractive and resilient place focused on the open space and natural systems along the Etobicoke Creek Valley in the downtown urban context. It brings together the city and nature and relies on good urban design as one of the main tools to create a legacy for the City of Brampton.

The character and identity of Riverwalk should emphasize sustainability and resilience, natural and cultural heritage and the movement of water and people through the site.

The Riverwalk UDMP proposes high-level design concepts and narratives that will be developed through a future detailed design process that will rely extensively on an integrated design approach involving a broad range of disciplines that include urban design, landscape, ecology, engineering, heritage, arts and culture.

The detailed design process should be focused on design excellence, collaboration, outreach, and engagement using variety of tools and techniques including visualization, visual communication and storytelling. Of particular importance will be engagement with the local Indigenous population to establish connections, dialogue and to learn from their culture and unique understanding of nature and spirit of place.

Placemaking

The Riverwalk UDMP aims to strengthen the connection between the community and the public open space network through integrated and inclusive design and engagement.

- Create places that contribute to the overall vision for Riverwalk.
- Create context-sensitive places that respond to the needs of the local community and visitors alike.
- Create welcoming, comfortable places for people to use and enjoy.
- Create places that contribute and compliment the urban and natural landscape.
- Create new connections within Riverwalk and to the broader open space network.
- Create places for social activity, places for people to gather as well as more intimate places for people to contemplate.

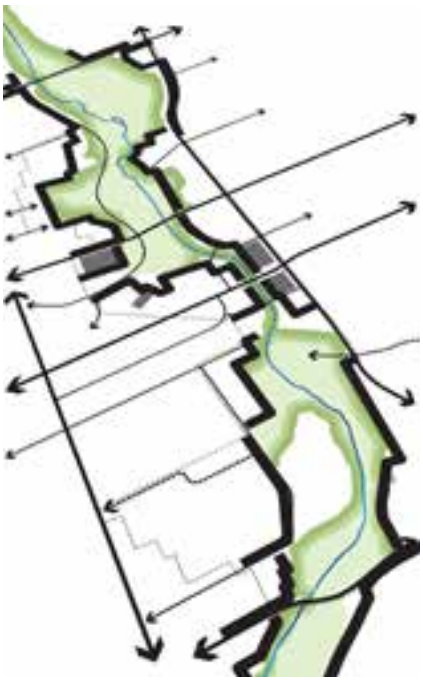


Fig. 209 Topography and Urban Form

Topography and Urban Form

Geography, topography, urban form, come together to define Riverwalk as a linear open space system. The creek valley remains the most important defining element giving Riverwalk a unique sense of place. The natural topography of the site is emphasized with dense vegetation, along valley slopes that emphasizes the grade change and heightens Riverwalk's landscape character.

Urban edges and built form further define the open space system while generally following the natural topography of the site. At the heart of Riverwalk, where it intersects with downtown Brampton, natural topography gives way to a strong urban form and tall vertical edges that delineate and frame the space, creating dense and vibrant urban landscapes.

Potential future development in the central portions of Riverwalk will provide additional spatial definition and activation. Increasing the urban density around Rosalea Park and along Queen Street and the bypass channel with transit-oriented, green development, plays a key role in supporting resilience, sustainability, active living and liveability in the downtown core.

Scale and Texture

The topography and urban form are integral to establishing the overall scale and texture of Riverwalk by expanding and compressing public space and creating friction that can speed up or slow down movement through the landscape.

Scale is further articulated by creating a dynamic relationship between open and enclosed spaces, edges and frontages and a hierarchy of pathways and trails that lead to framed views and open vistas.

Texture is established through the rhythm of landscape types and vegetation communities, gateways, bridges and architectural elements within the landscape, materials, heritage, public art, wayfinding and signage that give the users a sense of place and comfort and enhance the Downtown's identity and image

The scale and texture the north and south reached of Riverwalk is characterized by broad open spaces created by the floodplain of the Etobicoke creek, with a fine texture created by the vegetation and more naturalized landscapes. The central portion of riverwalk is characterised by larger elements, steeper valley slopes, taller buildings and imposing infrastructure while the testure is represented by a more urban palette and hasrscape materials.

As an urban riverine landscape, Riverwalk is dynamic and resilient and will grow and become more finely textured overtime.

The perceived scale and texture of Riverwalk will vary between day and night, based on weather and seasonal changes. Physical scale and texture will vary over the years as vegetation grows and matures, as public uses change and as new developments rise in downtown Brampton.

Movement and Narrative

Riverwalk is a landscape of movement, intended to be experienced as a continuous ribbon of publicly accessible open space that is linked through a landscape narrative that relates, physically, visually and thematically to the city of Brampton and to the Etobicoke Creek.

A number of feature landscapes will be woven into the fabric of Riverwalk, marking the progression from the outer, more naturalized areas to the central, urban portions of the site. These include visually striking landscape features such as mass plantings of native grasses and meadow species, the use of seasonal colour and form that will create an identity for Riverwalk, based on the natural and cultural features of the site.

Riverwalk is a system of inter-connected yet physically and functionally distinct parks and spaces that form a unified whole. A key component of placemaking for Riverwalk as a whole, is the creation of a narrative that can be discovered and interpreted as one moves through the landscape.

The story of Riverwalk is entwined with the natural and cultural heritage of the site and its existing geography and context. This narrative will be expressed throughout Riverwalk through cultural expression and public art, through design and landscape.

The flowing linear movement patterns that follow the Etobicoke Creek are intersected by the city streets that connect Riverwalk to downtown. The intersection of natural and urban space create opportunities for placemaking and story-telling. They mark important points of access and connection to the street network, public transit and active transportation routes.

Creating new connections along major east-west city streets such as Vodden, Church and Queen Streets will play a major in integrating Riverwalk into the network of neighbourhoods and open spaces and into the broader downtown core, contribute new premium opportunities for revitalization and bring residents, employees and visitors to downtown Brampton.

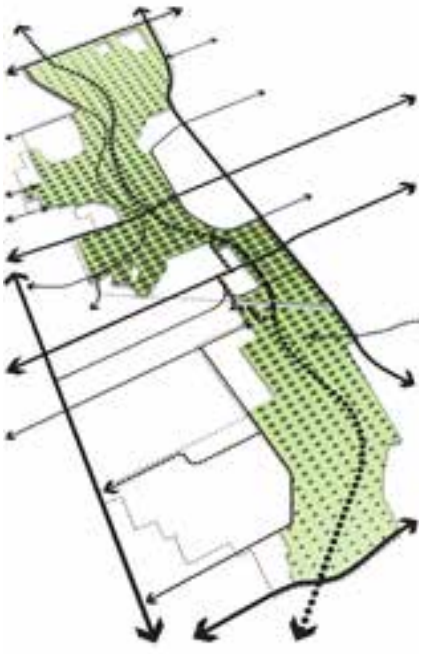


Fig. 210 Scale and Textrure

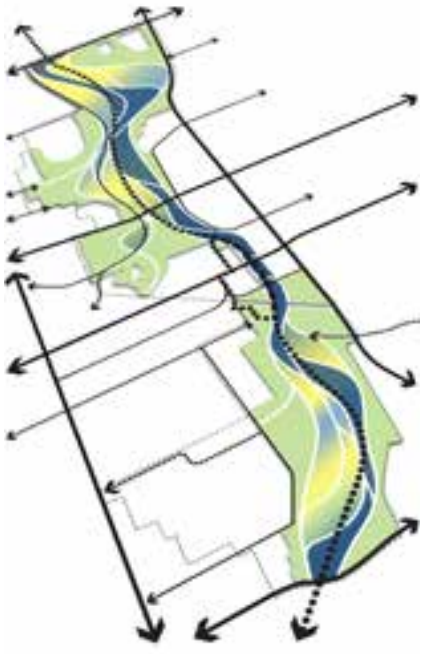


Fig. 211 Movement and Narrative

Design Excellence

The Riverwalk UDMP has set out an urban design framework that aims to unify the open space network while prioritizing design excellence to ensure the creation of high quality spaces and amenities, with a focus on innovation, sustainability and accessibility.

The design and selection of each element within the built landscape must be considered for its quality, durability, sustainability and visual quality, but more importantly, for its contribution to the character identity of Riverwalk overall.

Design excellence considerations should also be applied to infrastructure and engineering elements such as roads, bridges, stormwater features, as well as utility infrastructure, above and beyond conventional standards, design and construction practices.

Responding to Context

The Riverwalk vision requires a cohesive visual expression that will support and reinforce the very varying contexts from one end to the other. Riverwalk spans residential, institutional and highly urbanized downtown neighbourhoods and is framed by a variety of built elements and landscapes with differing functional requirements.

- Provide layers within the design of materials, pattern, texture and colour that respond to the unique Riverwalk context.
- Integrate the cultural and natural heritage of the site as a historical context for design elements.
- Provide integrated public art that provides visual interest, while interpreting significant aspects of the place and its history.

Elements of Continuity

To create a cohesive identity for Riverwalk within the broader open space network, there should be visual integration of design elements throughout the five character areas. The Riverwalk UDMP Recommends the following elements of continuity:

- A unifying aesthetic approach to the design of built elements and public space including simplicity, clean lines, good proportions, with themes of nature, water and movement.
- A unifying signature colour, to be selected as part of a future signage and wayfinding strategy, that can be repeated throughout the site, as part of identity signage and site furnishings.
- Natural materials, including stone, wood and natural metals that have a distinctive and robust characteristics that complement the natural environment.

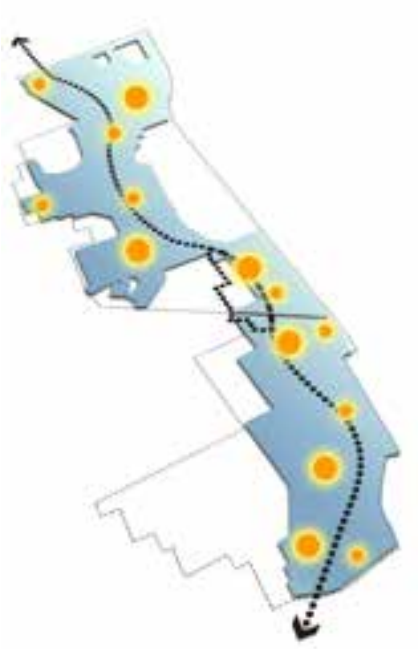


Fig. 212 Elements of Continuity and Elements of Variation

- A consistent structural design for pedestrian bridges within the Riverwalk area.
- A consistent plant palette for trees and shrubs with a focus on native species that support and enhance existing native plant communities and provide seasonal colour.
- A consistent lighting design, including poles, fixtures and light levels along the Etobicoke Creek Recreational Trail.
- A consistent language of gateway and identity signs, Information and Wayfinding signs and trail markers as outlined in **“Section 7.11 Wayfinding and Signage”.**

Elements of Variation

Elements of variation are context-specific interventions that serve to give character to individual spaces within the overall context of Riverwalk

The following elements will provide the diversity of expression that will allow Riverwalk to reflect the diverse neighbourhoods, communities that make up its context:

- Site-specific accent lighting
- Site-specific structures such as shelters, kiosks, etc.
- Public art installations
- Horticultural plantings including flowering perennials, ornamental grasses and bulbs that provide context-specific and seasonal colour.
- Educational, Interpretive and feature signs as outlined in **“Section 7.11 Wayfinding and Signage”.**

Harmony & Visual Balance

Provide harmony and visual balance (utilizing order, hierarchy, symmetry, rhythm) throughout design elements as well as within the overall landscape composition. Harmony and visual balance should be considered especially as it relates to built and architectural elements. However this principle can also apply to both urban and naturalized landscapes as a basis for spatial organization and composition.

- Order / Hierarchy - elements are arranged logically without visual confusion.
- Symmetry - a composition symmetrical about its central axis provides natural balance; An asymmetrical composition can also be balanced if the visual weight of different elements is balanced on either side.
- Rhythm - regular recurrence of similar elements creates a visual flow that is pleasing to the eye.

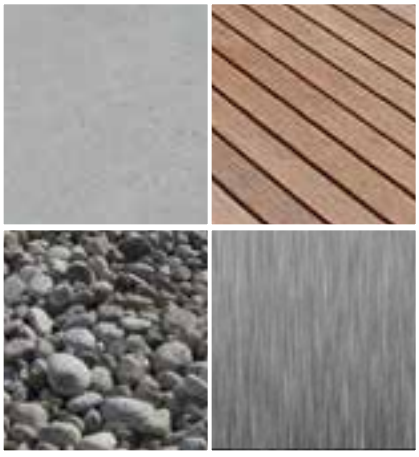


Fig. 213 High Quality, Durable Materials

Functional Clarity and Design Integrity

In order for Riverwalk to be timeless and enduring, the form of built components should be an honest expression of their required function.

- Design expression and detailing should be of its time; pseudo-historic expression should be avoided, with the exception of historic references as part of cultural or public art installations.
- Materials should be appropriate for their function and express their inherent nature.

Materials, Finishes and Enduring Visual Quality

The materials and finishes selected for Riverwalk must exemplify best practices for sustainability and resilience and create a palette that enhances the character and identity of Riverwalk. Materials and finishes are an important overall unifying layer throughout the Riverwalk area, while sometimes providing distinctive “moments” of difference.

- Utilize high quality, durable, compatible materials and finishes to ensure a long life and minimize ongoing maintenance.
- Apply a rigorous and consistent approach to details and connections.
- Provide texture, pattern and/or colour to provide visual interest and contrast where necessary.
- Key considerations include quality and durability of base materials, good design, detailing and workmanship.
- Planting of and native, drought, and salt tolerant species should be maximized throughout Riverwalk wherever possible, while ensuring appropriate site lines for safety and reducing required landscape maintenance.

Recommendations

1. Ensure that potential future development adjacent to Riverwalk will support and enhance the character and identity of Riverwalk.
2. Ensure that a variety of scale and texture is incorporated into the detailed design of public spaces and elements within Riverwalk.
3. Ensure that a cohesive narrative, based on the natural and cultural heritage of the site is carried through detailed design of public spaces and elements within Riverwalk.
4. Undertake collaboration, outreach, engagement using a variety of tools and techniques for visualization and visual communication during the detailed design of public spaces and elements within Riverwalk.
5. Ensure an appropriate balance between visual continuity & variability of site elements and program areas that supports intuitive wayfinding.
6. Foster a culture of design excellence and integrate excellence principles into the planning, design and procurement processes of all projects and initiatives outlined in the Riverwalk UDMP under **“Chapter 9.0 Implementation Framework”**.
7. Ensure that the design of built elements and features within the Riverwalk area follow principles of functional clarity and design integrity.
8. The design of public open space should respond to its context.
9. Select materials and site furnishings for enduring visual quality.
10. Express the character and identity of Riverwalk through elements of continuity and elements of variation.

8.3 The Riverwalk Demonstration Plan

The Demonstration Plan illustrates the vision for Riverwalk, with distinct urban and naturalized spaces defined by a series of special moments, varying degrees of character and a range of possibilities.

Urban Design and Open Space Concept

The Riverwalk UDMP proposes an overall urban design concept that builds on existing site conditions and the opportunities created by concurrent projects and initiatives to create a landmark linear public open space that organizes a system of parks, plazas and amenities along an active transportation spine, with a series of gateways, loops, views and vistas along the Etobicoke Creek valley.

The urban design concept for the Riverwalk area integrates a variety of natural and man made elements are inspired by the natural topography of the Etobicoke Creek valley, the movement of water through the landscape, the vibrant urban context and rich natural and cultural heritage of the site. Landscape and architectural interventions should be timeless and remain relevant long after their initial construction, yet the aesthetic expression of Riverwalk should be contemporary and of its time, avoiding historicist design styles.

Riverwalk is a unique green ribbon that connects urban neighbourhoods through a continuous network of public open space, organized along a spine that follows the Etobicoke Creek Recreational Trail and reaching into the city's core. It is a transformative project that will become a landmark place and will contribute to the revitalization of Brampton's downtown.

The Five Character areas

Riverwalk is divided into five distinct character areas that offer unique experiences to users through their natural and man-made features, relationship to the Etobicoke Creek and integration with the urban context. Each character area contributes to the overall character and identity of Riverwalk by exemplifying the principles and objectives of the Riverwalk UDMP, while providing variation and a context-specific sense of place.

The Riverwalk UDMP has identified each area for it's key character-defining features, which are described in detail in this chapter.

Area 1: Riverwalk North Gateway
Area 2: A Celebration of the Creek
Area 3: The Heart of Riverwalk
Area 4: The Riverwalk Promenade
Area 5: Riverwalk South Gateway

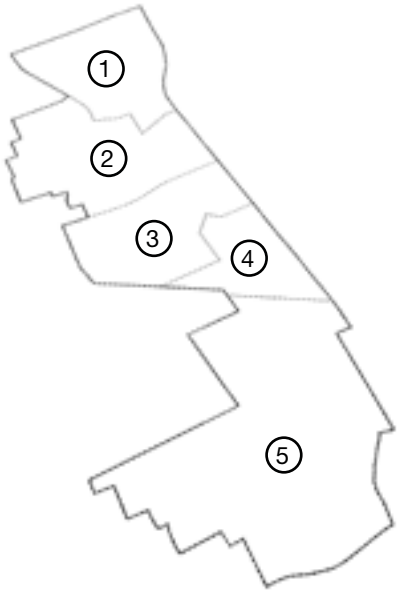


Fig. 214 Riverwalk Character Areas

The Demonstration Plan

The demonstration plan is a graphic representation of the vision and objectives as well as the recommendations set forth in **"Chapter 5.0 Environment, Resilience, Sustainability and Public Health", "Chapter 6.0 Sustainable Transportation"** and **"Chapter 7.0 Programming"** of the Riverwalk UDMP.

This plan illustrates a fully-realized, long term vision for Riverwalk. However, the representation of projects on the demonstration plan is not prescriptive and implementation of the projects illustrated is subject to a detailed design process and review by the City of Brampton and TRCA and subject to identification of collective priorities, funding sources and regulatory and budget approvals.

It is also dependent on the implementation of the DBFP EA flood protection solution and other projects which will transform land use within downtown Brampton. A detailed implementation plan is outlined in **"Chapter 9.0 Implementation Framework"**.

The Big Moves

1. Riverwalk Gateway Landscapes
2. Ken Whillans Drive Realignment and Streetscape
3. Ken Whillans Drive Extension
4. Rosalea Park Improvements
5. New Rosalea Plaza
6. Bypass Channel Enhancements
7. Etobicoke Creek Promenade
8. Queen Street Transit Plaza
9. Vodden Church, Scott, Queen and Clarence Bridge Enhancements
10. New John Street Pedestrian Bridge
11. New Pedestrian Rail Underpass
12. New Pedestrian Bridges
13. Centennial Park Arboretum Improvements
14. New Riparian / Wetland Boardwalks
15. Nature-base Playground / Discovery Trails
16. Community Gardens / Urban Agriculture
17. Outdoor Fitness Circuit
18. New / Reconfigured Sports Fields
19. New Trail / Pathway Connections
20. New Lookouts / Viewpoints
21. Integrated Stormwater Management and LID
22. New Meadow / Savannah Landscapes
23. Enhanced Wetland Landscapes
24. Improved Off-leash Dog Park
25. Forested / Tree compensation Landscapes
26. New / Enhanced Signalized Intersections
27. Streetscape Improvements / Sidewalks / Bike Lanes, Etc.
28. Potential Future Development Opportunities

Fig. 215 Riverwalk Demonstration Plan

8.4 Area 1: Riverwalk North Gateway

Fig. 216 Feature landforms

Fig. 217 Nature-based Play

The new North Gateway to Riverwalk revitalizes and integrates Duggan Park into the enhanced ecology of the naturalized channel. Expanded active transportation networks and enhanced pedestrian facilities are combined with distinct landscape features and opportunities for public art to signal the transition into Riverwalk.

The Riverwalk North Gateway landscape should exemplify the riverine system, anchoring Riverwalk within the natural systems of the creek valley and encouraging exploration and interaction with the riparian landscape.

The Big Moves

- Enhance and increase natural features (woodland, riparian edge, etc);
- Establish new stormwater management facilities;
- Establish new boardwalks and woodland trails;
- Provide improved access to the water's edge;
- Create new nature-based playground;
- Increase flexible space by relocating existing baseball fields, reconfiguring dogs-off leash area (long-term 10+ years).

Fig. 218 Dry meadow landscape

Fig. 219 Wetland Boardwalk at Corktown Common Stormwater Management Pond, Toronto, ON

Signature landscapes for a new Riverwalk Parkway

The landscapes along Ken Whillans Drive should exemplify the riverine landscape and include mass plantings that increase biodiversity and provide seasonal colour. Signature landscape landforms should direct the flow of water and frame views into the site.

As outlined in **"Chapter 6.0 Sustainable Transportation"**, the north portion of Ken Whillans Drive will also be reconfigured to provide a complete, green street with new bike lanes, enhanced sidewalks, street trees and new crossings to adjacent communities.

Integrated Stormwater Management

To achieve the stormwater management goals outlined in **"Chapter 5.0 Environment, Resilience, Sustainability and Public Health"** the signature landscapes along Ken Whillans Drive should be designed as an integrated stormwater management feature such as stormwater tree trenches or and bioswales to intercept stormwater from adjacent neighbourhoods.

Two areas on the east side of the creek have also been identified as potential future open water stormwater management ponds, that could be integrated into the recreational and play areas in Duggan Park. Ponds should be integrated into the naturalized landscape and include barrier-free access and viewing locations.

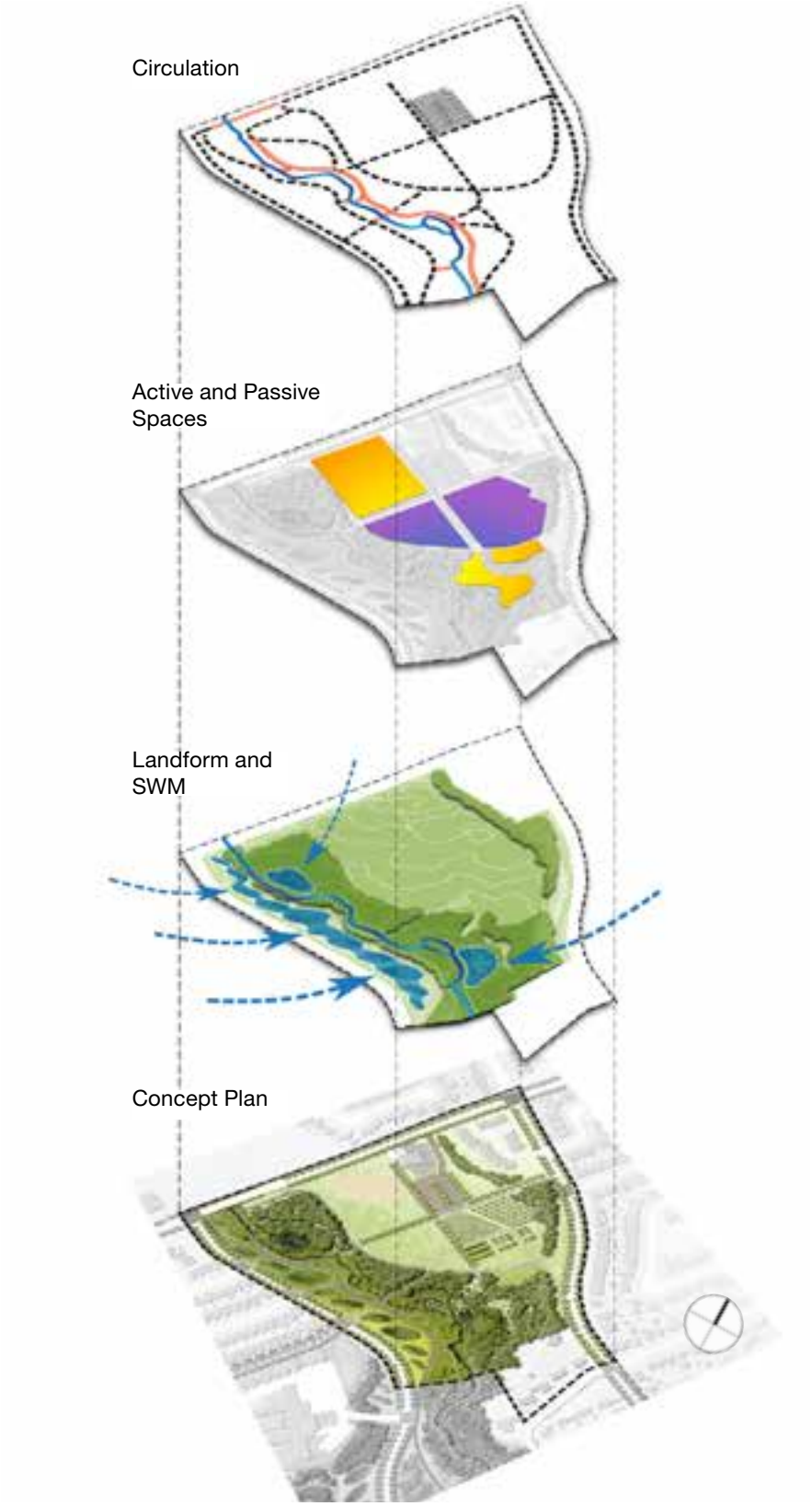


Fig. 220 Area 1 Components

Improving Access to the Creek

One of the primary interventions in this area is to improve visual and physical connections and access to the Etobicoke Creek through selective vegetation clearing, creation of lookouts, trails and boardwalks.

Trails on either side of the creek will be realigned to take advantage of the site's natural and constructed topography and to provide new views through the dense riparian vegetation.

To protect the banks of the creek from erosion and compaction from foot traffic, new boardwalks and lookout areas will provide access to desirable areas, while controlling the amount and type of activity that can occur. Boardwalks could also be seasonally closed if required, to protect bird nesting areas and other sensitive habitats. Together, the network of new trails, paths and boardwalks will create a series of interpretive loops through the landscape.

Diversifying Public Open Space

The majority of open space within Area 1 is located within the floodplain on the east side of the creek. The space is proposed to be divided between dedicated sports fields, flexible open space, community gardens and play areas, creating a balance between active and passive recreation and an accessible and equitable open space.

The forested and vegetated areas along the creek banks and valley slopes provide spaces for passive recreation, nature observation, walking, hiking and other informal activity.

As outlined in **"Chapter 7.0 Programming"**, community groups, schools and the local business community could be engaged in the in the stewardship and programming of these spaces.

Community Gardens and Urban Agriculture

The flat, protected landscapes of the east bank floodplain, in close proximity to adjacent residential neighbourhoods, would be well suited for community gardens, or urban agriculture. Cultivation and food production can foster a deeper connection to the landscape by allowing the community to personalize and share their culture through. Local food production also provides opportunities for new partnerships that could contribute to the creation, operation, maintenance and potential participation in the city's farmer's markets.

Nature-based Play and exploration

A new nature-based playground is proposed on the east floodplain and valley slopes of Duggan Park. The play area should be integrated into the landscape and natural topographical features, nature trails and sensory elements. The playground should be designed to provide a range of experiences, focus on cooperative, interactive and imaginative play and provide universal accessibility to all areas.

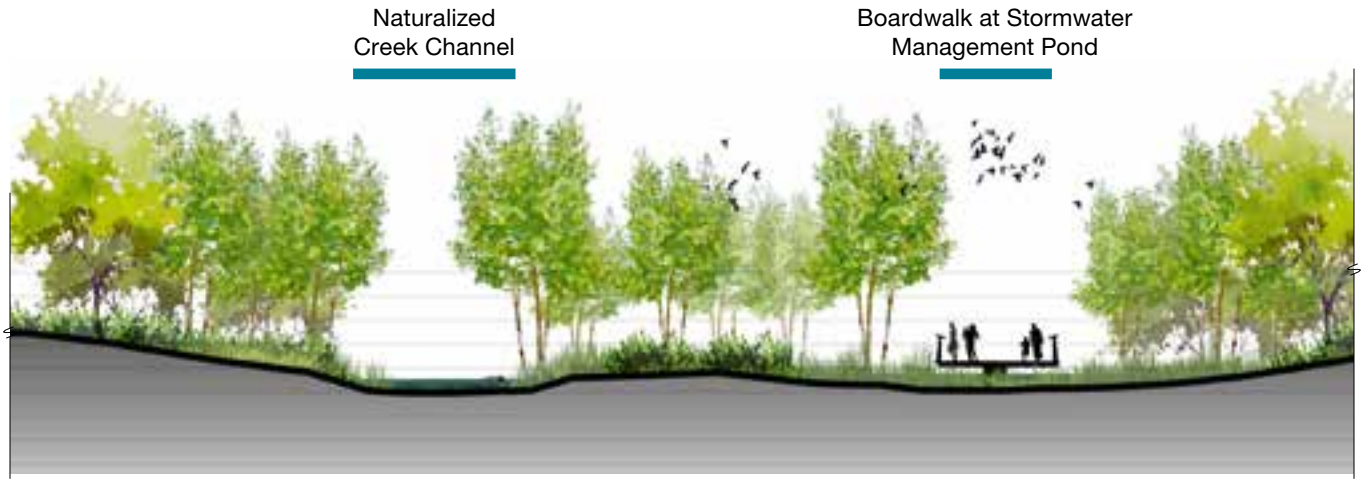


Fig. 221 Section at Duggan Park Wetland Boardwalk

Recommendations

1. Riverwalk Signature Landscapes with Integrated SWM.
2. New Riverwalk Gateway landscape - potential public art / interpretive location.
3. Expand naturalization and improve ecologies on east and west side.
4. Integrated stormwater management ponds in Duggan Park redevelopment through future Class EA.
5. New nature trails and boardwalks through naturalized areas on east side of Creek.
6. New nature-based playground / woodland interpretation loop.
7. Reforestation of valley slopes along Centre Street.
8. Enhanced Vodden Street bridge sidewalks with lookouts.
9. Relocation of sports fields and creation of new flexible green space.
10. Baseball diamond.
11. Parking lot greening.
12. Community gardens and urban agriculture,
13. New pedestrian crossings across Ken Whillans Drive and Centre Street. Potential for tabletop or narrowed crossings.
14. New bike lanes on Vodden Street, Ken Whillans Drive and Centre Street.
15. Street tree plantings on Ken Whillans Drive, Vodden and Centre Streets.

Fig. 222 Area 1 Concept Plan

Fig. 223 Conceptual Rendering: View of feature landscapes and potential reconfiguration of Ken Whillans Drive

8.5 Area 2: A Celebration of the Creek

Fig. 224 Boardwalks and stormwater management landscapes

Fig. 225 Nature-based play and exploration

Rosalea Park North will connect the naturalized, park-like landscapes to the north with the more urbanized and channelized creek to the south by creating a new meadow, stepping down to the Creek. The transition to the bypass channel marks an important point in the relationship between the City and the creek and offers important interpretive and educational opportunities.

The realignment of Ken Whillans Drive will expand Rosalea Park northwards and tie together the enhanced facilities of Riverwalk and Central Public School Park. The new sloping meadow and signature landforms will provide transition from the naturalized landscapes of the North Gateway to the active heart of Rosalea Park.

