Report to The Niagara Parks Commission

RE: Summary of Recommendations from the Property and Infrastructure Committee

The following are recommendations of the Property and Infrastructure Committee at its meeting held on January 9, 2025.

Chippawa Battlefield Viewing Platform Project

1. Approve the Chippawa Battlefield Viewing Platform project as presented.

Capital Projects Presentation

1. Receive the capital projects presentation for information.

Urban Forestry Management Strategy – 2024 Year-In-Review

1. Receive Report 2025-02 respecting the Urban Forestry Management Strategy –

   2024 Year-In-Review for information.

Niagara Parks Soil Health Analysis with Vineland Research and Innovation Centre

1. Receive Memo 2025-04 respecting Niagara Parks Soil Health Analysis with Vineland Research and Innovation Centre for information.

Dufferin Islands Visitor Experience and Ecological Enhancement Initiative – Year 2 Update

1. Receive Memo 2025-01 respecting Dufferin Islands Visitor Experience and Ecological Enhancement Initiative – Year 2 Update for information.

Prepared by:		Submitted and Authorized by:	
Name:	Darla Jones	Name:	David Adames
Title:	Executive Assistant to the Chair and Chief Executive Officer	Title:	Chief Executive Officer
		Date:	January 9, 2025

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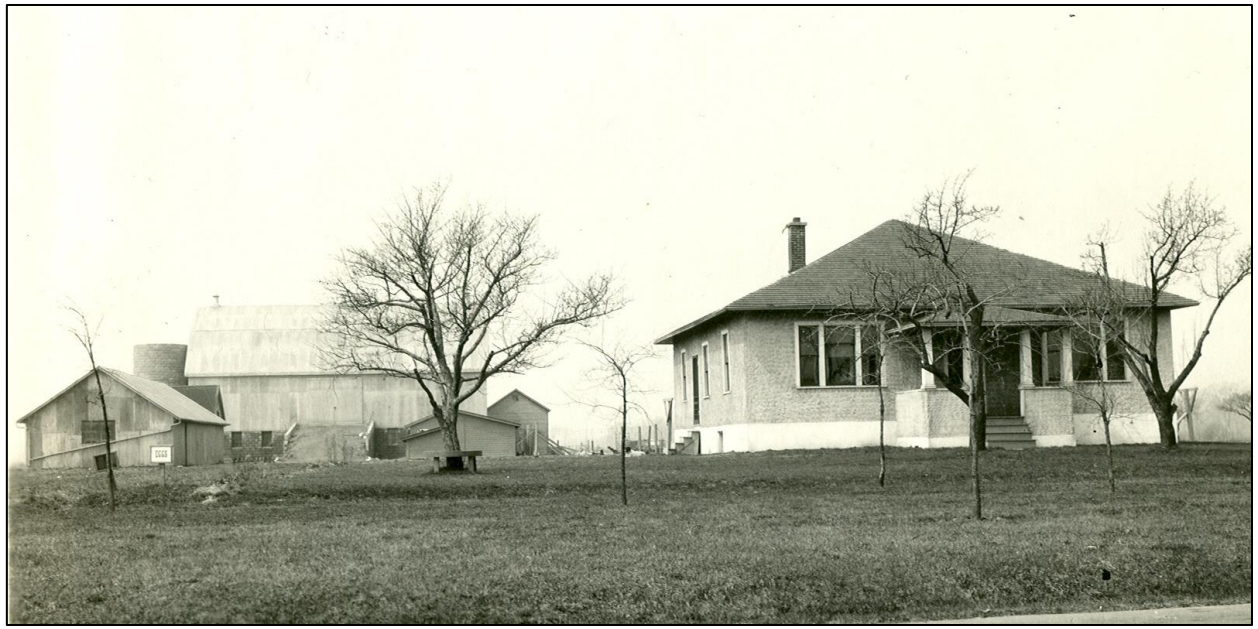
Chippawa Battlefield Viewing Platform Project

January 9, 2025

Chippawa Battlefield National Historic Site

- Site of the last major American invasion of Canada on July 5, 1814
- Designated National Historic Site in 1921
- Annual recognition events are held on July 5 each year
- Self guided tour of monument and interpretive panels



Modern History

- Following the War of 1812, lands were primarily used for agriculture
- Home was known as Milford Lodge (removed mid-20th century)
- Prior to NPC acquiring lands, used for Angus beef farming, then left fallow
- Lands acquired by NPC as part of Legends on the Niagara Golf Complex development

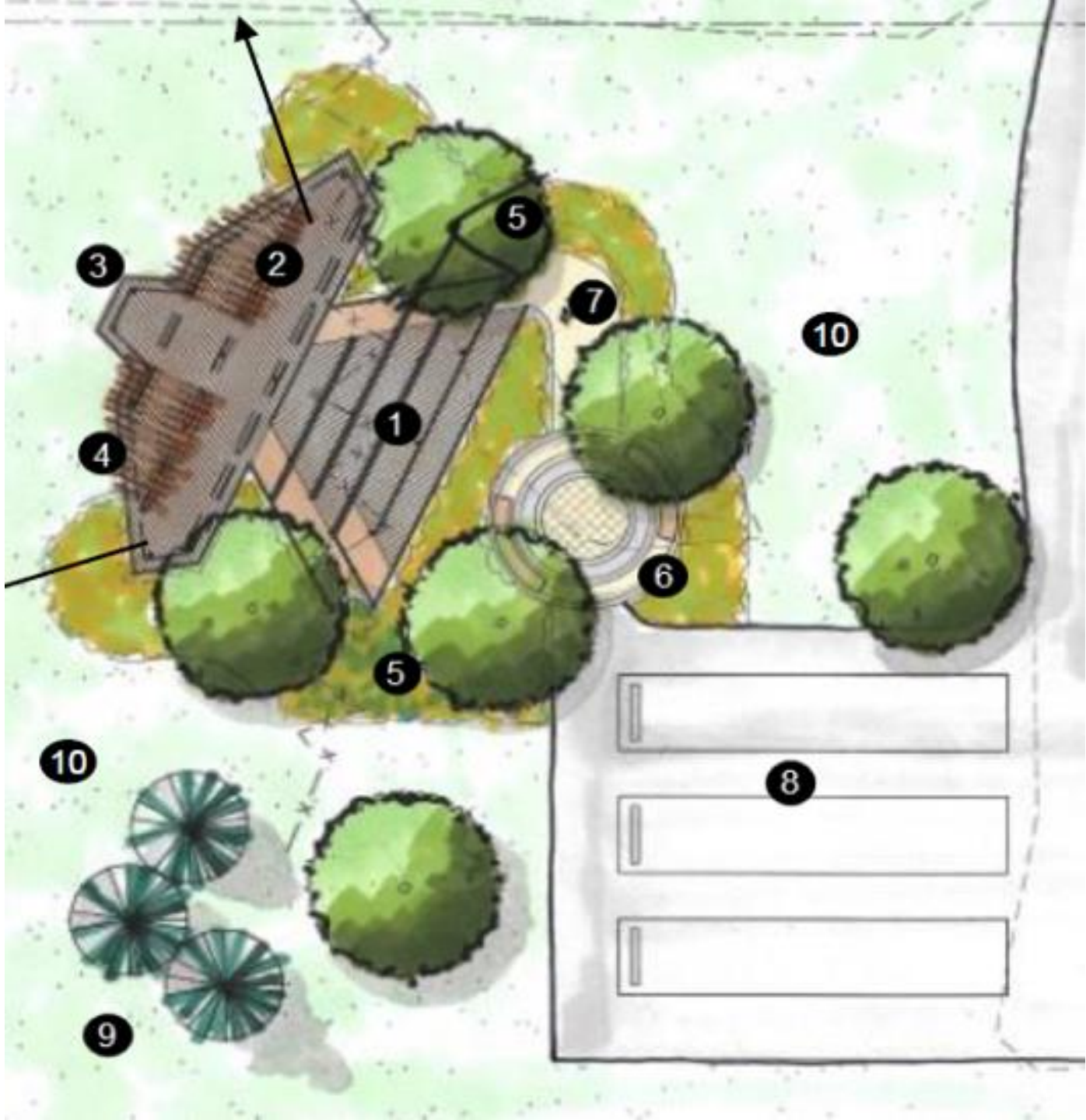
Grassland Bird Habitat Restoration

- Starting in 2017, 50 ha (120 acres) were restored to native tallgrass prairieland to support grassland nesting birds.
- Half of site was restored in support of offsetting requirements for GE Canada's new Welland factory.
- Eastern Meadowlark and Bobolink, both species at risk, have now returned and are successfully breeding.
- Funding support provided by:
  - Ministry of Natural Resources
  - Environment and Climate Change Canada
  - GE Canada

Site Overview and Study Area

Project Goals

- To design and build a signature, AODA-compliant viewing platform at the Chippawa Battlefield, overlooking the property, to provide interpretive and educational opportunities related to both natural and cultural heritage.
- To promote NPC's mandate as both cultural and natural heritage stewards.
- To support and promote Legends on the Niagara Audubon Certification.
- To support new and ongoing events.
- To support species at risk habitat and monitoring.
- To provide safe viewing opportunities for NPC's Prescribed Burn Program.
- To foster placed-based learning and educational opportunities (birding, SAR, War of 1812, grasslands, etc.).

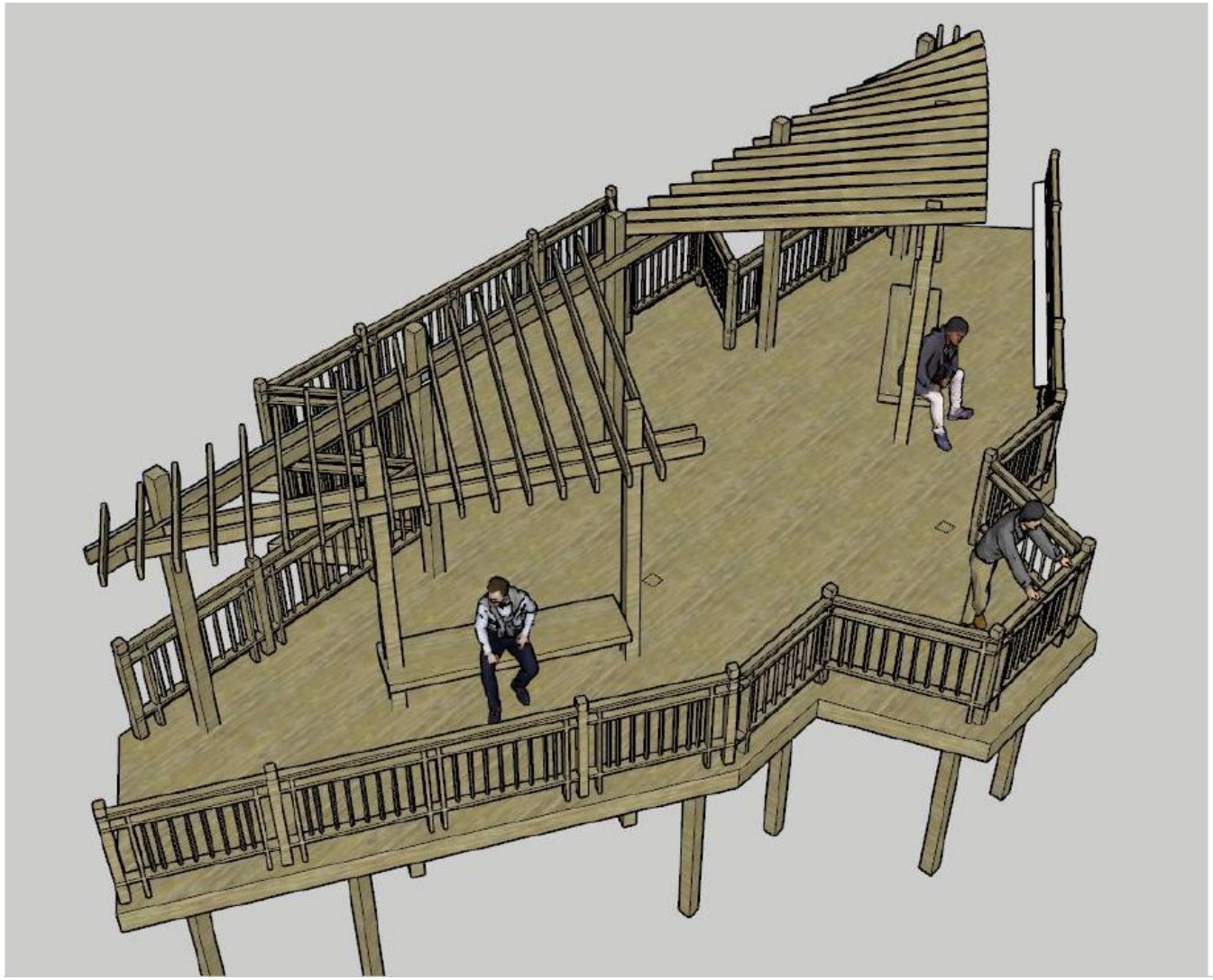


Indigenous Inspiration

- Consulting with Tim Johnson and Alyssa General revealed an opportunity to incorporate Indigenous symbolism.
- Platform was redesigned to reflect an Eastern Meadowlark.
- Mohawk term for Meadowlark is **Kahenta’kéha**, meaning “**of the field / meadow**”.
- The sun is a symbol of energy and life.


