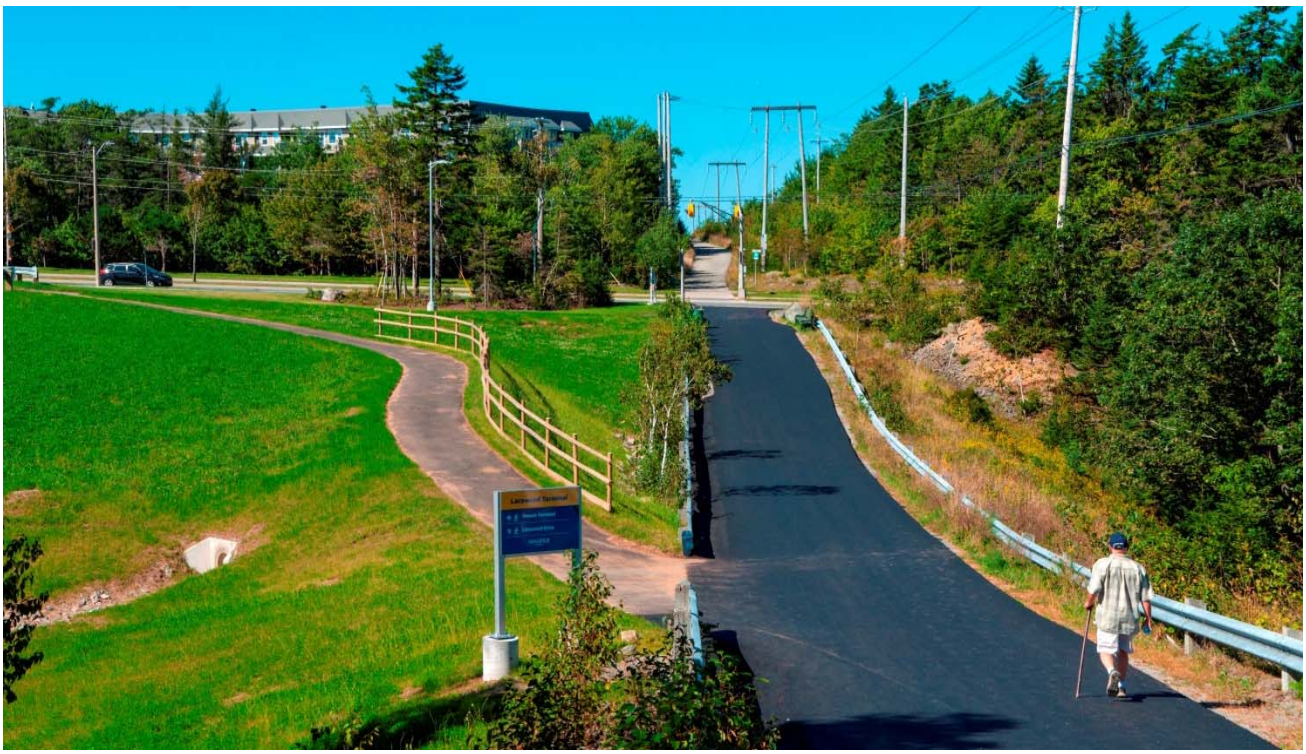
HALIFAX

FUNCTIONAL PLAN: MAINLAND LINEAR TRAIL

HALIFAX REGIONAL MUNICIPALITY
HALIFAX NORTH WEST TRAILS ASSOCIATION



FINAL REPORT (V 2.0) **MAY 18, 2016**

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1.0 Introduction

The Mainland Linear Trail (MLT)[1] is an approximately 4.5km dedicated active transportation (AT) greenway that runs north-south through mainland Halifax. Among HRM's most utilized AT assets, the MLT annually accommodates more than 100,000 AT trips for a variety of uses ranging from walking and running to cycling and wheelchairs. It connects key destinations including parks, schools, transit, and recreational facilities to neighbourhoods such as Fairview, Mount Royale, Clayton Park, Clayton Park West, Rockingham, Glenbourne, and Wedgewood Park.

Though the MLT has long been considered a key AT route in Halifax, the recent addition of major destinations in the area (Canada Games Centre, BMO Soccer Centre, new Halifax Transit Lacewood Terminal) has further increased its important role in providing an AT connection with the dense residential neighborhoods that surround it. In keeping with the commitment to advancing AT that was outlined in its *Active Transportation Priorities Plan*[2], HRM has identified the MLT as a key opportunity to increase use of AT modes as an alternative to auto-based travel.

1.1 Study Objectives

In conjunction with the Halifax North West Trails Association and Halifax Regional Municipality (HRM), WSP has developed a functional plan to guide future extensions and enhancements to this important AT spine. The functional Plan has three key objectives:

- Plan extensions / connections to complete a connected greenway from the Chain of Lakes Greenway to the new Bedford West community. Three extensions were considered:
    1. Extension south to the Chain of Lakes Trail;
    2. Extension north to the 'Waterline Trail', and;
    3. Extension between the Waterline Trail and the Larry Uteck AT Greenway.
- Identify the existing and potential new connections to and from communities along the Trail and recommend an approach for enhancement; and,
- Propose options for improving the existing trail.

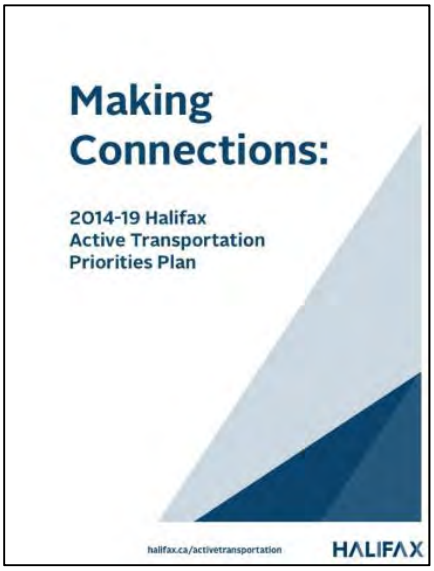
[1] Also commonly referred to as the "Mainland North Linear Parkway Trail" and the "Power Line Trail", among others.
[2] *Making Connections: 2014-19 Halifax Active Transportation Priorities Plan* (Halifax Regional Municipality, 2014)

1.2 Active Transportation Planning Context

The HRM *Active Transportation Priorities Plan*, which sets a course for AT-related infrastructure and programs for the region over a five year period (2014-19), recognizes the MLT as a key link in HRM's greenway network and provides recommendations on how it should be enhanced and expanded. These recommendations, as stated in the Plan (Table 10.3.1), are listed below:

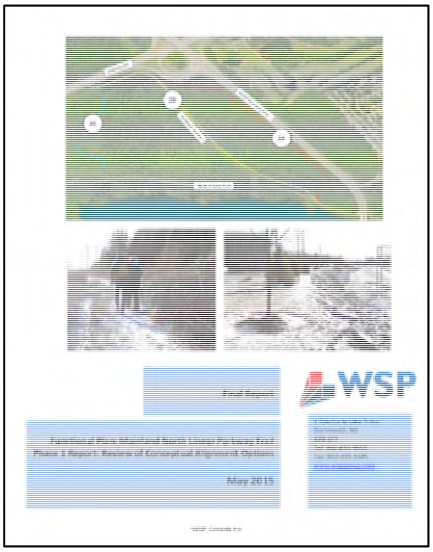
- Upgrade Mainland Linear Trail to Urban AT Greenway Standard (at least 3m wide and paved)
- Develop functional plan to connect the Mainland Linear Trail southwards to the Chain of Lakes Trail and northwards to Bedford South and Larry Uteck Greenway

This Functional Plan has been initiated by HRM to directly address these two recommendations.



1.3 Phase 1

The *Phase 1 Report*, submitted in May 2015, provided an overview of the conceptual design options that were under consideration for each of the three proposed AT connections. Review and evaluation of each option was completed based on background research (property ownership, GIS mapping information, record drawings), site investigations, stakeholder consultation, and preliminary engineering. The report recommended a preferred option for each of the three connections. Subsequent to acceptance of the report, the recommendations were endorsed by the Project Steering Committee. The *Phase 1 Report* has been included as Appendix C.



1.4 Phase 2

Phase 2 of the project expands upon the selected options from Phase 1, providing further analysis of each AT connection including functional design drawings and preliminary cost estimates. Another key component of Phase 2 is the review of the existing MLT facility in terms of neighbourhood connections and amenities and development of enhancement options.

2.0 Community Consultation

Community consultation played an important role in the development of this Functional Plan. Multiple consultation methods were employed in an effort to reach out to as many members of the community as possible. Consultation methods and results are outlined in the following sections.

2.1 Consultation Summary

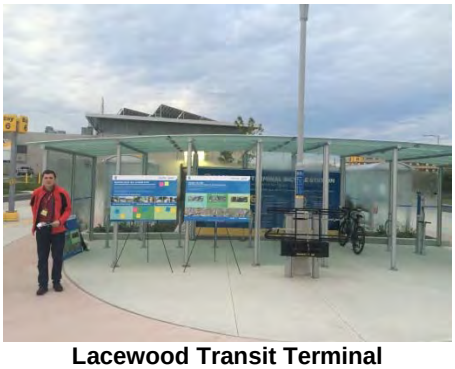
2.1.1 *Tactical Engagement*

Information gathered during public meetings can be valuable, but risks limiting input to those people who can reach the event venue and have the time to attend. Our Tactical Engagement strategy engages the community in their daily lives. We set up consultation materials in public places and engage the public in conversation in a way that does not require them to know about the project or go out of their way to participate.

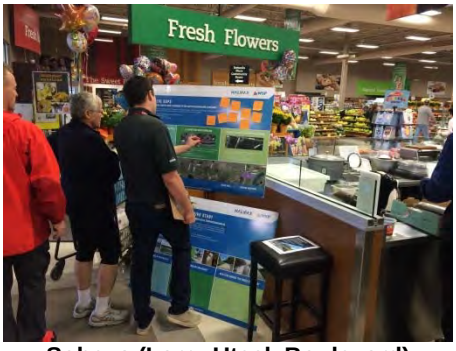
As part of community consultation process, WSP team members held strategically timed and located tactical engagement sessions intended to maximize exposure to pass-by traffic and spread awareness of the project to different parts of the Study Area. Community members were informed of the various aspects of the project and invited to provide feedback on consultation boards that were set up. The following engagement sessions were completed:

Location	Date
Mainland Linear Trail (near Lacewood Drive)	Saturday, September 19, 2015
Mainland Linear Trail (near Park West School)	Wednesday, September 23, 2015
Mainland Linear Trail (Halifax Transit Lacewood Terminal)	Wednesday, September 23, 2015
Sobeys (Larry Uteck Boulevard)	Saturday, October 3, 2015

MLT (Park West School)



Lacewood Transit Terminal



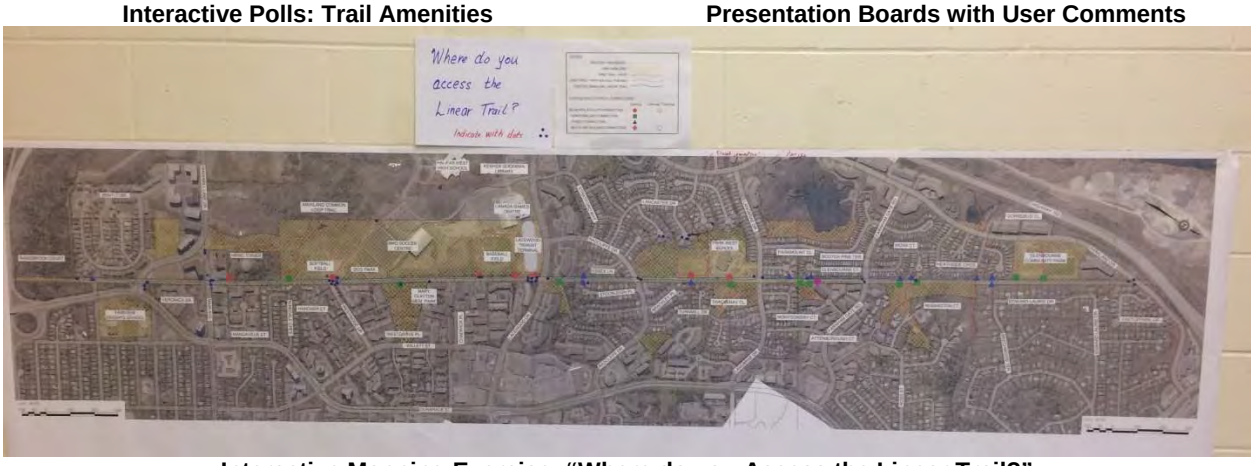
Sobeys (Larry Uteck Boulevard)

2.1.2 *Public Open House*

A public open house was held at the Canada Games Centre on Wednesday, October 7. The meeting – hosted by HRM and supported by the Halifax North West Trails Association and WSP Staff – included the presentation of project information boards and Study Area maps and encouraged feedback through comment boards, map notation, and interactive polls. The meeting was attended by more than 50 people, and generated a considerable amount of public comments.

Interactive Polls: Trail Amenities

Presentation Boards with User Comments

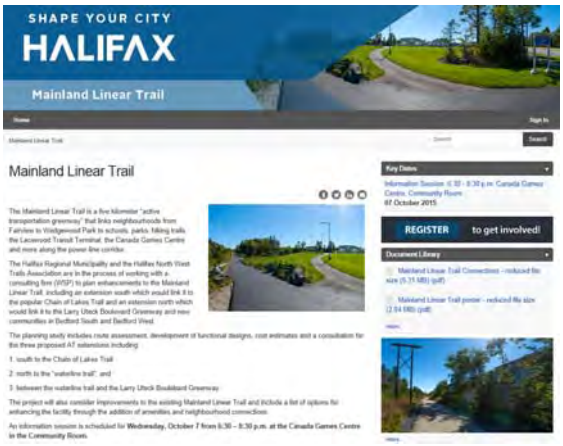


Interactive Mapping Exercise: "Where do you Access the Linear Trail?"

2.1.3 *Shape Your City Online Engagement*

In conjunction with HRM Staff, an online "*Shape Your City*" engagement site was established that included key project information and the opportunity to complete an 18-question survey related to the MLT and initiatives under consideration as part of the functional plan.

The site attracted nearly 1000 visits, and a total of 138 surveys were completed.



2.2 Consultation Results

The three community consultation methods that were used provided a wealth of valuable information related to the MLT and the project. Comments from the sessions have been compiled and are provided in Appendix B, along with the results of the Shape Your City survey.

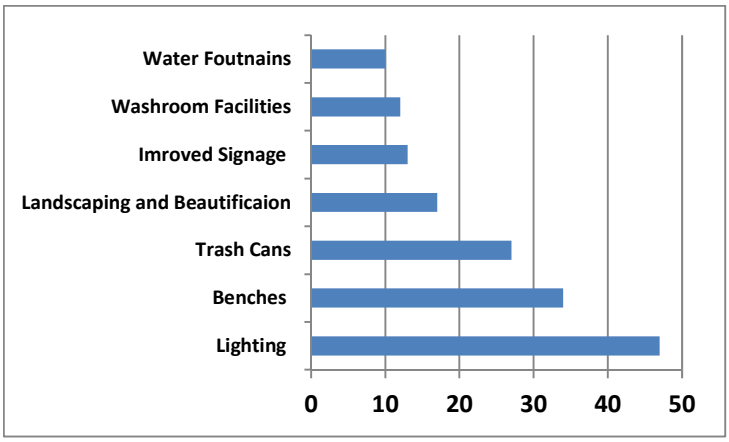
2.2.1 *Tactical and Open House Engagements*

The in-person engagement sessions included presentation of the various aspects of the project and solicitation of feedback related to the following key questions:

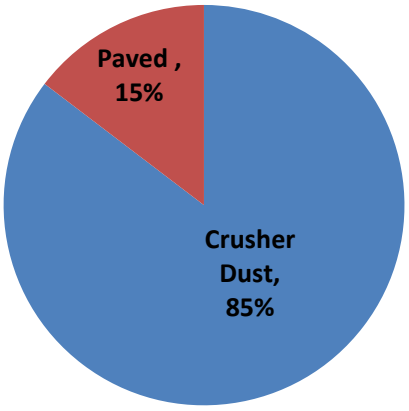
- **Where should connections to the trail be?**
- **What amenities should be added?**
- **What should the trail surface be?**
- **Would you be interested in the extensions to the trail that are under consideration?**

Overall, there was a general sense that the existing trail is meeting user needs in general, but that there is a desire for additional amenities and extensions to the facility. Key information obtained from the in-person engagements included:

- Desire for improved access to the trail from many different locations was stated. Many people noted that maintenance improvements are needed, particularly snow removal and vegetation clearing.
- There were many attendees that wondered why the existing street connector to Berkshire Close – which connects the cul-de-sac to the Park West School – has been closed off to public access.
- There were a wide range of amenities that were suggested for the trail. Among the popular amenities were lighting, benches, trash cans, dog bag dispensers, wayfinding signage, washrooms, and water fountains.
- On the question of trail surface, the majority of people indicated that they would prefer the existing crusher dust surface over asphalt pavement.
- There was considerable interest in the proposed extensions south (to the Chain of Lakes Trail) and north (to the Waterline Trail and Larry Uteck Boulevard).
    - The extension south to the Chain of Lakes Trail was the most intriguing of the three extensions; most people indicated strong desire to have access to the south.
    - The session in the Larry Uteck area clearly indicated that residents of the area have a strong desire to gain improved access to the regional trail network



"What amenities should the trail have"?



"What surface type should the trail have"?

Summary of Results: Interactive Amenities Poll

2.2.2 *Online Survey*

The online survey included a total of 18 questions related to many aspects of trail use. A total of 138 surveys were completed. Detailed survey results, including all survey questions and responses, are provided in Appendix B. Key findings of the survey are summarized below:

Trail Use	• More than 80% of respondents use the MLT at least once a month, with nearly a quarter of respondents using it on a daily basis. • Approximately one third of respondents do not use the trail during winter. • Walking (44%) and cycling (39%) were the most commonly used modes among respondents. • The majority of respondents use the MLT for recreational purposes. Utilitarian uses (trips to work, transit terminal, and other facilities) were indicated by approximately 25% of respondents.
Trail Users	• Over half (53%) of respondents live within three blocks of the MLT. • More than 80% of respondents access the trail directly without an intermediate trip by personal vehicle.
Proposed Trail Extensions	• The concept of extending the MLT south to the Chain of Lakes AT Greenway and north to the Waterline Trail and Larry Uteck Greenway were popular among respondents. o Approximately 70% of respondents indicated that they would use the extension south to the Chain of Lakes Trail at least a few times a month. o Approximately 55% of respondents indicated that they would use the extension north to Kearney Lake Road and Larry Uteck Boulevard at least a few times a month.