Fig. 226 Stepping landscape features

The Big Moves

- Realignment and reconfiguration of Ken Whillans Drive into a complete street;
- Regrading of the space on the west side of the creek to create a new meadow landscape;
- Improvements to the Central Public School Park fields and facilities and connections with adjacent community;
- Creation of a rocky cascade feature at the mouth of the bypass channel.

Fig. 227 Rocky cascade

A Transition for the Etobicoke Creek

As it passes through Rosalea Park north, the Etobicoke Creek undergoes a great transformation. It flows from its natural channel, with rocky bottom and thickly vegetated banks into the confines of the widened and deepened bypass channel. A rocky cascade will mark this transition and provide an opportunity to celebrate the lively, bubbling stream that occasionally becomes a torrential flow.

The entrance to the bypass channel is not only an opportunity to appreciate the delicate natural features of the creek, but also to experience a new relationship between City and the creek. The enhanced channel could have a meandering low flow channel and vegetated banks, with a new connection beneath Church Street, to Rosalea Park, allowing visitors to follow the creek as it flows south toward the city centre.

The landscape on the west bank and floodplain of the creek will be shaped into a gently sloping bowl, with access and views to the creek. The steep east bank offers a new high-level lookout and a broad view of the creek valley and downtown Brampton beyond.

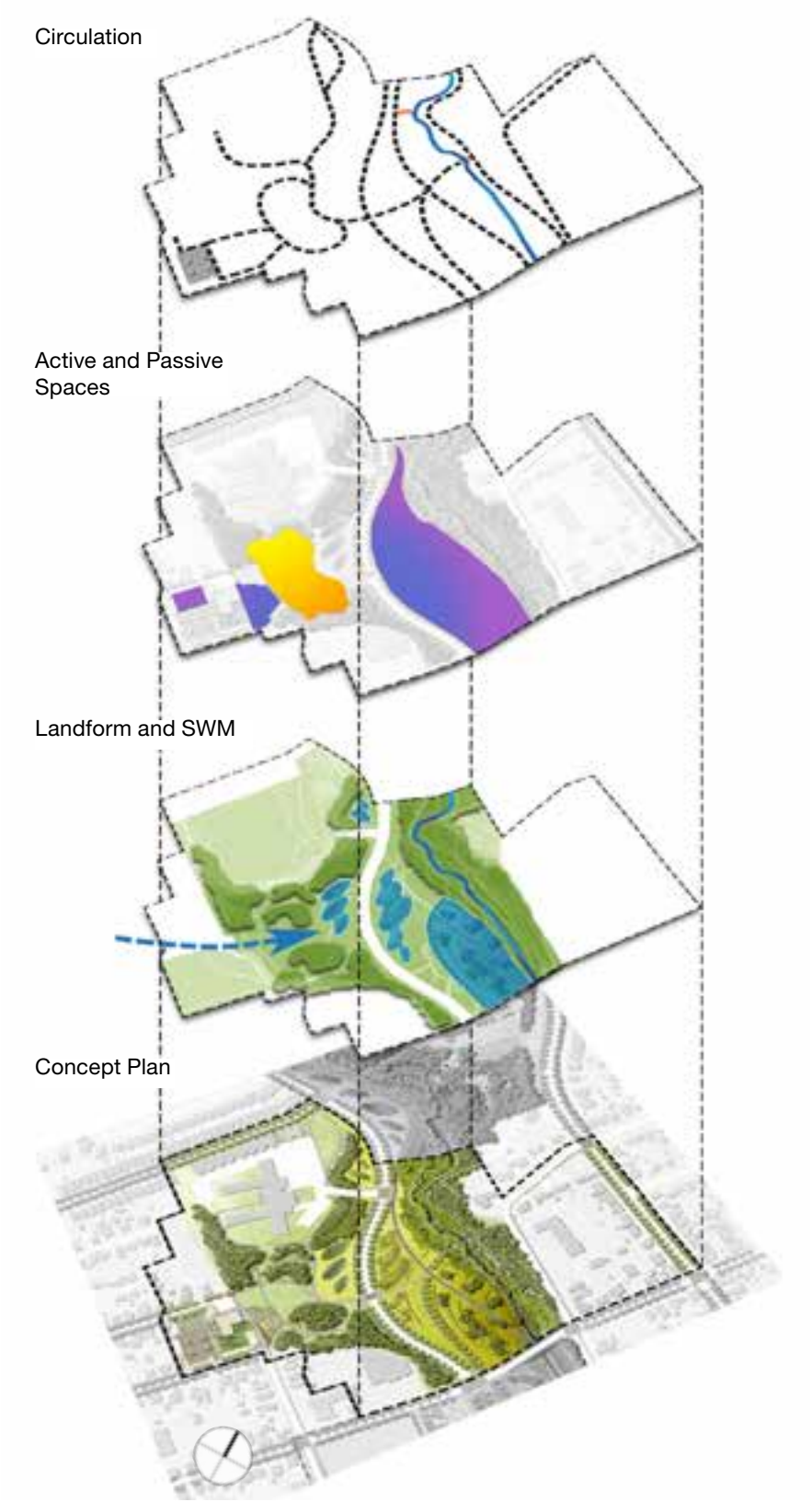


Fig. 228 Area 2 Components

A New Meadow Ecology

The realignment of Ken Whillans Drive required for the downstream flood protection solution identified in the DBFP EA, is the catalyst for many of the changes recommended in Area 2.

The realignment of Ken Whillans Drive will expand the floodplain and create a new open meadow on the west side of the creek. This sloping landscape is an opportunity to introduce a pollinator meadow or savannah, which are ecologies not currently found in the Riverwalk area. The new meadow will provide open views to the creek, new tree plantings and a new flexible open space with opportunities to access the banks of the creek and the new rocky cascade.

The meadow landscape should extend across Ken Whillans Drive and into Central Public School park and the overall area of manicured lawn should be greatly reduced. Integrated stormwater management features such as stormwater tree trenches or bioswales should be included in the meadow landscapes, on either side of Ken Whillans Drive to capture runoff before it reaches the creek.

Co-programming and Outdoor Fitness

As outlined in **"Chapter 7.0 Programming",** the Riverwalk UDMP recommends new connections to the Central Public School community centre and potential co-programming with the adjacent senior's residence.

The parking lot of the community centre should be reconfigured to provide space for community gardens and outdoor programming and should be include tree planting and permeable pavement, if subsurface conditions allow. The east side of the building should be reconfigured to provide a lookout and landscaped terraces from the upper level to the lower portions of Central Public School park.

The Riverwalk UDMP recommends the creation of a new fitness trail, integrated into the landscape and valley slopes and potentially connected to the adjacent seniors' residence.

A New Ken Whillans Drive Parkway Street

The realignment of Ken Whillans Drive will provide an opportunity to reconstruct the road as a complete street, including new bike lanes, realigned sidewalks, street tree plantings and integrated stormwater management such as linear stormwater tree trenches or bioswales and rain gardens. The realigned drive should blend seamlessly into the reconfigured portion of Ken Whillans Drive in Area 1.

The reconstructed street should include controlled crossings at Central Public School and at the senior's residence and where possible, intersections should include dedicated bike crossings, as well as upgraded pavement materials or raised 'tabletop' design to create safe, pedestrian and cycle-priority intersections.

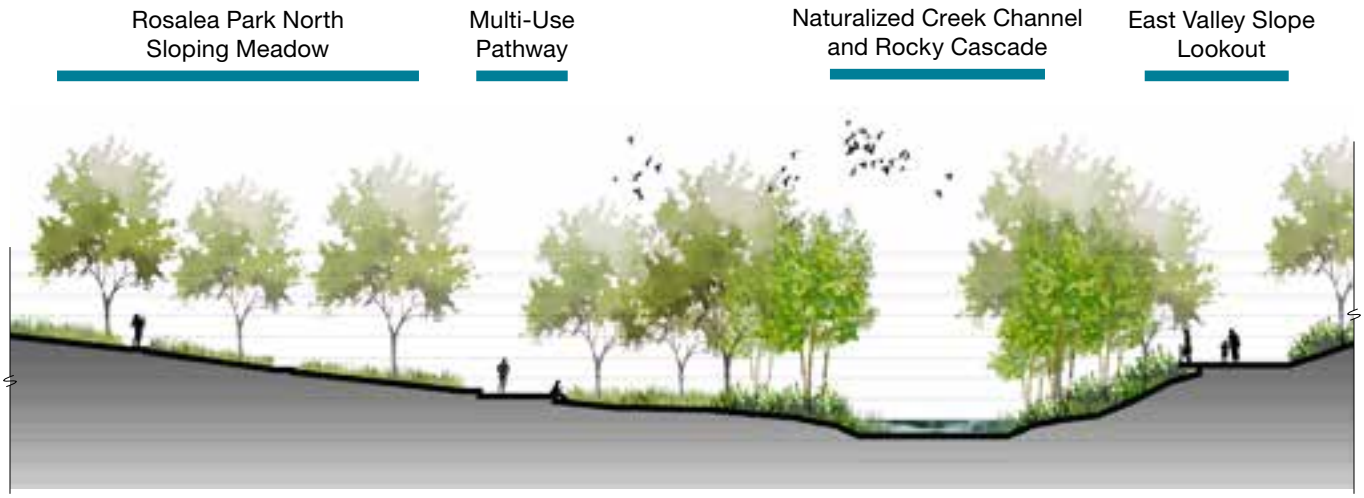


Fig. 229 Section Through Stepping Meadow at Rosalea Park North

Recommendations

1. Riverwalk Signature Landscapes with Integrated SWM.
2. New meadow / savannah landscape, with integrated seating, shade tree panting, sloping down to the start of the bypass channel.
3. Woodland restoration in Central Public School Park and adjacent valley slopes.
4. New pedestrian crossings at Ken Whillans Drive. Tabletop or narrowed intersections at crossings.
5. New sloped pathway and lookout on east bank of the creek.
6. New pedestrian bridge at mid-point between Church Street and existing pedestrian bridge.
7. New community gardens and green parking lot.
8. New lookout with horticultural terraced landscape and switchback ramp.
9. New fitness trail / woodland interpretation loop.
10. New pedestrian connection below Church Street bridge.
11. New landscaped, rocky cascade at mouth of bypass channel.
12. Opportunities for co-programming with adjacent seniors' residence.
13. New bike lanes on Ken Whillans Drive and Centre Street.
14. Street tree plantings on Ken Whillans Drive and Centre Street.
15. Potential expansion of Central Public School with new green roof and rooftop rainwater collection.

Fig. 230 Area 2 Concept Plan

Fig. 232 Conceptual Rendering: View toward Ken Whillans Drive and the Rosalea Park North Sloping Meadow, from Church Street Bridge Lookout

8.6 Area 3: The Heart of Riverwalk

Fig. 233 Urban plaza water feature, Adelaide airport, AU

Fig. 234 Market plaza and Woonerf

Rosalea Park is the Heart of Riverwalk. It should exemplify current best practices in sustainability, resilience and accessibility, offering a flexible, vibrant and engaging landscape. A new plaza and pedestrian priority street will connect Rosalea Park to the City core, while providing opportunities to host community events, public art, water features and outdoor performance space.

An enhanced centre for not only Riverwalk, but also Downtown Brampton, Rosalea Park will integrate flood protection measures within an adaptable and active landscape. It is the cultural hub and most highly programmed zone within Riverwalk. It marks the transition of the naturalized Etobicoke Creek as it enters the hardened bypass channel.

Fig. 235 Urban plaza with feature lighting and seating

The Big Moves

- An extension of downtown public open space and events spaces;
- Slopes, multi-use lawn, water features, seasonal programming;
- New urban plaza and event space;
- Extension of Ken Whillans Drive
- New connection to the Etobicoke Creek.

Fig. 236 Patio and plaza at Evergreen Brickworks, Toronto, ON

The Creek Meets the City

The creek is in its channelized course as it flows next to Rosalea Park, however, the design of Rosalea Park and Plaza should highlight the presence of water, both present and historically. Rosalea Park sits in the former creek valley and is an important space within Riverwalk. The creek should be celebrated, illustrated and interpreted through public art, water features, water play, as well as through educational and interpretive signs throughout the area.

Although a berm separates the creek from the park itself, the area south of Church Street and along the west side of the channel is a key opportunity to get closer to the water. New lookouts are proposed on the reconstructed Church and Scott Street bridges and these areas should provide an important opportunity to inform the public about the history and function of the channel and its relationship to the City.

A detailed design study should be undertaken to integrate new pathways, steps, lookouts, lighting, and public art with the design of the new bridge to allow visitors to view and access the creek and channel.

The Heart of Riverwalk

Together, Rosalea Park and Rosalea Plaza will be the heart of Riverwalk, a meeting place and central starting point for visitors to Riverwalk. Riverwalk can be seen as a linear park system, but it also radiates from its centre, with the most urban and activated spaces closest to Brampton's downtown core.

Rosalea Park and Plaza are well

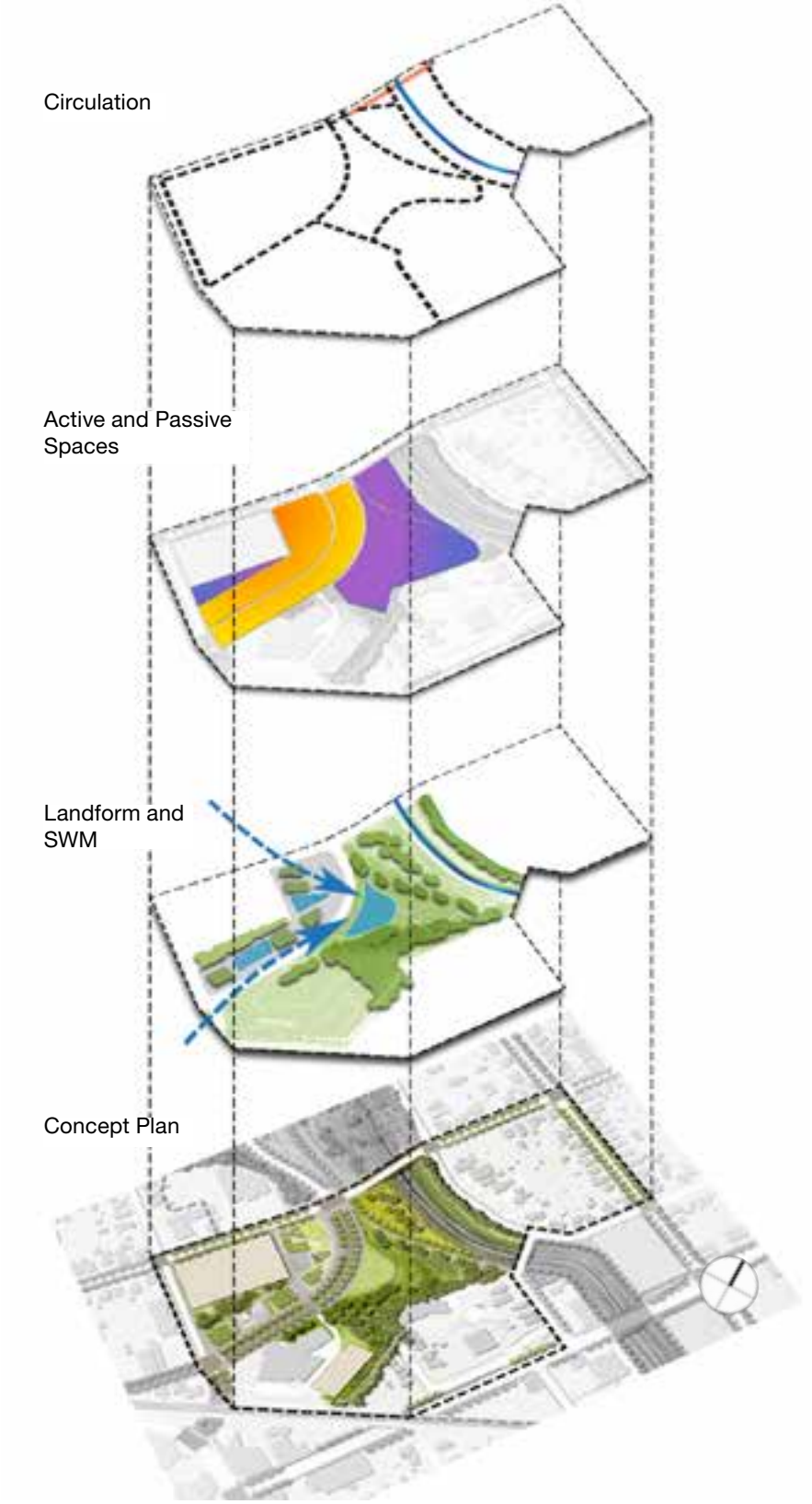


Fig. 237 Area 3 Components

positioned to become an extension of the 'Four Corners' open space, that could welcome public and community events, school groups, summer camps, farmers markets and seasonal events.

As outlined in **"Chapter 7.0 Programming"**, these open spaces will provide a balance between programmed, activated space and flexible open space with accessible amenities available throughout the year.

Rosalea Park

Rosalea Park is significant as the place where the bypass channel diverges from the creek's original course. The historical floodplain has provided dramatic topography, with steep valley slopes bordering the south side of the park and a broad, flat plain to the north.

The Riverwalk UDMP recognizes that Rosalea Park is a valuable and beloved green space in the city centre.

The park is proposed to remain as a soft landscape, with a gently sloped and curving lawn that can be used for informal, unprogrammed recreation and also serve as a gathering space that faces Rosalea Plaza, across Ken Whillans Drive.

The park landscape will also include an extension of the Rosalea Park North meadow, along the berm that borders the Etobicoke Creek Bypass Channel and gently sloping path will provide seasonal access beneath Church Street, however, access would be restricted based on the flow conditions of the creek.

Rosalea Plaza

The extension of Ken Whillans Drive will define a new urban plaza to the west of Rosalea Park. Rosalea Plaza should be closely related to Rosalea Park, it should compliment and extend the green space, while providing new public amenities that compliment the existing downtown open space network.

The plaza is proposed to include a playground and water feature, a new kiosk, with outdoor cafe area, washrooms and potential space for vendors. The plaza should also accommodate winter activities such as skating or markets and provide a vibrant and active downtown space.

Ken Whillans Drive Extension

The Ken Whillans Drive extension is outlined in **"Chapter 6.0 Sustainable Transportation"** and is envisioned to be an extension of Rosalea Park and Plaza, a flexible street that will connect the new park spaces with the four corners at Main and Queen Streets.

The Riverwalk UDMP recommends that the Ken Whillans Drive extension be designed as a pedestrian-priority street, with wide sidewalks, street trees integrated with stormwater systems, enhanced paving materials and rolled curbs that would allow a seamless connection between the open spaces on either side and can be closed to accommodate vendors or events.

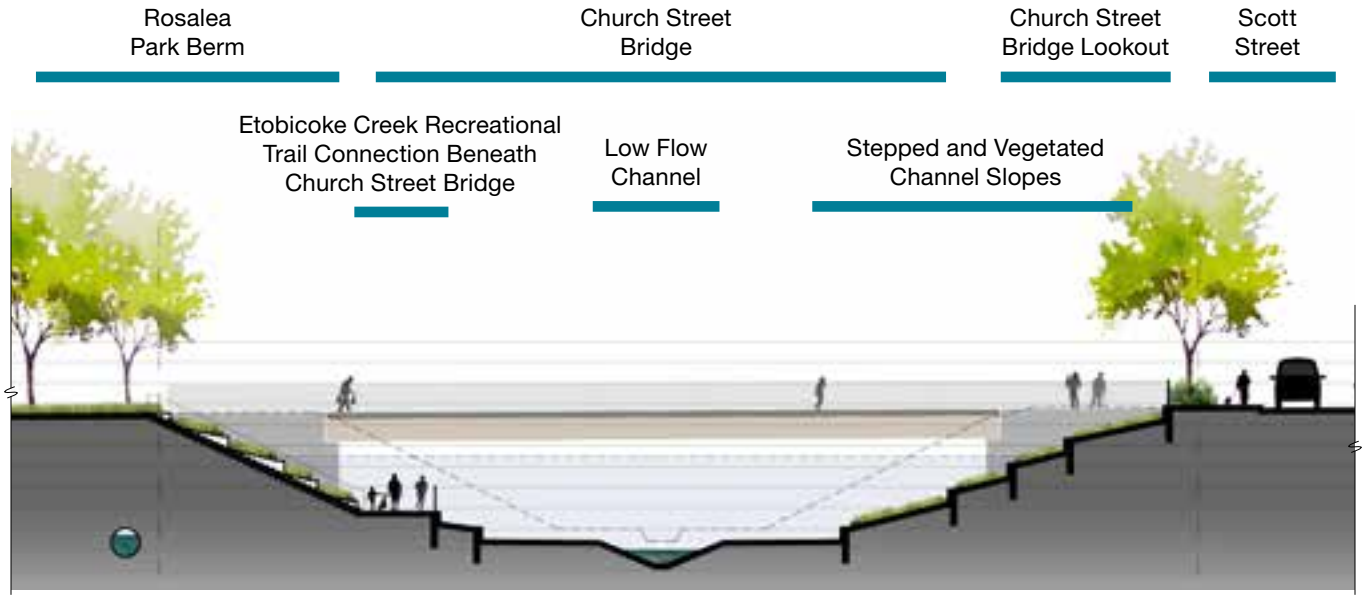


Fig. 238 Section South of Church Street Bridge

Recommendations

1. New Rosalea Plaza east of Ken Whillans Drive.
2. Vendor kiosk with washrooms.
3. Water feature, public art and horticultural beds.
4. New playground and splash pad.
5. Rosalea Park multi-use sloped lawn, with integrated seating.
6. Rosalea Park gathering space.
7. Ken Whillans Drive Extension. New flexible street and connection to YMCA driveway.
8. Enhanced Church Street bridge, widened sidewalks, enhanced open railings and lookouts.
9. Stepping meadow south of Church Street.
10. Integrated LID.
11. New pedestrian connection and lookouts along east bank of channel.
12. New pedestrian connection with switchback ramp to Maple Avenue.
13. Ramp and stair access down to the channel below and new pedestrian connection beneath the Church Street bridge.
14. New bike lanes on Church Street and Centre Street.
15. Street tree plantings on Ken Whillans Drive, Church Street, Centre Street.
16. Reforestation of valley slopes.
17. Enhanced Etobicoke Creek bypass channel.
18. Potential future redevelopment.

Fig. 239 Area 3 Concept Plan

Fig. 240 Conceptual Rendering: View of Rosalea Plaza toward Ken Whillans Drive Extension

8.7 Area 4: The Riverwalk Promenade

Fig. 241 Renaissance Park Pedestrian Bridge, Chattanooga, TN

Fig. 242 Public Art Fence, Toronto, ON. Marianne Lovink

The Riverwalk Promenade celebrates the intersection of the Etobicoke Creek valley and the city's downtown core through the creation of a striking landscape where the bypass channel creates a canyon through the city.

New and enhanced bridges connect across the channel to enhance pedestrian movement and stitch together the east and west banks.

With elevated boardwalks, decks, new pedestrian crossings and public spaces overlooking the creek, the Riverwalk Promenade transforms the bypass channel into an opportunity for interpretation and education in the form of water features, public art and dramatic views of this impressive flood conveyance infrastructure.

The Big Moves

- Elevated promenade along the edge of the channel;
- Rehabilitation of the Etobicoke Creek bypass channel to provide a better urban and ecological amenity;
- Reconnect the Etobicoke Creek Recreational Trail;
- New pedestrian / cycling bridge at John Street;
- New public space and transit stop at Queen / Centre Streets.

Fig. 243 Elevated Trails at Highline Park, New York, NY

Fig. 244 Elevated Boardwalk and Lookout, Qunli National Urban Wetland

The Riverwalk Promenade

The Riverwalk promenade will be defined by the new boardwalks that are proposed on either side of the channel banks, that will complete the Etobicoke Creek Recreational Trail and provide a continuous trail network throughout Riverwalk. These upper-level boardwalks are envisioned as wide, tree-lined promenades that can accommodate recreational users as well as public events or public art. Boardwalks would cantilever slightly over the channel, creating new public space and providing a new perspective on the city's flood protection infrastructure.

The promenade will close an important gap in the Riverwalk trail network by connecting the Etobicoke Creek Recreational Trail from the Scott Street bridge, across Queen Street and to the new John Street pedestrian bridge, finally terminating at a new pedestrian underpass beneath the railway corridor. The promenade boardwalks will become a defining landscape feature for Riverwalk and a key connection to the City at the Queen Street Plaza.

The promenade should become a key location for public art installations and interpretive elements that can highlight the natural and cultural heritage of the City and of the Creek. These installations can be integrated into the infrastructure, as art fences, wall treatments, pavement designs, or as stand-alone pieces placed in meaningful locations along the route.

Greening the Channel

The Riverwalk UDMP recommends a number of enhancements to the Etobicoke Creek bypass channel, that aim to improve water quality and reduce the heat island effect, as well as to create a new public amenity and a defining character element for Riverwalk as a whole.

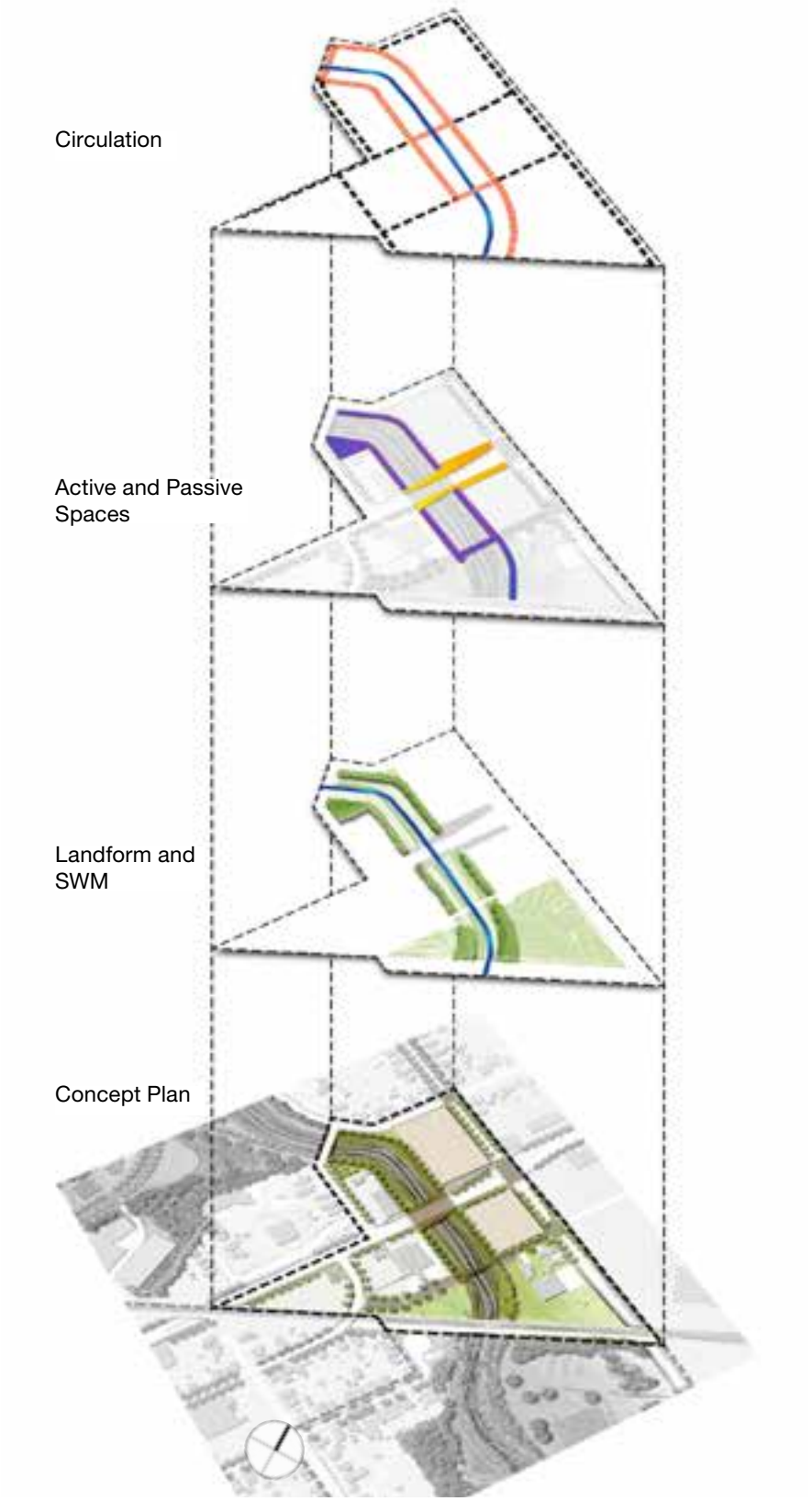


Fig. 245 Area 4 Components

In order to achieve these enhanced features, a funding and maintenance strategy will be required for the features that are above and beyond the flood protection solution recommended in the DBFP EA.

The Riverwalk UDMP recommends the shade trees be planted at the top of the channel banks and along the promenade boardwalks as well as to introduce greening into the channel, by creating a stepped side slope profile that will allow vegetated terraces to be constructed. The size and shapes of the terraces may vary and the Riverwalk UDMP recommends an organic, curvilinear form that would bring a lively and playful form to the otherwise static channel, while maintaining an overall 2:1 slope profile.

Improvements to the low flow channel are also recommended, including the inclusion of embedded riverstone or boulders, vegetated edges and variations in width and depth to reduce temperatures, create riffles and aerate the water.

The City Intersecting the Creek

Area 4 is the most constrained and urbanized portion of Riverwalk. It is also the place where Riverwalk intersects with the city and a place where the most direct physical and visual connections can be made.

The Queen Street bridge will be reconstructed to accommodate the widened channel, as part of the City's flood protection measures and the Riverwalk UDMP recommends that the new bridge be designed as a signature bridge, with an above-deck structure that marks this important connection to the creek and to Riverwalk.

The public realm should be expanded through cantilevered sidewalks and lookouts on both sides, that will overlook the channel below. This new public space will become one of the primary access points to Riverwalk and should be linked to a new urban plaza and transit stop at Queen and Centre Street.

As Queen Street stretches over the bypass channel, the roadway should be designed as a pedestrian priority space, with upgraded paving materials and pedestrian crossings to connect the segments of the Riverwalk promenade across the roadway.

A new pedestrian bridge is proposed at John Street, that will connect the promenade across the bypass channel and provide increased connectivity and redundancy in the transportation network. The new John Street pedestrian bridge should include lookouts and signage as well as opportunities for public art. The east and west approaches to the bridge, along John Street should be designed as pedestrian priority spaces, with enhanced pavements that create continuity with the Riverwalk open space network and connect into its urban context.

Provisions for emergency or maintenance access should be incorporated into the design of new bridges and integrated into potential new lookouts and viewing platforms.

