City of Dryden

Dryden Signature Trail System Improvements Feasibility Study

Final Report, March 2022

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Introduction

Introduction

This study evaluates sections of the existing Dryden Signature Trail, and assesses options for new trail sections that will, in combination, provide a continuous, distinct cycle and pedestrian route along the Wabigoon River in the section between Duke Street Dock and Van Horne Landing.

The consulting team was led by HTFC Planning and Design, with TREK providing geotechnical and hydraulic analysis, J. R. Cousin Consulting Engineers providing environmental assessment services, and Keewatin Aski Ltd. providing civil engineering input.

Process

The project commenced in the fall of 2021 with the City providing available background information, records, air photography base mapping, and prior studies. The team visited the site on October 8, 2021 to groundtruth the documents, meet the steering committee, and supplement the data with qualitative observations of use patterns, context, character, and condition.

The team submitted an Interim Memo on December 6, 2021, outlining findings to date with a focus on options for the Riverview Drive segment. The memo also included the preliminary geotechnical and hydrological report as well as the draft Phase 1 Environmental Site Assessment (ESA).

On January 17, 2022, HTFC presented the interim memo to the project steering committee and obtained feedback on some of the questions raised. The team incorporated this input to refine concepts and costs and prioritize options, and compiled all findings into a final report.

Vision

The vision for this section of the Dryden Signature Trail should align with the general vision for trails in the city: an interconnected trail system that highlights Dryden's natural spaces and waterfront, and draws people from within and outside the community. As the City's 'signature' trail, the quality of the experience for users is paramount. Envisioned in *City of Dryden Trail Enhancement and Development Project* report (2003) as "a visitor centre without walls" this trail should offer a welcoming combination of scenic character, amenities, ease of navigation and interpretive content.

Goals & Purpose

The purpose of this study is to furnish the City of Dryden with the information and insights they need to make decisions about the future of the Dryden Signature Trail. Specifically, the team was to report on the "financial, legal, logistical and practical considerations" related to the enhancement and completion of the Dryden Signature Trail System upstream of the dam.

The following broad goals were established by the project team, in consultation with the City, as critical to achieving the quality of experience envisioned:

- **Continuity** – the trail connects to destinations without interruption, and though its character may change through its length, there is a sense of cohesion through the use of common signage, fixtures, and details.
- **Safety** - the trail meets the safety and security needs of its users.
- **Amenity** – the trail provides adequate seating, shelter, and other amenities to enhance the comfort and enjoyment of users.
- **Accessibility** - the trail will be accessible to users of all ages and abilities, to the extent feasible.
- **Sustainability** – the trail will be economically, socially and environmentally responsible, meeting the needs of the community today and tomorrow.

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Executive Summary

Executive Summary

This study offers recommendations for the enhancement and completion of the Dryden Signature Trail between Duke Street Dock and Van Horne Landing, aimed at providing a welcoming combination of scenic character, amenities, ease of navigation and interpretive content. It was conducted between fall of 2021 and spring of 2022 by HTFC Planning and Design, with engineering support from TREK Geotechnical, JR Cousin Consultants, and Keewatin Aski Limited.

Future Needs Assessment

A review of current demographic information shows Dryden's statistics related to income, proximity to work, and age distribution all support trail development. Population growth is slow, but future economic development opportunities on the horizon could draw people faster than project.

Planning Context

The municipal and provincial planning context is generally well aligned with trail development, encouraging the acquisition and use of waterfront areas for public recreation, the creation of connected systems of pedestrian and cycle facilities, and investment in environmental stewardship and tourism infrastructure. Dryden's Working Circle Committee makes specific recommendations around land acknowledgments and more meaningful opportunities for reconciliation with Indigenous communities within public spaces including trails. The Accessibility for Ontarians with Disabilities Act also provides specific guidance on the design and operation of trails that are referenced throughout the feasibility study.

Land Ownership

Portions of the trail in Cooper Park traverse private land. The lease agreement with the owners expired in 2011, and is in need of renewal and updating. The City is encouraged to consider an easement instead of a lease, and negotiate additional width (3.5 - 4.0 m instead of 3.0 m) to suit current trail standards and accommodate amenities.

Key Findings & Recommendations

A number of system-wide general strategies are recommended:

Trail width: plan for 3.5 m wide trails throughout the Signature Trail system. Confirm cost/benefit of a narrower trail in detailed design phase.

Trail surface: transition to asphalt over time

Lighting: Transition to consistent, glare-free LED fixtures where there is inadequate ambient light.

Planting: Incorporate supplemental planting sparingly; instead focus on protecting existing vegetation and landscape character.

Signage: Prepare a signage plan that describes a coordinated family of signs integrating digital media, AODA requirements, and wayfinding.

Interpretive Features: Prepare interpretive plan that includes contemporary and inclusive themes along with forest industry and boreal forest information.

Maintenance: Establish digital database of trail condition and protocols for regular assessment, incorporating user-sourced information. Consider expanding snow clearing limits based on demand.

In addition, the study area was divided into six trail segments corresponding with local conditions and character.

Segment 1 (Duke Street to Cooper's Island)

- Undertake maintenance on retaining wall, furnishings and unit paver surface.
- Add interpretive and trailhead signage that includes accessibility information.

Cost: $136,000
Priority: High (1 to 2 years)

Segment 2 (Cooper's Island to Victoria Street)

- Undertake maintenance of trail surface, furnishings, signs.
- Fixed bridge structure to Cooper's Island is not recommended at this time due to high cost and accessibility challenges delivering limited benefit to users. Seasonal floating bridge sections may be a viable alternative, if blocking this channel is permitted by Transport Canada.
- Install new wayfinding signs at Victoria Street intersection.

Cost: $100,000
Priority: High (1 to 2 years)

Segment 3 (Victoria Street to Ross Street)

- Construct a river edge promenade on rip rap base at the toe of the bank to fill this gap in the trail. This option was rated higher than roadside options which offered a less appealing experience and higher disruption to the surrounding neighbourhood. Costs however are considerably higher than most roadside options, though this can be partially offset through the bank stabilizing value of the rip rap toe.
- Install a wood boardwalk structure at the south end of the river edge promenade with ramps and look out areas delivering users back to street level.
- Provide safe crossings and connections to the existing trail north and south ends of this segment
- Incorporate signage and seating areas along promenade.
- Phase in lighting and snow clearing over time, based on need.

Cost: $1.7M
Priority: Medium (4 to 5 years)

Segment 4 (Ross Street to River Heights Drive)

- Create roadside multi-use trail along Ross Street and River Heights Drive that connects to the existing concrete trail at Goodall St.
- Verify grades of existing asphalt ramp and reconfigure if it exceeds AODA regulations. In interim, provide signage indicating grades and alternative routes.
- Install safety railing or barrier at bottom ramp.

Cost: $166,000
Priority: Low (10 to 15 years), with exception of safety railing, which should be a high priority.

Segment 5 (Edgewater Drive to Yacht Club Road)

- Undertake general cosmetic and maintenance repairs on trail surface and edges.
- Add interpretive and trailhead signage at Yacht Club Road that includes accessibility information.

Cost: $70,000
Priority: Low (10 to 15 years)

Segment 6 (Yacht Club Road to Van Horne Avenue)

- Construct new granular trail connecting the Laura Howe Marsh Trail to Van Horne Landing docks, defining a developable parcel north and east of the trail.
- Incorporate movable shelter structures and other trail amenities.
- Expand boat launch and add amenities to dock for marine traffic, fishers, and visitors
- Rationalize and define parking area for boat launch, including pull-through stalls.
- Connect new trail to upgraded multi-use trail running north on Van Horne.

Cost: $1.8M
Priority: High (1 to 2 years)

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Future Needs Assessment

1.0 Future Needs Assessment

Introduction

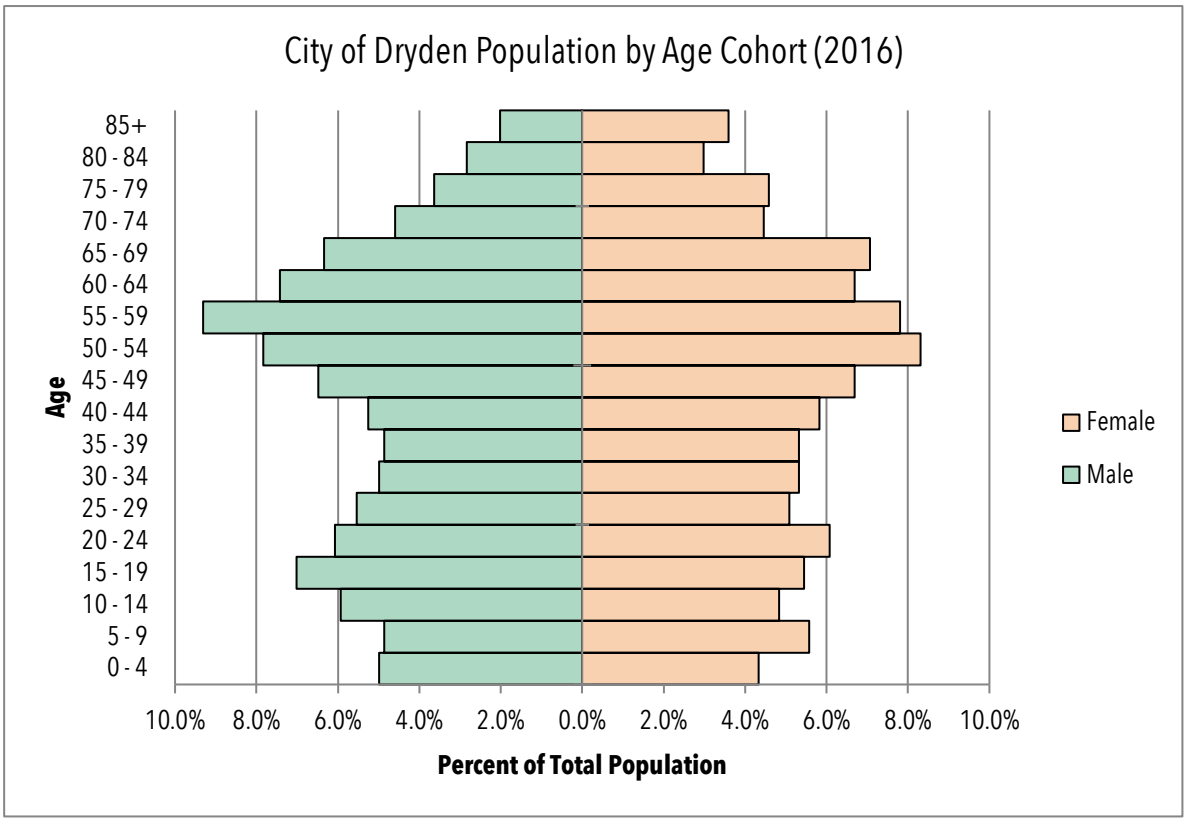
This chapter presents an analysis of future needs for trails infrastructure in the City of Dryden. It includes a review of the city's current and projected demographic makeup and implications for future trails improvement and development.

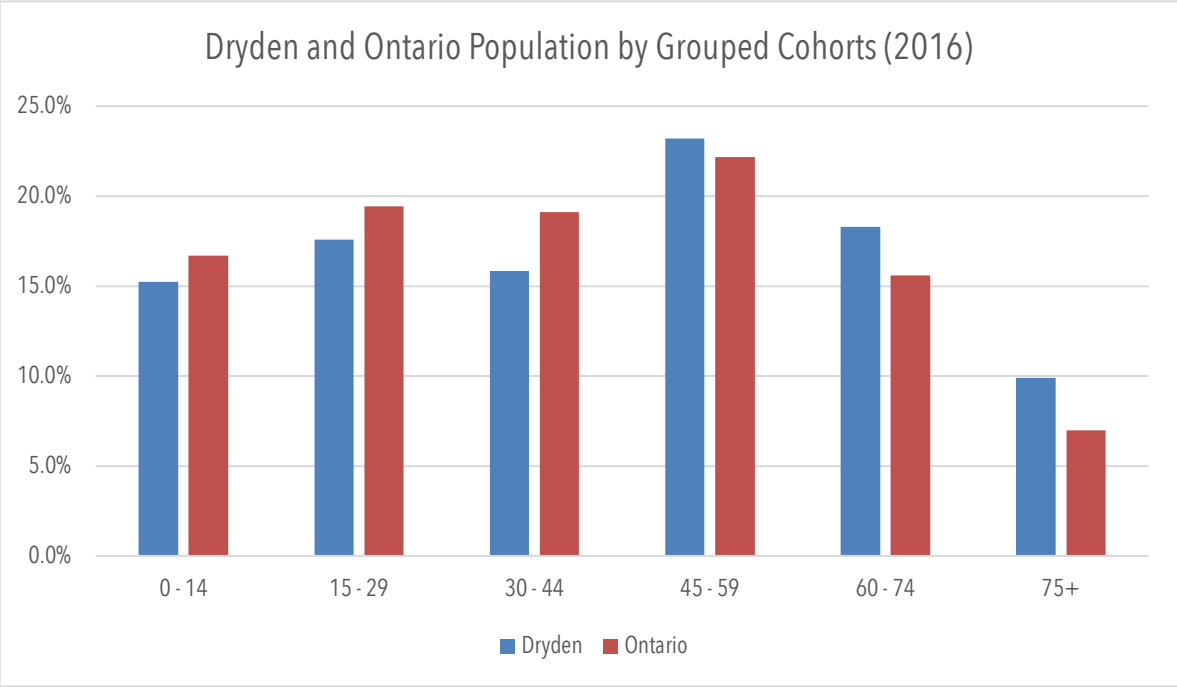
Current Demographics

Age and Sex

The City of Dryden has a population of 7,749; the majority of this population (5,586 people) are within the urban population centre while the remainder (2,163) are in the surrounding rural areas. The chart below shows the demographic makeup of the city by age and sex:

- **The shape of the graph is an "inverse pyramid," indicating there are more older adults than young children; this is a sign of an aging population.**
- **The median age in the City of Dryden is 46.2. This is approximately 5 years higher than median ages across the province (41.3) and country (41.2).**
- **There is a notable "baby boomer" generation population, particularly in the 50- to 60-year-old age range.**





The higher median age in Dryden can be attributed to these demographics (Stastistics Canada, 2016):

- **Adults between the ages of 60 and 74 make up 18.3% of the city's total population. In comparison, the provincial average for this same age group is 15.6%.**
- **9.9% of Dryden's population is over age 75. Across the province, this age cohort makes up only 7.0% of the total population.**
- **There is a slightly smaller proportion of children age 14 and under in Dryden (15.2%) than in other parts of Ontario (16.7%)**
- **The proportion of 30 to 44 year-olds in Dryden (15.8%) is significantly lower than that age cohort in the province as a whole (19.1%).**

Discussion & Implications

Trails infrastructure is important for many older adults, some of whom rely on walking or biking for their daily travel or an important source of physical activity:

- **It is important to remember that "approximately 40% of the average Canadian's life is spent either as a senior citizen or as a child without a driver's license."[1]**
- **The *Active Transportation in Canada Resource and Planning Guide* produced by Transport Canada says, "Approximately 20% of Canadian households do not own a car. Another 10% cannot drive because of a disability, while a further 10% simply do not have the income to support car ownership."[2]**

[1] Active Transportation in Canada Resource and Planning Guide, p. 19.
[2] Active Transportation in Canada Resource and Planning Guide, p. 19, quoting Litman, Todd, "Quantifying the Benefits of

Improved trails and other active transportation infrastructure are also important to support school-age children:

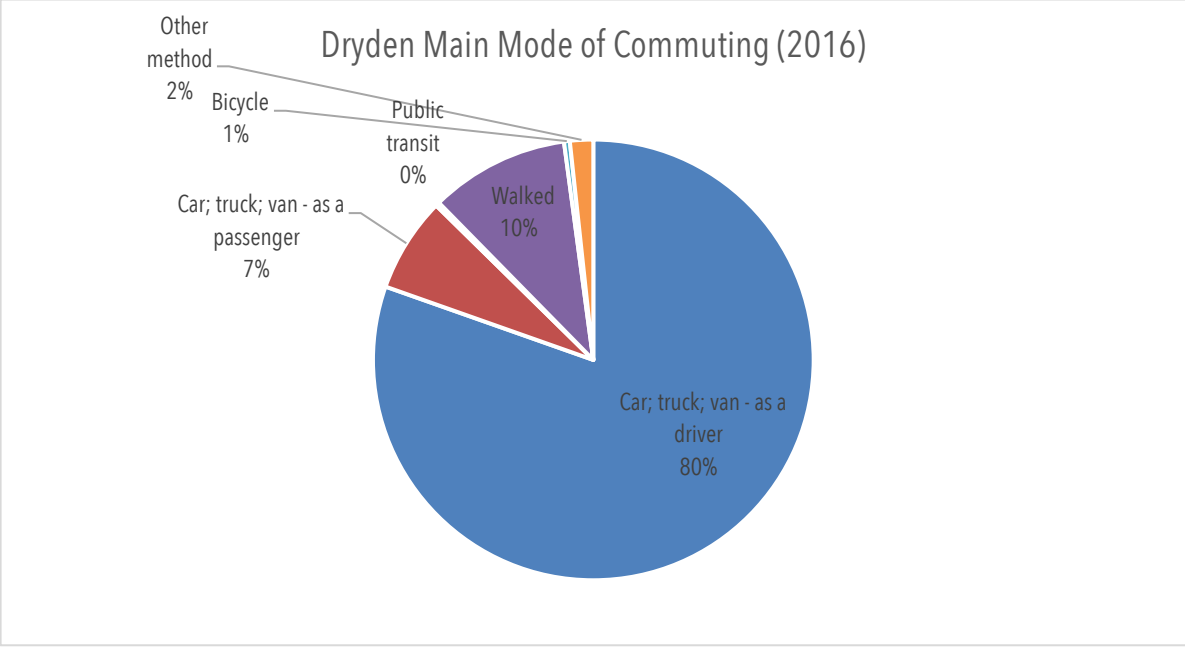
- **Thirty years ago, almost 80% of children used active transportation to travel to school. Today, only 35% of children travel by foot or bike.**
- **Roads around schools are often dangerous for children who still walk or bike to school because many parents who drive are rushing to drop off their children as quickly as possible. At other times, this can lead to traffic congestion and higher levels of air pollution around school zones.[3]**
- **One way to counter this trend is to build more trails and other active transportation infrastructure to encourage walking and cycling.**

By continuing to build trails infrastructure, Dryden become a more equitable place that supports youth, adults, and older adults alike.

Active Commuting & Workplace Travel

There are several distinct ways people use active transportation infrastructure, including trails. These include active commuting & workplace travel; active destination-oriented trips; and active recreation. No census data is available for active destination-oriented trips and active recreation; however, the 2016 census provides data on active commuting and workplace travel in municipalities across Canada.

The census data shows that 375 people in Dryden—approximately 10 to 13% of the employed labour force—use Active Transportation (walking, bicycling and all other modes) to commute to work. This active transportation mode share is higher than the provincial (7.5%) and national average (8.1%). However, there is room to continue to build upon Dryden's success in encouraging active transportation.



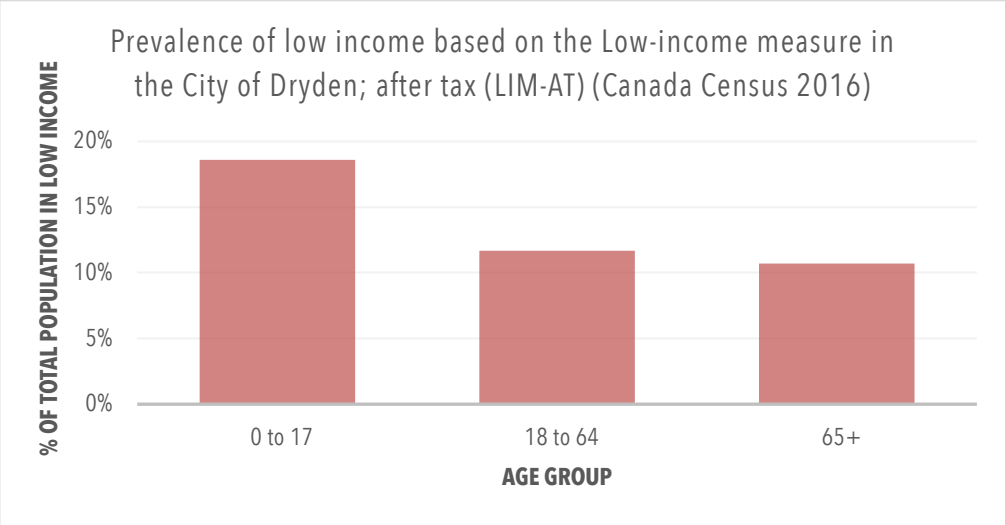
Income

Non-motorized Transportation for Achieving Mobility Management Objectives" Victoria Transport Policy Institute, 2010.
[3] Active and Safe Routes to School in Manitoba Handbook, p. 13.

In 2015, the median total income of households in the City of Dryden was $70,493 — down from $76,250 in the year 2005. The current median income is less than in the neighbouring census subdivision of the Unorganized Kenora District ($78,196) but is close to the median household income across Canada ($70,336).

970 persons or 12.8% of the total population of the City of Dryden in 2015 were in the low-income bracket (based on the low-income measure after tax (LIM-AT):

- **The prevalence of low income is highest in youth under 18, of whom 18.2% are low-income. When looking at 0 to 9-year-olds in particular, this number is even higher (over 20%).**
- **27.3% of lone-parent families were low income. In comparison, only 3.9% of couple families without children were low income.**
- **In the neighouring Unorganized Kenora District, only 10 percent of the population was low income in 2015.**
- **80 households in Dryden had an annual income of less than $10,000 per year after tax.**



Discussion & Implications

The 2016 census shows that across Canada, lower income areas often have higher trails and active transportation use.[4] This is not surprising, as active transportation is the most inexpensive way for people to travel:

- **A 2010 calculation found that active transportation costs an average of 3 cents per kilometre—approximately 15 times less than owning a mid-size car, which costs approximately 46 cents per kilometre.[5]**

[4] Ibid.

5 Litman, Todd, "Quantifying the Benefits of Non-motorized Transportation for Achieving Mobility Management Objectives" Victoria Transport Policy Institute, 2010 & "Transportation Affordability" TDM Encyclopedia, 2010.

- **CAA estimates that the total annual driving costs for an intermediate class car in Ontario are now more than $10,000 per year.[6] This is more than the total annual income of more than 80 households in the City of Dryden.**

The City of Dryden should plan to build trails and other active transportation infrastructure to meet the needs of its low-income residents, with particular consideration for its current and projected population of low-income children and seniors. The provision of improved trails will benefit low-income residents by providing low-cost transportation options.

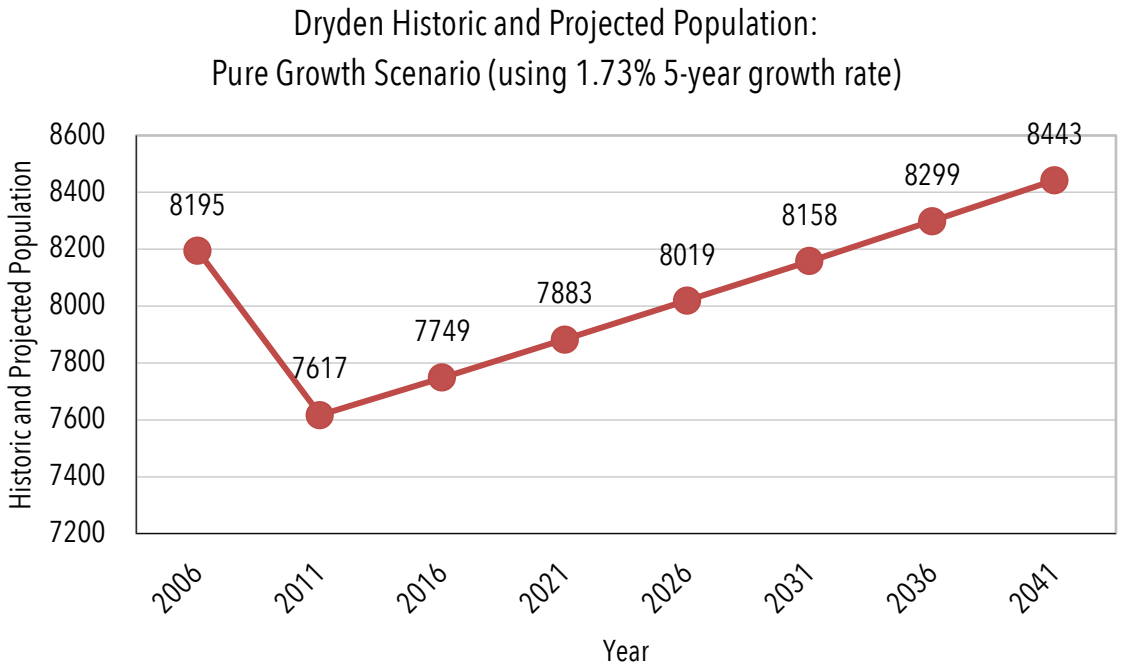
Future Demographics

Based on census data, the population of the City of Dryden will likely remain relatively flat, with only slow growth over time:

- **In 2016, the total population of the city was 7,749, an increase of 132 people (1.7%) since 2011. However, the population decreased dramatically (-7.1%) in the years between 2006 and 2011. In 2006, the population was 8,195 — 446 more people than there are today.**
- **In comparison, the average 5-year growth rate across the Kenora District census division was 13.8% between 2011 and 2016.**

The future population of the municipality can be projected by extrapolating Dryden's average population growth from 2011 – 2016 (1.7%) into the future, assuming a period of slow growth will continue (see chart below):

- **This pure growth model projects the municipality will have a population of 8,443 by the year 2041.**
- **This is an increase of 694 people from the 2016 census population.**



[6] CAA Driving Costs calculator (https://carcosts.caa.ca/)

This slow growth is in line with Ontario population predictions, which show that, "The population of Northern Ontario is projected to grow slowly . . . with a slight increase of 3.7 per cent, from 811,000 in 2020 to 841,000 by 2046 . . .The Northwest is projected to experience growth of 7,000 or 2.9 per cent, from 242,000 to 249,000" (Ontario Population Projections, Ontario Ministry of Finance, 2021).

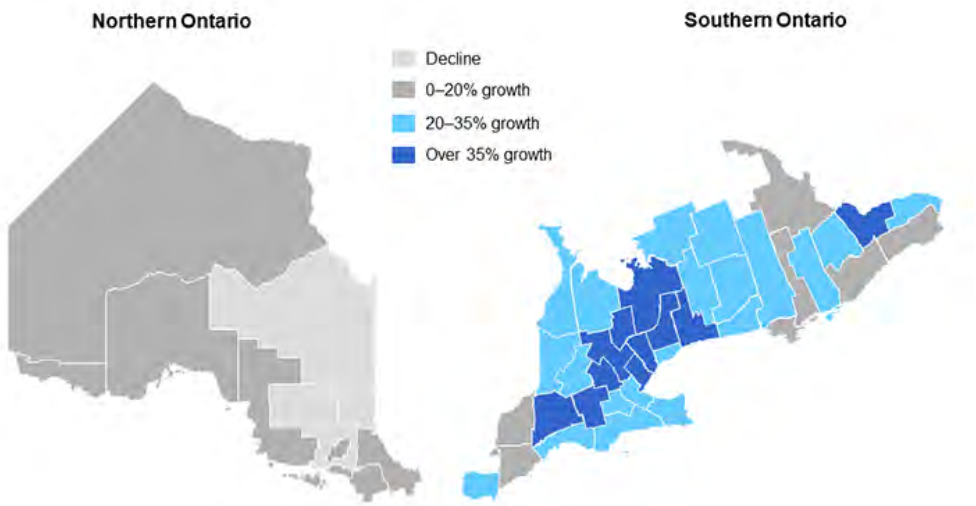


Figure 1: Population growth/decline by census division over 2020 to 2046. Source: Ontario Ministry of Finance projections (2021)

This growth will be driven by migration, as the aging population in the region means that the rate of deaths will outpace the birth rate over the coming decades. The Ontario Ministry of Finance report notes, "By 2031, all baby boomers will be 65 or older and the number of deaths will start to increase more rapidly. The number of deaths for 2020-21 is projected at 120,000, based on the data available to date that reflects the impact of the pandemic on mortality." But by 2045-46, the annual number of deaths is expected to pass 173,000 per year in Ontario. In contrast, the population only increases naturally by about 25,000 births currently. After a brief increase, this natural increase is expected to drop to 21,000 per year by 2045-46 (Ontario Population Projections, Ontario Ministry of Finance, 2021).