Surface Material	• A total of approximately 60% of respondents expressed that they would prefer that crusher dust remain the primary surface, including 20% who indicated that it should remain entirely crusher dust and 40% who indicated that it should be paved only in limited places susceptible to surface damage. • Slightly more than 40% of respondents would like the trail to be paved in its entirety. • Approximately 56% of respondents indicated that the benefit to alternative modes provided by paving the trail was important.
Amenities	• There was mixed reaction regarding the level of satisfaction related to trail amenities (i.e. benches, trash cans, directional signage and bicycle parking). Approximately 47% of respondents indicated that current amenities are acceptable, while 41% of respondents indicated that amenities should be improved. • When asked about which amenities should be added, there were a wide variety of responses; the most popular choices included: 1. Lighting 2. Wayfinding signage 3. Washrooms 4. Water fountains 5. Benches. 6. Interpretive signage 7. Bicycle parking 8. Landscaping
Trail Name	• Given that several names are commonly used for the trail (i.e. Powerline Trail, Mainland Linear Parkway Trail, Mainland Linear Trail) and that the Municipality are working to differentiate between the terms “trail” and “greenway”, respondents were asked if in their opinion the facility should be renamed. Approximately 40% or respondents indicated that they do think the trail should be renamed, while 22% indicated that it should not be renamed. A large portion (37%) had no opinion on the facility name.
Trail Condition	• More than half (59%) of users indicated that they have encountered issues with the condition of the facility.

3.0 Review of Extension Options

The Mainland Linear Trail (MLT) has considerable potential both within its existing limits as well as part of a more connected regional AT greenways network. In conjunction with other existing AT facilities including the Chain of Lakes AT Greenway, Waterline Trail, and Larry Uteck AT Greenway, there is potential to provide a continuous dedicated AT corridor linking between Peninsular Halifax and the developing communities in Bedford West. Development of connections through three key areas – challenging as they may be – is the only major constraint to complete this connected facility.

This Study has included route assessment, development of functional designs / cost estimates, and consultation for the following three potential AT connections:

1. Extension south to the Chain of Lakes Trail;
2. Extension north to the 'Waterline Trail', and;
3. Extension between the Waterline Trail and the Larry Uteck AT Greenway.

Each of the extensions presents a variety of challenges, along with potential opportunities. Phase 1 of the Study reviewed multiple options for developing connections through each of the three areas. The options were evaluated based on many factors including topography, land ownership, interaction with existing roadway infrastructure, interaction with utilities (power, water), facility type, user experience, and constructability / cost

The evaluation process involved consultation with key stakeholders including Nova Scotia Transportation and Infrastructure Renewal (NSTIR), various HRM departments, Halifax Water, Nova Scotia Power, and local trails groups.

The Phase 1 report (see Appendix C) provided an overview of the evaluation of each option and ultimately a recommendation of one connection to be considered in further detail as part of Phase 2. The following sections detail the recommended option for each connection. Functional design drawings are provided in Appendix A.

The preferred options presented here are based on the information available at the time of this study. When HRM is planning to implement these connections, they may wish to reassess some of the options to determine if there have been significant changes that would impact the recommendations

3.1 Chain of Lakes Trail Extension

The Phase 1 report recommended extension of the MLT to the Chain of Lakes AT Greenway primarily via Halifax Water lands on either side of Highway 102, along with a grade separated highway crossing. The proposed route formalizes the water easement as an AT facility and provides a good neighborhood connection to the Mount Royale subdivision. It also aligns well with what appears to be the optimum location for a Highway 102 crossing. The proposed alignment is illustrated in Figure 3-1.

Functional design sketches for the proposed extension are provided on Sheets 2 and 3 in Appendix A. Key functional design issues are discussed in the following sections:

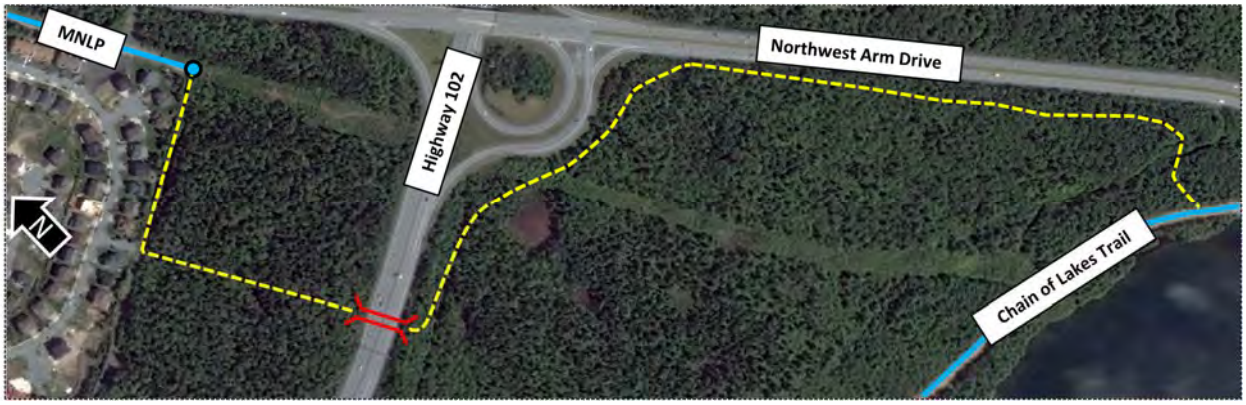


Figure 3-1: Recommended Alignment Option: MNLPT Connection to Chain of Lakes Trail

3.1.1 *Existing MLT Limits to Highway 102*

The selected option includes extension of the MLT west from its existing limits and establishment of a connection along the Halifax Water sewer easement at the south boundary of the Mount Royale Subdivision before turning to cross the highway. This alignment crosses NSPI, Halifax Water, and NSTIR property but follows the property boundary edges as much as possible to minimize disturbance to the lands. It also provides a formal connection to the trail from Mount Royale Subdivision, and has natural advantages including:

- Grades are favorable between the subdivision connector and Highway 102 with minimal earthwork expected to form a level trail;
- Surface conditions are generally good, with no apparent watercourse crossings required, although one culvert is anticipated to be required to provide proper surface drainage;
- There is no existing infrastructure expected along the alignment that will be impacted by greenway construction;
- The mixed forest dominated by semi-mature conifers is not too dense to compromise visibility or security.

3.1.2 *Highway 102 Crossing*

Crossing Location

To minimize approach grades to the bridge structure, it is advantageous to seek a crossing location at which elevations along the Highway are as close as possible to the assumed finish

grade of the bridge structure. It is also preferable to locate the crossing away from the two adjacent interchanges where the highway is less wide to limit the required span length.

Based on preliminary review and site investigations, a potential crossing location was identified approximately halfway between the Highway 102 interchanges at North West Arm Drive and Highway 103, just east of the highway sign structure. A rock outcrop on the north side of Highway 102 at this location provides a high point that is advantageous for approach grades.

Bridge Structure

The dedicated AT bridge structure proposed for the crossing of Highway 102 consists of two spans with an intermediate support to accommodate NSTIR's future plans to widen this section of Highway 102. The first span is about 40m and crosses 6 to 7 existing lanes of traffic with an allowance for 2 to 3 additional future lanes. The second span of about 30m would cross a future lane for vehicles exiting at North West Arm Drive.

These spans constitute a major bridge structure generally consisting of cast-in-place concrete abutments, a steel structure supporting a paved bridge deck, and safety railings. Although minimal earthwork is expected on the north side of the crossing, the topography falls away very quickly on the south side of the highway which suggests a significant amount of imported fill would be required to raise the greenway profile high enough to provide a 5.5m clearance for highway traffic.

Although it is not expected that there will be any conflict with the greenway and the overhead electrical wires immediately south of the highway crossing, this should be confirmed prior to any detailed design to ensure a safe separation is maintained between greenway users and the electrical infrastructure.

3.1.3 *Highway 102 to Chain of Lakes AT Greenway*

Connection south from Highway 102 to the Chain of Lakes Trail requires crossing Halifax Water's backup watershed lands. The lands are undeveloped, with the exception of an easement owned by Nova Scotia Power that serves as a transmission corridor.

The selected alignment option runs along the west side of North West Arm Drive, separated by a forested buffer. This option provides a direct connection between Highway 102 and the primary desire line to the east of the Chain of Lakes Trail and limits additional development of watershed lands. The greenway alignment is immediately adjacent to the future highway extension at the North West Arm Drive interchange and detailed design will have to coordinate the final layout and grades of the future interchange.

The greenway will have to cross a watercourse and there is a wetland area near the electrical corridor that may be impacted by the alignment shown. If the wetland or future highway widening plans render the current layout unfeasible, an alternative alignment is indicated on the Functional Plans that should not infringe on the wetland and would be less impacted by the highway widening.

Terrain generally slopes to the south toward the Chain of Lakes Trail, with the steepest grades immediately south of Highway 102 and at the southern extent of the greenway approaching the Chain of Lakes Trail. Maximum permissible trail grades of 8% are shown for these two segments to minimize earthworks.

3.1.4 *Preliminary Cost Estimate*

A Class D high level cost estimate has been prepared for the extension to the Chain of Lakes AT Greenway based on quantities calculated from the functional design drawings. As shown in the breakdown provided in Appendix A, it is anticipated that the proposed connection would have an estimated cost in the range of $2.0M to $3.0M.

This estimate is based on a crusher dust surface greenway. The majority of the cost is carried by the pedestrian bridge and associated borrow required to raise the trail profile to meet the bridge on the south side of the highway. An estimate of $1.2M is included for the bridge structure based on the expected span lengths. We understand preliminary cost estimates completed by NSTIR indicate a higher cost of approximately $1.8M for the bridge structure; but it is not known what this estimate included or what assumptions were made.

All estimates shown in Appendix A include construction costs only and are based on unit rates observed on similar projects in the past. Actual cost may vary significantly due to material and labour costs, time of year, industry workload, competition, etc. In addition, since the functional design drawings are conceptual only, detailed design would be required to provide accurate construction quantities. For these reasons, a large contingency of 35% has been included in the estimate to account for this uncertainty.

3.2 Waterline Trail Extension across Kearney Lake Road

The Phase 1 report recommended extension of the MLT north to the Waterline Trail via an AT facility along Parkland Drive to Kearney Lake Road, and a new off-street connection running along the north side of Kearney Lake Road and the east side of Highway 102. The proposed extension (illustrated in Figure 3-2) improves connectivity to both the Waterline Trail and to destinations in the Kearney Lake Road area.

Functional design sketches for the proposed extension are provided on Sheets 4 and 5 in Appendix A. Key functional design issues are discussed in the following sections:

Figure 3-2: Recommended Alignment Option: MNLPT Connection to Waterline Trail

3.2.1 *Existing MLT Limits to Kearney Lake Road*

The proposed connection between the MLT and Kearney Lake Road includes reconfiguration of the existing sidewalk and grass strip as a multi-use trail (3-4m wide) on the east side of Parkland Drive. This provides a continuous off-street connection.

The existing 2.8-3.0m sidewalk could be widened into the grass boulevard to create a 4.0m wide surface

Key design issues are described below:

- Steep grades in some places (~8%) to follow Parkland Drive profile;
- Limited line of sight around corners may cause safety concerns for AT users;
- There are two street crossings and two commercial driveways that the facility would cross, which introduces additional conflicts with two-way cycling traffic. It would also require modification the existing corner curb cuts at the intersections with Castlepark Grove;
- Widening of the existing sidewalk (approximately 2.8-3.0m) to the Parkland Drive curb would provide a 4.0m surface, which is ideal in terms of greenway width. However, this would require removal / relocation of some trees, utility poles, and fire hydrants. Also, extension of the hard surface into the grass boulevard would create a construction joint between the new and existing concrete and would reduce the buffer between the trail and the street.

Alternative options that may be considered include:

- Designate the existing 2.8m sidewalk as ‘shared use’, permitting two-way pedestrian and cyclist traffic. The width is narrower than preferable, especially given the relatively steep grades and tight corners.
- Add on-street bike lanes on Parkland Drive between the MLT and Kearney Lake Road. The existing cross section in approximately 13m, and can accommodate ideal 1.8m bike lanes and optional 1.0m buffer areas.

3.2.2 *Kearney Lake Road to Waterline Trail*

A new off-street connection running along the north side of Kearney Lake Road and along the east side of Highway 102 has been considered to connect between the proposed Kearney Lake Road crossing point (Parkland Drive signalized intersection) and the Waterline Trail. Since a segment of this alignment shares property with the adjacent Highway 102 on-ramp, property acquisition from NSTIR or an easement may be required.

The proposed trail connection would cross the hotel driveway and extend west to the Highway 102 On-Ramp

Looking south along the Highway 102 NB On-Ramp

Although this alignment provides good connection to nearby businesses and hotels, there are several design challenges involved.

- Very steep grades (7-10%) are needed to climb from the intersection at the highway ramp to the Waterline Trail; switchbacks or retaining walls may be required to meet design standards;
- Due to the space restrictions along the north side of Kearney Lake Road, relocation of hydrants and guy wires is likely to be required near the intersection with the highway ramp;
- Land constraints may require acquisition of property in front of the Holiday Inn Express where a retaining wall would likely be required;
- There is a large (1.2m dia.) water main that runs beneath the Highway 102 northbound on-ramp that would restrict the trail profile and alignment;

3.2.3 *Preliminary Cost Estimate*

A Class D high level cost estimate for the connection between the MLT's existing terminus at Parkland Drive and the Waterline Trail has been prepared based on quantities calculated from the functional design drawings. As shown in the breakdown provided in Appendix A, it is anticipated that the proposed connection would have an estimated cost in the range of $350,000 to $400,000. Further description is provided below:

Key components of the cost estimate include:

- Sidewalk widening on Parkland Drive: Increasing the width of the sidewalk to 4.0m will require widening of the existing concrete sidewalk into the grass boulevard along with relocation of three fire hydrants, 11 electrical poles, and more than 20 trees.

- Greenway construction: The greenway along Kearney Lake Road and Highway 102 will require retaining walls and considerable earthworks, particularly on the section between the hotel and highway ramp. A crusher dust surface has been assumed for the greenway; no allowance has been made for property acquisition at the corner of the Holiday Inn Express property.

For the purposes of comparison, a cost estimate was prepared for the previously considered option that included on-street bike lanes between the MLT terminus and Kearney Lake Road. Assuming that on-street bike lanes are installed on Parkland Drive and the greenway connection is made between Kearney Lake Road and the Waterline Trail, it is anticipated that the proposed connection would have an estimated cost in the range of $200,000.

3.3 Waterline Trail Extension across Larry Uteck Boulevard

The Phase 1 report recommended extension of the Waterline Trail north to Larry Uteck Boulevard via an off-street connection running along the east side of Highway 102, extending up to the existing crosswalk at the intersection of Larry Uteck Boulevard and the Highway 102 northbound exit ramp. The proposed connection provides direct connectivity and is preferred to a more circuitous on-street route through adjacent streets and/or developments. The proposed alignment is illustrated in Figure 3-3.

Functional design sketches for the proposed extension are provided on Sheets 6 and 7 in Appendix A. Key functional design issues are discussed in the following sections:

Figure 3-3: Recommended Alignment Option: Waterline Trail Connection to Larry Uteck Greenway

3.3.1 *Existing Waterline Trail Limits to Larry Uteck Boulevard*

The southernmost section – between the Waterline Trail and the Highway 102 exit ramp – consists of rocky terrain with moderate slopes with no watercourses or wetlands; it is expected that one culvert would be required to provide proper surface drainage. The alignment is elevated several meters above the highway so a railing or fencing will be required along one side of the greenway for safety.

The section of the alignment between the highway exit ramp and commercial area has fairly level terrain and would require the removal / relocation of several trees and possible relocation of utility pole guy wires and a fire hydrant. It is recommended that a sidewalk be added along the south side of Larry Uteck Boulevard to provide connectivity between the greenway and the existing asphalt multi-use path along Peakview Way. Additional connections between the greenway and the Peakview Way commercial area are also indicated on the functional plans.

Looking north along the Highway 102 northbound Exit Ramp

Looking south between the commercial and the Highway 102 northbound Exit Ramp

Crosswalk at Highway 102 northbound Ramp @ Larry Uteck Boulevard

3.3.2 *Preliminary Cost Estimate*

A Class D high level cost estimate for the connection between the Waterline Trail and Larry Uteck AT Greenway has been prepared based on quantities calculated from the functional design drawings. As shown in the breakdown provided in Appendix A, it is anticipated that the proposed connection would have an estimated cost in the range of $250,000 to $350,000.

This estimate is based on a crusher dust greenway surface and no allowance has been made for potential connections to the existing commercial development off of Peakview Way.

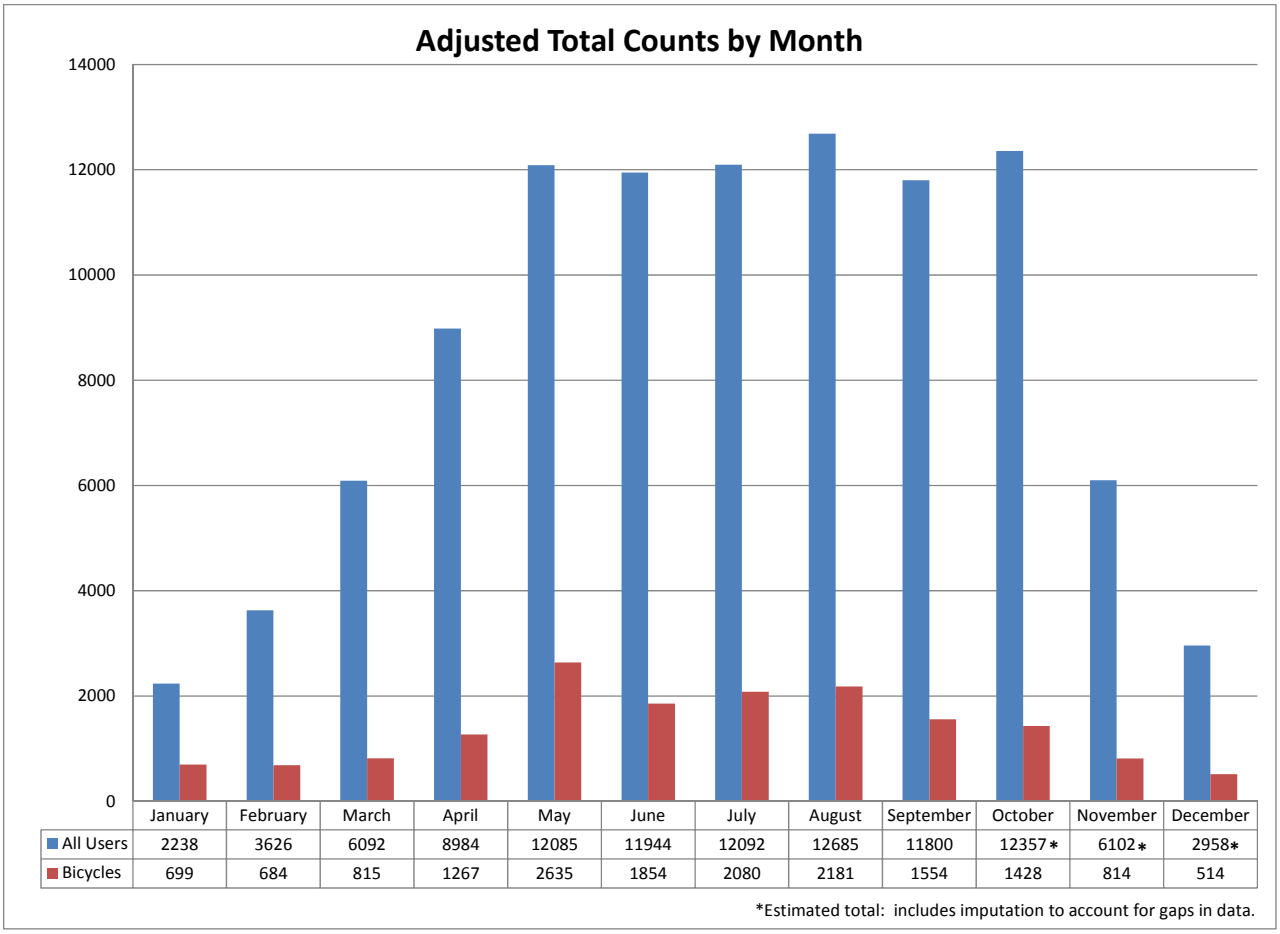
4.0 Mainland Linear Trail: Existing Conditions

The existing Mainland Linear Trail (MLT) is an approximately 4.5km dedicated active transportation (AT) greenway that runs north-south between the Mount Royale subdivision and Parkland Avenue (just south of Kearney Lake Road). An important component of this functional planning study is a review of the existing Mainland Linear Trail (MLT) in terms of neighbourhood connections and amenities, and recommendation of proposed improvements to enhance the facility.