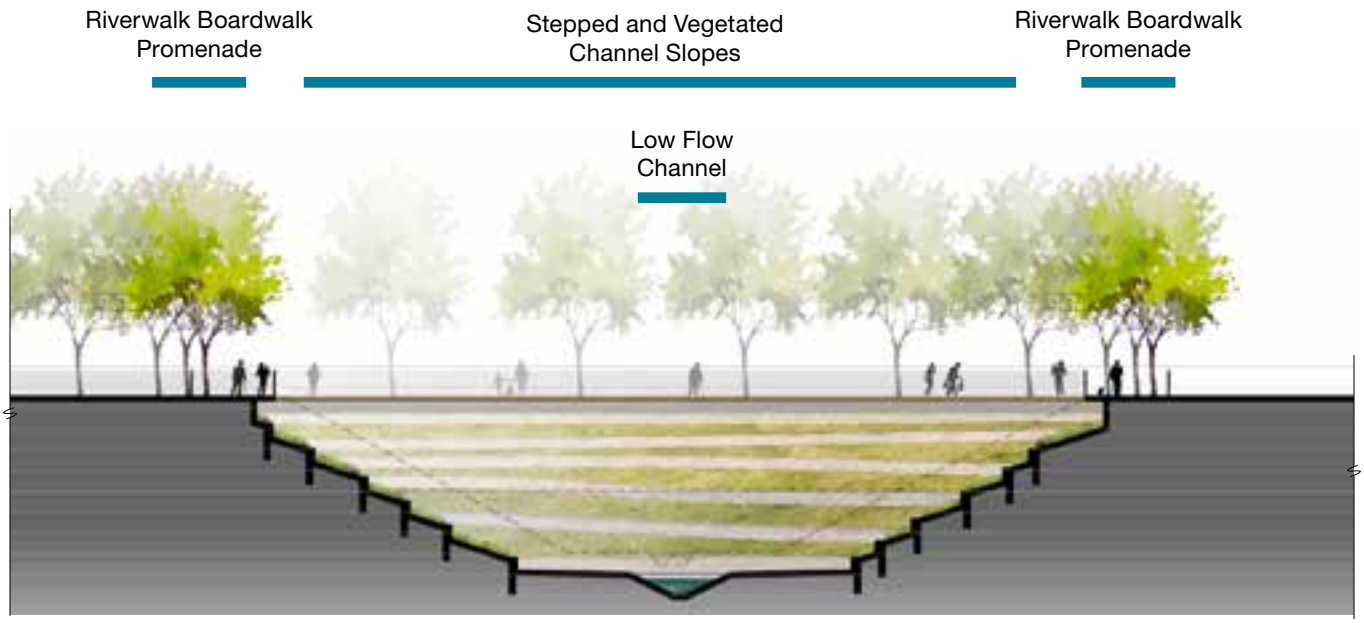


Fig. 246 Section Through Bypass Channel

Recommendations

1. New Riverwalk promenade boardwalks and high-level walkways and lookouts connecting Scott, Queen and John Streets.
2. Widened Queen Street bridge with new plaza space and lookouts.
3. Gateway feature on Queen Street, marking the intersection Riverwalk with the City
4. Enhanced bypass and low flow channel, with vegetated terraces, riffle structures.
5. Establish a funding and management strategy to maintain enhanced channel infrastructure.
6. New pedestrian bridge at John Street with lookouts.
7. Reconfigured flexible, pedestrian priority John Street.
8. New pedestrian underpass beneath railway on east bank.
9. Enhanced Scott Street bridge sidewalks and lookouts.
10. Access and egress stairs for the bypass channel at new bridges.
11. New transit plaza and public space at Queen and Centre Streets.
12. New landscaped space at Scott Street.
13. New bike lanes and street tree planting on Queen Street and Centre Streets.
14. Potential future redevelopment.

Fig. 247 Area 4 Concept Plan

Fig. 248 Conceptual Rendering: View of enhanced Etobicoke Creek bypass channel, John Street pedestrian bridge and proposed elevated boardwalks

8.8 Area 5: Riverwalk South Gateway

Fig. 249 Etobicoke Creek Recreational Trail

Fig. 250 Riffle structure, Thornton Creek, Seattle, WA

Within Centennial Park, Etobicoke Creek returns to a more naturalized channel. Riverwalk will leverage opportunities for enhancing the ecological capacity and interpretive value of Centennial Park and connect adjacent communities and facilities across the riverine system.

This southernmost portion of the Riverwalk area provides great opportunities to explore the landscape through new pathways, trails,crossings and lookouts that create spaces for education and interpretation of the native habitats, flora and fauna.

The Big Moves

- Enhance and increase natural features (wetland, woodland, arboretum, etc);
- Provide improved access and new crossings;
- Create new signature landscape entrances to the park and Riverwalk area;
- Improved access to Wellington and James Streets;
- New / improved pedestrian and cycling bridges.

Fig. 251 Cherry Blossoms in High Park, Toronto, ON

Fig. 252 Wetland boardwalks and small gathering spaces

Protecting and enhancing the Etobicoke Creek valley landscape

Centennial Park is Riverwalk's green jewel, with naturalized landscapes and habitat ranging from the forested woodlands along the valley slopes, to dense riparian edges, open meadows and wetlands. These areas are an important natural feature within Brampton's downtown core, providing an easily accessible natural spaces that contrast sharply with their urban context.

The Riverwalk UDMP proposes to protect these areas and enhance them through the control of invasive species and the expansion of naturalized areas through reforestation and naturalization of degraded and manicured areas. Additional protection is recommended through intercepting and treating stormwater.

A Rich Educational and Interpretive Landscape

The southernmost portion of Riverwalk has a wealth of natural features that are well suited to informal or programmed nature-themed educational or interpretive programs. These include the creek itself, which flows in its natural channel, naturalized meadows, the Centennial Park wetland and arboretum. The design and development of site elements surrounding these natural features should incorporate a high level of design, using contemporary forms and materials. Lookouts bridges and boardwalks should include integrated interpretive elements such as signage or public art to draw attention and focus to natural features and processes. Interpretive panels and interactive features should also be located throughout the park, at points of interest and near important landscape features.

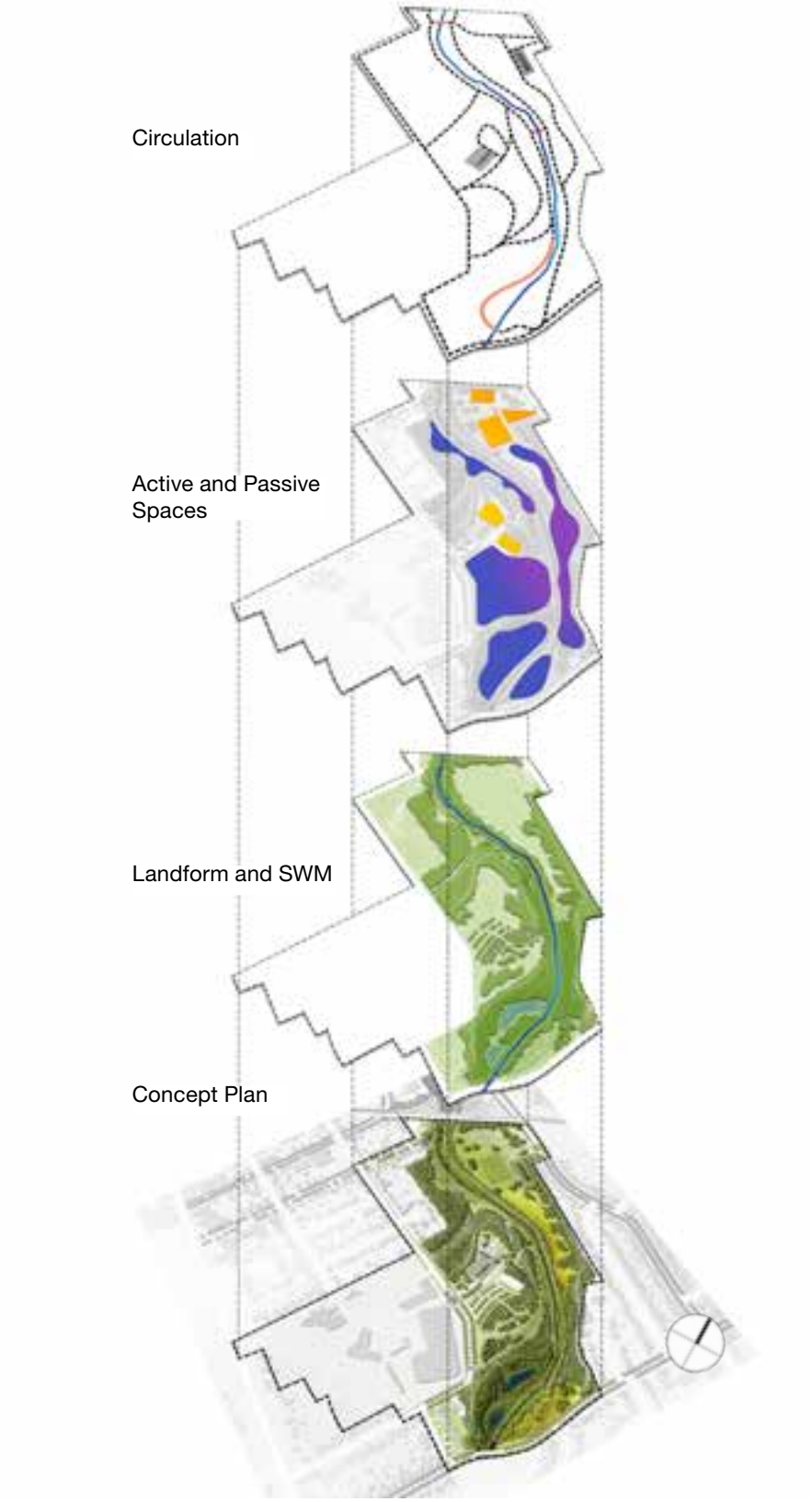


Fig. 253 Area 5 Components

An Expanded Trail Network

As outlined in **"Chapter 6.0 Sustainable Transportation"**, the Riverwalk UDMP proposes to increase the number of trails and to create new loops and links within Centennial Park, to create a continuous Riverwalk trail system that will allow visitors to travel through the site without the need for on-street routes. New crossings, trails and boardwalks will provide access to previously inaccessible areas of the park and in some cases, will formalize informal paths and help to prevent trampling of sensitive vegetation and erosion of the creek banks. The increased trail network will also provide improved access to Riverwalk from the neighbourhoods on either side of the creek and create redundancy in the surrounding transportation network.

Centennial Park Arboretum

As outlined in **"Chapter 7.0 Programming"**, the Riverwalk UDMP proposes to enhance the existing John Arthur Carroll Arboretum on the west plateau, over the Etobicoke Creek. An enhanced arboretum collection should exemplify local species and provide a visually striking arrangement of trees and horticultural beds, with displays of seasonal colour and form.

The arboretum will have a close relationship to the wetland in the creek valley below, as well as the less formal areas of Centennial Park, through new trail and boardwalk connections. Interpretive and information signs should be incorporated into the design of the arboretum, pathways and lookouts and partnerships with nearby schools and community groups should be fostered to encourage outdoor education and interpretation.

Wetland Discovery Walk

One of the most important natural features in Area 5 is the wetland, at the south end of Centennial Park. The Riverwalk UDMP proposes to protect and enhance the wetland. A new pedestrian crossing north of Clarence Street will connect to a boardwalk that meanders through the wetland, allowing users to experience a remote and rich natural landscape.

A lookout on the upper plateau is also proposed to provide views to the creek and wetland below. The wetland boardwalk will connect to an expanded network of trails and pathways, that will allow visitors to discover and understand the valley landscapes.

The Riverwalk UDMP proposes a number of new nature and sensory trails through the various vegetation communities within Centennial Park. Programming and curating of these discovery walks can be organized in partnership with other agencies, community groups, businesses and schools

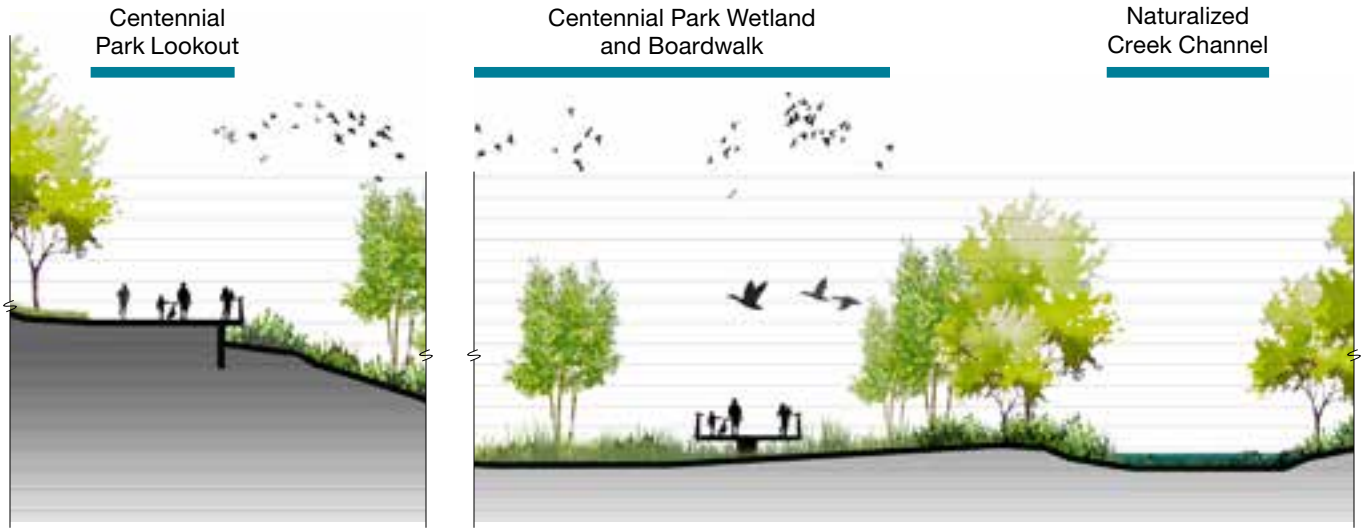


Fig. 254 Section at Centennial Park Wetland and Arboretum Lookout

Recommendations

1. Riverwalk Signature Landscapes.
2. New pedestrian bridges at wetland and at mid-point of park.
3. New switchback ramp and reconstructed bridge at Wellington Street
4. New wetland interpretation loop boardwalk and lookouts.
5. Expanded naturalization and improved ecologies on east and west side.
6. New recreational trail connection beneath railway.
7. Significant tree planting at arboretum and along Centre Street.
8. Integration of stormwater with street trees or bioswales along Mary and Guest Streets.
9. Parking lot greening with bike parking.
10. Gathering spaces and picnic areas along pathways.
11. Enhanced Clarence Street bridge sidewalks with lookouts
12. New bike lanes on Clarence Street and Centre Street.
13. New connection to hospital and park east of site.
14. Co-programming opportunities with schools west of site.
15. Sports fields (Tennis / Soccer)
16. Horseshoe pits / Pickleball at Legion.
17. New accessible playground
18. Washrooms, drinking fountains.

Fig. 255 Area 5 Concept Plan

Fig. 256 Conceptual Rendering: View toward Centennial Park wetland boardwalk from new pedestrian bridge

Fig. 257 Riverwalk Demonstration Plan

9.0
Implementation Framework

9.1 Implementation and Phasing

The implementation plan outlines the projects, strategies, partnerships and policy updates that will contribute towards the development and construction of Riverwalk over time.

The Riverwalk UDMP recommends a range of improvements to the open space and active transportation networks that will facilitate programming initiatives as well as a number of projects that support objectives for resilience and sustainability in the Riverwalk area.

The implementation framework divides the concepts outlined in the Riverwalk UDMP into a series of distinct projects that can be implemented individually, or grouped as related scopes of work.

The Riverwalk UDMP implementation framework also sets out a phasing strategy that takes into consideration, existing and future funding and priorities, as well as coordination with related or concurrent or projects by the City, TRCA, Peel Region and other agencies. The Riverwalk UDMP projects are divided into three implementation phases as follows:

1. Phase 1: Short-term and DBFP-EA Related Projects
2. Phase 2: Medium-term Implementation
3. Phase 3: Long Term Implementation

The Riverwalk UDMP also identifies projects that can be implemented incrementally over a longer period of time and supporting City-wide initiatives that can be implemented as funding becomes available.

The projects in each phase are not presented in a specific order but rather as a palette of options that can be considered, subject to a detailed design and review process, subject to identification of collective priorities, funding sources, regulatory and budget approvals and more detailed phasing and implementation plans.

As projects are implemented, it is important to consider the opportunities to stage the improvements to ensure that some areas of Riverwalk remain usable and accessible for visitors. It is also important to stage implementation to avoid repeated closures and construction activity in any particular area and that important or sensitive habitats are disturbed as little as possible.

A number of projects identified in the Riverwalk UDMP could benefit from concurrent implementation. There are economies of scale that can be achieved if several related projects are implemented together or in close succession, reducing the duration of disturbance and minimizing costs for mobilization, materials and labour.

Further design development, phasing, real estate and land acquisition strategies will require coordination with a range of projects that are ongoing in the complex context of the downtown and may positively or adversely impact the implementation of Riverwalk.

Land and Property Acquisition

The Riverwalk UDMP can largely be implemented within the land currently held by the City of Brampton. It is acknowledged that lands will be acquired for the Downtown Flood Protection project. Once the flood protection project is implemented the lands now in public ownership may be used. However, if land contiguous with the Riverwalk open space network becomes available, the City should consider acquisition to ensure connectivity and continuity in the open space network on both sides of the Etobicoke Creek. The City and its partners should also actively pursue opportunities for land acquisition and partnerships with institutional and private land owners in the Riverwalk area for the purpose of improving the environmental, open space, active transportation/access, natural systems and public infrastructure.

Partnerships and Development Agreements

The City should seek to establish partnerships and secure development agreements with adjacent and future land owners to secure setbacks and provide a more generous public realm along key City streets including Queen Street, Church Street, Centre Street and Ken Whillans Drive. Development agreements should also seek to ensure that the design and character of new buildings and developments in the Riverwalk area are consistent with the goals and objectives of the Riverwalk UDMP and will contribute to an integrated public open space network.

Coordination with Ongoing Metrolinx / CN Work

At the time of completion of the Riverwalk UDMP, the Metrolinx / CN work on the GO Service Improvements on the Kitchener Line and the potential 3rd rail is ongoing. Due to the significance of the Metrolinx / CN improvements in the context of downtown Brampton and the Riverwalk area, its intersection with the Etobicoke Creek and implications to the approved DBFP EA flood protection solution, the following are considerations for future coordination:

- The GO Service Improvements on the Kitchener Line will be of the utmost importance to Brampton and in particular for Downtown by significantly improving regional transit and the local transit network and by creating development opportunities.
- The potential 3rd rail required for the service improvements will have positive effects once constructed, however, there are potential impacts to the transportation network in downtown Brampton, particularly at the multiple crossings of the elevated rail corridor.
- One of the key goals of the Riverwalk UDMP is to develop a strong, sustainable mobility and active transportation network in the area, through the continuation of the regionally important Etobicoke Creek Recreational Trail.
- Of particular importance to the Riverwalk area, are the Etobicoke Creek crossing and potential improvements to the Centre Street underpass.
- The Queen Street and Union Street underpasses are outside of the Riverwalk area proper, however they are important active transportation connections and potential future work on the GO service expansion / 3rd rail should consider improvements to the pedestrian and cycling facilities at these crossings.
- The recently completed on-street connection of the Etobicoke Creek Recreational Trail along Scott, James and John Streets was achieved through long term work and significant funding from the City of Brampton. It is a very important connection that provides continuity, redundancy and resilience in the trail network, which must be reinstated and potentially improved by the GO service expansion / 3rd rail line future work.
- The Riverwalk UDMP proposes a continuation of the Etobicoke Creek Recreational Trail through a pedestrian underpass or tunnel through the rail embankment north of Centennial Park, as well as East and West connections, along John Street to the Peel Memorial Health Centre and City Hall and Main street to the West.
- From the DBFP EA perspective, the CN crossing of Etobicoke Creek is of utmost importance as it is where the channel reconfiguration efforts and construction are anticipated to start. The Environmental Study Report (ESR) of the DBFP EA, includes a potential solution that avoids the reconstruction of the bridge and that could be implemented independently of the Metrolinx / CN work, however this area should be reviewed carefully as an important opportunity for both projects.

9.2 Policy Recommendations

In order to facilitate the implementation of the projects identified in the Riverwalk UDMP, a number of processes, partnerships, agreements, operation and maintenance considerations must be put in place. These recommendations include updates to existing plans and policies as well as recommendations for new, Riverwalk-specific policy documents that should be developed to provide additional detail and support beyond the scope of the Riverwalk UDMP.

Existing Policy Updates to Support the Riverwalk UDMP

The following existing policy documents, regulations and guidelines should be reviewed and updated to be consistent with the vision and goals set out in the Riverwalk UDMP:

- Brampton Parks and Recreation Master Plan (2017)
- Sustainable Community Design Guidelines (2013)
- Transportation Master Plan (2015)
- Active Transportation Master Plan (2019)
- Stormwater Management Master Plan (2009)
- Brampton's Culture Master Plan (2018)
- Brampton Outdoor Wayfinding and Signage Program (2007)
- Brampton Community Energy and Emissions Reduction Plan (2019)
- Brampton Official Plan (2015/2022)
- Downtown Brampton., Queen Street Corridor and Brampton Flowertown Secondary Plans
- Brampton Cultural Heritage and Archaeological Policies
- Brampton Integrated Downtown Plan (IDP) and Open Space System

New Riverwalk Studies and Programs to Support the Riverwalk UDMP

In addition to the broader, high-level and city-wide policy recommendations, the following Riverwalk-specific documents should be developed to ensure that Riverwalk can be implemented successfully.

Riverwalk Stormwater Management Strategy

The Riverwalk UDMP recommends that the City conduct a feasibility assessment considering constraints, such as groundwater proximity and infiltration rates, to inform a stormwater management strategy that would control runoff from the Riverwalk area and intercept the storm sewer systems that flow through the Riverwalk. The strategy should outline recommendations for each implementation project and the estimated benefits of recommended stormwater improvements relative to applicable performance targets.

Riverwalk Environment, Resilience, Sustainability and Public Health Plan

The Riverwalk UDMP recommends that the Environment, resilience, sustainability and public health framework be be further developed into a plan complete with targets and indicators.

Riverwalk Public Art Strategy

Brampton's Culture Master Plan (2018) recommends the implementation of a City-Wide public art strategy that could govern the management, commissioning, procurement and curation of the city's public art collection. Within this framework, a public art strategy specific to Riverwalk should also be developed to ensure funding and ongoing curation of a collection specifically tailored to the Riverwalk area.

Riverwalk Signage and Wayfinding Strategy

The Riverwalk UDMP recommends that the City's Outdoor Wayfinding and Signage Program be updated and expanded to include Riverwalk as a distinct area within the downtown Brampton, with it's own identifiable signs and markers, that will fit within the broader signage program. The Riverwalk signage and wayfinding strategy should also include information specific to the active transportation network such as trail and distance markers, route options and destinations for navigating the Riverwalk area.

Riverwalk Community Partnerships and Stewardships

A number of projects identified in the Riverwalk UDMP, could be implemented in part, through grass-roots efforts, with the help of the community.

Similarly, the ongoing operation and maintenance of Riverwalk and its extensive naturalized areas presents some great opportunities to engage community groups, schools and other organizations and foster a sense of ownership over this great landscape resource at the heart of the City.

The Riverwalk UDMP recommends building on the recommendations included in the Brampton Grow Green Environmental Master Plan and establishing a Riverwalk community working group, or similar organization to create an ongoing dialogue between the community and the City and to set out a framework through which community groups can get involved in the implementation and stewardship of Riverwalk.

9.3 Financial Considerations

The area of Brampton subject to the Riverwalk UDMP is large, complex and of the utmost importance for the revitalization of the downtown core, and for the City's progress.

Riverwalk UDMP Costs

The Riverwalk UDMP has proposed a number of high-level design concepts that require detailed design in future phases. It is challenging to forecast these future design solutions and construction approaches to produce a reliable cost estimate at this early stage. Nevertheless, it is understood that the costs related to the Riverwalk UDMP urban design scope will be extensive, and will be implemented over a long period of time through a variety of projects and initiatives. Funding for the implementation of the Riverwalk UDMP may come from a variety of sources at the municipal, Region, as well as Provincial and Federal levels, through borrowing and investment mechanisms, including:

- development charges;
- a variety of grants;
- through the community benefits process;
- from agreements;
- from specific charges and contributions, and;
- as a last resort, from reserves and taxes.

The Economic Development Return on Investment (ROI) Study produced in 2019 indicated a significant potential return on investment related to the implementation of the Riverwalk program, which includes both the flood protection solution outlined in the DBFP EA and the urban design concepts outlined in the Riverwalk UDMP.

The major benefit of the Riverwalk program for Downtown and the City will be the elimination of the Special Policy Area, which will stimulate redevelopment and act as a key contributor to economic development. Benefits also include The revitalization of the surrounding area and the Downtown core, the creation of a major attraction for the public, tourists, businesses and for private investment .

As indicated in the ROI report there are very significant potential benefits related to the concepts and features proposed in the Riverwalk UDMP, some quantifiable, other less. These include the environmental improvements, climate change mitigation and public health benefits described in **"Chapter 5.0 Environment, Resilience, Sustainability and Public Health"**.

Preliminary Cost Estimates

The preliminary cost estimate included in the DBFP EA assessed capital costs for the flood protection solution to be between $85 million and $106 million. The DBFP EA estimate does not include costs related the urban design improvements outlined in the Riverwalk UDMP, however, implementing the urban design improvements concurrently with the flood protection solution, as outlined in **"Section 9.4 Phase 1: DBFP-Related and Short-Term Projects"**, is anticipated to deliver cost benefits for the Riverwalk program as a whole.

For the first phase of implementation it can be estimated that the urban design improvements described in the Riverwalk UDMP, may be 40% or more of the costs identified for flood protection in the DBFP EA. However, not all Phase 1 projects are required to be delivered concurrently with the upcoming detailed design phase for the flood protection solution identified in the DBFP EA. This, along with the urban design considerations from the Riverwalk UDMP will allow a much more realistic assessment of these costs.

Meanwhile the extensive advocacy work and the search for programs and grants and diverse sources of funding will be ongoing, alongside the continued update and development of additional details related to the multiple benefits of this landmark initiative. Staff will continue to report to Council with additional, detailed information about costs and funding as they become available.

Recommendations

1. That the concepts put forward in the Riverwalk UDMP be used as the basis for the future parks planning, design and development of the five character areas outlined in the illustrative concept plans in **"Chapter 8.0 Concept Design and Demonstration Plan"**;
2. That the appropriate studies will be undertaken to advance the Riverwalk UDMP vision objectives and principles;
3. That the provisions and key actions for the implementation of the Riverwalk UDMP be pursued by the City in collaboration with its partners in the area (e.g. TRCA, Region of Peel and potential private partners) to secure the funding needed and ensure development;
4. That other projects in the area including those outlined in **"Section 2.1 Riverwalk in Context"**, are fully coordinated, taking into consideration the provisions included in Riverwalk UDMP and align with its vision and principles and that possibilities for cooperation and partnership including scope, design, funding be established.

9.4 Phase 1: DBFP-Related and Short-Term Projects

Phase 1 Scope

The projects identified for Phase 1 implementation are those most closely related to the flood protection solution identified in the DBFP EA and short-term projects that will unlock the central portion of Riverwalk.

Timing:

- Detailed design: 2021-2023
- Phased construction: 2024- 2027
- Timelines to be confirmed pending coordination with the DBFP EA implementation, coordination with the CN/ Metrolinx rail expansion project and securing additional funding.

Partnerships

- City of Brampton
- TRCA
- Region of Peel

Phase 1 Projects

A1. Bypass Channel Improvements
The Etobicoke Creek bypass channel will be widened and deepened as part of the DBFP EA flood protection solution. As part of the Phase 1 projects, the Riverwalk UDMP recommends enhancements to the channel, building upon the DBFP EA solution. The urban design improvements must work within the flood protection requirements and framework set out in the DBFP EA, while demonstrating design excellence, providing improved integration with the Riverwalk open space network and achieving Brampton's environmental, resilience and sustainability objectives. Suggested improvements include the creation of stepped and vegetated channel slopes, upper-level boardwalks and tree plantings, low flow channel improvements, a new rocky cascade at the upstream end of the channel and emergency access and egress routes.

A2. Ken Whillans Drive Realignment
A portion of Ken Whillans Drive north of Church Street will be realigned as part of the flood protection solution identified in the DBFP EA.

Upgrades to the realigned Ken Whillans Drive have been identified as a Phase 1 project that should be implemented concurrently with the flood protection solution identified in the DBFP EA. Improvements include new bike lanes, widened sidewalks with pedestrian priority crossings, street tree planting/Stormwater tree trenches and other integrated stormwater management facilities.

A3. Rosalea Park North Meadow
The regrading of this area is required as part of the DBFP EA flood protection solution, associated with the realignment of the southern portion of Ken Whillans Drive. The creation of the Rosalea Park North meadow is identified as a Phase 1 project that will include new pathways and trails down to the Etobicoke Creek and under the Church Street bridge, a new pollinator meadow landscape, new site furnishings and integrated stormwater management facilities.

A4. Upgrades to Queen, Church, Scott Street Bridges
The replacement of the Queen, Church and Scott Street bridges will be required to accommodate the expanded bypass channel, as part of the DBFP EA flood protection solution. Enhancements to these bridges beyond those identified in the DBFP EA shall include protected bike lanes, widened sidewalks, enhanced railings and lookouts and potential access and egress to the creek below.

These bridges should exemplify design excellence, celebrate the crossing of the creek and the intersection of Riverwalk through downtown Brampton. Bridge improvements should be implemented concurrently with new cycling infrastructure (D1) and enhanced intersections and crossings (D3).

A5. John Street Pedestrian Bridge
Although not required for as part of the flood protection solution identified in the DBFP EA, the new John Street pedestrian bridge has been identified as a Phase 1 project as the construction of the new crossing should be closely coordinated with the design and construction of the new channel (A1).

A6. John Street Improvements
Improvements to John Street, on the east and west banks of the channel, are proposed to strengthen pedestrian and cycling connections in the area. Improvements include bike lanes and pedestrian priority crossings, enhanced paving materials for shared use and street tree plantings. The John Street Improvements should be undertaken in conjunction with the John Street Pedestrian Bridge (A5) and in coordination with the proposed GO/ CN 3rd rail line project.

A7. CN Rail Pedestrian Underpass
The pedestrian rail underpass at Centennial Park is a key north-south connection to achieve continuity in the open space network and to provide an immersive Riverwalk experience. Currently identified as a Phase 1 project, the implementation of this important new connection is dependent on its integration with the detailed design of the new bypass channel and coordination with the proposed timelines for the CN/ Metrolinx work and the new Etobicoke Creek rail crossing.