In contrast, net migration numbers are projected to remain near current numbers, where they account for 90 percent of population growth. While net migration has slowed over the COVID-19 pandemic period, this rate is expected to rebound over the coming years, as shown on the chart below (Ontario Population Projections, Ontario Ministry of Finance, 2021).

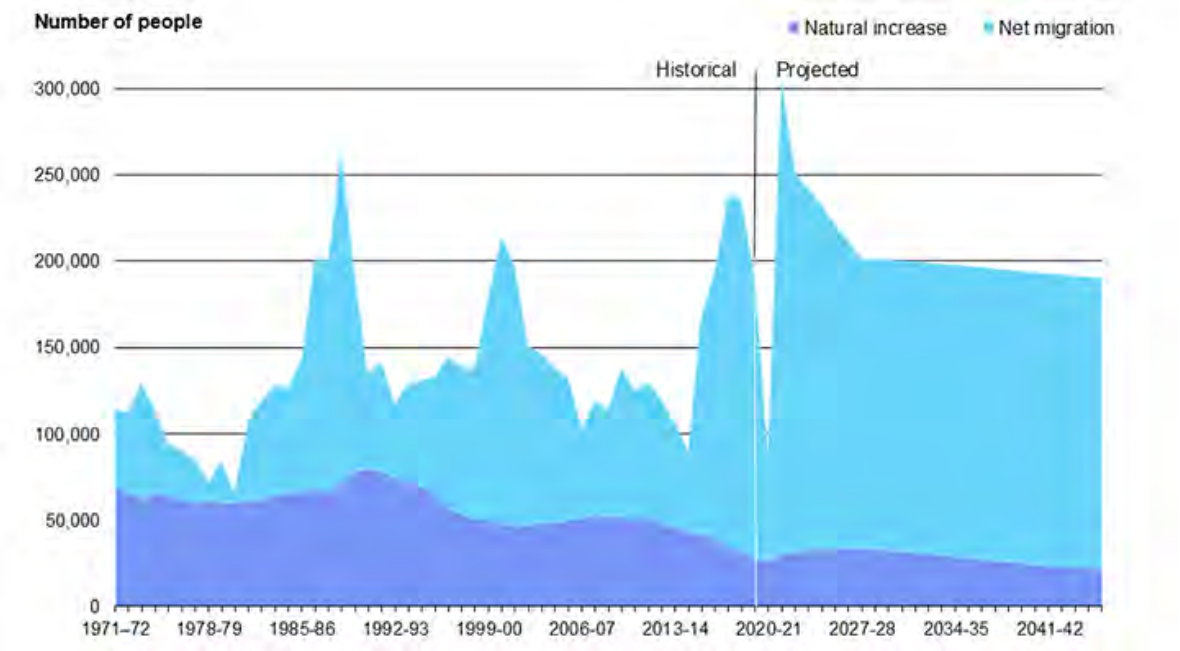


Figure 2: Contribution of natural increase & net migration to Ontario's population growth, 1971 to 2046. Sources: Statistics Canada for 1971-2020 and Ontario Ministry of Finance Projections, 2021.

The Province of Ontario says, "The personal mobility of older adults "is directly influenced by . . . access to personal transportation and proximity to important amenities. Mobility is also indirectly affected by perceptions of safety and awareness of alternative transportation options".[7] Based on the projections highlighted above, the City of Dryden will need to act now to prepare for an aging population over the next 25 years by investing in trails and other active transportation infrastructure.

Future Economic Development Influences

After a long period of contraction in the region's resource industries, there are now some reasons for optimism in Dryden's economic development future, including the potential for a deep geological repository of nuclear waste in the region, which could result in significant long term job creation, and the Goliath gold mine project, which recently received Federal approval to proceed with future stages of planning.

These and other opportunities could influence Dryden's growth and labour migration patterns in a way that further reinforces the need and value of quality active transportation and trail amenities in the community.

[7] Province of Ontario, Finding the Right Fit, 2011.

4

Planning & Ownership Context

Planning Context

This section shows how the plan relates to other key planning documents in the City of Dryden, including the Official Plan, the Zoning By-Law, the 5-Year Strategic Plan, the Community Improvement Plan, the Dryden Development Corporation – Economic Development Strategic Plan and Dryden Tourism Development Strategy and Implementation Plan, the Trail Enhancement and Development Plan and the Multi-year Accessibility Plan. This section also looks at potential for collaboration with the Dryden Working Circle Committee.

Provincial plans, including the Ontario Planning Act, Ontario Municipal Act, Ontario Heritage Act, and the Growth Plan for Northern Ontario, were reviewed but in most cases trail-related decisions and guidance were deferred to the municipality. The exception is the Accessibility for Ontarians with Disabilities Act, which directly bears on trail design and planning. As discussed below, the local implications of this Act are set out in Dryden's Accessibility Plan (section 8).

1. City of Dryden Official Plan (Municipal)

The City of Dryden's Official Plan establishes a vision, policies, and general land use designations that guide Council, municipal staff and the public when making decisions about future land use and economic development decisions in the City of Dryden.

Several policies in the plan relate to trails:

- Section 3.2.1 specifically supports "...activities and infrastructure that promote a healthy community including recreation facilities, trails and parks..."
- Section 3.2.6 "...encourages pedestrian and bicycle use in the City through the development of a connected trail system and improved infrastructure for cycling."
- Section 4.1.4 says, "Linkages to recreation and open space areas will be created through the development of trails, parks, roadways and sidewalks designed to provide space to pedestrians."
- Section 4.5.3 states, "A connected open space system shall be developed that will link the Laura Howe Marsh, Yacht Club and waterfront trail system into the larger trail system in the City. In addition, there shall be areas of public gathering places and public art displays."

- Section 4.8.1 says, "The City will continue to acquire waterfront areas for public open space uses wherever possible. Parking, trails, launching and docking facilities will be developed as funding permits."

- Section 4.8.3 states, "A continuous trail system will be developed through the City to provide for year-round recreational activities. This trail system shall be designed to be accessible and multi-purpose wherever possible."

- Section 8.7.2 lists objectives for any subsequent Community Improvement Projects. Item number one in the list of projects is "The development of a municipal wide recreational trail and parks system." The second item is "improvements to sidewalks, trails and road surfaces to enable connected, safe and comfortable travel by pedestrians, bicycles and vehicles."

2. City of Dryden Zoning By-law (Municipal)

The Zoning By-law identifies permitted land uses and sets out other requirements for lot sizes, dimensions, building heights among other things. Based on the City of Dryden Zoning Schedule sheets A – 1 and A – 3, the Signature Trail is largely located on land zoned HZ (Hazard). In the Zoning By-law, Hazard Lands (section 4.22) prohibit the erection, alteration or use of buildings and structures with the exception of six permitted uses: Agriculture, Conservation, Golf Course, Marine Facilities, Passive Public Parks, and Resource Management Activities.

Small portions of the Signature Trail may occupy land zoned R1 (Residential 1) and OS (Open Space). The OS zoning is well matched to the Trail already, and within R1 zoning, trail land may already follow existing sidewalks or rights-of-way.

3. City of Dryden 5-Year Strategic Plan (Municipal)

Dryden's 5-Year Strategic Plan is a high-level vision with guiding principles that help manage and measure the community's growth. The Strategic Plan establishes six goals:

1. Community Diversity and Inclusion
2. Community Safety and Wellbeing
3. Infrastructure
4. Fiscal Sustainability
5. Economic and Investment Diversity
6. Communications and Our People

Examples of some principles and priorities that may be directly applicable for the Signature Trail are:

- Under Safety: "Safe, shared use of community spaces is promoted as an element of quality of life."
- Under Community Pride: "Well-maintained properties, assets and infrastructure are appealing to residents and visitors."
- Under Quality of Life: "Champion environmental stewardship, protecting our natural beauty and our access to nature."
- Under Economic and Investment Diversity: "Utilize a portion of the MAT (Municipal Accommodation Tax) to further build community capacity and local tourism activities and attractions."

4. City of Dryden Community Improvement Plan (Municipal)

The Community Improvement Plan applies to a specific area of the City of Dryden, enclosing the most urban portion of the community. The Signature Trail is located within this area. This area is called the Community Improvement Project Area. The Community Improvement Plan inventories other plans and policies affecting the planning context in Dryden. This plan includes a high-level vision, and follows with more detailed objectives based on community engagement and other feedback.

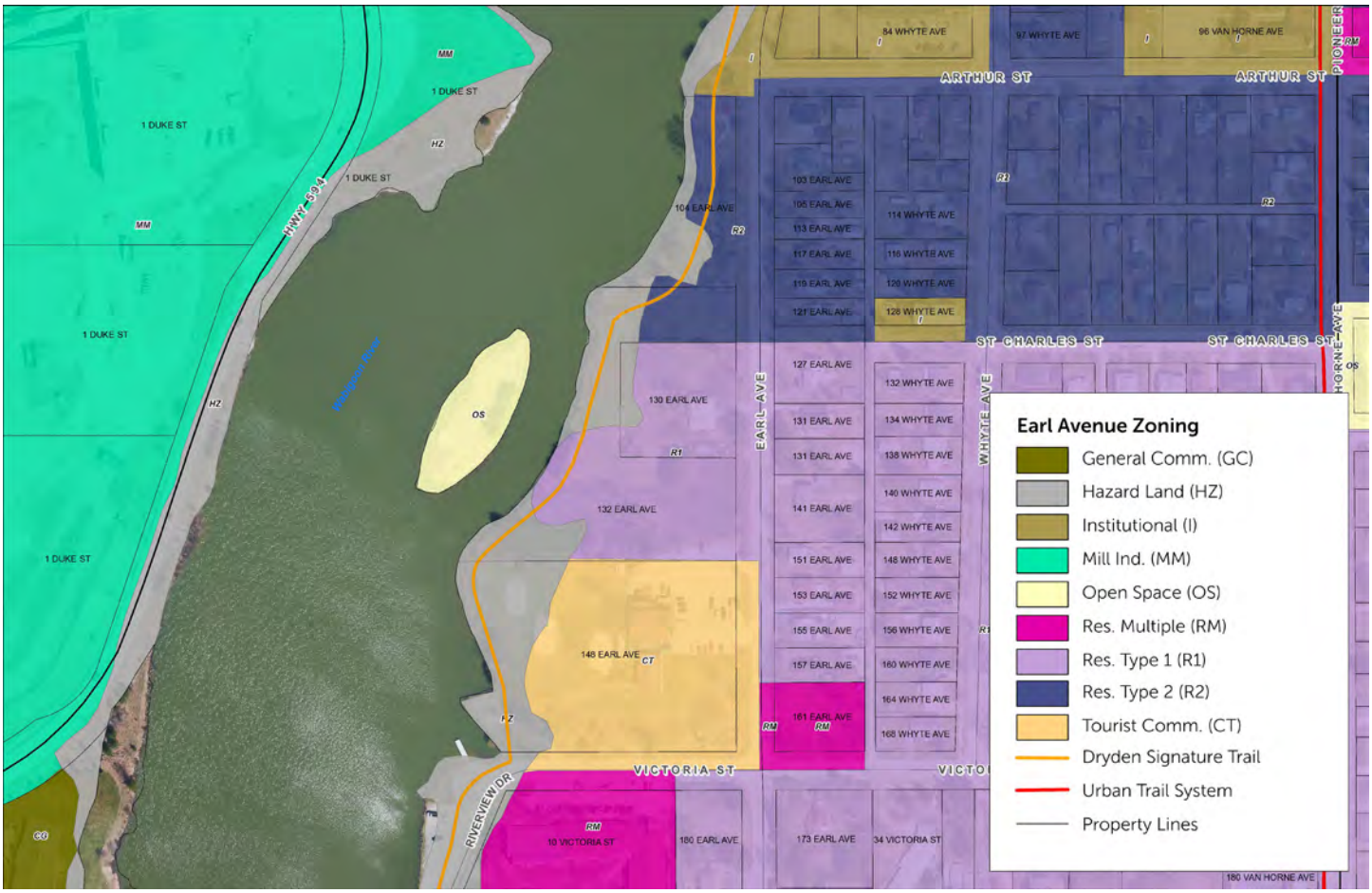
This plan includes 14 financial incentive programs, including grants, tax assistance and land disposition programs to assist property owners improve their lands, buildings, landscapes and parking areas among other things.

Section 5.6 discusses waterfront lands, explaining that "any new development should include considerations for maintaining / enhancing public waterfront access..." This plan also details some funding instruments and grants, including their eligibility criteria and list of eligible costs.

5. Dryden Development Corporation - Economic Development Strategic Plan *and* Dryden Tourism Development Strategy & Implementation Plan (Municipal)

The Economic Plan has little overlap with trail planning considerations, but the Tourism Plan does suggest that trails and related signage is a "tourism product that would require little resources to deliver".

Earl Avenue Zoning Map



6. City of Dryden Trail Enhancement & Development Plan (Municipal)

The Trail Enhancement and Development Plan is now dated, having been completed in 2003. It is the only plan exclusively devoted to trails and recreation, and provides trail standards, cost estimates, and recommendations for implementation. Its contents should be compared with more contemporary plans to avoid using any outdated information.

7. Dryden Working Circle Committee (Municipal / Indigenous)

Dryden's Working Circle was formed to help recognize and enhance the relationship between the City of Dryden and Indigenous and Métis residents. It began through discussions at Council on how to achieve objectives in the City of Dryden's Strategic Plan, specifically:

- Community Diversity and Inclusion
- Economic and Investment Diversity

The Working Circle is made up of three City Councilors and the CAO, plus four Indigenous members of the community. The Working Circle has a specific mandate to:

- Identify issues important to Dryden's Indigenous population. Including things such as lifestyle issues, social issues, amenities Indigenous people are looking for and other issues impacting their experience living in the community, positive or negative.
- Identify actions the community could take to improve the experience of Indigenous people in Dryden.
- Identify actions or activities the community could take to bring Indigenous and non-Indigenous community members closer together. These actions may start as small steps that lead to bigger moves over time.
- Identify opportunities for fostering positive relationships between Indigenous peoples and other community members and make recommendations to City Council to capture these opportunities.

The Working Circle has successfully developed municipal land acknowledgments, and successfully recommended the renaming of Colonization Avenue to Boozhoo Avenue and Memorial Avenue. The Working Circle could provide valuable input about Indigenous experience around use of the Signature Trail.

8. The Accessibility for Ontarians with Disabilities Act (Provincial) *and* Dryden's Multi-year Accessibility Plan 2018-2022 (Municipal)

The Accessibility for Ontarians with Disabilities Act sets out province-wide, mandatory accessibility standards that apply to all new construction and to all major or extensive renovations. This includes public outdoor spaces such as recreational trails. The act explicitly recognizes the history of discrimination against persons with disabilities, and seeks to benefit all Ontarians through the development and implementation of these accessibility standards. The act also acknowledges that existing conditions such as rock formations or sensitive habitat make full compliance with the standards unfeasible.

Dryden's Multi-year Accessibility Plan focuses on meeting and implementing the recommendations of the Act. The Plan establishes Accessibility Standards for the Built Environment. Under the City of Dryden's Action Plan for these standards, the first objective of the Design of Public Spaces Standards is to: "Incorporate accessibility when building new public spaces or making planned significant alterations to existing public spaces under the following sections of the Standard:"

- Recreation trails and beach access routes
- Outdoor public eating areas, such as those found at rest stops or picnic grounds
- Outdoor play spaces
- Exterior paths of travel (sidewalks or walkways) and their associated elements, such as ramps, stairs, curb ramps, rest areas and accessible pedestrian signals
- Accessible off-street and on-street parking spaces
- Obtaining services (service counters, fixed queuing guides and waiting areas)
- Maintenance planning (i.e. inspection of sidewalks)

Ownership

The following table shows results from a property search for five properties along Earl Avenue in Dryden, Ontario. The search was conducted between 11/22/2021 and 11/24/2021 via OnLand, Ontario's virtual Land Registry Office. Civic addresses were cross referenced with Property Identification Numbers by the Building and Planning Department of the City of Dryden. A map of these properties follows on the next page.

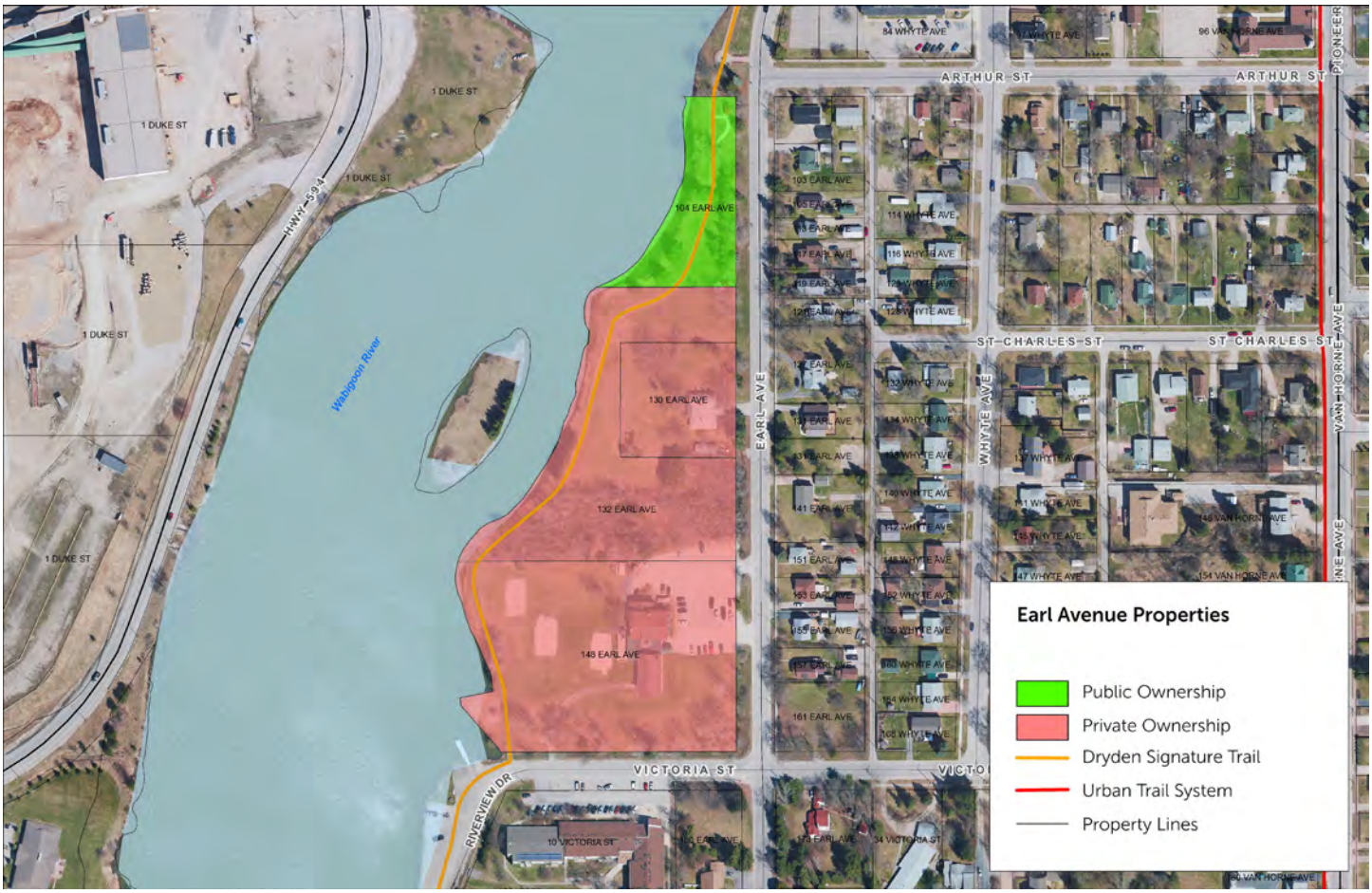
Civic Address	Property Identification Number	Property Description	Owner
148 Earl	42086-0516	PCL 14530 SEC DKF; PT MILL PROPERTY VAN HORNE W OF EARL ST AS IN LT38169; DRYDEN	Privately held
132 Earl	42086-0517	PCL 6224 SEC DKF; PT MILL PROPERTY VAN HORNE W OF EARL ST AS IN LT12364 EXCEPT LT38169 & PT 2, 23R4993; S/T LT81317; DRYDEN	Privately held
130 Earl	42086-0518	PCL 33096 SEC DKF; PT LT 4 CON 5 VAN HORNE PT 2, 23R4993; DRYDEN	Privately held
104 Earl (parcel 1)	42086-0519	PCL 5998 SEC DKF; PT MILL PROPERTY VAN HORNE AS IN LT12003; DRYDEN	The Corporation of the City of Dryden
104 Earl (parcel 2)	42086-0520	PCL 8384 SEC DKF; PT MILL PROPERTY VAN HORNE W/S EARL ST LYING N OF A LINE DRAWN ACROSS SAID MILL PROPERTY PARALLEL TO THE N LIMIT THEREOF AND DISTANT S THEREFROM 4 CHAINS; DRYDEN	The Corporation of the City of Dryden

The search confirmed two properties are owned by The City of Dryden and three are privately held. The Signature Trail crosses two of those private properties: 132 and 148 Earl Ave. Between 1990 and 2011, a lease agreement was in place between the owners of these properties and the City of Dryden, permitting use of a 3.0 metre wide strip of land "as an extension of the Town of Dryden waterfront development park for the enjoyment and use of the public." (By-Law No. 2028-90).

As that agreement has not been renewed, it is recommended that the City either renew the lease with 132 and 148 Earl Avenue, or even better, establish a permanent easement for the trail. Easements are the most suitable legal instrument for long term agreements such as this.

During the negotiations, it is further recommended that the City widen the area in question to 3.5 or 4.0 metres to meet current multi-use trail standards as described in Chapter 6, and allow some space for seating, lighting, signs and other trail-side amenities.

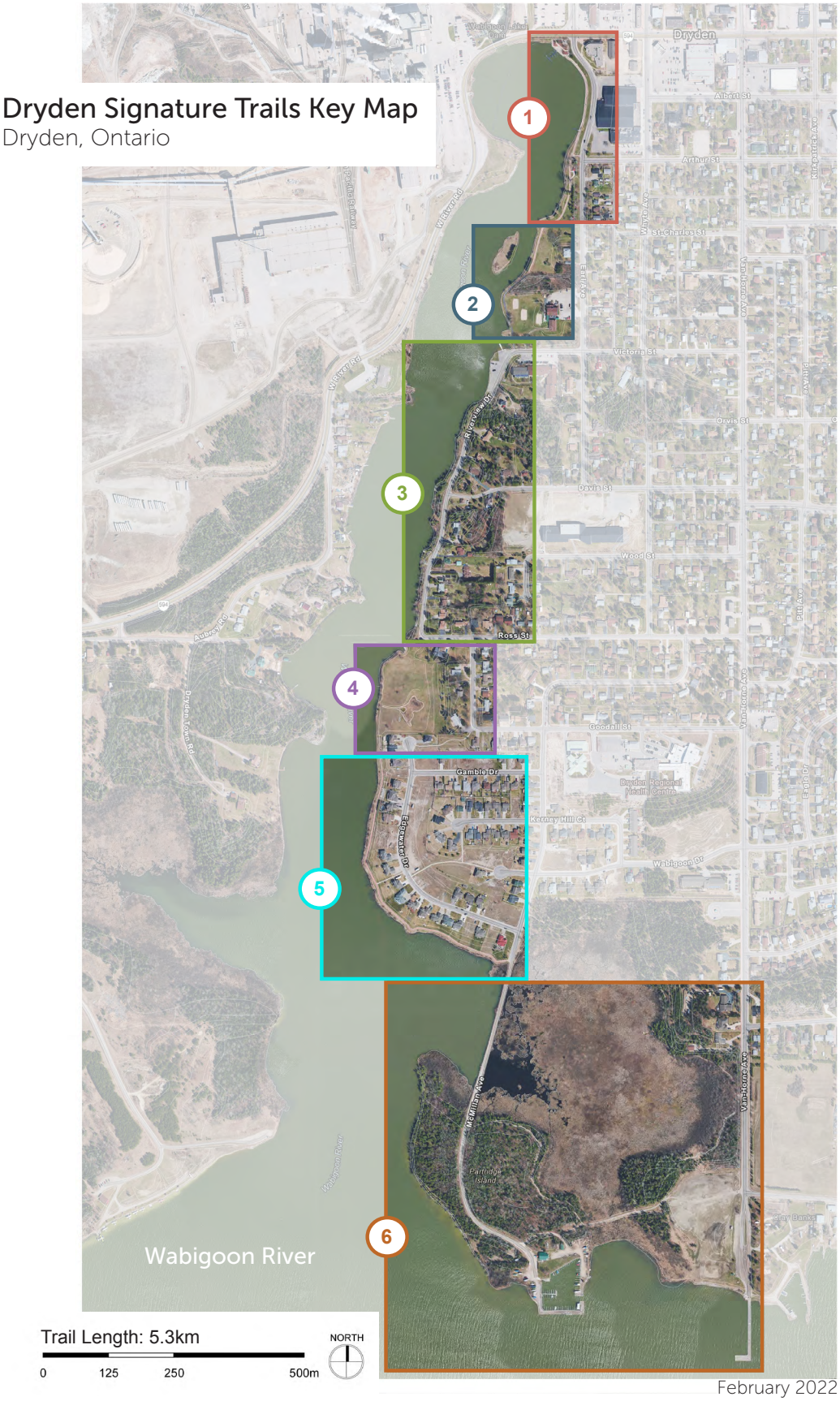
Map of Public & Private Property Along Earl Avenue



5

Site Analysis

The study area was divided into six trail segments corresponding with local conditions and character. These segments were also used to organize the recommendations, cost estimates and geotechnical review.



Segment 1: North End of Trail

Site Observations:

- Areas of trail uneven.
- Precast concrete unit pavers shifting in spots.
- Concrete retaining wall is slumping.
- Park includes a seasonal washroom.
- Two large cottonwood trees serve as ‘pillars’ to the next portion of the trail.
- Benches and waste receptacles along this section of trail at approximately 60m intervals.

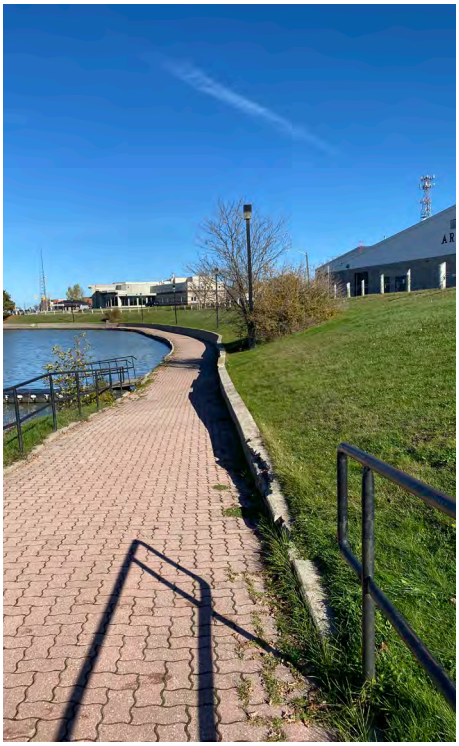
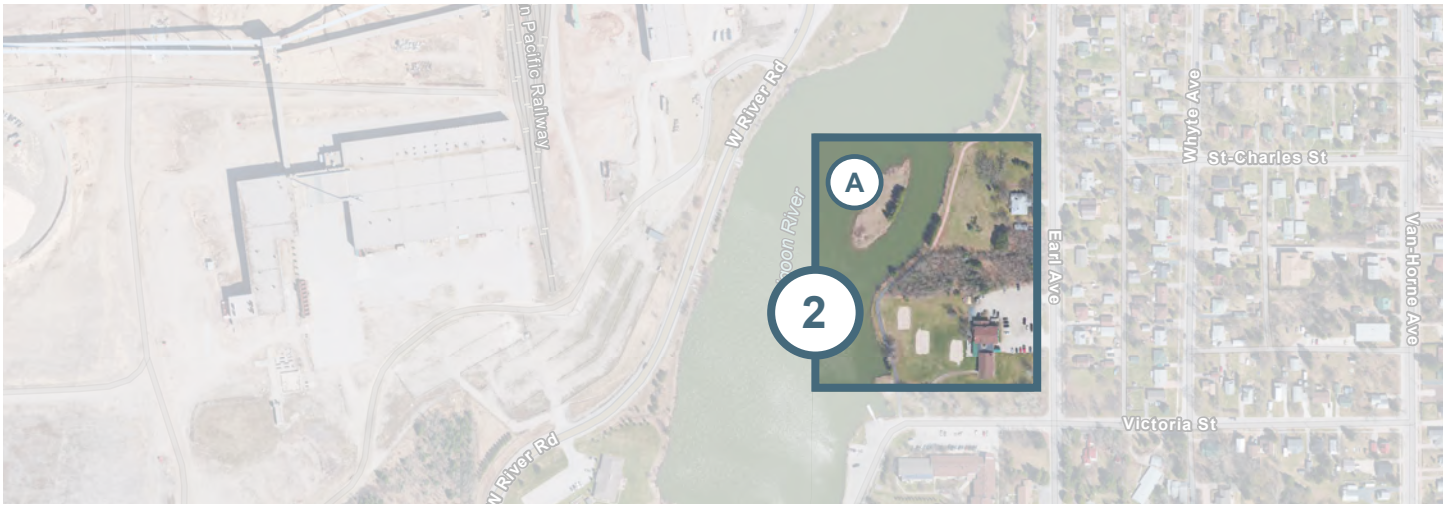


Photo 1: Retaining wall

Photo 2: Seasonal washroom & two large cottonwood pillars

Segment 2: Cooper's Island & Earl Avenue



Site Observations:

- Paving pattern and materials vary throughout this segment.
- Channel between the shoreline and Cooper's Island (A) is manufactured, was dredged out by the mill (3m to 4.5m deep, mucky, sandy bottom).
- Hazelnut/alder, yarrow along shoreline, Manitoba maple, pine, cedar and 8-9 mature spruce trees on Cooper's Island.
- Shore erosion happening where link/bridge to Cooper's Island might be located (lines up with asphalt patch in the trail.
- Uneven sections of trail.
- Proposed use for Cooper's Island unclear - as a look out point? To what? What else would you do on the island?
- Benches and waste receptacles along this section of trail.
- Pathway lighting at approximately 30m intervals - poles are aluminum.