4.1 Overview

The MLT is a dedicated AT greenway that permits access to all non-motorized modes of transportation. One of the region's busiest AT facilities, it accommodates in excess of 100,000 trips per year. The MLT is very popular in terms of both recreational and utilitarian purposes.

The facility is maintained year-round, including snow removal during the winter months. User counts completed during 2013-14[3] indicated there is fairly significant seasonal variation in use. Between May and April, monthly volumes were consistently in the range of 12,000; sharp drop-offs were evident between November and March, with monthly volumes ranging between 2,000 and 6,000. This seasonal variation, which reflects the influence of winter conditions on trail use, is quite typical of similar AT facilities in HRM.



	January	February	March	April	May	June	July	August	September	October	November	December
All Users	2238	3626	6092	8984	12085	11944	12092	12685	11800	12357*	6102*	2958*
Bicycles	699	684	815	1267	2635	1854	2080	2181	1554	1428	814	514

*Estimated total: includes imputation to account for gaps in data.

[3] *2013-2014 Trail Use Monitoring: Final Report* (WSP, 2014)

4.1.1 *Design Standard*

The MLT has a relatively consistent cross section, surface type / condition, and alignment.

Cross Section

The vast majority of the MLT has a 3-4m wide trail surface.


South of Washmill Lake Drive


South of Westridge Drive

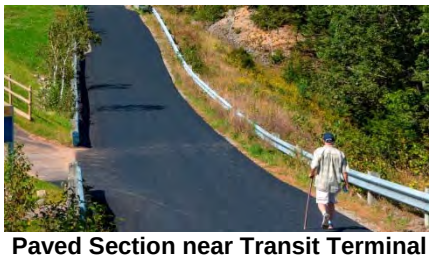

North of Radcliffe Drive

Surface Type

The MLT has a fine crusher dust surface. There are limited locations at which asphalt paving has been installed as a means to reduce erosion and improve user safety/comfort on steep sections. Overall, the existing crusher dust surface is in relatively good condition, though it can be prone to challenges during the winter and spring months.


Winter Conditions


Rutting on Steep Sections


Paved Section near Transit Terminal

Alignment

Having been developed largely along a power corridor, the 'Linear' trail is very straight. The alignment provides a direct connection that is advantageous on relatively flat sections; however, in areas with more varied topography (i.e. north of Langbrae Drive), steep grades result.


Straight, Flat Section


Curvature near Main Avenue


Steep Sections north of Farnham Gate

4.1.2 *Maintenance*

In its role as an AT spine, it is imperative that it remains an attractive option regardless of season. The MLT is maintained year round, including the removal of snow during winter conditions. Aside from periods of extended snow and ice, the trail remains accessible and is reasonably well used all winter. Regular mowing of grass along the corridor and trimming of brush is also completed during warmer seasons.

Although the MLT itself is well maintained, there were concerns associated with maintenance of many access points. During winter, most access points are not cleared of snow, making the MLT less accessible.

4.1.3 *Amenities*

At present, user amenities on the MLT are limited primarily to rest areas, trash receptacles, and trail signage.

Rest Areas

There are several rest areas on the existing MLT, most of which are located at or near trail access points. One to two benches are typically included for seating, though there are some locations at which large boulders provide informal seating that was observed to be in use during site visits. Most rest areas include trash cans, with a limited number including dog waste bag dispensers.

Bench seating north of Westridge Drive

Boulders and bench seating south of Westridge Drive

Trail Signage

There is a relatively limited amount of trail signage on the MLT. Trail branding signs, which help users identify the facility, are located at several major access points. On the MLT itself, signage is limited primarily to regulatory (i.e. dog waste pickup), warning (i.e. intersection approaching), information (i.e. map at Halifax Mainland Common), and facility markers (i.e. signs for intersecting trails).

4.1.4 *Access / Connections*

Adjacent Land Uses

The amount and type of connections between the MLT and adjacent streets and land uses varies considerably along the facility.

- South of Main Avenue: Abutting land uses are primarily residential, including single family dwellings (Mount Royale subdivision) and a growing multi-unit residential area (Washmill Lake Drive).
- Main Avenue to Lacewood Drive: There is a diverse mixture of abutting land uses.
    - The east side of the MLT is primarily residential, including multi-unit apartment buildings and townhome-style condominiums. Further east there are important commercial destinations including the shopping centres on Lacewood Drive.
    - The west side of the MLT through this section includes many key regional destinations including the Mainland Common (trails, dog park, sports fields), Halifax Transit Lacewood Terminal, Canada Games Centre, BMO Soccer Centre, Keshen Goodman Library, and Halifax West High School. Further west is the Bayers Lake Business Park.
- North of Lacewood Drive: Abutting land uses north of Lacewood Drive are primarily residential, the majority of which are single family dwellings. One notable exception is the Park West School, which is located at the MLT's intersection with Langbrae Drive.

Connection Types

Connections along the MLT range from formally designated pathways to informal desire lines. The types of connections are typically dependent on adjacent land use and topography. Connection type is a key determinant in trail accessibility, influencing key factors such as surface type, width, grade, and maintenance requirements (i.e. snow clearing, vegetation cutting).

Formal Connection to Lacewood Transit Terminal

Informal Connection to Residential Building

4.1.5 *Street Crossings*

Street crossings expose users to conflicts with vehicles, and therefore are very important to consider from a safety perspective. There are seven existing street crossings on the MLT; all have unique characteristics (i.e. visibility, traffic volumes, mid-block vs. intersection, distance, traffic control) that distinguish them from each other.

4.2 Review of Existing Connections and Amenities

The following sections provide an inventory and review of existing connections and amenities on the MLT. For the purposes of this review, the MLT has been broken down into the following eight sections:

Section	Length
A. South of Washmill Lake Drive	260m
B. Washmill Lake Drive to Main Avenue	280m
C. Main Avenue to Westridge Drive	510m
D. Westridge Drive to Lacewood Drive	890m
E. Lacewood Drive to Radcliffe Drive	400m
F. Radcliffe Drive to Langbrae Drive	385m
G. Langbrae Drive to Farnham Gate Road	500m
H. Farnham Gate Road to Parkland Drive	1100m

Existing trail connections are illustrated in Figures 4-1 and 4-2.

Figure 4-1: Study Area (Sections A to D)

Figure 4-2: Study Area (Sections E to H)

4.2.1 *Section A: South of Washmill Lake Drive*

The southernmost section of the MLT commences approximately 250m north of the Bicentennial Highway and runs northward – parallel to Dunbrack Street – approximately 260m from the southeast corner of Bently Drive to Washmill Lake Drive. This is the newest section of the MLT, having been constructed in 2014.

With the exception of the approaches to the Washmill Lake Drive intersection, the surface is approximately 3m wide crusher dust in good condition. Overall, there is a gentle uphill grade in the northbound direction throughout this section.

The trail diverges as it approaches Washmill Lake Drive and transitions to an asphalt surface. A 2m wide westerly spur connects to the Washmill Lake Drive sidewalk, while the primary eastern spur leads to the signalized intersection of Washmill Lake Drive and Dunbrack Street

Typical Cross Section: South of Washmill Lake Drive

Connections

At present, there are no formal connections between the trail and adjacent land uses. There is a cleared area between the MLT and Dunbrack Street (directly opposite Rosedale Avenue) that functions as an informal easterly connection to Dunbrack Street. At this midblock location on Dunbrack Street, pedestrian crossing is a safety concern.

#	Connection	Description
A1	**Ramsbrook Court (Potential Connection)**	There is a lack of connectivity between the MLT and the Mount Royale Subdivision. Ramsbrook Court, located at the southeast corner of the Bently Drive loop and near the southern terminus of the MLT, is an ideal location for connection. There are challenges, however, due to lack of available land and presence of a stormwater retention pond.

#	Connection	Description
A2	**Fairview Neighbourhood Connector (Potential Connection)**	To the immediate east of Dunbrack Street, there is an older asphalt trail that runs from Rosedale Avenue to Adelaide Avenue and connects (via sidewalk) to Main Avenue. This provides a potentially valuable connection to Fairview Jr. High School, Fairview Heights School, and the Fairview neighbourhood. It was noted that there has been concern associated with people crossing Dunbrack Street between Rosedale Avenue and the opposite power corridor driveway in order to access the MLT.

Potential Connection to Ramsbrook Court (A1)

Dunbrack Street Pathway (A2)

Amenities

There are currently no public amenities on this section of the trail.

4.2.2 Section B: Washmill Lake Drive to Main Avenue

This section runs approximately 280m between the Washmill Lake Drive – Dunbrack Street intersection and a mid-block crossing at Main Avenue. Multi-unit residential buildings are directly adjacent to the trail on both sides. With the exception of the approaches to the Washmill Lake Drive intersection, the surface is approximately 3m wide crusher dust in relatively good condition.

The trail diverges on the southern approach to Washmill Lake Drive; both spurs are relatively steep and have been paved to improve traction. A 2m wide westerly spur connects to the Washmill Lake Drive sidewalk, while the primary eastern spur leads to the signalized intersection of Washmill Lake Drive and Dunbrack Street. Some shoulder damage was noted in this vicinity, likely caused by vehicles accessing the trail from the west.

Typical Cross Section: Washmill Lake Drive to Main Avenue

Connections

Connectivity to the multi-unit residential buildings on the west side of the trail is limited by the grade separation between the trail and the buildings. Along the first 150m of the east side of the trail there is an evergreen tree buffer and some grade separation; connections are not necessary along this stretch. There are, however, two short sections of parking lot where the tree buffer disappears and surface parking is located close to the trail. At least one of these parking areas may encroach on the trail Right of Way.

#	Connection	Description
B1	**Veronica Drive Residential Buildings (Existing Desire Line)**	Veronica Drive includes three multi-unit residential buildings that run along the entire of the eastern edge of this section of trail. Approximately 170m north of Washmill Lake Drive, there is an informal access into 34 Veronica Drive through the small parking lot that abuts the trail. The trail is at grade with the parking at this location.

Connections to Washmill Lake Drive

Veronica Drive Residential Building (B1)

Amenities

Existing amenities along this section include the following:

- At Washmill Lake Drive, where the trail diverges, there is one large rock providing informal seating.
- Opposite the 34 Veronica Drive informal access point, there is a large rock providing informal seating.
- At the approach to Main Avenue there is one garbage bin and a dog bag dispenser. Three trees have been planted on the east side of trail.

Garbage and Dog Bag Dispenser on Approach to Main Avenue

4.2.3 *Section C: Main Avenue to Westridge Drive*

This section runs approximately 500m between the Main Avenue and Westridge Drive. East of the trail, abutting land uses include a mixture of multi-unit residential buildings and single family homes; the west side is primarily the Mainland Common, though there is a church and water tower just north of Main Avenue. The surface is approximately 3.5m wide crusher dust in

relatively good condition. There is a modest uphill climb from south to north, reaching local high point (LHP) around 50m south of Westridge Drive.

Typical Cross Section: Main Avenue to Westridge Drive

Connections

Existing connections include the following:

#	Connection	Description
C1	**Main Avenue / Washmill Lake Drive Parking Lot with Access to Mainland Common Loop Trail**	There is an existing parking lot just west of the multi-unit residential building at 333 Main Avenue that accesses the Mainland Common Loop Trail. The parking lot is gated and unsigned. It is not readily apparent to potential users that the lot may be used to access the trails.
C2	**Main Avenue Residential Building / Parking Area**	The first 80m of the trail runs alongside a gravel parking lot and multi-unit residential building accessed from Main Avenue; there is a 1m wide gravel path (approximately 20m long) into the rear of the parking lot. It was noted that drainage / runoff issues are apparent.
C3/C4	**Mandaville Court Residential Buildings**	There is a small collection of multi-unit residential buildings accessed from Mandaville Court; there appear to be two existing informal connections. C2 connection is through a gated fence and onto a concrete path through a courtyard area. C3 is a 15m long connection into the rear of the parking lot that was installed by the apartment building.
C5	**Hanover Court**	The Hanover Court development, comprising two storey town house blocks, has around 130m frontage onto the trail. There does not appear to be any obvious desire paths into the development, though individual town house users likely access the trail. There is some ornamental planting in the trail right of way along this section.

#	Connection	Description
C6	**Halifax Water Lands**	This connection runs to the rear of the Trinity Anglican Church. It is a gated, gravel driveway leading west into the Halifax Water facility. At a distance of around 150m, it meets another Mainland Common North path trending north-south. There are several other informal paths into the wooded, Halifax Water lands. At the 210m mark there is a fence line perpendicular to the trail; this could be utilized as a possible trail access control point.
C7	**Mainland Common Loop Path**	This is a signed connection onto the Mainland Common Loop path, a recreational footpath loop that appears to be mulched.
C8	**Westridge Drive**	The Westridge Drive trail is a primary trail connection; it is critical to providing access from the MLT to the Mainland Common in general and, more specifically, to the adjacent off-leash dog park, BMO Soccer Centre (distance of 350m), Thomas Raddall Drive (distance of 450m), and Halifax West High School (distance of 650m). The crusher dust trail is generally 3m wide, level and suitable for winter maintenance. The 350m long trail terminates in the parking lot of the BMO Soccer Centre.

Mandaville Court Residential Building (C3/C4)

Halifax Mainland Common Loop (C7)

Amenities

There is an open lawn area with one bench and multiple large rocks (informal seating / play) located about 40m south of Westridge Drive. This west facing seat has little or no solar shelter.

Amenity Area south of Westridge Drive

4.2.4 *Section D: Westridge Drive to Lacewood Drive*

This section runs approximately 860m between Westridge Drive and Lacewood Drive. East of the trail, abutting land uses include several multi-unit residential buildings as well as Mary Clayton Memorial Park. The west side is primarily the Mainland Common and has many key regional destinations including the Mainland Common (trails, dog park, sports fields), Halifax Transit Lacewood Terminal, Canada Games Centre, BMO Soccer Centre, Keshen Goodman Library, and Halifax West High School. Despite the abundance of key land uses to the west, there are only limited westerly trail connections possible due mainly to grade changes. The surface is approximately 3m wide crusher dust in good condition. Grades through this section are negligible, though there are no obvious drainage issues.

Typical Cross Section: Westridge Drive to Lacewood Drive

Connections

Existing connections include the following:

#	Connection	Description
D1/D2	**Westgrove Place Residential Buildings**	The first 200m abuts a small group of multi-unit residential buildings accessed from Westgrove Place that are generally separated by vegetation from the MLT. There are two existing informal connections into the complex.
D3	**Mary Clayton Memorial Park**	The Mary Clayton Memorial Park connection, which fronts onto the MLT for approximately 200m, is a heavily wooded passive recreational area. There are unsurfaced woodland trails in the park and one clear (but unsurfaced) connection from the MLT. There are also several other informal links as well. Mary Clayton Memorial Park does provide a pedestrian connection to Willett Street. Though there is not an existing crosswalk where at the Park's entrance at Willet Street; there are crosswalks at Westridge Drive (120m to the south) and at Chadwick Place (250m to north). Note that there are sidewalks on Harlington Crescent, which offers an eastward connection through the 'Killam on Harlington' property to a crosswalk on Dunbrack Street which offers a connection to the top of Clayton Park Drive and adjacent recreational facilities.
D4/D5/D6	**Chadwick Place Residential Buildings**	North of Mary Clayton Memorial Park there is a group of multi-unit residential buildings accessed from Chadwick Place and Gristmill Court. There are parking lots along much of this trail frontage; there is 2-3m of horizontal separation from the trail, with rocks used as a barricade. It was noted that vehicles had crossed from the trail into the parking. There are several informal trail connections leading directly into the Gristmill Court parking lots.
D7	**BMO Fieldhouse Trail**	At around the 410m mark, there is an indistinct path running westward, across the Mainland Common, to meet Thomas Raddall Drive. It tracks along the northern edge of the BMO fieldhouse (approximately 220m). Though surrounding grades are steep (as a result of earthworks associated with the adjacent sports facilities), the grade along the path is only moderate. The path runs up a small, natural valley, and alongside some remnant trees. The path forms a good east-west extension of the Mary Clayton Memorial Park paths.
D8	**Canada Games Centre Trail**	Connects at around 600m mark, adjacent to the Gristmill Court development. This is a good quality 3m wide crusher dust trail connection running west a distance of approximately 200m, along the southern edge of the ballfield and leading to the rear of the Canada Games Centre. The connection is not signed to the Canada Games Centre and – due to the changes in grade along the trail – the connectivity is not obvious. Many trail users tend to walk diagonally through the CGC parking lot. There is a 1.5m wide asphalt path running through the parking lot towards Thomas Raddall Drive, but it terminates around 70m short of the street.
D9/D10	**Halifax Transit Lacewood Terminal**	Asphalt connections to the new Transit Terminal that were constructed in 2015. It was noted that the paved surfaces can become slippery during winter due to the surface and slope.

Asphalt Path to Lacewood Transit Terminal (D9/D10)

Path to Mary Clayton Memorial Park (D3)

Mainland Common Connection (D8)

Chadwick Place Residential Building Connection (D6)

Amenities

There is seating area, comprised of 2 benches set at 45 degrees, 380m north of Westridge Drive, on the west side of the MLT. There were previously two benches just south of Lacewood Drive, though it appears they have recently been removed.