A8. Reconstruction of the Centennial Park North Pedestrian Bridge

The existing pedestrian bridge south of the bypass channel will require replacement to accommodate the flood protection measures identified in the DBFP EA. Consideration should be given to enhancements beyond the scope of the EA, to include a wider crossing, enhanced materials, lighting, signage as well as providing a better, more accessible connection to Wellington street at this important node in the Riverwalk area.

A9. Switchback Ramp to Wellington Street

The creation of a new switchback ramp up to the cul-de-sac at James and Wellington Streets should be considered on conjunction with the replacement of the Centennial Park north pedestrian bridge (A7), in order to provide barrier-free access to the southern portion of Riverwalk.

As with the reconstruction of the pedestrian bridge, lighting and signage should also be included in the design and construction of the new ramp. If possible, this project should be implemented concurrently with the recommended water quality unit for stormwater management on Wellington Street.

A10. Water Quality Unit at Wellington Street

Although the majority of LID practices identified in section “5.4 Stormwater Management” are outside the immediate scope of the Riverwalk UDMP, the water quality unit at the end of Wellington Street is within the Riverwalk area and could be implemented as part of Phase 1, in coordination with the Switchback ramp to Wellington Street (A9).

Fig. 258 Phase 1 Projects

9.5 Phase 2: Medium-term Implementation

Phase 2 Scope

The projects identified in Phase 2 are those that further establish the overall framework for a unified Riverwalk. These are key projects that will serve to enhance connections within Riverwalk and to surrounding neighbourhoods and make Riverwalk an integrated part of downtown Brampton. Pending approval and funding, Phase 2 projects could be implemented within a 3 to 7 year range, pending further coordination with other projects and developments.

Timing:

- Detailed design: 2023-2025 (pending approvals and funding).
- Phased construction as funding is secured and scope of associated projects defined.
- Timelines to be confirmed pending future funding and coordination with related projects.

Partnerships

- City of Brampton
- TRCA
- Region of Peel

Phase 2 Projects

B1. Rosalea Park Revitalization

The Rosalea Park revitalization has been identified as a Phase 2 project, as it will become the heart of Riverwalk and a catalyst for open space improvements throughout the Riverwalk area. Improvements include the creation of a multi-use kiosk with event power and public washrooms, an open sloped lawn and informal performance space with seating, new pathways and a new ramp connection to Maple Avenue from the park. The Rosalea Park improvements should be implemented concurrently with the Ken Whillans Drive extension (B2) and integration of stormwater management should be coordinated between the two projects.

B2. Ken Whillans Drive Extension

The Ken Whillans Drive extension, is identified as a Phase 2 project that will provide a strong new connection to downtown Brampton and allow Ken Whillans Drive to become contribute to the become Riverwalk's signature street. The Ken Whillans Drive extension will include bike lanes, sidewalks and multi-use trails, pedestrian priority crossings, enhanced paving materials for shared use and integrated stormwater management facilities.

B3. Reconfigured Ken Whillans Drive North

The reconfiguration of the northernmost portion of Ken Whillans Drive, is identified as a Phase 2 project that will extend complete Riverwalk's signature street and connection to downtown Brampton. If funding allows, this portion could also be implemented along with the realignment and reconfiguration of the south portion of Ken Whillans Drive (A2). Enhancements include new bike lanes, widened sidewalks with pedestrian priority crossings, tree planting and integrated stormwater management facilities.

B4. Etobicoke Creek Recreational Trail and SWM Landscapes along Ken Whillans Drive

The portion of the Etobicoke Creek Recreational Trail north of Church Street is proposed to be realigned and widened to have a closer relationship with the topography of the valley and better connection to the creek. This project has been identified as a Phase 2 project as it will begin to establish the identity of Riverwalk through its strong narrative expression and integrated stormwater management landscapes. The realignment of the trail should be implemented concurrently and coordinated with upgrades to Ken Whillans Drive north (B3).

B5. Duggan Park SWM Facilities

The creation of new stormwater management facilities in Duggan Park will help to protect the water quality of Etobicoke Creek and contribute to the overall stormwater management function of the Riverwalk area. The Riverwalk UDMP recommends that the City conduct a Class EA to select a preferred solution for providing quality control for the existing storm sewers draining through Duggan Park. The solution will define how the facilities will integrate with the Duggan Park redevelopment (C2 & C8) and other recommendations of the Riverwalk UDMP, such as improvements to the riparian edges and new boardwalks and lookouts.

B6. Vodden Street bridge improvements

The Vodden Street bridge improvements will include protected bike lanes, widened sidewalks, enhanced railings and lookouts to the creek below. Bridge improvements should be implemented concurrently with new cycling infrastructure (D1) and enhanced intersections and crossings (D3) in the area.

B7. Central Public School Park Revitalization

The revitalization of Central Public School grounds and park includes the creation of a new terraced landscape with horticultural beds, new community gardens, a new fitness loop and connections to the adjacent senior's residence, significant new tree plantings and integrated stormwater management facilities.

The revitalization could also include the expansion of the Central Public School community centre as green public amenity including a maintenance and operation facility and creation of integrated green roof and rainwater harvesting systems.

B8. New Rosalea Park North Pedestrian Bridge and Lookout

A new pedestrian bridge in Rosalea Park North is identified as part of the Phase 2 projects to create new connections to Scott Street and increase the pathway network north of Church Street. The new bridge should be implemented along with a new pathway connection and lookout on the east bank of the creek and would further enhance the experience of the Rosalea Park North Meadow (A3). If possible, this project should be implemented concurrently with the recommended water quality unit for stormwater management on Scott Street.

B9. Queen Street Transit Plaza

The Queen Street transit plaza at the corner of Queen and Centre Streets is identified as a Phase 2 project as it will become an important link in the City's higher-order transit system. The implementation of the plaza is dependent on agreements between the city and adjacent developments but should be considered in conjunction with the upgrades to the Queen Street bridge (A4) in order to ensure integration with the Riverwalk trail system.

B10. Duggan Park Nature-based Playground

The expansion and revitalization of the playground in Duggan Park has been identified as a Phase 3 project that will encourage a strong connection to nature for the park's youngest users. The project includes nature-based play structures and equipment, integration with the site's natural topography and interaction with the riparian edge of the creek. The playground could be implemented concurrently with the Duggan Park SWM Ponds (A8)

Fig. 259 Phase 2 Projects

9.6 Phase 3: Long Term Implementation

Phase 3 Scope

The projects identified for Phase 3 implementation are those that continue to elevate Riverwalk into a showpiece within the city and promote further community and neighbourhood engagement.

The projects in Phase 3 do not have established timelines and will be dependent on available finding, partnerships and City priorities.

Timing

- Timelines to be confirmed pending funding and coordination with other projects.

Partnerships

- City of Brampton
- TRCA
- Region of Peel

Phase 3 Projects

C1. Rosalea Park West Plaza

The Rosalea Park West Plaza includes the creation of a new public open space with an amenity and washroom kiosk, urban water features, playground, skating loop, planting, horticultural beds and integrated stormwater management facilities.

The Rosalea Park West Plaza could be implemented concurrently with the Ken Whillans Drive extension (B2) and Rosalea Park revitalization (B1), but is contingent on the relocation of the existing tennis club and redevelopment of adjacent lands.

C2. Duggan Park Sports Field Relocation

The relocation of some of the existing sports fields from Duggan Park will allow the reallocation of open space and the creation of new, flexible park space, community gardens and potential space for urban agriculture.

The removal of sports fields from Duggan Park is contingent on securing space that can accommodate larger-scale community sporting events that are currently held in the park.

C3. Centennial Park Arboretum Revitalization

The revitalization of the existing arboretum in Centennial Park is identified as a Phase 3 project that would benefit from partnerships and stewardship from local schools or neighbourhood organizations.

The project includes reforestation and curation of a native tree collection, realignment and creation of new trails and lookouts and the integration of stormwater management facilities.

C4. Centennial Park Wetland

The protection and enhancement of the existing wetland in Centennial park has been identified as a Phase 3 project that will include the creation of new wetland boardwalks, pathways and lookouts.

C5. Centennial Park Pedestrian Bridges

Two new pedestrian bridges in Centennial Park are identified as Phase 3 projects to create new connections within the park, allowing pedestrians to remain within the park rather than rerouting to adjacent streets and providing options to short-circuit the length of the park, providing new connections from he parking lots to either side of the creek.

Bridges should be implemented concurrently with the Centennial Park Arboretum Revitalization (C4 and wetland expansion (C5) and coordinated closely with the new boardwalks in the area.

C6. Centennial Park Sports Field Reconfiguration

The reconfiguration of sports fields at the north end of Centennial park is identified as a Phase 3 project that will provide new flexible open space, potential reconfiguration of the tennis courts, existing children's playground, soccer fields and the creation of a signature, entrance landscape along Centre Street.

C7. Clarence Street Bridge Improvements

The Clarence Street bridge improvements will include protected bike lanes, widened sidewalks, enhanced railings and lookouts to the creek below.

Bridge improvements should be implemented concurrently with new cycling infrastructure (D1) and enhanced intersections and crossings (D3) in the area.

C8. Sustainability Improvements

Upgrades to the existing parking lots in the Riverwalk area have been identified as Phase 3 projects. Timelines are not determined but the inclusion of trees, bioretention and permeable pavements should be considered when parking lots are repaved.

The Duggan Park lot could be implemented concurrently with the sports fields relocation (C3). The Central Public School lot could be upgraded concurrently with the Central Public School Park Revitalization (B6) and the Centennial Park lots could be upgraded concurrently with the sports field reconfiguration (C7) and arboretum revitalization (C4).

Fig. 260 Phase 3 Projects

9.7 Small-scale, Incremental and Supporting Projects

Incremental Projects within the scope of the Riverwalk UDMP

Incremental projects are improvements that are not site specific and that can be implemented strategically over time throughout the entire Riverwalk area. Some portions of the projects noted herein could be implemented concurrently with any of the projects identified in Phases 1, 2 or 3.

D1. Naturalization Planting and Reforestation

Tree planting and natural heritage restoration and enhancement in the Riverwalk area will contribute to the sustainability objectives for Riverwalk and as identified in the Brampton Grow Green Environmental Master Plan and the Brampton One Million Trees Program.

Riverwalk tree planting initiatives are in addition to the required on and off-site tree compensation, to mitigate the loss of vegetation caused by the flood protection measures as outlined in the DBFP EA. Naturalization planting and reforestation should be undertaken, where space and site conditions allow, in conjunction with all projects identified in Phases 1, 2 & 3, with a focus on Duggan Park, Central Public School, Rosalea and Centennial Parks and on degraded or unvegetated valley slopes.

D2. Pathway Resurfacing and Realignment

Upgrades to Riverwalk pathways and trails including resurfacing, placement of pavement markings and wayfinding signs can be integrated into projects that impact any of the parks in the Riverwalk area. In particular, portions of the Etobicoke Creek Recreation Trail should be realigned to achieve the objectives of the Riverwalk UDMP and should be considered in conjunction with each project identified in Phases 1, 2 & 3.

D3. New Seating, Site Furnishings and Lighting Upgrades

Upgraded site furnishings should be deployed in key areas of the park, including the spaces created by rearranged pathways and ponds. Furnishings should include coordinated park benches, picnic tables and an increased number of waste and recycling receptacles, to accommodate increasing numbers of visitors. Selection of site furnishings should take into consideration life cycle costs with preference given to durable, high quality and sustainable materials.

D4. Integrated Park Signage and Wayfinding

This item includes the Implementation of the City's Parks and Trails Wayfinding Strategy including new elements of interpretation and education throughout the Park. Riverwalk wayfinding elements should be coordinated with adjacent amenities, including the local and regional trail network, natural and cultural heritage features and downtown open spaces and attractions.

D5. Public Art

An overall strategy or program for public art should be developed for Riverwalk, that will guide the selection and placement of permanent and temporary art installations and be governed under the City's Public Art Framework. Public art within the Riverwalk area could take the form of a fluid and changing collection that can evolve with the City's public art goals and guidelines, as well as a number of permanent, integrated public art features that can tell the story of Riverwalk and its inhabitants.

Supporting projects outside the scope of the Riverwalk UDMP

A number of projects have previously been identified in other documents as part of boarder City-wide initiatives, that will support the objectives of the Riverwalk UDMP.

E1. Enhanced Level and Grade-Separated Rail Crossings

There are a total of 4 rail crossings within or closely adjacent to the Riverwalk area. Although not required to be implemented concurrently, enhancements to pedestrian and cycling facilities at these crossings should be implemented in conjunction with the CN rail expansion project or other planned roadworks in the area as these crossings function as important gateways between Riverwalk and the downtown core.

E2. New Cycling Infrastructure

Cycling infrastructure including on-street, separated and protected bike lanes, signalized crossings, bike parking and support infrastructure. New cycling infrastructure should be implemented as per the City's Active Recreation Master plan and in conjunction with road upgrades in the area.

E3. Street Tree Plantings

The Riverwalk UDMP recommends street tree plantings on the 'Green Corridors' and main streets connecting Riverwalk to downtown and to surrounding neighbourhoods. Planting of street trees is consistent with the Brampton Grow Green Environmental Master plan and will contribute to the City's One Million Trees targets. Street trees should be provided sufficient soil quality and quantity to succeed in the long term and should be integrated with stormwater infrastructure where possible. Street tree plantings should be considered in conjunction with Phase 1, 2 & 3 projects and with roadway upgrade projects in the area.

E4. Enhanced intersections and Crossings

Enhanced crossings include the provision of fully controlled intersections, tabletop or raised intersections, widened pedestrian crossings and dedicated bike crossings. These improvements should be incorporated into roadway upgrade projects in the area.

E5. Low Impact Development and Stormwater Management

The introduction of low impact development (LID) practices for stormwater management is identified as an important component of the Riverwalk UDMP's resilience and sustainability framework. Even small-scale implementation of LID can have a positive impact on stormwater management in the Riverwalk area and should be integrated into any road upgrades in the area to the extent possible. Other stormwater management improvements, such as water quality units, should be bundled with road upgrades where external sewersheds can be intercepted and controlled.

Recommendations

1. Ensure that all related projects, as well as small incremental projects in the area align with the Riverwalk vision and principles, and comply with the provisions outlined in the Riverwalk UDMP.
2. In future phases of design, take into consideration the state of repair of existing utilities, any required replacements or upgrades, including provision for burying aerial power lines in order to align with the Riverwalk vision and principles, and comply with the provisions outlined in the Riverwalk UDMP.

Fig. 261 Small-scale and Incremental Projects

Fig. 262 Conceptual Aerial Rendering

10.0
Conclusion and Next Steps

10.1 Conclusion

The Riverwalk UDMP includes detailed recommendations and a phased implementation framework to ensure the continuation of work in the next steps and the success of the entire Riverwalk Program

The Riverwalk UDMP is a comprehensive document that includes provisions and recommendations to fulfill the bold goals and objectives set out by the City of Brampton, including a complex and innovative framework for open space connections and public realm development of the downtown Etobicoke Creek area.

The Master Plan builds upon and complements the DBFP EA. The two documents are intrinsically linked and the urban design concepts presented in this report should continue to be considered along with the approved flood protection solution through future detailed design and implementation phases.

The Riverwalk UDMP was developed on a foundation of extensive and ongoing advocacy, communication and engagement with Brampton City Council, key stakeholders and with the public, in partnership with the TRCA and Region of Peel.

The Riverwalk UDMP includes a framework for environment, resilience, sustainability and public health, building on a number of previous City reports, studies and policies, and contributes to the City of Brampton's ongoing commitment to fostering healthy, resilient and environmentally sustainable communities.

Benefits of the Riverwalk UDMP

The recommendations and concepts described in the Riverwalk UDMP will bring significant benefits to downtown Brampton and to the broader context within the city and Region including:

- Providing a guiding document and a framework for future design and capital investment initiatives as well as smaller projects completed in more localized areas.
- Improving access to natural heritage areas for residents and visitors; the importance of which has been made more evident than ever during the recent pandemic and beyond.
- The creation of an extensive, continuous and accessible public open space system, with new opportunities for programming for a wide variety of events, for people of all ages, conditions and interests and based on integrated, eco-design for equity, diversity and inclusiveness.
- The creation of signature Riverwalk places and features including the new Rosalea Park and plaza, the Central Public School Fields Park / Rosalea Park North, the Riverwalk Promenade along the continuous Etobicoke Creek Recreational Trail.
- The provision of an innovative framework for resilience, sustainability, climate change adaptation, flood protection and mitigation and public health in the Riverwalk area and downtown Brampton through.
- Redefining the character and identity of the Riverwalk area and downtown Brampton through the interpretation and experience of heritage, culture and arts.
- Contributing to downtown revitalization through the creation of new well-connected, high-quality, humanly-scaled landmark spaces and destinations for residents, visitors and business investment.

10.2 Next Steps

The Riverwalk Program

Together with the approved DBFP EA, the completion of the Riverwalk UDMP represents an important milestone in achieving the overall Riverwalk Program and when completed the Riverwalk Program will:

- Protect from flood and disasters, increase public safety
- Revitalize the downtown core and surrounding area
- Trigger infrastructure renewal, including Low Impact Development
- Generate employment, attract people and investment
- Build community, support and diversity, bring people together
- Develop central park system, demonstrate Eco Park Space principles
- Make a resilient, sustainable, healthy Downtown and City
- Support equity, diversity and culture, improve social life
- Stimulate new approaches, innovation, change

The recommendations and concepts presented in this report must continue to be refined and championed to ensure continued integration with the city's growth and revitalization.

Recommendations

1. Continue ongoing funding advocacy and outreach initiatives.
2. Continue community engagement, information sharing, education and advocacy through future phases including detailed design and implementation.
3. Undertake feasibility studies to develop indicators to support the recommendations in the environment, resilience, sustainability and public health framework (e.g. SWM / LID).
4. Prioritize innovation, design excellence, quality, placemaking, accessibility and inclusiveness when undertaking new development and revitalization of parks and open space.
5. Work with city departments to coordinate related projects and to advance the recommended sustainable mobility and active transportation improvements.
6. Develop an area-specific energy action plan as outlined in the Brampton Community Energy and Emissions Reduction Plan (CEERP) to reach climate change mitigation & GHG emission reduction goals.
7. Consult with Indigenous groups and community representatives to develop a cultural heritage engagement and interpretation strategy for the Riverwalk area.
8. Develop public art, wayfinding and signage strategies for the Riverwalk area.
9. Work with partners including TRCA and community groups to implement the ecological improvements within the Riverwalk area with a focus on achieving the EcoSpace principles.
10. Work with city departments and partners including Region of Peel to coordinate infrastructure improvements with a focus on bridges, utilities and blue-green infrastructure.
11. Work with partners and stakeholders to foster public health and active living by providing food production, urban agriculture, all season outdoor programming and supporting amenities.

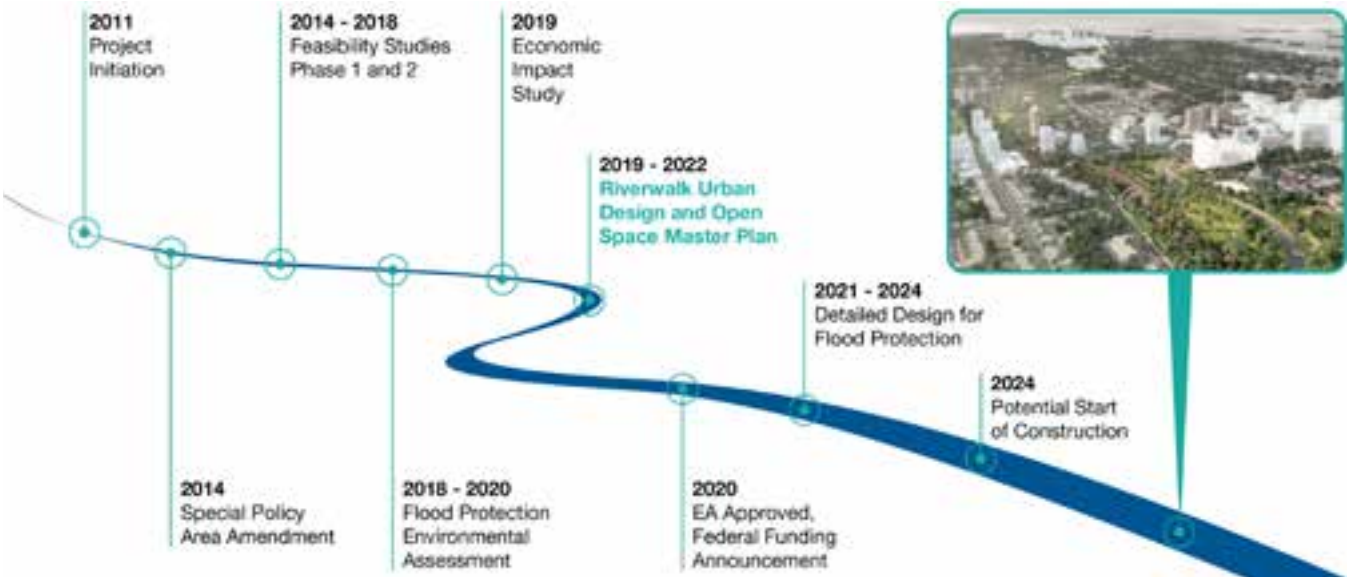


Fig. 263 Riverwalk Program Timeline

11.0
Appendices

Appendix 1:
Engagement Overview

Riverwalk Urban Design Master Plan
Engagement Summary

Introduction:

The Riverwalk Area Urban Design Master Plan (UDMP) was developed through extensive public engagement and communication with a variety of participants including key internal and external stakeholders, city committees, community groups and members of the public. The engagement process included extensive outreach, numerous presentations and intensive communication, building on the Downtown Brampton Flood Protection (DBFP) Environmental Assessment (EA) engagement process.

Engagement overview:

Downtown Brampton Flood Protection Environmental Assessment three Public Information Centres (PICs) took place from 2018 to 2020 as a way to familiarize the public with the DBFP EA project and to gain public feedback. Information on the DBFP EA engagement process is located in Chapter 10: Consultation (https://trca.ca/conservation/green-infrastructure/dbfpea/downtown-brampton-flood-protection-ea-esr-chapter-10-2/download) of the final Environmental Assessment report approved in September 2020.

Initiated in August 2019, the Urban Design Master Plan has relied extensively on its engagement work in order to bring it to the higher level desired and to produce relevant outcomes.

A comprehensive **Technical Team** was created in order to discuss and coordinate issues related to the Riverwalk program consisting of relevant City departments, representatives of the Toronto and Regional Conservation Authority (TRCA), as well as the Region of Peel Climate Change and Public Health divisions. Working together, the design concepts and demonstration plans were discussed and developed. Comments provided and the chapters of the UDMP were finalized, including extensive implementation provisions and recommendations for future work.

The UDMP engagement process also included:

- Presentations to City committees and other organizations with interest in the area (e.g. Brampton Environmental Advisory Committee, Regional Watershed Alliance, Brampton Advisory Committee, Brampton Business and Industry Association, Age-Friendly Committee, City of Brampton Board of Trade, CARP)
- Community outreach/ Public outreach and engagement (e.g. Community Liaison Team, Public Information Sessions)

- Key information on Website and communication platforms, all open to the public (e.g. Overview of program, UDMP, DBFP key documents, Have Your Say Public Consultation page, FAQs)
- Visualization (e.g. image gallery, videos, virtual reality)

Public Information Sessions

Two Public Information Sessions (PIS) took place in 2020 to 2021 with Swerhun Inc. assisting in organizing, running the sessions, facilitating questions and a plenary discussion as well as managing follow up surveys for both sessions.

PIS #1 (October 1st, 2020)

- The session was held remotely via Webex Events. Participants were able to join and participate in the online event using a computer, tablet, smartphone app, or by telephone.
- The session introduced the project to the public, presented key information with focus on the existing condition and constraints and opportunities analysis, preliminary Vision and principles, responded to questions, and sought feedback from a diverse range of participants.
- Over 40 members of the public logged into the Public Information Session.
- Feedback centered around the following:
    - Improve connections, safety, and ecology
    - Relationships and influence of other initiatives
    - Connections between engagement and decision making
- Comprehensive survey was posted online to seek more comments and provide opportunities for further engagement.
- 23 participants responded to an online survey about the UDMP from October 9 to November 6, 2020. The City used Twitter, the Riverwalk project website, and the Brampton Engage website to promote the online survey.
- 9 participants signed up to receive project updates and extensive email exchanges ensued.

For more information, see materials posted on the dedicated engagement pages at https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Pages/Have-Your-Say.aspx

PIS #2 (March 17th, 2021)

- Session held remotely via Webex Events. Participants were able to join and participate in the online event using a computer, tablet, smartphone app, or by telephone.
- Approximately 70 members of the public joined the Public Information Session.

- The session was focused on discussing the Vision and principles, preliminary design concepts and recommendations.
- Feedback was centred around the following:
    - Strong support for the proposed approaches to enhancing sustainability and protecting nature
    - Concerns about area impacts
    - Interest in culture, identity, programming, and future engagement
- A comprehensive survey was posted online to seek additional comments and provide opportunities for further engagement.
- 47 participants responded to an online survey about the UDMP and posted materials from March 25 to April 9, 2021.
- The City used Twitter, the Riverwalk project website, and the Brampton Engage website to promote the online survey
- 38 participants signed up to receive project updates and extensive email exchanges ensued.

For more information, see materials posted on the dedicated engagement pages at https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Pages/Have-Your-Say.aspx

Community Liaison Team

The UDMP Community Liaison Committee acted as the voices of the broader community and key interest groups. On September 23rd, 2020 and March 9th, 2021, two CLT meetings took place as opportunity to present the draft materials to key interest groups, to ask questions, provide input and feedback, and garner community involvement needed for the Riverwalk Program and UDMP to succeed. The team consisted of representatives of:

- City Committees (e.g. Brampton Environmental Advisory Committee, Brampton Heritage Board, Age-Friendly Committee, Brampton Cycling Advisory Committee, Accessibility Advisory Committee)
- Community advocacy groups (e.g. CARP, Bike Brampton, Brampton Says Group, Brampton's Seniors Council, Fight Gridlock in Brampton, Rotary Club, Sierra Club Peel Chapter, The Etobicoke Creek Residents Association)
- Business groups (e.g. Brampton Board of Trade, BIA, New Brampton)
- Other community stakeholders (e.g. YMCA, PAMA, United Achievers Community Services, St. Paul's United Church)

Through the UDMP process, city staff have made significant efforts to engage with local and regional Indigenous communities. Staff will continue with its partners to explore opportunities for engagement and partnerships with Indigenous communities, within and surrounding the Riverwalk area by:

- Engaging Indigenous Communities and groups in the design of open and cultural spaces.
- Incorporating input from local Indigenous Communities through the detailed design process for flood protection and associated open space.

Advocacy, communication, and engagement efforts will continue in the future for detail design and other related projects and initiatives including advocacy and outreach to senior levels of government for support and funding, with the key stakeholders and partners as well as for broader community engagement.

Riverwalk Program Engagement Timeline *(2018 to present):*

2018 – 2020:

Downtown Brampton Flood Protection EA

Public Information Centre (PIC) #1	November 2018
Public Information Centre (PIC) #2	Spring 2019
Public Information Centre (PIC) #3	Fall 2019

Urban Design Master Plan

2020

CLT Meeting #1	September 23rd
Public Information Session #1	October 1st
Online survey conducted to collect public feedback	Oct. 9 – Nov. 6th

2021

Riverwalk presented at the Youth Support Task Force Meeting	February 25th
Regional Watershed Alliance – Riverwalk Presentation	March 4th
CLT Meeting #2	March 9th
Public Information Session #2	March 17th
Online survey conducted to collect public feedback	March 25th – April 9th
BIA Presentation	March 26th
Downtown Councillors' Town Hall Meeting #1	April 8th
Downtown Councillors' Town Hall Meeting #2	May 18th
Age Friendly Committee – Riverwalk Presentation	June 22nd

Riverwalk Program Engagement Materials:

City of Brampton | Riverwalk | Have Your Say

- Webpage link
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Pages/Have-Your-Say.aspx

Public Information Session #1

- Presentation (PDF)
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Documents/2020-10-01_PIS%201%20Presentation-FINAL-combined-accessible.pdf
- Meeting Summary + Feedback (PDF)
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Documents/UDMP%20PIS%201%20Meeting%20Summary%20October%201%202020.pdf
- Online Survey Summary (PDF)
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Documents/UDMP%20Online%20Survey%201%20Summary.pdf

Public Information Session #2

- Presentation (PDF)
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Documents/PIS%202%20Presentation-FINAL-ACCESSIBLE.pdf
- Meeting Summary + Feedback (PDF)
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Documents/Summary%20-%20UDMP%20Public%20Info%20Session%202%20JL%20210423%20FINAL.pdf
- Online Survey Summary (PDF)
  https://www.brampton.ca/EN/Business/planning-development/projects-studies/riverwalk/Documents/Final%20Summary%20-%20UDMP%20Online%20Survey%202.pdf

Regional Watershed Alliance – Riverwalk Presnetation

- TRCA RWA Agenda + Presentations:

https://pub-trca.escribemeetings.com/Meeting.aspx?Id=3f7f587e-58e2-48ef-ad28-885740b585d9&Agenda=Agenda&lang=English

Age Friendly Committee – Riverwalk Presentation

- Meeting Minutes (PDF)
  https://pub-brampton.escribemeetings.com/FileStream.ashx?DocumentId=33261

Riverwalk presented at the Youth Support Task Force Meeting

- Meeting Minutes (PDF – COB internal)
  9c64681f19ac90f624e8c68cc368e49e_20210225_YSTF_Meeting_Notes.pdf (ehq-production-canada.s3.ca-central-1.amazonaws.com)

BIA Presentation

- Presentation (PDF – COB internal
  https://bramptonca.sharepoint.com/:b:/s/cpt00453/EWYhYfvc4AdGmC2b16epPxsBRaqOq_qHaNkj-1g--qvF_w

Appendix 2:
Existing Open Space, Facilities & Programs Report

Existing Open Space, Facilities & Programs Report

Brampton Riverwalk Urban Design Master Plan

June 29, 2020

Prepared for:
DTAH

Prepared by:

Monteith+Brown planning consultants

40+ Years of Planning Excellence Established·1977

Table of Contents

1.0 Introduction

1.1 The Riverwalk Urban Design and Open Space Master Plan

The purpose of the Urban Design Master Plan (UDMP) is to establish urban design concepts and guidelines for the Downtown Brampton Riverwalk area. The UDMP will provide direction for future uses within the area, including open space and public amenities, active transportation, and opportunities for sustainable development. It will draw upon several previous planning studies and contemplate linkages (physical, operational, relevance) to other city-building initiatives within the area.

The Study Area, referred to as "the Riverwalk", includes the Etobicoke Creek Valley and adjacent lands between Vodden Street, Centre Street, Clarence Street and the western delineated area for Riverwalk. As illustrated in the adjacent figure, the study area is divided into five distinct character areas:

1. Duggan Park
2. Central School Fields
3. Rosalea Park
4. The Etobicoke Creek Bypass Channel
5. Centennial Park

Source: Part 1 Briefing Memo: Existing Conditions Analysis, DTAH

1.2 Existing Open Space, Facilities & Programs Report

The purpose of the Existing Open Space, Facilities and Programs Report ("EOFP Report") is to inform programming of the public realm through the UDMP. More specifically, the EOFP Report focuses upon recreational components within the public realm by taking into account existing recreation facilities located within the study area along with relevant findings contained within the City of Brampton Parks and Recreation Master Plan.