Photo 3: Cooper's Island

Photo 4: Shore erosion

Photo 5: Asphalt patch on trail

Photo 6: Uneven section of trail

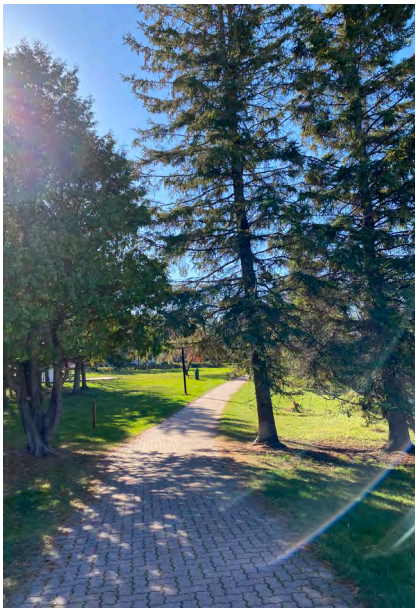


Photo 7: Paving pattern changes

Photo 8: Waste receptacle & Bench

Photo 9: Uneven areas of asphalt trail

Segment 3: Riverview Dr. from Victoria St. to Ross St.

Site Observations:

- Skene Boat Launch (B) marks the end of the dedicated trail along the shoreline and the trail now moves onto the undifferentiated pavement at the intersection of Davis St. and Riverview Dr. This creates pedestrian and traffic congestion with the boat launch, roadway and path all intersecting in the same area.
- Curb stops pushed into the lake at the boat launch, no edge to retain them.
- Accessibility challenges - unit paver pathway ramp up Riverview Dr. edge is steep (> 10% slope).
- Pathway moves to the roadway shoulder as it heads south - rocky edge/cliff is dangerous with very steep slopes that drop off to water below.
- Small 'bump out' areas along the shore line could serve as potential rest areas or look out points to the river.
- Provide defined trail either along the roadway or along the water's edge. Mid-bank option is not feasible due to highly variable grades and granite outcrops. Refer to Chapter 6 for more on these options.

Photo 10: Skene boat launch

Photo 11: Curb stops pushed into river

Photo 12: Unit paver ramp up to roadside section of trail

Photo 13: Rocky cliff, steep slopes

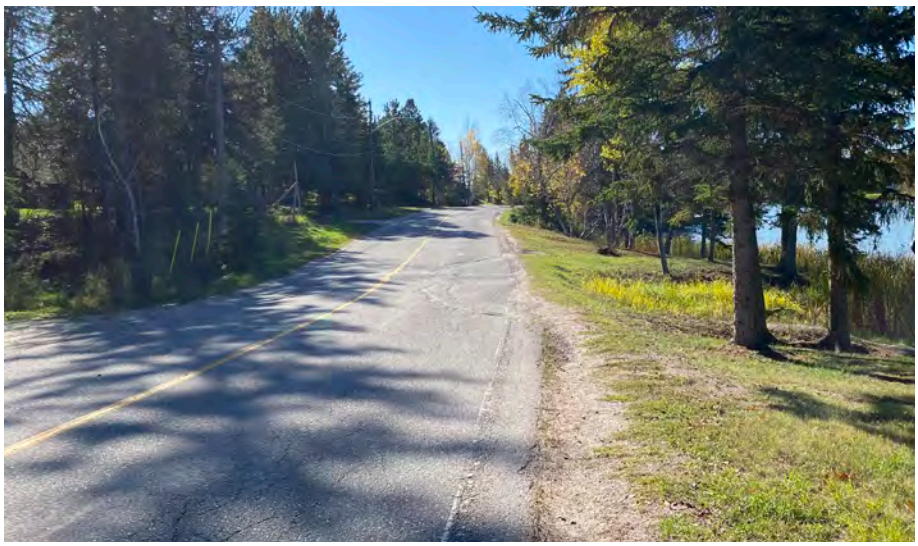


Photo 14: Trail along roadside

Photo 15: 'Bump out' area

Segment 4: Ross St. to River Heights Dr.

Site Observations:

- This section of the trail is on residential roadways - north side along Ross St., south side on River Heights Dr. and then continues south on a dedicated concrete pathway that connects to a pedestrian trail along the shoreline behind private residences.
- Shoreline is flat and ideal for a trail along the water's edge, however this property is privately owned and cut off from the rest of the trail (pedestrians must loop around on River Heights Dr.).
- Trail is very steep from River Heights Dr. down to the pedestrian trail along the shoreline and terminates at the water's edge with no physical barrier to prevent runaway wheelchairs or strollers from continuing down the bank into the river. See Photos 16 and 17.

Photo 16: Transition of trail to concrete

Photo 17: Steep section of trail

Segment 5: Edgewater Dr. to Yacht Club Rd.

Site Observations:

- Precast concrete unit pavers along stretch of trail behind private residences - some uneven and low spot areas.
- Doggy bag amenities, concrete light poles spaced every ± 30m.
- Scenic views of the Wabigoon River.
- Yacht Club Rd. is a gravel causeway through the Laura Howe Marsh to a forested area on the other side.

Photo 18: Unit paver trail behind houses

Photo 19: Trail amenities

Segment 6: Laura Howe Marsh to Van Horne Landing

Site Observations:

- This section of the trail runs along the gravel causeway (Yacht Club Rd.), through the forest to the south along a packed granular trail along the Laura Howe marsh (C), opens up to a large, open field (D) and terminates at the Van Horne Landing at the southern end of the trail (E).
- Poplar, birch, spruce forest.
- Trail opens up to large, empty field at Van Horne Landing - very windy, exposed site.
- Trail head signage is located at the southern entrance to the trail and has two large granite blocks placed as a deterrent for motorized vehicles.
- Trail head sign with map is in good condition.
- Parking lot that terminates at the water's edge does not have well defined edges - unclear where to park, navigate boat launch, pedestrian access, etc.
- City of Dryden owns part of the forest to the west of the large, open field.

Photo 20: Granite quarry block vehicle deterrents

Photo 21: Trail Head sign

Photo 22: Ridge near water's edge at Van Horne Landing

6

Trail Improvement Options & Recommendations

This chapter describes our recommendations for enhancement of the Signature Trail. The first section presents general strategies that will apply throughout the study area, followed by recommendations specific to each segment, including a discussion of design options where applicable. The general recommendations are numbered and include the prefix 'G'. Segment-specifc recommendations are numbered with a prefix that relates to that segment.

A. General Strategies

Trail Width

The determination of trail width is based on consideration of a number of factors, including adjacent conditions, volume and mix of traffic, vehicular access requirements, slope, and ease of retrofit. Recent trail standards for Brampton and Toronto recommend 3.5 metres as a width "appropriate and comfortable for medium-volume trails". This size allows space for two cyclists to pass each other with a bit of space between them, or a cyclist to pass two pedestrians walking abreast. Within these and other current trail standards, narrower widths are acceptable for medium-volume trails in some circumstances. However, the AASHTO Guide for Development of Bicycle Facilities (2012) sets the minimum paved width for a two-directional shared-use trail at 3.0 m.

For the Riverview Drive segment of the Signature Trail, the lack of shoulders, the mix of pedestrians and cyclists moving at different speeds, the sloped sections of the boardwalk, the value in accommodating emergency vehicle access, and the difficulty in revising the width in future all support a trail width in excess of the 3.0 m minimum.

Recommendations:

G1. Plan and budget for a trail width of 3.5 metres for the Riverview Drive section of the trail (Segment 3). During detailed design of this facility in future, the width of this segment can be fine-tuned to suit the budget, need and local conditions.

G2. It is considered good practice to maintain consistent width throughout a named trail, so it is recommended that other new trail sections like Segment 6 at the Van Horne Landing match the width of Segment 3.

G3. As the other segments are retrofitted, their width can also be adjusted to suit.

Trail Surface

The existing trail surface materials within the study corridor vary considerably. They include precast concrete pavers, asphalt, concrete, crushed stone and unpaved roadway shoulder. The surface is uneven in a number of locations, and the pavers are showing signs of deterioration.

Beyond the inconsistency of materials, which diminishes the coherence of Dryden's Signature Trail, some of the materials are problematic. Concrete unit pavers of the type used on the Signature Trail can create accessibility challenges for people using wheelchairs – the joints make it difficult to travel in a straight line and in some people can set up debilitating 'whole body vibrations'. Further, this type of paver is no longer being manufactured, so repairs are difficult or involve unsightly patches with alternate materials.

Recommendations:

G4. Transition to a consistent trail surface of asphalt, which is compliant with AODA standards and easy to maintain and repair.

G5. Where it is advisable for geotechnical or structural reasons, such as ramp sections and places that will experience periodic flooding, surface material can be concrete.

G6. The transition to new trail surface can be phased over several years as funding allows, but should be completed in increments of adequate length to have an impact and take advantage of economies of scale: ±250 metres.

Lighting

Trail lighting is more than a crime deterrent; it also improves transportation safety, extends the comfortable hours of use in winter and throughout the day, and if sensitively designed, elicits a positive aesthetic response from cyclists, pedestrians and neighbouring residents and businesses. On the other hand, trail lighting can create an ambiance that may not align with the desired user experience. It is also the most expensive element in the trail corridor. The decision to illuminate a trail or not should be based on safety concerns, proximity to urban core, ambient light levels and the program for that trail (i.e. stargazing trails would definitely not include lighting).

Some aluminum pedestrian-scale light fixtures are located along the trail in Segments 1 and 2, and Segment 5 includes concrete pole pedestrian-scale fixtures. These were not observed in operation, but it is assumed they are in working order and incorporate HID (high intensity discharge) light sources such as metal halide or high-pressure sodium. At a 30-metre typical spacing, it is likely that there will be light and dark zones along the trail – typically the spacing should be 2.5 to 3 times the height of the pedestrian fixture, or approximately 15 to 20 m to provide uniform lighting where there is no light contribution from a nearby roadway.

Recommendations:

G7. Review light levels along the trail, noting gaps and poor uniformity.

G8. Consider additional pedestrian scale lighting for off-road sections of the trail that do not benefit from nearby streetlights.

G9. Where illumination is desired, aim for a level at the lower range of IES minimum of 0.5 standards to maintain the natural character of the trail.

G10. More than light intensity, light uniformity influences the perception of safety, so pole height, spacing, and distribution pattern should be considered together.

G11. Over time, replace existing fixtures with a consistent and contemporary fixture, reusing piles and electrical service where possible. New fixtures should have the following features:

a. full cutoff screening of the luminaire to control glare
b. LED for energy efficiency and fixture life
c. durable aluminum poles and bases to eliminate rusting
d. colour temperature in the 3000K range for improved color rendering and more comfortable perceived brightness

Planting

The character of vegetation varies greatly through the study area, including swaths of almost treeless lawn, manicured park space, boreal forest shoreline remnants, residential street frontages, wetlands and open grasslands. This variety is one of the best features of the Signature Trail, adding significant interest and interpretive opportunities within a relatively short section of the City's trail network.

Recommendations:

G12. Supplemental plantings could be considered where they can enhance that variety or offer necessary screening from sun and wind – e.g., at the bench alcoves in Segment 1 or along the new waterfront trail in Segment 6 – but in general the existing range of vegetation and landscape characters should be preserved and protected.

Signage & Information Strategy

Signage is a vital component of any quality trail system, projecting an identity for the trail, providing critical information its safe use, and useful information for its enjoyment. The passing of the Accessibility for Ontarians with Disabilities Act (AODA) brings another dimension to the contemporary trail sign systems: the requirement to provide users with accurate and useful data on trail conditions that will affect their ability to use the trail. This includes factors such as slope, condition, surfacing, changes in width, and length between rest areas or exit points. With such information provided at the trailhead and key entry points, trails do not need to be labeled as 'accessible' or 'not accessible'; users make that determination based on their abilities and comfort level.

The other aspect of trail signage that has evolved since the Signature Trail was built is the broad acceptance of on-line mapping and geographic positioning systems (GPS) as primary wayfinding tools among the public. Recognizing and complementing these tools with physical signs, including QR Codes on signs to give quick access to maps and ancillary information like points of interest and operating hours of nearby attractions, and ensuring the on-line maps are accurate and complete, will help enhance the experience for visitors and maximize benefits to the local economy.

Recommendations:

G13. Prepare a Signage Plan that provides design and location guidance for a family of sign types that meet current accessibility standards and link to digital sources. The hierarchy of signs should include:
   a. Trailhead Signs at key entry points, complete with information to guide use for people with disabilities;
   b. Directional Signs at key decision points, complete with QR codes or other digital markers;
   c. Branded Trail Markers at regular intervals along the trail;
   d. Information and Regulatory Signs where guidance on use is required; and
   e. Interpretive Signs at points of cultural or natural interest.

G14. Signs need to be consistent in materials and graphic design, durable, legible, easy to clean and maintain.

G15. The character of the signs for the Signature Trail should not default to rustic wood structures, but can reflect a contemporary and progressive community image. The graphics and design of the sign structures should align with the marketing focus of Dryden's tourism destination marketing initiatives.

Interpretive Features

Prior studies recommend interpretive installations and artworks along this section of the Signature Trail. The density and diversity of these features in the 2003 Trail Enhancement and Development Project report is high, which presents a risk of information overload if implemented as envisioned. That said, the concept of using judiciously located interpretive elements to stimulate interest and enhance the trail experience is sound and should be further investigated in detailed design stages.

Recommendations:

G16. Critically review the interpretive concepts presented in City of Dryden Trail Enhancement and Development Project report (2003).

G17. Prepare an updated interpretive plan for the Signature Trail. Consider incorporating Indigenous world views and other recommendations from Dryden's Working Circle Committee, alongside proposed forest industry and boreal forest themes and other contemporary story lines. The plan should avoid sections of the trail that have the high scenic and recreational value.

Maintenance Strategy

Trail maintenance is a common concern among users, and often dominates the feedback received by municipalities managing trail systems. Budget and human resource shortfalls, access limitations and lack of regular surveillance for some stretches all contribute to the challenges faced by managers of these facilities. For Dryden's Signature Trail, maintenance was reported to be periodic and largely in reaction to calls from the public. A more proactive and systematic approach will add certainty around budgeting and resource allocation, and ensure the trail is reliably and safely available for everyday use.

Recommendations:

G18. Establish a digital database of trail attributes and conditions dedicated to trail management and maintenance.

G19. Develop a checklist to facilitate monitoring and annual condition assessment for key sections of Dryden's trail network including the Signature Trail.

G20. Formally invite trail users to report maintenance issues via a QR code or phone number posted on trailheads. Verify and note chronic problems areas in trail database.

G21. Obtain geotechnical advice on any trail section prone to heaving, slumping or other integrity problems.

G22. Institute program of scheduled seasonal maintenance each spring, with monthly walk-throughs during the season of use.

G23. Assess and adjust snow clearing limits on trails based on demand for winter use annually.

B. Segment-Specific Recommendations

The following section provides recommendations for each of the trail segments identified and analyzed in Chapter 5.

The requirements for improvement within most of the segments were generally clear and straightforward, relating to maintenance, accessibility, wayfinding, and amenity upgrades. Even the Van Horne Landing area offers clear opportunities for improved trail continuity and programming that will maintain and enhance the development options for the parcels immediately north of the water's edge. The work in these segments does not appear to have any significant environmental, regulatory, design or construction impediments to implementation if funding can be secured.

The exception is Segment 3, which presents the most challenging gap in continuity of the Signature Trail, due to the steep and varied riverbank terrain and narrow right-of-way. Various options are presented and evaluated to address the gap and arrive at a preferred option and recommendations.

Segments 1 & 2: North End of Trail & Cooper's Island & Earl Avenue

Existing Trail Segment

Proposed Trail Signage

0 250m

NORTH

Segment 1: North End of Trail

Recommendations:

1.1 Undertake accessibility upgrades (i.e. even out low spots, tripping hazards).

1.2 Existing precast concrete unit pavers are no longer in production - consider replacing with a more accessible surface material over time, such as asphalt or pavers with smaller chamfers.

1.3 Shore up retaining wall sections that are slumping.

1.4 Perform general cosmetic trail improvements (i.e. sanding and restaining of wood benches).

1.5 Additional trailhead signage at the marina would help with wayfinding (i.e. map of the entire trail with "you are here" marked).

Segment 2: Cooper's Island & Earl Avenue

Recommendations:

2.1 Confirm need for Cooper's Island access and program activities. It appears the cost will exceed the benefits.

2.2 If island connection is required, consider gangways and a floating bridge removed seasonally.

2.3 Preserve the natural environment (consider trimming understory of mature spruce to 3-4.5m clearance).

2.4 Consider emergency access to Cooper's Island.

2.5 Address shore erosion where link/bridge to Cooper's Island might be located.

2.6 Refer to geotechnical report for discussion of traditional bridge structure and clearance requirements.

2.7 Provide signage at the intersection where trail crosses boat launch and Victoria St.

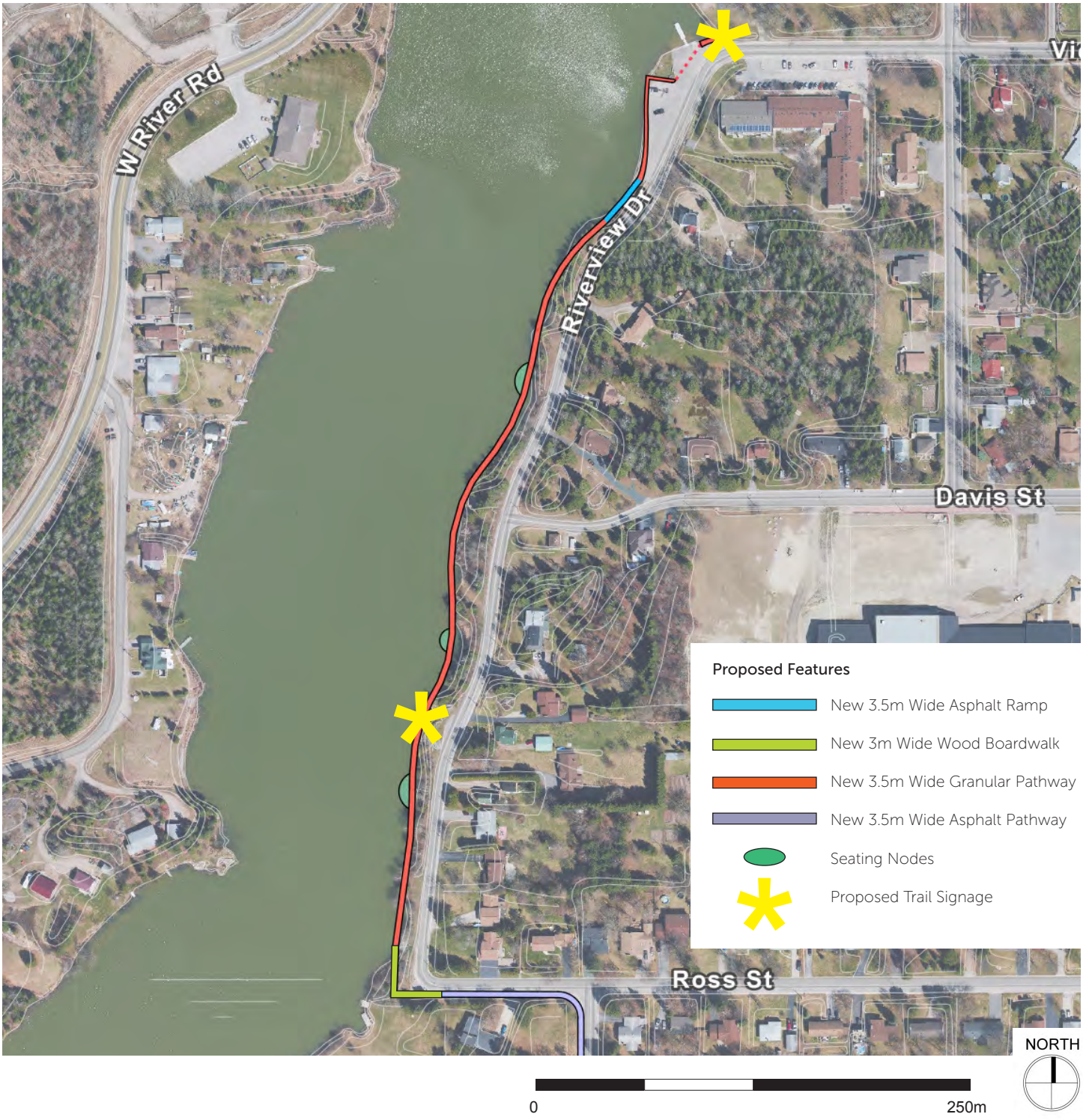
Segment 3: Riverview Dr. from Victoria St. to Ross St.

To fill this gap in the trail, two options are proposed: providing a clearly defined trail along the water's edge or along the roadway. A mid-bank option is not feasible due to highly variable grades and granite outcrops. The options are outlined and evaluated below.

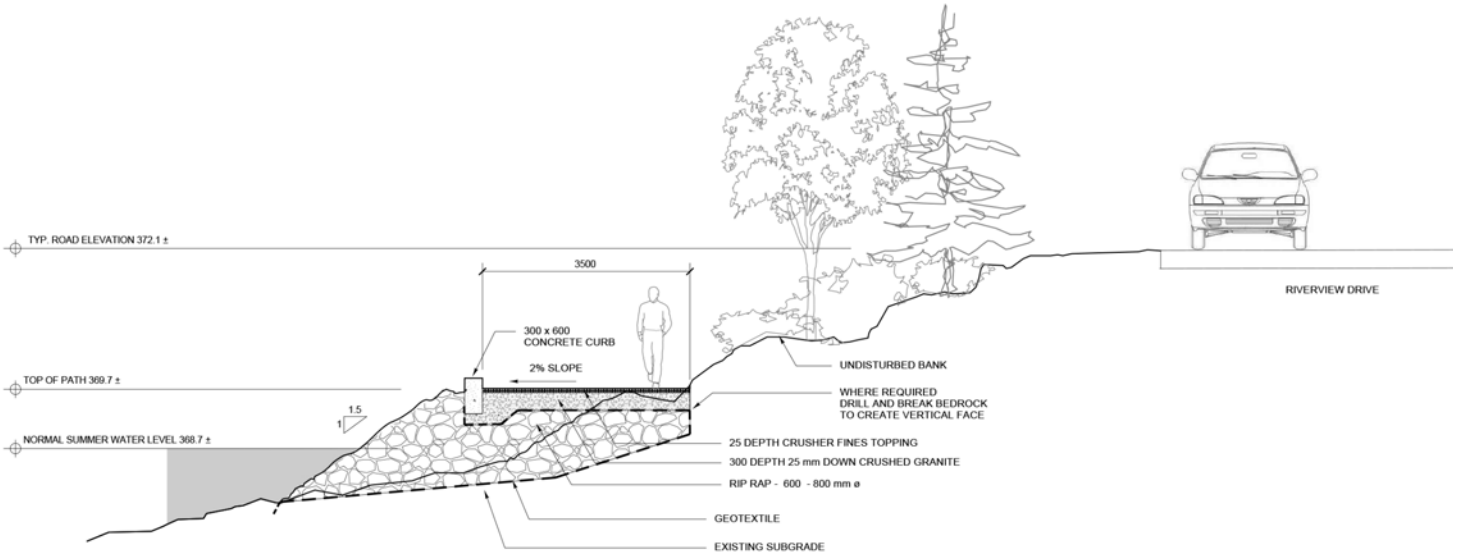
OPTION 1 - River Edge Promenade

This option proposes constructing a new low-level promenade along the bank on a bench of rip-rap that would also serve to armour the river edge and stabilize the roadbed for Riverview Drive. The promenade would be accessed by a asphalt ramp leading down from the Skene boat launch parking on the north side, and connect with a wooden boardwalk and ramp system that connects with Ross Street to the south. It would be set above the typical flood and wave elevations but be designed to withstand periodic flooding. The intent if for the promenade to roughly follow the existing shoreline, though some rock blasting and fill sections will be required to smooth the alignment. See map on the following page.