EXISTING GRAVEL DRIVEWAY
TO BE RETAINED
EXISTING UNDISTURBED TURF AREA
EXISTING SPLIT RAIL FENCE
TO BE REMOVED AND
STORED IN BARN
EXISTING TOPSOIL
STOCKPILE TO BE RE-USED
ON PROPOSED BERM
EXISTING LANDSCAPED
ISLAND TO BE RETAINED
EXISTING
GRAVEL
PARKING AREA
TO BE RETAINED
REMOVE EXISTING TURF AND
TOPSOIL AND REPLACE WITH
GRAVEL-SEE DETAIL
EXISTING
UNDISTURBED
TURF AREA
EXISTING GRAVEL DRIVEWAY
TO BE RETAINED
EXISTING BARN
BUS PARKING
REMOVE EXISTING TURF AND
TOPSOIL AND REPLACE WITH
GRAVEL-SEE DETAIL
EXISTING TOPSOIL
STOCKPILE TO BE RE-USED
ON PROPOSED BERM
EXISTING UNDISTURBED TURF AREA
EXISTING UNDISTURBED TURF AREA

Viewing Platform Concept Design



Free Standing Interpretive Sign

Stantec

Chippawa Platform

Next Steps:

- Detailed engineering: 95% complete
- Cost Estimate: $560k
- Future funding opportunity through sale of Sarah Street lands to Niagara Region

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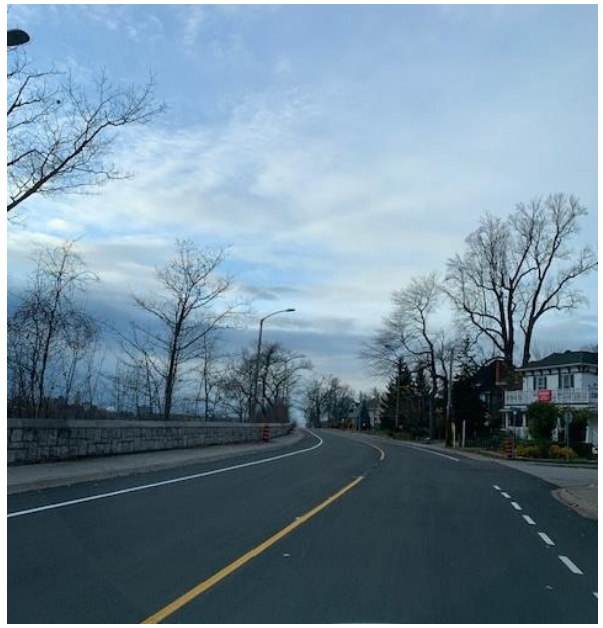
Capital Projects Update

Property and Infrastructure Committee Meeting

January 9, 2025

Service Road 18

Service Road 27



Niagara River Parkway from Zimmerman Ave to John Street

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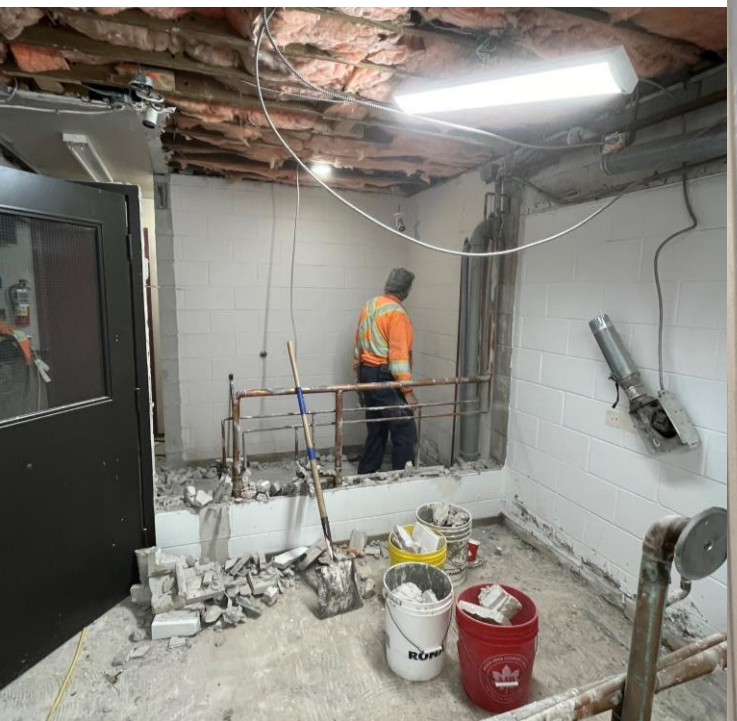
Parkway Paving



Whirlpool Golf Course Halfway House Washrooms

- Framing Complete
- Washrooms to be open by start of golf season

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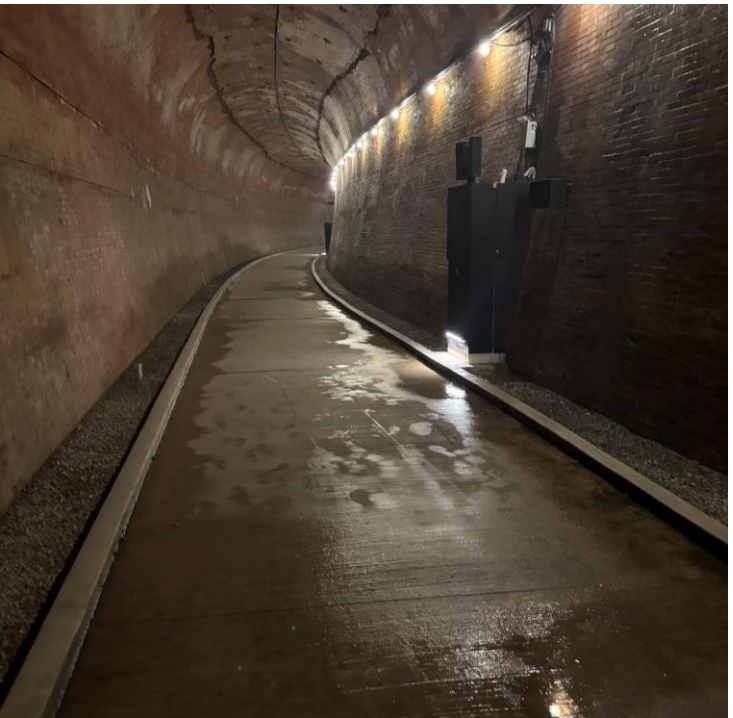
QVP Public Washroom

- Foundation Work Complete
- Structure to be Complete: End of January
- Washrooms Open to Public: End of May



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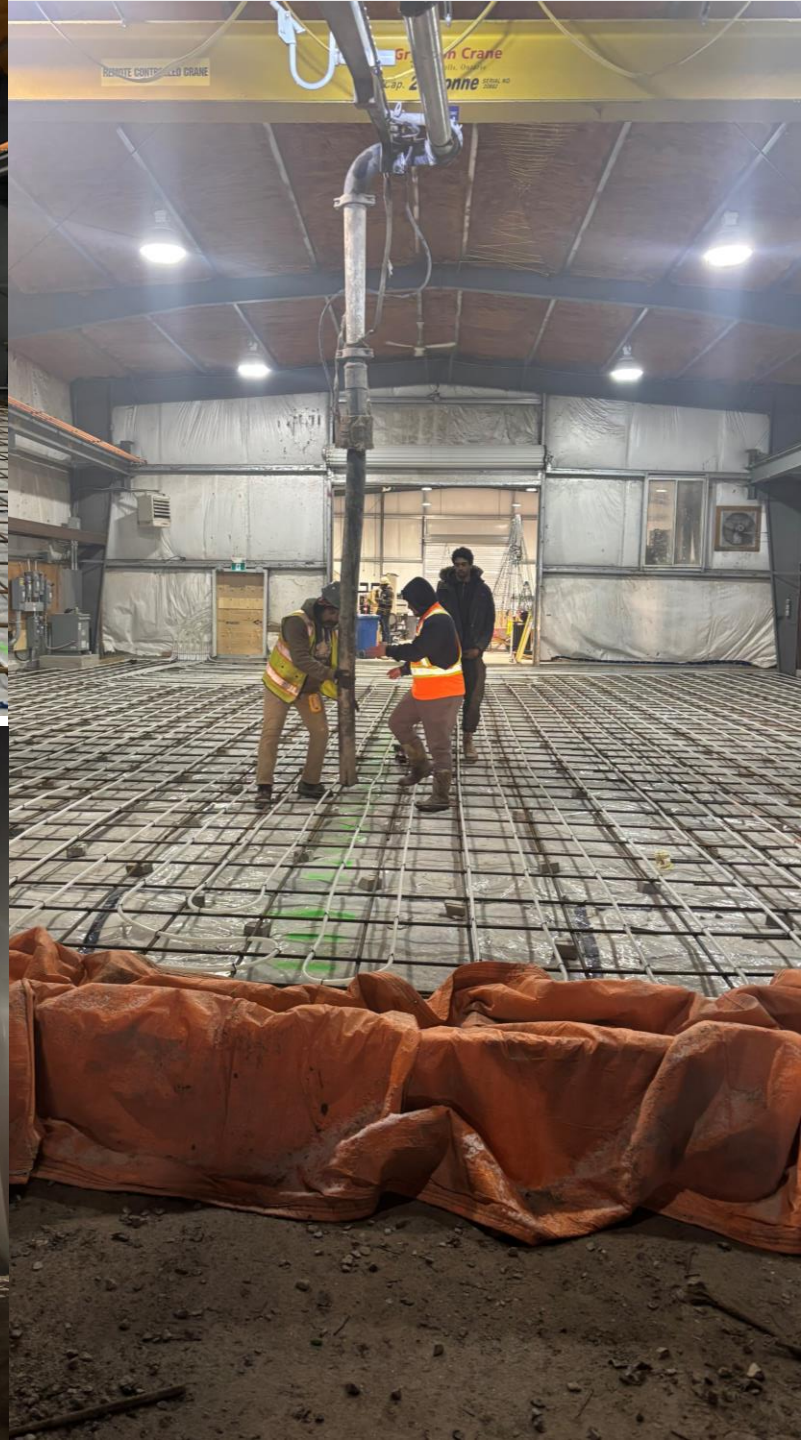
The Tunnel Emergency Lighting

Emergency lights were added at each junction box in case of power failure in the tunnel.