The EOFP Report explores the following items identified in the City of Brampton UDMP Terms of Reference, Section 5.4 – Public Realm Programming:

a) Study and asses the Parks and Recreation Master Plan integration, Downtown and /or Central Area context and the role the valley and open space system could play.

b) Study and assess current condition and projections, including an assessment and evaluation of the current programming at existing public parks (e.g. Rosalea Park, Centennial Park, Duggan Park, the Central Public School fields).

c) Analysis of needs (open space, active and passive, built amenities) for the study and surrounding area, including how the programs of these spaces should be changed to address the impacts of flood mitigation measures proposed in the Environmental Assessment.

d) Study how new programming opportunities, arising from the downtown redevelopment, the new Public Realm and Open Space System, the Valley reconfiguration, new trends and city and/or region opportunities should be considered and incorporated.

e) Study and propose events and cultural opportunities and concepts.

This EOFP Report is focused upon physical infrastructure including functional programmatic elements in the sense of parks design, facility and functionality. This Report does not delve into operational matters such as delivery of programs and services, maintenance, scheduling, etc. nor does it provide draft and final programming concept reports, real estate implications, or funding recommendations; these components will be carried out through subsequent phases of the UDMP by the Consulting Team as well as ongoing implementation of the UDMP by City Staff.

1.3 Brampton Parks and Recreation Master Plan

The Parks and Recreation Master Plan (PRMP) was endorsed by City of Brampton Council in June 2017. It is the blueprint for the planning and provision of parks, recreation and facilities, programs and service delivered by the City of Brampton to the year 2031. Implementation is the primary responsibility of the Community Services Department though other corporate Departments and Divisions also have a role in furthering the City's parks and recreational interests.

The PRMP establishes the following vision to guide planning for Brampton's parks and recreation sector:

"Plan. Grow. Play. Together."

The PRMP embodies guiding principles that support health promotion, design of healthy communities, sustainability, inclusivity, and public sector excellence. As an overarching master plan, the vision and guiding principles should be considered in all planning processes with the potential to influence the local parks and recreation system, including the UDMP for the Riverwalk as has been prescribed through Section 5.4 of the UDMP Terms of Reference.

With 114 recommendations, the PRMP encompasses a wide range of capital and operational topics for the City as a whole, and specific geographic areas in certain instances. The following PRMP recommendations are notable in the context of guiding the broad vision and objectives the UDMP; other PRMP recommendations are also referenced through facility or amenity specific discussions contained in Section 5 of this EOFP Report.

- Evaluating options to **renew existing parkland in line with other planning initiatives** focused on urban design, revitalization and intensification as is being carried out through this UDMP process. *(PRMP Recommendation #16).*

- Supporting "**Urban Park" and "Linear Connector" classifications of parkland** recognizing that urban squares and park plaza forms of parkland will play a more prominent role, particularly within: lands planned for redevelopment and intensification; communities where a greater focus is being placed upon urban design and enhancement of the public realm; and/or where necessary to support the City's active transportation objectives. *(PRMP Recommendation #1).*

- Acquisition of new parkland to **attain a specified parkland service ratio**, thereby implying that any parklands that may be potentially removed from the Riverwalk should be replaced with an equal amount of parkland at the very least, but preferably adding to the net supply of parkland as a whole. *(PRMP Recommendations #2 and #3)*

- Adopting a view that parks should function as "outdoor community centres" that concentrate a **wide range of activities** along with being designed to provide **safe and barrier-free** experiences. *(PRMP Recommendations #12, # and #15)*.

- **Working with local school boards** to plan joint school and park campuses at the time existing schools are being renovated or redeveloped, as well as development of joint-use agreements to access outdoor facilities at schools such as sports fields, tennis courts *(PRMP Recommendations #9, #36, #48, #53, and #56).*

- Proactively seeking **partnerships with others in the community** to deliver parks and recreation facilities, programs and services. In the context of the UDMP, this may include - but is not limited to -

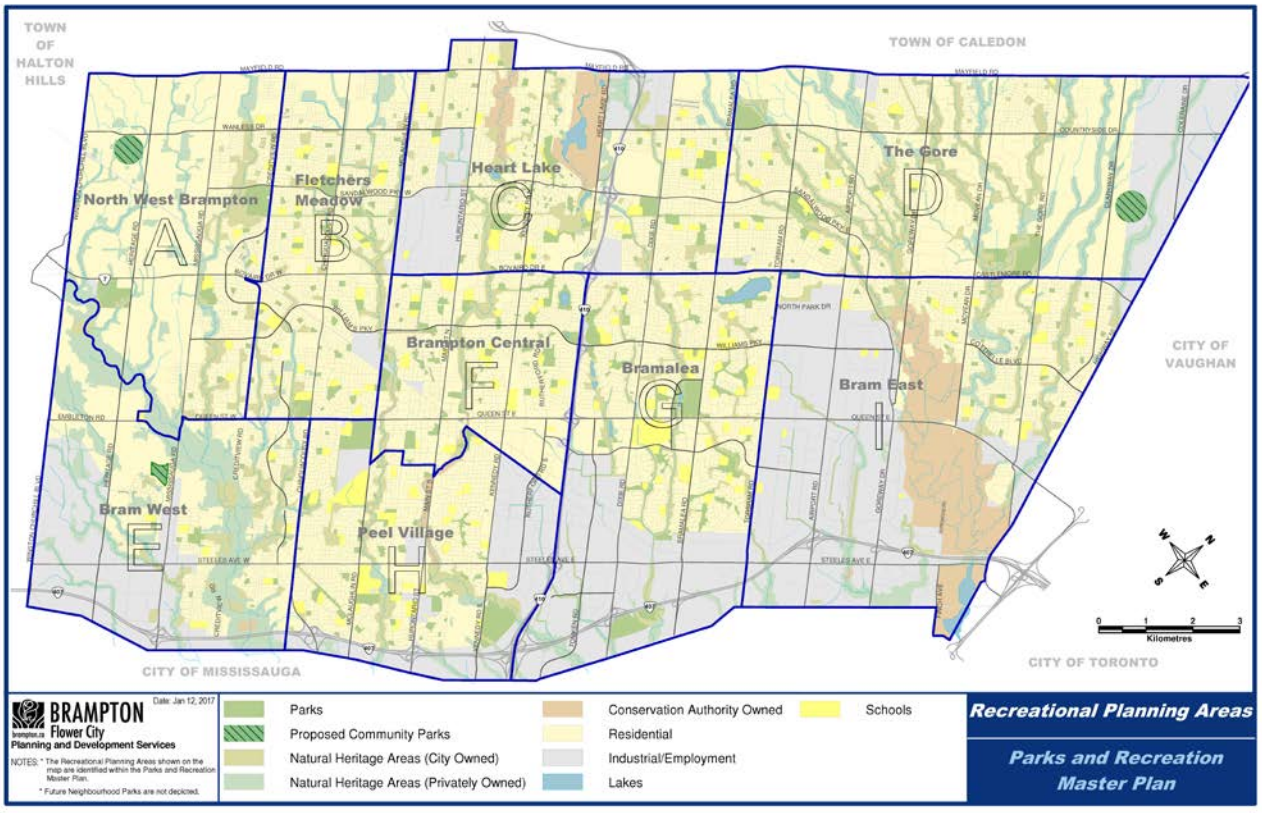
the YMCA, TRCA, local school boards, Royal Canadian Legion, Brampton Horseshoe Club and the Brampton Tennis Club that have an established presence within the Riverwalk. *(PRMP Recommendation #89).*

- Extending the Sustainable Neighbourhood Retrofit Action Plan (SNAP) model into strategic park locations, something that may have relevance given flood mitigation measures being contemplated for the Riverwalk. *(PRMP Recommendation #19).*

- Providing adequate signage at all municipal parks, trailheads and recreation facilities. *(PRMP Recommendation #13).*

- Providing public washrooms (through permanent and portable facilities) at Community and City Parks, as well as strategic trailheads in greenway systems. *(PRMP Recommendation #14).*

The PRMP establishes nine Recreational Planning Areas, also referred to as RPAs, that segment the City of Brampton based upon factors such as proximity to major parks and/or recreation facilities historical and identifiable neighbourhood boundaries, presence of discernable boundaries, and more. The vast majority of Riverwalk Study Area is physically located in RPA F which is also known as Brampton Central, with the exception of a small portion of the study lands - comprised of parkland and open space lands - that are located east of the Etobicoke Creek where situated south of the CN railway line that would form part of RPA H.



Source: Parks and Recreation Master Plan, 2017

2.0 Existing Parks and Recreation Facilities

This Section summarizes the parks and recreation facilities found within and near the Riverwalk.

2.1 Parks and Recreation Facilities within the Study Area

There are a total of 36.6 hectares spread across 9 parks and open spaces located immediately within the Riverwalk study area.

Table 1: Parkland Located within the Riverwalk

Park Name	Area (hectares)	Notable Amenities
Centennial Park	16.6	Rectangular fields (x2), tennis courts (x3), playground, arboretum, lit horseshoe pits (club x6), picnic shelter, vehicular parking, direct connection to Etobicoke Creek Recreational Trail
Central Public School Park	2.9	Ball diamond backstops, open space, Central Public School Recreation and Art Centre
Duggan Park	9.0	Ball diamonds (lit x2, unlit x1), off-leash park, playground, direct connection to Etobicoke Creek Recreational Trail
Earnie Mitchell Park	0.1	Transit island with seating, mix of grass and stone pavers, horticultural beds
Etobicoke Creek Diversion Channel	1.3	Naturalized area
Ken Whillans Drive Park	3.2	Direct connection to Etobicoke Creek Recreational Trail, heritage plaque
McLoughlin Park	0.3	Seating area, horticultural beds
Rosalea Park	2.3	Lit tennis courts (club x7), open space and special event area, vehicular parking, direct connection to Etobicoke Creek Recreational Trail
Scott Street Park	0.8	Naturalized area
Total	36.6	

In terms of indoor recreation space, the Community Services Department manages Central Public School Recreation and Art Centre (this is a former school that was repurposed in the early 1980s). The Recreation and Art Centre contains an auditorium, two multi-purpose program rooms and studio spaces. Non-municipal recreation spaces include the Brampton YMCA across from Rosalea Park along with the Royal Canadian Legion that is co-located onsite at Centennial Park.

2.2 Parks and Recreation Facilities outside of the Study Area

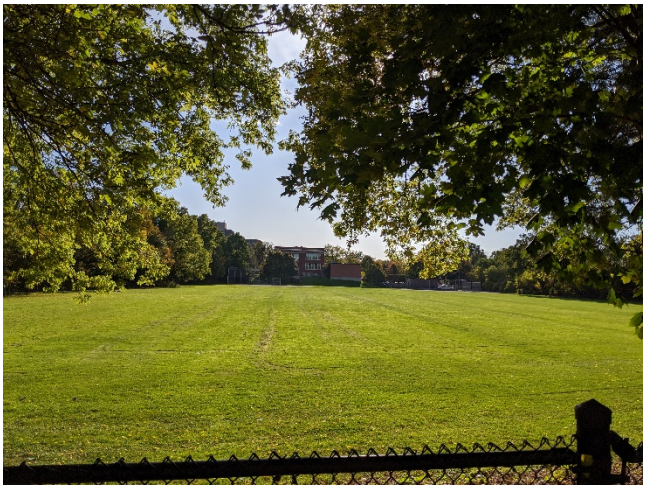
Notable parks and recreation facilities located outside of, but near to, the Study Area include:

Parks:

- Chinguacousy Park
- Fred Kline Park
- Gage Park
- Madoc Park
- Memorial Park

Recreation / Cultural Centres:

- Brampton Library, Four Corners Branch
- Century Gardens Recreation Centre
- Chris Gibson Recreation Centre
- Rose Theatre



Central Public School Park sports field

Duggan Park ball diamond

Centennial Park picnic shelter

Rosalea Park open space

3.0 Facility & Programmatic Considerations

This Section presents the PRMP findings for selected recreation facilities along with how these may have bearing upon the Riverwalk UDMP planning process.

3.1 Rectangular Sports Fields

The PRMP projects a need for 9 new soccer fields by the year 2031, primarily associated with growth in the City's east and west ends. Furthermore, PRMP Recommendation #54 directs up to 20 existing rectangular fields be relocated to newly developing residential areas, particularly those fields presently located in established areas where pressures for urban renewal and intensification are more pronounced.

Riverwalk-Specific Implications

No new rectangular sports fields are required within the Riverwalk. In fact, there is opportunity to remove and repurpose one or both of the junior sized rectangular fields found at Centennial Park. However, City staff indicate that there is a pressing need for junior fields in Brampton and thus removal of the Centennial Park fields would require the City to find a suitable replacement site(s) elsewhere in Brampton; this is anticipated to be manageable through the parkland acquisition and development processes planned in new residential growth areas since junior fields can be readily integrated within Neighbourhood Park typologies.

The City should also explore the potential to form a reciprocal agreement with the Dufferin-Peel Catholic District School Board to gain access to the Cardinal Leger Secondary School field; doing so could offset programs displaced from a repurposed municipal rectangular fields, if necessary.

Action:

- In the event that comprehensive change to the form and programming of Centennial Park is contemplated, repurposing the existing rectangular sports fields would be supported provided that its junior sized fields are replaced elsewhere.

3.2 Ball Diamonds

Although the PRMP found a slight surplus of capacity in the local ball diamond capacity, its analyses point to a cautious approach given that utilization trends had recently reversed to a growth scenario and the fact that local organizations are seeking parks that contain multiple diamonds of a higher design and maintenance standard; the latter sentiment continues to prevail based on consultations presently being undertaken through ongoing sport policy work through the Recreation Division.

It also bears noting that the Recreation Division is working on refining its data collection practices to better track market demand metrics for ball diamond sports and thus long range planning for its diamond supply is still being understood.

Riverwalk-Specific Implications

The PRMP is supportive of relocating ball diamonds in established areas in the same manner described in preceding paragraphs that pertain to rectangular fields. Although there is a strong concentration of ball diamonds in RPA F – in which the Riverwalk is located – Duggan Park is Brampton's only venue containing three major diamonds, and is the only site in the Riverwalk that accommodates organized league play. Its multi-diamond design is conducive to delivering a quality ball experience sought by user groups.

Should the Riverwalk UDMP rationalize a different programme for Duggan Park, a replacement site would be needed for its three major ball diamonds. This would require a Community Park or City Park typology (per the City of Brampton Official Plan) given the land area for three diamonds and associated parking could be between 4 to 6 hectares before accounting for other park facilities/amenities. This would present challenges due to the ability of the City to assemble a parcel of this size, redevelop an existing park to accommodate replacement of the Duggan Park lit diamonds, and ensure that there are sufficient setbacks from adjacent land uses to prevent conflicts such as light spillage, noise and traffic associated with organized ball programs.

City staff note that while the Central Public School Park backstops are in use, the outfield is not considered to be acceptable for sporting activity. Therefore, these can be repurposed should the need arise to do so provided that any existing programming can be directed to an alternative location.

Action:

- Retain the Duggan Park ball diamonds unless a replacement site can be secured that can accommodate any ball diamonds to be repurposed, provide the same level of quality, and does not compromise the ability of the City to meet other future needs.
- In the event that comprehensive change to the form and programming of Central Public School Park is contemplated, repurposing the existing ball diamonds and associated open space would be supported.

3.3 Tennis & Pickleball Courts

PRMP Recommendations #56 and #57 speak to new tennis courts in the east and west ends of the City. While no recommendations specific to pickleball courts are contained in the PRMP, the document suggests that future needs would be addressed by overlaying pickleball courts on top of existing tennis courts to allow both sports to be played. The PRMP points out that the vast majority of the City's public tennis courts are located along the Hurontario Street/Main Street corridor, a number of which have overlapping service areas.

Riverwalk-Specific Implications

The PRMP does not recommend new tennis courts be provided in or near the Riverwalk, its internal assessments suggested that the City engage the Brampton Tennis Club as to whether it is more advantageous for the Club to remain at Rosalea Park or relocate to an alternative site such as the Flower City Community Campus or the future Community Park planned for Mississauga/Embleton. The tennis courts and clubhouse at Rosalea Park may be in need of capital reinvestment having been in service for a number of years and future investment – whether at the existing site or new park – should be directed in a manner that allows the club to grow and deliver quality programs.

In the event that the Tennis Club is amenable to relocating and/or an adequate replacement site can be secured, there is opportunity to redevelop 0.6 hectares (1.5 acres) within the Rosalea Park. However, as a major recreational stakeholder in the Riverwalk and one that has the potential to be affected given the importance of Rosalea Park to the overall UDMP vision, further conversations will need to be held with the Brampton Tennis Club.

There are also three tennis courts at Centennial Park. While the degree to which these courts were utilized was not known during the preparation of the PRMP, it notes that existing courts in established areas will be needed to meet growth-related pressures. Whereas the Rosalea Park tennis courts are available only to Brampton Tennis Club members, the Centennial Park courts are available free of charge to anyone wishing to use them.

The Centennial Park courts have the potential to be used to a greater extent with growth-related pressures, as well as if the City were to overlay pickleball lines on the courts in light of a high concentration of seniors that reside in the area. However, it bears noting that the Centennial Park tennis courts have an overlapping service area with courts located at Steacy Park to the south and thus the potential exists to reclaim the tennis court lands particularly since the adjacent soccer fields are proposed as candidates for repurposing and creates an opportunity to reimagine the park as a whole. Should this occur, the tennis courts should be replaced elsewhere so that the City retains its overall service level ratio.

Action:

- Engage the Brampton Tennis Club to determine their interest in relocating operations to an alternative site with new courts and clubhouse facilities.
- Two separate and distinctive options are identified for the Centennial Park tennis courts: 1) overlay pickleball lines on the tennis courts if retaining them, in recognition of the high concentration of older adults and seniors' residences in the area; or 2) repurpose the tennis courts along with the rectangular fields if a re-imagination of the entire park is undertaken and relocate the courts elsewhere in the City.

3.4 Basketball/Multi-Use Court

PRMP Recommendations #61 and #62 direct new basketball/multi-use courts to newly developing residential areas within a 10 to 15 minute walk as well as a new court within RPA F situated south of Williams Parkway and/or in proximity to the Queen Street corridor.

Riverwalk-Specific Implications

With no basketball courts located within a 10 to 15 walking distance (approximately 800 metres) of the Riverwalk, there is merit in exploring the provision of a basketball court within the Study Area. Centennial Park is a candidate site assuming that the UDMP rationalizes that it continues to meet an active recreational need, with a noted caveat that there is a potential for noise-related conflicts if situated too close to residences that back onto the park from Centre Street (these residences are already accustomed to a degree of noise from the existing tennis courts). Central Public School Park, Rosalea Park or a new park site are alternatives for a basketball court depending upon the UDMP vision for each.

Action:

- Integrate a basketball court within a new or existing park located in the Riverwalk, potentially designed in a multi-use manner to also allow other court sports such as ball hockey.

3.5 Water Play Features

The PRMP recommends that a 'major' splash pad be provided in each RPA meaning that the Riverwalk and its surrounding areas would be served if the City implements PRMP Recommendation #28 and constructs a major splash pad at Gage Park.

Riverwalk-Specific Implications

Although the traditional splash pad template found in certain City parks is not recommended in the Riverwalk, municipalities are designing public fountains and water features to also function for cooling and water play; Brampton's splash pad at Cassie Campbell Community Centre is an example of this form. In the event that public fountains or public art features are integrated in urban parks/plazas, there is opportunity to make functional use of such features for water play and further animate/activate the space.

Public water features also have the ability to be used in the winter months for outdoor skating, though it is noted that there are two quality outdoor skating venues in proximity to the Riverwalk at Gage Park and Chinguacousy Park. While the PRMP does not recommend additional ice rinks, should a multi-functional water feature be included in the Riverwalk, it would be worthwhile to at least evaluate the capital and operating costs of providing outdoor skating in relation to enhancing the multi-seasonal experience in the Riverwalk if supported through the UDMP vision.

Action:

- Water play and cooling opportunities should be considered as part of the functional design of public fountains that may ultimately be integrated within the UDMP.

3.6 Skateboard Parks

Most of the City's skateboard parks are designed for multiple wheeled action sports such as skateboarding, mountain biking, BMX, two-wheel scooters and in-line skating. The PRMP does not recommend the provision of 'major' or 'minor' skateboard parks in the vicinity of the Riverwalk given proximity to a first-class skatepark at Chinguacousy Park as well as a minor skatepark located at Fairgrounds Park which is located in RPA F.

Riverwalk-Specific Implications

The PRMP Recommendation #66 encourages smaller scale BMX and mountain biking opportunities by way of a integrating a few basic elements into park design, noting that this would not constitute a formal 'bike park' but rather amenities to hone one's skill. As the PRMP encourages such amenities to be considered for parks in established areas that are slated for renewal, this would apply to the Riverwalk.

Action:

- Integrate basic BMX and/or mountain bike amenities within a park(s) located in the Riverwalk.

3.7 Indoor Recreational Space

The PRMP does not direct specific investment to new community centre construction within established areas of Brampton. The PRMP supports looking at older community centres at the time they approach their remaining useful life to evaluate the ability to consolidate programming, and the City subsequently launched a facility renewal strategy specific to the Bramalea family of recreation centres which will result in improvements to selected facilities, work that may benefit certain residents living in the Riverwalk.

Riverwalk-Specific Implications

Residential areas within the Riverwalk are serviced by the Central Public School Recreation and Art Centre; as a former school and a building with historical significance, there are certain functional limitations that are not easily rectified without major structural alterations. There may be some architectural and functional improvements that could be explored pending the development of a vision for the school property as a whole, including ways to facilitate greater community programming, providing access to washroom facilities for those participating in activities onsite or travelling along the Etobicoke Creek Trail, or showcasing the historical significance of the area to a greater degree.

The Riverwalk is also served by a number of facilities located in Bramalea, as well as the Brampton YMCA that is co-located with Rosalea Park. The YMCA operates on a public membership model but enables access for non-member access to its facilities on a drop-in basis. With an indoor pool, fitness centre, gymnasium, indoor track and youth zone, the Brampton YMCA is able to address a number of community recreation needs.

Action:

- Explore functional and programmatic enhancements that integrate and showcase Central Public School Recreation and Art Centre within the UDMP.

4.0 Potential Considerations / Directions for the UDMP

The EOFP Report encourages the City of Brampton to build upon existing parkland and open supplies recognizing the needs associated with potentially thousands of new residents and jobs in and around the provincially designated Urban Growth Centre.

4.1 Parks & Recreation in the Riverwalk

Parkland and open space are prominent and defining features within the Riverwalk, due in part to the Etobicoke Creek and the City's historical assembly of nearby parkland to complement the expansive green corridor. The Riverwalk's parks and open space system:

- greatly contributes to the character of the community and helps to define its sense of place;
- stimulates healthy living through its walkability and providing a strong connection to nature; and
- encourages active forms of travel for recreational and utilitarian purposes, which contributes to community vibrancy by connecting people to each other as well as physical health.

UDMP findings to date reinforce PRMP findings that encourage the City to bolster park supplies and enhance the park experience in established and intensifying areas such as the Riverwalk; further illustrating this point, the PRMP advocates a greater focus to be placed on securing park parcels within or near intensification corridors which in the case of the Riverwalk, this may result in bolstering Neighbourhood Park supplies to offset RPA F's slight deficit in Community and City Park typologies.

This EOFP Report finds support for providing a balanced park experience that meets a broad range of interests whether for sport, recreation, social activity, arts and culture, and appreciation of nature. This may require the reorientation of certain parks, either as a whole or portions within them, to help achieve the vision ultimately set out through the UDMP. Park and open space contributions to the public realm can come in a variety of forms including:

- parkland **dedications** permitted by the Planning Act and certain facilities funded by Community Benefit Charges (formerly Development Charges);
- design of **stormwater** management facilities to allow public use and/or replicate natural lands to offer visual respite from the built form;
- encouraging **privately-owned public spaces** (POPS) and working with the building and land development industry to explore the provision of indoor recreational spaces within private developments; and
- employing **enhanced urban designs** in outdoor civic spaces such as around transit stations, municipal facilities, and other institutional lands.

In addition to exploring opportunities to add new parklands and open spaces within the Riverwalk, the following pages summarize park-specific considerations that may inform the preparation of the UDMP concept as the planning process continues to progress.

4.2 Rosalea Park

Consultations and analyses, both past and present, confirm the importance of Rosalea Park along with its potential to be reconceived as a prominent park/focal point within the Riverwalk. Many factors contribute to Rosalea Park being a 'hub' of social, recreational and environmental activity namely its:

- *central location* within the Riverwalk Study Area as well as forming a part of the Queen Street and Main Street corridors, which is a designated Urban Growth Centre under the provincial Places to Grow plan making it a significant node for intensification, employment, and transit-oriented developments;
- *historical role* as a gathering place for passive gathering, recreation (YMCA) and sport (tennis);
- *direct connection* to the Etobicoke Creek Trail and broader active transportation system, including linkages to the aforementioned Urban Growth Centre; and
- *integral function* as part of the contiguous Etobicoke Creek open space system.

From a recreational perspective, perhaps the most important consideration pertains to whether the City reinvests in the tennis club or whether club operations are transferred to a new site. Whatever action is undertaken will play a substantial role in the park's future vision given that the tennis facility is presently a major focal point and functional element of the park, as well as the land area that the tennis facility occupies within the park.

Regardless of the tennis facility's future status, it will be important to reinforce the passive recreational nature of Rosalea Park given the anticipated pressure that is expected to be placed upon it as residential and employment intensification developments emerge. With the existing open space in the park already being used for special events and community gatherings, further opportunities should be explored that reinforce the park as the "festival heart" for the Riverwalk and potentially for other large city events.

Opportunities to reinforce sense of place through the application of appropriate park design and urban design principles should be explored, as well as the park providing a critical link between the Etobicoke Trail and the Queen Street/Main Street intensification corridors. In addition, the park vision should embody a 'campus' or 'hub' approach that considers the YMCA (which shares an internal laneway with the park), adjacent residential towers (include seniors' residences), and to a lesser extent the Rose Theatre which is located approximately 200 metres to the south.

4.3 Duggan Park / Ken Whillans Drive Park

Located along the northern perimeter of the study area, Duggan Park (east of Etobicoke Creek) and Ken Whillans Drive Park (west of the creek) could be considered as a 'gateway node' to the Riverwalk based upon the defined boundary for the UDMP (though it bears noting that this does not imply the parks are a terminus since the Etobicoke Creek Trail extends into the City much further north).

Any opportunities to reconceive Ken Whillans Drive Park would be in keeping with its function as a 'Linear Connector', being a parcel of land whose primary function is to form part of the Etobicoke Creek Trail that connects Vodden Street to Church Street by following Ken Whillans Drive. There is a heritage element to these lands – associated with the Dale Estate – thereby providing additional opportunities for historical interpretation through signage and/or public art along the trailway.

Opportunities to reconceive Duggan Park are more challenging given the strong need for, and reliance upon the major ball diamonds by organized sport. Further, demands for the off-leash area are expected to increase as pet-owners living in higher-density dwellings cannot expect to have backyards to exercise their dogs to the same degree as housing units found in the suburban areas (the PRMP references this trend but does not make recommendations specifically for leash-free areas). Unless the City is able to secure a large parcel of parkland elsewhere that can accommodate three or more lit ball diamonds, it is envisioned that the community will continue to rely on Duggan Park for sport and active recreation.

4.4 Centennial Park

Centennial Park anchors the southern 'gateway node' for the UDMP study area through which the Etobicoke Creek Trail continues across Clarence Street. There is strong support to relocate the existing rectangular fields to suburban parks, thereby opening up the potential to redevelop that space for alternative uses.

The EOFP Report finds rationale that would support a substantial re-imagination of Centennial Park, primarily associated with the repurposing of the rectangular fields and tennis courts located on the east side of Etobicoke Creek (provided that those facilities would be relocated to other areas of Brampton). It would be more challenging to rationalize a redevelopment of the parklands located west of the Creek given the presence of the Royal Canadian Legion, the Brampton Men's Horseshoe Club, the John Arthur Carroll Memorial Arboretum and their associated parking requirements. User groups and residents would optimally be engaged to articulate community needs as part of any re-visioning for the park.

4.5 Central Public School Park / Recreation & Art Centre

Central Public School Park and the Central Public School Recreation and Art Centre present an interesting opportunity to better interact with the rest of the Riverwalk by way of its history that dates back to the late 1800s, the architecture of the former school and the community programming that occurs inside it, and its expansive open space that is bordered on two sides by mature tree rows that create a direct visual line from Ken Whillans Drive.

The PRMP and limited usage potential of the backstops support relocation of sports field programming that presently occurs within the open space. Doing so creates an opportunity to activate the site for a different use(s) such as passive recreation, arts and culture, and/or neighbourhood/community events. In doing so, there is a potential to frame the park with its urbanized edge and enhance the pedestrian experience from Ken Whillans Drive.

4.6 McLoughlin Parkette, Earnie Mitchell P and Scott Street Parkette

The EOFP Report does not rationalize any recreational facilities that could be accommodated within the McLoughlin Parkette, Earnie Mitchell Park or Scott Street Parkette.

4.7 Etobicoke Creek Trail

The Etobicoke Creek Trail is a major north-south corridor that transcends a considerable portion of the city. Within the Riverwalk, it is generally well-signed for routing with the exception of a stretch between Rosalea Park and Centennial Park through which it would be beneficial for the UDMP to consider ways to strengthen the connection through physical links and/or better wayfinding.

Within the Riverwalk, the trail is surfaced with asphalt and contains a number of linkages to adjacent land uses, sideways and roadways by way of pathway connections and bridges that cross the creek. The trail surface is non-marked and appears to be approximately 2.0 to 2.5 metres wide in most sections. To facilitate the safe and efficient travel of different types of trail users (e.g. walkers, joggers, cyclists, etc.), the UDMP should explore opportunities to delineate two-way travel through markings as well as potentially whether there is a need to widen the trail itself.

5.0 Conclusion

The Existing Open Space, Facilities and Programs Report is intended to inform further development of the vision and conceptual planning in support of the Brampton Riverwalk UDMP. This Report has been prepared to ensure alignment with the City of Brampton Parks and Recreation Master Plan, and assesses the needs for parks and recreational open space within the Study Area. Considerations have been advanced where there are potential opportunities to re-imagine public parks and open spaces, as well as where existing infrastructure or programmatic elements of parks may be better left in their form.

Appendix 3:
Case Studies

Case Studies

Brampton Riverwalk
Urban Design and Open
Space Master Plan

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Table of Contents

1.1 Introduction

Case Studies Criteria

Case studies were selected to demonstrate projects that address a number of complex issues including:

- Watercourses with a wet-dry cycle, typical low flow condition and periodic riverine flooding;
- Urban conditions with complex land use and ownership contexts;
- Improvements related to flood mitigation and economic development.