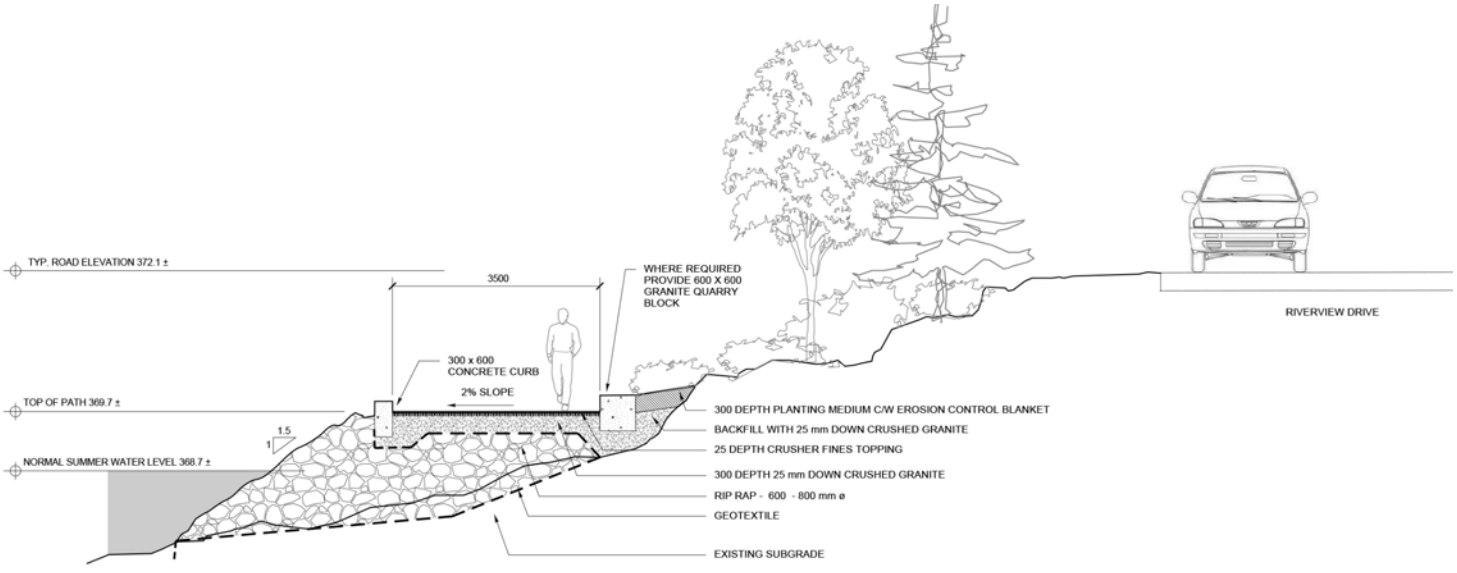
OPTION 1 - River Edge Promenade



OPTION 1 - River Edge Promenade

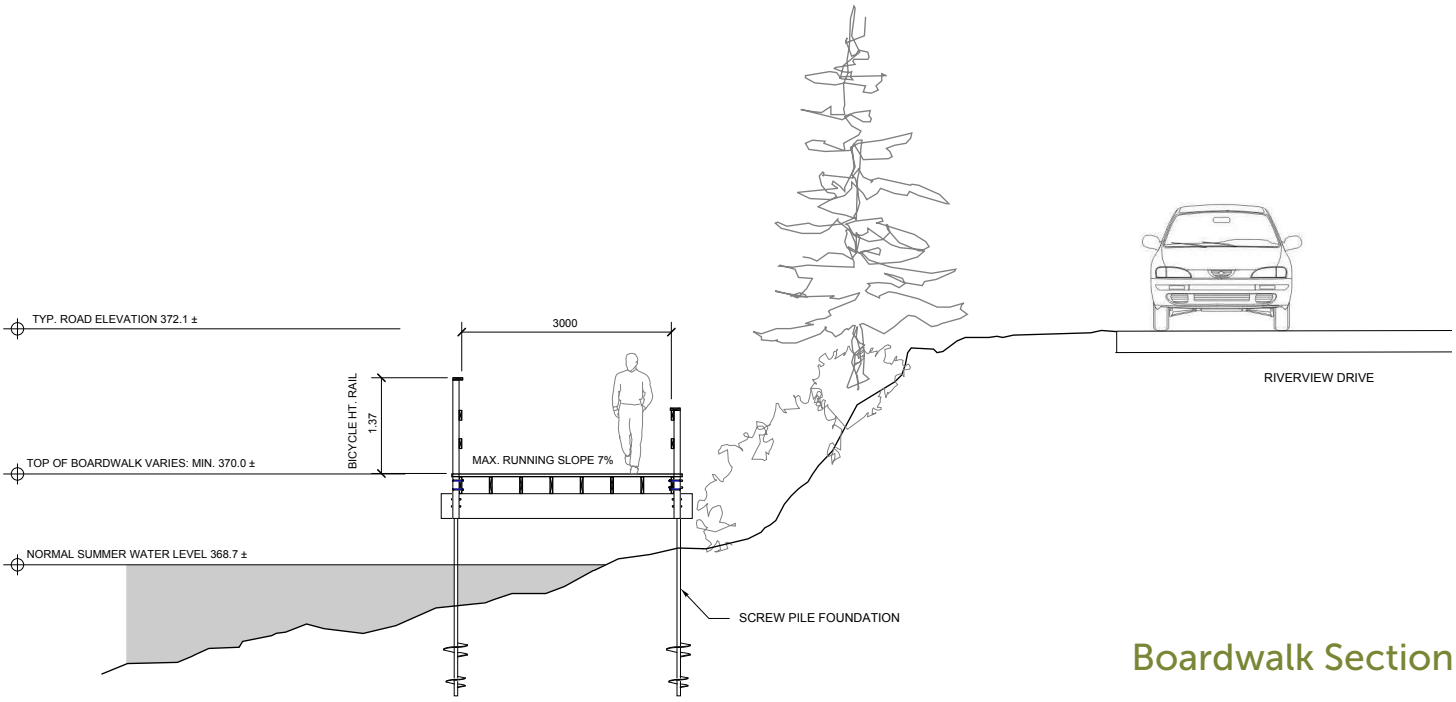


Typical Cut Section

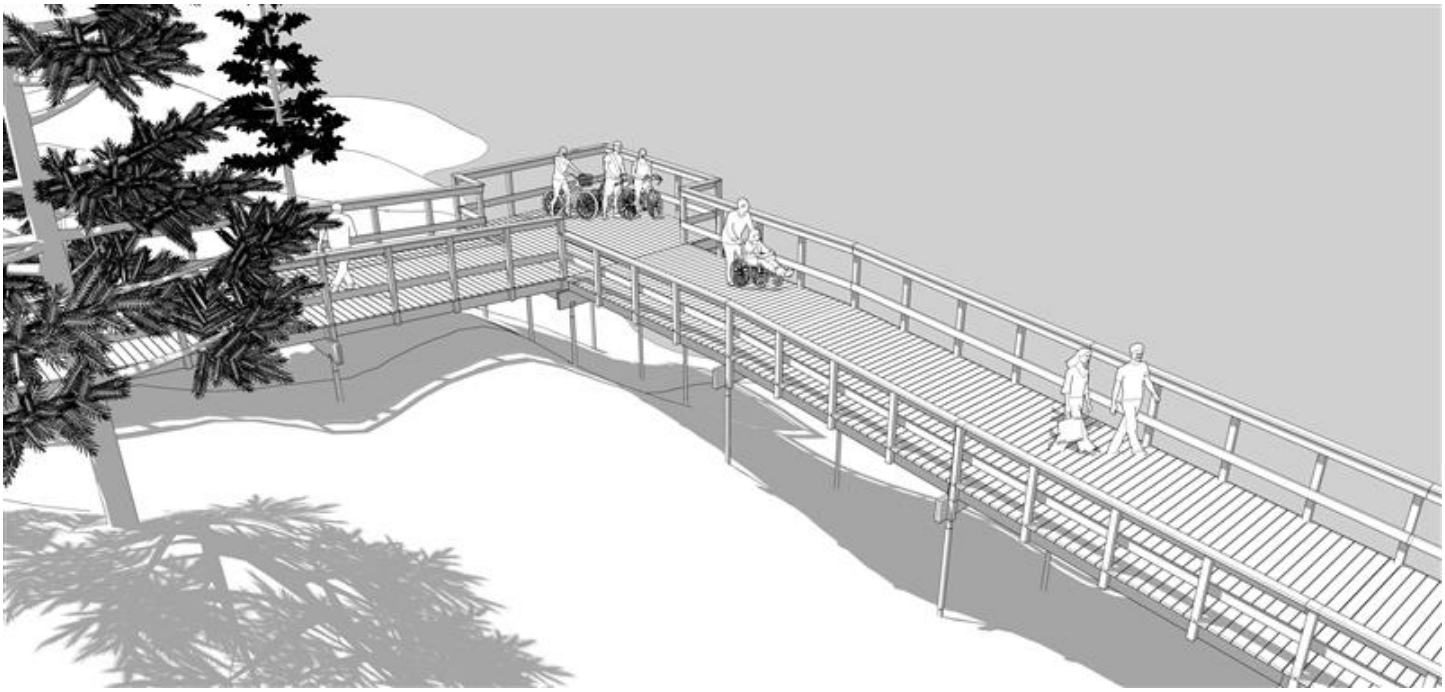


Typical Fill Section

OPTION 1 - River Edge Promenade



Boardwalk Section



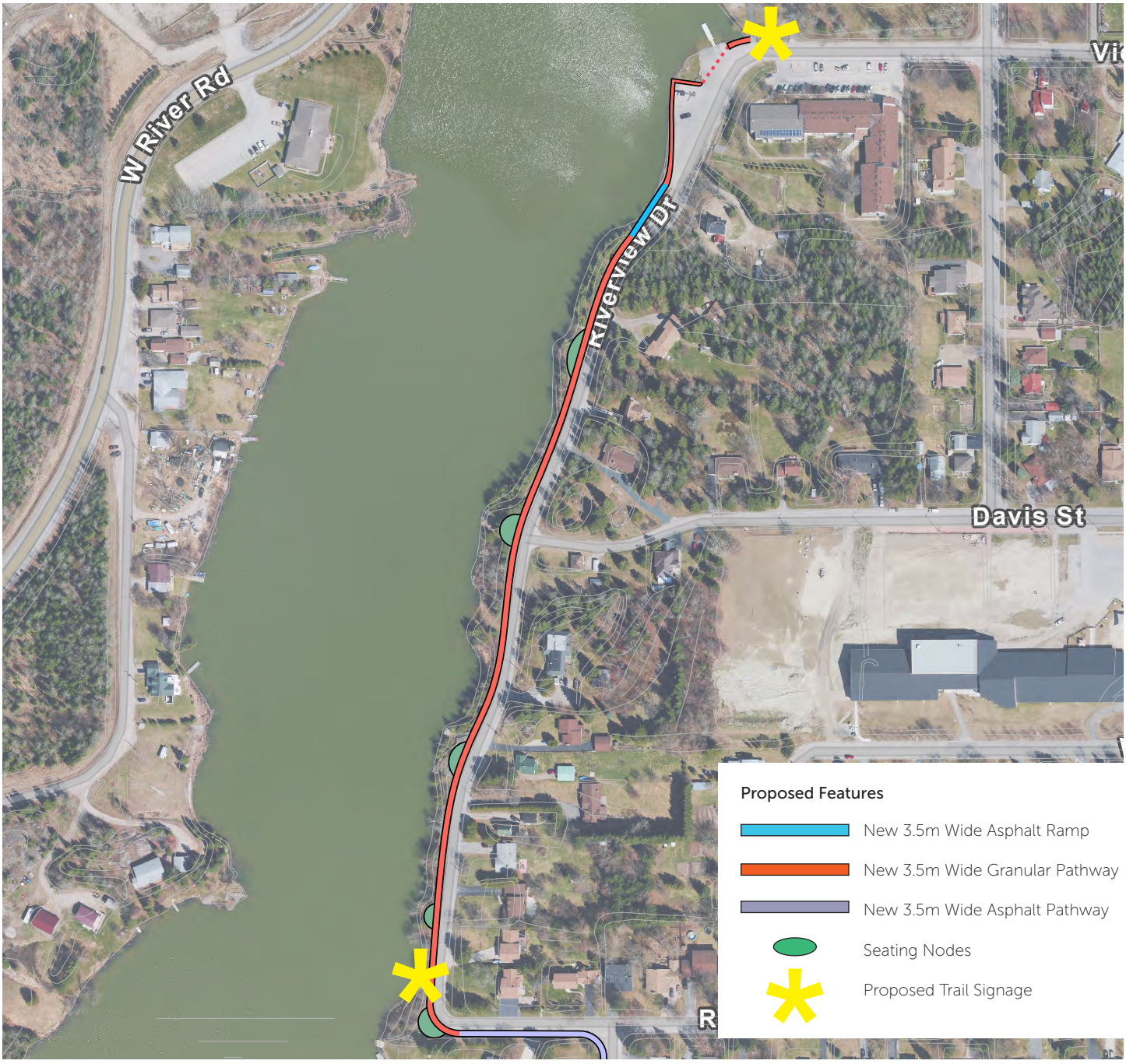
Boardwalk Concept Image

Segment 3: Riverview Dr. from Victoria St. to Ross St.

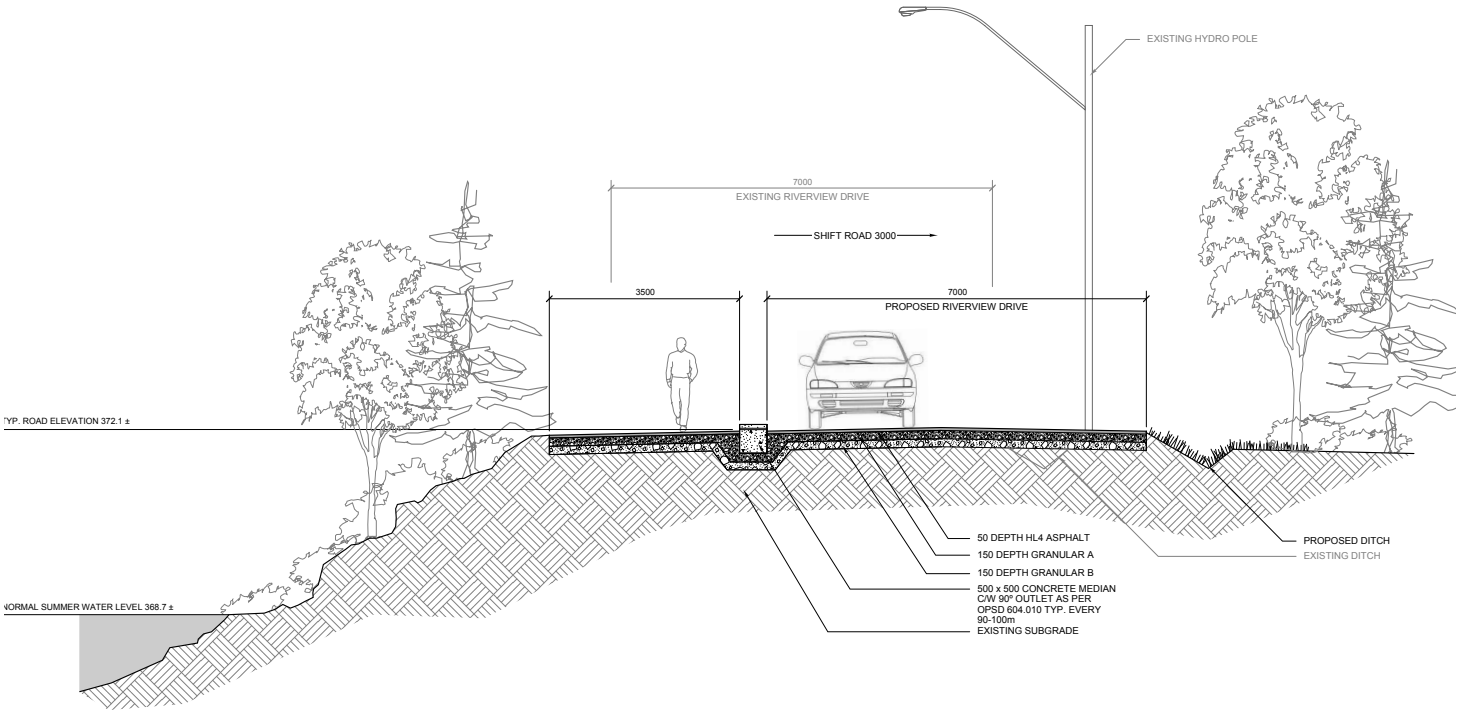
OPTION 2 - Roadside Trail

The second option for the Riverview segment is to build a protected multi-use trail at road level, requiring varying degrees of reconfiguration of the road or embankment.

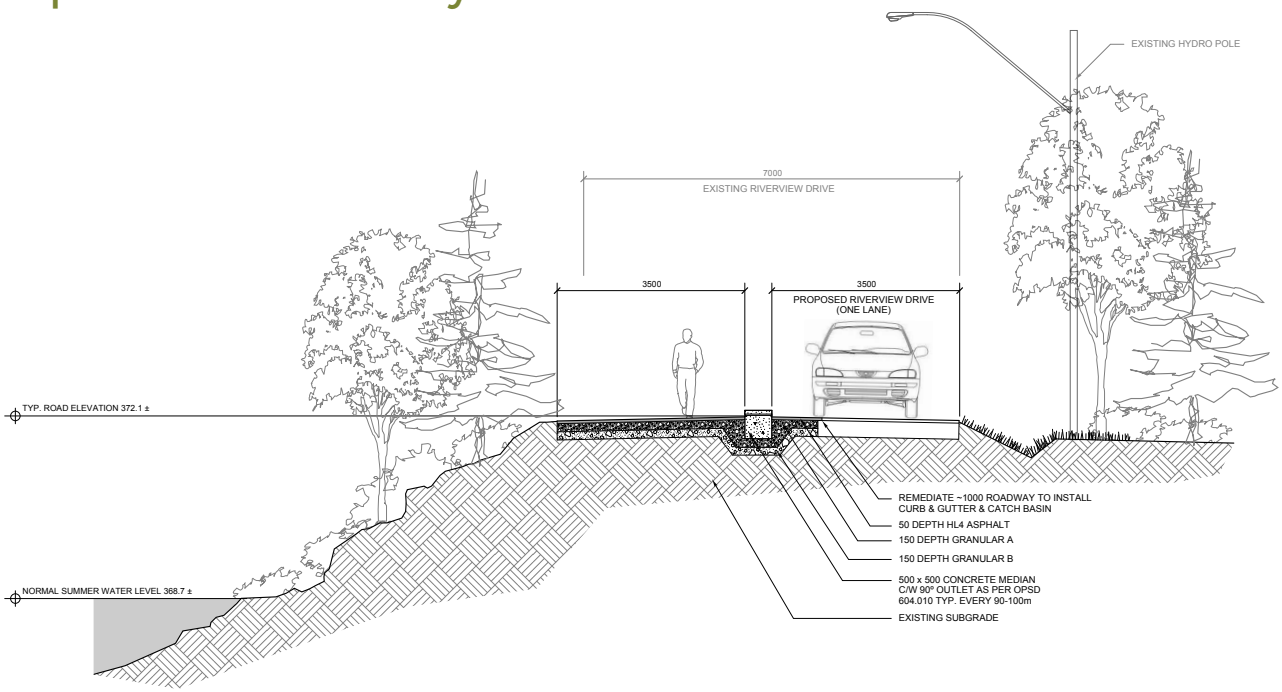
This study considered four variants to create the space required for a trail: 2a shifts the road east over the existing ditch; 2b converts Riverview Drive to a narrower one-way road; 2c builds out over the bank with rip-rap; and 2d is similar to 2c, but instead of draining toward the river it drains toward the roadway. Refer to Appendix B for a more detailed discussion of the roadside options.



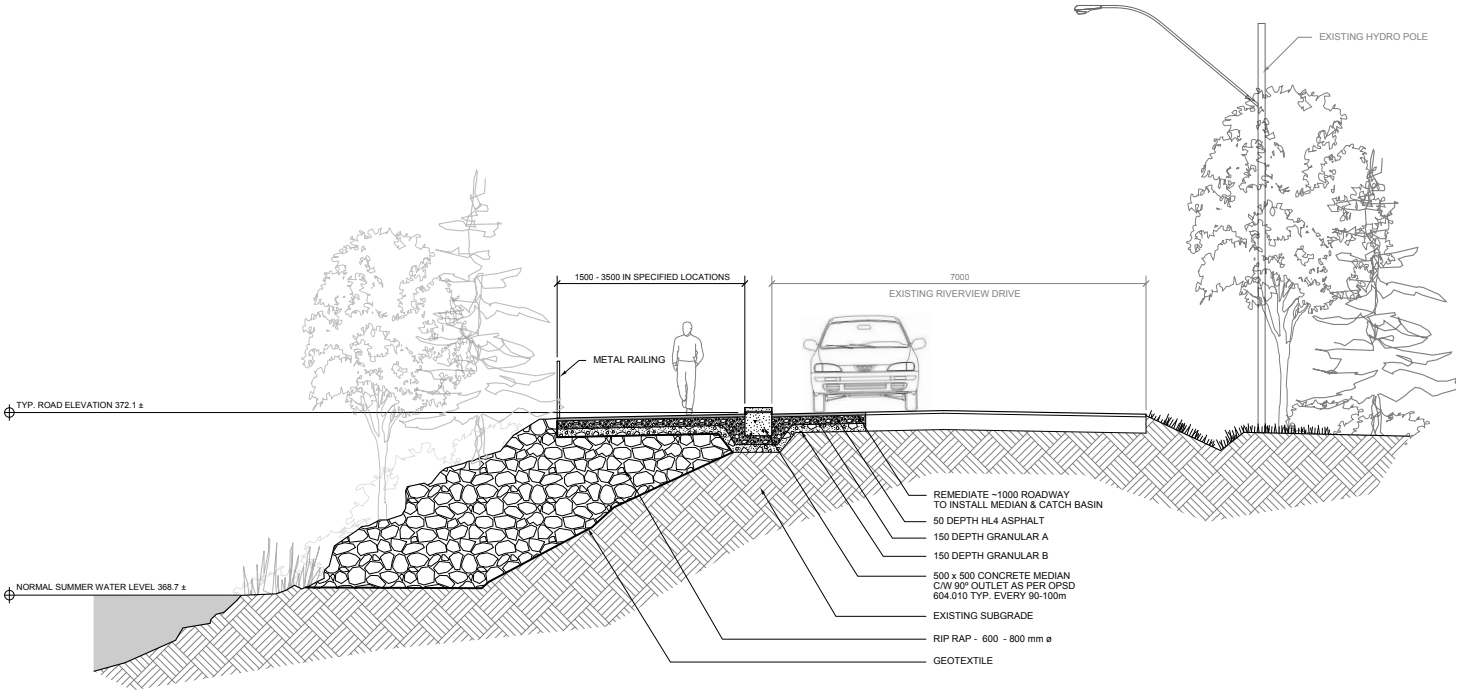
Roadside Trail
Option 2a: Shift Road East



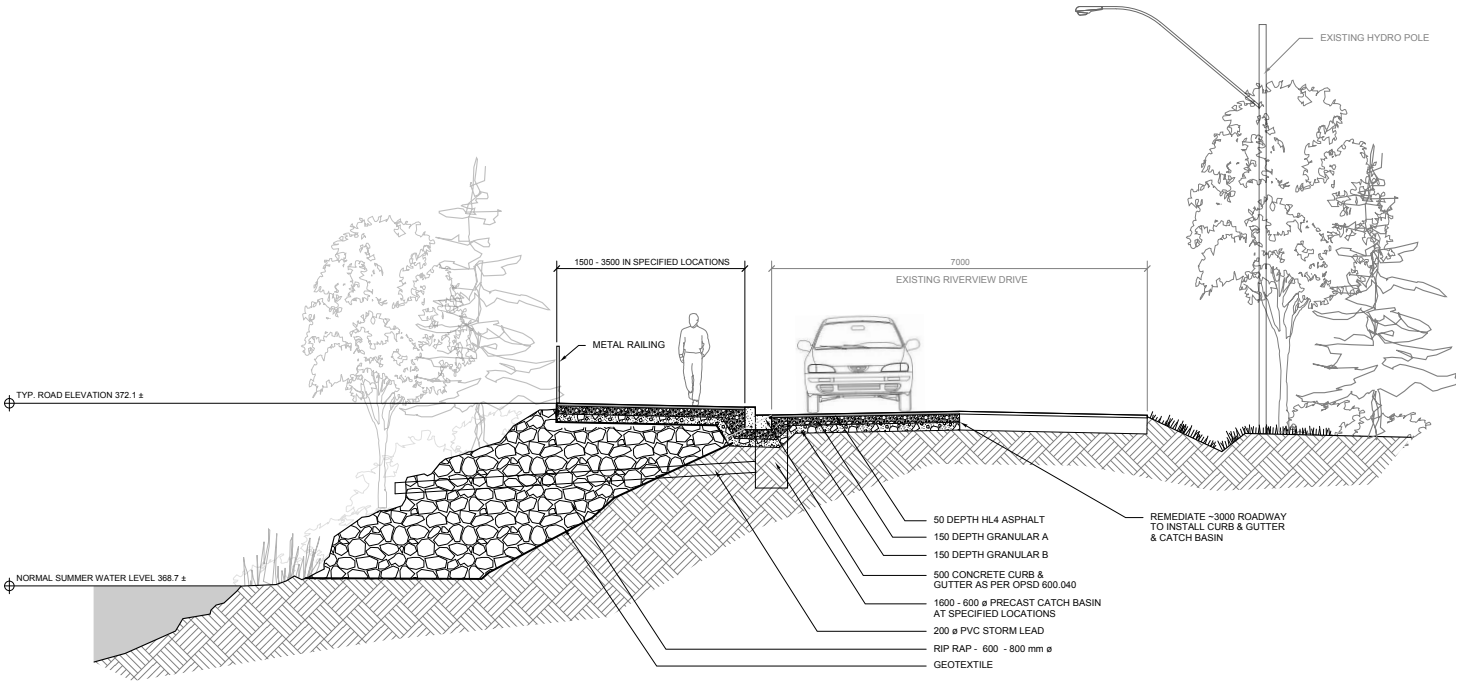
Roadside Trail
Option 2b: One-Way Road



Roadside Trail
Option 2c: Walkway Draining to River (East Draining)



Roadside Trail
Option 2d: Walkway Draining to Road (West Draining)



Evaluation of Options

The evaluation of options for the Riverview Drive segment weighed a number of factors, including ease of construction, impacts on natural areas, anticipated usage, seasonal considerations, maintenance, perceived and actual safety, accessibility, and character or experience. The two options differ significantly in the experience they offer users which was identified by the project steering committee as a key measure of success. The chart below outlines this and other points of comparison between the two options.

	Option 1	**Option 2 a**	**Option 2b**	**Option 2c**	**Option 2d**
	River Edge Promenade	**Roadside Trail – Shift Road East**	**Roadside Trail – One-Way Road**	**Roadside Trail – East Draining**	**Roadside Trail – West Draining**
Experience	excellent	moderate: traffic noise and adjacency	reduced traffic, best of roadside options	narrowing of path at outcrops diminishes experience	narrowing of path at outcrops diminishes experience
Habitat Disruption	toe of slope habitat affected	negligible	negligible	top and toe of slope affected	top and toe of slope affected
Env. Permits	DFO, MNRF	none	none	DFO, MNRF	DFO, MNRF
Additional Eng. Studies	geotechnical, hydraulic	geotechnical, stormwater	geotechnical, transportation	geotechnical	geotechnical
Traffic Safety	no risk	some risk	some risk	some risk	some risk
Community Impacts	may create vagrancy/ security concerns	driveway approaches impacted	disrupts traffic patterns and inconveniences homeowners	additional activity at street level	additional activity at street level
Lighting	will be dark at night	roadway lighting	roadway lighting	roadway lighting	roadway lighting
Cost	$1.7M	$1.9M	$0.6M	$0.9M	$1.0M
Ease of Construction	may require specialist contractors	hydro pole relocation, bedrock & tree removal	straightforward	may necessitate bank stabilization work	may necessitate bank stabilization work
Construction Impacts	modest traffic and noise disruption	some traffic and noise disruption	some traffic and noise disruption	some traffic and noise disruption	some traffic and noise disruption
Ease of General Maintenance	moderate	moderate	moderate	moderate	moderate
Ease of Snow Clearing	granular base and access limitations complicate snow removal	straightforward, could be 4-season facility, reduced snow storage east side	straightforward, could be 4-season facility	straightforward, could be 4-season facility reduced snow storage west side	straightforward, could be 4-season facility reduced snow storage west side

Discussion

In summary, the least expensive option – converting Riverview Drive to one-way and narrowing it to one lane, is the most favorable of the roadside options if the transportation analysis proves it will not adversely affect traffic patterns in this part of Dryden. On the negative side for this option, it is anticipated that the one-way street will not be favourably received by local residents and possibly the community at large, as it is a popular route, and cut-through traffic on nearby residential streets would inevitably increase.

The river edge promenade has good constructibility, minimal disruption to bank vegetation, traffic and residents, and offers a true 'signature' experience to users, reinforcing the link to Dryden's waterways and natural areas. Costs however, are highest among the options. As the geotechnical report indicates, signs of pavement shifting on Riverview Drive might necessitate armoring of the toe of the slope with rip rap to stabilize the roadbed in the future, which would considerably reduce the cost of this option as it can be tied into that stabilization budget. The concerns that would need to be addressed if this option were to move forward are lighting, security, and winter use – all of which can be phased in over time.

Preferred Option

Due to the combination of anticipated public backlash to a one-way street and the diminished experience of the trail edging along a narrow road right-of-way, the consultant team recommends the river edge promenade as the preferred option for completing the signature trail along Riverview Drive. Higher costs can be offset by tying to other construction work (such as stabilization) phasing in amenities like benches and signage, and optimizing the width as described in recommendation G1.

Segment 3: Riverview Dr. from Victoria St. to Ross St.
(Preferred Option - Construction of River Edge Promenade)

Recommendations:

3.1 Provide safe and well-marked crossing where boat launch, roadway and pathway intersect - connect to existing trail to the north. Extend trail along shoreline where current parking lot is and provide parking curbs.

3.2 Provide a 3.5m asphalt trail that ramps down to the water's edge at an accessible slope of 5%.

3.3 Provide 600m long granular trail built on rip rap at toe of bank. See Option 1 figures on page 46).

3.4 Minor vegetation clearing will be required to construct the promenade and provide safe clearance for users.

3.5 Elevation of promenade to be set above normal water level fluctuations and anticipated wave action - refer to Geotechnical report in Appendix A.

3.6 Provide seating nodes where space allows at key lookout points.

3.7 Promenade should be constructed to accommodate snow clearing equipment, but it will not likely be a priority for clearing in the near future.