Rest Area with Garbage Can North of Westridge Drive

4.2.5 *Section E: Lacewood Drive to Radcliffe Drive*

This section runs approximately 360m between Lacewood Drive and Radcliffe Drive. Just north of Lacewood Drive there are multi-unit residential buildings on both the west and east side of the MLT. Further north, the trail is abutted by residential streets including Essex Lane and Stockleigh Place. The trail climbs gently northward to a local high point at around the 100m mark, and then runs steadily downhill to Radcliffe Drive. Beyond the Essex Lane and Stockleigh Place street connectors the trail passes behind single family homes; it was noted that vegetation is starting to encroach on the clearway. The crusher dust surface is approximately 3m wide and generally in good condition.

Typical Cross Section: Lacewood Drive to Radcliffe Drive

Connections

Existing connections include the following:

#	Connection	Description
E1	**Lacewood Drive Residential Building**	There is an unsurfaced woodland trail which drops down into the parking lot of the adjacent Lacewood Drive apartment block (301 Kinsley Woods).
E2	**Barkton-Warwick Trail**	A 0.5m wide woodland trail that tracks eastward below the power lines approximately 180m, intersecting at the elbow of a 1.8m wide asphalt street connection that runs between the Warwick Lane and Barkton Lane. The trail is narrow and overgrown; grades are generally easy with one short steeper section. These lands are owned by HRM.
E3	**Stockleigh Place Street Connector**	A 1.8m wide asphalt path (within a 3m ROW) with chain link fencing. It extends east from the MLT 40m to connect to Stockleigh Place, a residential cul-de-sac. A sidewalk serves the street entrance and there is a 2m wide curb cut. There is some overgrown ornamental planting in the right of way adjacent to this intersection.
E4	**Radcliffe Drive Residential Building**	The Parkhaven, a multi-unit residential building accessed from Radcliffe Drive, abuts the first 100m on the west side of the MLT; its parking lot sits unscreened, approximately 1m above the trail. There are informal links into the parking lot, though there are no apparent desire paths into the rear of the property.

#	Connection	Description
E5	**Essex Lane Street Connector**	A 1.8m wide asphalt path (within a 3m ROW) with chain link fencing. It extends west from the MLT 50m to connect to Essex Lane, a residential cul-de-sac. A sidewalk serves the street entrance and there is a 2m wide curb cut.

Radcliffe Drive Residential Building Connection (E4)

Essex Lane Street Connector (E5)

Barkton-Warwick Trail (E2)

Amenities

There is a single bench set in a small open grass area just south of Radcliffe Drive.

Bench just south of Radcliffe Drive

4.2.6 *Section F: Radcliffe Drive to Langbrae Drive*

This section runs approximately 490m between Radcliffe Drive and Langbrae Drive. Abutting land uses on the west side include Park West School, a sports field, and a wooded area. The east side is abuts a multi-unit residential building (just north of Radcliffe Drive), two residential cul-de-sacs (Brackley Place and Thackeray Close), and a park / wooded area. It was noted that vegetation is starting to encroach on the clearway. The crusher dust surface is approximately 3m wide and generally in good condition.

Typical Cross Section: Radcliffe Drive to Langbrae Drive

Connections

Existing connections include the following:

#	Connection	Description
F1	**Radcliffe Drive Residential Building**	A multi-unit residential building (159 Radcliffe Drive) accessed from Radcliffe Drive abuts the first 100m on the east side of the MLT. At the 30m mark, there is a desire path into the adjacent parking lot. Grade separation increases further north, making direct access challenging.
F2	**Brackley Place / Thackeray Close Street Connector**	A 1.5m wide asphalt path (within a 3m ROW) with chain link fencing. It extends east from the MLT 35m before splitting to serve residential cul-de-sacs including Brackley Place (to south) and Thackeray Close (to the north). Sidewalk is present on Brackley Place, but not on Thackeray Close.
F3	**Turnmill Drive Woodland Trail**	A woodland trail that extends east from the MLT approximately 170m to connect to Turnmill Drive. The trail connects with the MLT at the Park West School drop-off loop, close to the School's main doors. The trail, which is located on HRM-owned lands, is steep and rocky and passes through a small playground. Vegetation has become overgrown in many places.
F4	**Park West School Sports Field**	There are three short sections of crusher dust path leading off the MLT to access the sports field (160m, 220m, and 280m north of Radcliffe Drive, respectively). A 180m connection to Lanshaw Close is present from the southwest corner of the sports field.

#	Connection	Description
F5	**Park West School Connection**	Short trail connection providing access to the sidewalk that extends around the school drop off loop. The drop-off loop sits slightly above the trail and the unsurfaced path is relatively poor quality and steep. The very northern section of this trail, adjacent to the school drop off and playground, feels too wide and open. The trail is offset to the west of the power lines and there are no trees under the power lines. Only a shallow swale separates the trail from the playground.

Turnmill Drive Woodland Trail (F3)

Park West School Connection (F5)

Park West School Sports Field Connection (F4)

Amenities

There are currently no public amenities on this section of the trail.

4.2.7 Section G: Langbrae Drive to Farnham Gate Road

This section runs approximately 410m between Langbrae Drive and Farnham Gate Road. The west side is abutted by residential cul-de-sacs including Parkmount Close and Glenbourne Court. The east side abuts a residential street (Roxbury Crescent) and several multi-unit residential buildings closer to Farnham Gate Drive. There is a steady uphill grade between Langbrae Drive and the street connector to Parkmount Close. The crusher dust surface is approximately 3m wide and generally in good condition.

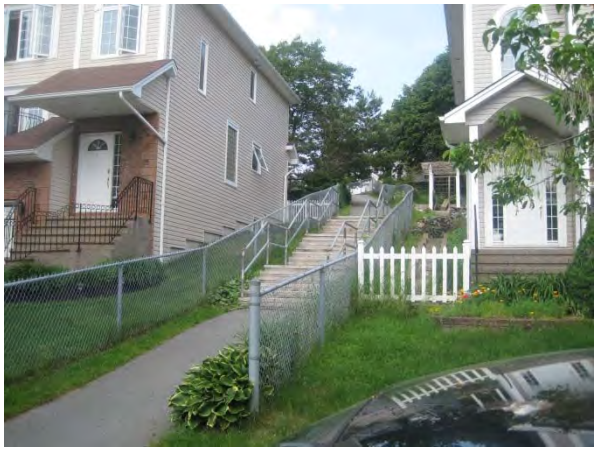
Typical Cross Section: Langbrae Drive to Farnham Gate Drive

Connections

Existing connections include the following:

#	Connection	Description
G1/G2	**Montgomery Court Trail**	There are two crusher dust trail links that join and connect to the Montgomery Court cul-de-sac (approximately 140m). The southernmost trail (G1) is 150m north of Langbrae Drive, and consists of a 1m wide path through dense woodland that continues through an HRM-owned playground. The northernmost trail (G2) is 50m north of G1, and includes a 0.6m wide path that – despite limited width – is the more open of the two trails. There are shrubs along its north side.
G3	**Montgomery Court Residential Building**	An informal desire path that links into the parking lot of the adjacent multi-unit residential building at 35 Montgomery Court, it is located 200m north of Langbrae Drive.
G4	**Parkmount Close Street Connector**	A 2.4m wide asphalt path (within a 4m ROW) with chain link fencing. It extends east from the MLT 35m west to Parkmount Close, a residential cul-de-sac. Sidewalk is present on Parkmount Close.
G5	**Glenbourne Court Street Connector**	A 2.4m wide asphalt path (within a 4m ROW) with chain link fencing. It extends east from the MLT 30m west to Glenbourne Court, a residential cul-de-sac. Sidewalk is present on Glenbourne Court. Across the cul-de-sac bulb there is a westerly connection down to Red Fern Terrace (via a path with steps) and, from there, on to Belchers Marsh, which includes a pond that is surrounded by trails.

Asphalt Path to Parkmount Close (G4)



Connection with Steps to Red Fern Terrace (G5)

Montgomery Court Residential Building (G3)

Montgomery Court Trail (G1/G2)

Amenities

There is a seating area 25m north of Langbrae Drive below the power lines; one bench sits on the east side of the MLT in an open grass area that extends down to Langbrae Drive.

There is also a seating area approximately 10m south of Farnham Gate Road that includes one bench and a garbage barrel on the east side of the MLT below a small rock outcrop.

4.2.8 *Section H: Farnham Gate Road to Parkland Drive*

This section runs approximately 1050m between Farnham Gate Road and the MLT northern terminus at Parkland Drive. The west side is abutted by several residential streets, as well as the Glenbourne Sports Field and Bike Facility. The east side abuts residential streets but is buffered by wooded areas along most of its length. The grade descends steadily northward from Farnham Gate Road to a local low point near Heathside Crescent. It then climbs to reach a local high point near Gorsebud Park, descending again to Parkland Drive. The crusher dust surface is approximately 3m wide and generally in good condition, though there were some areas of rutting caused by runoff.

Typical Cross Section: Farnham Gate Drive to Parkland Drive

Connections

Existing connections include the following:

#	Connection	Description
H1	**Attenborough Court Woodland Trail Link**	A 1m wide gravel/crusher dust woodland trail link that extends east approximately 190m to connect to Attenborough Court, a residential cul-de-sac. There is also a short spur that connects it to the Remington Court woodland trail link (H2). This path runs through HRM property and has gentle grades.
H2	**Remington Court Woodland Trail Link**	A 1m wide gravel/crusher dust woodland trail link that extends east approximately 140m to connect to Remington Court, a residential cul-de-sac. There is a sidewalk on Remington Court and a 3m wide curb cut. Amenities at the Remington trail head include a bench, garbage can, and local mailboxes. This path runs through HRM property and has gentle grades. Across the Remington Court cul-de-sac bulb, a 1m wide crusher dust trail continues, through a playground and on to Oakley Avenue (approximately 180m). The Park trail is gated.
H3	**Beechwood Terrace Street Connector**	A 1.8m wide asphalt path (within a 10m ROW) with chain link fencing, it extends east approximately 90m to Beechwood Terrace and Edward Laurie Drive. There is a dogleg located close to the street and a utility pole reduces clearance to 2.4m. There are no sidewalks on these two streets. There are no amenities but there is a MLT sign posted.
H4	**Scotch Pine Terrace Street Connector**	A 1.8m wide asphalt path (within a 4m ROW) with chain link fencing. It extends west from the MLT 45m to Scotch Pine Terrace, a residential street. Sidewalk is present on Scotch Pine Terrace. Adjacent private planting slightly obscures the link.
H5	**Moss Court Street Connector**	A 1.8m wide asphalt path (within a 4m ROW) with chain link fencing. It extends west from the MLT 40m to Moss Court, a residential cul-de-sac. Sidewalk is present on Moss Court. There is a garbage bin at the trail end.

#	Connection	Description
H6	**Heathside Crescent Street Connector**	A 1.5m wide asphalt path (within a 5m ROW) with chain link fencing. It extends west from the MLT 45m to Heathside Crescent, a residential street. Sidewalk is present on Heathside Crescent. Dense ornamental planting on south side obscures link from the street.
H7	**Gorsebud Close Street Connector**	A curved 1.8m wide asphalt path (within a 3m ROW) with chain link fencing. It extends west from the MLT 50m to Gorsebud Close, a residential cul-de-sac. Sidewalk is present on Scotch Pine Terrace. There is a mail box in the ROW at the street end and a garbage bin at the trail end. Adjacent street tree(s) slightly obscure the link.
H8	**Glenbourne Park Woodland Trail**	A narrow informal woodland path that winds up a treed slope from the MLT to the former ball field. Terrain may limit the potential or any upgrades to this connection.
H9	**Glenbourne Park Connector Path**	A 1m wide gravel path that extends 40m west from the MLT to Glenbourne Community Park playing fields, ballpark, and dog park.
H10	**Parkland Drive**	The MLT's northern terminus is at Parkland Drive. Parkland Drive has sidewalks on both sides of the street. There is a small amenity area that includes a bench and garbage can. Parkland Drive is relatively wide at this location and can accommodate on-street parking on both sides of the street; as a result, it can serve as a key access point for those who park and use the trail.

Scotch Pine Terrace Street Connector (H4)

Gorsebud Close Street Connector (H7)

Remington Court Woodland Trail Link (H2)

Amenities

User amenities along this section include the following:

- A seating area that includes two benches set at 45 degrees, located approximately 820m north of Farnham Gate Road close to the local high point.
- A single bench approximately 30m south of the Parkland Drive trail entrance.
- There are garbage bins located at street connector intersections including Moss Court and Gorsebud Close.

Seating Area with Garbage Can

4.3 Street Crossings

There are seven street crossings along the MLT, as summarized in Table 4-1. The following sections summarize existing conditions at each of the crossings.

Table 4-1: Street Crossing Locations

Intersection	Crossing Control
1. Washmill Lake Drive	Crosswalk at traffic signal
2. Main Avenue	N/A
3. Westridge Drive	Signed trail crossing
4. Lacewood Drive	Marked / signed crosswalk with flashing beacons
5. Radcliffe Drive	Marked / signed crosswalk
6. Langbrae Drive	Marked / signed crosswalk
7. Farnham Gate Road	Marked / signed crosswalk

4.3.1 *Washmill Lake Drive*

The MLT crosses Washmill Lake Drive at the Washmill Lake Drive – Dunbrack Street signalized intersection. Trail users must use the crosswalks on the channelized right turn lanes as well as the signalized crosswalk on the Washmill Lake Drive eastbound approach.

This is the only street crossing on the MLT that occurs at a signalized intersection.

Washmill Lake Drive Crossing

4.3.2 *Main Avenue*

The Main Avenue crossing is located mid-block, approximately 120m east of the Main Avenue intersection at Washmill Lake Drive. Main Avenue is a 2-lane collector street with moderate traffic volumes. Sightlines on the approaches appear to be adequate; however, the Main Avenue eastbound approach has a sharp horizontal curve immediately upstream and a downhill grade that could result in higher vehicle speeds. It was indicated that previous requests to the Municipality for the installation of a marked crosswalk were denied as existing traffic volumes and crossing demand do not meet crosswalk warrants.

Main Avenue Crossing

Main Avenue Crossing

4.3.3 *Westridge Drive*

The Westridge Drive crossing is located at western limit of Westridge Drive where it meets the parking lot driveway for the Mainland Common Dog Park and softball field. Westridge Drive is a 2-lane local street with relatively low traffic volumes.

The intersection of Westridge Drive with the trail is very open and poorly defined. There are no curbs on the street in the vicinity of the intersection and street crossing is extremely wide (>15m).

There is presently not a signed / marked crosswalk in place; however, there are advance warning signs indicating the upcoming crossing on both the trail and street. Traffic on Westridge Drive is directed to 'yield to trail users'.

The Westridge Drive approach appears adequate in terms of visibility and grade; however, the parking lot driveway has a skewed approach angle and is on a relatively steep downslope.

Approaching the Westridge Drive Crossing

4.3.4 *Lacewood Drive*

The MLT crosses Lacewood Drive at mid-block, approximately 100m east of the Lacewood Drive intersection with Radcliffe Drive. Lacewood Drive is a 4-lane arterial street that accommodates relatively heavy traffic volumes.

The existing crossing is an RA-5 crosswalk, appropriately signed / marked and equipped with pedestrian activated flashing beacons. There are curb cuts in place for trail users, and a concrete center median that provides a refuge area for trail users. Crosswalk flags were installed at the intersection in early 2016.

Lacewood Drive Crossing

4.3.5 *Radcliffe Drive*

Radcliffe Drive is a 2-lane collector street with moderate traffic volumes. The MLT crosses Radcliffe Drive at a mid-block crosswalk; the crossing distance is approximately 13m. There is some horizontal curvature on the Radcliffe Drive eastbound approach, but sightlines appear to be adequate.

The existing crossing includes standard RA-4 crosswalk signs and pavement markings. Trail stop signs are provided on both trail approaches. There are curb cuts in place for trail users. Crosswalk flags were installed at the intersection in early 2016. Trail identification signs were not apparent on either approach.

Radcliffe Drive Crossing

4.3.6 *Langbrae Drive*

Langbrae Drive is a 2-lane collector street with moderate traffic volumes. The MLT crosses Langbrae Drive at a mid-block crosswalk approximately halfway between Parkland Drive and Dunbrack Street; the crossing distance is approximately 13m. Both street approaches are relatively flat and straight, and sightlines appear to be good.

There are "No Stopping (Mon.-Fri. 8AM-4PM)" signs on both Langbrae Drive approaches. The crosswalk is monitored by school crossing guards during the AM and PM peak periods on school days.

The existing crossing includes standard RA-4 crosswalk signs and pavement markings. Trail stop signs are provided on both trail approaches. There are curb cuts in place for trail users.

Langbrae Drive Crossing

4.3.7 *Farnham Gate Drive*

Farnham Gate Drive is a 2-lane collector street with moderate traffic volumes. The MLT crosses Farnham Gate Drive at a mid-block crosswalk approximately halfway between Parkland Drive and Dunbrack Street; the crossing distance is approximately 13m. The Farnham Gate westbound approach is on a horizontal curve and has a moderately steep downgrade, which could reduce sight distance and increase vehicle speeds.

On-street parking is not permitted on either Farnham Gate Drive approach.

The existing crossing includes standard RA-4 crosswalk signs and pavement markings. Trail stop signs are provided on both trail approaches. There are curb cuts in place for trail users.

Trail identification signs were not apparent on either approach.

Farnham Gate Drive Crossing

5.0 Recommendations

5.1 Greenway Extension Options

The following recommendations consider the findings of both the Phase #1 Report – which reviewed several options for extending the Mainland Linear Trail – as well as the further review considered as part of this Functional Plan.

5.1.1 *Chain of Lakes Trail Extension*

Section 3.1 summarizes the assessment / functional design for an extension of the MLT south to the Chain of Lakes Trail via a new dedicated bridge over Highway 102 and a greenway alignment through Halifax Water lands. This option would have considerable benefits for AT, providing a direct connection separated from traffic. However, the Highway 102 AT bridge was estimated to be very expensive (at least $1.2M), and its implementation would be complicated by presently uncertain plans with regard to the future widening of the highway corridor. The remaining portion of this connection, which would skirt Halifax Water's lands just west of Northwest Arm Drive, is expected to be a viable connection.

Discussions with NSTIR during this project have indicated that the Province is planning to replace the Highway 102 – Northwest Arm Drive interchange in the short- to medium term. Though timelines remain uncertain at this point, the considerable opportunity that this presents must be considered. Incorporating a dedicated AT crossing into the design of the new overpass structure is expected to be more cost effective than a new AT bridge crossing west of the interchange, and less subject to uncertainty with respect to future highway widening.

5.1.2 *Waterline Trail Extension across Kearney Lake Road*

Section 3.2 summarizes the assessment / functional design of a proposed connection between the MLT and the Waterline Trail across Kearney Lake Road. The option that was investigated included a connection along the east side of Parkland Drive between the MLT terminus and Kearney Lake Road, crossing at the signalized intersection, and extending along the northeast quadrant of the Highway 102 interchange, ultimately connecting to the Waterline Trail.