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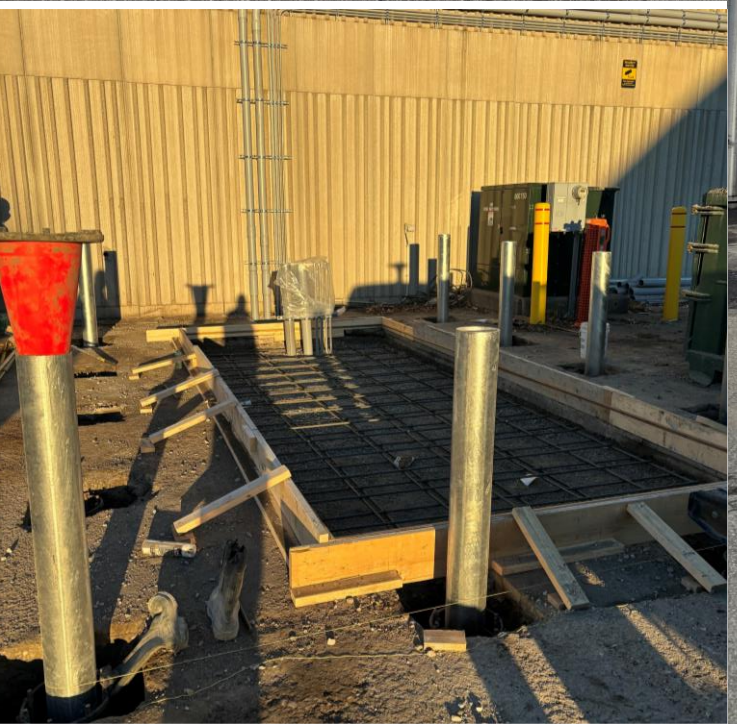
WFOL Building Expansion

Work complete to install in floor heating and level floor between original structure and addition.

Falls Parking Curbs and Asphalt



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Maintenance Centre Emergency Generator

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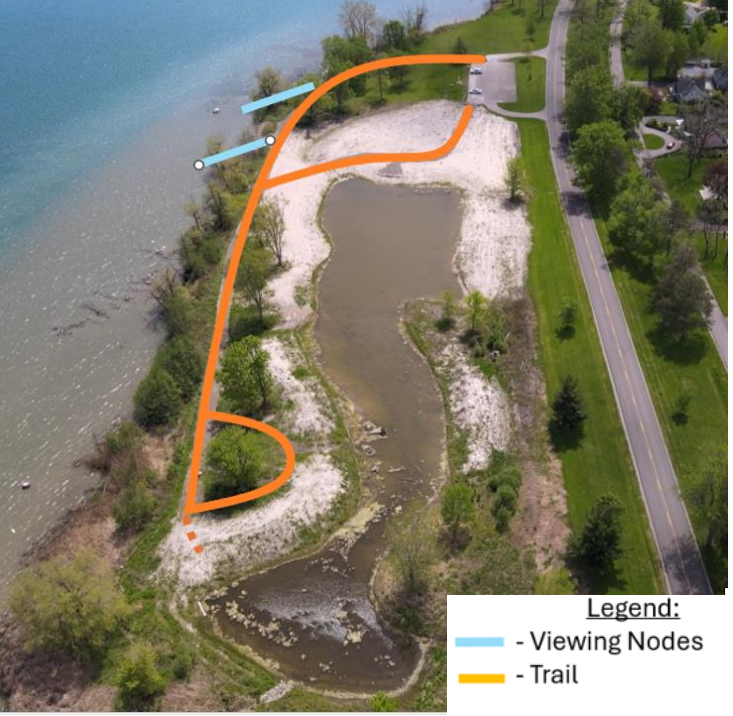
Aerocar Improvements

Guest queueing area expansion completed.

Ticket Booth Updates;

- Reducing Ticket Windows from 4 to 3 (before image bottom right).
- Windows to open laterally for staff safety.
- Framing complete windows are being fabricated and will be installed by the end of February.

Fort Erie Breakwall Repairs



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Gonder's Flat Wetland Enhancement

- Approval was received from Fisheries and Oceans Canada in October 2024.
- Viewing Area Construction Complete.
- Trail remediation expected to be completed in December (weather dependent) with final remediation in the spring by NPC.
- A report on the project will be brought forward to the March meeting.

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Legends Front Path Paving

Legends Front Path was paved from the main parking lot to east of the Clubhouse.

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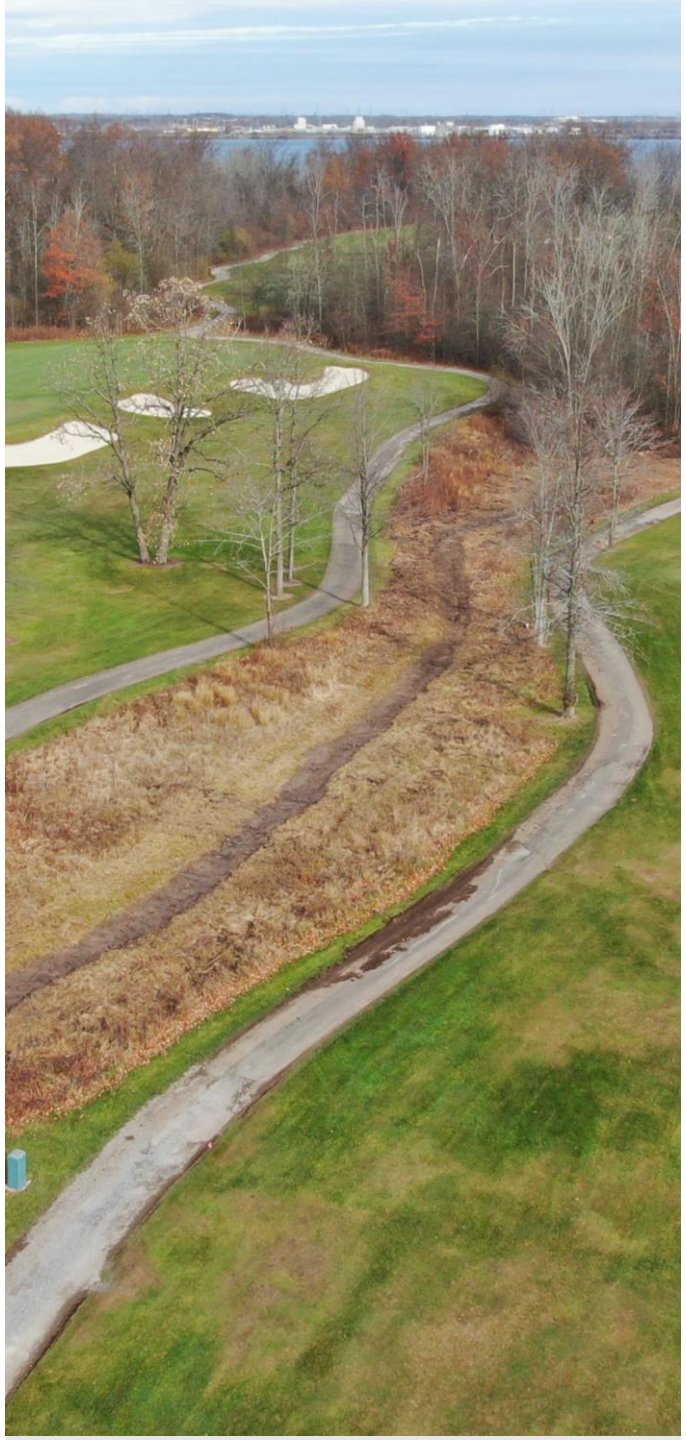
Legends Drainage Work Prior to Cart Path Paving



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Legends Cart Path Paving

Total Length of Path System: 11km

Contractor Mobilization: February 10th

Granular Pathways Complete (Course Opening): April 11th

Paving Complete: May 30th

Project Complete with Restoration Work : June 13th

Legends Cart Path Reforestation Program

- Based on review, 37 trees are impacting the cart path and require removal or substantial pruning.
- Removed trees to be replaced at 5:1 ratio (185 trees) in spring 2024.
- New trees will be located throughout Legends Golf Complex and adjacent areas.
- Trees planted to offset tree removals are in addition to NPC's target of planting 5000 trees per year.

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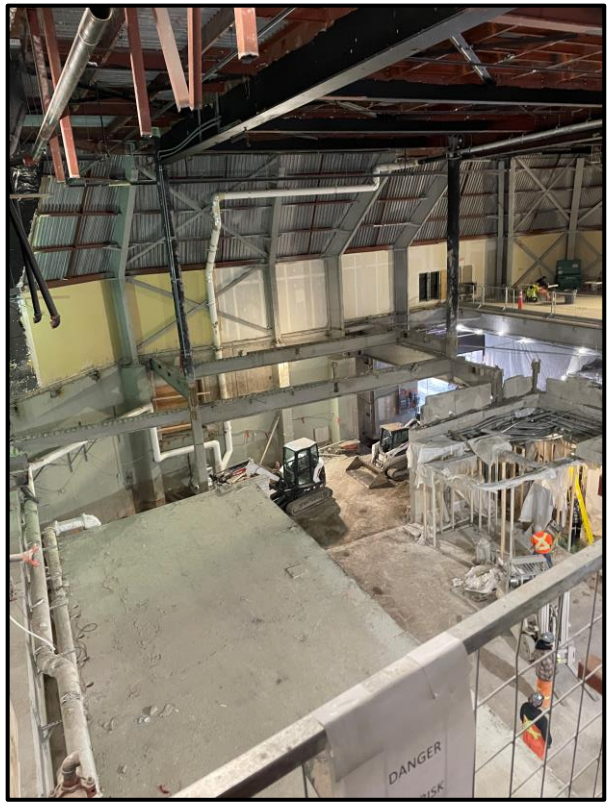
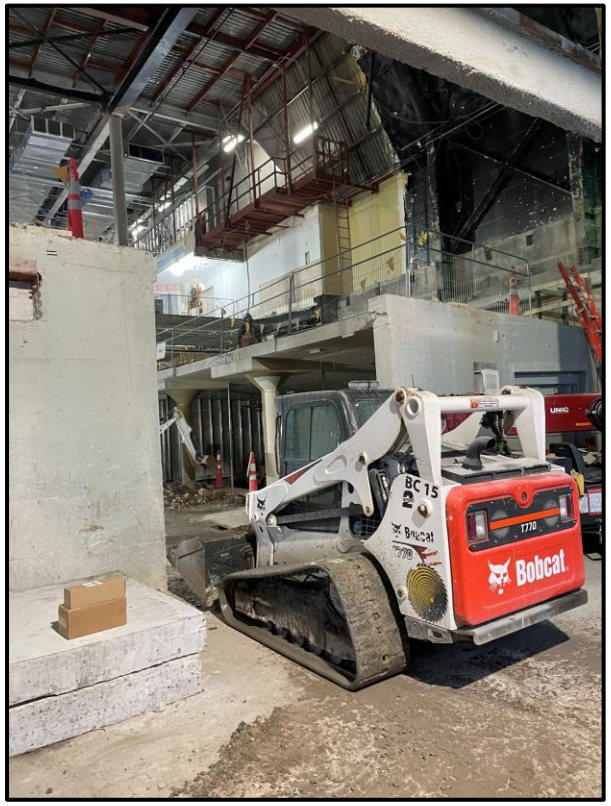
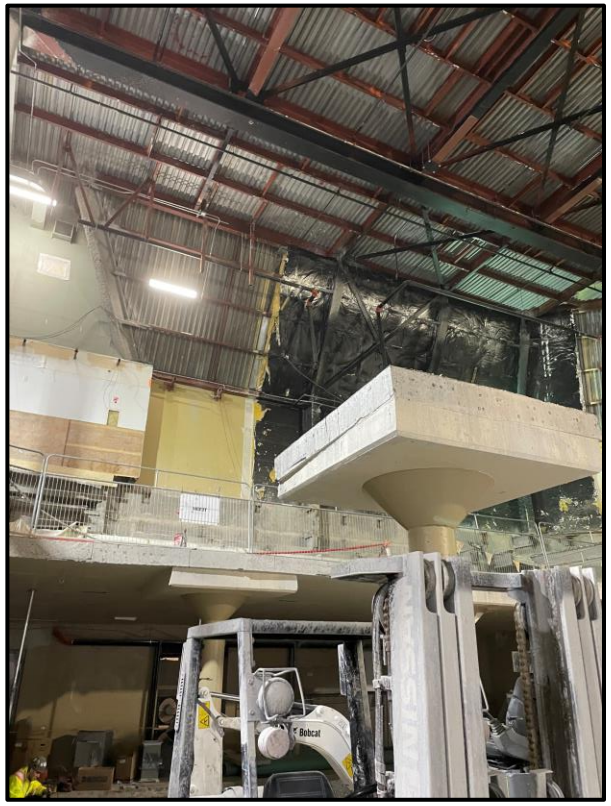
2024/2025