3.8 Incorporate signage (wayfinding, directional, interpretive) where appropriate.

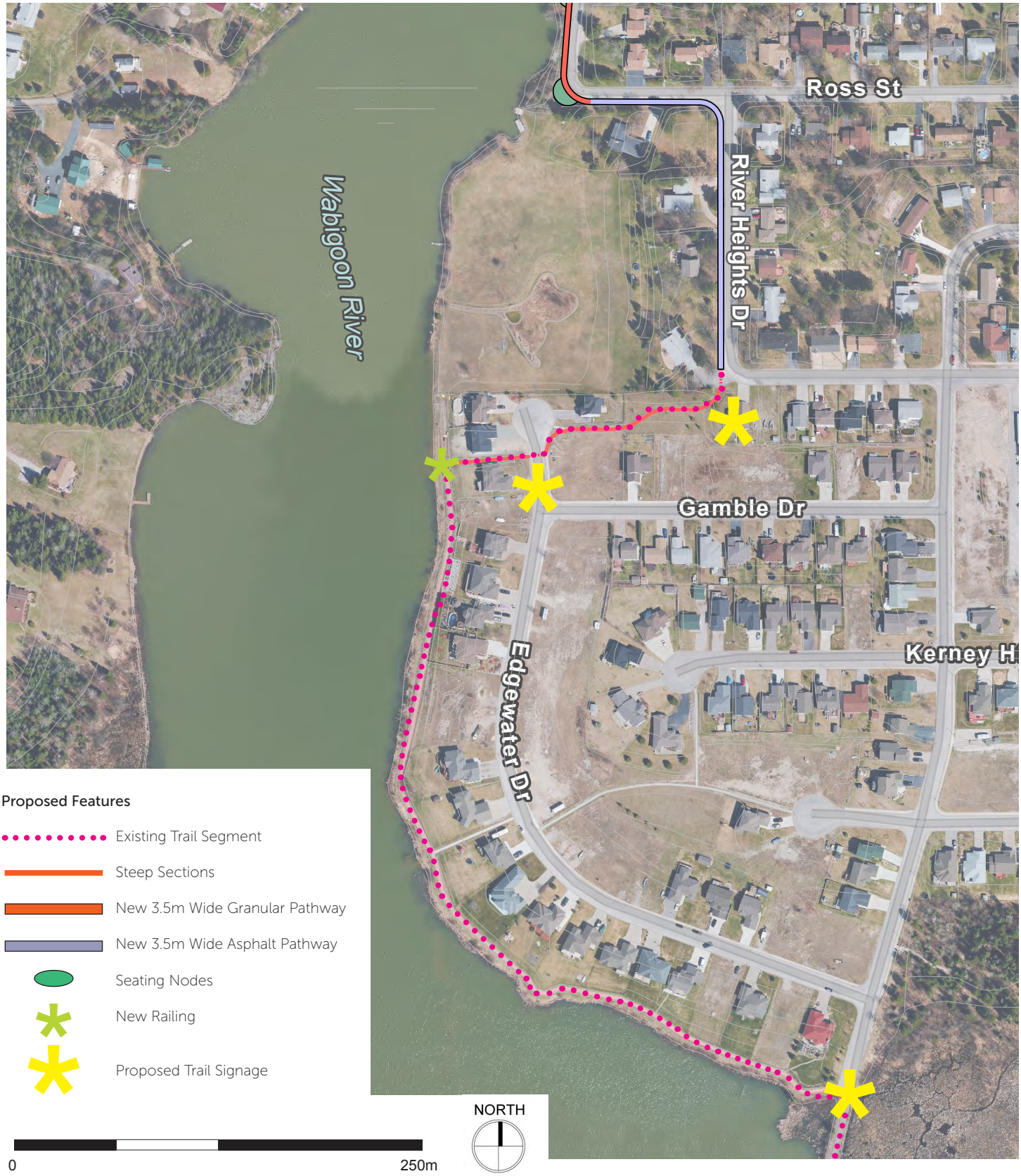
3.9 At south end of Segment 3, construct a 3m wide dogleg boardwalk to bridge over bedrock and bring users back up to street level.

3.10 Provide for lookout points along this segment of the trail.

3.11 All sloped sections should be at 7% or less, in accordance with AODA standards for boardwalk ramps.

3.12 Provide a trail connection to on-road segment of trail at Ross St.

Segments 4 & 5: Ross St. to River Heights Dr. & Edgewater Dr. to Yacht Club Rd.



Segment 4: Ross St. to River Heights Dr.

Recommendations:

4.1 Create a roadside trail along Ross St. and River Heights Dr. that connects the new boardwalk to the existing concrete trail at the corner of River Heights Dr. and Goodall St.

4.2 Verify grades of existing asphalt ramp and reconfigure if it exceeds AODA regulations. In interim, provide signage indicating grades and alternative routes. Include provisions for upgrades where feasible in the future capital plans.

4.3 Provide a barrier or railing at the bottom of the ramp to prevent runaway strollers or wheelchairs from falling into the river.

Segment 5: Edgewater Dr. to Yacht Club Rd.

Recommendations:

5.1 Undertake general cosmetic trail improvements and accessibility upgrades.

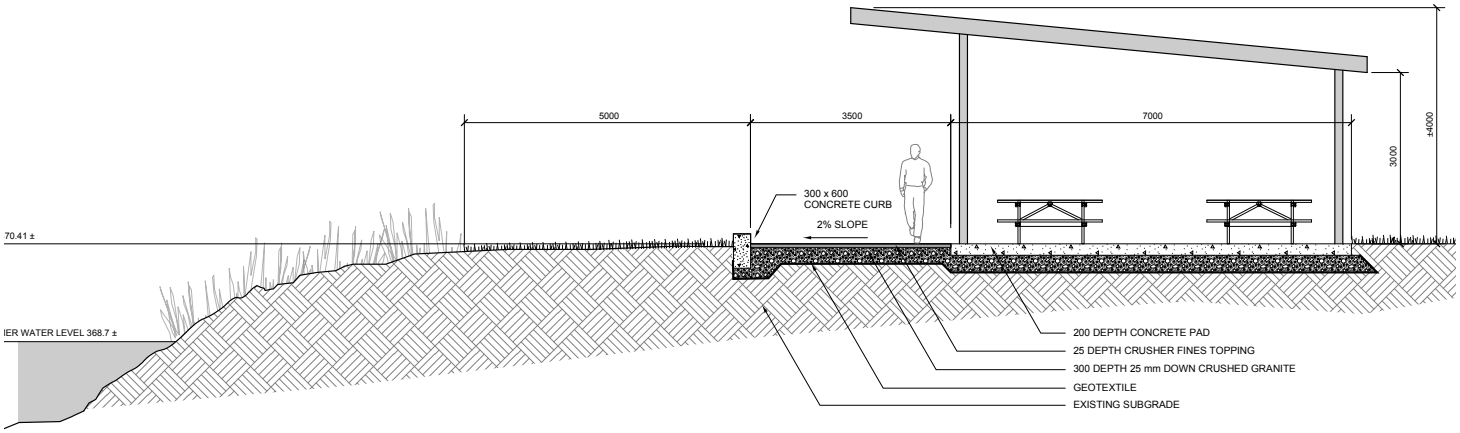
5.2 Rectify uneven spots along the trail.

5.3 Existing precast concrete unit pavers are no longer in production - consider replacing with a more accessible surface material over time, such as asphalt or pavers with smaller chamfers.

5.4 Create a gateway where the path moves onto Yacht Club Rd. to help with wayfinding at this section of the trail.

Segment 6: Laura Howe Marsh to Van Horne Landing

Signature Trail & Pavilion



Trail & Pavilion Section

Partially covered pavilion/lookout point

Gateway signage at entrance to parking lot & Boat launch

Granular trail along the shoreline

Lookout points along the shoreline

Shade structure along dock lookout area

Trailhead signage mapping sections of the trail

Segment 6: Laura Howe Marsh to Van Horne Landing

Recommendations:

6.1 Consider offering amenities at the start of the trail leading into Laura Howe Marsh. Enhanced lighting and signage would help to highlight this gateway to the Dryden Signature Trail.

6.2 Construct a granular trail that continues along the forest edge and follows the existing ridge down to the pavilion/lookout area. Extend the trail heading north along the west side of parking lot.

6.3 Add tree plantings along the west side of the trail extension to mitigate strong wind and sun.

6.4 Designate large open field for future development (i.e. commercial or residential development).

6.5 Conduct study of servicing capacity and requirements to support future development.

6.6 Field can be kept as a flexible space for sports recreation uses or festivals in the meantime.

6.7 Define parking lot edges with parking fences or other physical barriers.

6.8 Provide parking and regulatory signage to direct boat launch traffic and mitigate potential safety issues between vehicles and pedestrians.

6.9 Construct parking fence with painted lines to delineate stall locations.

6.10 Expand the current parking lot to accommodate vehicle and boat trailer pull-throughs.

6.11 Add parking islands to define and direct traffic flow. Add tree plantings to provide shade for vehicles where possible.

6.12 Provide safe pedestrian connections from the parking lot to the future pavilion/boardwalk and water's edge.

6.13 Expand the current boat launch on the west side of Government Dock to accommodate two launches.

6.14 Construct partially covered pavilions/lookout areas that offer seating and waste receptacles.

6.15 Pavilion/lookout area to incorporate shade and wind protection from the lake - maintain porosity to consider views to the lake. from future developments.

6.16 Pavilion/lookout design to be highly adaptable and easily relocated if uses change in this area.

6.17 Provide an area for food trucks and vendors to set up for markets, special events, celebrations, etc. (may need upgrade to existing on site services or addition of on site services).

6.18 Opportunity for enhanced interpretive signage (ie. bird & wildlife of the area).

6.19 Construct a shade structure at the end of Government Dock (could be paired with a vertical public art component or element) to serve as a focal point from the shoreline.

6.20 Add benches, fishing rod holders and boat bumpers to Government Dock.

7

Cost Estimates

Dryden Trails Cost Estimate

Budget Costs for Dryden Signature Trail Segments

March 15, 2022

Item	Description	QTY.	UNITS	COST	EXT.
1.0	**SEGMENT 1 (North End of Trail) Total length: 370m**				
1.1	+/- 20% of retaining wall needs shoring (removal of concrete sections, replace w/ new concrete retaining wall)	26	l.m.	$500.00	$13,000.00
1.2	+/- 30% of trail needs repairs (removal of unit pavers, replace w/ 3.5m wide 75mm asphalt pathway & 150mm base)*	385	sq.m.	$175.00	$67,375.00
1.3	Tree planting @ existing seating nodes	7	each	$650.00	$4,550.00
1.4	Trail markers & misc. signage	1	Allow	$2,500.00	$2,500.00
1.5	Interpretive signage (content creation & installation)	1	Allow	$7,500.00	$7,500.00
1.6	Mobilization & general conditions	1	l.s.	$2,000.00	$2,000.00
				Subtotal	**$96,925.00**
				15% Consultant Fees	**$14,538.75**
	*Cost to replace pavers w/ asphalt for information purposes only			**25% Contingency**	**$24,231.25**
				Total	**$135,695.00**
2.0	**SEGMENT 2 (Cooper's Island & Earl Ave.) Total length: 260m**				
2.1	+/- 65% of trail needs repairs (removal of unit pavers, replace w/ 3.5m wide 75mm asphalt pathway & 150mm base)*	600	sq.m.	$175.00	$105,000.00
2.2	Tree planting @ existing seating nodes	8	each	$650.00	$5,200.00
2.3	Trailhead sign @ Skene Boat Launch	1	Allow	$6,000.00	$6,000.00
2.4	Trail markers & misc. signage	1	Allow	$2,500.00	$2,500.00
2.5	Interpretive signage (content creation & installation)	1	Allow	$7,500.00	$7,500.00
2.6	Mobilization & general conditions	1	Allow	$2,000.00	$2,000.00
				Subtotal	**$128,200.00**
				15% Consultant Fees	**$19,230.00**
	*Cost to replace pavers w/ asphalt for information purposes only			**25% Contingency**	**$32,050.00**
				Total	**$179,480.00**

Continued on the next page

3.0 SEGMENT 3 (Riverview Dr. from Victoria St. to Ross St.) Total length: 620m

3.1	Bedrock removal allowance	1	l.s.	$50,000.00	$50,000.00
3.2	Rough grading/excavation	1755	cu.m.	$40.00	$70,200.00
3.3	600-800mm ø rip rap - supply, place & compact	3800	cu.m.	$50.00	$190,000.00
3.4	150mm granluar 'A' base	760	cu.m.	$50.00	$38,000.00
3.5	Geotextile	7020	sq.m.	$15.00	$105,300.00
3.6	CIP concrete curb 300 x 600mm c/w 200mm granular 'B' subbase & 150mm granular 'A' base	585	l.m.	$180.00	$105,300.00
3.7	Granite quarry blocks	90	cu.m.	$1,500.00	$135,000.00
3.8	Surface crusher fines - supply, place & compact	120	cu.m.	$65.00	$7,800.00
3.9	Growing medium - supply & place	65	cu.m.	$200.00	$13,000.00
3.10	Boardwalk ramp, 3m wide, 40m long	120	sq.m.	$1,800.00	$216,000.00
3.11	Piles for boardwalk	40	each	$1,500.00	$60,000.00
3.12	Mobilization & general conditions	1	Allow	$156,970.00	$156,970.00
3.13	Environmental & Geotechnical reports	1	Allow	$65,000.00	$65,000.00
				Subtotal	$1,212,570.00
				15% Consultant Fees	$181,885.50
				25% Contingency	$303,142.50
				Total	$1,697,598.00

4.0 SEGMENT 4 (Ross St. to River Heights Dr.) Total length: 470m

4.1	Roadside trail (3.5m wide 75mm asphalt pathway & 150mm base)	945	sq.m.	$100.00	$94,500.00
4.2	Accessibility upgrades for AODA compliant slopes (Survey & design report for a Class B cost estimate)	1	Allow	$10,000.00	$10,000.00
4.3	Trail markers & mic. Signage	1	Allow	$5,000.00	$5,000.00
4.4	Accessibility signage (where slopes exceed AODA standard)	4	each	$500.00	$2,000.00
4.5	Guard railing where trail connects to the shoreline	1	each	$2,000.00	$5,000.00
4.6	Mobilization & general conditions	1	l.s.	$2,000.00	$2,000.00
				Subtotal	**$118,500.00**
				15% Consultant Fees	**$17,775.00**
				25% Contingency	**$29,625.00**
				Total	**$165,900.00**

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5.0 SEGMENT 5 (Edgewater Dr. to Yacht Club Rd.) Total length: 570m

5.1	+/- 10% of trail needs repairs (removal of unit pavers, replace w/ 3.5m wide 75mm asphalt pathway & 150mm base)*	200	sq.m.	$175.00	$34,912.50
5.2	Addition of benches	2	each	$1,500.00	$3,000.00
5.3	Gateway node at Yacht Club Rd. (trailhead signage, bench & waste receptacle)	1	Allow	$10,000.00	$10,000.00
5.4	Mobilization & general conditions	1	l.s.	$2,000.00	$2,000.00
				Subtotal	$49,912.50
				15% Consultant Fees	$7,486.88
	*Cost to replace pavers w/ asphalt for information purposes only			25% Contingency	$12,478.13
				Total	$69,877.50

6.0 SEGMENT 6 (Laura Howe Marsh to Van Horne Landing) Total length: 2,970m

6.1	Trailhead seating node (additional signage & solar lighting)	1	Allow	$20,000.00	$20,000.00
6.2	Granular trail (3.5m wide, 450m length)	1,675	sq.m.	$75.00	$125,625.00
6.3	Asphalt (expanded parking lot)	5,320	sq.m.	$95.00	$505,400.00
6.4	Concrete curbs (150mm x 150mm)	200	l.m.	$85.00	$17,000.00
6.5	Trail markers & misc. Signage	1	Allow	$5,000.00	$5,000.00
6.6	Gateway signage (5m x7m monument size)	1	Allow	$30,000.00	$30,000.00
6.7	Expanded boat launch	1	Allow	$20,000.00	$20,000.00
6.8	Parking wheel stops	20	each	$600.00	$12,000.00
6.9	Parking fence (wood, 1m height)	95	l.m.	$250.00	$23,750.00
6.10	Covered 'moveable' pavilion (5m x 7m size)	3	each	$98,000.00	$294,000.00
6.11	Concrete pads under pavilions (6m x 8m pad size)	144	sq.m.	$225.00	$32,400.00
6.12	Picnic tables	12	each	$1,200.00	$14,400.00
6.13	Waste receptacles	2	each	$1,000.00	$2,000.00
6.14	Permanent shade structure at the end of dock (10m x 10m size)	1	Allow	$150,000.00	$150,000.00
6.15	Interpretive signage (ie. Bird & wildlife, information kiosk)	1	Allow	$10,000.00	$10,000.00
6.16	Fishing rod holders added to the dock	8	each	$65.00	$520.00
6.17	Boat bumpers	50	each	$200.00	$10,000.00
6.18	Permanent benches along the dock (backless to face both directions)	8	each	$1,500.00	$12,000.00
6.19	Tree planting along trail extension & in parking islands	31	each	$650.00	$20,150.00
6.20	Mobilization & general conditions	1	l.s.	$2,000.00	$2,000.00
				Subtotal	$1,306,245.00
				15% Consultant Fees	$195,936.75
	Note: GST not included			25% Contingency	$326,561.25
	Also not included: Interpretive Features & Signage Plan & Additional Lighting			Total	$1,828,743.00

8

Implementation

Implementation Timeline

Recommendations for the Dryden Signature Trail will be implemented in phases. The following outlines priorities for implementation based on projected funding opportunities, urgency of upgrades and general value to the community, as discussed with the project steering committee.

Phase 1 (1-2 years)

Segment 1: North End of Trail *and*
Segment 2: Cooper's Island & Earl Avenue

- Repair recommendations can be implemented incrementally (ie. unit pavers phased out in favour of asphalt trail surface).
- Easiest to implement first and enjoy right away.
- Funds fo wayfinding and interpretive signage are available.

Segment 6: Laura Howe Marsh to Van Horne Landing

- Development at Van Horne Landing will have immediate benefits for the community and provide a boost to Dryden's tourism industry.
- New trail and dock amenities will improve the value and development potential of the adjacent property.
- Most recommendations will be easy to implement with minimal disruption to the community.

Phase 2 (4-5 years)

Segment 3: Riverview Dr. from Victoria St. to Ross St.

- Dedicate time and resources to funding applications - could be a longer process than for the more straightforward maintenance and upgrade segments.
- Undertake necessary geotechincal and environmental studies.
- Complete detailed design and obtain permits.

Segment 4: Ross St. to River Heights Dr.

- Bringing this portion of the trail up to AODA standards may not be feasible in the short-term. Install requisite signage and safety railing in the interim.

Phase 3 (10-15 years)

Segment 5: Edgewater Dr. to Yacht Club Rd.

- Repairs for this segment of the trail are not anticipated in the immediate future. This segment is generally in good condition (as of October 2021). It is anticipated that this portion of the trail will need upgrades and repairs in 10-15 years.

Appendices

A

Geotechnical/ Hydrotechnical Report

TREK GEOTECHNICAL Quality Engineering | Valued Relationships

March 11, 2022 Our File No. 0298-008-00

Mr. Glen Manning, MALA, FCSLA, GRP
Principal, Landscape Architect
HTFC Planning & Design
500- 115 Bannatyne Avenue East
Winnipeg, MB R3B 0R3

RE: Dryden Signature Trails
Geotechnical and Hydrotechnical Desktop Study Report

As requested by HTFC Planning and Design (HTFC), this letter provides geotechnical and hydrotechnical recommendations in support of a conceptual design feasibility assessment for upgrades to the Signature Trails system in Dryden, Ontario. The terms of reference for TREK's assignment are included in our proposal to HTFC dated September 22, 2021. TREK's scope of work includes a site reconnaissance visit to visually assess the existing trail condition along sections near the waterfront, to review existing geotechnical and hydrotechnical information, and to provide high-level recommendations to aid in conceptual design and feasibility assessment. This letter report provides a summary of our site reconnaissance visit, review of existing information, and geotechnical and hydrotechnical recommendations, including requirements for further assessment during subsequent design phases.

Review of Existing Information

TREK reviewed technical reports, maps, photos, historic flow records and drawings to develop a better understanding of the project study area. The City provided several reports and drawings to assist with the geotechnical and hydrotechnical desktop studies. Furthermore, anecdotal observations and normal operating procedures for the Wabigoon Lake Dam were provided by Marie Cyr on November 29, 2021 (Domtar General Mill Manager) and integrated into the desktop studies.

The following documents have been reviewed (not appended to this report):

- "Wabigoon River and Swanson Creek – Flood Risk Mapping Study General Report", Dillon Consulting Engineers & Planners, May 19, 1987.
- "Public Information Flood Risk Map – Town of Dryden", Ontario Ministry of Natural Resources, 1989.
- "Geotechnical Investigation for the Proposed Lift Station, Education and Museum Buildings" near the waterfront (Van Horne Landing) of Dryden, Ontario, M. Block and Associates Ltd., 2010.

Based on a review of nearby well drilling logs and regional maps, we anticipate the soil stratigraphy to consist of various layers of sand, silt and clay, overlying till and a bedrock surface of variable depth. The test holes drilled at Van Horne landing encountered silty clay and clayey silt layers overlying sandy silt and silty sand layers to the depth of exploration (7.8 m), which is generally

consistent with our interpretation of regional stratigraphy. Surficial bedrock outcrops are present at various locations in Dryden, including areas along the signature trail and Wabigoon River.

The community of Dryden is located along the Wabigoon River and the shores of Wabigoon Lake. The Wabigoon River flows northwest from Wabigoon Lake along a 2.3 km channel to the Wabigoon Lake Dam. Wabigoon Lake Dam includes a multi-bay spillway and a powerhouse, with Wabigoon Lake serving as the reservoir with lake level control provided through flows releases from the lake with the operation of the spillway and powerhouse. Wabigoon Lake has a surface area of approximately 179 km^2, with a normal operating target level of 368.7. A Water Survey of Canada (WSC) stream flow gauge has been operated on the Wabigoon River (Wabigoon River at Dryden - 05QD016) downstream of the Wabigoon Lake Dam, providing historic and continuous flow data. The contributing drainage area of the Wabigoon River to the dam is approximately 2,340 km^2 based on the WSC records for the gauging station (05QD016). The dam was constructed in 1912 to provide power for the early pulp and paper company and is currently operated by the local Domtar plant. The dam raised the original level of the lake by 0.5 to 0.6 m and controls the river outflows and water levels upstream of the dam. The dam consists of a six (6) bay stoplog-controlled concrete spillway structure.

Study Area Description

The study area is shown on Figure 01 (provided by HTFC) and is located between the Wabigoon Lake Dam (downstream/north limit) and Van Horne Landing in Wabigoon Lake (upstream/south limit). The trail network includes sections that run adjacent to/along roadways, as well as separate sections that run along the waters edge of the Wabigoon River. A site reconnaissance visit was undertaken on October 18, 2021 by Michael Van Helden, Ph.D., P.Eng. of TREK along with HTFC staff to visually assess trail conditions and identify features pertinent to the geotechnical and hydrotechnical assessments. A description of site conditions along with digital photographs taken during the site visit are provided in the following section.

HTFC has defined 6 distinct areas of interest in the study area based on existing trail conditions and required upgrades as follows:

Section 1 – Earl Avenue Waterfront: This section consists primarily of waters-edge unit paver surfaced pathways supported by a retaining wall structure (Photo 1). Upgrades to this section do not require geotechnical or hydrotechnical input, as such additional comments are not included within the geotechnical recommendation section. However, upgrades to this section may warrant a condition assessment of the existing retaining walls.

Section 2 - Cooper's Island: The trails through this section are both unit paver surfaced with numerous asphalt and gravel patches. The pathway is fairly close to the shoreline (Photo 2) and portions show evidence of pavement distress due to shoreline erosion and slope movement (Photo 3); surficial soils on the shoreline consist of sandy silts and clays, as well as organics, and show evidence of minor erosion. Pathway upgrades in this section will consist primarily of surfacing material upgrades that do not require geotechnical or hydrotechnical input. A concept involving a bridge crossing of the Wabigoon River to Cooper's Island (Photo 3) is being considered, which will

require geotechnical input for foundation alternatives and hydrotechnical input for determining Wabigoon River levels to set the elevation of the structure and river velocities to design erosion protection.

Section 3 – Riverview Drive: The existing roadway is currently used for active transportation atop a 5 to 6 m tall slope; a discontinuous informal trail also runs adjacent to the river side of the roadway. The pathway does not meet accessibility or active transportation requirements (Photo 4). The slope terrain varies in this section including areas of bedrock outcrops adjacent to the roadway (Photo 5) as well as steep slopes from the roadway down to the shoreline (Photo 6). Natural slopes in the area appear to sit in a marginally stable condition at an angle of approximately 2H:1V (2 horizontal to 1 vertical); in this regard, evidence of pavement distress likely due to creep movements of the slope were observed (Photo 7). Upgrades to the existing pathway likely require roadway widening and geotechnical assessment with respect to slope stability, erosion protection and embankment construction is anticipated. A waters-edge pathway option is also being considered, which will require an assessment of slope stability, rockfall hazards, erosion protection, embankment construction and Wabigoon River levels.

Section 4 – River Height's Drive: The existing network utilizes the roadway and sidewalks along Ross Street, River Height's Drive and a pathway connection to Edgewater Drive that are well offset from the lakeshore. Upgrades to this section do not require geotechnical or hydrotechnical input, as such additional comments are not included within the geotechnical recommendation section.

Section 5 – Edgewater Drive: The existing waters-edge pathway (Photo 8) is unit-paver surfaced and located on an existing slope with a height of approximately 3 to 4 m above lake level. The pathway and slope appear to be in good condition with no signs of slope movement or erosion along the shoreline; the lake bottom appears to be shallow in the near shore area. Provided upgrades do no result in changes to elevation or geometry of the existing pathway, significant geotechnical or hydrotechnical considerations are not anticipated along this section. As such additional comments are not included within the geotechnical recommendation section.

Section 6 – Laura Howe Marsh and Van Horne Landing: The trail through the Laura Howe Marsh traverses a variety of terrain, however geotechnical and hydrotechnical input is not expected to be required. Development along the shoreline of Van Horne Landing (Photo 9) is being considered, for which erosion protection may be required. It is our understanding that no in-water structures are being considered at this time.

Hydrotechnical Considerations

Lake Levels – Cooper's Island, Riverview Drive, Van Horne Landing

The maximum permissible level for the Wabigoon River is indicated in the 1987 Dillon Consulting Wabigoon Flood Study Report[1] as 368.81 m while the minimum level of 367.84 m is controlled by the elevation of the pump intakes from the paper mill to ensure that a minimum flow rate of 7 m^3/s can be maintained from late summer through the winter season. Furthermore, the 1987 report mentions that the lake level has been maintained in the 368.4 m to 368.7 m range under normal operating conditions. The immediate forebay and Wabigoon Lake levels are controlled through powerhouse generating unit operations with additional outflow control provided by adding or removing stop logs from the spillway. The 1987 report notes that the maximum Wabigoon Lake level of 368.81 m has been marginally exceeded on numerous occasions by less than 0.15 m. However, Wabigoon Lake levels have only been exceeded three times by more than 0.15 m between 1940 – 1987. The exact exceedance values are not readily available.

It has been assumed that under normal operating conditions, the water levels upstream of the dam match the levels within the upstream Wabigoon River channel and lake, with only a small drop in elevation from friction losses along the channel reach. As flows increase however, the hydraulic gradient within the outlet channel also increases, with an increasing differential necessary between the level at the dam (forebay) and at Wabigoon Lake to pass the required outflow. Detailed backwater analyses are required to estimate the change in water levels at the proposed Cooper's Island pedestrian bridge location, as levels are a function of outflow, forebay level, spillway/powerhouse operation and the resultant Wabigoon Lake levels. Bathymetric surveys would be required to allow for the development of the backwater model. The 1987 report presents a spillway rating curve for the Wabigoon Lake Dam, for a range of stop log configurations in each of the 6 bays. The spillway rating curve would be used in conjunction with the developed backwater model to establish the downstream boundary conditions over a range of flow conditions.

Flood-frequency estimates were determined based on a Log Pearson Type III frequency analysis of available Wabigoon River flows and compared to the previously developed frequency flows from the 1987 report as presented in Table 1.