The option considered would provide a continuous separated extension of the MLT; however, does have notable challenges. Widening of the sidewalk on Parkland Drive would increase it to an ideal greenway width (4m), but would also impact several trees, utility poles, and hydrants. Given that there are viable alternative options (on-street bike lanes, shared sidewalk), sidewalk widening is not considered to be warranted at this time. On the north side of Kearney Lake Road, greenway construction would be constrained by steep terrain, land constraints, and the presence of a large water main.

5.1.3 *Waterline Trail Extension across Larry Uteck Boulevard*

Section 3.3 summarizes the assessment / functional design of a proposed connection between the northern limit of the Waterline Trail and Larry Uteck Boulevard. The proposed off-street connection runs along the east side of Highway 102, extending up to the existing crosswalk at the intersection of Larry Uteck Boulevard and the Highway 102 northbound exit ramp. The proposed connection provides the most direct route, and has good vertical and horizontal separation from highway traffic.

The following recommendations are related to extensions to the Mainland Linear Trail:

	Recommendation	Priority	Cost
R1	**It is recommended that the Chain of Lakes Trail extension be implemented along Halifax Water lands, with a new dedicated crossing of Highway 102 incorporated into the future Highway 102 – Northwest Arm Drive interchange.** Unfortunately, the route cannot be completed until the new Northwest Arm Drive structure is completed. In the interim, HRM should work closely with NSTIR to ensure that the new interchange design considers this important connection.	**High**	**$750,000 - $1,250,000[1]**
R2	**It is recommended that the Waterline Trail extension across Kearney Lake Road be implemented, including the following components (these upgrades should coincide with formal adoption of the Waterline Trail as an official greenway facility):** i. Existing MLT Limits to Kearney Lake Road: Install on-street bike lanes on Parkland Drive between the MLT and Kearney Lake Road. The existing cross section in approximately 13m, and can accommodate ideal 1.8m bike lanes and optional 1.0m buffer areas. **ii.** Kearney Lake Road to Waterline Trail: Construct a new greenway connection running along the north side of Kearney Lake Road and along the east side of Highway 102. This connection will require cooperation with NSTIR and Halifax Water, and challenging terrain will constrain the design and result in increased construction costs.	**High**	**$150,000 - $200,000**
R3	**It is recommended that the Waterline Trail extension to Larry Uteck Boulevard be implemented (this upgrade should coincide with formal adoption of the Waterline Trail as an official greenway facility).**	**High**	**$275,000- $325,000**
Notes:			
1.	**Approximate cost for greenway construction on either side of Highway 102. Bridge costs are not included due to uncertainty associated with the future Highway 102 – Northwest Arm Drive interchange.**		

5.2 Enhancement of the Existing Mainland Linear Trail

Recommendations related to the existing Mainland Linear Trail are provided in the following sections. Section 5.2.1 provides general recommendations, Section 5.2.2 is related to trail

crossings, and Sections 5.2.3 to 5.2.10 consider more specific recommendations for trail connections and amenities for each trail segment.

5.2.1 *General Recommendations*

Trail Signage

Trail signage is an important tool used to inform users of many aspects of the facility. Examples of trail signage types include:

Warning Signage	 WA-14	Signs that provide warning of potential hazards such as upcoming street crossings and abrupt alignment changes.
Regulatory Signage	 RB-87	Signs that indicate the applicable rules and regulations. For example, user restrictions, pet waste pickup, etc.
Wayfinding Signage		Signs that indicate the name of the facility or a particular location, provide information to users on the distance and direction to key destinations and amenities, and identify where they need to change course.
Distance Markers		Signs that indicate the distance traveled from a particular location. They can help users maintain an understanding of their current location.

Interpretive Signage		Signs that provides information that describes a special aspect of an area.

The following recommendations related to trail signage should be considered:

Recommendation			Priority	Cost
R4	**Directional Wayfinding Signage: Install directional signage along the MLT to indicate distance to key destinations including municipal facilities (i.e. transit terminal, Canada Games Centre, library), schools, and other AT facilities.** Coordination with HRM should be completed to ensure that signage elements (style, size, etc.) are consistent with HRM wide standards. Placement should be based on a detailed review that considers key destinations and gateways in the Study Area.		**Medium-High**	**$ (per sign)**
R5	**Trail Identification Signage**: **Install Mainland Linear Trail identification signage on all trail approaches at street crossings and major trail intersections.**		**High**	**$ (per sign)**
R6	**Connection Identification Signage: Install identification signage for key connections to the trail.** For example, signage placed on the trail that indicates the name of street(s) accessed by a particular connection would improve wayfinding.		**Medium**	**$ (per sign)**

Recommendation			Priority	Cost
R7	**Trail Distance Markers: Install distance markers along the MLT, marked in 0.5m-1.0km intervals.** Given the length of the trail, the many access points, the fact that most users likely do not travel the length of the trail, placement of the origin of the distance markers (i.e. the zero km mark) is less obvious than for most linear trails. It is suggested that consideration be given to either of the following: ➢ Place origin at Parkland Drive and mark at 0.5km or 1.0km intervals the entire length of the MLT in one direction; ➢ Place origin at a central location (i.e. Lacewood Drive) and mark at 0.5km or 1.0km intervals extending north and south from the origin, with indication of the direction (north or south).		**Medium**	**$ (per sign)**
R8	**Trail Warning Signage: Install warning signage for connections with special visibility or alignment constraints.** Key examples include street connectors that connect to steep slopes (i.e. north of Farnham Gate Drive) – signage could be installed on the trail to indicate the upcoming intersection and on the connection approach to warn of fast moving bicycles.		**Medium**	**$ (per sign)**
R9	**Interpretive Signage: Review opportunities to install interpretive signage.**		**Low**	**$**
R10	**Regulatory Signage: Consider additional regulatory signage to discourage dumping of organic waste.**		**Medium**	**$**

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$$ < Projects in the range between approximately $5,000 and $20,000.
$$$ < Projects in the range between approximately $20,000 and $50,000
$$$$ > Large projects expected to exceed a cost of approximately $50,0

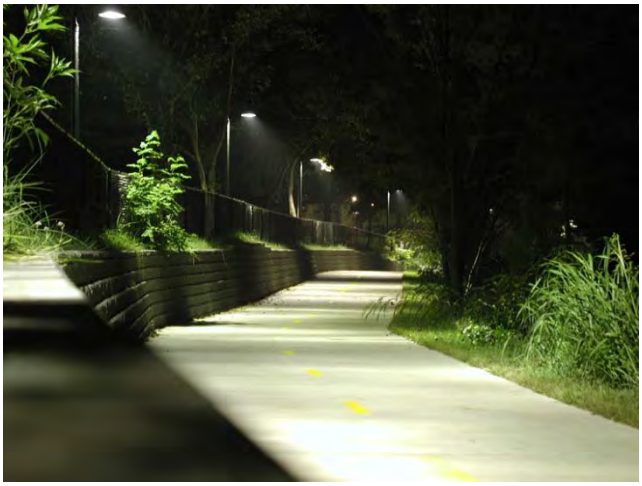
Trail Lighting

Lighting is an important safety feature on trails that improves operational safety (i.e. hazard avoidance) and personal security. Trail lighting can extend usable hours of the facility, which is particularly beneficial during fall and winter months when daylight is limited.

Trail lighting is expensive to install, operate, and maintain, and can result in undesirable effects such as unwanted light pollution in residential areas. As a result, its installation is typically limited to areas of particularly high use.

Trail lighting was among the most popular amenities discussed by the public for consideration on the MLT. Several attendees expressed that darkness is the primary factor that hinders their use of the facility during the winter months, which in turn limits their ability to access the transit terminal and other key destinations.

Burnside Drive Greenway (Dartmouth, NS)



Scull Creek Trail (Fayetteville, AK)
[Source: www.fayetteville-ar.gov/]

Recommendation		Priority	Cost
R11	**It is recommended that a feasibility review be completed that provides an analysis of the infrastructure, costs, and other impacts associated with installation trail lighting in the areas immediately surrounding the Mainland Common.**	**High**	**Approx. $5,000**

Trail Surface

Surface type is one of the most important aspects of a trail. Surface type can vary considerably depending on the type of trail, ranging from bare forest floor on woodland trails to asphalt / concrete pavement on urban greenways. Though the majority of trails in HRM – including the MLT – have a crusher dust surface, the installation of asphalt pavement surfaces is growing in popularity. There are a variety of advantages and disadvantages associated with both paved and unpaved surfaces, some of which are summarized below.

	Crusher Dust / Gravel Surface	Asphalt Pavement Surface
		
Advantages	• Comfortable, softer surface for running and walking • More conducive to "natural" environment • Reduced construction costs	• Significantly enhanced surface for many users including cyclists, pedestrians with strollers, rollerbladers, and wheelchair users o Smoother and more consistent o Improved ability to climb steep sections • Winter maintenance is significantly improved • Reduced ongoing repairs and maintenance due to improved durability and drainage
Disadvantages	• Reduced winter accessibility • Susceptible to damage from water drainage (erosion, washouts) • Less durable and can show wear in high use areas • Can be challenging for wheeled users (i.e. cyclists, pedestrians with strollers, rollerbladers, and wheelchair users), particularly on hills • Reduced stability for walkers and runners	• Harder surface can be less comfortable for walkers and runners • Impervious surface • Can encourage higher cycling speeds • Increased construction costs • May be less aesthetically pleasing to users seeking a more "natural" experience

The MLT's crusher dust surface remains in useable condition for a good portion of the year, owing to regular maintenance. However, there are times when the trail surface becomes nearly unusable due to ice / snow buildup and softening during spring melt and prolonged wet weather. These conditions would be mostly avoidable with a hard asphalt pavement surface.

The majority of public feedback received indicated a preference to retain the existing crusher dust surface (except for in areas prone to drainage issues). Given that the MLT is currently used primarily for recreational and pleasure uses, this is not unexpected.

Alternatives to the resurfacing the entire MLT with pavement may include the following:

- Consider retaining a gravel portion of the trail alongside the paved section where width allows.
- Prioritize asphalt resurfacing for trail sections in the vicinity of key destinations.

3m Asphalt Surface with 1m Gravel Shoulders
Lindale Trail (Cedar Rapids, IA)
[Source: linncountytrails.org]

3m Asphalt Surface Greenway
Highfield Park Drive (Dartmouth, NS)

Recommendation		Priority	Cost
R12	**It is recommended that consideration be given to resurfacing the MLT with asphalt pavement:** The MLT has been identified as a key greenway asset in HRM's Active Transportation Priorities Plan, and given the relatively high population density surrounding its alignment and its connectivity with important regional destinations, there is exceptional potential for the attraction of active modes for utilitarian purposes both within and outside of the immediate area. It is expected that a paved surface will open up the MLT to a wider range of users, attracted by the exceptional maintenance standard and improved functionality for wheeled uses (i.e. cycling, strollers).	**High**	**$150,000-$200,000 (per kilometer)**

Gateway Features

Gateways formally identify access points to a trail, and can include elements ranging from signage and maps to amenities and rest areas. They can play an important role in improving user experience.

One of the MLT's best assets is its continuous and linear alignment. Though this is highly advantageous from an AT perspective, it does present more challenges for the establishment of gateways than – for example – a loop trail. There are numerous places at which users access the trail, and the amount of distance / time that each user spends on the trail is dependent on their particular origin and destination. Since it would be impractical to add gateways at all trail access locations, prioritization is necessary.

	Recommendation	Priority	Cost
R13	It is recommended that a simple, consistent gateway treatment be considered for installation at major trail entrances and roadway crossings to improve branding and awareness of the trail. A proposed gateway concept, illustrated in Figure 5-1, includes the following elements: • Post / rail fencing system running perpendicular to the trail. Suggested configuration includes: - Main gatepost: 8" x 8" x 8' pressure treated post with affixed MLT branding sign. - Secondary gatepost: 8" x 8" x 5' pressure treated post - Fence posts: 6" x 6" x 4' pressure treated posts. First post offset 18" from gateposts, and typical posts set at 6' on centre. - Rails: 2" x 6" pressure treated rails lagged to fence posts. • Seating area: Set back 15-30' from gateway, including: - One 6' bench - Garbage bin - Planting of deciduous trees (3 suggested as typical). - A minimum 3m grass clear zone along both sides of the seating area. Specific locations recommended for gateway improvements are described for each trail section in Sections 5.2.3 to 5.2.10.	**Medium**	**<$5000 per location**

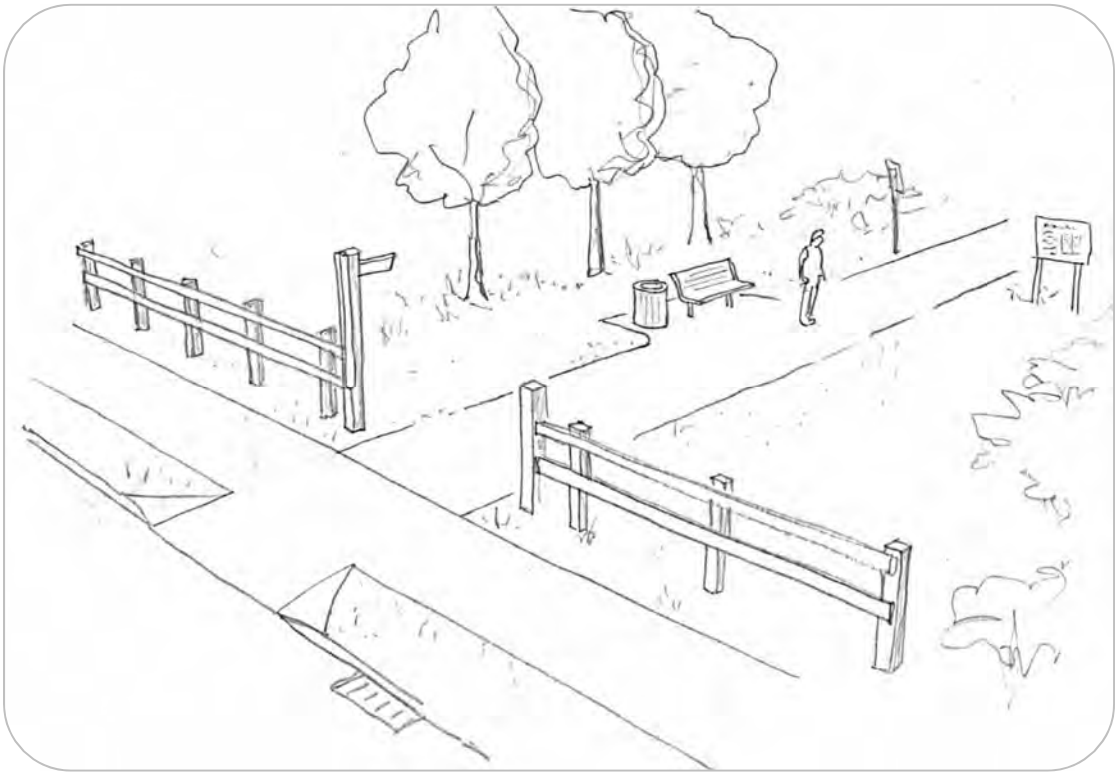


Figure 5-1: Gateway Concept for Street Crossing Locations

5.2.2 *Street Crossings*

Locations at which the AT facilities intersect with public streets are the most critical parts of the facility in terms of user safety. It is important that both trail users and motorists are considered in determining the appropriate mechanisms for facilitating street crossings.

Traffic control is a critical aspect of street crossings that determines the manner in which crossings are completed. The type of traffic control in place (if any) is typically determined based on methods prescribed in the Transportation Association of Canada (TAC) *Pedestrian Traffic Control Guide* (2012), which considers several factors, most notably the relationship between pedestrian crossing volumes and vehicular volumes. The implications of traffic control type on trail crossing operation include:

- Designated Crosswalk: In locations where designated (marked / signed) crosswalks are present, motorists on the street are obligated to yield the right-of-way to trail users. Cyclists must dismount while crossing.

- No Crosswalk Present: In locations that are not designated crosswalks, trail users are not afforded the right-of-way and must wait for an acceptable gap to cross. Cyclists are not required to dismount while crossing.

- Trail Crossing: The TAC *Bikeway Traffic Control Guidelines for Canada* (2012) includes designated trail crossing warning signage as well as pavement markings (crosswalk lines supplemented with “Elephant’s Feet” markings that signify that bicycles may cross) that may installed on trail crossings (See Figure 5-2). Depending on a jurisdiction’s Motor Vehicle Act (MVA), these trail crossings may provide right-of-way to the trail users and permit cyclists to cross without dismounting. Though these types of trail crossings have been installed in other parts of Canada, Nova Scotia’s MVA does not currently permit their installation. The advance trail crossing warning signage may be installed; however, does not assign priority to pedestrians and cyclists unless a designated crosswalk is in place.

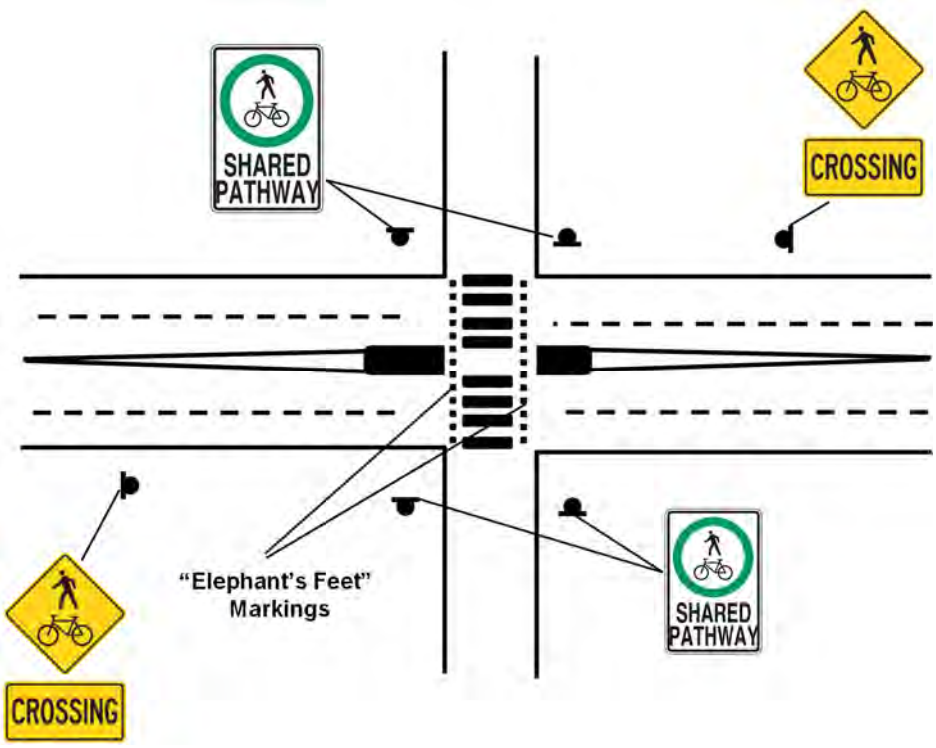
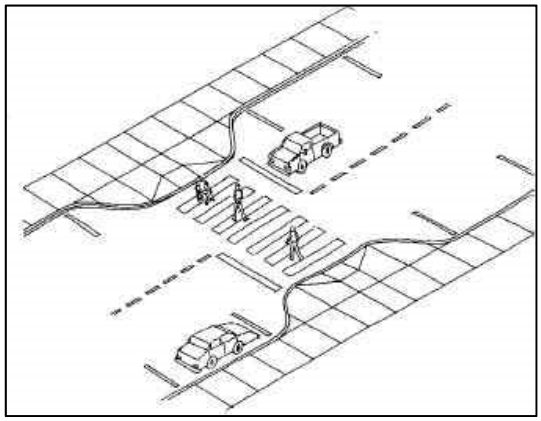


Figure 5-2: Trail Crossing Configuration
Source: *TAC Bikeway Traffic Control Guidelines* (2012) – Figure 40

Pedestrian and Bicycle Crossing Ahead' sign (WC-47) and 'Crossing' tab (WC-7S)

Shared Pathway' sign (RB-93)

- Curb extensions (also commonly referred to as 'bulb-outs' or 'bump-outs') are treatments that introduce physical narrowing of a street at intersections, in many cases improving functionality, safety, and aesthetics. Key benefits include reduction in pedestrian crossing distance, improved pedestrian visibility, lower vehicle speeds, and improved delineation of on-street parking.