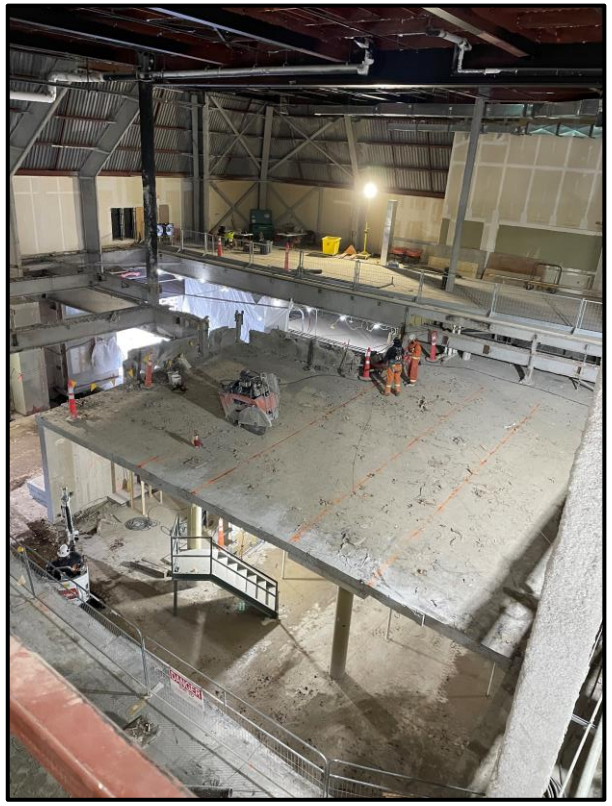
Strategic Projects

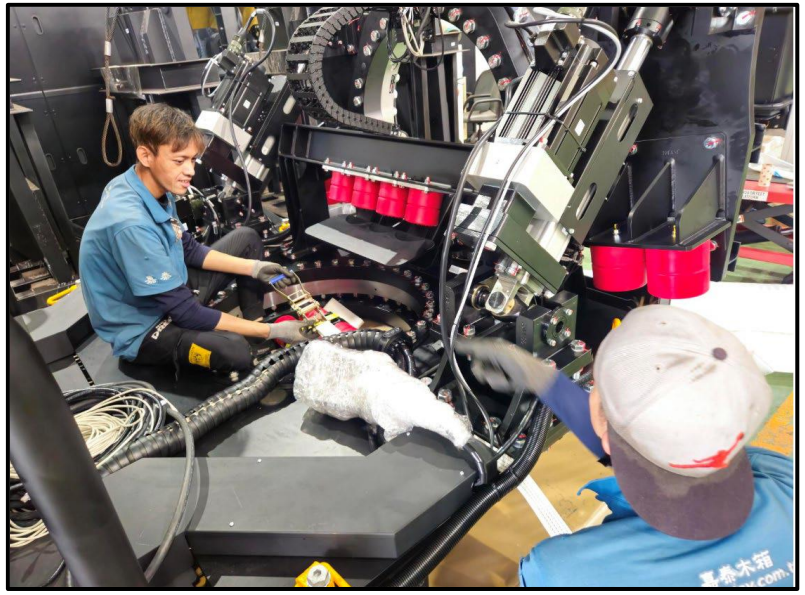
Flying Theatre Site Preparation











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Flying Theatre Equipment Fabrication

Seat and Canopies are completed. The platforms are completed.

First shipment arriving January 25th

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Flying Theatre Filming

- The final two scenes will be captured the week of January 13-17th including;
- The generator hall at NPPS.
- The Finale which incorporates a flight path along the parapet wall featuring the Falls at night, Falls Illumination, Festival lighting and Fireworks.

Report to the Property and Infrastructure Committee

RE: Urban Forestry Management Strategy – 2024 Year-In-Review

Recommendation(s)

That the Property and Infrastructure Committee recommends that The Niagara Parks Commission:

1. Receive Report 2025-02 respecting the Urban Forestry Management Strategy – 2024 Year-In-Review for information.

Overview

The purpose of this report is to provide an update on the ongoing implementation of the Urban Forestry Management Strategy. The following report will highlight the current and emerging challenges within Niagara Parks' urban forest canopy and the progress that has been made towards the targets and goals of the Urban Forestry Management Strategy. A summary of this progress can also be seen in Appendix A. In 2018, the Commission adopted three (3) key performance indicators to measure sustainability of its urban forest: 35% canopy coverage, all landscape planting projects follow the 5-10-20 biodiversity quantity distribution, and to maintain 75% of the full Niagara River shoreline in native vegetation.

In 2024, the following progress has been achieved towards the three primary targets:

1) Towards planting a net gain of 5000 trees per year, 7351 trees were planted in 2024. This number of trees also offsets the 282 trees that were removed throughout 2024.
2) Using the 5-10-20 rule to increase biodiversity, 56 different tree and shrub species were used, representing 30 genera and 20 families, significantly exceeding biodiversity targets.
3) To achieve the 75% shoreline covered in native vegetation, staff have managed invasive species on 1.8km shoreline of the 8km annual target.

Summary of the Urban Forestry Management Strategy

Niagara Parks' 10-year Urban Forestry Management Strategy (UFMS) was approved by the Board in 2018. The UFMS' objective is to establish and maintain a healthy forest canopy which can provide numerous benefits to adjacent residents and visitors to Niagara Parks. The forest canopy includes both trees and shrubs. In addition to providing clean air, trees provide habitat for wildlife, lower

energy costs by providing shade to buildings, mitigate flooding impacts and shoreline erosion, and supports the natural backdrop that draws millions of visitors to Niagara Parks each year. The urban forest canopy within Niagara Parks, which includes the trees within manicured parklands to natural areas such as the Niagara Glen, is under constant pressure due to threats such as invasive pests, disease, and a changing climate. In response, Niagara Parks continues to engage with multiple partners to monitor and promote the health of its forest canopy.

1) Canopy cover target for Niagara Parks from 28% (2017 data) to 35%.

Annual goal to meet target: NPC must plant a net gain of 5000 trees per year over the next four years.

Building on the success of 2023, NPC continued to meet and exceed its tree planting goal by planting over 7350 trees in 2024. This includes the planting of 200 large-caliper sized trees throughout NPC property, representing the most large-caliper trees NPC has planted in a year. In addition, another 67 large-caliper trees were planted along Whirlpool Golf Course's 18th hole as part of its landscape redevelopment plan. While the cost of large-caliper tree stock is significantly higher than seedlings and smaller potted stock, these trees provide an instant impact to the landscape and are less susceptible to trampling and wildlife damage. The Memorial Tree Program, which also utilizes large-caliper tree stock, continues to be very popular, adding dozens of trees each year to NPC's urban forest.

In June 2024, over 150 secondary students planted 500 trees near the Niagara Glen as part of their visit to Niagara Parks. In collaboration with Land Care Niagara and the Niagara-on-the-Lake Rotary Club, another 25 trees were planted at Paradise Grove on October 19, 2024. These trees were donated to Niagara Parks by a local student and her family in recognition of her birthday. On October 26, 2024, NPC once again hosted its annual Community Tree Planting Event across from Old Fort Erie in which nearly 500 trees were planted by more than 80 volunteers. The purchase of these trees was made possible by the Niagara Parks Foundation's Toonies for Trees Program.

In recognition of Destination Canada's RendezVous Travel Tourism tradeshow being hosted in Niagara Falls in 2027, Niagara Falls Tourism provided NPC with funding to plant 1100 trees, representing the number of delegates expected to attend the tradeshow. This funding was then leveraged to obtain an additional $16,000 to increase this total to 2000 trees. As a result, all 2000 native trees have been planted on a vacant parcel of land adjacent to Dufferin Islands and Rapidsview Park. Approximately 30 students from Brock University participated in the planting of these trees on September 23, 2024.

To further support NPC's ongoing tree planting efforts, staff have continued to engage with the Niagara Peninsula Conservation Authority and their successful application to the Government of Canada's 2 Billion Trees Program. Through this program, there are opportunities to offset costs related to the purchase of trees as well as develop a seed collection and propagation strategy for the Niagara Region over the next four years.

2) A minimum of 75% of the shoreline covered in native vegetation.

Annual Goal to meet target: Over the next five years, a minimum of 5% of the shoreline will require the removal of invasive species and replanting with native species annually.

Shoreline vegetation is critical to prevent erosion, improve water quality, mitigate flooding, and provide wildlife habitat. While native trees, shrubs, grasses, and wildflowers have deep growing roots that bind the soil, invasive species provide little value, often have shallow roots, and chemically alter the soil and prevent the growth of native vegetation. Of the shoreline that is currently vegetated, approximately 50% is dominated by native vegetation. In order to meet this target, approximately 8km of shoreline must be converted from invasive species to native vegetation annually over the next 4 years. While environmental stewardship staff continued to work along the upper Niagara River to remove pockets of dense growing invasive species (e.g. Japanese Knotweed), progress was limited by delays in receiving an exemption to the Ontario Pesticide Act from the Ministry of Natural Resources which is required to effectively treat and prevent the regrowth of invasive species. It is anticipated that this exemption will be received prior to the 2025 season and the removal of invasive species along the upper Niagara River will be prioritized.

Through the Niagara Parks Foundation, NPC received $20,000 in funding from the Niagara Community Foundation to manage and restore the Niagara River shoreline. As a result, bioengineering was used at several locations to prevent further erosion on over 300m of shoreline. Bioengineering utilizes a combination of plants, biodegradable geo-textiles, root wads, and stone to stabilize the shoreline, blending in with the natural environment. In addition, a 100m stretch of shoreline was also restored within Dufferin Islands using these bioengineering techniques. This shoreline area continues to be impacted by visitor trampling and excessive vegetation damage by an over-population of waterfowl.

As per NPC's Viewpoint Management Strategy, staff continue to manage designated viewpoints along the Niagara River shoreline using sustainable best management practices, minimizing impacts to native vegetation while providing spectacular views of the river. During the 2024 season, all designated viewpoints have been completed.

3) Increase biodiversity using 5-10-20 rule.

Increasing biodiversity is another key pillar of the UFMS. Natural areas with low diversity are at greater risk of decimation by invasive species and climate change. NPC continues to deal with the impact that the invasive Emerald Ash Borer has had on its forest canopy which was dominated by a monoculture of Ash trees. Niagara has the benefit of being within the Carolinian Forest zone, which historically had a high biodiversity with hundreds of tree and shrub species. NPC continues to utilize the 5-10-20 rule for tree species selection where no more than 5% of one species, 10% of one genus, and 20% of one family make up the species composition for larger scale tree planting initiatives. Staff have updated all tree planting lists to incorporate this rule, in combination with soil health analysis, while considering current and future threats (e.g. utilizing fewer oak species due to nearby Oak Wilt).

In addition to species diversity, it is critical to consider age and size distribution. When planting trees and shrubs, a variety of tree stock sizes and age is being utilized, ranging from large-caliper ball and burlap trees to bareroot seedlings. Annual tree planting also ensures a range of age structures within the urban forest.

4) Preventative tree maintenance and removals.

Preventative tree maintenance, such as pruning, is critical for the long-term health of trees. Pruning is necessary to removes hazards, encourages tree growth, and ensures trees are structurally sound. Guided by NPC's forestry standards, preventative tree maintenance is completed on cycles ranging from annually in high priority/risk zones to 10-year cycles for low priority/risk zones. In 2024, 176 trees have been pruned to date. This preventative maintenance has also contributed to a decrease in after-hours call-ins of forestry staff to remove fallen trees and limbs that may be blocking roadways, trails, and/or creating safety hazards.

In Niagara Parks, the removal of living trees is avoided whenever possible. Trees are only removed when they are deemed a hazard, or when they are dead, declining, or damaged to a point where their retention is not recommended in the interest of public safety. Occasionally, live trees may also need to be removed when they interfere with other trees, buildings, driveways, utility wires, and other infrastructure. Invasive tree species are removed whenever possible, with their stumps treated with herbicide to prevent further spread and suckering. In 2024, 282 trees have been removed, including 97 Ash trees that have succumbed to Emerald Ash Borer and 16 damaged during storm events.