The projects selected are related to Brampton's Riverwalk, and associated Downtown Brampton Flood Protection EA either through a similar physical hydrology of the watercourse, similar process.

Parameters for Comparison

Where available, the following parameters are included for each case study for comparison:

Project Overview
- Project Description
- Project Type
- Cost
- Date Completed

Hydrology
- Watercourse
- Total Length of Watercourse
- Length of Project Reach:
- Total area of Watershed Basin
- Base Flow
- Peak Flow 100-year Storm
- Peak Flow Regional Storm
- Population in watershed

Observations / Conclusions / Benefits
- Land Use
- Socio-Economic Benefits
- Ecological Benefits
- Maintenance Requirements
- Process / Regulatory Framework

Relevance to Brampton Riverwalk

1.2 Lower Don / West Don Lands, Don River, Toronto, ON

Project Overview

Project Description: A great many streams have been truncated, buried, dammed, rerouted, straightened, and lined with wood, steel, rock, or concrete in the process of building the city and suburbs. Ponds and marshes have also been filled; the widespread removal of vegetation and the disturbance and compaction of soils have also occurred. These actions have severely altered the character, habitats, and hydrogeological functioning of the natural watershed, resulting in significant loss of development land that falls within the regulatory flood plain and the Lower Don Special Policy Area.

The Flood Protection Landform – Corktown Common:
Corktown Common is a 7.3 hectare (18 acre) park located at the foot of Lower River Street and Bayview Avenue. Situated on former industrial lands, the park has transformed an underutilized brownfield into a spectacular park and community meeting place featuring a lush landscape.

Corktown Common is a critical part of a series of local measures designed to control flooding within the regulatory floodplain on the Don River north of Lake Ontario. It is situated on top of a concurrently-built large-scale flood protection landform that protects against a 500-year flood, creating safe conditions for the development of the park and the surrounding residential and commercial neighborhood.

Fig. 1 Lower Don Trail Master Plan

With a marsh, sprawling lawns, urban prairies, playground areas, a splash pad and a variety of inviting features like a fireplace, permanent barbecue, large communal picnic tables and washrooms, this spectacular new green space is already the heart of an emerging new community.

Project Type: Economic Development / Flood Reduction / Creation of Park Amenity

Cost: $1.25 Billion

Date Completed: The study for this project began in May of 2003 and received Class EA approval October 6, 2005. Construction began in May 2006, with the Don River Bridge extension and Bala Underpass completed in 2007 and the flood protection landform finished in 2012.

Hydrology

Watercourse: Don River

Total Length of Watercourse: approx. 38 km

Length of Project Reach: approx. 2km

Total Area of Watershed Basin: approx. 236,000 hectares

Baseflow: approx. 4 m^3/sec

Peak Flow 100-year Storm: 402.8 m^3/sec (2018)

Peak Flow Regional Storm : 1504.5 m^3/sec (2018)

Population in Watershed: Approx. 1.4 Million

Observations / Impacts / Benefits

Land Use

The West Don Lands occupy a 32 hectare area between the Don River and Parliament Street to the west, and from the CN Rail line to Queen Street to the north. The West Don Lands precinct plan indicates a mixed residential and commercial land use, with provision for affordable housing and recreational opportunities.

The East Bayfront precinct plan is a 36 hectare waterfront area that extends south of the CN Rail line between Jarvis and Cherry Street. It is expected to become a community with 6-8,000 units of housing, including affordable housing and related commercial spaces.

Fig. 2 Corktown Common, Dry Side of Flood Protection Landform, MVVA

Socio-economic Benefit

Approximately 400,000 cubic metres (about 40,000 dump truck loads) of clean soil taken from construction sites within the Greater Toronto Area was used in the construction of this massive landform, which provides the necessary flood protection for the new West Don Lands community, permitting the removal of the flood-plain designation and allowing the land to be rezoned for residential development.

The completion of the project removed more than 200 hectares of prime downtown lands, including the Financial District, from the Don River's flood plain. It is estimated that the flood protection landform removes the risk of more than of $160 million in flood damages in the event of a major storm.

Ecological Benefit

Corktown Common was the city's first park to be maintained using organic means, and it continues to be a model for the development and expansion this for other City of Toronto parks.

Among the many new habitats created within the park, plant communities were created to provide habitat for 13 endangered bird species, including the Bald Eagle, the Red-shouldered Hawk, the Golden Eagle, the Peregrine Falcon, the Yellow and King Rail, the Barn Swallow and the Canada Warbler.

The site Retains 100% of annual rainfall on site, equivalent to 1.15 million gallons per year. An extensive subsoil drainage system is located beneath the decomposed granite layer throughout the site to collect infiltrated stormwater and irrigation water, conveying the subsurface water to the constructed marsh.

Maintenance Requirements

n/a

Process / Regulatory Framework

n/a

Fig. 3 Cross Section of Park over FPL at Corktown Common, MVVA

Sources:
https://trca.ca/app/uploads/2016/07/don-hydrology-report3.pdf

https://www.landscapeperformance.org/case-study-briefs/corktown-common

https://waterfrontoronto.ca/nbe/portal/waterfront/Home/waterfronthome/projects/corktown+common

https://www.canadianarchitect.com/parks-and-regeneration/

https://www.blogto.com/city/2013/08/corktown_common_sets_the_standard_for_toronto_parks/

Relevance to Brampton Riverwalk

Although the Don River has higher base flows than the Etobicoke Creek, the issues surrounding both urban watercourses are similar.

- Both watercourses are highly constrained, urbanized and subject to flooding which has resulted in SPA designations being placed on valuable land in the cities' downtown core;
- Similar to Brampton's DBFP EA, The flood protection measures undertaken in the Lower Don Precinct are intended to remove the SPA designation from hundreds of acres and unlock their development potential;
- The design addresses flood conveyance requirements while creating a memorable series of active and passive recreational spaces;
- The site includes a mix of channelized watercourse,. floodplain and open space;
- The project redefines the site's relationship to water.

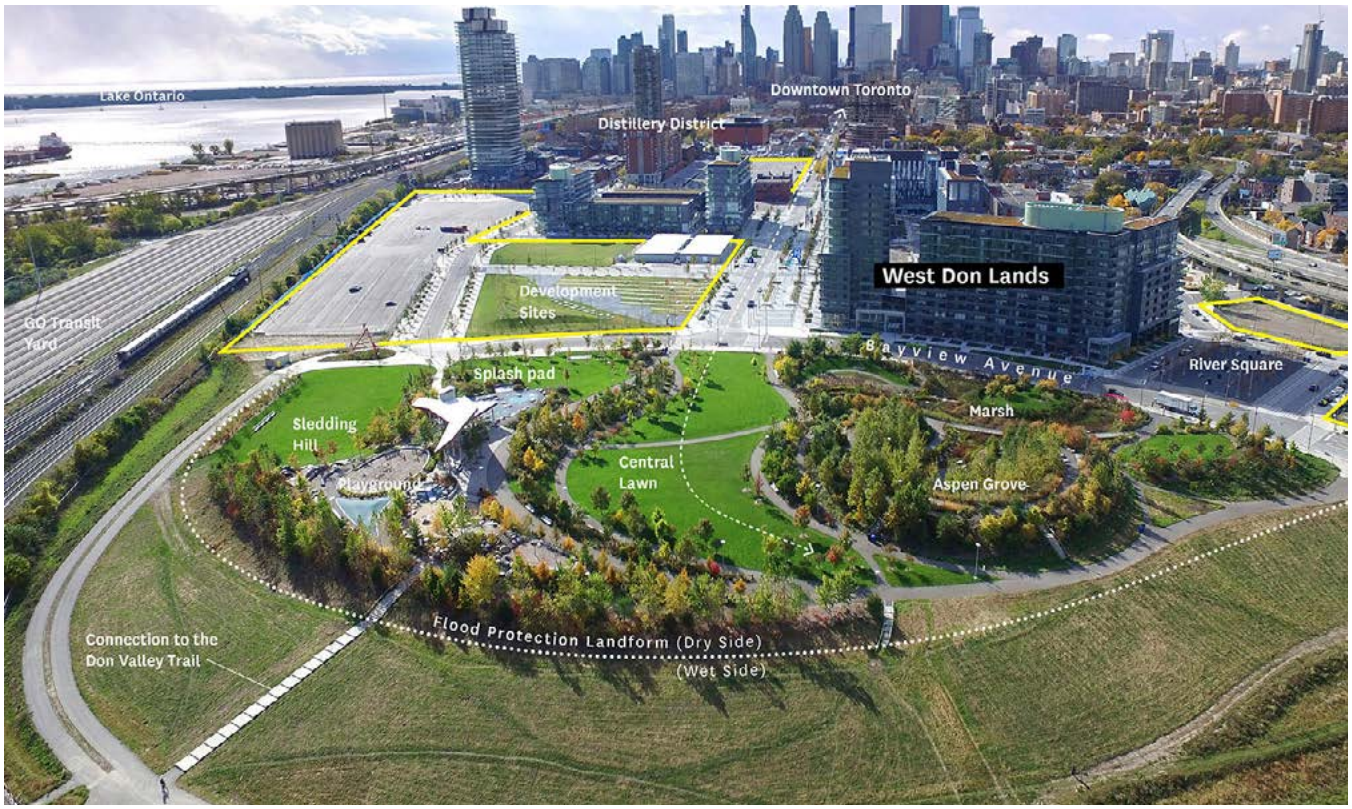

Fig. 4 Corktown Common Diagram of Flood Protection Measures. Photo credit: American Society of Landscape Architects

1.3 Edgeley Pond and Park, Vaughan, ON

Project Description:

In the 1980's, the stormwater control infrastructure was constructed by the TRCA in the Edgeley Pond + Park site to provide online flood control for almost 767 ha of developing lands upstream that drain into the Black Creek. As land was converted from open space / agriculture uses to residential / employment uses, this resulted in increased water levels in ditches, sewers, streams and creeks. On August 19, 2005, the City of Vaughan and other surrounding municipalities experienced a rainstorm event that was equivalent to a 100-year storm event or worse that resulted in severe flooding and damage on private and public properties and highlighted the need for increased stormwater management functionality.

Edgeley Pond + Park is the largest piece of City owned of land in Vaughan's new downtown, the Vaughan Metropolitan Centre (VMC). Located at the corner of Highway 7 and Jane Street, this pond and park will become the heart of the community, creating an integrated collection of spaces that merges social amenity programming with the functional operations of a large stormwater infrastructure system and sustainable ecosystem.

In its current condition, the site is undersized as a stormwater facility. The new park will be key to providing 7.5 hectares of green space and stormwater management that will ecologically connect to the larger Black Creek system, the network of pedestrian and bicycle routes currently underway and planned for the VMC, as well as unlocking development potential through Edgeley Pond and Park is the largest open space, City-owned piece of land in the Vaughan Metropolitan Centre (VMC) and is located at the northeast corner of Highway 7 and Jane Street. As the VMC's first residential neighbourhood, Edgeley Pond and Park will become the heart of the community and a signature amenity for the new downtown.

The vision is to build a sustainable open space at the centre of the VMC that will function as a hybrid of vital stormwater management infrastructure and create an innovative public space design.

In order to unlock future development potential, retrofitting of the pond is required which will also provide water quality and flood control, and optimize ecological function.

Project Type: Economic Development / Flood Reduction / Creation of Park Amenity

Cost: estimated cost $22Million

Date Completed: In progress

Fig. 5 Edgeley Pond and Park Master Plan

Hydrology

Watercourse: Black Creek is a tributary to the Humber River

Length of Watercourse: approx. 36km

Length of Project Reach: approx. 1km

Watershed Basin: 6,800 hectares. The Black Creek is the smallest of sub-watershed in the Humber River watershed (91,100 hectares) and is classified the second most developed subwatershed with the urban land use reaching over 70%.

Baseflow: 6.0 m^3/sec (2018)

Peak Flow 100-year Storm: 31.4 m^3/sec (2018)

Peak Flow Regional Storm : 89.77 m^3/sec (2018)

Population in Watershed: Approx. 856,200 (Humber River Watershed). Over the next seven-years, it is expected that over 8,000 new residents will move into developments adjacent to or overlooking Edgeley Park. An additional 17,000 residents will call the larger VMC home over the next fifteen-years.

Observations / Impacts / Benefits

Land Use

The Black Creek subwatershed is almost entirely developed for residential, commercial and industrial uses.

Socio-Economic Benefit

Centrally located in the heart of the VMC, the progress of the pond + park will instigate further development in the area and will become a signature amenity for the new downtown. With a series of future active frontages, the park will have no 'back-side' or negative edges.

To support the VMC's rapid growth, Edgeley Pond + Park represents the striking balance between the evolving urban fabric and public open space by acting as a green reprieve.

Key to the success of Edgeley Pond + Park is creating a space for people. Although the land serves a significant functional stormwater purpose, the park needs to be activated and enjoyed by people of all ages and abilities.

The park will set a precedent of how to seamlessly design and incorporate stormwater and related maintenance functions with park programing. Edgeley Pond + Park promises to be a dynamic space, both due to the influence and prominence of stormwater and supporting the exciting evolution of the VMC.

Park programming will carefully consider the larger precinct open space planning and will complement the unique setting and functional requirements. The pond + park will offer a diverse environment for residents and visitors alike.

Fig. 6 Edgeley Pond and Park Existing Control Structure

Ecological Benefit

According to the TRCA, Black Creek is considered to have the worst water quality rating and forest condition/ coverage percentage due to urbanization. Base soil conditions with low infiltrations rates compounded with the increasing the amount of impervious space has contributed to flashy inundation rates during storm events.

An important design goal of the SWM facility in Edgeley Pond + Park is to design for an off-line system to meet current TRCA guidelines. This will involve isolating Black Creek in normal flow conditions and designing the SWM facilities to treat the SWM quality and quantity independently to better the health of the system. The Edgeley Pond + Park design will be a truly remarkable space that people of all ages and abilities can enjoy year-round, one that integrates functional and aesthetic qualities and creates a sustainable ecosystem that is resilient to climate change.

Maintenance Requirements

n/a

Process / Regulatory Framework

As plans for the Vaughan Metropolitan Center (VMC) progressed, it triggered a need to fully understand the stormwater conditions, flooding risks and quantity / quality improvement opportunities for the area. The Black Creek Optimization Study, the Black Creek Renewal Class EA, and the VMC Master Serving ESA aimed to provide that understanding. These studies identified several large-scale improvements that were needed to realize the future of the VMC.

To help provide clarity on required and available resources for these improvements, the City commissioned the Black Creek Financial Strategy, which included a proposed plan for the pond and park site by in February 2015.

Through extensive consultation with affected landowners and other stakeholders, the financial strategy established estimate for the proposed work and the associated funding mechanisms and was approved by Council in 2016. With need and funding established, the Edgeley Pond and Park project was commissioned.

The Edgeley Pond + Park project itself specifically brings forward recommendations and principles of the VMC Secondary Plan and the VMC Municipal Servicing Class EA Master Plan. Through the seamless integration of the park vision and the qualitative and quantities analysis of the stormwater system, the future of the Edgeley Pond + Park aims to meet the needs of the region, city, neighborhood and site collectively.

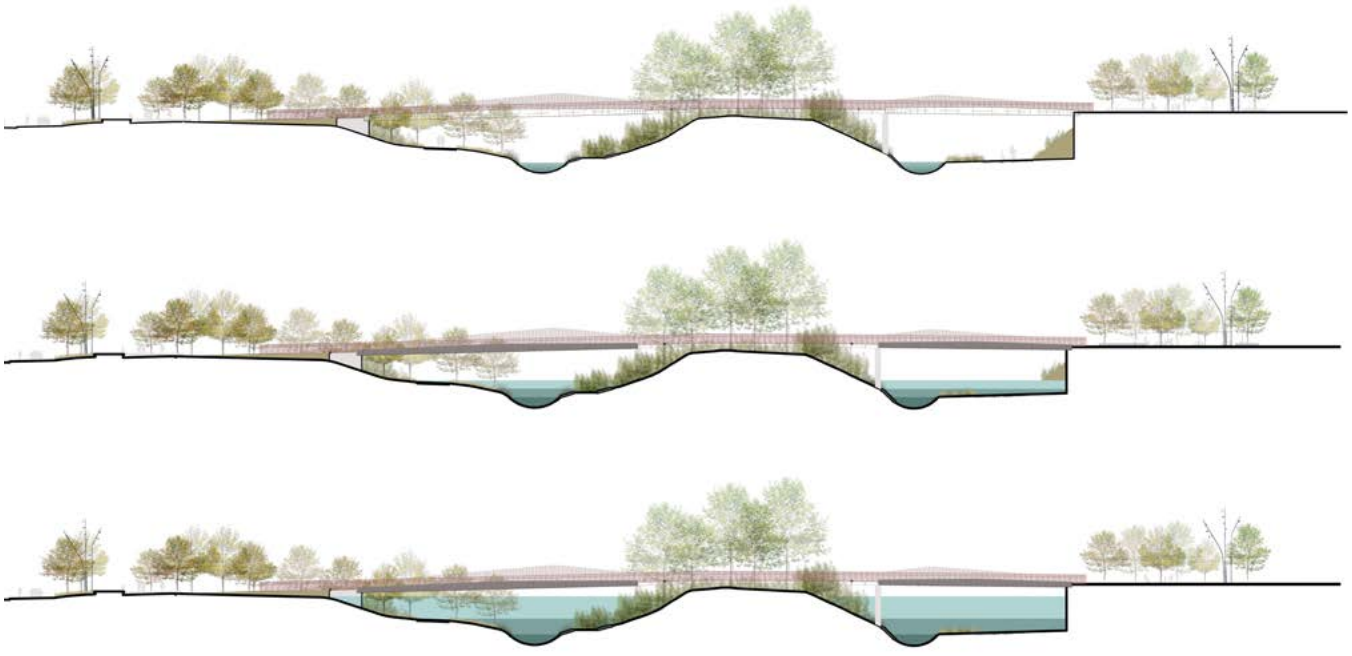

Fig. 7 Edgeley Pond and Park Schematic Sections

Sources:

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Relevance to Brampton Riverwalk

Although Edgeley Park has yet to be constructed, many of the principles that have guided the design are very similar to those shaping the vision for the Riverwalk:

- Black Creek is subject to annual seasonal flooding and the design for the pond and park is intended to mitigate impacts on surrounding neighbourhoods and businesses;
- The design is an integrated approach to flood protection that balances the requirements and constraints arising out of the technical requirements for stormwater managements with the opportunities for the creation of public amenities and new habitat;
- Greater connectivity within the site and to surrounding neighbourhoods;
- The project seeks to redefine stormwater management in an urban context, at the heart of the VMC.

Fig. 8 Edgeley Pond and Park Schematic View of Black Creek

1.4 Sawmill River, Yonkers, NY

Project Overview

Project Description: For more than a decade the Saw Mill River Coalition and its parent organization, Groundwork Hudson Valley, have led the effort to bring the Saw Mill River to daylight. Part of the revitalization of downtown Yonkers, this project has enormous ecological, economic and cultural significance. On November 15, 2011, after many years of organizing, waters began to flow aboveground in downtown Yonkers for the first time in 90 years – a major achievement for both the Coalition and the City.

In the 1920s, engineers undertook a project to bury the Saw Mill River in downtown Yonkers in order to manage sanitation and floods. The final phase at Larkin Plaza was completed in 1922.

After flowing through the newly-constructed flume, the river emptied into the Hudson River at a point immediately north of the Yonkers Pier.

Because of severe flooding, the natural stream channel in many reaches of the Saw Mill River has been intensively altered — relocated and channelized — over the years. Four engineering projects since 1981 have been completed (Chappaqua, Ardsley, two in Yonkers) over 25 percent of the stream with another in the planning stages (Elmsford/ Greenburgh). These flood control projects have contributed to the degradation of the Saw Mill River Basin's ecosystem. The methods used, installing concrete or plastic lining in the riverbed, does not allow for turtles to nest or aquatic life to burrow into sediment.

The underground river channel was left in place for "overflow" in heavy rainstorms—which otherwise would have flooded the park. A chamber was built around the underground river channel to divert part of the river flow into the new river path. Because the presence of historical contaminants meant the site was the a brownfield, the new path was lined with heavy vinyl.

Project Type: Economic Development / Flood Reduction / Creation of Park Amenity

Cost: $19 Million US

Date Completed: December 2011

Fig. 9 Daylighting The Saw Mill River. Photo: Mathews Nielsen Landscape Architects.

Hydrology

Watercourse: Sawmill Creek is a Tributary to the Hudson River, NY

Length of Watercourse: Approx. 20 miles (approx. 32 km)

Length of Project Reach: 1,100 feet (approx. 0.3km)

Watershed Basin: Approx. 26.5 square miles (approx. 6,863 hectares)

Baseflow: 30 cubic feet/sec (0.85 m^3/s)

Peak Flow 100-year Storm: 1,540 cubic feet/sec (43.6 m^3/sec)

Peak Flow Largest Flood of Record (US): 1,970 cubic feet/sec (55.8 m^3/sec) (Hurricane Irene, 2011)

Population in Watershed: Approx. 110,000

Observations / Impacts / Benefits

Land Use

Industrial, commercial, residential, parkland. The condition of the Saw Mill River reflects the surrounding land uses as it flows from suburban to urban areas, resulting in a general decline in environmental quality from north to south.

Socio-Economic Benefit

Efforts to get people involved in the daylighting of the Saw Mill River have taken many forms over the years. Early on, tours of the river's underground tunnels and culverts for public officials and other interested parties helped win a $3.1 billion commitment from a local realty group, Struever-Fidelco-Capelli, to build housing, offices, and commercial space along the river's path.

The City has already credited the new park with triggering redevelopment, including a $7 million renovation of a tech firm with 180 jobs, a $43 million historic redo of five to seven buildings, and an apartment tower and mixed-used complex to replace abandoned buildings along one side of the pa**rk.**

The park attracts human beings with the sound of water and its beauty. The park hosts tours, art shows, events, music, public art, and a seasonal farmer's market run by Groundwork Hudson Valley. The American Eel Outdoor Classroom, complete with a mosaic showing the eel's journey from the Sargasso Sea to the river, is used by local educators.

Fig. 10 The Saw Mill River. Photo: Zach Youngerman.

Ecological Benefit

With the aboveground riverbed we have recreated 14,000 square feet of aquatic habitat were created, including a tidal pool and two freshwater pools that support many species (turtle, ducks, blue crab, black-nosed dace, the endangered American eel, and more). The new natural river flows parallel to the preexisting underground flume, which now serves as an overflow channel to protect the integrity of the new park and the downtown area from floods. Native plant species planted as riparian habitat attract beneficial insects to encourage food chains.

Maintenance Requirements

n/a

Process / Regulatory Framework

The project took more than a decade of political lobbying, collaborative initiatives, and local, state and federally-funded environmental cleanup campaigns.

Many circumstances converged to make"daylighting," or uncovering the previously buried sections, of the Saw Mill River a reality. The US Army Corps identified "daylighting the covered reach in Larkin Plaza" as a valid restoration project (1992). EPA and the National Park Service launched Groundwork Yonkers, with City buy-in, to focus on environmental projects (1999). "Daylighting" was a priority project, and Groundwork enlisted Columbia University design students to create a vision (2002). Scenic Hudson provided funding for Groundwork to hold community input sessions (2004).

Critical multi-year funding from the EPA Office of Water and the NY-NJ Harbor Estuary Program sustained the community process, a habitat plan, and on-the-ground work with the City's Downtown and Waterfront Development Office and the engineering design and construction team. While Groundwork began the partnering work, the effort grew to involve local businesses, numerous community partners, and state and federal funding agencies. These have evolved into long-lasting working relationships.

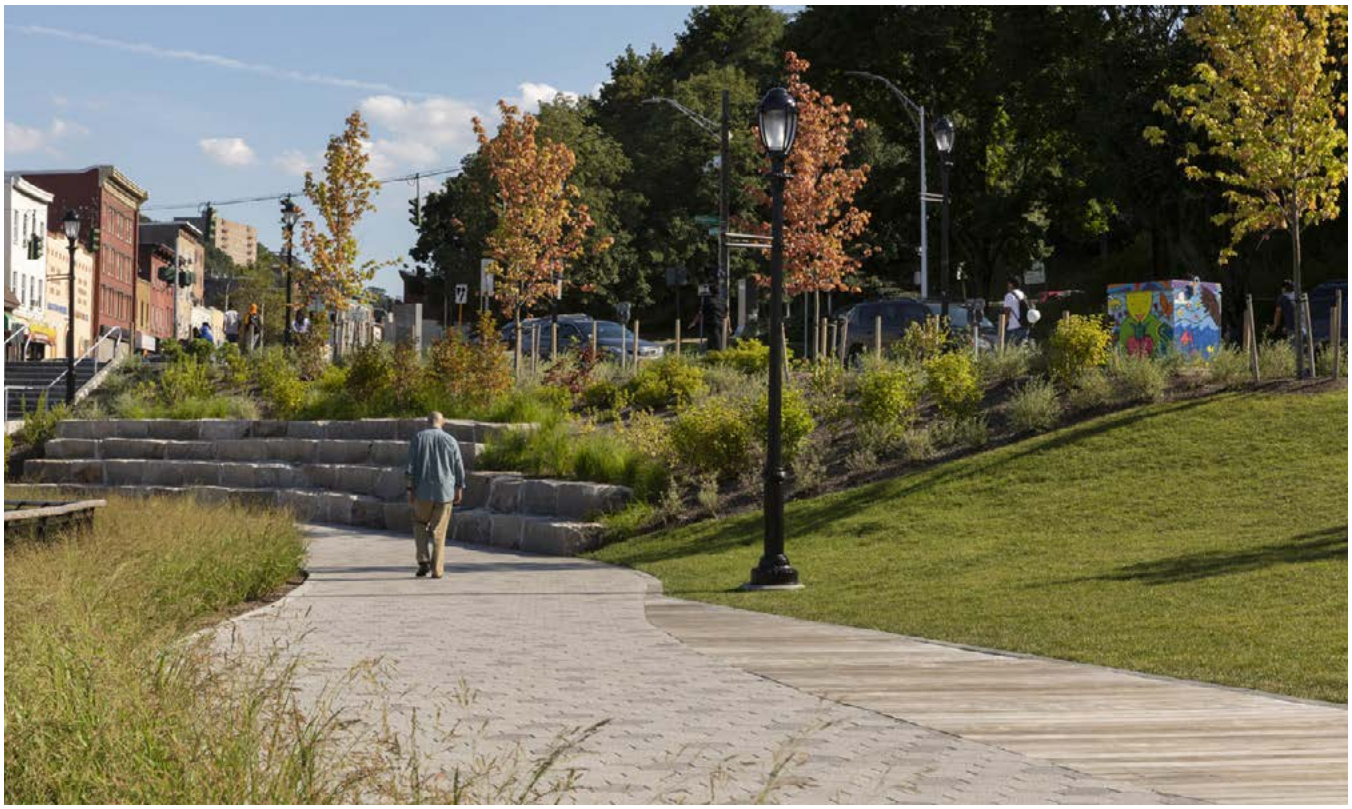

Fig. 11 Daylighting The Saw Mill River Phase 3. Photo: Mathews Nielsen Landscape Architects.

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Relevance to the Brampton Riverwalk

The Saw Mill Creek Daylighting project is not specifically a flood protection project, but it does bear some significant relevance to Brampton's Riverwalk in that it succeeds in turning a highly engineered, hard canal into an important public amenity in an urban centre.

- This project is of particular relevance for the central, channelized portions of the creek, illustrating how a constrained channel in a can still offer great public space even with a watercourse with a naturally low baseflow condition:
- The project improved the water quality and habitat conditions of the stream;
- The design for the Saw Mill River created a new relationship between the City and it's watercourse, where there previously was none.

Fig. 12 Daylighting The Saw Mill River Phase 3. Photo: Mathews Nielsen Landscape Architects.

1.5 Chattanooga Renaissance Park, Chattanooga, TN

Project Overview

Project Description: The 23.5-acre Renaissance Park on Chattanooga's North Shore occupies a former industrial site. An intermittent stream draining over 175 acres of urban watershed cuts through the site and was contributing to significant non-source point pollution of the Tennessee River.

The design for the park included a strategy to remove buried waste and treat it on site rather than be exported to landfills. A created wetland system now collects and cleans runoff before release into the Tennessee and is the centerpiece of the park that now serves as an amenity for adjacent new residential and mixed use developments.

The constructed wetland serves as both a beautiful viewing and relaxation point and as a fully functioning urban-runoff cleaning system.

Throughout the park, there are various opportunities not only to get in touch with the natural scenery, but also with the past of both Chattanooga and the former manufacturing and enamelling facility. Informative signs mark the city's cultural history and illustrate the stormwater treatment process.

A terraced amphitheater rises from the wetland bank, and some of the slopes next to the amphitheater are planted with a naturalized flower meadow; other places where the lawn is mowed invite visitors to have a picnic or to rest for a while and enjoy the forest scenery on the other side of the floodplain storage.

Project Type: Ecological restoration / Economic Development / Flood Reduction / Creation of Park Amenity

Cost: $8 Million US

Date Completed: 2006

Fig. 13 Renaissance Park Lookout. Photo: Hargreaves Associates.

Hydrology

Watercourse: Intermittent stream draining to the Tennessee River

Length of Watercourse: 1 acre constructed wetland with intermittent stream approx. 1300 feet in length (approx. 400m)

Length of Project Reach: n/a

Watershed Basin: approx**.** 175 acres (approx. 70 hectares)

Base flow: n/a

Peak Flow 100-year Storm: n/a.

Peak Flow Largest Flood of Record (US): n/a

Population in watershed: approx. 3500

Observations / Impacts / Benefits

Land Use

Reclaimed industrial land surrounded by new residential and mixed use developments.

Socio-Economic Benefits

Renaissance Park has been a catalyst for reinvestment in Chattanooga's growing Northshore neighborhood and has stimulated economic development and neighborhood reinvestment. Since 2005, $55 million has been invested in two redevelopment projects adjacent to Renaissance Park. Five additional properties within 1/4 mile of the park were redeveloped between 2005 and 2013.

The project has contributed to an increase in property values. The aggregate land value within 1/4 mile of Renaissance Park increased by 821% between 2005 and 2013, compared to a 319% increase for the other properties in the Northshore neighborhood.

The park has reduced actual per acre maintenance labor cost by $4,500 or 73% per year compared to an adjacent park with large expanses of lawn and ornamental plantings

Fig. 14 Renaissance Park Wetland Gabions. Photo: Hargreaves Associates.

Ecological Benefits

The park's design promotes the return of native plants and animals, enhances river ecosystems, and provides a balance between urban renewal and the conservation of natural resources. Through the construction of the project removed 34,000 cu yd of contaminated soil from the 100-year floodplain and sealed it safely within the park's iconic landforms. This includes 12,000 cu yd of soil commingled with enamel frit, which was leaching contaminants into groundwater.