Curb extensions at mid-block street crossing
***Source: Designing Sidewalks and Trails for Access* (FHWA, 2006)**

Recommendations related to trail connections for this section are summarized in Table 5-1.

Table 5-1: Trail Street Crossing Recommendations

R#	Location	Recommendation(s)	Priority	Cost*
R14	**All Crossings**	**Install TAC recommended trail crossing signage at all street crossings:** Includes the 'Pedestrian and Bicycle Crossing Ahead' sign (WC-47) and 'Crossing' tab (WC-7S) on advancing street approaches and the 'Shared Pathway' sign (RB-93) on trail approaches (shown in Figure 5 1). HRM should also monitor future activities related to bicycle crossing legislation in Nova Scotia and identify opportunities to implement bicycle crossings – or "CrossBikes" – at MLT street crossings.	High	$
R15	**Main Avenue**	Consider the installation of a designated crosswalk	High	$
R16	**Westridge Drive**	Consider intersection upgrades to improve visibility for both trail users and motorists approaching the intersection (See Section 5.2.5).	High	$$$$
R17	**Langbrae Drive**	Consider the installation of curb extensions at the crosswalk to narrow the existing 13m crossing distance and improve sightlines between motorists and trail users.	Medium	$$
R18	**Farnham Gate Drive**	Consider the installation of curb extensions at the crosswalk to narrow the existing 13m crossing distance and improve sightlines between motorists and trail users.	Medium	$$

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$$$ < Projects in the range between approximately $20,000 and $50,000
$$$$ > Large projects expected to exceed a cost of approximately $50,000

5.2.3 *Section A (South of Washmill Lake Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-2.

Table 5-2: Trail Connections Recommendations: Section A (South of Washmill Lake Drive)

	Location	Recommendation(s)	Priority	Cost*
R19	**A1 Ramsbrook Court**	• Establish a connection to Ramsbrook Court.	High	$$
R20	**A2 Fairview Neighbourhood Connector**	• Consider upgrades to the trail, including: - Widen to 3m cross section and repave; - Improved access at Rosedale Avenue, Coronation Avenue, and Adelaide Avenue; - Direct connection into the two schools; this would require tree clearing and improved pavement; - Improved maintenance (vegetation and winter conditions) - Improved wayfinding signage to and from MLT.	Medium	$$$$
R21		• Consider prohibiting access to the MLT via the power corridor driveway opposite Rosedale Avenue to discourage unsafe crossings and encourage crossing at the Washmill Lake Drive intersection.	High	$

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$$$ < Projects in the range between approximately $20,000 and $50,000
$$$$ > Large projects expected to exceed a cost of approximately $50,000

Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-3.

Table 5-3: Trail Amenities Recommendations: Section A (South of Washmill Lake Drive)

	Location	Recommendation(s)	Priority	Cost*
R22	**Approach to Washmill Lake Drive**	• Consider installation of a new seating area where the northern spur meets Washmill Lake Drive. • Add MLT signage and wayfinding signage.	Medium	$$

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$$$ < Projects in the range between approximately $20,000 and $50,000
$$$$ > Large projects expected to exceed a cost of approximately $50,000

5.2.4 *Section B (Washmill Lake Drive to Main Avenue)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-4.
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Table 5-4: Trail Connections Recommendations: Section B (Washmill Lake Drive to Main Avenue)

	Location	Recommendation(s)	Priority	Cost*
R23	**B1 Veronica Drive Residential Buildings**	• Consider approaching property owner (Killam Properties -- PID: 41262890) to review potential for improving this 10m long connection into the Veronica Drive block.	Medium	$-$$
R24		• Consider landscape improvements including: - Addition of fencing to better define trail edge, - Addition of a gateway with trail sign - Remove or restrict parking restriction at gateway. • Investigate property ownership along the two parking areas where it appears that the parking areas may encroach on the trail right-of-way.	Medium	$-$$
*	**Cost estimates are preliminary and for planning purposes only. Estimated costs have been categorized as follows:** **$ < Relatively low cost projects less than $5,000.** **$$ < Projects in the range between approximately $5,000 and $20,000.** **$$$ < Projects in the range between approximately $20,000 and $50,000** **$$$$ > Large projects expected to exceed a cost of approximately $50,000**			

Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-5.

Table 5-5: Trail Amenities Recommendations: Section B (Washmill Lake Drive to Main Avenue)

	Location	Recommendation(s)	Priority	Cost*
R25	**Approach to Washmill Lake Drive**	• Consider the following gateway improvements: - Installation of a bench (north facing) and a garbage bin adjacent to the existing rock. - Additional shrub planting to deter illegal crossings of Washmill Lake Drive. - Installation of signage and mapping with reference to proposed Fairview connections.	Medium	$-$$

	Location	Recommendation(s)	Priority	Cost*
R26	**Approach to Main Avenue**	• Consider the following gateway improvements: - Create new seating area on west side of trail, opposite the three trees. - Add 15m section of fence back along trail, rear of trees, alongside the parking lot. - Add gateposts and fencing across ROW (approx. 10m) - Add MLT signage and wayfinding signage.	Medium	$-$$
*	**Cost estimates are preliminary and for planning purposes only. Estimated costs have been categorized as follows:** **$ < Relatively low cost projects less than $5,000.** **$$ < Projects in the range between approximately $5,000 and $20,000.** **$$$ < Projects in the range between approximately $20,000 and $50,000** **$$$$ > Large projects expected to exceed a cost of approximately $50,000**			

5.2.5 *Section C (Main Avenue to Westridge Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-6.

Table 5-6: Trail Connections Recommendations: Section C (Main Avenue to Westridge Drive)

	Location		Recommendation(s)	Priority	Cost*
R27	**C1**	**Main Avenue / Washmill Lake Drive Parking Lot with Access to Mainland Common Loop Trail**	• Consider adding signage at the parking lot driveway indicating MLT and Mainland Loop Trail access. Also, install a garbage receptacle at the entrance to the Mainland Loop Trail.	Medium	$
R28	**C2**	**Main Avenue Residential Building / Parking Lot**	• Consider upgrades to the existing parking lot (regrading or paving) to improve drainage and better formalize the parking area as part of the MLT. • Consider approaching property owners (PID: 00338251) to review potential for improving this connection. Potential improvements include vegetation clearance, trail surface improvements, and the addition of a gateway and signage.	High	$$
R29	**C3 C4**	**Mandaville Court Residential Buildings**		Medium	$-$$
R30	**C5**	**Hanover Court**	• Consider approaching the owner (Condo PID: 41259102) to review potential for creating an approximately 20m connection for local residents adjacent to the existing seating area.	Medium	$-$$
R31	**C8**	**Westridge Drive**	• Consider upgrades to the Westridge Drive intersection and connections including the following (See Figure 5-3): - Realign the trail to the east on its northbound approach to Westridge Drive to improve the approach angle / gradient and sightlines for vehicles exiting the parking lot. - Extend sidewalk and curb west on Westridge Drive to the MLT and add curb extensions, narrowing the crossing distance and better delineating and formalizing on-street parking spaces. These spaces may be designated as accessible parking. - Add a trail connection around the parking lot to connect to the trail extending to Thomas Raddall Drive. Fencing may be beneficial to discourage shortcutting across the parking lot. - Consider upgrades to the existing parking lot including surface improvements and landscaping.	High	$$$$

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$$ < Projects in the range between approximately $5,000 and $20,000.
$$$ < Projects in the range between approximately $20,000 and $50,000
$$$$ > Large projects expected to exceed a cost of approximately $50,000

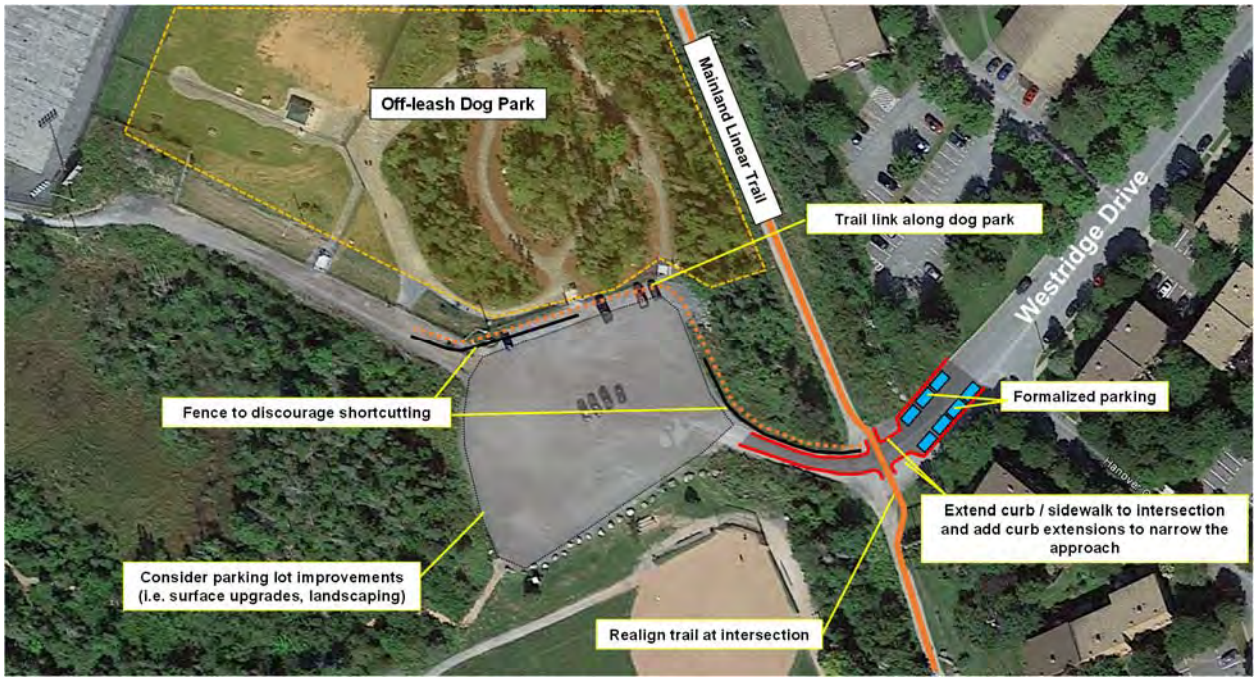

Figure 5-3: Concept for Upgrades at Westridge Drive

Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-7.

Table 5-7: Trail Amenities Recommendations: Section C (Main Avenue to Westridge Drive)

	Location	Recommendation(s)	Priority	Cost*
R32	**Approach to Main Avenue**	• Consider the following gateway improvements: - Add gate posts; - Add tree planting on grassed slope west of the trail; - Add MLT signage and wayfinding signage; - Sign the parking lot for trail users; - Separate the parking lot from Mandaville Court with shrub planting.	Medium	$-$$
R33	**Existing Amenity Area just south of Westridge Drive**	• Consider landscaping improvements (i.e. crown lifting, tree/shrub removal) to open this area up to Westridge Drive.	Medium	$
*	**Cost estimates are preliminary and for planning purposes only. Estimated costs have been categorized as follows:** **$ < Relatively low cost projects less than $5,000.** **$$ < Projects in the range between approximately $5,000 and $20,000.** **$$$ < Projects in the range between approximately $20,000 and $50,000** **$$$$ > Large projects expected to exceed a cost of approximately $50,000**			

5.2.6 *Section D (Westridge Drive to Lacewood Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-8.

Table 5-8: Trail Connections Recommendations: Section D (Westridge Drive to Lacewood Drive)

	Location	Recommendation(s)	Priority	Cost*
R34	**D1 D2 Westgrove Place Residential Buildings**	• Consider approaching property owner (PIDs: 40090045 / 40090011) to review potential for improving a 15m connection into the southern parking lot and 45m connection into the northern section of the block. Improvements could include: vegetation clearance, trail surface improvements, and the addition of a gateway and signage.	Medium	$-$$
R35	**D3 Mary Clayton Memorial Park**	• Consider improving the first 20m of woodland path as it passes down through the depression. This may require a short bridge span.	High	$$$
R36		• Consider adding a gateway element, MLT signage, and wayfinding signage to both the MLT and Willett Street entrances to the Park.	High	$
R37	**D4 D5 D6 Chadwick Place Residential Buildings**	• Consider approaching property owners (PIDs: 40178493 / 40178501 / 40178519 / 40177750 / 40177743) to review potential for improving and signing three connections into the Chadwick Place block; the northernmost connection (D6) to be aligned with adjacent connection to the Canada Games Centre (D8). The new links to be approximately 10m long each.	Medium	$-$$
R38	**D7 BMO Fieldhouse Trail**	• Consider improving the alignment, grading and surface treatment of the path.	Medium	$$
R39	**D8 Canada Games Centre Trail**	• Consider the following improvements: - Extend the existing 1.5m wide asphalt path through the Canada Games Centre parking lot up to Thomas Raddall Drive (approximately 70m). - Adding MLT signage and wayfinding signage to/from Canada Games Centre and Keshen Goodman Library. - Consider removal of vegetation to improve visibility at trail intersection. - Implement winter maintenance	High	$$-$$$
R40	**D9 D10 Halifax Transit Lacewood Terminal**	• Improved winter maintenance to reduce slippery conditions.	Medium	-

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Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-9.

Table 5-9: Trail Amenities Recommendations: Section D (Westridge Drive to Lacewood Drive)

	Location	Recommendation(s)	Priority	Cost*
R41	**Approximately 100m north of Westridge Drive**	• Consider adding a new seating area on the west side at around the 100m mark; this trail section is set in a small cut with rock outcrops and is in the shadow of taller evergreen trees (near dog park). Also, consider additional mowing to create a wider verge along the first 100m of this trail section to expose rock outcrop.	Medium	$

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5.2.7 *Section E (Lacewood Drive to Radcliffe Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-10.

Table 5-10: Trail Connections Recommendations: Section E (Lacewood Drive to Radcliffe Drive)

	Location		Recommendation(s)	Priority	Cost*
R42	**E1**	**Lacewood Drive Residential Building**	• Consider approaching property owner (PID: 40682346) to review potential for improving this 50m path connection.	Medium	$-$$
R43	**E2**	**Barkton-Warwick Trail**	• Consider upgrading this 180m long path to a secondary trail. This would include regrading of the sections with steeper grades. Potential for NSPI contribution to any proposed works.	Medium	$$-$$$
R44	**E3**	**Stockleigh Place Street Connector**	• Consider pruning and selective thinning of adjacent plantings. • Consider adding identification signage on the MLT for the street connector.	Low	$
R45	**E4**	**Radcliffe Drive Residential Building**	• Consider approaching property owner (PID: 40682346) to review potential for improving this 10m long connection, restricting access to one entrance to the parking lot. • Consider landscaping improvements to the slope facing the trail.	Medium	$
R46	**E5**	**Essex Lane Street Connector**	• Consider adding identification signage on the MLT for the street connector.	Low	$

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Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-11.

Table 5-11: Trail Amenities Recommendations: Section E (Lacewood Drive to Radcliffe Drive)

	Location	Recommendation(s)	Priority	Cost*
R47	**Approach to Radcliffe Drive**	• Add a garbage bin to the existing seating area.	Medium	$

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5.2.8 *Section F (Radcliffe Drive to Langbrae Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-12.

Table 5-12: Trail Connections Recommendations: Section F (Radcliffe Drive to Langbrae Drive)

	Location		Recommendation(s)	Priority	Cost*
R48	**F1**	**Radcliffe Drive Residential Building**	• Consider approaching property owner (PID: 40547341) to review potential for improving this 10m path connection.	Medium	$-$$
R49	**F2**	**Brackley Place / Thackeray Close Street Connector**	• Consider adding identification signage on the MLT for the street connector.	Low	$
R50	**F3**	**Turnmill Drive Woodland Trail**	• Retain as a woodland path but consider limited improvements to improve visibility and safety: - Tree clearing and pruning to open up trail; - Minor realignments to improve grades; - Upgrades to trail surface; and - Identification signage.	Medium-High	$$-$$$
R51	**F4**	**Park West School Sports Field**	• Consider adding wayfinding signage. • Reinstate the street connector to Berkshire Close, which is in place but has been closed off to access for unknown reasons.	High	$
R52	**F5**	**Park West School Connection**	• Consider the following gateway improvements to the area adjacent to School Drop-off / Playground: - Re-grading of trail and landscape improvements to swale; - Realignment of trail to introduce subtle horizontal curves; - Addition of tree and shrubs; - Addition of fencing adjacent playground; and - Add MLT signage and wayfinding signage.	Medium-High	$$-$$$
R53					

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Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-13.

Table 5-13: Trail Amenities Recommendations: Section F (Radcliffe Drive to Langbrae Drive)

	Location	Recommendation(s)	Priority	Cost*
R54	**Approach to Langbrae Drive**	• Consider the following gateway improvements: - Create new seating area on east side of trail; - Addition of trees and shrubs; - Addition of fencing adjacent to the playground; - Add MLT signage and wayfinding signage.	Medium	$$

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5.2.9 *Section G (Langbrae Drive to Farnham Gate Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-14.

Table 5-14: Trail Connections Recommendations: Section G (Langbrae Drive to Farnham Gate Drive)

	Location		Recommendation(s)	Priority	Cost*
R55	**G1** **G2**	**Montgomery Court Trail**	• Consider upgrading these connections to secondary trails (approximately 160m total). Selected tree removal and pruning should be considered to create an improved clear zone.	Medium-High	$$-$$$
R56	**G3**	**Montgomery Court Residential Building**	• Consider approaching property owner (PID: 40348518) to review potential for improving this 20m connection. Potentially may include some re-grading.	Medium	$$
R57	**G4**	**Parkmount Close Street Connector**	• Consider adding identification signage on the MLT for the street connectors.	Low	$
R58	**G5**	**Glenbourne Court Street Connector**			

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Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-15.