The removal of 282 trees is substantially lower than the over 1,500 trees that were being removed annually over the past several years. The loss of any trees, however, still adds to the overall replacement pressure to achieve the 35% canopy cover target by 2028. Since the creation of the Urban Forestry Management Strategy, replacement targets have been adjusted to provide a net gain of canopy on an annual basis (see Table 1). Niagara Parks utilizes a range of replacement ratios

starting at a minimum three new trees for every one tree removed, depending on the size of the tree being removed as per the table below:

Table 1: Tree Replacement Ratio

DBH of Tree to be Cut/Removed	Number of Replacement Trees Required
20 cm – 30 cm	3
31 cm – 50 cm	4
51 cm or greater	5

5) Inspections and Tree Risk Assessment

Visual tree inspections are performed weekly at Niagara Parks to identify any immediate threats (e.g., hanging limbs) or future hazards (e.g. signs of tree rot). As hazards are identified, their locations are recorded, prioritized based on their risk, and placed into the Forestry Team's work plan. Following storm events, additional inspections are also completed to identify any signs of storm damage. In-depth tree inspections are also completed by the Forestry Supervisor and lead-hand arborists on a cycle ranging from one to four years as determined by NPC's Forestry Standards, which consider visitor density and existing infrastructure. These in-depth inspections require the arborists to get within the tree canopy to proactively identify any potential failure points. Proactive tree inspections and assessments are also contributing to fewer after-hour call-ins for forestry staff and is improving the safety of NPC's forest canopy.

6) Invasive Plant Species Management

Invasive plant species, such as Tree-of-Heaven, European Buckthorn, Phragmites (Common Reed), and Japanese Knotweed have the ability to outcompete native plant species and alter soil chemistry, inhibiting native plant growth. This is detrimental to species diversity and habitat for Niagara's native wildlife. Some of these invasive species are also host plants to highly destructive invasive insects. For example, Tree-of-Heaven is the preferred host plant of the Spotted Lanternfly, which can have detrimental impacts to Niagara's wine industry should it become established in Niagara. With $22,000 in funding support from the Ontario Invasive Species Centre, provided through the Niagara Parks Foundation, staff have prioritized the removal and treatment of Tree-of-Heaven along the White Water Walk attraction. This area of the gorge represents the highest density of this invasive species on NPC property. Staff are using a combination of cutting and herbicide injections to control this species.

When managing invasive species, Niagara Parks staff continue to utilize integrated pest management (IPM) techniques. IPM techniques may include mechanical removal (by hand or tools), chemical treatments, or even through prescribed burning. This ensures current best practices are used while minimizing impacts on the surrounding environment. For example, during the summer and fall of 2024, NPC piloted the use of a herd of goats to graze on the highly invasive and fast growing phragmites. Used over the past few years by Ontario Power Generation, this technique was selected for the Gonder's Flats wetland site to avoid the use of herbicides within standing water and populations of Swamp Rose Mallow, a species at risk. Goats have been shown to inhibit regrowth of phragmites, kill the viability of the seed, and fertilize and aerate the soil. Approximately one acre of phragmites was removed through this method, which will be reviewed in spring 2025 to determine success. The biggest success of this initiative to date however is the positive media coverage received, reaching national audiences through media outlets and publications such as the CBC and MacLean's magazine. It is estimated that more than $1.8 million in earned media was gained from this initiative, bringing attention to NPC's environmental stewardship mandate and actions.

Current and Emerging Challenges

Oak Decline and Oak Wilt

Oak Wilt is a disease caused by an invasive fungus that can cause tree mortality within weeks of infection. While Oak Wilt is considered to be a relatively slow-moving disease, it can be spread through the roots of adjacent infected trees and up to a 1.5km radius of infected trees by small beetles which are attracted to the fruity scent of the fungus. There are currently no remedies for Oak Wilt in Canada. There are, however, measures that can be taken to limit the spread of the disease including the elimination of pruning Oak trees between March to November of any given year and avoiding damage to tree bark by mowers and line-trimmers. Any unavoidable open wounds must be painted using latex paint.

During the summer of 2023, the presence of Oak Wilt was positively identified in Canada for the first time, within the City of Niagara Falls and subsequently, Niagara-on-the-Lake. During this time, Niagara Parks contacted the Canadian Food Inspection Agency (CFIA) to also test Oak trees on its property that had recently died or were in decline. Fortunately, all testing within Niagara Parks has come back as negative for Oak Wilt to date. In 2024, no further positive detections of Oak Wilt have been found in Canada.

In the short-term, should Oak Wilt be positively identified within Niagara Parks, procedures set by CFIA will need to be followed. Infected trees are required to be cut down with all material, including wood chips, to either be buried a minimum of 2m or incinerated if proper equipment is available. Remaining stumps need to be covered in plastic until they can be grinded and/or removed, noting

that the fungus can remain in the infected tree roots for up to several years. If the removed trees have to be hauled off-site to a suitable storage area, it must be done within 30 minutes, followed by a thorough disinfection of all tools, equipment, and trucks used.

Should it fully establish within Niagara Parks, Oak Wilt will have devasting long-term impacts to NPC's forest canopy and operations. As a sizable proportion of NPC's forest canopy north of the falls is composed of Oak trees, these trees will pose a hazard to public safety and infrastructure. The removal and processing of thousands of mature oak trees will strain existing forestry resources and equipment. Based on the impacts Emerald Ash Borer has had to the forest canopy south of the falls, similar visual and resource impacts can be expected with Oak Wilt in the north.

Hemlock Woolly Adelgid

In coordination with CFIA, Niagara Parks has been actively monitoring for the invasive Hemlock Woolly Adelgid since 2013. Hemlock Woolly Adelgid (HWA) is an aphid-like insect that attacks and kills hemlock trees. Its egg sacs, which look like tiny cotton balls are typically the only visible sign of this pest before the tree begins to decline. It can be spread by wind, animals, and human movement of nursery stock, logs, and other wood products, including firewood.

First reported in Canada in British Columbia in the 1920's, HWA was found in Ontario for the first time in 2013 at the Niagara Glen where it was subsequently eradicated through the removal of the infected trees. While continued annual monitoring throughout Niagara Parks found no further outbreaks between 2015 and 2018, HWA was detected in the Niagara Glen once again during the summer of 2019 where infected trees were subsequently cut and burned on-site. HWA has since been found in several other areas within Southern Ontario, including the Lake Erie shoreline and the City of Hamilton.

During annual HWA inspections in 2023 and 2024, staff confirmed that HWA was once again present in the Niagara Glen. As there are over three hundred mature Eastern Hemlock trees found within the Niagara Gorge as well as within Dufferin Islands and the Botanical Gardens, NPC has purchased equipment that can inject insecticide directly into the trees. This provides longer term protection and reduces the need to cut and burn infected trees. All Hemlock trees within the proximity of the infected trees have been injected to date.

Spotted Lanternfly

To date, the Spotted Lanternfly (SFL) has not established in Canada, however populations have been found in the United States (U.S) including the nearby states of Pennsylvania and New York. SFL is an insect that feeds on and kills its host plants, which include more than 70 species, such as Black Walnut, Tree of Heaven, and cultivated grapes. The arrival of the SFL in Niagara could result

in the significant decline of native tree species and forest habitat as well as massive economic impacts to Niagara's wine industry if left untreated. It is anticipated that SFL will be in Canada within the next five years.

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) is continuing to conduct monitoring of SFL on Niagara Parks property using sticky band traps. The Ontario Invasive Species Centre has also provided NPC with educational signage to install at key locations within the park to increase awareness of this emerging threat. As the invasive Tree-of-Heaven is a preferred host of SFL, NPC's Forestry and Stewardship teams have prioritized the control and removal of existing Tree-of-Heaven trees from NPC property.

Forest Tent Caterpillar

While not an invasive species, the Forest Tent Caterpillar (FTC) is still considered a forest pest to NPC's tree canopy. Easily identified by the 'tent' like webs they create, FTC can be a significant defoliator of trees, however it rarely leads to tree mortality. While most healthy trees can often tolerate a single defoliation in a year, a second defoliation by another pest, such as Spongy Moth, can potentially lead to tree health decline or mortality. As a result, NPC actively monitors FTC populations, especially in areas where there is overlap with Spongy Moth populations.

Wildlife Impacts

The return of native wildlife, such as beavers to Niagara Parks property, including Dufferin Islands, requires ongoing monitoring of trees that have been chewed by beavers, to ensure public safety. In high profile areas, tree protections (hardware cloth) have been installed to limit damage to native trees. Additionally, as part of the Dufferin Islands Visitor Experience and Ecological Enhancement Initiative being implemented through the funding support of TD Canada Bank, NPC has installed eight "Beaver Cone" flow protectors to prevent the blockage of culverts within the Islands by beavers.

While efforts have been taken to reduce the populations of Cormorants throughout the province, Cormorants continue to inhabit numerous mature trees directly adjacent to the Niagara River shoreline. The chemical composition of their feces often results in tree and branch mortality. Due to the location of these trees, the threat to public safety is low, however the loss of these trees reduces biodiversity and tree canopy cover of the Niagara River. As many of the mature trees along the upper Niagara River shoreline are within the same age range, staff have prioritized the replanting of trees along the Niagara River shoreline over the past two years.

Illegal Cutting and Dumping

There continues to be several instances of illegal pruning and cutting of shoreline vegetation on NPC's property. Removal of native species and improper pruning techniques leads to costly shoreline erosion and allows for the establishment of dense growing invasive species. In addition, illegal dumping of yard waste onto NPC property also continues to be a problem. Aside from being unsightly, yard waste has the potential to spread invasive species and choke out native plant species. The unauthorized removal of vegetation and dumping on Niagara Parks property is strictly prohibited under the Niagara Parks Act.

Staff continue to engage with residents who have cleared shoreline vegetation and include messaging in resident newsletters to educate about the importance of shoreline vegetation and the potential damage being caused.

Research and Collaboration

Vineland Research and Innovation Centre

The Vineland Research and Innovation Centre (Vineland) has extensive expertise related to managing Ontario's urban forest, ranging from soil science, nursery production, and effective tree planting methods and strategies. To enhance NPC's capacity and increase tree planting success, Vineland has been engaged to further expand knowledge sharing to NPC staff and School of Horticulture students. Over the next five years, this new Memorandum of Understanding (MOU) aims to guide future tree plantings through soil health analysis and amendments, review opportunities for tree production (seed collection and nursery development), and develop best practices to increase the forest canopy within Niagara Parks.

During the 2024 season, six current and future tree planting sites were sampled for soil health. The results of this analysis have been effective at guiding tree species selection and the addition of amendments (e.g. compost) to the soil. Additional soil analysis will be completed across Niagara Parks in 2025.

As a next phase of this partnership, NPC and Vineland will be looking at the feasibility of establishing food forests and micro forests within Niagara Parks. These food forests utilize species that produce fruits and seeds that could be consumed, which could potentially be utilized within NPC's culinary offerings. These food forests, however, will require additional maintenance and management to ensure they remain viable.

Brock University

With a new five-year MOU signed with Brock University in 2024, staff have continued to collaborate with the Environmental Sustainability Research Centre to advance NPC's environmental

stewardship mandate. Brock's faculty and students have conducted several research projects within Niagara Parks, including assessing connections to nature, impacts of climate change on NPC's forest canopy, age structure of NPC's forest canopy using dendrochronology (tree coring), and a comparison between constructed and natural wetlands. As a priority in 2025, a Memorandum of Agreement (MOA) will be developed with the ESRC to further develop and define mutually beneficial initiatives that support both NPC and provide hands-on learning opportunities to students.

Greening the Landscape Research Consortium

To support growing the urban forest canopy using best practices and research, Niagara Parks has been a member of the Greening the Landscape Research Consortium since 2021. The consortium, which is being facilitated by the Vineland Research and Innovation Centre, comprises numerous members who make up a part of the urban tree value chain, such as tree nurseries, landscaping organizations and businesses, and public agencies that undertake forest management and tree planting initiatives, including municipalities and Niagara Parks. Over the first three years of this collaboration, the following five focus areas were studied:

- Best Practices for Tree Establishment and Maintenance,
- Urban Tree Grow Contracts,
- Training and Tools,
- Canopy Climate Readiness,
- Public Perceptions of Urban Tree Planting and Management.

Starting in 2025, a new set of focus areas and research projects will be developed and prioritized by the consortium membership. Participation in this consortium ensures that Niagara Parks is on the front line of current best practices and research related to urban forest management.