As shown in Table 1, the estimated frequency flows for the period from 1970 – 2020 are reduced compared to the 1987 Dillon Consulting flows from 1927 – 1986. This is largely due to the flow record length and the varying period of record, with the Dillon analysis including larger flood events that occurred between 1927 and 1986. Flow records for the years between 1927 and 1969 are not available on the WSC website. The largest discharges were recorded in 1941 (142.4 m^3/s), 1954 (131.5 m^3/s), 1956 (175.8 m^3/s) and 1970 (121.2 m^3/s) based on the 1987 report.

[1] "Wabigoon River and Swanson Creek – Flood Risk Mapping Study General Report", Dillon Consulting Engineers & Planners, May 19, 1987.

Table 1 - Wabigoon River at Dryden - 05QD016 Frequency Estimates

Return Period (Years)	Wabigoon River at Dryden - 05QD016 Estimated Log Pearson III Fit Discharge (m^3/s)*	Wabigoon River Discharge Estimates - 1987 Dillon Consulting (m^3/s)**
2	62	79
5	97	125
10	112	157
20	123	187
50	132	226
100	137	256

* - Frequency flows based on Log Pearson Type III frequency analysis of Wabigoon River at Dryden – (05QD016) 1970-2020).
** Frequency flows based on estimates conducted by Dillon Consulting Engineers (1987) for the years 1927, 1941, 1949-1986.

As noted, discharge records are available for downstream of the dam structure from Water Survey of Canada, however, water levels for Wabigoon Lake and the forebay are not publicly available. TREK requested an updated rating curve and water level readings from Domtar on November 29, 2021 for the Wabigoon Lake Dam. Domtar indicated that daily water level readings are internally recorded and provided to the Ministry of Natural Resources but are not openly shared with third parties. A request would have to be made to the Ministry of Natural Resources to determine if that information could be made available for study use.

Minimum Freeboard for Cooper's Island Bridge

It has been assumed that the flow velocities and headlosses through the structure are limited due to the structure location within the wide river section. However, the design lake level and normal summer lake levels will need to be assessed to determine the required vertical clearance from high water to soffit for ice and debris passage, navigation clearances and bank and bed armor to prevent erosion. Under the Navigable Waters Act, sufficient clearances are required to permit navigation by watercraft through a crossing. It is probable that the river would be considered navigable using watercraft, potentially requiring clearance for powered vessels (e.g. 6 m boat with outboard), not only paddle craft such as canoes or kayaks. The following general guidelines are typically required to maintain navigation:

- Provide a minimum width of 4 m for single cell/span crossings at normal water levels.
- Provide a minimum clearance of 2.5 m from normal water level to underside of soffit.

At this location, the highest levels are under normal flow conditions as the differential from the lake to the dam is minimal. Under flood conditions, the larger differential required to pass the higher flow results in lower levels at the downstream end of the river closer to the dam and the proposed bridge as the lake stays relatively constant at approximately 368.7 m. Bridge design typically requires a minimum freeboard from flood level, however in this case the highest levels are under low flow/normal conditions which would in this case have to be considered. Note however that navigation clearances would most likely be the controlling factor in setting the underside of girder at this location. Assuming that the upper normal water level of 368.7 m from the 1987 report represents normal summer lake conditions at Cooper's Island with a normal summer outflow and

therefore minimal differential from the lake, the resultant minimum underside of girder elevation should be set at approximately elevation 371.2 m to provide a minimum clearance of 2.5 m. A more detailed frequency analysis and backwater analysis should be performed during future design phases based on available water level data to estimate a more accurate and representative summer water level (Q50% summer water level).

Wave Runup/Setup Potential and Minimum Elevations for Riverview Drive Waters Edge Pathway / Shoreline protection at Van Horne landing

It is possible that extreme winds acting on Wabigoon Lake can result in setup on the lake, with resultant increases in lake levels relative to the static level depending on the intensity and duration of a wind event. Lake levels can rise significantly due to setup in the direction of the wind event, with equivalent setdown at the opposite end of the lake. Wind and wave analysis for the Riverview Drive pathway section and the waterfront development at Van Horne Landing may be required to establish design parameters and levels for the target design event required for erosion protection. If judged necessary, this task would include design wave height, lower erosion protection (scour) limits, and lake set-up and runup (upper protection limit) for the selected design event. Riprap sizing and gradation requirements will also need to be assessed. Bathymetric survey data for the river local to the Riverview Drive pathway section and on Wabigoon Lake at Van Horne Landing will need to be collected as the height of wave runup along a shoreline is very dependent on the slope and offshore water depth, with the runup decreasing in height as the slope flattens.

Based on experience, it is expected that setup on the lake would result in water level increases that are smaller than 1 m along the Riverview Drive Waters Edge. Therefore, the maximum permissible level for the Wabigoon River of 368.81 m plus a 1.6 m freeboard (accounting for wave setup and runup) would likely provide a conservative design elevation (sufficient for feasibility analysis) for shoreline protection and the river's edge pathway at 370.41. At Van Horne Landing, increased water levels could occur due to the larger surface area of the lake. A detailed analysis should be performed during future design phases to finalize freeboard requirements for the trail and Van Horne Landing, as well as to determine the required rock size to withstand wave impact during the design wind events.

Geotechnical Considerations

Section 2 - Cooper's Park and Cooper's Island Crossing

TREK understands that the crossing to Cooper's Island may consist of either a floating dock structure, or a conventional bridge structure. For the former, permanent (at shore) dock structures may be supported on either footings or pipe piles anchored in bedrock (anticipated to be shallow). No geotechnical considerations apply to the removable (floating) dock components. For the latter crossing option, deep foundations are likely required to transfer loads from the superstructure down to competent bearing surfaces (likely bedrock). All substructure units for either a bridge or dock structures will need to be assessed relative to ice loading, which may be considerable and could drive a more robust design. Based on existing grades at the shoreline and the island, we do not

anticipate significant fills or retaining walls will be required to satisfy bridge height requirements, however these features should be assessed during future design phases and may require geotechnical investigations to examine subgrade conditions and soil stratigraphy for foundations (likely footings or pipe piles anchored in rock). Native soils present near ground surface appeared to consist of sandy silts, so embankment settlement for approach fills up to the bridge abutments is anticipated to occur during construction. Erosion protection should be included to protect abutments or permanent dock structures and prevent undermining of footings or exposure of piles due to scour.

Portions of the pathway through Cooper's park are located quite close to the shoreline exhibit pavement distress due to presumed bank erosion and slope movement. If reconstruction of the pathway is required to change the surface type, it is recommended that the pathway be relocated farther from the shoreline in these areas; a minimum offset of approximately 3 m should be maintained from the edge of the pathway to the top of slope.

Section 3 - Riverview Drive

TREK understands that the pathway alignment along Riverview Drive will consist of either an upper bank pathway (either on the existing street or a widened pathway on the river side of the street), or a lower bank "river's edge" pathway that follows the existing shoreline. Both concepts will require further geotechnical assessment during future phases of design.

The on-street pathway is expected primarily utilize the existing roadway area to accommodate the active transportation corridor. Widening of the roadway towards the river may be required, in which case any fill placement will need to be assessed in terms of slope stability. Based on the site reconnaissance, approximately 40% to 60% of the slopes off the edge of Riverview Drive are controlled by bedrock outcrops; in these areas, slope stability is not expected to be of concern. However, in other areas (as shown in Photo 6) the slope dips steeply off the edge of the roadway and pavement distress is evident and may be attributed to gradual creep movements of the slope. Widening of the roadway will require a free-standing boardwalk structure or a significant embankment that extends down to the river bottom. The level of stability for these slopes is considered marginal, therefore slope flattening and/or stabilizing toe berms or other slope stabilization alternatives may be required to permit the construction of boardwalk structures near the top of bank; in this regard a factor of safety target between 1.30 and 1.50 will likely be required at the location of the proposed structures. Widening of the roadway through embankment construction will require even larger toe berms and potentially flatter slopes. Depending on the soil conditions present, the stabilization costs in these isolated areas could be significant. For feasibility assessment as part of the current assignment, it can be assumed that flattening of slope for boardwalk structures to 3H:1V or flatter may be required; for new embankments a slope of 4H:1V or flatter may be required. Foundations for any structural boardwalks should consist of rock-socketed pipe or H-piles. A comprehensive geotechnical investigation to evaluate overburden and bedrock conditions should be performed, including the installation of geotechnical instrumentation, topographic/bathymetric survey and a detailed slope stability analysis and foundation assessment (if required) should be performed as part of future phases of design.

The river's edge pathway concept would involve construction of a lower bank embankment beyond the existing shoreline (*i.e.* in the water). Construction materials for the embankment should consist of angular riprap or clean crushed rock armoured with riprap to protect from wave action. Without detailed bathymetric survey, the quantity of material required is uncertain; the river bottom along the pathway alignment may be as deep as 3 to 4 m based on available fishing depth maps and may also be sloping with the bedrock surface. Slope stability of the lower toe embankment will need to be assessed based on detailed bathymetric survey during future design phases. In terms of slope stability for the roadway, the river's edge pathway embankment would actually serve as a stabilizing toe berm for the overall slope; as such, it is possible that this alternative may improve pavement performance adjacent to steeply sloping areas by reducing creep movement of the slopes. While the cost of this option may be relatively high (due to the cost of clean crushed rockfill or riprap), the geotechnical risks associated with this option may be less severe in comparison to widening of the roadway for an upper bank pathway or construction of structures at the top of slope. Final design for the river's edge pathway should incorporate provisions to scale the exposed bedrock outcrops to remove any overhead rockfall hazards.

It should also be noted that placement of fill below the ordinary high water mark (OHWM) will require a Request for Review be submitted to the Fisheries and Oceans Canada (DFO), which may require further environmental assessment as part of future design phases.

Future Assessments

Future design phases should include the following engineering assessments:

1. A detailed topographic and bathymetric survey should be performed along Riverview Drive, Van Horne Landing and at the proposed pedestrian bridge location. The topographic and bathymetric survey will be required to establish existing geometries and levels of slope stability, to assess the impact of proposed embankments or toe berms, and to determine the degree of stabilization required. It will also be required to undertake detailed hydraulic assessments.
2. A detailed hydrologic / hydraulic assessment should be performed based on established rating curves and dam operation protocols to confirm water levels on Wabigoon River and Lake Wabigoon, in order to establish probabilistic water levels. These levels are required to finalize the soffit elevation of a bridge structure to Cooper's Island, to recommend a pathway elevation at Riverview Drive (river's edge option) and erosion protection elevations at Riverview Drive and Van Horne Landing. The analysis should include a wind and wave analysis to determine riprap extents and sizing requirements.
3. A geotechnical investigation appropriate to the scale of the proposed development should be performed at Cooper's Island to confirm subsurface conditions for the design of bridge foundations or permanent dock structures (floating dock option). The investigation should include test holes drilled to and cored into bedrock to confirm piled foundation depths.
4. A detailed geotechnical investigation should also be performed along Riverview Drive and possibly other areas (depending on the selected design concept). The investigation should include upper bank test holes (likely with a geotechnical soils rig) as well as lower-bank

hand-augered test holes to evaluate the consistency of soils near the shoreline. If on-street pathways are selected involving embankment widening with fill placement, then geotechnical instrumentation is also recommended to monitor groundwater levels to aid in slope stability analysis.

5. Appropriate timelines should be incorporated into the design schedule for environmental approvals required for any in-water work (DFO). The submissions may require an aquatic biologist to prepare the submission and liaise with the regulatory officials.

Once the design concepts have been finalized, TREK can provide approximate budgetary estimates for future geotechnical and hydrotechnical work to aid in the comparison of alternatives.

Closure

The geotechnical information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation and laboratory testing). Soil conditions are natural deposits that can be highly variable across a site. If subsurface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary. All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work or standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy. This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of HTFC Planning and Design (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

Kind Regards,

TREK Geotechnical
Per:

Michael Van Helden, Ph.D., P.Eng.
Senior Geotechnical Engineer

Reviewed By

Kent Bannister, M.Sc., P.Eng.
Senior Geotechnical Engineer

Figure 01 – Study Area Site Plan (Provided by HTFC)

Photo 1 – Pathway in Section 1 (Earl Avenue Waterfront)

Photo 2 – Pathway in Section 2 (near Cooper's Island)

Photo 3 – Pathway pavement distress in Cooper's Park

Photo 4 – Cooper's Island crossing location in Section 3

Photo 5 – Discontinuous trail in Section 3 (adjacent Riverview Drive)

Photo 6 – Area of bedrock outcrop in Section 3 (Riverview Drive)

Photo 7 – Steep slopes in Section 3 (Riverview Drive)

Photo 8 – Pavement distress due to slope creep movements in Section 3 (Riverview Drive)

Photo 9 – Existing pathway in Section 5 (Edgewater Drive)

Photo 10 – Existing shoreline in Section 6 (Van Horne Landing)

B

Riverview Drive - Recreational Path Construction Options

KEEWATIN-ASKI LTD.
engineering & architecture

RIVERVIEW DRIVE RECREATIONAL PATH CONSTRUCTION OPTIONS

OPTION 2a: Shift Riverview Drive to the east to allow path/trail construction on west side of road and maintain two-way traffic (see attached Sketch – Drawing 1)

i. **Road Requirements**

a) Grade raise of existing northbound lane to construct profile change (2% crossfall profile to the west) to include:
   - addition of granular base material and new asphalt surfacing

b) Construction of new northbound lane to include:
   - granular subbase & base materials and new asphalt surfacing

c) Removal of existing northbound & southbound lanes

d) Reconstruction of residential entrances

e) East ditch reconstruction

ii. **Pathway Requirements**

a) Base aggregates under pathway likely not required as existing road base materials may be adequate

b) Construction of 500 mm wide, raised concrete median required between edge of road and pathway with drainage outlets constructed every 90 metres

c) * Pathway railing system not required

d) * Drainage - 2% crossfall profile to the west

e) For pathway adjacent to roadway, hot laid asphalt surface recommended in lieu of crushed millings as sheet drainage from roadway would cause erosion issues and snow removal operations would also cause a loss of surface aggregate.

iii. **Construction Constraints**

a) Shifting road to the east would require complete stormwater analysis as existing drainage on east side of road would be affected

b) Shifting road to the east would require the relocation of existing utility poles

c) Shifting road to the east would require bedrock removal

d) Shifting road to the east would require tree removal

e) Shifting road to the east would require residential entrance reconstruction

iv. **Operational Constraints (post construction)**

a) Reduced snow storage area on east side of road

b) Initial snow clearing for southbound lane will place snow windrow onto pathway

v. **Class 'D' Construction Cost Estimate** (see attached cost estimate breakdown)

a) **$1,882,854** (includes 25% contingency and 15% Consultant Fees)

OPTION 2b: Converting Riverview Drive to one-way traffic and utilize existing southbound lane for path/trail construction (see attached Sketch – Drawing 2)

i. **Road Requirements**

a) * Existing road drainage could remain

b) Removal of asphalt surfacing in existing southbound lane

ii. **Pathway Requirements**

a) Base aggregates under pathway likely not required as existing road base materials may be adequate

b) 500 mm wide, raised concrete median required between edge of road and pathway with drainage outlets constructed every 90 metres

c) * Railing system not required

d) * Drainage - 2% crossfall profile to the west

e) For pathway adjacent to roadway, hot laid asphalt surface recommended in lieu of crushed millings as erosion issues and snow removal operations would cause loss of surface aggregate.

iii. **Construction Constraints**

a) Conversion of an existing two-way roadway to a one-way traffic roadway may require a traffic impact study to determine potential impacts resulting from the change to existing traffic patterns.

iv. **Operational Constraints (post construction)**

a) If Riverview Drive one-way traffic direction was southbound, initial snow clearing for southbound lane will place snow windrow onto path/trail

b) Public awareness for conversion of two-way traffic to one-way traffic

v. **Class 'D' Construction Cost Estimate** (see attached cost estimate breakdown)

a) **$579,287** (includes 25% contingency and 15% Consultant Fees)

OPTION 2c: Pathway construction on west side of Riverview Drive with pathway drainage profile to the west (see attached Sketch – Drawing 3)

i. **Road Requirements**

a) Asphalt surface reinstatement adjacent to constructed concrete median (300 mm wide at minimum)

b) * Existing road drainage could remain

ii. **Pathway Requirements**

a) Subbase and base construction

b) Rip-rap construction and embankment fill

c) Railing system (where required)

d) Construction of 500 mm wide, raised concrete median required between edge of road and pathway with drainage outlets constructed every 90 metres

e) For pathway adjacent to roadway, hot laid asphalt surface recommended in lieu of crushed millings as sheet drainage from roadway would cause erosion issues and snow removal operations would also cause a loss of surface aggregate.

iii. **Construction Constraints**

a) Rip-rap and embankment fill in certain locations could be extensive

b) Potential narrowing of pathway width from 3,500 mm to 1,500 mm at locations where embankment fill is not constructable (abrupt banks). It is estimated that the existing topography on the west side of Riverview Drive would require 44% of the pathway (approx. 211 linear metres) to be constructed at a reduced width (1,500 mm) with 56% of the pathway constructible at the presented width of 3,500 mm. Furthermore, there may be the potential for specific areas along Riverview Drive to require the construction of additional pathway support systems at the reduced width sections.

c) Loading of the upper bank with the construction of a pathway may require geotechnical investigations to determine existing embankment/slope stability and/or the requirement to provide for the construction of toe berms (embankment fill) to facilitate additional loading.

iv. **Operational Constraints (post construction)**

a) Reduced snow storage area on west side of road

b) Initial snow clearing for southbound lane will place snow windrow onto pathway

v. **Class 'D' Construction Cost Estimate** (see attached cost estimate breakdown)

a) **$927,662** (includes 25% contingency and 15% Consultant Fees)

OPTION 2d: Pathway construction on west side of Riverview Drive with pathway drainage profile to the east (see attached Sketch – Drawing 4)

i. Road Requirements

a) Construction of standard concrete curb with gutter (OPSD 600.040) on west side of Riverview Drive

b) Construction of stormwater infrastructure to include:

- Stormwater catch basins at 90 metre intervals with stormwater outfall piping constructed under pathway to outlet at river bank

c) Asphalt surface reinstatement of southbound lane adjacent to constructed curb & gutter (300 mm wide at minimum)

d) * Existing road drainage could remain

ii. Pathway Requirements

a) Subbase and base construction

b) Rip-rap construction for embankment fill

c) Railing system (where required)

d) For pathway adjacent to roadway, hot laid asphalt surface recommended in lieu of crushed millings as erosion issues and snow removal operations would cause loss of surface aggregate. Further, eroded sediment would deposit in catch basin.

iii. Construction Constraints

a) Rip-rap for embankment fill in certain locations could be extensive
b) Environmental Compliance Approval (ECA) may be required for stormwater works
c) Potential narrowing of pathway width from 3,500 mm to 1,500 mm at locations where embankment fill is not constructable (abrupt banks). It is estimated that the existing topography on the west side of Riverview Drive would require 44% of the pathway (approx. 211 linear metres) to be constructed at a reduced width (1,500 mm) with 56% of

the pathway constructible at the presented width of 3,500 mm. Furthermore, there may be the potential for specific areas along Riverview Drive to require the construction of additional pathway support systems at the reduced width sections.

d) Loading of the upper bank with the construction of a pathway may require geotechnical investigations to determine existing embankment/slope stability and/or the requirement to provide for the construction of toe berms (embankment fill) to facilitate additional loading.

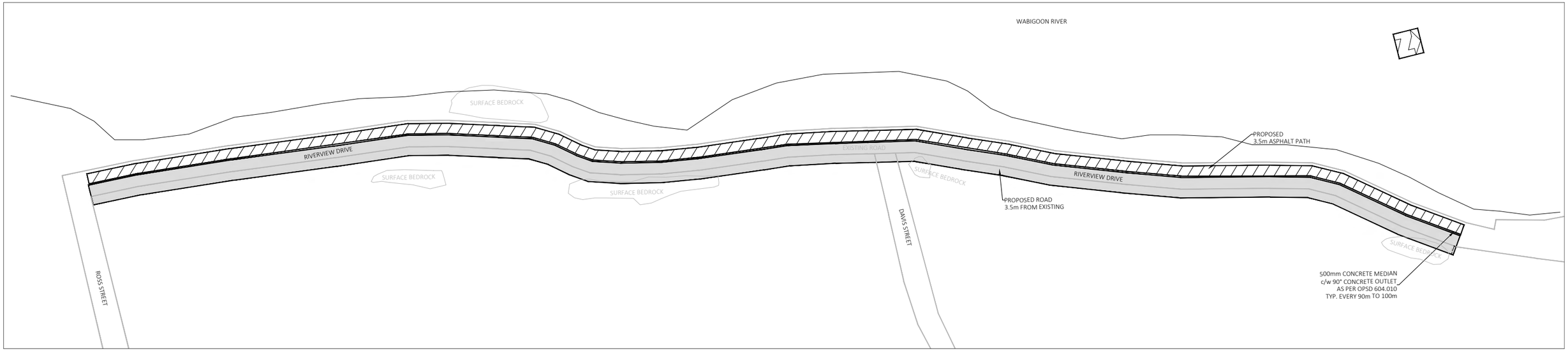
iv. Operational Constraints (post construction)

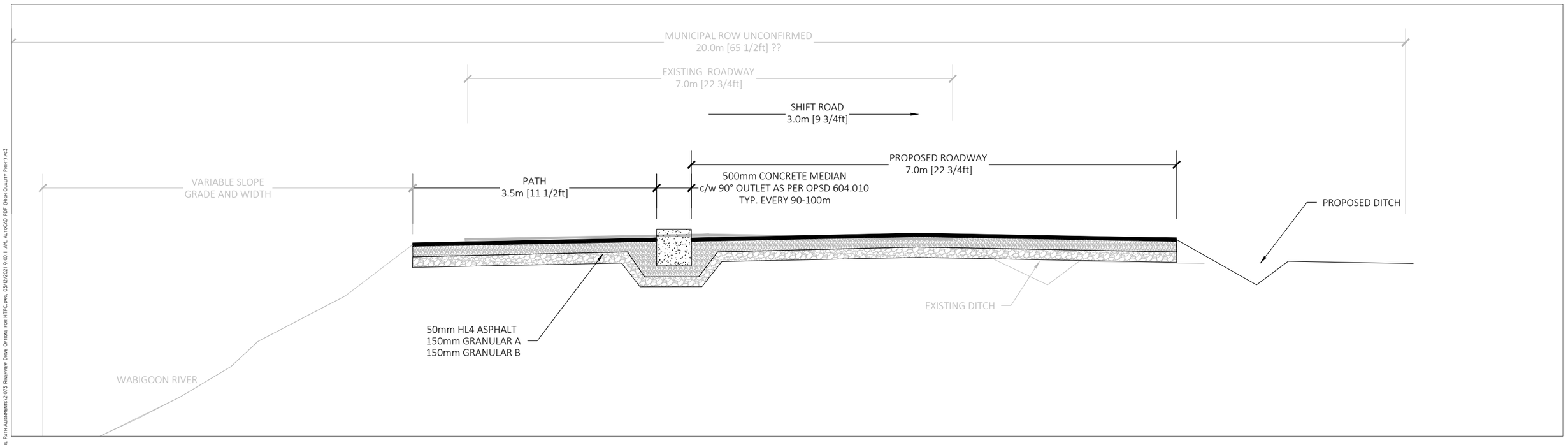
a) Reduced snow storage area on west side of road

b) Initial snow clearing for southbound lane will place snow windrow onto pathway

v. Class 'D' Construction Cost Estimate (see attached cost estimate breakdown)

a) **$1,016,747** (includes 25% contingency and 15% Consultant Fees)





DRAWING 1

DRYDEN WATERFRONT DEVELOPMENT
RIVERVIEW DRIVE WALKWAY
OPTION 2a -SHIFT ROAD EAST
DECEMBER 3, 2021

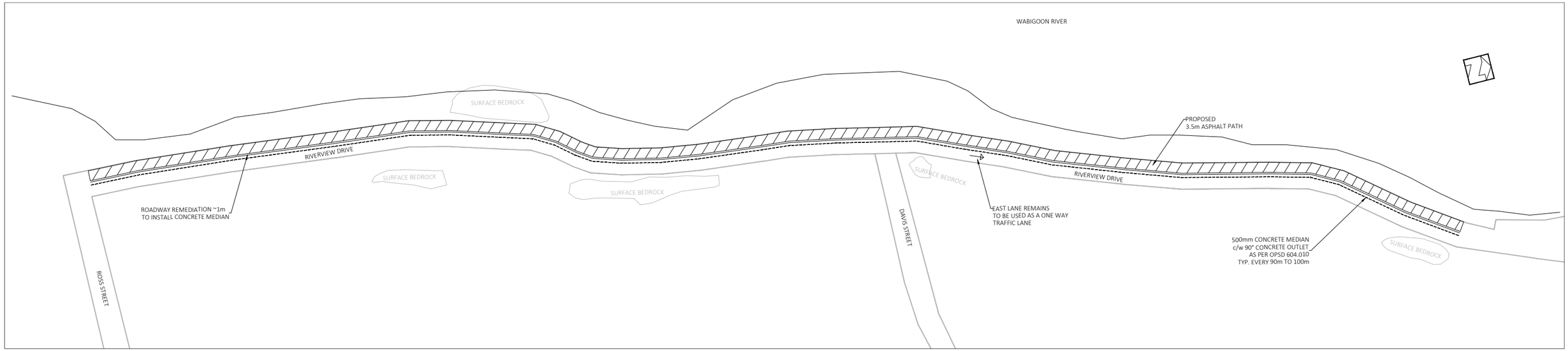
KAL engineering architecture

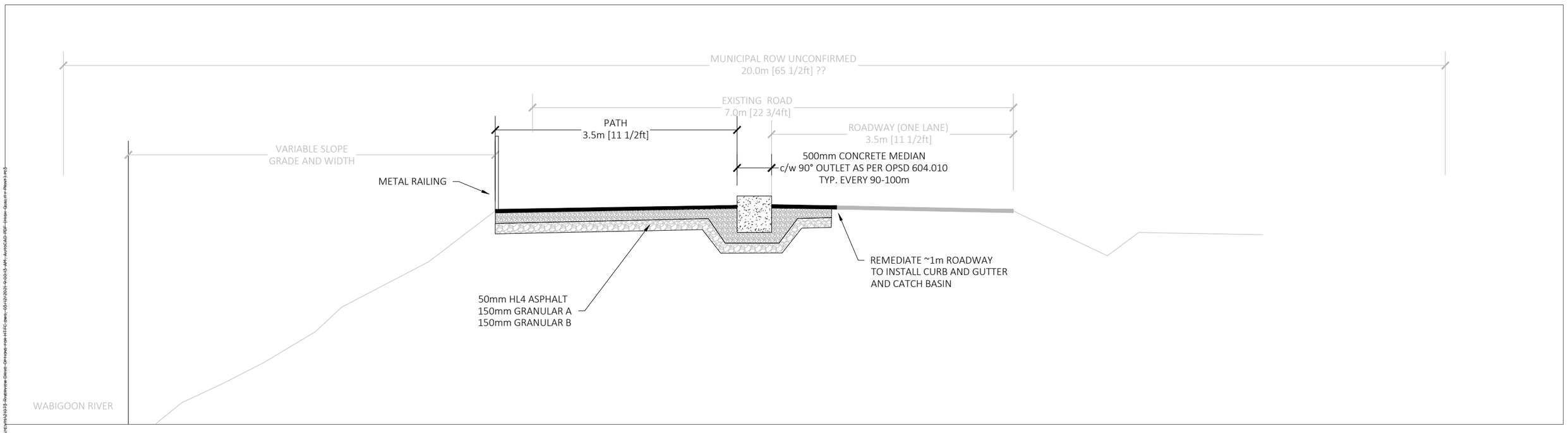
Class D Cost Estimate - Riverview Drive Recreational Path - Option 2a