Table 5-15: Trail Amenities Recommendations: Section G (Langbrae Drive to Farnham Gate Drive)

	Location	Recommendation(s)	Priority	Cost*
R59	**Approach to Langbrae Drive**	• Consider the following gateway improvements: - Tree planting beneath power lines; - Addition of fencing between residential properties and trail; - Add garbage bin. - Add MLT signage and wayfinding signage	Medium	$-$$
R60	**Approach to Farnham Gate Drive**	• Consider the following gateway improvements: - Addition of fencing between residential properties and trail; - Add MLT signage and wayfinding signage	Medium	$-$$

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5.2.10 *Section H (Farnham Gate Drive to Parkland Drive)*

Trail Connections

Recommendations related to trail connections for this section are summarized in Table 5-16.

Table 5-16: Trail Connections Recommendations: Section H (Farnham Gate Drive to Parkland Drive)

	Location		Recommendation(s)	Priority	Cost*
R61	**H1**	**Attenborough Court Woodland Trail Link**	• Consider upgrading to a secondary trail. Selected tree removal and pruning should be considered to create an improved clear zone.	Medium-High	$$
R62	**H2**	**Remington Court Woodland Trail Link**	• Consider upgrading to a secondary trail. Selected tree removal and pruning should be considered to create an improved clear zone.	Medium-High	$$
R63	**H3**	**Beechwood Terrace Street Connector**	• Consider adding identification signage on the MLT for the street connectors. • Improved maintenance of vegetation at entrances to improve aesthetics and visibility.	Low	$
R64	**H4**	**Scotch Pine Terrace Street Connector**		Low	$
R65	**H5**	**Moss Court Street Connector**		Low	$
R66	**H6**	**Heathside Crescent Street Connector**		Low	$
R67	**H7**	**Gorsebud Close Street Connector**		Low	$
R68	**H8**	**Parkmount Close Street Connector**	• Consider adding identification signage on the MLT.	Low	$
R69	**H9**	**Glenbourne Court Street Connector**			
R70	**H10**	**Parkland Drive**		Low	$

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Trail Amenities

Recommendations related to trail amenities for this section are summarized in Table 5-17.

Table 5-17: Trail Amenities Recommendations: Section H (Farnham Gate Drive to Parkland Drive)

	Location	Recommendation(s)	Priority	Cost*
R71	**Approach to Farnham Gate Drive**	• Consider the following gateway improvements: - Add a bench under the power lines on the east side of the trail (backing on existing shrubs; - Add garbage bin. - Add MLT signage and wayfinding signage	Medium	$
R72	**Approach to Parkland Drive**	• Consider the following gateway improvements: - Selective tree clearing and pruning to open up southerly view along the trail from Parkland Drive. - Add MLT signage and wayfinding signage	Medium	$

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Appendix A
Functional Design Drawings

MAINLAND LINEAR TRAIL

FUNCTIONAL DESIGN

HALIFAX, NOVA SCOTIA

REVISION 0

ISSUED FOR REVIEW - APR. 25, 2016

DRAWING LIST:

SHEET 1 COVER SHEET

SHEET 2 CHAIN OF LAKES TRAIL CONNECTION
PLAN AND PROFILE - STA. 0+000 TO 0+550

SHEET 3 CHAIN OF LAKES TRAIL CONNECTION
PLAN AND PROFILE - STA. 0+750 TO 1+500

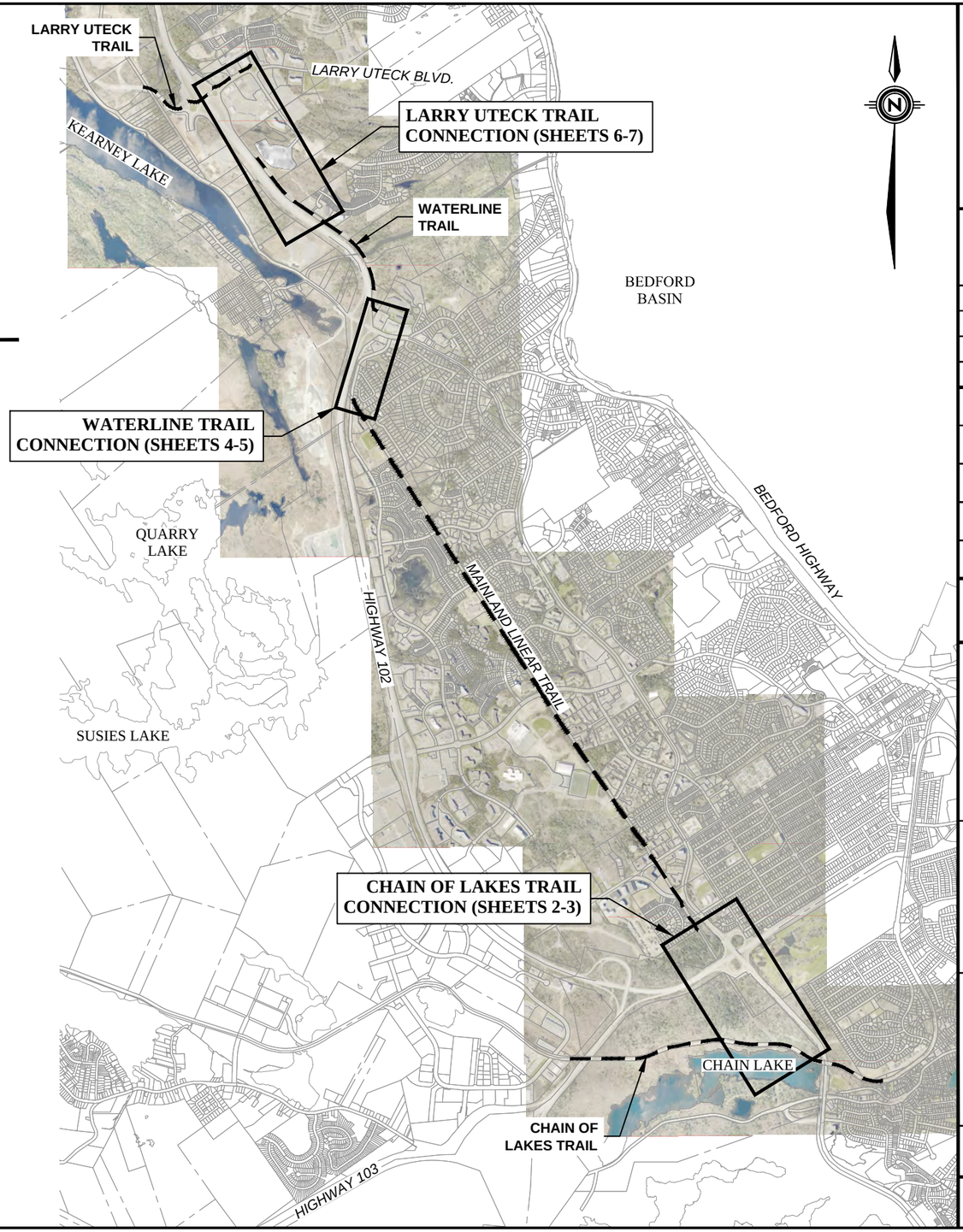
SHEET 4 WATERLINE TRAIL CONNECTION
PLAN AND PROFILE - STA. 0+000 TO 0+450

SHEET 5 WATERLINE TRAIL CONNECTION
PLAN AND PROFILE - STA. 0+450 TO 0+900

SHEET 6 LARRY UTECK BLVD.CONNECTION
PLAN AND PROFILE - STA. -0+530 TO 0+000

SHEET 7 LARRY UTECK BLVD.CONNECTION
PLAN AND PROFILE - STA. 0+000 TO 0+550

SHEET 8 TYPICAL GREENWAY CROSS SECTION



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PROJECT: MAINLAND LINEAR TRAIL

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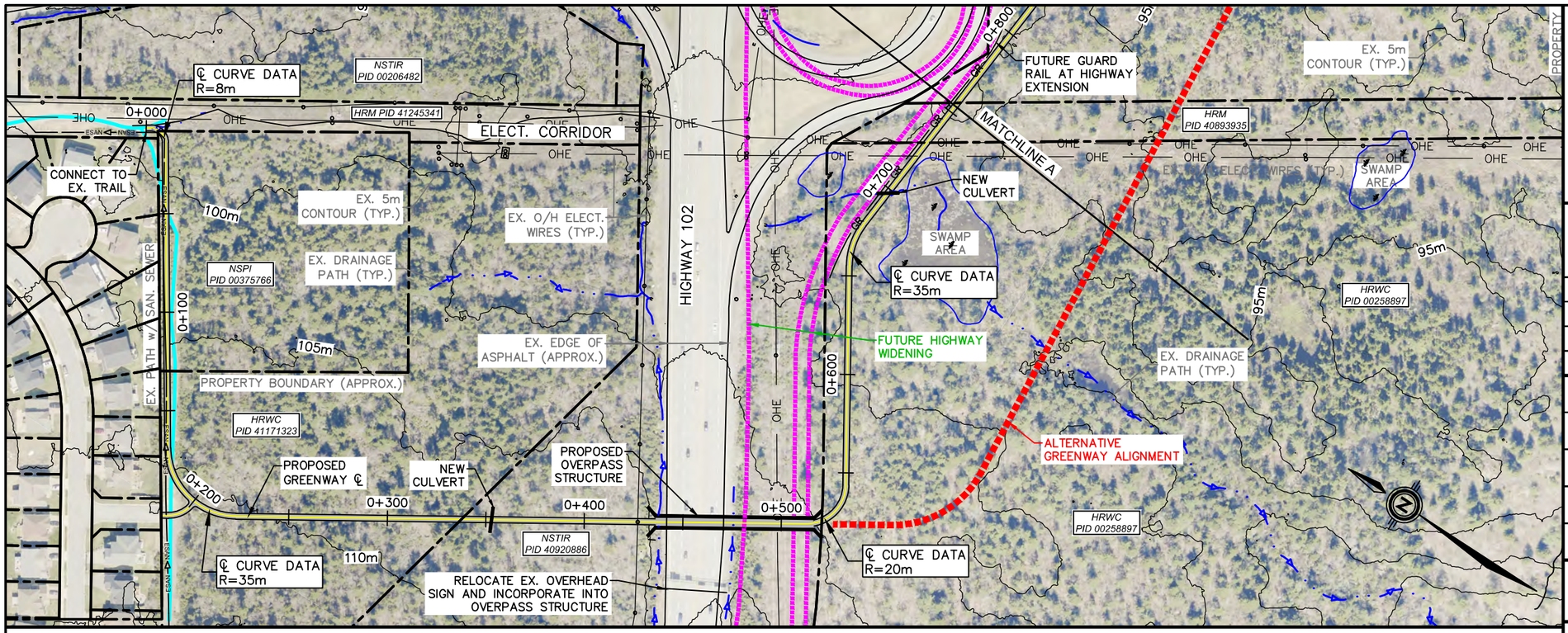

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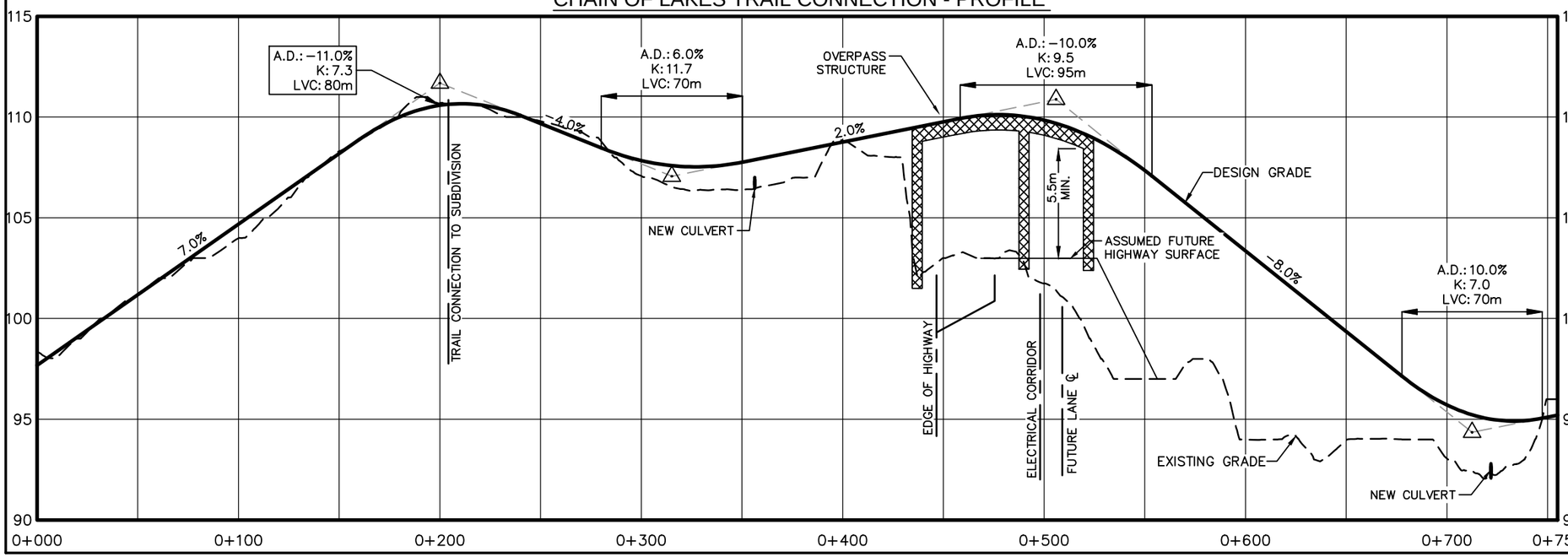

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MAINLAND LINEAR TRAIL

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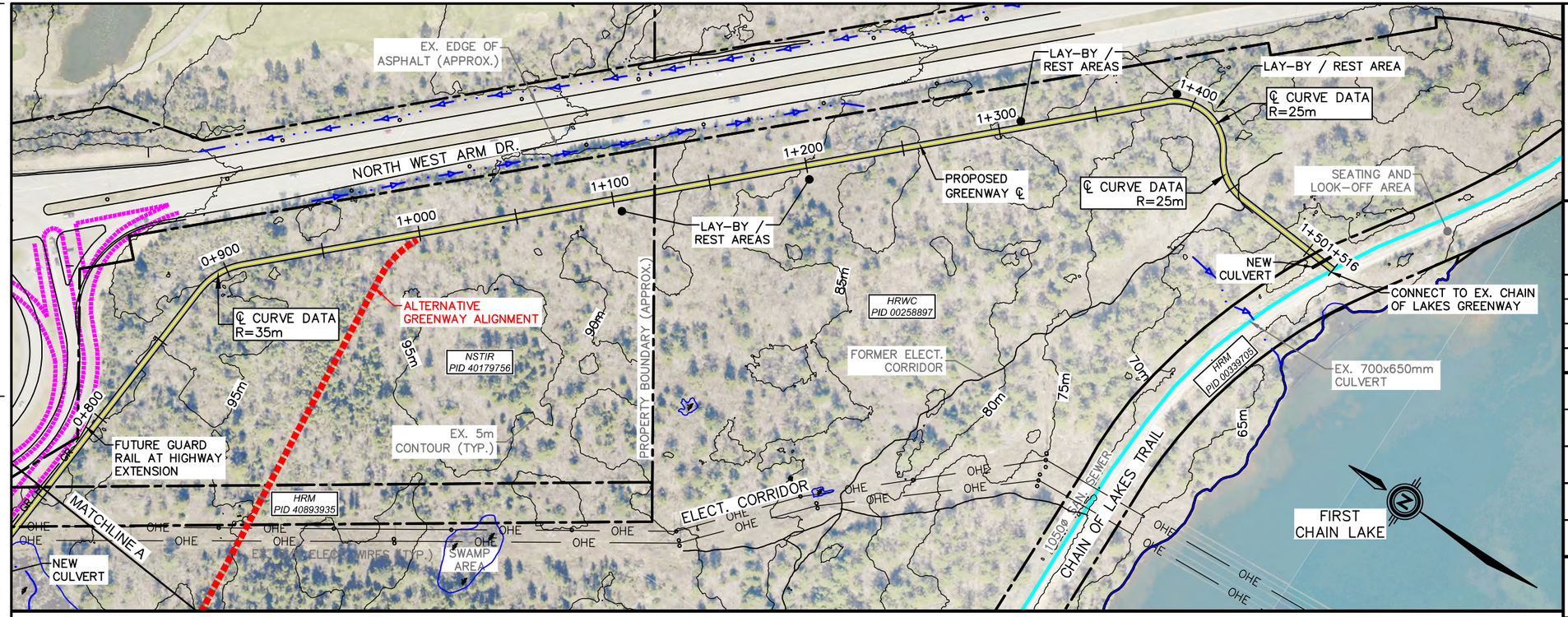
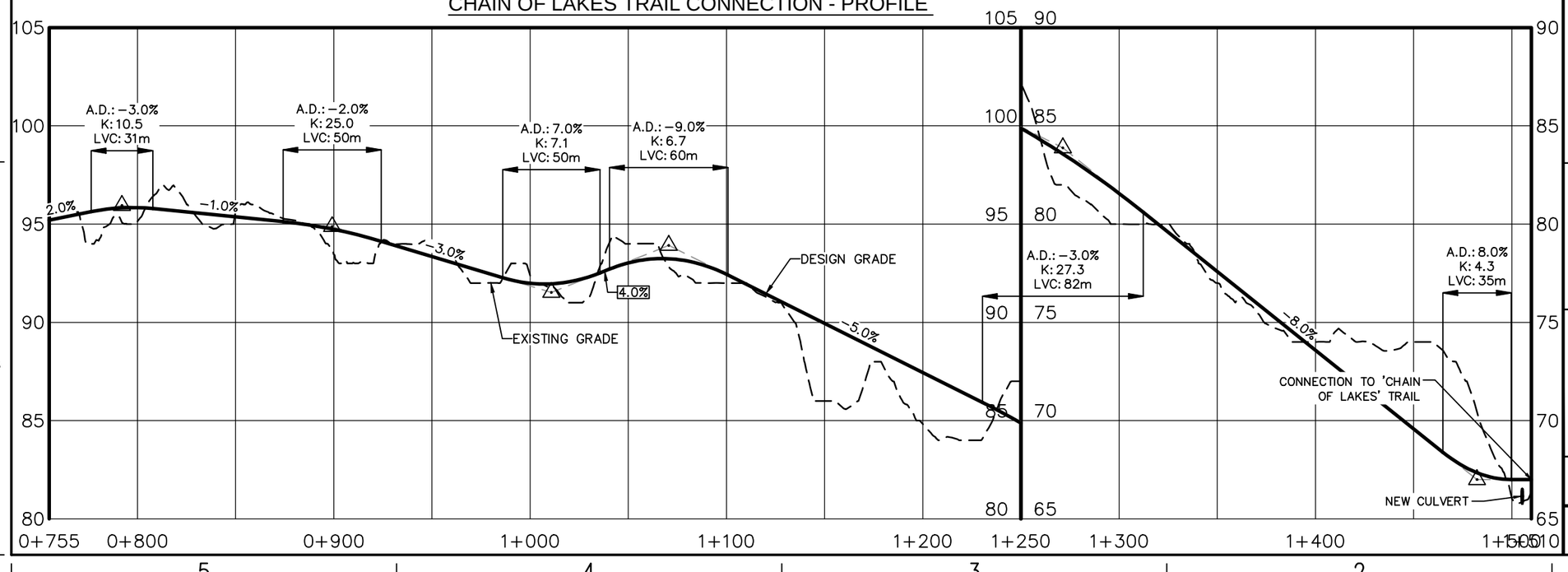