Forest Management Planning with Niagara College

In collaboration with Niagara College's Ecosystem Restoration Program, site specific forest management plans have been completed for the Paradise Grove Black Oak Savannah and Brown's Point in Niagara-on-the-Lake and Locust Grove in Queenston. These plans identify threats such as invasive species and present opportunities to utilize best management practices to support a resilient forest canopy while providing unique recreational opportunities. During the 2024/25 season, students have completed a land management plan for the Chinquapin Oak Savannah, located

across from the Botanical Gardens Arboretum and are in the process of developing a Niagara gorge restoration strategy for these unique but difficult to access terrains.

Implications

Land Management - Operations

The management of NPC's forest canopy requires constant proactive maintenance. Regular tree health assessments and maintenance pruning is necessary to provide a safe environment for visitors and staff and ensure the trees can grow to maturity. The arrival of another invasive species pest, such as Spotted Lanternfly, and an increase of extreme storm events would place considerable pressure on Parks Operations. With the arrival of Oak Wilt into the Niagara Region, forestry practices have already had to change, including timing restrictions on pruning oak trees. Should Oak Wilt establish within Niagara Parks, there would be a need to modify tree processing procedures and a greater focus on sterilizing tools and equipment to reduce the spread of this harmful disease.

Financial

Within the 2024/25 budget, $75,000 has been budgeted for NPC's tree planting program. Since the launch of the Niagara Parks Foundation's Toonies for Trees program at point-of-sale terminals in 2023, the program has successfully raised over $37,000 for tree planting in Niagara Parks. This funding is used directly to support NPC's Community Tree Planting events which teaches volunteers how to select, plant, and maintain trees. Through funding programs, such as Canada Trees for Life, there is an opportunity to match all of the funds raised through the Toonies for Trees Program. Applications to the program will be submitted in early 2025.

NPC continues to have success on acquiring funding support for environmental stewardship initiatives from external sources. During the 2024/24 fiscal year, NPC, through the Niagara Parks Foundation, acquired the following funding:

- Niagara Falls Tourism - $11,000
- Canada Trees for Life - $16,000
- Ontario Invasive Species Centre - $22,000
- Niagara Community Foundation - $20,000
- TD Canada Bank – Year 2 of 3 of $400,000 contribution to Dufferin Islands restoration.

The long running memorial tree program also provides funding for the planting of large-caliper tree stock. In addition, staff continue to seek external grant programs and partnership opportunities to support tree planting initiatives.

Staffing

As seen with the arrival of the Emerald Ash Borer (EAB), a single invasive species can require a substantial increase in staff resources. Prior to the arrival of EAB, approximately 400-500 trees were removed annually. At the peak of the EAB infestation, the forestry department was required to remove over 4000 trees annually, the majority being ash trees. Should Oak Wilt establish within Niagara Parks, the devastation to the forest canopy would be comparable to that caused by EAB, especially north of the falls. The difference, however, is that oak trees impacted by Oak Wilt can die within weeks, opposed to the 2-3 years it took for Ash trees to succumb to EAB. Fortunately, the spread of Oak Wilt is considerably slower than that of EAB, so at least initially, the removal of infected Oak trees would be somewhat manageable. The continued monitoring and management of invasive species is critical for ensuring the management of NPC's forest canopy is sustainable.

Ongoing training of NPC staff is also critical to ensuring current best practices and research are being utilized to manage NPC's urban forest. Through Arboriculture Canada, members of NPC's forestry team have completed training in Tree Risk Assessment, Tree Appraisal, and Tree Biology and Care. Staff have also received training directly from the CFIA and Ontario Invasive Species Centre on managing Oak Wilt.

Legal and/or Legislative

Under the Occupiers Liability Act, NPC must ensure that natural areas and related infrastructure are maintained in a safe condition and that NPC is not intentionally putting visitors to Niagara Parks in harm's way. The UFMS and associated Forestry Standards provide direction for regular tree maintenance and inspections which will improve overall safety and visitor experiences.

Consultation

Staff have consulted, and will continue to consult, with other departments and outside agencies to ensure best practices are being utilized as well as compliance with applicable policies and legislation. Niagara Parks has been active in pursuing partnership opportunities related to improving the forest canopy with Vineland Research and Innovation Centre, Brock University, Niagara College, and the Ontario Woodlot Association, as well as hosting community planting events and participation in the Greening the Landscape Research Consortium.

Dependent on the scale of the tree management initiative, staff continue to engage in agency and public consultation through media releases and social media posts. Staff will also continue to produce and release communications and digital media to inform the public about NPC's stewardship initiatives and the benefits of these natural assets. Over the past year, NPC has been engaged by neighbouring municipalities to learn about its urban forestry and invasive species management practices.

Due to an increased demand and interest in sustainability initiatives, staff also collaborate with the Group Sales department to showcase NPC's sustainability initiatives to potential corporate group and corporate clients, such as tree planting events or contributions to habitat restoration projects.

Alternatives for Consideration

As information only, no alternative is recommended.

Rationale for Recommendation

Implementation of the Urban Forest Management Strategy provides NPC with the ability to manage a suitable balance of functional wildlife habitats and natural areas while providing exceptional views, recreational opportunities, and safe access to the Niagara River. Trees are one of the few assets that appreciates exponentially in value over time. They are a long-term investment that must be actively managed to ensure optimal benefits are realized. The proactive management of NPC's forest canopy is starting to reduce after-hour call-ins (overtime) and create greater efficiencies. Staff continue to pursue training and are utilizing current research and best practices to guide tree selection, locations for planting and management of existing vegetation, including removals, and to preserve key viewing areas and landscapes. Failure to actively manage NPC's forest canopy would result in unsafe conditions, poor quality wildlife habitat, and unsightly park and natural areas dominated by invasive species and/or unhealthy trees.

The management of the forest canopy provides numerous educational and experiential opportunities to students, corporate groups, and visitors to Niagara Parks. Tree planting events and interpretive hikes and presentations have proven to be very popular, leading to revenue generation opportunities.

NPC will continue to engage with the public and adjacent stakeholders as it continues to manage its tree canopy. Collaboration will also be necessary to ensure access to the best available research and resources for ongoing monitoring. The continued soil health analysis will be critical for identifying stresses to the forest canopy and improve planting success.

Relevance to Strategic Plan

Directly contributing the goals of Niagara Parks 2018-2028 Strategic Plan, these initiatives assist NPC to protect and enhance the natural heritage of the Niagara River corridor while providing a superior and safe visitor experience. These initiatives align with the Strategic Plan as follows:

Preserving and showcasing our rich heritage, culture and lifestyle

- NPC's unique natural areas provide eco-tourism and educational value-added opportunities for visitors, showcasing spectacular views memorable adventures.
- The Urban Forestry Management program improves NPC's ability to manage and maintain its natural areas, ensuring they remain safe, resilient and provides essential benefits.

Leveraging and activating our natural wonders and iconic experiences

- Provides an opportunity to promote professional development and build stronger working relationships with strategically aligned agencies.
- Demonstrates leadership in understanding diversity of ecology, physiography, culture and history of NPC property. This program builds on NPC's image as an international leader in environmental sustainability and education as we strive to utilize best practices.

Supporting a dynamic business environment

- Leverages NPC's existing resources and partnerships to acquire additional funding to support NPC's mandate.

Taking experiences, services and hospitality to the next level

- A comprehensive program will ensure efficient implementation of projects and reduce maintenance activities, while maximizing staff resources.

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Title: Project Manager, Forest Health

Submitted by: _____
Name: Steve Barnhart
Title: Senior Director, Planning, Environment and Culture

Authorized by: _____
Name: David Adames
Title: Chief Executive Officer

Date: January 9, 2025

Appendices

Appendix A: Urban Forestry Management Strategy 2024 Update – Presentation

NIAGARA PARKS

Urban Forestry Management Update

2024

3 Pillars of Environmental Stewardship

Resilient Forest Canopy

- 35% Canopy Cover
- Improved forest health and increased planting success
- Planting plans based on existing conditions (e.g. soils)

Biodiversity

- Increased Species & Habitat Diversity
- Utilized 5-10-20 rule for planting plans
- Species at Risk and Invasive Species Management
- Seed Collection and Propagation

Shoreline Management

- 75% Shoreline Vegetation
- Shoreline Erosion Mitigation
- Coastal Wetlands
- Climate Change Resiliency
- Viewpoint Management

Active 2024 Programs:

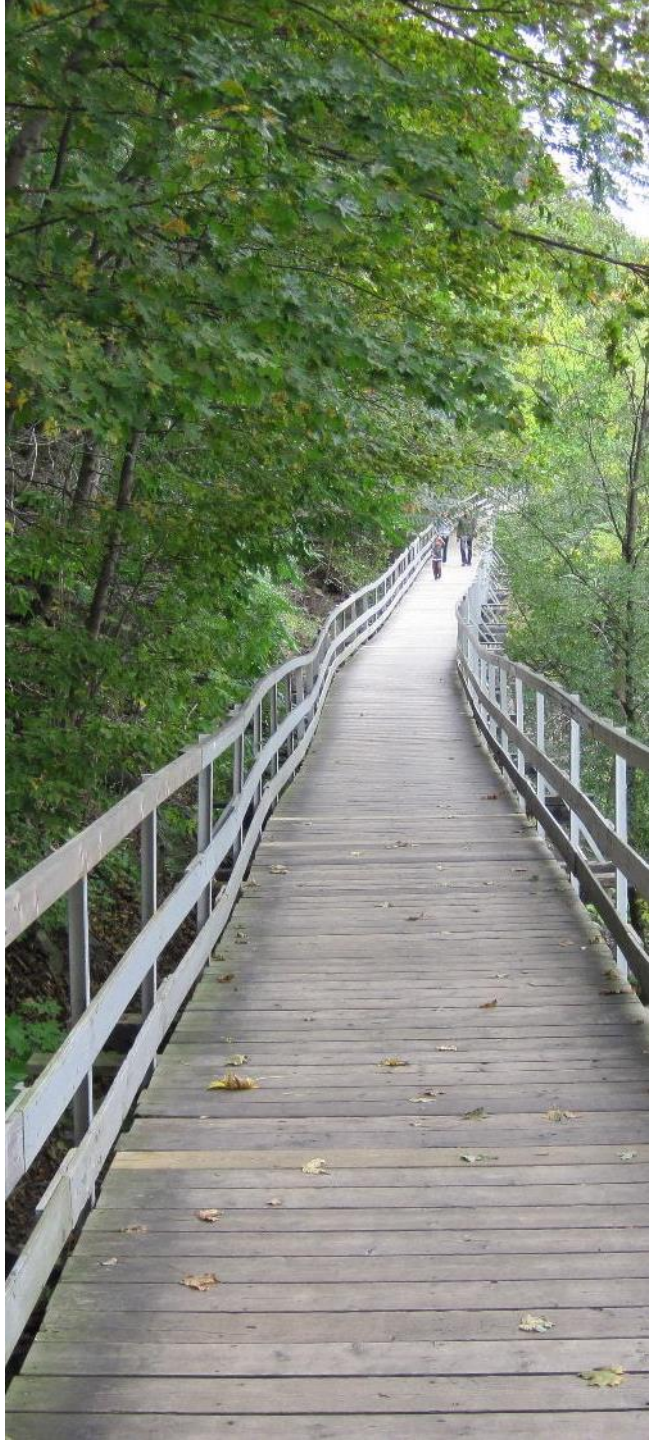
- Forest Canopy Management
- Species at Risk Management
- Invasive Species Management
- Prescribed Burns at Paradise Grove, Whirlpool Golf Course, and Botanical Gardens – Legacy Garden
- Chippawa Grasslands Restoration
- Completion of Indigenous Plant installations at Niagara Glen
- Certified Audubon Cooperative Sanctuaries for Golf
- Niagara River Coastal Wetland Restoration – Gonder's Flats
- Natural Shoreline (Riparian zones) Restoration

2024 Urban Forestry Update

- Over 7350 trees planted, including 200 large caliper stock
- More than 150 students participated in planting over 500 trees at the Niagara Glen
- Donation and planting of 25 trees at Paradise Grove with Land Care Niagara and NOTL Rotary Club
- More than 500 trees were planted as part of the Community Tree Planting Event at Old Fort Erie – funded by the Toonies for Trees Program
- Rapidsview Tree Planting of 2000 trees with funding from Niagara Falls Tourism and Canada Trees for Life

Soil Health Analysis

- Considers Physical, Biological, Chemical, and Hydrological components of soil
- Guides species selection
- Recommends soil amendments (e.g. compost)
- Ensures the right tree is planted in the right place!
- Improves long-term survival
- Six current and future planting locations sampled in 2024