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL PRICE
SECTION A - GENERAL REQUIREMENTS					
A1	Mobilization	1	L.S.	$31,447.55	$31,447.55
A2	Bonding & Insurance	1	L.S.	$17,970.03	$17,970.03
A3	Travel, Accomodations & Meals	1	L.S.	$71,880.12	$71,880.12
A4	Supervision	1	L.S.	$60,648.85	$60,648.85
A5	Site Office, Security, Health & Safety	1	L.S.	$2,246.25	$2,246.25
A7	Demobilization	1	L.S.	$29,201.30	$29,201.30
A8	Materials Testing Allowance (compaction/concrete)	1	L.S.	$15,000.00	$15,000.00
A9	Hydro Allowance - pole relocation	1	L.S.	$40,000.00	$40,000.00
A10	As-Built Drawing Allowance	1	L.S.	$3,000.00	$3,000.00
	TOTAL SECTION A - GENERAL REQUIREMENTS				**$271,394.11**
SECTION B - PATHWAY CONSTRUCTION					
B1	150 mm granular 'B' Type III subbase - supply, place & compact	252.9	cu.m.	$35.00	$8,851.50
B2	150 mm granular 'A' base - supply, place & compact	252.9	cu.m.	$50.00	$12,645.00
B3	50 mm HL4 asphalt surfacing	1686	sq.m.	$90.00	$151,740.00
B4	CIP concrete median - 500 mm wide, c/w 200 mm granular 'B' subbase and 150 mm granular 'A' base	481	l.m	$180.00	$86,580.00
B5	Concrete drainage outlets between median sections	6	ea.	$350.00	$2,100.00
	TOTAL SECTION B - PATHWAY CONSTRUCTION				**$261,916.50**
SECTION C - ROAD CONSTRUCTION					
C1	Strip and remove existing asphalt	1535	sq.m.	$8.00	$12,280.00
C2	350 mm granular 'B' Type III subbase - supply, place & compact	1075	cu.m.	$35.00	$37,625.00
C3	150 mm granular 'A' base - supply, place & compact	460	cu.m.	$50.00	$23,000.00
C4	Drainage Ditch Reinstatment - East side only	480	l.m.	$50.00	$24,000.00
C5	50 mm HL4 asphalt surfacing - both lanes	3072	sq.m.	$65.00	$199,680.00
C6	Existing Residential Entrance Reinstatement	11	ea.	$2,000.00	$22,000.00
	TOTAL SECTION C - ROAD CONSTRUCTION				**$296,585.00**
SECTION D - SURFACE WORKS					
D1	Bedrock Removal	900	cu.m.	$500.00	$450,000.00
	TOTAL SECTION D - SURFACE WORKS				**$450,000.00**
SECTION E - STUDIES AND INVESTIGATIONS					
E1	Environmental & Geotechnical reports	1	L.S.	$65,000.00	$65,000.00
	TOTAL SECTION E - STUDIES AND INVESTIGATIONS				**$65,000.00**
SECTION F- PROVISIONAL ITEMS					
F1	Provisional unit cost for tree removal & disposal	1	ea.	$300.00	N/A
F2	Provisional unit cost for 3/4 clear stone	1	cu.m.	$75.00	N/A
	TOTAL SECTION F - PROVISIONAL ITEMS				**N/A**

SUMMARY

SECTION A - GENERAL REQUIREMENTS	$271,394.11
SECTION B - PATHWAY CONSTRUCTION	$261,916.50
SECTION C - ROAD CONSTRUCTION	$296,585.00
SECTION D - SURFACE WORKS	$450,000.00
SECTION E - STUDIES AND INVESTIGATIONS	$65,000.00
SECTION F - PROVISIONAL ITEMS	$ N/A
SUBTOTAL ESTIMATED CONSTRUCTION COSTS	**$1,344,895.61**
Consulat Fees (15%)	$201,734.34
Contingency (25%)	$336,223.90
TOTAL ESTIMATED CONSTRUCTION COSTS	**$1,882,853.85**





DRAWING 2

DRYDEN WATERFRONT DEVELOPMENT
RIVERVIEW DRIVE WALKWAY
OPTION 2b - ONE WAY ROADWAY
DECEMBER 3, 2021

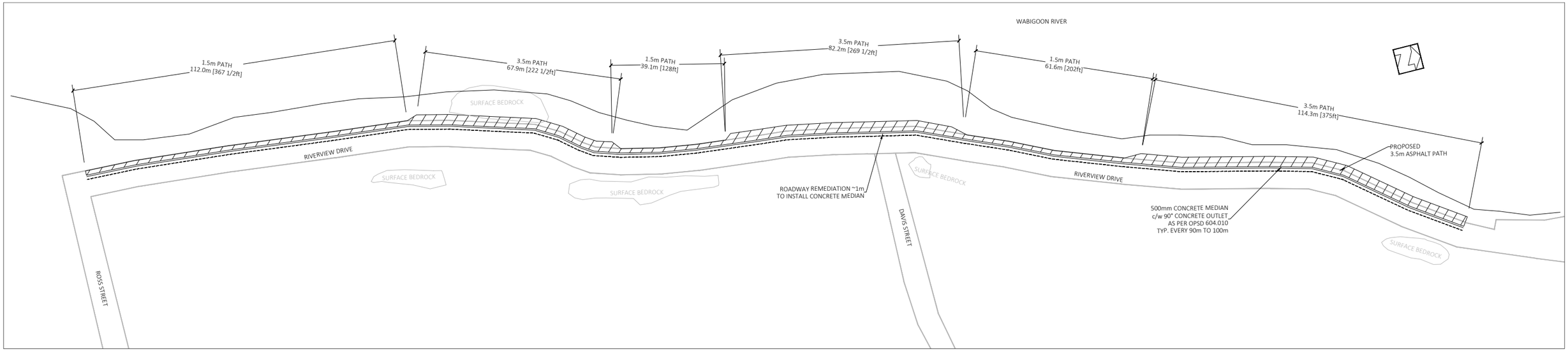
KAL engineering architecture

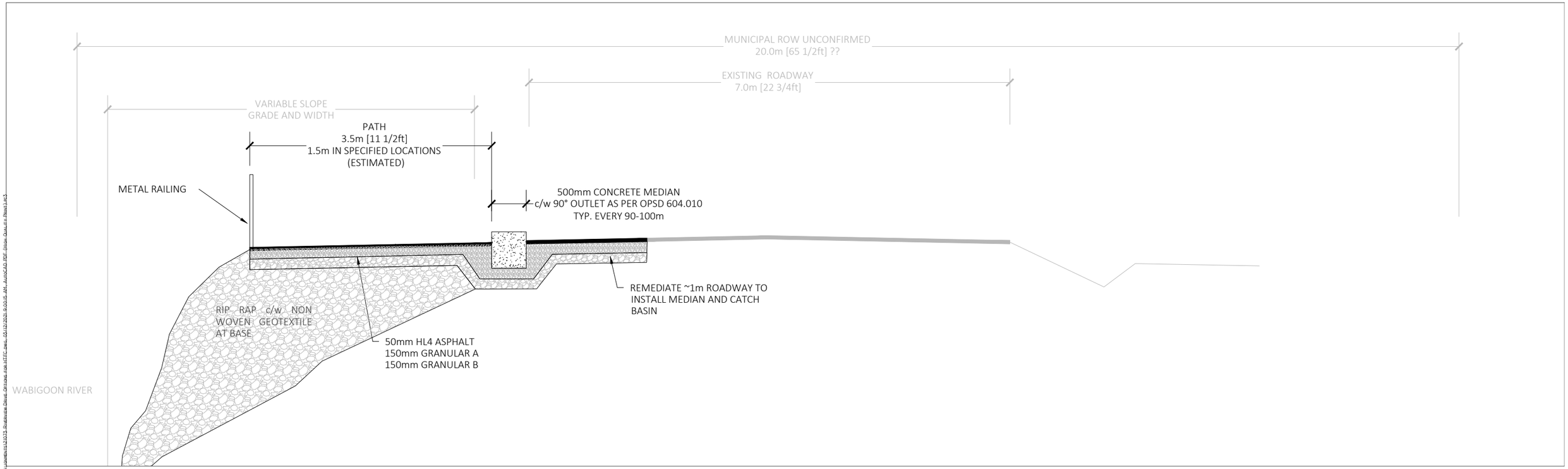
Class D Cost Estimate - Riverview Drive Recreational Path - Option 2b

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL PRICE
SECTION A - GENERAL REQUIREMENTS					
A1	Mobilization	1	L.S.	$6,074.48	$6,074.48
A2	Bonding & Insurance	1	L.S.	$3,471.13	$3,471.13
A3	Travel, Accomodations & Meals	1	L.S.	$13,884.52	$13,884.52
A4	Supervision	1	L.S.	$11,715.06	$11,715.06
A5	Site Office, Security, Health & Safety	1	L.S.	$433.89	$433.89
A7	Demobilization	1	L.S.	$5,640.59	$5,640.59
A8	Materials Testing Allowance (compaction/concrete)	1	L.S.	$15,000.00	$15,000.00
A9	Hydro Allowance	1	L.S.	$6,000.00	$6,000.00
A10	As-Built Drawing Allowance	1	L.S.	$3,000.00	$3,000.00
	TOTAL SECTION A - GENERAL REQUIREMENTS				**$65,219.67**
SECTION B - PATHWAY CONSTRUCTION					
B1	150 mm granular 'B' Type III subbase - supply, place & compact	252.9	cu.m.	$35.00	$8,851.50
B2	150 mm granular 'A' base - supply, place & compact	252.9	cu.m.	$50.00	$12,645.00
B3	50 mm HL4 asphalt surfacing	1686	sq.m.	$90.00	$151,740.00
B4	CIP concrete median - 500 mm wide, c/w 200 mm granular 'B' subbase and 150 mm granular 'A' base	481	l.m.	$180.00	$86,580.00
B5	Concrete drainage outlets between median sections	6	ea	$350.00	$2,100.00
	TOTAL SECTION B - PATHWAY CONSTRUCTION				**$261,916.50**
SECTION C - ROAD CONSTRUCTION					
C1	Strip and remove existing asphalt	1535	sq.m.	$8.00	$12,280.00
C2	350 mm granular 'B' Type III subbase - supply, place & compact	0	cu.m.	$35.00	$0.00
C3	150 mm granular 'A' base - supply, place & compact	0	cu.m.	$50.00	$0.00
C4	50 mm HL4 asphalt surfacing (300 mm wide adjacent to median)	144	sq.m.	$65.00	$9,360.00
	TOTAL SECTION C - ROAD CONSTRUCTION				**$21,640.00**
SECTION D - STORM SEWERS					
D1	600 mm x 600 mm Catch Basins c/w Frame & Cover	0	ea	$4,000.00	$0.00
D2	Storm Sewer, 250 mm dia PVC DR35	0	l.m.	$300.00	$0.00
	TOTAL SECTION D - STORM SEWERS				**$0.00**
SECTION E - STUDIES AND INVESTIGATIONS					
E1	Environmental & Geotechnical reports	1	L.S.	$65,000.00	$65,000.00
	TOTAL SECTION E - STUDIES AND INVESTIGATIONS				**$65,000.00**
SECTION F - PROVISIONAL ITEMS					
F1	Provisional unit cost for bedrock removal	1	cu.m.	$550.00	N/A
F2	Provisional unit cost for 3/4 clear stone	1	cu.m.	$110.00	N/A
	TOTAL SECTION F - PROVISIONAL ITEMS				**N/A**

SUMMARY

SECTION A - GENERAL REQUIREMENTS	$65,219.67
SECTION B - PATHWAY CONSTRUCTION	$261,916.50
SECTION C - ROAD CONSTRUCTION	$21,640.00
SECTION D - STORM SEWERS	$0.00
SECTION E - STUDIES AND INVESTIGATIONS	$65,000.00
SECTION F - PROVISIONAL ITEMS	$ N/A
SUBTOTAL ESTIMATED CONSTRUCTION COSTS	**$413,776.17**
Consulat Fees (15%)	$62,066.43
Contingency (25%)	$103,444.04
TOTAL ESTIMATED CONSTRUCTION COSTS	**$579,286.64**





DRAWING 3

DRYDEN WATERFRONT DEVELOPMENT
RIVERVIEW DRIVE WALKWAY
OPTION 2c - WALKWAY DRAINING TO RIVER
DECEMBER 3, 2021

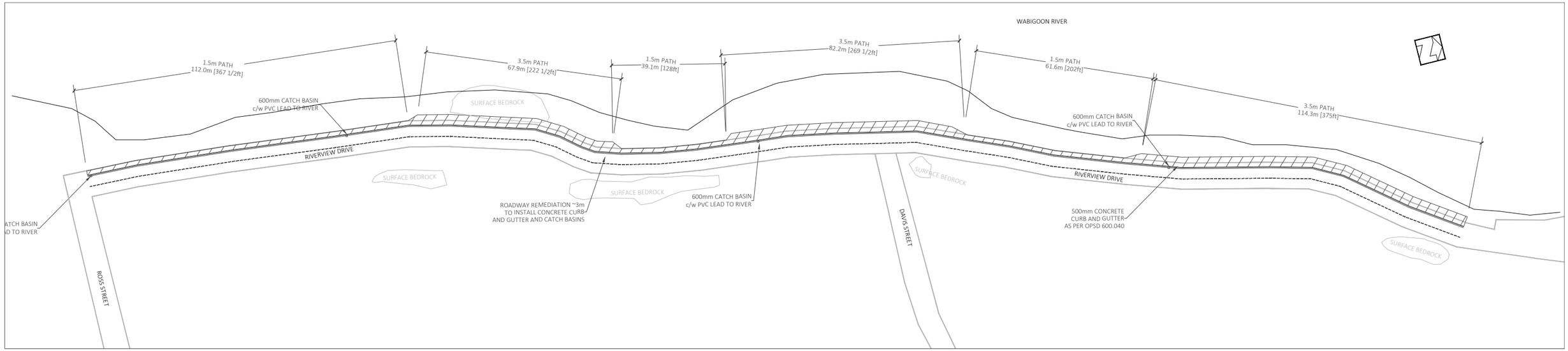
KAL engineering architecture

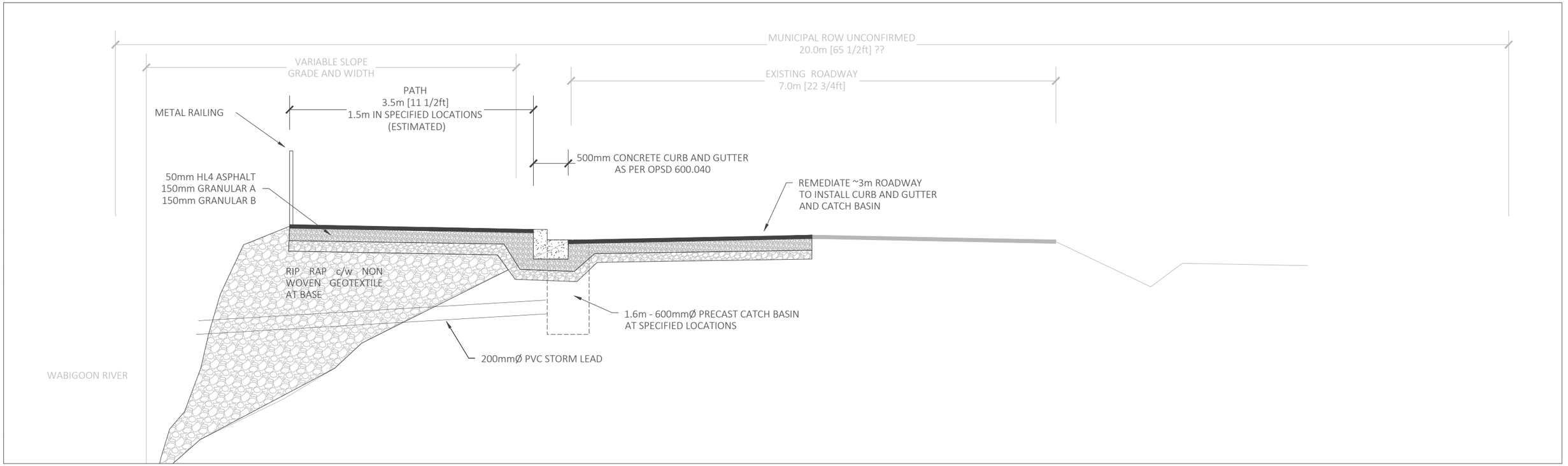
Class D Cost Estimate - Riverview Drive Recreational Path - Option 2c

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL PRICE
SECTION A - GENERAL REQUIREMENTS					
A1	Mobilization	1	L.S.	$13,112.36	$13,112.36
A2	Bonding & Insurance	1	L.S.	$7,492.78	$7,492.78
A3	Travel, Accomodations & Meals	1	L.S.	$29,971.10	$29,971.10
A4	Supervision	1	L.S.	$25,288.12	$25,288.12
A5	Site Office, Security, Health & Safety	1	L.S.	$936.60	$936.60
A7	Demobilization	1	L.S.	$12,175.76	$12,175.76
A8	Materials Testing Allowance (compaction/concrete)	1	L.S.	$15,000.00	$15,000.00
A9	Hydro Allowance	1	L.S.	$6,000.00	$6,000.00
A10	As-Built Drawing Allowance	1	L.S.	$3,000.00	$3,000.00
	TOTAL SECTION A - GENERAL REQUIREMENTS				**$112,976.70**
SECTION B - PATHWAY CONSTRUCTION					
B1	150 mm granular 'B' Type III subbase - supply, place & compact	189.75	cu.m.	$35.00	$6,641.25
B2	150 mm granular 'A' base - supply, place & compact	189.75	cu.m.	$50.00	$9,487.50
B3	600 mm x 800 mm rip-rap - supply& place	1728	cu.m.	$50.00	$86,400.00
B4	non-woven geotextile - to be placed under rip-rap sections	1728	sq.m.	$15.00	$25,920.00
B5	1370 HT Rail Section - c/w concrete footings	481	l.m.	$300.00	$144,300.00
B6	50 mm HL4 asphalt surfacing	1265	sq.m.	$90.00	$113,850.00
B7	CIP concrete median - 500 mm wide, c/w 200 mm granular 'B' subbase and 150 mm granular 'A' base	481	lin.m	$180.00	$86,580.00
B8	Concrete drainage outlets between median sections	6	ea	$350.00	$2,100.00
	TOTAL SECTION B - PATHWAY CONSTRUCTION				**$475,278.75**
SECTION C - ROAD CONSTRUCTION					
C1	Strip and remove existing asphalt	0	sq.m.	$8.00	
C2	350 mm granular 'B' Type III subbase - supply, place & compact	0	cu.m.	$35.00	$0.00
C3	150 mm granular 'A' base - supply, place & compact	0	cu.m.	$50.00	$0.00
C5	50 mm HL4 asphalt surfacing (300 mm wide adjacent to median)	144	sq.m.	$65.00	$9,360.00
	TOTAL SECTION C - ROAD CONSTRUCTION				**$9,360.00**
SECTION D - STORM SEWERS					
D1	600 mm x 600 mm Catch Basins c/w Frame & Cover	0	ea	$4,000.00	$0.00
D2	Storm Sewer, 250 mm dia PVC DR35	0	l.m.	$300.00	$0.00
	TOTAL SECTION D - STORM SEWERS				**$0.00**
SECTION E - STUDIES AND INVESTIGATIONS					
E1	Environmental & Geotechnical reports	1	L.S.	$65,000.00	$65,000.00
	TOTAL SECTION E - STUDIES AND INVESTIGATIONS				**$65,000.00**
SECTION F - PROVISIONAL ITEMS					
F1	Provisional unit cost for bedrock removal	1	cu.m.	$550.00	N/A
F2	Provisional unit cost for 3/4 clear stone	1	cu.m.	$110.00	N/A
	TOTAL SECTION E - PROVISIONAL ITEMS				**N/A**

SUMMARY

SECTION A - GENERAL REQUIREMENTS	$112,976.70
SECTION B - PATHWAY CONSTRUCTION	$475,278.75
SECTION C - ROAD CONSTRUCTION	$9,360.00
SECTION D - STORM SEWERS	$0.00
SECTION E - STUDIES AND INVESTIGATIONS	$65,000.00
SECTION F - PROVISIONAL ITEMS	$ N/A
SUBTOTAL ESTIMATED CONSTRUCTION COSTS	**$662,615.45**
Consulat Fees (15%)	$99,392.32
Contingency (25%)	$165,653.86
TOTAL ESTIMATED CONSTRUCTION COSTS	**$927,661.63**





DRAWING 4

DRYDEN WATERFRONT DEVELOPMENT
RIVERVIEW DRIVE WALKWAY
OPTION 2d - WALKWAY DRAINING TO ROAD
DECEMBER 3, 2021

KAL engineering architecture

Class D Cost Estimate - Riverview Drive Recreational Path Option - 2d

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL PRICE
SECTION A - GENERAL REQUIREMENTS					
A1	Mobilization	1	L.S.	$14,912.06	$14,912.06
A2	Bonding & Insurance	1	L.S.	$8,521.18	$8,521.18
A3	Travel, Accomodations & Meals	1	L.S.	$34,084.70	$34,084.70
A4	Supervision	1	L.S.	$28,758.97	$28,758.97
A5	Site Office, Security, Health & Safety	1	L.S.	$1,065.15	$1,065.15
A7	Demobilization	1	L.S.	$13,846.91	$13,846.91
A8	Materials Testing Allowance (compaction/concrete)	1	L.S.	$15,000.00	$15,000.00
A9	Hydro Allowance	1	L.S.	$6,000.00	$6,000.00
A10	As-Built Drawing Allowance	1	L.S.	$3,000.00	$3,000.00
	TOTAL SECTION A - GENERAL REQUIREMENTS				**$125,188.95**
SECTION B - PATHWAY CONSTRUCTION					
B1	150 mm granular 'B' Type III subbase - supply, place & compact	189.75	cu.m.	$35.00	$6,641.25
B2	150 mm granular 'A' base - supply, place & compact	189.75	cu.m.	$50.00	$9,487.50
B3	600 mm x 800 mm rip-rap - supply& place	2000	sq.m.	$50.00	$100,000.00
B4	non-woven geotextile - to be placed under rip-rap sections	1728	sq.m.	$15.00	$25,920.00
B5	1370 HT Rail Section - c/w concrete footings	481	l.m.	$300.00	$144,300.00
B6	50 mm HL4 asphalt surfacing	1265	sq.m.	$90.00	$113,850.00
	TOTAL SECTION B - PATHWAY CONSTRUCTION				**$400,198.75**
SECTION C - ROAD CONSTRUCTION					
C1	Strip and remove existing asphalt	0	sq.m.	$8.00	
C2	350 mm granular 'B' Type III subbase - supply, place & compact	0	cu.m.	$35.00	$0.00
C3	150 mm granular 'A' base - supply, place & compact	0	cu.m.	$50.00	$0.00
C4	500 mm concrete curb (OPSD 600.040) including 150 mm Granular 'A' Base and 200 mm Granular 'B' Type III Subbase	480	l.m.	$200.00	$96,000.00
C5	50 mm HL4 asphalt surfacing (300 mm wide adjacen to curb & gutter)	144	sq.m.	$65.00	$9,360.00
	TOTAL SECTION C - ROAD CONSTRUCTION				**$105,360.00**
SECTION D - STORM SEWERS					
D1	600 mm x 600 mm Catch Basins c/w Frame & Cover	5	ea	$4,000.00	$20,000.00
D2	Storm Sewer, 250 mm dia PVC DR35	35	l.m.	$300.00	$10,500.00
	TOTAL SECTION D - STORM SEWERS				**$30,500.00**
SECTION E - STUDIES AND INVESTIGATIONS					
E1	Environmental & Geotechnical reports	1	L.S.	$65,000.00	$65,000.00
	TOTAL SECTION E - STUDIES AND INVESTIGATIONS				**$65,000.00**
SECTION F - PROVISIONAL ITEMS					
F1	Provisional unit cost for bedrock removal	1	cu.m.	$550.00	N/A
F2	Provisional unit cost for 3/4 clear stone	1	cu.m.	$110.00	N/A
	TOTAL SECTION E - PROVISIONAL ITEMS				**N/A**

SUMMARY

SECTION A - GENERAL REQUIREMENTS	$125,188.95
SECTION B - PATHWAY CONSTRUCTION	$400,198.75
SECTION C - ROAD CONSTRUCTION	$105,360.00
SECTION D - STORM SEWERS	$30,500.00
SECTION E - STUDIES AND INVESTIGATIONS	$65,000.00
SECTION F - PROVISIONAL ITEMS	$ N/A
SUBTOTAL ESTIMATED CONSTRUCTION COSTS	**$726,247.70**
Consulat Fees (15%)	$108,937.16
Contingency (25%)	$181,561.93
TOTAL ESTIMATED CONSTRUCTION COSTS	**$1,016,746.78**

C

Phase 1 Environmental Site Assessment

HTFC Planning & Design

Phase I Environmental Site Assessment

Dryden Signature Trail Upgrade

Prepared by:

Oswald Wohlgemut, M.Sc.
Environmental Scientist

Reviewed by:

Jeff Dyck, P.Eng.
Senior Municipal Engineer

March 2022

ACKNOWLEDGMENTS

To prepare this report various sources of information were investigated and researched. The firm of JR Cousin Consultants Ltd. wishes to thank HTFC Planning & Design and the City of Dryden for their assistance and co-operation in gathering information for this project.

REMARKS

The findings and conclusions in this report were prepared in accordance with generally accepted professional engineering principles and practices. The findings and conclusions were based upon objective data available to us at the time of forming our opinions and accuracy of the report depends upon the accuracy of this data.

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EXECUTIVE SUMMARY

On behalf of HTFC Planning & Design (HTFC), JR Cousin Consultants Ltd. (JRCC) conducted a Phase I Environmental Site Assessment (ESA) of the Dryden Signature Trail System in Dryden, Ontario.

Background and Scope of Work

The City of Dryden is considering upgrading the trail system between Duke Street and Van Horne Landing, which may include re-surfacing, constructing a pedestrian bridge to Cooper's Island, extending the trail along Riverview Drive, and constructing a shoreline feature at Van Horne Landing. A Phase I ESA was performed to determine whether there are any existing or potential environmental concerns along the trail system prior to construction and to evaluate whether additional investigations are required. The Phase I ESA included a records review, personal interviews, and a non-intrusive site investigation.

Findings

The Signature Trail has two distinct sections, between Duke Street and Victoria Street, and along Edgewater Drive. The southern section of trail extends into the Laura Howe Marsh Conservation Area. The following is summarized historical information and observations from the site investigation and discussions with personnel.

- A steam driven sawmill and shingle mill was located at the site of Skene Landing until 1902.
- Cooper's Island was separated from the mainland between 1955 and 1975 by excavating and dredging the river bed.
- The Dryden Signature Trail System was constructed sometime between 1975 and 1996.
- A pumphouse was operated at Cooper Park until 1976.
- The trail section along Edgewater Drive was developed sometime between 1996 and 2002.
- The Laura Howe Marsh interpretive trail system was developed in 1997.
- The trail consists of paving stone between the Duke Street Dock and Cooper's Island, and along Edgewater Drive.
- There is pedestrian lighting along the sections between the Duke Street Dock and Skene Landing, and along Edgewater Drive.
- There are washroom buildings located just east of Cooper Park and at Van Horne Landing.
- The Wabigoon River level is maintained by a dam just north of the trail system, which prevents the trail from flooding.
- The trail stops at Riverview Drive and continues again at Edgewater Drive pedestrians must walk along residential streets to connect the two trail sections.
- The trail system was well maintained and free of litter during the site investigation.
- Bedrock outcrops were observed along Riverview Drive.

From a review of information on the trail system and site observations, no existing environmental or health and safety concerns were identified. There may be impacts from the development of the trail system along the river

bank or with any in-water works, which would require approval from Fisheries and Oceans Canada (DFO), Transport Canada, and Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF).

Conclusions and Recommendations

It is recommended that approvals be obtained from DFO, Transport Canada and MNRF for any river bank or in-water works. During construction works, the contractor should take care to ensure leaks or spills from the construction equipment does not occur and that a safe distance is maintained from any overhead or buried transmission lines near the trail sections.

There was no evidence of any significant environmental concerns on the trail system that would limit upgrading at this time, and no additional environmental site investigations would be necessary.

1.0 INTRODUCTION

As part of the Dryden Signature Trail System Improvements Feasibility Study, HTFC Planning & Design (HTFC) requested that JR Cousin Consultants Ltd. (JRCC) conduct a Phase I Environmental Site Assessment (ESA) of the sections proposed for upgrade along the Dryden Signature Trail System.

1.1 Purpose

The City of Dryden is considering upgrading the Dryden Signature Trail System, with a focus on:

- extending the trail around the lookout point in Cooper Park
- constructing a pedestrian bridge from the trail to Cooper's Island and constructing a viewing area on the island
- constructing a new trail section along Riverview Drive
- reviewing the trail sections throughout the Laura Howe Marsh
- extending the trail from the Laura Howe Marsh to Van Horne Landing
- constructing a waterfront feature at Van Horne Landing.

To proceed with the Feasibility Study, a Phase I ESA is required to ensure the land parcels being considered are suitable for upgrade or development. The purpose of the Phase I ESA is to identify actual and potential site contamination that may have an environmental impact on the proposed development, prior to planning. If there are any existing environmental concerns, additional intrusive investigations may need to be conducted to evaluate the concerns.