The park increased floodplain storage by 9.32 acre feet (15,047 cu yd) through excavation of contaminated soil and creation of a constructed wetland and reduced irrigation water demand by 74% or 1.6 million gallons per year compared to a baseline case with 79% turf.

The project improved habitat value of the North Market Branch stream from "marginal" to "suboptimal". USEPA Rapid Bioassessment habitat scores rose from 60 in 2002 to 122 in 2014.

An area that was full of contaminated material is now cleaning water through a self-regulating gate, the runoff flows into the wetland, where it is slowed by rock-filled, steel mesh basket gabions. Those gabions also direct the flow of water, causing it to meander through the wetland plant cells that are planted behind every gabion.

Maintenance Requirements

The decrease in hard surfaces and large areas of naturalized plantings reduced actual per acre maintenance labor cost by $4,500 or 73% per year compared to an adjacent park with large expanses of lawn and ornamental plantings.

Process / Regulatory Framework

n/a

Fig. 15 Renaissance Park Aerial View. Photo: Hargreaves Associates.

Sources:
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https://www.landscapeperformance.org/case-study-briefs/renaissance-park

https://land8.com/how-this-toxic-industry-site-turned-into-an-environment-protecting-wonder/

https://www.chattanoogafun.com/listing/renaissance-park/1133/

Relevance to the Brampton Riverwalk

Although the watercourse flowing through Renaissance Park is not subject to flooding in the same way the Etobicoke Creek would be, this project has relevance to the Riverwalk in that it creates a stormwater management facility that is fully integrated into the public landscape.

- Even where physical access to the water is not possible, the project takes advantage of the grade changes to create striking views to the water below;
- The design seeks to illustrate the stormwater management process, creating a spectacle of water flowing through the site;
- The design balances stormwater management, with improvements to habitat and water quality;
- The project transforms previously derelict land into valuable new public space.

Fig. 16 Renaissance Park Pedestrian Crossing. Photo: Hargreaves Associates.

1.6 Thornton Creek, Seattle, WA

Project Overview

Project Description: The area surrounding the confluence of the north and south branches of Thornton Creek experiences storm water-related flooding that frequently affects an arterial roadway, floodplain homes, a high school and a community centre.

Initiated by Seattle Public Utilities as a neighborhood flood control project, the effort entailed rebuilding 1,600 feet of the creek's channel. The channel was realigned and repositioned the creek back into its natural flood plain.

The overall goals of the project were to increase stream and floodplain capacity, decrease street closures, and enhance aquatic habitat.

In 2004, the City of Seattle purchased the 2.4-acre (0.97 ha) parking lot from Northgate Mall and began building the Thornton Creek Water Quality Channel. Opened in 2009, it achieved several community goals in limited space: integrating a water-quality facility, providing a diverse housing mix, and allowing public open space. It receives and treats runoff from 680 acres (280 ha) by providing a multi-layered landscape of native plants that also serves as an amenity for surrounding private development.

Project Type: Economic Development / Flood Reduction / Ecological Restoration / Creation of Park Amenity

Cost: $11 million US

Date Completed: 2009

Hydrology

Watercourse: Thornton Creek

Length of Watercourse: approx. 18 miles (approx. 29km)

Length of Project Reach: 1,600 feet (approx. 0.5km)

Watershed Basin: 7,402 acres (approx. 2995 hectares)

Baseflow: 3.6 to 3.9 cubic feet/sec (approx 127-137m^3/sec)

Peak Flow 100-year Storm: n/a

Peak Flow Largest Flood of Record (US): n/a

Population in Watershed: approx. 200,000

Fig. 17 Thornton Creek Water Quality Channel. Photo: SvR Design.

Observations / Impacts / Benefits

Land Use

The two most dominant land uses in Thornton Creek are Single family and Right-Of-Way totaling 73% of the entire watershed.

The next most dominant land uses are Retail/Service, Recreation/ Entertainment, and School Day care totaling 12%.

Socio-Economic Benefits

The project catalyzed $200 million in residential and commercial development. The redevelopment added 530 units of housing and 50,000 square feet of retail space while increasing open space within the Northgate Urban Center by about 50% and providing pedestrian links from adjacent commercial and residential neighborhoods.

Ecological Benefits

The project transformed a 6 ft wide rockery-lined channel into a meandering channel 15 to 20 ft wide with a 30 to 100 ft wide floodplain. Approximately 150 pieces of large wood and stream gravel were added to create natural and complex in-stream habitat. During wet weather, excess storm flows that crest the Base Flow Channel are spread evenly among the adjacent vegetated Wet Bioswale Terraces. This slows the flow down, enhancing sedimentation and pollutant removal.

The project was designed to remove an estimated 40-80 percent of total suspended solids from 91 percent of the average volume of annual stormwater runoff from the 680-acre drainage basin and reduced impervious surfaces by 78 percent while creating new habitat within this heavily paved commercial area.

Within one month after opening, native birds were observed at the project. A variety of desirable native volunteer plants have migrated into the site and begun to establish.

Following the radical redevelopment project that revitalized the creek and cleaned up the water by removing pollutants through stream bed filtration, adjacent neighborhoods no longer flood, water quality has improved, and, most surprisingly, Chinook salmon have returned to the creek to spawn.

Fig. 18 Thornton Creek Water quality channel. Photo: Brian Kuchar.

Maintenance Requirements

Since the Water Quality Channel is designed to settle out sediments, it requires periodic maintenance to remove accumulated sediments and associated pollutants in order to maintain its function.

A maintenance crew monitors sediment accumulation within the Facility four times per year and after significant storm events. Sediment is be removed when it reaches 50 percent of the total solids capacity of a Sediment Pool within the Water Quality Channel and/or when accumulated sediment begins to hinder base flow.

Maintenance will continue to happen adaptively, with monitoring and removal schedules and vegetation adjusted to respond to changing conditions within the Facility.

Organizations of citizens have also cleaned up nearby wetlands, educated the public about stream health and quality of neighborhood life, and rallied to bring more of the creek to daylight.

Process / Regulatory Framework

Seattle's 1994 Comprehensive Plan identified Northgate as an Urban Center - a target area for new jobs, housing and public investment. Yet, for more than a decade thereafter, political controversy and litigation stymied new development. Much of the controversy surrounded the headwaters of Thornton Creek's South Fork and its piped flows.

Creek advocates fought to exhume the 60-inch storm pipe to create a constructed creek bed, while private land owners focused on developing the Facility's future site as mixed use commercial property.

In December 2003, the City changed land use regulations, funded a transportation investment plan, and approved many other community amenities for Northgate.

The Mayor and the City Council established a Northgate Stakeholder Group whose primary mission was to forge consensus on an approach to developing a solution for the South Fork's headwaters that would meet stormwater treatment, commercial and community goals and in June 2004, the Stakeholder Group supported a preferred option and Seattle Public Utilities (SPU) acquired the Facility's 2.7 acre site in coordination with adjacent property owners via a joint venture agreement.

Fig. 19 Thornton Creek Control Structure. Photo: SvR Design.

Sources:

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Relevance to the Brampton Riverwalk

The Thornton Creek revitalization is an example of a flood protection initiative that became a central community amenity integrating ecological concerns with the primary goal of increasing the conveyance of the watercourse.

- Although the scale of flood mitigation is less than the Regulatory flood being studied as part of the DBFP EA, Thornton Creek is an excellent example of an integrated approach to flood protection;
- The use of green infrastructure similar to those used on this project should be considered for areas within the Riverwalk precinct to create a resilient system that is not wholly reliant on man-made structures;
- Improvements to water quality and in-stream habitat.

Fig. 20 Thornton Creek Riffle Structure. Photo: SvR Design.

1.7 Guadalupe River Park, San Jose, CA

Project Overview

Project Description: The Guadalupe River frequently flooded San Jose's downtown and Alviso community, with numerous severe flooding events in its history.

As it flows through downtown, the Guadalupe River is primarily a flood protection channel that sits at the heart of the urban park, giving the space both its name and its primary design element: a depressed channel. The channel is designed to provide flood protection, maintain water quality and assure safety during large rain events.

Levels of water in the river vary drastically from season to season as winter rains fill the channel and summer heat dries them up. Managed by the Santa Clara Valley Water District, the system provides three diversion channels and culverts, which are designed to safely overflow during large events such as a 100-year flood. On the northern reaches of the park, where sufficient land existed to widen the river naturally, flood protection is managed through natural river terracing, flooding meadows, detention areas, natural riparian vegetated river banks.

The Guadalupe River's natural channel directly upstream of the confluence with Los Gatos Creek has a capacity of 7,000 cubic feet per second (cfs), roughly the flow of a 10-year flood event. By modifying the channel, replacing bridges, protecting against erosion and building a bypass box culvert to handle high flows, the capacity of the channel was improved to handle 14,600 cfs upstream of the confluence with Los Gatos Creek and 17,000 cfs downstream of the confluence.

The additional capacity was designed to protect the area from a 100-year flood event. Together these projects will safeguard hundreds of homes, schools and businesses from flooding and also enhance habitat for endangered fish.

Project Type: Economic Development / Flood Reduction / Ecological Restoration / Creation of Park Amenity

Project Type: Flood Reduction / Ecological Restoration / Creation of Park Amenity

Cost: $242 million US

Date Completed: December 2004* (The Lower Guadalupe project in the Alviso area. The Upper Guadalupe project is scheduled to be constructed over the next 15 years.)

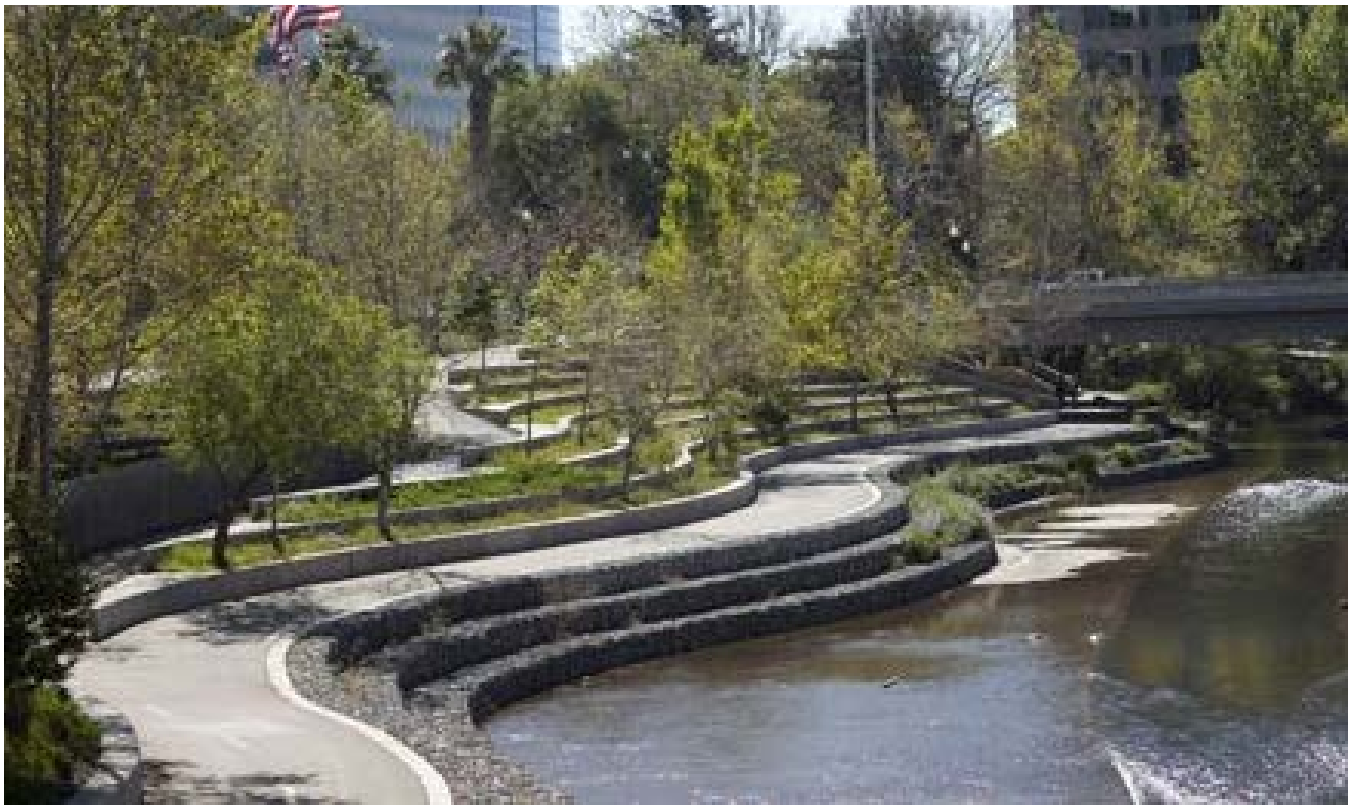

Fig. 21 Guadalupe River Park East Bank. Photo: Ray Rodriguez.

Hydrology

Watercourse: Guadalupe River

Length of Watercourse: 14 miles (23 km)

Length of Project Reach: 3 miles (approx. 4.8 km)

Watershed Basin: 171 square miles (440 km2)

Baseflow: n/a

Peak Flow 100-year Storm: 17,000 cubic feet/sec (481 m^3/sec)

Peak Flow Largest Flood of Record (US): n/a

Population in Watershed: n/a

Observations / Impacts / Benefits

Land Use

The Guadalupe River Park boasts anchor institutions such as the Children's Discovery Museum and SAP Center. San Jose's central train hub — Diridon Station — is a five-minute walk from the park. One of the motivations for this project is to allow the park to benefit from opportunities presented by the planned redevelopment of parcels near its boundaries. Much of the land adjacent to the park is planned for office mixed-use or residential mixed-use development, including a number of potential projects between Diridon Station and the park.

Socio-Economic Benefits

As a result of the project, a number of properties removed from FEMA flood designation, removing flood insurance requirement. The urban park has become an asset to community and to convention business that has saved the city $27 million in annualized flood damages.

Buoyed by widening tech company interest in downtown San Jose and plans to bring BART and high-speed rail to Diridon Station have spurred significant planning and development interest around the station and downtown. The City, businesses and community leaders are now considering a revitalization of the aging park to capitalize on the anticipated growth, leverage state and philanthropic resources and direct investment toward the social, cultural and economic well-being of the community.

Fig. 22 Guadalupe River Park. Photo: Hargreaves Associates.

Ecological Benefits

The Guadalupe River Park was designed to provide natural restoration to the river banks where possible. In pairing this goal with that of flood protection and overlaying it with the overhead transportation infrastructure, the resulting riverine landscape consists of distinct alternating zones of densely vegetated areas with highly constructed tunnel-like areas almost devoid of vegetation near the low-flow channel.

The river is home to many wildlife species, including the Chinook Salmon, Rainbow Trout, Great Blue Heron and California Beaver. The Guadalupe River Park habitat is currently best described as a system of patches of natural river restoration areas combined with man-made flood protection structures that provide limited habitat and ecological benefits.

Maintenance Requirements

The Guadalupe River Park Conservancy provides community leadership for the development and active use of the Guadalupe River Park & Gardens through education, advocacy and stewardship. The Conservancy staff provides maintenance in designated areas of the park and holds volunteer days to support these efforts.

However, after more than a decade since its construction, the river park has aged, making a number of challenges clear: maintenance is inconsistent; the region's housing affordability crisis has created a large population of homeless residents who live along the river banks; there has been conflict over the quantity and quality of water for fish and other wildlife habitat; and a lack of amenities and basic design features, such as lighting, has left the park underutilized.

Process / Regulatory Framework

The project was authorized by the federal government in 1986. In 1991, the water district and city agreed to incorporate plans for Guadalupe River Park into the flood protection project.

Construction began on the Downtown Project in 1992, and the section from Coleman Avenue to Highway 880 was completed in 1996. Between 1996 and 1999, construction was halted and the Corps of Engineers and the Santa Clara Valley Water District agreed to redesign some elements of the project in order to protect and preserve and/or restore the natural environment of the river, as well as provide flood protection.

Those issues resolved. Construction began in October 1999 from Interstate 280 to Woz Way, near the Children's Discovery Museum. The remaining construction work on the project began in Spring 2002 and was completed in December 2004.

Fig. 23 Guadalupe River Park in Downtown San Jose. Photo: David Godshall, 2011.

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Relevance to the Brampton Riverwalk

Similar to the Etobicoke Creek, the Guadalupe River has a very low baseflow condition, with significant flood events that threatened downtown San Jose. The Guadalupe river Park combines flood protection with new public waterfront space at the core of the city.

- The design integrates a stepped banks to create access to the bottom of the valley;
- The design functions well in a low flow condition, providing visual interest and public amenity during the dry seasons;
- Even through the hardened portions of the channel, the design introduces naturalization within the low flow channel and along the stepped banks to provide shading and improved water quality and habitat, while meeting conveyance requirements.

Fig. 24 Guadalupe River Park Visitors. Photo: Dvortygirl 10, 2005.

1.8 San Luis Obispo Creek Restoration, San Luis Obispo, CA

Project Overview

Project Description: San Luis Obispo Creek is an important steelhead stream in central California. Over the years, this coastal stream had been negatively impacted by urban development and pollution.

The channel was in an extremely degraded condition and erosion was actively occurring. Much of the riparian vegetation had been lost due to erosion and encroachment of urban land uses and the City of San Luis Obispo decided to extend the downtown creek trail and restore the stream.

The agreed-upon design called for widening the creek's floodplain and re-contouring the stream banks. The design also incorporated building terraced stone walls to prevent bank scouring during high winter flows. Based on a morphological survey of the channel, design included boulder structures, including multiple rock weirs and rock veins to curb future erosion, improve water quality and restore stream habitat. The plan also included lowering the north terrace and reducing the slope of some of the channel banks to improve bank stability and slow creek velocities adjacent to the banks, helping to reduce channel erosion. Native riparian vegetation was incorporated in the restoration along the channel banks.

The Creek Walk now extends along the southern edge of the city's Mission Plaza, with walkways alongside it and two pedestrian bridges across it, connecting residents and visitors to nature as well as the built environment. The Creek Walk extends about 1/3 of a mile, from Chorro to Broad Street. Large shade trees line the creek and the plaza. Large boulders invite children to play along the water's edge. Interpretive signs tell the story of the native steelhead trout, their migration and life cycle.

Project Type: Flood Reduction / Ecological Restoration / Creation of Park Amenity

Cost: The total investment was $100,000 US, with a great deal of in-kind donations of labor and materials made by local business owners.

Date Completed: 1998

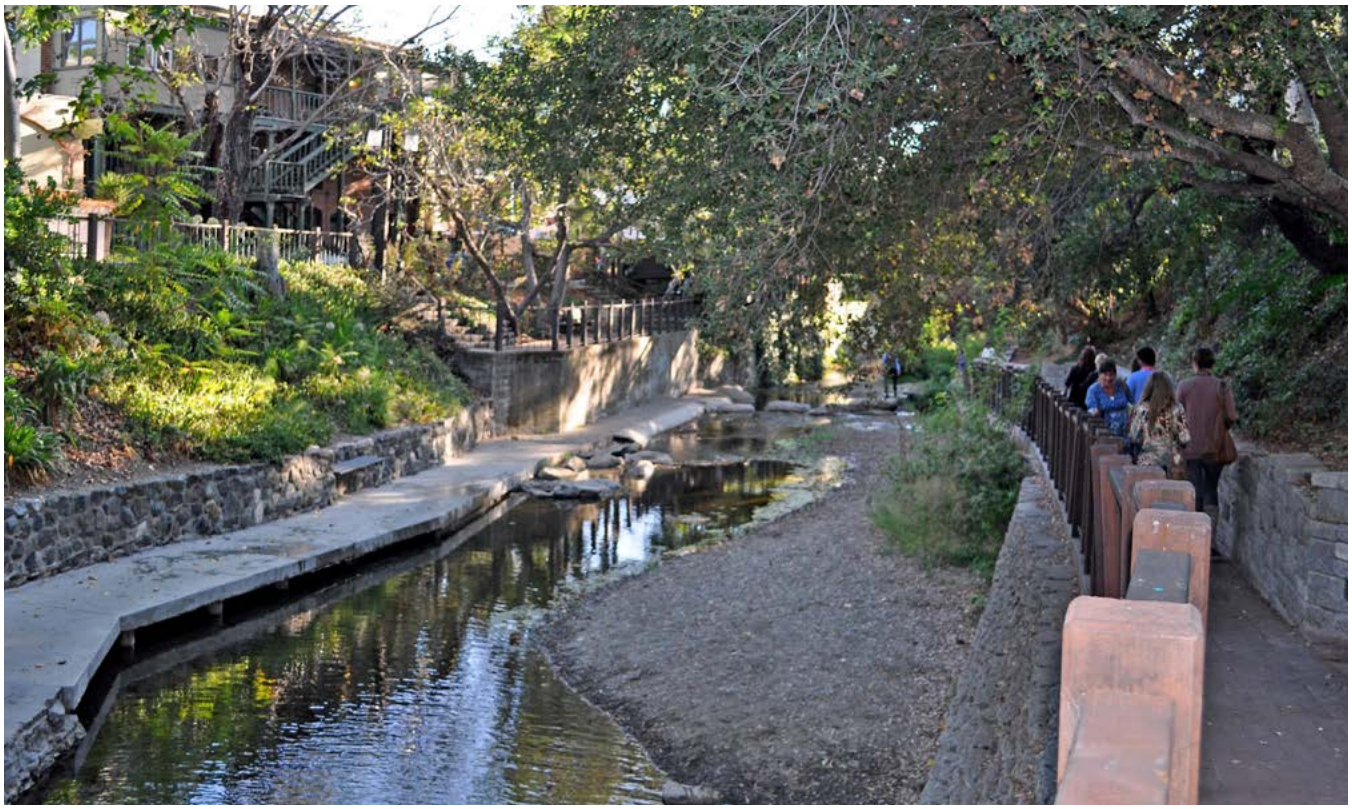

Fig. 25 San Luis Obispo Creek Walk. Photo: http://www.foodandwinesafari.com/?p=2271, 2012.

Hydrology

Watercourse: San Luis Obispo Creek

Length of Watercourse: 18 miles (29km)

Length of Project Reach: 1/3 of a mile (approx. 0.5 km)

Watershed Basin: 84.8 square miles (approx. 220 km2)

Base flow: min. 2.5 cubic feet/sec (approx. 0.07 m^3/sec)

Peak Flow 100-year Storm: n/a

Peak Flow Largest Flood of Record (US): 19,800 cubic feet/sec (approx. 560 m^3/sec)

Population in watershed: approx. 56,220 in watershed (US Census, 2010)

Observations / Impacts / Benefits

Land Use

Urbanized - 25% (15.27% urban, 2.22% commercial, industrial and public facility, 7.69% residential), Agricultural - 49%, Other - 26% (4.07% open space, 20.3% rural lands, 1.67% recreation)(SLO County LUC)

Socio-Economic Benefits

n/a

Ecological Benefits

Before the restoration project, the creek had vertical eroding banks and no protective riparian vegetation. Habitat and water quality was adversely impacted by poor channel conditions.

The restoration of the Creek involved the construction of a series of rock veins and rock weirs. Boulders, each over one ton, were used in the stream restoration. The boulder structures were designed to direct stream flows toward the center of the channel, slowing velocities, reducing the channel grade and to provide pools for habitat.

San Luis Creek is considered critical habitat for steelhead. The project was conducted during the summer to reduce impact on fish.

Fig. 26 San Luis Obispo Creek in Downtown San Luis Obispo. Photo: Wikimedia Commons, 2019.

The small residual flow was temporarily diverted through a plastic culvert pipe. The pipe was light weight, which permitted the moving of the pipe during the project construction period. A small temporary coffer dam was constructed to collect the low at the upper end of the project and direct the flow into the temporary culvert pipe.

Preserving riparian habitat was a high priority throughout all phases of the project. Slope protection fabrics combined with vegetation were used for erosion control. A drainage study was also prepared to examine the effect of modernizing the channel without heightening the existing flood problems.

Maintenance Requirements

Maintenance activities primarily involve the repair, care and upkeep of a channel at a pre-existing or approved design condition, within a designated flow conveyance capacity. Maintenance activities are geared to maintaining the channel's design condition.

Stream corridor management must consider water quality, aquatic habitat, flood management, and protection of buildings and infrastructure from channel erosion. Management actions may consist of channel sediment removal, vegetation control and riparian enhancement, repair of bank protection structures, and construction of new bank protection and flood management improvements.

Process / Regulatory Framework

City Council adopted the restoration design, as well as a flood management policy that was atypical for cities at that time. The city policy avoided creating the usual concrete-lined, trapezoidal channels that many communities were adopting for flood control. The City began developing a program designed to protect the creek while reducing the risk of flooding and the community eventually gained consensus on a design for the creek's restoration that defeated a proposal to cover the downtown creek.

Fig. 27 San Luis Obispo Creekwalk. Photo: City of San Luis Obispo

Sources:

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Stream Management and Maintenance Programfor the San Luis Obispo Creek Watershed: https://www.slocity.org/Home/ShowDocument?id=4406

San Luis Obispo, Downtown Concept Plan, Public Draft January 31, 2017

Relevance to the Brampton Riverwalk

The scale of the San Luis Obispo Creek approaches that of the Etobicoke Creek. Surrounded by a historical Mission and smaller scale residential neighbourhoods, the delicate interventions in the San Luis Obispo creek valley have created a network of pathways, ramps and steps to travel along the watercourse..

- Similar to the central portion of the Riverwalk precinct, within urbanized, in urbanized areas, buildings were erected adjacent to the creek banks leaving no space for an adequate vegetation buffer;
- The San Luis Obispo Creek Walk, similar to Riverwalk, is a continuous link through the city's downtown that connects to surrounding neighbourhoods but has a distinct identity of its own.

Fig. 28 San Luis Obispo Creek. Photo: San Luis Obispo Real Estate.

1.9 Arcadia Creek Daylighting, Kalamazoo, MI

Project Overview

Project Description: The city of Kalamazoo daylighted a five-block section of Arcadia Creek in downtown as part of a multi-year, multi-million- dollar redevelopment project completed in 1995. While the new channel could not be naturalized, this project does show that waterways can be daylighted in very dense urban centers.

Arcadia Creek has been underground for the better part of 100 years. As impervious areas increased, so did the frequency of flooding as the culvert that contained Arcadia Creek was not large enough to handle the increased runoff according to the City of Kalamazoo. City engineers examined the cost of replacing the culvert but discovered that daylighting the creek and placing it in a canal would be cheaper.

The newly opened section of the creek first passes through three blocks in an open concrete channel 20 feet wide by 12 feet deep, fitted with six weirs that pond water in the channel about 1.5 feet deep. Without the weirs, the water would ordinarily flow only a few inches deep. The designers felt that an illusion of deeper flow would prove more attractive. At the same time, they kept the weirs relatively low to retain considerable flood capacity between the weir tops and the top of the channel.

A stormwater pond completes the final two blocks of the daylighted section of Arcadia Creek. Its gentle, grassed slopes provide an area for people to relax and recreate. This landscaped area and an adjacent parking lot are also used as a festival site.

The total length of the reopened system is 1,550 feet, including the channel, several wide bridges, and the pond. Downstream of the pond, Arcadia Creek passes underground for another nine blocks before joining the Kalamazoo River.

The combined channel, stormwater pond, and double culvert provide Kalamazoo with protection from a 500-year flood.

Project Type: Economic Development / Flood Reduction

Cost: $18 Million US

Date Completed: Construction of the project took place between 1989 and 1992, and finished in 1995.

Fig. 29 Arcadia Creek Redevelopment. Photo: OCBA Landscape Architects.

Hydrology

Watercourse: Arcadia Creek is a tributary to the Kalamazoo River

Length of Watercourse: approx. 5.5 miles (approx. 8.8km)

Length of Project Reach: approx. 1/3 mile (approx. 0.5 km)

Watershed Basin: 10,971 acres (approx. 4,440 hectares)

Baseflow: n/a

Peak Flow 100-year Storm: n/a

Peak Flow Largest Flood of Record (US): n/a

Population in watershed: approx. 250,000

Observations / Impacts / Benefits

Land Use

Arcadia Creek is located in the downtown area of Kalamazoo, Michigan. The watershed is mostly urban.

Socio-Economic Benefits

The flood-protection benefit and amenity value of the creek combine with the overall redevelopment effort to boost the attractiveness of Kalamazoo's downtown for private investment. Public-sector investments of $18 million for the entire redevelopment project have leveraged more than $200 million in private development, including a new museum, a bank headquarters, and other institutions and businesses.

Property tax revenues to the city from the redevelopment zone have increased from $60,000 to $400,000 annually and post-daylighting, downtown businesses no longer have to pay for flood insurance. Activities at the new festival site by the stormwater pond generate an estimated $12 million annually in sales and payroll for local businesses.

Fig. 30 Arcadia Creek Daylighting. Photo: OCBA Landscape Architects.

Ecological Benefits

The exposed stream absorbs storm water runoff much better than underground pipes, and offsets costs of repairing underground infrastructure and storm pipes. The daylighted stream also helped to increase biodiversity, improve water quality and mitigate heat island effect.

Maintenance Requirements

Slowing water in the channel causes the creek to drop much of its sediment load there, where a small front-loader can periodically scrape silt off the concrete bottom with relative ease, reducing the frequency of more difficult dredging operations at the earth-lined, grass-banked stormwater pond downstream.

Process / Regulatory Framework

To fund the revitalization, the downtown development authority issued bonds based on tax-increment financing. Those bonds are now being paid back by property tax revenues which have increased from $60,000 US to $400,000.66 US.

Fig. 31 Illuminated Festival Place. Photo: Seven Canyons Trust.

Sources:

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Relevance to the Brampton Riverwalk

The Arcadia Creek Daylighting project is relevant to Brampton's Riverwalk in that it is primarily a flood protection project that has successfully the flood risk from its downtown while achieving an important and successful public space.

- The project has become an important open space that can host community-scale events
- This project is of particular relevance for the portions of the Etobicoke Creek that is adjacent to Rosalea Park where the water's edge becomes integrated into the the backdrop for a large community amphitheater;
- The project improved the water quality and habitat conditions of the stream;
- The design for Arcadia Creek created a new relationship between the City and it's watercourse, where there previously was none.

Fig. 32 Arcadia Creek Festival Place. Photo: Discover Kalamazoo.

1.10 Los Angeles River Ecosystem Restoration, Los Angeles, CA

Project Overview

Project Description: The City of Los Angeles' 2007 Los Angeles River Revitalization Master Plan (LARRMP). builds upon the County of Los Angeles' 1996 Los Angeles River Master Plan, but specifically focuses on the 32 miles of the River within the City.

The long-term vision for the River involves restoring a continuous, functioning riparian ecosystem along the River corridor within the project area. This would involve restoring riparian vegetation to support birds and mammals, and ideally, developing fish ladders and riffle pools to allow for restoration of steelhead trout habitat, though this may take many years and coordination with downstream cities.

The LARRMP includes approximately 240 short and long-term projects.