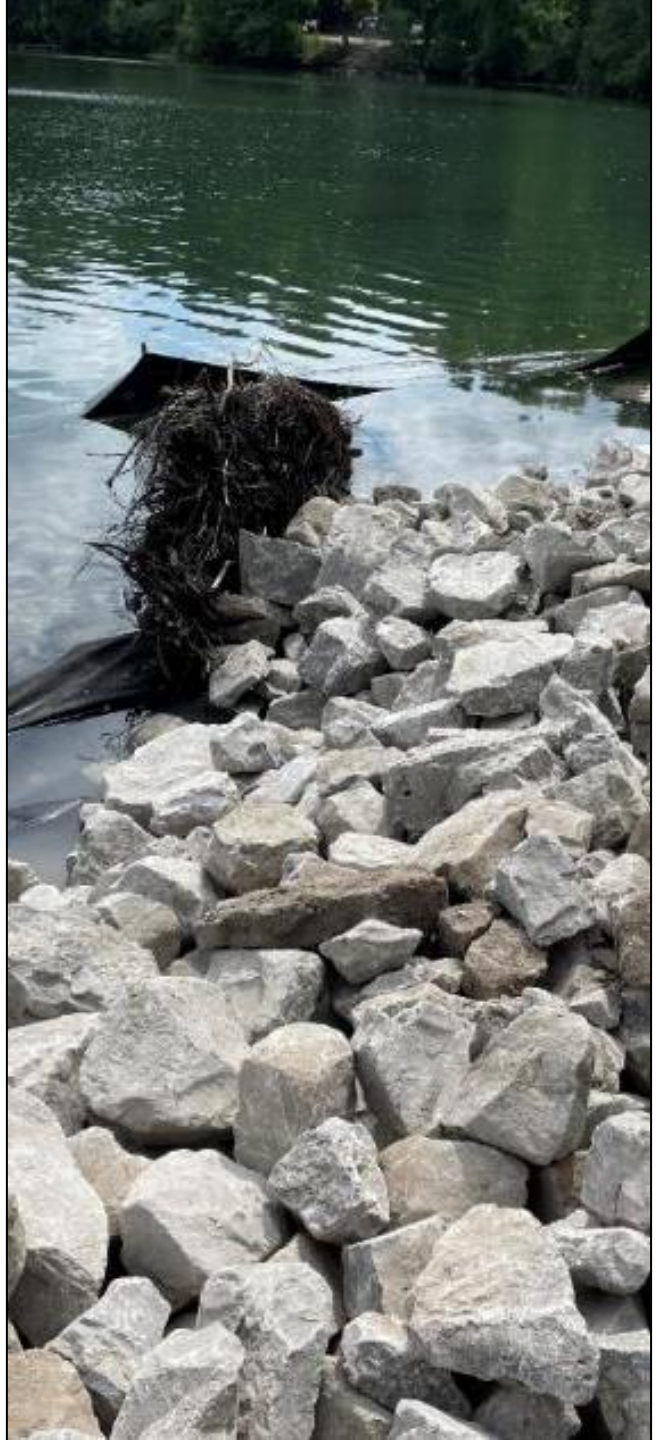


Invasive Species Management

- Implementation of Invasive Species Strategy that was developed with Brock University
- Management of Tree of Heaven along White Water Walk – funding provided by Ontario Invasive Species Centre
- Pilot project using goats to manage Phragmites at Gonder's Flats
- Priority species:
  - Phragmites – Common Reed
  - Tree of Heaven
  - Knotweed
  - Flowering Rush

Invasive Species Monitoring

- Monitoring for current and future threats:
  - Oak Wilt (CFIA)
  - Spotted Lanternfly (Invasive Species Centre, OMAFRA)
  - Hemlock Woolly Adelgid (CFIA, ISC)
  - Spongy Moth
  - Box Tree Moth
- Removal and/or treatment of target species (Box Tree Moth, Buckthorn, Tree of Heaven, Honeysuckle) along shoreline and within natural areas
- Eastern Hemlock Trees within Niagara Glen injected to prevent spread of Hemlock Wooly Adelgid



NIAGARA PARKS

Shoreline Restoration

- Removal of invasive species and planting with native vegetation
- Management of all NPC designated viewpoints
- Niagara River shoreline erosion mitigation using bioengineering – funding provided by Niagara Community Foundation
- Erosion control at Dufferin Islands

Memorandum

Date:	January 9, 2025
To:	Property and Infrastructure Committee
From:	Steve Barnhart, Senior Director, Planning, Environment and Culture
Subject	Niagara Parks Soil Health Analysis with Vineland Research and Innovation Centre

The purpose of this memo is to provide an update on the soil health analysis work being implemented in collaboration with the Vineland Research and Innovation Centre through the new Memorandum of Understanding (MOU).

Overview

As one of the top priorities of the new partnership between The Niagara Parks Commission (NPC) and the Vineland Research and Innovation Centre (Vineland), staff began undertaking a soil health analysis of NPC's priority tree planting areas during the summer 2024. Soil health can be defined as the capacity of the soil to provide ecosystem services (e.g. support plant growth). An analysis of the soil quality and composition is essential for promoting plant health, selecting appropriate species, increasing survivability, and identifying the need for amendments to improve soil quality prior to or during planting. Previously, NPC would utilize a general approach to selecting tree and shrub species based on existing conditions such as overall soil type (clay, loam, sand), moisture levels, and/or shade conditions. This often led to mixed results with tree survival falling below the preferred 80% threshold after three years, with no obvious reasons. In many instances, it is possible that tree mortality could be attributed to the wrong species of tree being planted in a particular area or the existing soil health was too poor to sustain tree establishment in the first place.

Current research has shown that tree health and planting success (survival) is highly dependent on several interconnected soil health factors such as pH, soil respiration, compaction, organic matter/microbial content, and electrical conductivity. Simply put, tree health is significantly impacted by what is underground compared to what is seen above ground. As a result, Vineland looks at eight soil regulating parameters, which encompass the physical, chemical, biological, and hydrological features of the soil to determine its health. Understanding the conditions below the surface will allow NPC to ensure that the right tree is being planted in the right place.

During the summer of 2024, six priority tree planting areas were selected for soil health analysis including the Community Tree Planting event site across from Old Fort Erie, Smuggles Cove and

Laura Secord Homestead properties in Niagara-on-the-Lake, and areas adjacent to the Niagara Glen and Upper Whirlpool Woods in Niagara Falls. These sites were prioritized as current or potential future planting areas or where existing trees were appearing unhealthy. Vineland staff conducted training of NPC employees to collect proper soil samples, which would undergo analysis at their lab. In total, nearly 100 soil samples were collected and analyzed. Once completed, Vineland provided an easy to understand “Soil Health Report Card” for each site based on the eight soil health parameters. These parameters are highly interconnected, so if one element is deemed poor, it could be preventing the ability of the plant to absorb essential nutrients, even if the nutrients are present, leading to a decrease in plant health and survival.

Soil Health Analysis Results

During the fall of 2024, Niagara Parks approved funding from Niagara Falls Tourism and Canada Trees for Life to plant 2000 trees within Niagara Parks. To accommodate this number of trees, a vacant fallow area of the Rapidsview Parking lot property, directly adjacent to Dufferin Islands, was identified as a suitable planting location. As a result, a soil health analysis was prioritized for this location to guide species selection prior to project implementation. Twenty-six samples, representing 13 locations across the 3.5-hectare (8.5 acre) site, were collected by NPC staff and analyzed at Vineland’s modern, full-service soil laboratory.

Overall, the site was deemed to have relatively healthy soils. Therefore, soil amendments would not be required prior to tree planting but incorporating compost during the planting was recommended. An example of the results can be seen below in Figure 1.0. If soil conditions were deemed poor, a strategy for amending the soil would have been provided (e.g. addition of compost, fertilizing, neutralizing acidic soils, etc.). Mulching and maintaining watering schedules were, however, identified as a priority after planting based on soil conditions.

In addition, during the summer of 2024, Vineland also conducted a soil health analysis along Whirlpool Golf Course’s 18th hole, which was undergoing landscape changes to improve safety along the Niagara River Parkway. Given the proximity to the Niagara Parkway, this soil health analysis was essential for identifying and mitigating any impacts from road salt, as well as guiding species selection. Over 65 large caliper trees were selected and planted as part of this initiative.

Poor Condition
Declining Condition
Sub-Optimal Condition
Optimal Condition

Samples 1-5 (Top-Soil)

All soil health results are ranked to characterize soil condition with respect to its impact on tree growth and productivity

Soil Test	Recommended Range	Rapidsview Pit 1 0 - 20cm	Rapidsview Pit 2 0 - 20cm	Rapidsview Pit 3 0 - 20cm	Rapidsview Pit 4 0 - 20cm	Rapidsview Pit 5 0 - 20cm
Soil texture	n/a	Silt Loam	Silt Loam	Silt Loam	Silt Loam	Loam
Bulk density (g/cm3)	**<1.4 for Coarse, <1.2 for Medium, <1.1 for Fine Textured Soil**	0.98	1.33	1.07	1.02	1.04
Soil organic matter (%) *Particulate + Mineral OM*	**>4% for Coarse, >6% for Medium and >8% for Fine Textured Soil**	7.6	5.2	8.3	9.1	12.4
Particulate organic matter (%) *Food for soil microbes*	**>2% for Coarse, >3% for Medium and >4% for Fine Textured Soil**	2.3	1.0	2.2	4.3	3.6
Soil respiration (mg/g) *Soil microbial life*	**>1**	0.75	0.70	1.10	1.50	1.80
pH	**6.0 - 7.0**	7.4	7.2	7.3	7	6.6
Electrical conductivity (µS/cm) *Soil salinity*	**300-1000**	220	170	170	190	280
Saturated hydraulic conductivity (cm/day) *Rate of infiltration when saturated*	**36-72**	647	15	321	22	69

Figure 1: Rapidsview Planting Site – Soil Health Analysis Summary

Species Selection

Not all trees require the same growing conditions. Some can tolerate a range of conditions (e.g. pH) while others require very specific conditions to reach their full potential. Based on Vineland's previous research on optimal growing conditions for a wide variety of tree and shrub species in Niagara, the soil health report also provides recommendations for the species that should be considered in a planting plan based on the existing soil conditions at the site (Figure 2). This list has been highly beneficial for staff to develop an appropriate planting plan with the best chance of survival. As soil conditions are typically not uniform throughout a large parcel of land, Vineland has further refined the species list to reflect the varying conditions throughout the site. Vineland has also provided a map to identify where each species will thrive (Figure 3).

X	Poorly Suited to Planting Conditions
✓	Well Suited to Planting Conditions

Tree Species Selection

		Planting Recommendations (according to soil health)		
Common Name	**Scientific name**	**Adjacent to Parking Lot and Burning Springs Hill**	**Middle Section of Planting Area**	**Parking Lot Entrance**
Acer rubrum	Red Maple, Swamp Maple, Soft Maple	X	✓	X
Acer saccharinum	Silver Maple, Soft Maple	✓	✓	✓
Acer x freemanii	Freeman Maple	✓	✓	✓
Aesculus glabra	Ohio Buckeye, Fetid Buckeye	✓	X	✓
Amelanchier canadensis	Shadblow Serviceberry, Thicket Serviceberry	✓	X	X
Amelanchier laevis	Smooth Serviceberry, Allegheny Serviceberry	✓	X	X
Carpinus caroliniana	Blue-Beech, American Hornbeam, Musclewood, Ironwood	✓	X	X
Carya laciniosa	Shellbark Hickory, Big Shagbark Hickory	✓	X	X
Celtis occidentalis	Hackberry, Northern Hackberry, Common Hackberry	✓	✓	✓
Euonymus atropurpureus	Burning-Bush Euonymus, Spindle Tree, Eastern Wahoo	✓	X	X
Gleditsia triacanthos var. Inermis	Honey Locust (Thornless), Thornless Common Honeylocust	✓	✓	✓
Gymnocladus dioicus	Kentucky Coffeetree	✓	X	✓
Juglans nigra	Black Walnut, American Walnut	✓	✓	✓
Nyssa sylvatica	Black Gum, Black Tupelo, Sour Gum, Pepperidge	✓	X	✓

Figure 2: Recommended species list based on soil analysis

Figure 3: Map of recommended species throughout the Rapidsview planting area

NPC's Urban Forestry Management Strategy

The primary goal of NPC's Urban Forestry Management Strategy (UFMS) is to create a forest canopy that is resilient to current and future threats (e.g. disease, extreme weather events, etc.). As stressed and unhealthy trees are highly susceptible to disease and infestations, improving growing conditions is critical for increasing the resilience of these trees. To achieve a canopy coverage target of 35% as outlined in the UFMS, NPC has committed to planting a minimum of 5000 trees annually. This ambitious target represents a significant investment of financial and staff resources which can be wasted if trees continuously die off and need to be replaced. Therefore, conducting soil analysis to guide species selection before planting ensures the efficient use of NPC's resources, requiring less ongoing inputs to preserve and grow the forest canopy.