1.2 Scope of Work

The scope of work for conducting a Phase I ESA is comprised of gathering information from various sources such as historical records review, interviews with persons knowledgeable about the history of the area, and a site visit by JRCC personnel. The site visit included non-intrusive and non-destructive methods of observation, such as visual inspection and photographs. A review of the current land use and surrounding land use practices was conducted, to determine any environmental or health and safety impacts. This report includes a summary of the information obtained and a recommendation of any further site evaluations.

1.3 Significant Assumptions, Limitations and Exceptions

JRCC has conducted this Phase I ESA in accordance with the Canadian Standards Association *Phase I Environmental Site Assessment* (Designation: Z768-01), the American Standard for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (Designation: E 1527 – 05), and Ontario Regulation 153/04. These standards provide a methodical and systematic approach for acquiring the appropriate information to conduct a Level I (Phase I) ESA. The findings and recommendations reached in this report are based on information made available to JRCC and the conditions at the time of the site visit. Conclusions derived from this environmental assessment are intended to reduce, but not wholly eliminate the uncertainty regarding potential environmental concerns on the subject lands, and recognizes reasonable limitations with

regards to time, accuracy, work scope and cost. Historical data and information obtained from personal communication used in this report are assumed to be correct however, JRCC has not conducted further investigations into the accuracy of this data.

1.4 User Reliance

JRCC has produced this report for the use of HTFC, and takes no responsibility for any third party decisions or actions based on information contained in this report.

2.0 SITE DESCRIPTION

2.1 Location and General Description

The portion of the trail system that is being considered for this Feasibility Study is located along the east side of the Wabigoon River, between Duke Street and Van Horne Landing, in the City of Dryden, Ontario. The length of trail to be reviewed was approximately 3.6 km. The trail temporarily ends at two locations. The first section is between Victoria Street and Ross Street, along Riverview Drive. The second section is between Ross Street and Edgewater Drive, at a private park area. Access to the other section of trail is along Ross Street and River Heights Drive. The trail ends at the Laura Howe Marsh, where pedestrians can walk through the marsh trail system. The Signature Trail System includes several monuments and trail signs. A dock into the river is located at the north end of the trail, and at Van Horne Landing on the south end. A plan of the trail system is included in Appendix A.

2.2 Description of Trail and Infrastructure

The Duke Street Dock is located at the north end of the trail system on the river. The trail consists of paving stone with a concrete retaining wall on the east side and the water's edge along the west side. Another dock is located opposite the arena and metal guard rails surround the trail around Cooper Park, which is a circular area of paving stone with benches for seating and a stone monument in the centre. The monument describes the location of a past water pumphouse at the site that was removed in 1976. The trail continues south and has another trail sign indicating the past location of The Dryden Mill and current Domtar pulp mill across the river. There is a public bathroom building located on the east side of the trail, which is connected to the city's water and sewer system. The trail continues south past Cooper's Island, which is approximately 25 m off shore. The trail is surrounded by mowed grasses on both sides and scattered trees and bushes along the shoreline. South of Cooper's Island, the trail is bordered by an urban forest and then becomes uneven, with dips and swales and evidence of asphalt repairs. South of the forest area the trail transitions into an asphalt surface with mowed grass and scattered trees surrounding the trail. The water's edge in this location is secured with timbers and metal posts for erosion protection. The trail then temporarily stops at Skene Landing, which is a parking lot and boat launch, with a dock. The trail has metal lamp posts, benches, culverts, and waste bins along its length from the Duke Street Dock to Skene Landing.

A trail sign at Skene Landing indicated that the site was the original location of a steam driven sawmill and shingle mill, which was sold in 1902. South of Skene Landing, the trail continues with brick pavers and a metal guard rail for approximately 35 m and then the trail ends along the west shoulder of Riverview Drive. The shoulder of Riverview Drive is not wide enough for pedestrians to walk next to the road safely, forcing them onto the grassed and treed area along the river bank. There are sections of exposed bedrock along the shoreline and roadway along the length of Riverview Drive. At the intersection of Riverview Drive and Davis Street there is a wooden trail marker and signs indicating a buried electrical line. Overhead electrical power lines run along the east side of Riverview Drive. Several culverts were identified along this stretch below the road and shoulder.

A concrete sidewalk connects to the next section of trail from River Heights Drive. The trail continues at Edgewater Drive, running along the river bank and is bordered to the east by residential properties. The

trail consists of brick pavers with mowed grass on either side. There are lamp posts along this section of trail and two land drainage sewer grates. This section of trail ends at the start of the Laura Howe Marsh Conservation Area.

The Laura Howe Marsh Conservation Area consists of nature trails through forested land that surround a large marsh area. The trail is compacted granular material with several culverts identified throughout the marsh area that cross under the trails. Two small pedestrian bridges of wooden construction were noted over drainage ditches. Several trail signs were located throughout the marsh area, which provided information on various plant and wildlife species present in the area. There were also signs at the entrances to the marsh trail that the trail is for pedestrian use only and that motorized vehicles are prohibited. The trail ends at an open field approximately 230 m from Van Horne Landing, and two portable toilets are located at the trail head.

Van Horne Landing is a boat launch and dock on the shore of Wabigoon Lake. The area separating the marsh trail and the shoreline is an open grass field. A permanent bathroom building, which is maintained by the city, is located near the parking lot area. This washroom building is serviced by a holding tank. Van Horne Avenue is a paved access road to Van Horne Landing and the parking area. A trail sign is located along the shore.

2.2.1 Drainage

The Dryden Signature Trail sections that were reviewed had ten culvert crossings under the trail into the river.

2.2.2 Water and Sewer

There is a watermain and forcemain that crosses beneath the trail system at the south end of Riverview Drive, before it crosses the river.

2.2.3 Electrical

There is a buried electrical line that crosses beneath the trail system at the intersection of Riverview Drive and Davis Street. There are also buried electrical cables running alongside the trail from Duke Street to Victoria Street, and along Edgewater Drive, to power the lamp posts.

2.3 Adjacent Properties

The trail section between Duke Street and Victoria Street runs alongside the Dryden Memorial arena, a residence, and the Riverview Lodge properties on the east side. West of the river is the Domtar pulp mill. Just north of the Duke Street Dock is the hydroelectric generating station on the Wabigoon River. Riverview Drive runs alongside several residential properties on the east side with several residential properties on the west side of the river. Along the Edgewater Street section of trail are several residential properties which border the trail on the east side and two residential properties on the west side of the river. The Laura Howe Marsh area is surrounded by residential properties on the north, west and east sides, however the properties are not visible from the trail system. An RV park, marina and yacht club surround Van Horne Landing.

3.0 RECORDS REVIEW

3.1 Aerial Photographs

A chronological set of aerial photographs dating back to 1956 were reviewed to identify changes in land use, and features on the subject property and neighbouring lands. Aerial photographs from 1955, 1975, 1996, 2002, 2012, and 2021 were reviewed and are included on Plans 2 through 9 in Appendix A. The following sections describe observations from the review of the historical aerial photographs.

3.1.1 1955 Aerial Photographs (Plans 2 - 4)

The trail system could not be observed in the photos. Cooper's Island was also attached to the mainland in the photographs. There were two boat buildings on the water at Skene Landing and two more just north of that. There were floating logs on the river for the pulp mill works. The residential area of Edgewater Drive was an undeveloped quarry area.

3.1.2 1975 Aerial Photograph (Plan 5)

The photo shows Van Horne Landing with the dock extending into Lake Wabigoon. The Laura Howe Marsh was visible, along with the undeveloped Edgewater Drive residential area. Cooper's Island had been separated from the mainland by dredging works.

3.1.3 1996 Aerial Photograph (Plan 6)

The photo shows the trail system along the riverside from Duke Street Dock to Skene Landing. It appears that the trail section near Edgewater Drive has started to be developed, but no residential housing is present. The boat building near Skene Landing had been removed.

3.1.4 2002 Aerial Photograph (Plan 7)

The photo shows the completed trail system along Edgewater Drive, and some houses have been constructed along the trail at that section. The trail system in the Laura Howe Marsh can be seen. The yacht club near Van Horne Landing can be seen.

3.1.5 2012 Aerial Photograph (Plan 8)

The photo is largely unchanged from the 2002 photo, with some additional housing in the Edgewater Drive area along the trail system.

3.1.6 2021 Aerial Photograph (Plan 9)

The photo is largely unchanged from the 2012 photo, with some additional housing in the Edgewater Drive area.

3.1.7 Summary of Aerial Photograph Review

From a review of the historical aerial photographs, the Dryden Signature Trail System was developed sometime between 1975 and 1996. Cooper's Island was formed sometime between

1955 and 1975. The trail along Edgewater Drive was developed sometime between 1996 and 2002.

3.2 Land Ownership, Maintenance and Zoning

The Dryden Signature Trail System is currently owned and maintained by the City of Dryden on vacant land and parkland. The trail system does not have a specific zoning designation by the City.

3.3 Geotechnical Information

A review of the Soil Survey mapping for Dryden indicated that the majority of the trail area is classified as Sioux Series, which is clay, clay loam, silt loam, silty clay loam, and loam soils, developed over calcareous clay or silty clay lacustrine material. Soils are considered to be well drained with the land being nearly level to moderately sloping. The soils in the marsh area are unclassified and have very poor drainage and depressional topography.

The City of Dryden is located in the Wabigoon River Basin, which is part of the Precambrian Shield physiography. The overburden of the area consists of shallow deposits of sand and clay overlying the Precambrian bedrock.

3.4 Ecoregion Information

The trail system is located within the Lake of the Woods Ecoregion of Canada. This ecoregion is characterized by a transition between boreal forests to the north and mixed forest region of the southeast. Native tree species consist of trembling aspen, paper birch, jack pine, white spruce, black spruce, and balsam fir. Wildlife associated with the ecoregion include moose, black bear, wolf, lynx, snowshoe hare, and woodchuck. Common bird species in the ecoregion include waterfowl, ruffed grouse, hooded merganser, pileated woodpecker, bald eagle, turkey vulture, and herring gull. From a review of the DFO database, there were no records of any aquatic species at risk or critical habitat area identified along the Wabigoon River, near the project areas.

3.5 Previous Investigations and Reports

The *Wabigoon River and Swanson Creek Flood Risk Mapping Study* from Dillon Consulting (May 1987) was reviewed for background information on the flood potential. A previous Phase I ESA was completed for the subject property by JRCC (October 2006). The flows and water level through Dryden are maintained by the Wabigoon Lake Dam and the hydroelectric generating station. The hydroelectric generating station on the Wabigoon River in Dryden has been in operation since the 1920s and the Wabigoon Lake Dam was constructed in 1912. In general, flooding along the trail system is not expected to be a concern, due to the water level control measures in place.

The *City of Dryden Trail Enhancement and Development Project* report by Werner Schwar Landscape Architect (October 2003) was reviewed for background information. The document discusses the options considered in upgrading the signature trail system including:

- add more 'Forest Discovery' interpretive information along the river shoreline and information regarding wetlands along the Laura Howe Marsh trails
- resurface the path with concrete for accessibility
- add handrails on the river side of the path for safety
- construct a walkway at Skene Landing
- include a picnic area north of the boat launch, along with a walkway along the shoulder of Riverview Drive, with pedestrian lighting
- add a sitting area at Davis Street
- construct a pedestrian walkway from Riverview Drive along River Heights Drive, through the residential neighborhood, with pedestrian lighting
- add pedestrian lighting, plant vegetation along the shoreline, reduce slope on the entrance ramp, resurface the trail with concrete and trail entrance structures along the Edgewater Drive section
- connect granular trail to Laura Howe Marsh Trail
- add two additional entrances to the Laura Howe Marsh
- add viewing platforms
- prohibit mountain biking in the trail system.

A *Phase I Environmental Site Assessment of the Laura Howe Marsh* by AMEC Earth and Environmental (April 2008) was reviewed for background information on any potential areas of environmental concern in the marsh area. The study indicated that the marsh was developed in 1911 as a result of the construction of a dam on the Wabigoon River, which caused flooding in a lowland area of Wabigoon Lake. The marsh area is undeveloped, with the exception of 2.5 km of walking trails with viewing platforms for residential use. The marsh area is considered to be an environmentally sensitive conservation area. In 1997 the interpretive trail was constructed around the marsh providing public access. No potential or actual contamination was observed.

3.6 Ministry of the Environment, Conservation and Parks (MOE) Database Search

Various MOE databases were reviewed for any indication of past or present environmental contamination. There was no evidence of past waste disposal activities along the trail area, and the waste disposal site for the city is located approximately 5.5 km to the southwest.

The MOE Freedom of Information Request was submitted for information on any records of past environmental impacts on the trail or on the adjacent properties. A response from the province had not yet been received at the time of this report.

3.7 Summary of Historical Findings

The following is a summary of historical findings from the trail system:

- Alexander Skene started and operated a steam driven sawmill and shingle mill from 1896 to 1902 at the site of Skene Landing.

- A dam was built at the mouth of the Wabigoon River in 1898 and a sawmill was built on the site of the current Domtar pulp mill in 1908.
- The dam was replaced in 1912.
- Construction of the dam on the Wabigoon River caused the alteration of water levels along the shore of the lake and created the Laura Howe Marsh.
- The Dryden water pumphouse was constructed in 1928 by Mr. Frank Cooper, and supplied water to the City for forty-eight years. The site of the pumphouse is now Cooper Park.
- The Laura Howe Interpretive trail was constructed in 1997.

4.0 SITE INVESTIGATION

JRCC personnel conducted a site investigation on October 18, 2021 to examine the trail system by walking it, conducting a visual exam, and identifying areas of interest or concern. The weather during the site investigation was sunny and warm, and the ground surface was visible. Adjacent properties were also examined with respect to the privacy of the occupants. Photos from the site investigation are attached in Appendix B.

4.1 Natural Features

4.1.1 Landscape

The natural landscape of the trail area varied from a well manicured trail along the river front, to the shoulder of a roadway, to a nature trail in the forest. The elevations along the trail section between Duke Street and Victoria Street varied from flat to moderately sloped. The section along Riverview Drive was elevated and had bedrock outcrops along the shore and some steep drop offs to the river. The trail section along Edgewater Drive was generally flat and surrounded by mowed grass to the river, and residential properties sloping up to the east. The Laura Howe Marsh trail system was a low lying forested area with ditches and culverts under the trail. Van Horne Landing was an area that gently slopes into the lake.

4.1.2 Vegetation and Wildlife

The vegetation present along the trail section from Duke Street to Victoria Street included mowed grasses, cedar, pine, spruce, decorative trees and willow bushes. Cooper's Island appeared to consist of native grasses, willow bushes, reeds and pine trees. The section along Riverview Drive included pine, spruce and aspen trees, with rushes, reeds and scrub brush along on shore. The trail area along Edgewater Drive consisted of mowed grass along the trail, with reeds, rushes and scrub brush at the river shore. The marsh trail consisted of native grasses, birch and spruce trees, reeds and rushes, with deadfall in the surrounding forest area. There was evidence of beavers, deer, waterfowl, turtles, and birds of prey in the marsh area.

4.1.3 Air Quality and Noise

Air quality was generally good at the time of the site investigation and no distinct odours could be detected. There was no distinct odour that could be detected from the Domtar Plant across the river.

The only significant noise detected during the site investigation was the periodic sound of traffic along the streets bordering the trail. While not observed during the site investigation, water traffic could add to noise levels.

4.2 Site Observations

4.2.1 Trail Sections

Between Duke Street and Victoria Street

At the north end of the trail system the Duke Street Dock consists of several floating dock structures for boats and leads to a circular sitting area at the terminal of the trail near the intersection of Duke Street and Earl Avenue. There were benches and waste receptacles regularly along the trail in this section, and it was consistently being used by pedestrians during the site visit. In general the trail was well maintained and no litter was detected. This section of the trail had a clear view of the Domtar pulp mill on the other side of the river. A dam is also located just north of the area on the Wabigoon River.

Cooper Park, another circular seating area, was also occupied by pedestrians. The public bathroom building located near Cooper Park was closed at the time of the site visit. Cooper's Island is an undeveloped natural island in the river that could not be accessed for inspection. There was a residence and a private urban forest area along the west side of the trail, and the Riverview Lodge also had a large green space on the west side of the trail near Skene Landing. The parking lot at Skene Landing had several vehicles with trailers parked during the site visit.

Riverview Drive

The trail ends at the shoulder of Riverview Drive and pedestrians must walk alongside the street to reconnect with the trail further south. There were no pedestrians observed walking along the roadway during the site visit, but the road is actively used by vehicles. The slopes along the river at this section were quiet steep, due to the exposed bedrock outcrops along the shore. There was a small manicured wooded area for pedestrians, with boulders and a trail near the intersection of Davis Street.

Edgewater Drive

This trail section runs along the river bank and the backyards of several residences, separated by individual fences. This trail section was also well maintained and no litter was observed. Homeowners have access to the trail from gates in their fences. Waste receptacles were located at either end of this trail section.

Laura Howe Marsh

The trail head for the Laura Howe Marsh Conservation Area begins at McMillan Avenue, where a trail sign is posted along with a waste receptacle and bench. The trail is located in the forested area, however there are several lookouts onto the marsh. The trail and walking bridges were well-maintained and pedestrians were observed throughout. Another trail sign was located on the south end of the trail system, where it accessed Van Horne Landing. There were two portable toilets located at this southern trail entrance.

Van Horne Landing

The area between the marsh trail and the boat launch was an open field of native grasses with no distinct trail. The parking lot at the boat launch had several vehicles and trailers parked. The public bathroom building was closed at the time of the site visit. The trail sign located along the shore was for the Migizi canoe trail along Wabigoon Lake.

4.2.2 Adjacent Properties

The majority of adjacent properties were residential, with the exception of the Domtar Pulp Mill, the Riverview Lodge, the Marina, and the Yacht Club.

5.0 INTERVIEWS

5.1 Colin Hawkins – Asset and Facilities Manager

Correspondence was conducted with Colin Hawkins (Asset and Facilities Manager), from the City of Dryden, after the site inspection was completed. The information provided was used to assess the history of the site, the infrastructure of the area and any potential environmental or health and safety concerns associated with the trail system.

6.0 FINDINGS AND DISCUSSION

6.1 Records Review, Interviews and Site Investigation

The following is a summary of the general findings based on the historical records review, personal interviews and site investigation:

- There was a steam driven sawmill and shingle mill located at the site of Skene Landing until 1902
- Cooper's Island was separated from the mainland sometime between 1955 and 1975 by excavating and dredging the river bed
- There was a pumphouse operated at the site of Cooper Park until 1976
- The Dryden Signature Trail System was constructed sometime between 1975 and 1996
- The trail section along Edgewater Drive was developed sometime between 1996 and 2002
- The Laura Howe Marsh interpretive trail system was developed in 1997
- The trail consists of paving stone between the Duke Street Dock and Cooper's Island, and along Edgewater Drive
- There was pedestrian lighting along the sections between the Duke Street Dock and Skene Landing, and along Edgewater Drive
- There were washroom buildings located just east of Cooper Park and at Van Horne Landing
- The Wabigoon River level is maintained by a dam just north of the trail system, which prevents the trail from flooding
- The trail stops at Riverview Drive and continues again at Edgewater Drive pedestrians must walk along residential streets to connect the two trail sections
- The trail system was well maintained and free of litter during the site investigation
- There were bedrock outcrops observed along Riverview Drive.

6.2 Potential and Existing Environmental and Health and Safety Concerns

Potential environmental and health and safety concerns on the site reviewed included:

- Air emissions – no emission sources were detected
- Odours – no noticeable odours were detected
- Chemical storage or handling – no indications of hazardous chemicals were present
- Designated substances – no designated substances typically found in buildings were present
- Pesticides or herbicides – no pesticides or herbicides were detected
- PCBs and CFCs – no equipment was present on the site which could contain PCBs or CFCs
- Radioactive materials – no radioactive materials were present
- Mechanical equipment – no mechanical equipment was present

- Spills, surface staining or stressed vegetation – there were no indications of petroleum or chemical spills, surface staining or stressed vegetation along the trail system
- Contaminated in-fill – there was no indication of contaminated in-fill on the trail system
- Fuel Storage tanks – there was no indication or records of buried or above ground fuel storage tanks
- Solid or liquid waste – there was no indication or records of solid or liquid waste disposal
- Water wells – there were no water wells on or adjacent to the trail system identified
- Wastewater – there is one buried wastewater crossing located on the south end of Riverview Drive; a public washroom connected to the city sewer system near Cooper Park, and a public washroom with a holding tank at Van Horne Landing
- Flooding – there was no indication of past flooding events on the trail system and the water level is maintained by the dam on the Wabigoon River.

There were no immediate environmental or health and safety concerns identified along the sections of trail proposed for upgrading. It is unlikely that past site activities, such as the mill and pumphouse would have any impacts on future upgrading. There were no potential areas of environmental concern from the adjacent properties that could impact the trail upgrade project. Any surface upgrades are not expected to have any impacts on the water and sewer pipes below Riverview Drive; however caution should be exercised if excavations occur near the buried electrical cables alongside or beneath the trail.

There is a potential for spills or leaks on the trail system from heavy equipment used during the construction works.

6.3 Discussion of Potential Trail Upgrade Impacts

Any potential upgrades to the trail system will likely occur along the water front of the Wabigoon River and Wabigoon Lake. Any works along the shoreline will need to consider Fisheries and Oceans Canada (DFO) Standards and Codes, and *Measures to Protect Fish and Fish Habitat*. This would consider maintaining riparian vegetation, ensuring proper sediment control and preventing deleterious substances from entering the river. Any in-water works, such as bank reconstruction or constructing a pedestrian bridge to Cooper's Island would require a review and approval by DFO and a Crown Lands Work Permit through the Ministry of Northern Development, Mines and Natural Resources (MNRF), and approval from Transport Canada Navigation Protection Program. Any alterations to Riverview Drive, or adding sidewalks along River Heights Drive would require approval from the City of Dryden. Inspections of Cooper's Island would be required prior to development to ensure that there are no species at risk impacted.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the records review, site investigation and interviews, there are no environmental or health and safety concerns on the subject property which would limit or prevent upgrading the trail system. No additional Environmental Site Assessments are necessary based on the information reviewed and the observations made. However if any in-water works are to occur, such as a pedestrian bridge to Cooper's Island and a trail extension into the river bed, approval will need to be obtained from DFO, Transport Canada, and MNRF.

Care should be taken by the construction contractor to ensure leaks or spills do not occur onsite during the upgrading works and that a safe distance is maintained from the overhead and buried transmission lines near the trail sections.

APPENDIX

Appendix A

Plan 1: Site Layout Plan

Plan 2: 1955 Aerial Photograph 1

Plan 3: 1955 Aerial Photograph 2

Plan 4: 1955 Aerial Photograph 3

Plan 5: 1975 Aerial Photograph

Plan 6: 1996 Aerial Photograph

Plan 7: 2002 Aerial Photograph

Plan 8: 2012 Aerial Photograph

Plan 9: 2021 Aerial Photograph

Appendix B

Photo 1: Trail between Duke Street and Arthur Street

Photo 2: Domtar Pulp Mill across the Wabigoon River

Photo 3: Washroom Building near Cooper Park

Photo 4: Cooper's Island

Photo 5: Bench and Waste Bin along Trail between Arthur Street and Victoria Street

Photo 6: Patched Asphalt Trail Section North of Skene Landing

Photo 7: Skene Landing

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Photo 10: Path between River Heights Drive and Edgewater Drive

Photo 11: Trail Section along Edgewater Drive

Photo 12: Laura Howe Marsh

Photo 13: Pedestrian Bridge along the Marsh Trail System

Photo 14: Van Horne Landing

Photo 15: Field between the Marsh Trail and Van Horne Landing

Photo 16: Washroom building at Van Horne Landing

Appendix A

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Plan 4: 1955 Aerial Photograph 3

Plan 5: 1975 Aerial Photograph

Plan 6: 1996 Aerial Photograph

Plan 7: 2002 Aerial Photograph

Plan 8: 2012 Aerial Photograph

Plan 9: 2021 Aerial Photograph

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DRAWN BY:	OT
REVIEWED BY:	OW

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DRYDEN SIGNATURE TRAIL SYSTEM IMPROVEMENTS PHASE 1 ESA

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TITLE: 1955 AERIAL PHOTOGRAPH 2

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TITLE: 1955 AERIAL PHOTOGRAPH 3

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TITLE: 1975 AERIAL PHOTOGRAPH

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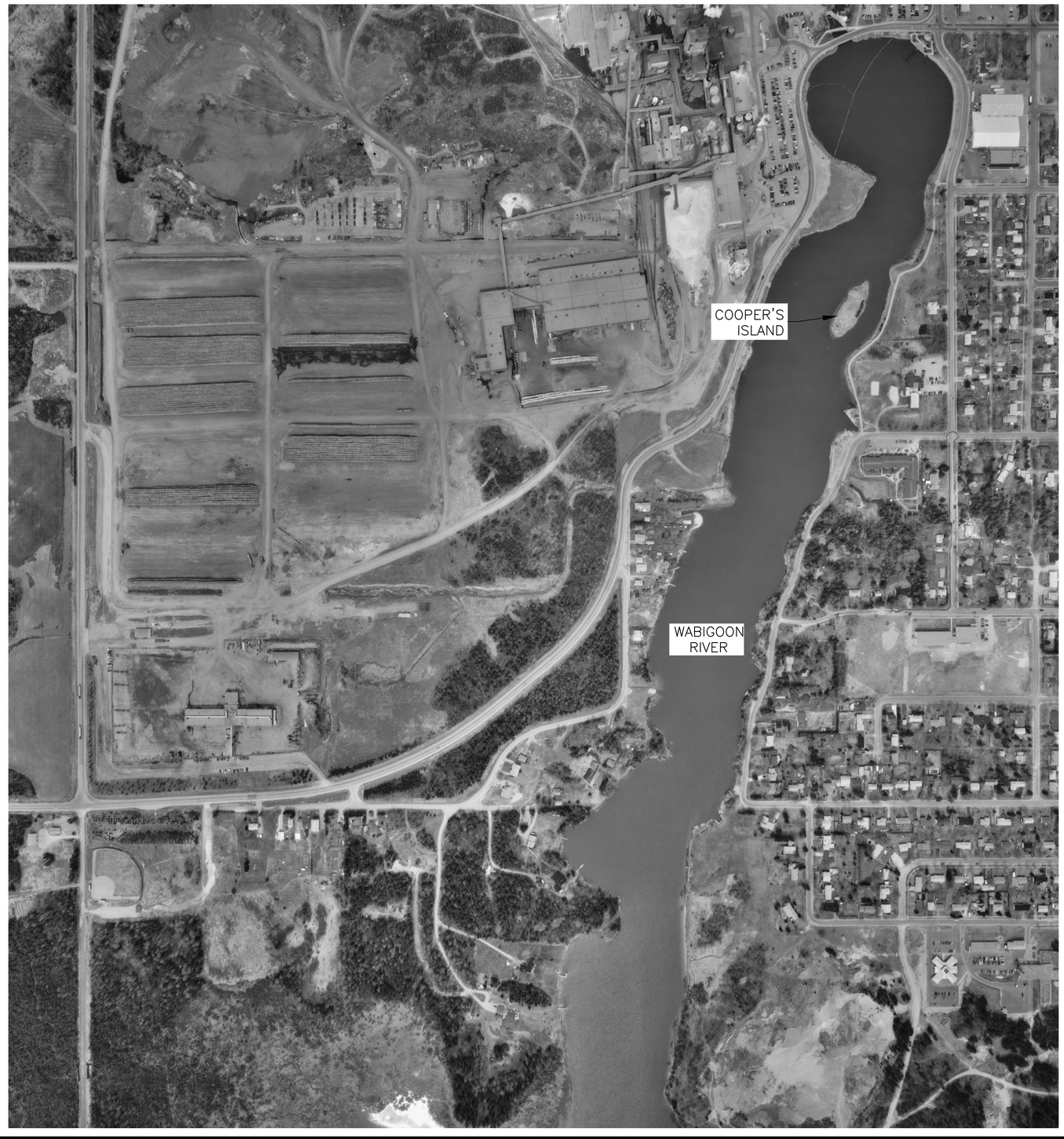
NTS	21/11/23	5	5 of 9



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TITLE: 1996 AERIAL PHOTOGRAPH

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TITLE: 2002 AERIAL PHOTOGRAPH

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TITLE:
2012 AERIAL PHOTOGRAPH

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TITLE: 2021 AERIAL PHOTOGRAPH

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Appendix B

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