In the near-term, channel walls are modified to provide green landscaped terraces for wildlife habitat, water quality treatment, and public enjoyment. A system of pathways and overlooks provides public access.

Accomplishing long-term improvements will involve expanding channel capacities and reducing flow velocities through a combination of flood storage outside the channel in retention basins and underground box culverts, and, over the long-term, potential repurchase of private property to allow for channel widening.

The vision for the Los Angeles River's revitalization includes four basic organizing principles:

- Revitalize the River
- Green the Neighborhoods
- Capture Community Opportunities
- Create Value

Project Type: Economic Development / Ecological Restoration / Creation of Park Amenity

Cost: Anticipated to be billions

Date Completed: Ongoing. The Los Angeles River Revitalization Master Plan was adopted in 2007 with a timeline for implementation is 20 to 50 years.

Fig. 33 Schematic Rendering for the Los Angeles River Downtown Design Dialogue (City of Los Angeles, Bureau of Engineering. Photo: WSP

Hydrology

Watercourse: Los Angeles River

Length of Watercourse: 48 miles (77km)

Length of Project Reach: 32 miles (51.4km)

Watershed Basin: 834 square miles (216,005 hectares)

Baseflow: approx. 7 cfs feet/sec (approx. 0.19 m^3/sec)

Peak Flow 100-year Storm: n/a

Peak Flow Largest Flood of Record (US): 11,400 cubic feet/sec (approx. 323 m^3/sec)

Population in watershed: approx. 5 million

Observations / Impacts / Benefits

Land Use

The upper portion of the watershed, approximately 360 square miles, is covered by forest or open space, while the remaining watershed, approximately 474 square miles, is highly developed with commercial, industrial, and residential uses.

The portion of the river addressed by the Master Plan is almost entirely urbanized and it's water is heavily polluted from agricultural and urban runoff.

Socio-Economic Benefits

Re-envisioning the River will create a publicly-accessible open space, recreation and park amenity for the region. It further will enliven and connect with some of Los Angeles County's most culturally rich and distinct neighborhoods.

These new efforts to revitalize the city's main waterway threaten to alter its role in the lives of neighbors who use it every day. There is a concern that through the improvements to the watercourse, gentrification will affect existing low-income residents and reduce the stock of affordable housing.

Fig. 34 L.A. River between Frogtown and Lincoln Heights. Photo: Samanta Helou Hernandez, 2018.

The River further provides a non-vehicular, multi-modal transportation corridor through downtown and the region, whose growth will both conflict and complement the open space, ecology and community connection goals. Yet, this aspect of River as corridor remains vital to the city's future resiliency and sustainability.

The revitalization endeavors as well to foster economic development and enhance property values for surrounding communities. This will further exacerbate an endemic shortage of affordable housing, thus pushing out communities of color and working poor already at-risk for social and economic survival. So, finally, the River revitalization must redress historic and incidental environmental and social injustices.

Ecological Benefits

The ongoing efforts to revitalize the river fall into the category of "habitat enhancement" rather than restoration, since actual restoration of the river to its natural state is no longer possible or necessarily desirable. Revitalization promises to restore an ecological asset, including critical wildlife and plant habitat, and provide a component of runoff capture and storage.

The plan intends to remove concrete and restoring a soft-bottom where possible to establish a connected riparian corridor. Neighborhoods would be integrated with the river through a network of greened streets, sidewalks, and pathways.

Compromises between ecology and flood control could be implemented through collaboration between the City and County of Los Angeles, the Army Corps of Engineers and numerous regional and local non-profit organizations and public stakeholders in the area.

Maintenance Requirements

n/a

Process / Regulatory Framework

The Los Angeles River Revitalization Master Plan guides the City's policy and project implementation along the Los Angeles River and in its watershed.

Fig. 35 Schematic Rendering of the L.A. River Ecosystem Restoration Study. Photo: City of Los Angeles, 2016.

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Relevance to the Brampton Riverwalk

Although the Los Angeles River is a much larger scale of watercourse than the Etobicoke Creek, but its relevance lies in the decades-long planning studies that have been undertaken to address issues related to previous flood-protection measures, which include concrete channels of a similar nature to the Etobicoke Creek bypass channel.

- Similar to Brampton, the City of Los Angeles has realized the important potential civic and ecological amenity of its watercourse and has been working with upper levels of government to fund and implement solutions that will integrate new social and environmental layers of the River, while maintaining its flood conveyance capabilities;
- Similar to the Etobicoke Creek, an important component to achieve water resiliency calls for a watershed-level approach, capturing stormwater flows and directing them to appropriate aquifer recharge sites, reducing the burden of flooding on the River while augmenting local supplies in areas not prone to liquefaction or contamination spread;
- The variety of channel design, edge conditions and treatment of channelized segments included in the master plan could be considered for various segments of the Riverwalk.

Fig. 36 The L.A. River. Photo: Getty Images/iStockphoto.

1.11 Waller Creek Revitalization and Waterloo Greenway, Austin TX

Project Overview

Project Description: Over time, the health of this historic creek's diverse ecosystem has been challenged by intense development. With floods and droughts mixed in, the results are plain: poor water quality, a crumbling creek bedrock, and eroding banks.

In 2011, construction began on a mile-long tunnel to carry all of Waller Creek's flow, protecting 28-acres of downtown Austin from flooding while maintaining the idea of Waller Creek in a dramatically reduced above ground flow.

The 2015 Waller Creek Corridor Framework Plan team was tasked with restructuring this spatially complex corridor, and its constructed nature, as the backbone for a series of new parks and neighborhood connections.

Stretching from Waterloo Park to Lady Bird Lake, the Waller Creek Tunnel helps reduce the risk of flooding in downtown Austin.

- Reduces flood risk to buildings and roads
- Helps revitalize the Waller Creek District
- Allows for reinvestment in parks and trails
- Improves water quality and wildlife habitat in and along Waller Creek
- Provides a constant flow of water in the creek.

The tunnel reduces the size of the floodplain along Waller Creek. In doing so, it helps revitalize the eastern part of downtown. This area is called the Waller Creek District.

Project Type: Economic Development / Flood Reduction / Ecological Restoration / Creation of Park Amenity

Cost: $160 Million US (Tunnel), $250 Million US, with an additional $110 million estimated for long-term maintenance (Waterloo Greenway Parks estimate).

Date Completed: Ongoing. The tunnel was completed in 2018 and the Waterloo Greenway is projected to be complete in 2025.

Fig. 37 Film Screening in the Waterloo Greenway. Photo: Waterloo Greenway

Hydrology

Watercourse: Waller Creek

Length of Watercourse: 7 miles (approx 11km)

Length of Project Reach:
Tunnel length: The tunnel is approximately 5,600 ft (1,707 m) long. It lies 70 feet below the surface and ranges in size from 22 to 26 feet in diameter. It captures floodwaters and releases them into Lady Bird Lake.
Greenway length: 1.5 miles (approx. 2.4km)

Watershed Basin: 6 square miles (approx. 1,500 hectares)

Baseflow: 0.5 cfs (0.14 m^3/sec)

Peak Flow 100-year Storm: 8,500 cfs (240 m^3/sec)

Peak Flow Largest Flood of Record (US): n/a

Population in watershed: n/a

Observations / Impacts / Benefits

Land Use

The Waterloo Greenway runs through downtown Austin and land use is almost entirely urbanized.

Socio-Economic Benefits

Upon completion, the Waller Creek Tunnel removed approximately 28 acres of downtown land from the 100-year floodplain, creating a new hydrologic condition for the creek and a unique opportunity for urban revitalization and ecological restoration of the Waller Creek Corridor.

Fig. 38 Waterloo Greenway Master Plan, MVVA

The Waterloo Greenway will be home to a wild array of natural and cultural destinations where the environment, arts, health, and adventure will converge and nourish authentic and uplifting experiences that reflect the city's diversity.

Ecological Benefits

The overarching environmental goals for Waterloo Greenway are to:

- Build an ecologically robust and resilient urban creek, riparian corridor, and park system
- Steward the ecological system built along lower Waller Creek long term
- Connect all people to nature
- Cultivate the next generation of environmental stewards
- Become a national leader in the fields of environmental stewardship and urban greenway projects

Maintenance Requirements

The Waller Creek Tunnel is operated by the City of Austin's Watershed Protection Department. During floods, staff are on hand to remove debris at entrances to the tunnel. Sometimes, the tunnel must be cleaned to remove sediment and debris.

Except during cleanings, the tunnel is almost always full of water. To maintain water quality, fresh water is drawn in from the lake. This provides a system to maintain a constant flow of water in the creek during dry periods.

Process / Regulatory Framework

The Waller Creek Tunnel was funded through "tax increment financing," (TIF) which uses funds generated from the increased property values and property taxes within the Waller Creek District. This not only pays for the tunnel but is also helping to fund the redevelopment of Waterloo Park as an event venue with the Waterloo Greenway Conservancy. The conservancy and the TIF are also funding a chain of parks and trails along the creek.

Moving forward, Waterloo Greenway project will be paid for through a public-private partnership. Waterloo Greenway Conservancy will oversee private funding through philanthropic endeavors and special events while the city considers things such as a public tax increment reinvestment zone to pay for the project.

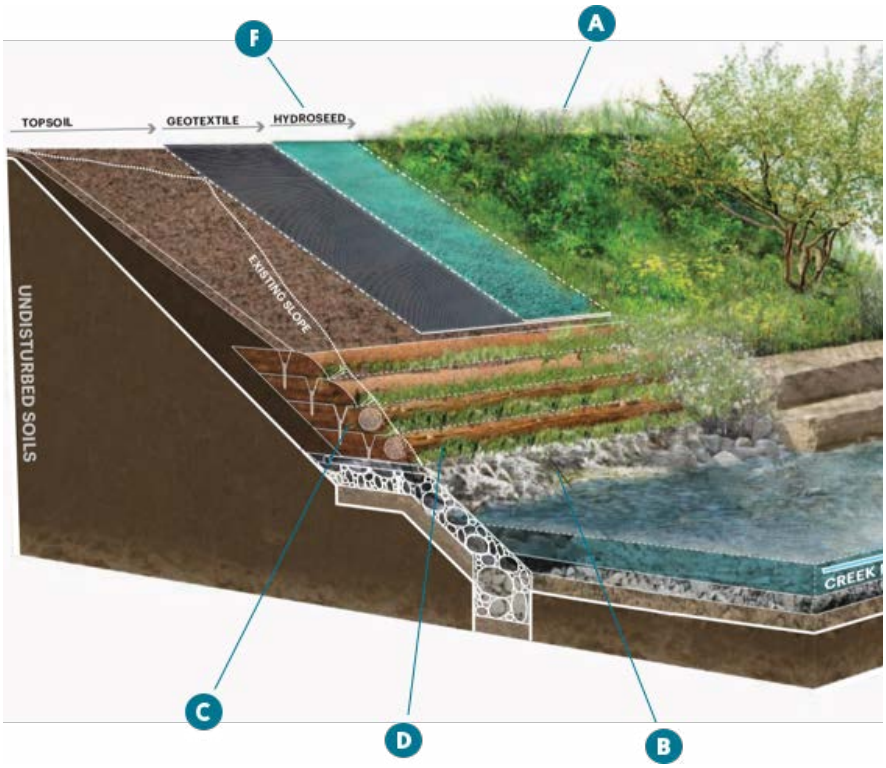

Fig. 39 Waterloo Greenway Cross Section of Rehabilitated Channel Slopes, MVVA

Sources:

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Relevance to the Brampton Riverwalk

The Waller Creek / Waterloo Greenway is relevant to riverwalk in a number of ways but most importantly, that aims to reconnect disparate portions of the river valley through a rich network of public open space.

- Both watercourses are highly constrained, urbanized and srequired flood protection infrastucture to unlock their urban design and open space potential.
- The revitalization of Downtown Austin's riverfront was catalyzed by a large flood protection infrastructure project.
- The project redefines the site's relationship to water and has created a vibrant new relationship between the City and it's watercourse.

Fig. 40 Waller Creek tunnel during construction. (Photo: City of Austin)

Appendix 4:
Addendums and Updates

Appendix 5b:
Brampton Riverwalk UDMP Etobicoke Creek Hydraulic Modelling

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MEMORANDUM

DATE	December 7, 2021
TO	**James Roche, Tanya Brown (DTAH)**
CC	Abe Khademi
SUBJECT	Brampton Riverwalk Urban Design Master Plan Etobicoke Creek Hydraulic Modelling
FROM	Steve Hollingworth
PROJECT NUMBER	19181

The Brampton Riverwalk Urban Design Master Plan (UDMP) envisions a significant transformation of the existing open space system along Etobicoke Creek in Brampton, generally extending from Clarence Street north to Vodden Street. The UDMP builds upon the improvements to Etobicoke Creek recommended through the Downtown Brampton Flood Protection Environmental Assessment (DBFPEA) to provide additional detail and variability to integrate urban design elements and public access opportunities.

This memorandum has been prepared to document the additional analyses completed to assess the impact of modifications to the DBFPEA recommended solution on flood levels in Etobicoke Creek and ensure that the flood protection objectives will continue to be met.

Downtown Brampton Flood Protection EA (DBPFEA)

Under existing condition, modelling predicts that water will spill from the Etobicoke Creek channel and spill through the Downtown Brampton area under extreme storm events such as a re-occurrence of Hurricane Hazel. The DBFPEA included detailed hydrologic and hydraulic investigations of Etobicoke Creek to develop and evaluate alternative solutions to contain the Regulatory Flood to the Etobicoke Creek channel and prevent a spill through the downtown area.

The preferred solution involves the realignment of Ken Whillans Drive, raising the elevation of Church Street, replacing the Church Street, Scott Street and Queen Street bridges and installing additional openings under the CN rail embankment. In addition, the existing concrete channel is proposed to be widened and deepened, but will remain a concrete channel. The preferred solution contains flooding within the reconstructed concrete lined channel, with a minimum 0.5 m freeboard to account for future upstream development and potential future climate change

HEC-RAS Hydraulic Model Set-Up

The modelling completed for the DBFPEA used detailed, coupled 1-Dimensional and 2-Dimensional modelling to more accurately represent the spill from the channel through the downtown area. However, with the DBFPEA solution in place, the flow in Etobicoke Creek will be contained to the valley corridor, and all the flow will be in generally the same direction as the low flow channel. As such, the flow in the system should behave the same as a typical contained valley system and therefore can be represented by a much simpler, traditional 1-Dimensional hydraulic model.

A HEC-RAS 1-Dimensional model was constructed to represent the hydraulics of the proposed improved Etobicoke Creek system. The original HEC-RAS model of the Etobicoke Creek system was initially obtained from the TRCA. Through the UDMP / DBFPEA study area, generally from downstream of the CN bridge to upstream of Church Street, the cross sections in the HEC-RAS model were updated to reflect the proposed channel and overbank grading design from the DBFPEA. Similarly, the CN, Queen Street, Scott Street and Church Street bridges and roadways were represented in the model based on the preliminary general arrangement drawings included with the DBFPEA.

The HEC-RAS model was then simulated to predict the flood levels in the system for the same Regional storm flows applied to the DBFPEA modelling: the Regional (Hurricane Hazel) storm event and a check storm event based on a 25% increase in the Regional storm flow rate to account for future upstream development and future potential climate

change. The HEC-RAS model was also set to match the predicted flood level from the DBFPEA at the upstream side of the improved CN rail crossing as the downstream boundary condition.

The resulting flood elevations from the HEC-RAS model are compared to the output from the DBFPEA model for the Regional and check storm events in Tables 1 and 2, respectively

Table 1: Model Comparison – Regional Storm Event

Location	Flood Level from DBFPEA (m)	HEC-RAS Water Surface Elevation (m)	HEC-RAS Energy Grade Line Elevation (m)
Upstream of CN	211.70	211.76	212.76
Upstream of Queen Street	212.00	212.17	213.11
Upstream of Scott Street	212.15	212.42	213.36
Upstream of Church Street	213.25	213.00	213.70
Upstream of Concrete Lined Channel	213.70	212.77	214.00

Table 2: Model Comparison – Regional +25% Storm Event

Location	Flood Level from DBFPEA (m)	HEC-RAS Water Surface Elevation (m)	HEC-RAS Energy Grade Line Elevation (m)
Upstream of CN	212.20	212.20	213.34
Upstream of Queen Street	212.50	212.68	213.71
Upstream of Scott Street	212.65	212.90	213.95
Upstream of Church Street	213.70	213.53	214.30
Upstream of Concrete Lined Channel	214.30	214.33	214.49

The models give slightly different results, which is expected as they calculate hydraulic losses and flood levels using different techniques. However, the results are comparable and the HEC-RAS model confirms that there will be considerable freeboard upstream of Church Street in the Regional + 25% storm event. Note that, according to the DBFPEA grading design, the low point on Church Street (at the intersection with Ken Whillans Drive) is at an elevation of 214.47 m. Containing flooding upstream with no risk of overtopping Church Street is critical to preventing a spill of floodwater from the channel and through the Downtown Brampton area.

It is therefore concluded that the results of the HEC-RAS analyses are sufficiently accurate for testing the impact of different urban design refinements on flooding in Etobicoke Creek relative to the UDMP.

Urban Design Master Plan Vision

The UDMP proposes a number of refinements to the basic solution from the DBFPEA to enhance the public realm through the Riverwalk study area.

The DBFPEA proposed that the concrete lined channel, from upstream of Church Street to downstream of the CN corridor, would be reconstructed as a widened and deepened concrete channel with smooth concrete side slopes at an inclination of 2H:1V. The UDMP generally maintains the overall geometry of the DBFPEA solution, with the same widened and deepened valley base, same overall channel corridor width and same average 2H:1V side slopes through the reconstructed channel from downstream of the CN railway to upstream of Church Street. However, the UDMP proposes stepped side slopes along the corridor. The low flow channel and base of the channel corridor would be formed of smooth concrete, similar to the DBFPEA solution. However, the side slopes would be formed of a series of steps. The vertical faces of each step would be formed of smooth concrete, and the top of each step would be planted with short, low maintenance vegetation.

The different elements of the UDMP solution were integrated into a revised HEC-RAS model to assess the impacts of the proposed channel alterations on flood levels in Etobicoke Creek. Note that an average Manning's 'n' value of 0.033 was applied to the banks of the Etobicoke Creek channel in the HEC-RAS model. The value of 0.033 represent the length-weighted average of the concrete vertical faces of the steps (n=0.013) and vegetated tops of each step (n=0.050).

The results, summarized in Tables 3 and 4, show that the refinements to Etobicoke Creek proposed by the UDMP would result in flood levels in Etobicoke Creek comparable to those associated with the DBFPEA solution for both the Regional storm and Regional + 25% storm events. The Energy Grade Line (EGL) elevation upstream of Church Street (the most critical location) would be the same or slightly less than the DBFPEA solution for the and Regional + 25% storm event. Both the water surface elevation and EGL are predicted to remain safely below the critical overtopping elevation of 214.47 m at Church Street.

Table 3: UDMP Solution – Regional Storm Event

	DBFPEA Solution		UDMP Channel Concept	
Location	**HEC-RAS Water Surface Elevation (m)**	**HEC-RAS Energy Grade Line Elevation (m)**	**HEC-RAS Water Surface Elevation (m)**	**HEC-RAS Energy Grade Line Elevation (m)**
Upstream of CN	211.76	212.76	211.76	212.76
Upstream of Queen Street	212.17	213.11	212.10	212.98
Upstream of Scott Street	212.42	213.36	212.41	213.35
Upstream of Church Street	213.00	213.70	213.10	213.64
Upstream of Concrete Lined Channel	212.77	214.00	212.80	213.99

Table 4: UDMP Solution – Regional + 25% Storm Event

	DBFPEA Solution		UDMP Channel Concept	
Location	**HEC-RAS Water Surface Elevation (m)**	**HEC-RAS Energy Grade Line Elevation (m)**	**HEC-RAS Water Surface Elevation (m)**	**HEC-RAS Energy Grade Line Elevation (m)**
Upstream of CN	212.20	213.34	212.20	213.34
Upstream of Queen Street	212.68	213.71	212.59	213.62
Upstream of Scott Street	212.90	213.95	212.91	213.99
Upstream of Church Street	213.53	214.30	213.69	214.30
Upstream of Concrete Lined Channel	214.33	214.49	214.27	214.45

Verification of Model Results

The UDMP vision of Etobicoke Creek was simulated using the coupled 1-D / 2-D modelling from the DBFPEA to verify the results from the HEC-RAS hydraulic analyses. The updated 1-D / 2-D modelling confirmed that the modifications to Etobicoke Creek proposed in the UDMP would result in flood levels comparable to the DBFPEA and would continue to satisfy the flood reduction objectives from the DBFPEA. A letter summarizing the hydraulic verification is attached to this memorandum.

Potential Further Refinements to the Urban Design Master Plan Vision

Given that the above analyses demonstrate that the UDMP is expected to maintain flood levels in Etobicoke Creek comparable to the DBFPEA solution, there is some flexibility for further refinements to the UDMP concept without impacting the overall flood protection solution recommended by the DBFPEA. These refinements could include more variation in materials, such as armourstone or textured concrete instead of smooth concrete along portions of the channel. Refinements to the low flow channel could also be considered, such as off-line pools and occasional cobbles and boulders embedded into the concrete along the low flow channel.

Version 1.0
March 3, 2021 Matrix 22062-531

Ms. Meg St John
TORONTO REGION CONSERVATION AUTHORITY
101 Exchange Ave.
Vaughan, ON L4K 5R6

Subject: MIKE FLOOD Modelling for Urban Design Master Plan Riverwalk Concept

Dear Ms. St John:

1 INTRODUCTION

DTAH is undertaking an Urban Design Master Plan (UDMP) for downtown Brampton, building upon the preferred alternative design concept from the Downtown Brampton Flood Protection EA (DBFP EA; Matrix 2020). DTAH has prepared a channel design that includes vegetated benches as part of fulfilling the UDMP objective to integrate the DBFP EA flood protection measures into the planned open space public realm along the Etobicoke Creek valley. As part of the UDMP team, The Municipal Infrastructure Group Ltd. (TMIG) completed hydraulic modelling in HEC-RAS to support the design; assessments were completed to compare flood levels to those presented in the DBFP EA report.

Toronto and Region Conservation Authority (TRCA) retained Matrix Solutions Inc. to update the MIKE FLOOD model prepared during the DBFP EA to confirm that the proposed UDMP design maintains the objectives of the DBFP EA to eliminate spill from upstream of Church Street into the downtown Brampton Special Policy Area (SPA). This letter details the methods and findings of this MIKE FLOOD modelling.

2 MIKE FLOOD UPDATES

TMIG provided Matrix with AutoCAD® Civil 3D surface files of DTAH's proposed design. The channel design includes stepped benches that provide a variation in surface materials (and corresponding roughness) as well as visually appealing concepts, while maintaining the overall 2:1 side slopes identified through the DBFP EA. A sample cross-section for comparison is shown in Figure 1.

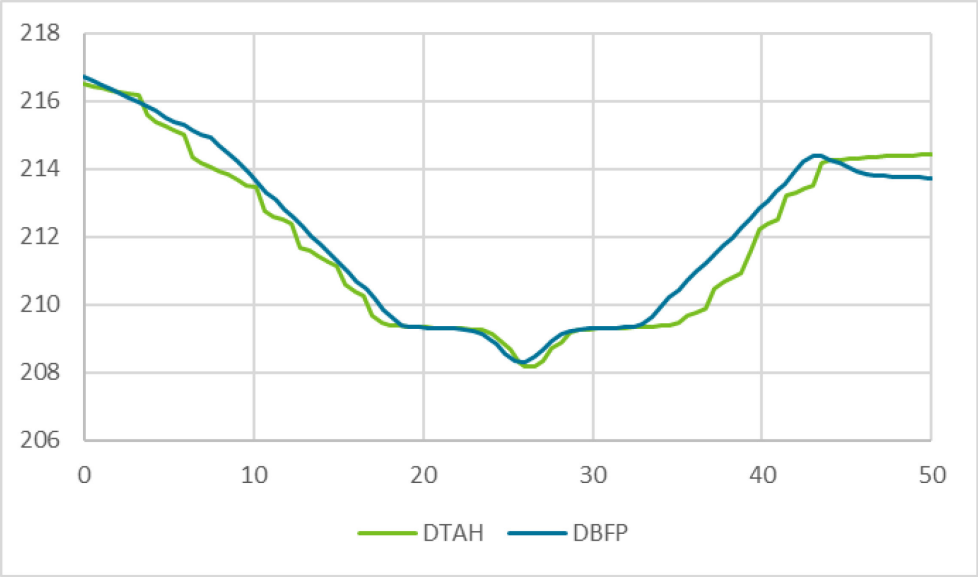


FIGURE 1 Sample Cross-section Comparison

Matrix imported the provided surface into MIKE FLOOD and revised the cross-section geometry within the bypass channel to simulate the proposed design. To maintain consistency with DTAH's design and associated HEC-RAS modelling, a Manning's n value of 0.013 was applied to the low flow portion of the channel to reflect the proposed concrete bottom and a composite Manning's n roughness value of 0.033 was applied to the side slopes. The composite Manning's n reflects the varied roughness of the proposed design, which includes a smooth concrete (n = 0.013) front face of the stepped geometry with some vegetated plantings (n = 0.05) along the top (TMIG 2021). Consistent with TRCA's standard guidelines for Manning's n, the roughness value of 0.05 corresponds to municipal parks, playing fields, lawns, manicured grasses, etc. where regular maintenance is required.

Bridges were not included in the MIKE FLOOD model with the exception of the Canadian National Railway (CN) crossing. Consistent with the DBFP modelling, the CN crossing includes three culverts to be installed on the east (left) side of the existing bridge. The three culverts are approximately 6 m in diameter, multiplate round pipe culverts. The channel under the existing bridge was widened to provide a transition into the additional culverts and also lowered to accommodate the preferred profile of the bypass channel. The invert of the culverts was set to ensure low flow is maintained in a single channel under the main bridge. Bridges for Church Street, Scott Street, and Queen Street were not included in the model as the DBFP EA stipulates that bridge decks and abutments shall be outside and above the Regional flood hazard lines.

3 MODEL RESULTS

The results of the MIKE FLOOD modelling indicate that the plan put forth by DTAH very closely replicates the hydraulic results presented during the DBFP EA. Tables 1 and 2 provide a comparison of the resulting water levels at key landmarks within the study area.

TABLE 1 MIKE FLOOD Model Result Comparison - Regional Event

Location	Cross Section ID	Maximum Water Surface Elevation (m)	
		DBFP EA (MIKE FLOOD)	UDMP (MIKE FLOOD)
Upstream of CN crossing	4668.41	211.84	211.86
Upstream of Queen Street	4538.41	211.94	211.99
Upstream of Scott Street	4388.41	212.06	212.07
Upstream of Church Street	4168.41	212.80	212.31
Upstream of Concrete Lined Channel	4088.41	213.71	213.53

CN - Canadian National Railway
DBFP EA - Downtown Brampton Flood Protection Environmental Assessment
UDMP - Urban Design Master Plan

TABLE 2 MIKE FLOOD Model Result Comparison - Regional + 25% Event

Location	Cross Section ID	Maximum Water Surface Elevation (m)	
		DBFP EA (MIKE FLOOD)	UDMP (MIKE FLOOD)
Upstream of CN crossing	4668.41	212.35	212.39
Upstream of Queen Street	4538.41	212.45	212.51
Upstream of Scott Street	4388.41	212.55	212.56
Upstream of Church Street	4168.41	213.27	212.80
Upstream of Concrete Lined Channel	4088.41	214.09	213.99

CN - Canadian National Railway
DBFP EA - Downtown Brampton Flood Protection Environmental Assessment
UDMP - Urban Design Master Plan

The critical parameter in this study is the water elevations upstream of Church Street and upstream of the concrete bypass channel. This is where the spill into the downtown Brampton SPA 3 originates. Maintaining riverine water levels below this spill elevation is a key component in reducing flooding within the downtown Brampton SPA 3, which is the objective of the DBFP EA. The DBFP EA indicated a spill elevation of 214.47 m, located at the low point on Church Street. TRCA has specified that in order to meet the objectives of the DBFP EA, the Regional Event water levels at this location shall provide a freeboard of at least 0.5 m to the spill elevation and that the Regional +25% event water levels do not overtop the spill elevation. The MIKE FLOOD model results presented in this report indicate that both of these conditions are met by the provided UDMP design concept.

Other considerations of the DBFP EA preferred alternative include lowering of water levels within the bypass channel to reduce backwater effects on the urban drainage system. The results of the MIKE FLOOD model indicate that the UDMP design concept very closely matches the DBFP EA water levels throughout the bypass channel and, therefore, will provide a similar reduction in water levels at the urban drainage system outlets.

No significant changes in water levels were noted between the DBFP EA results and the UDMP results downstream of the bypass channel. The remaining inundated area in the downstream portion of SPA 3 is the same between these two design concepts.

4 CONCLUSION

Based on the modelling discussed herein, the UDMP channel design prepared by DTAH provides a reasonable balance between the objectives of the DBFP EA to mitigate flooding within the downtown Brampton SPA 3 while also accommodating the urban design master plan vision.

As previously noted, the Manning's n values used within the bypass channel in this assessment represent smooth concrete (n = 0.013) in the low flow channel and on the face of the stepped benches and maintained grasses (n = 0.05) along the top of the benches. Regular maintenance of these grassed features is required to prevent vegetation from overgrowing and to ensure the intended design will perform as expected into the future.

5 CLOSURE

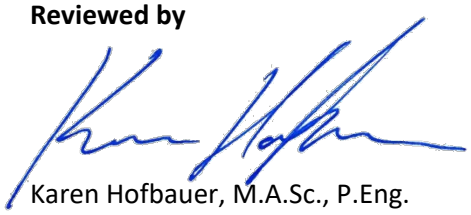
We trust that this letter report suits your present requirements. If you have any questions or comments, please contact either of the undersigned.

Yours truly,

MATRIX SOLUTIONS INC.

Kelly Molnar, P.Eng.
Water Resources Engineer

Reviewed by



Karen Hofbauer, M.A.Sc., P.Eng.
Senior Water Resources Engineer

KM/vc
Attachments

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Alex Taranu, City of Brampton
Tanya Brown, DTAH
Steve Hollingworth, The Municipal Infrastructure Group Ltd.
Anneliese Grieve, on behalf of Toronto and Region Conservation Authority

VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V1.0	03-Mar-2021	Final	22062-531 UDMP MIKE FLOOD Modelling LR 2021-03-03 final V1.0.docx	Issued to client

REFERENCES

Matrix Solutions Inc. (Matrix). 2020. *Downtown Brampton Flood Protection Environmental Assessment, Water Resources Engineering Technical Report*. Version 1.0. Prepared for Toronto and Region Conservation Authority. Guelph, Ontario. May 2020.

The Municipal Infrastructure Group Ltd. (TMIG). 2021. *Brampton Riverwalk Urban Design Master Plan Etobicoke Creek Hydraulic Modelling*. Prepared for CompanyName. Vaughan, Ontario. February 2021.