While there is an added cost (approximately 5-15% dependent on planting area and stock sizes) to conducting soil health analysis as part of a tree planting project, these costs are easily offset by a decrease in ongoing tree maintenance and replacement costs (labour and materials). To support its long-term forest management strategy, this soil health analysis program also allows NPC to be proactive in improving site conditions, whether it be topdressing the site with compost two years before planting or adding fertilizer at the time of planting. With a single tree costing up to $350 plus labour to install, it is important that NPC understands the existing soil conditions and that it is planting the right tree species, giving it the best chance to reach its full potential. Ongoing analysis of soil health across Niagara Parks' property is anticipated to continue to provide a comprehensive review of existing site conditions and guide future tree plantings.

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Authorized by: _____
Name: David Adames
Title: Chief Executive Officer

Date: January 9, 2025

Appendices

n/a

Memorandum

Date:	January 9, 2025
To:	Property and Infrastructure Committee
From:	Steve Barnhart, Senior Director, Planning, Environment & Culture
Subject	Dufferin Islands Visitor Experience and Ecological Enhancement Initiative – Year 2 Update

Overview

In October 2022, TD Canada Bank's – Ready Commitment program approved a grant of $400,000 to the Niagara Parks Foundation for the implementation of the Dufferin Islands Visitor Experience and Ecological Enhancement Initiative. Phased over three years, this initiative has the following primary objectives:

1) Provide environmental educational opportunities in the core of Queen Victoria Park: As one of the earliest restoration sites in Canada, Dufferin Islands has a rich and unique natural and industrial history providing numerous points of interest and topics which can be interpreted through various forms of media.

2) Protect sensitive natural areas from trampling, erosion, and degraded infrastructure: Assess and restore the constructed islands, moraine, shorelines, habitats, and aging infrastructure throughout Dufferin Islands.

3) Promote universal access through a natural environment: Improve trail conditions by resurfacing, re-grading of existing trail surfaces, construction of boardwalks at strategic locations, and improve existing sidewalks and curbs to provide accessible trail opportunities, protect adjacent habitats, and reduce ongoing maintenance.

4) Support the long-standing Winter Festival of Lights program: As a critical economic driver for the Niagara Region during the winter months, protection of the environment and restoration of Dufferin Islands infrastructure will continue to provide the majestic background for the Winter Festival of Lights.

To meet these objectives, a number of initiatives have been identified within the following focus areas:

- Land and Habitat Management
- Infrastructure Renewal – Weir Structures and Bridges
- Trail and Accessibility Improvements
- Education, interpretation, and Monitoring

Year 2 Progress

Over the past two years, the generous financial contribution through TD's Ready Commitment has provided numerous benefits to the community and visitors to Niagara Parks as well as directly contributing to the ecological restoration and conservation of Dufferin Islands. Within each focus area, the following projects have been initiated and/or completed in Year 2:

Habitat and Land Management

Completed in Year 2:

- Management of invasive species is ongoing. Staff engaged in the removal of phragmites, buckthorn and Tree of Heaven. Tree of Heaven, a fast growing, highly invasive tree has been prioritized as it is the primary host of the Spotted Lanternfly, an invasive species of insect that is currently migrating towards Niagara that can harm over seventy species of native trees.
- Eight beaver cones have been purchased and installed onto culverts throughout Dufferin Islands (Figures 1 & 2). Beaver cones reduce the likelihood of the culverts being blocked by debris from beavers and causing flooding. These devices have already been highly effective at mitigating the impacts of the resident beavers while providing an educational opportunity to discuss wildlife management.
- Installed/reinstalled five wildlife feeding signs, providing education about why feeding wildlife is harmful throughout the Islands.
- Another 100m of eroding shoreline has been restored using bio-engineering techniques. This included the installation of root wads and aggregate, as well as the planting of native vegetation to stabilize the bank (Figures 3-6).
- Over 5,000 native trees, shrubs, and wildflowers have been planted within the Islands, including along shorelines. This also includes the planting of 2000 trees and shrubs along the upper moraine to expand the existing forest canopy and reduce water flow down the moraine which could lead to erosion (Figures 7-10).

- Restoration of three degraded constructed islands has been completed. Restoration included the addition of soil and planting of native vegetation (Figures 11-15). Access to these islands is temporarily limited to walk-through only until restoration efforts can establish.
- Added to scope:
    - To support the selection of species and soil amendments, Vineland Research and Innovation Centre was engaged to conduct a soil health analysis along the upper moraine along Dufferin Islands.
    - A Landscape Architect was engaged to redesign the central picnic area which has been highly degraded due to over-use. The design is in progress and incorporates innovative solutions to manage stormwater run-off and high pedestrian traffic.

Trails and Infrastructure

Completed in Year 2:

- Engaged a consultant to develop boardwalk specifications which would allow AODA-compliant access into the interior Dufferin Islands. As the size and scope of this boardwalk has increased, Niagara Parks will be incorporating its installation into its capital budget planning process. In addition, the consultant has provided specifications to regrade and elevate portions of the interior trail system for continued accessibility. Installation of the Beaver Cones has also significantly reduced trail flooding, therefore previously wet trail areas are no longer a concern.
- Development of trailhead signage and interpretive signage content is ongoing.
- A structural engineer was engaged to assess and develop a restoration strategy for the failing weir (#5) upstream of the American Water Willow, a species at risk. Design work and cost estimates have been completed. Due to the high replacement costs, Niagara Parks will be incorporating the replacement of this weir into its future capital budget. Monitoring of the American Water Willow is ongoing.
- Added to scope:
    - In late 2023, the weir (#12) at the outflow of Dufferin Islands failed (Figures 16 & 17). As a result, a structural engineer has been engaged to design a new replacement weir for this location as well. This weir is critical to holding back water into the large pond area, which supports fish and bird species. Once the design is completed, this weir will be prioritized for replacement through NPC's capital planning process.

Trail Accessibility

Completed in Year 2:

- Resurfacing another 500m of trail surface with limestone screenings is in progress. These areas have been prioritized based on the High-Efficiency Trail Assessment Process (HETAP) that was conducted by the Toronto Region Conservation Authority in Year 1.
- While the HETAP inspection did not identify any significant accessibility concerns related to the bridges, all of the bridges throughout Dufferin Islands are undergoing an inspection by a structural engineer to phase in their replacement. As these bridges are replaced, they will be AODA compliant.
- Added to scope:
    - NPC has continued to consult with a Landscape Architect to design an accessible pedestrian route along the outer loop of Dufferin Islands as well as provide an alternative accessible access point to the interior islands. These designs are in progress and will be brought forward to the Commission upon completion.
    - To improve pedestrian and vehicular safety, Burning Springs Hill was converted to permanent one-way traffic only into Dufferin Islands. As a result, the intersection at the base of the hill was modified to prevent wrong turns up the hill or left onto Dufferin Isle Drive (Figure 18).

Education and Interpretation

Completed in Year 2:

- Based on the Dufferin Islands Interpretive Plan that was completed in Year 1 to highlight both the natural and cultural heritage significance of the site, interpretive signage and tour content development is underway. Interpretive signage content and locations will be finalized over the winter of 2024/25.
- As recommended within the Interpretive Plan, on July 28, a Wilderness Photography Workshop was held at Dufferin Islands to teach participants about the ethical and technical aspects of capturing wildlife images. This event was highly successful, therefore additional workshops are being planned for 2025.
- On September 23, 2024, over 35 Brock University students participated in a tour of Dufferin Islands to discuss challenges and opportunities. They also participated in the planting of more than 300 native trees.

- NPC continued to host several site/project tours at Dufferin Islands, including delegates from the Ontario Association of Landscape Architects Conference on October 17, 2024, as well as additional students and faculty from Brock University and Niagara College.
- Added to Scope:
    - In collaboration with Brock University and the Niagara Peninsula Conservation Authority, since May 2024, a research project has been undertaken to understand how to build connections to nature. Through surveys, the project aims to determine how visitors to Dufferin Islands currently connect with nature and then develop strategies for enhancing this connection. According to previous research, those who connect with nature in a sustainable way tend to have greater respect and care for nature. Therefore, using this research, NPC can develop its messaging and educational resources to further build this connection to aid in the protection and enhancement of these natural areas. More than 300 surveys have been collected to date (Figure 19).

Background

Dufferin Islands has a long history as a tourism and recreation destination, but also provides an early example of ecological restoration. Prior to its purchase by the Province of Ontario in 1886, the lands, now known as Dufferin Islands (renamed after then Canadian Governor-General, the Earl of Dufferin), were privately owned and utilized for sawmill operations and the Burning Spring tourist attraction. Beginning in 1903, the fast-flowing waters through Dufferin Islands were diverted for power generating operations. As a condition of permitting this flow diversion, The Niagara Parks Commission (NPC) required the Ontario Power Company to remediate the Islands. Unsatisfied by the initial results, NPC required the Ontario Power Company to further restore the Islands in 1920 to what they are today.

Since its restoration in the 1920s, Dufferin Islands has become a well-loved picnicking and hiking destination for visitors to Niagara Parks with visitation continuing to grow. Dufferin Islands is a naturalized urban park that provides outdoor experiences to visitors and supports a wide range of wildlife in the core of Niagara Parks. The age of the existing infrastructure, combined with the increased visitation, has resulted in extreme degradation of the lands and waters within the Islands. The degradation occurring within Dufferin Islands impacts both the visitor experience and significant ecological assets within the park.

Even though Dufferin Islands has been substantially altered over time, it still contains ecologically significant features. To date, over 320 plant species have been identified within the Islands, many of

which are rare, including 12 that are Species at Risk in Ontario and Canada. For example, Dufferin Islands has one of only two populations of American Water Willow in Niagara which requires protection from failing infrastructure. The Islands have also become home to numerous animals such as beavers, red fox, mink, and muskrats. Dufferin Islands is also a significant birding area due to the wide range of waterfowl, raptors, shorebirds, and songbirds that visit the Islands seasonally or year-round. Unfortunately, over-feeding by visitors has resulted in an unhealthy over-population of waterfowl (geese and ducks) that is negatively impacting water quality, shoreline vegetation, aesthetics, and wildlife behaviour.

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Appendices

Appendix A: Dufferin Islands Project Photos

Appendix A:
Dufferin Islands and Project Photos – Year 2

Figure 1: Installation of Beaver Cones at Dufferin Islands

Figure 2: Installed Beaver Cones at Dufferin Islands

Figures 3 & 4: Degraded shoreline at Dufferin Islands

Figure 5: Installed root wads as part of bioengineering

Figure 6: Rootwads anchored with rip rap

Figure 7: Planting large caliper stock at Dufferin Islands

Figure 8: Additional planting of shoreline vegetation to expand riparian buffer

Figure 9: Staff planting of trees at Dufferin Islands along newly restored shoreline

Figure 10: Tree planting by Brock University students above Dufferin Islands moraine

Figure 11: Restoration of man-made islands in progress

Figure 12: Restoration of man-made islands in progress

Figure 13: Addition of soil, compost, and mulch onto man-made islands to support soil regeneration

Figure 14: Trail and trail surface updgrades between bridges

Figure 15: Snapping turle nesting on newly restored man-made island

Figure 16: Intact Weir #12 at outflow of Dufferin Islands – July 2023

Figure 17: Failure of Weir #12 at outflow of Dufferin Islands – November 2023

Figure 18: Modified Burning Spring Hill intersection – Completed August 2024

Figure 19: Poster board with QR to link to survey as part of Connecting to Nature research project