CHAIN OF LAKES TRAIL CONNECTION - PROFILE



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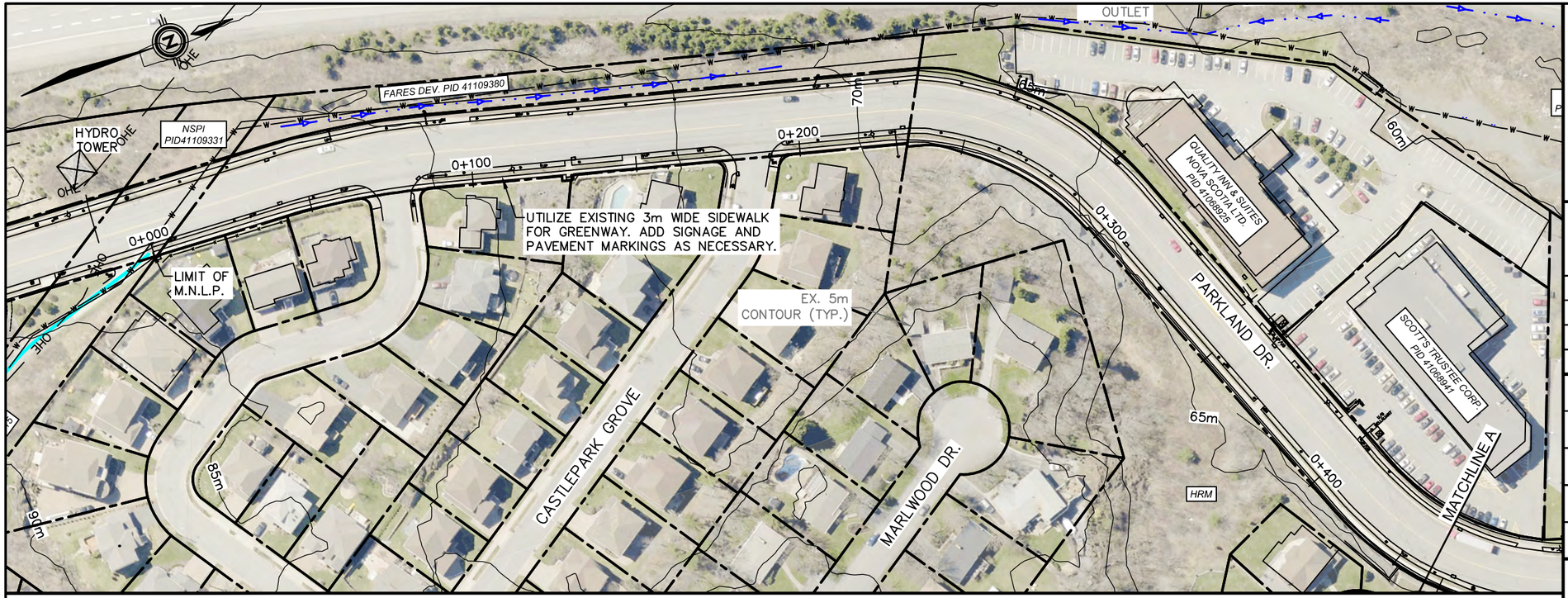
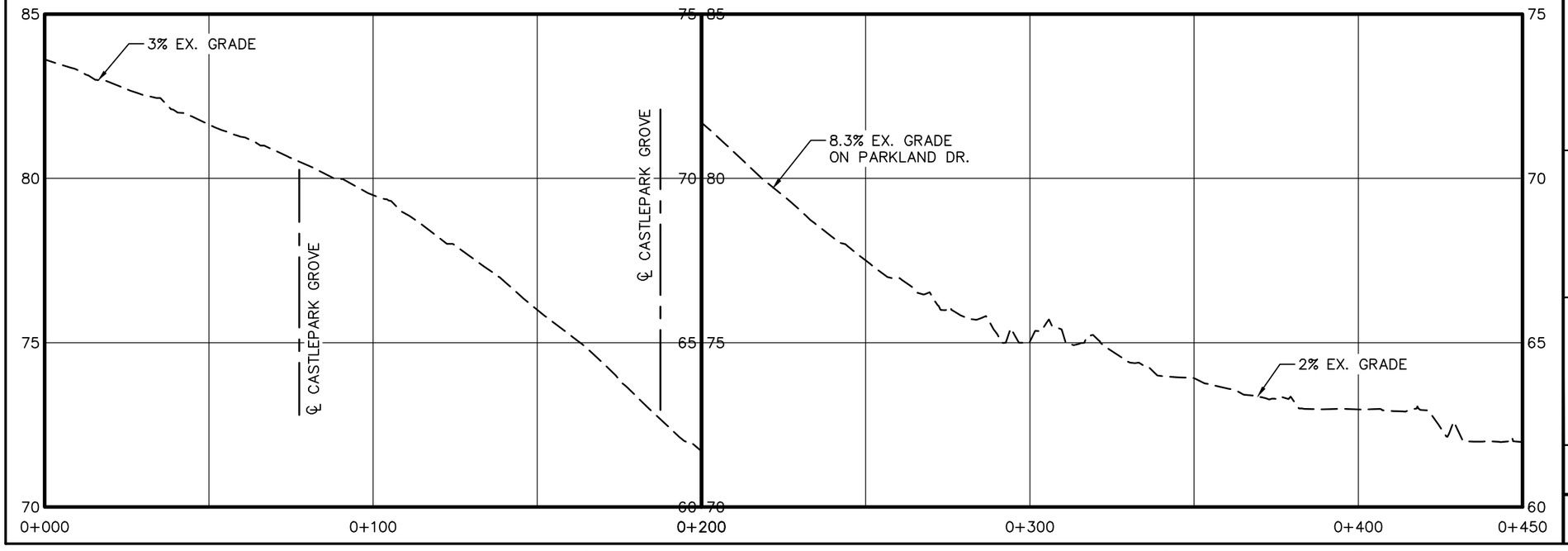


WATERLINE TRAIL CONNECTION - PROFILE



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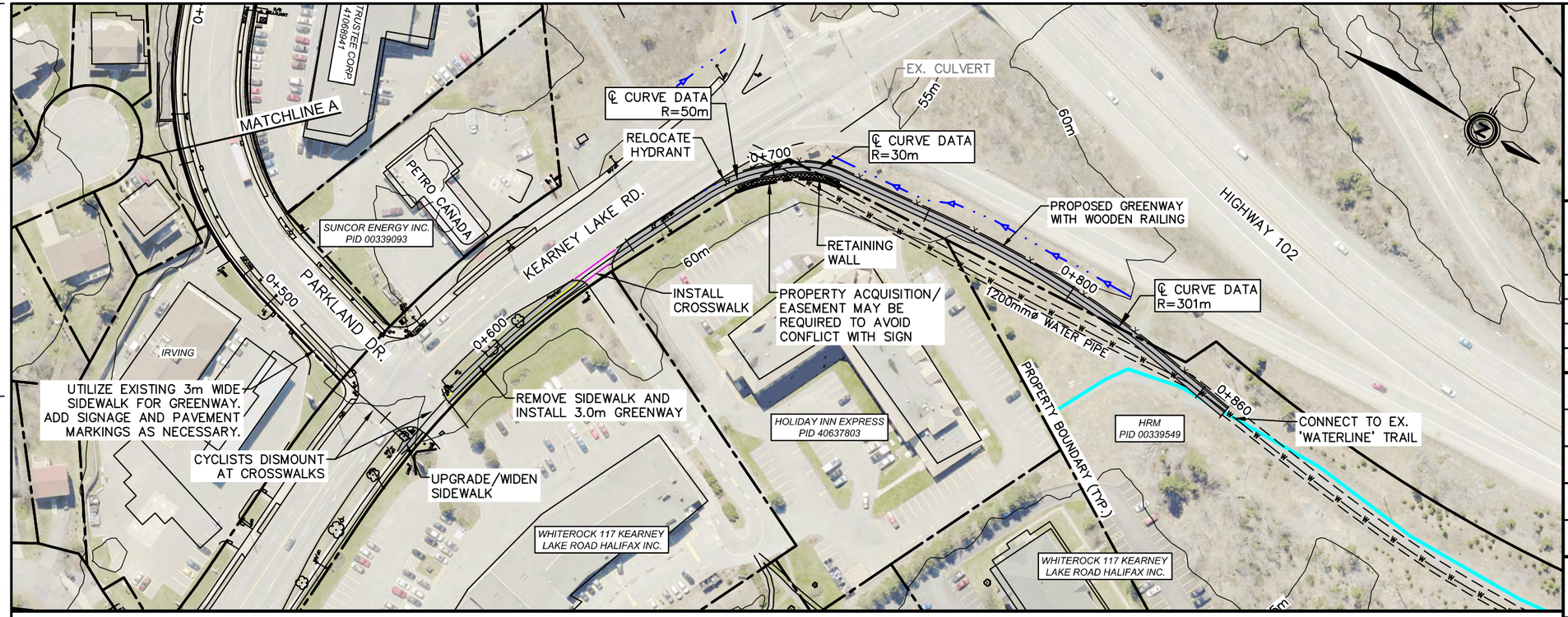

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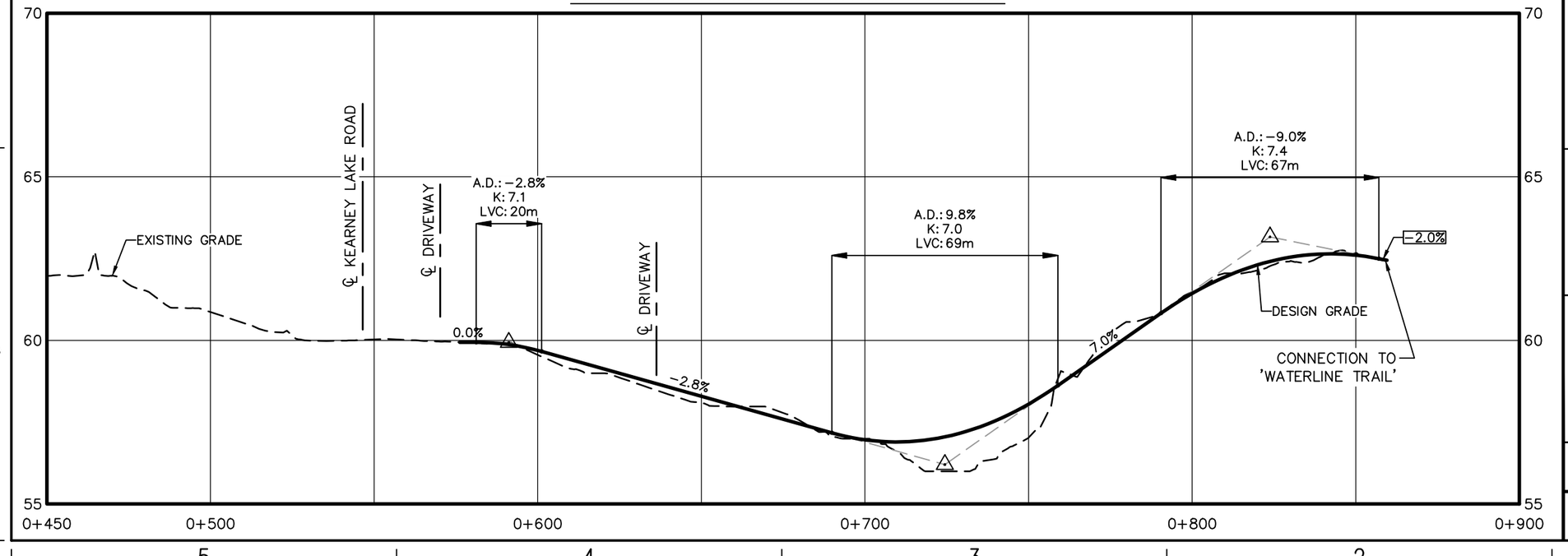

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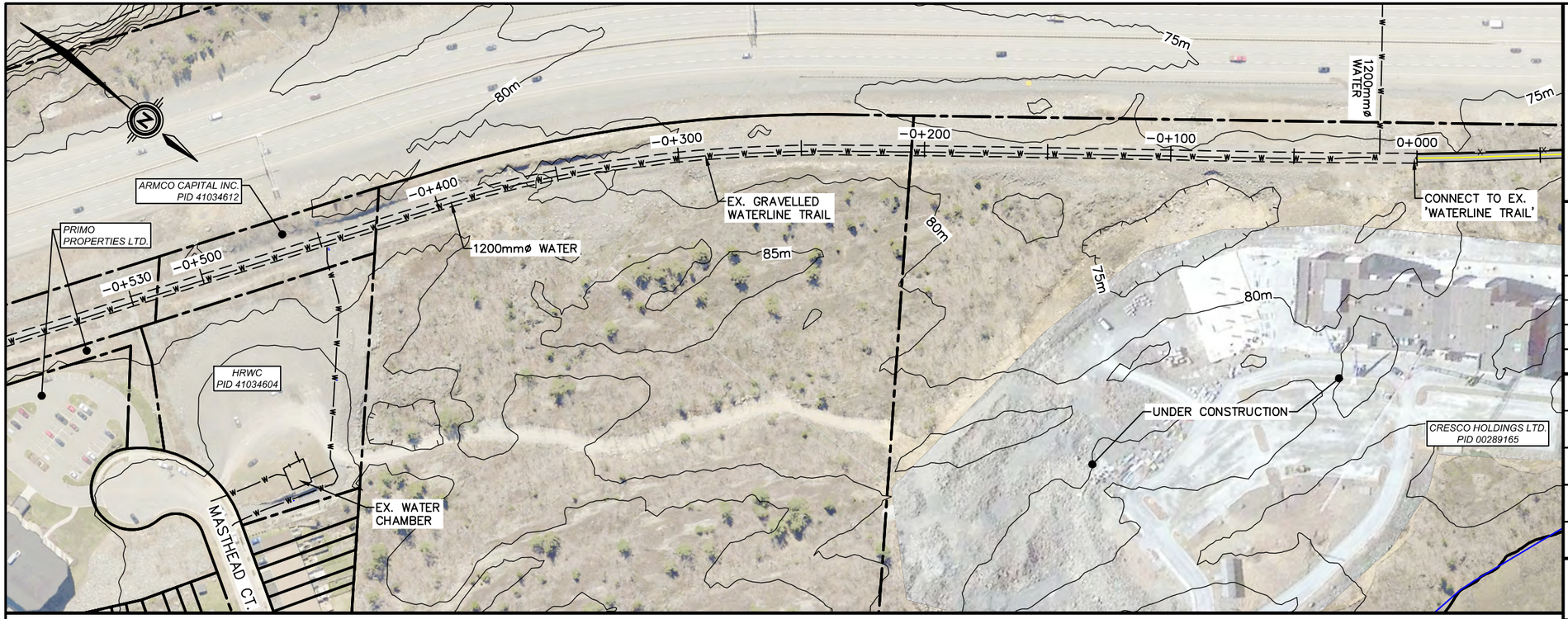
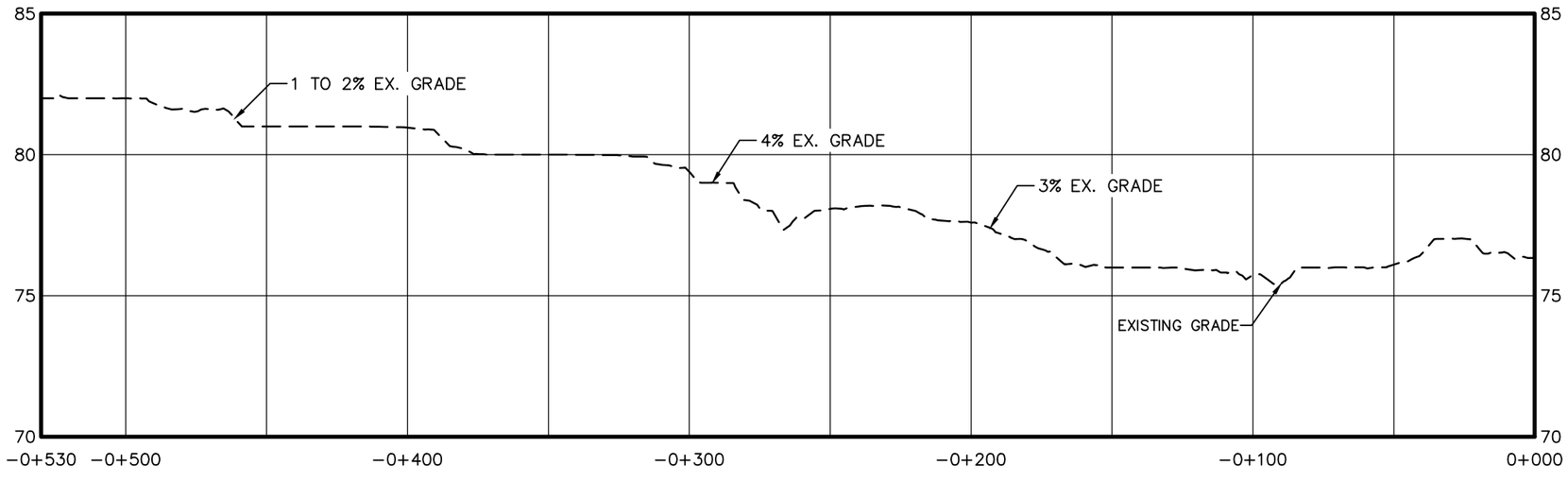


LARRY UTECK TRAIL CONNECTION - PROFILE



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1	2016/04/25	ISSUED WITH FINAL REPORT
0	2015/12/15	ISSUED FOR REVIEW
NO.	DATE	DESCRIPTION

PROJECT NO: 151-00734
DATE: (YYYY/MM/DD) 2016/04/25
ORIGINAL SCALE: 1:2000
DESIGNED BY: P. NICKERSON
DRAWN BY: P. NICKERSON
CHECKED BY: M. CONNORS

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

SCALE: 1:2000 METRIC
40 30 20 10 0 40 80

CLIENT: HALIFAX

CLIENT REF. #: P14-111206-72

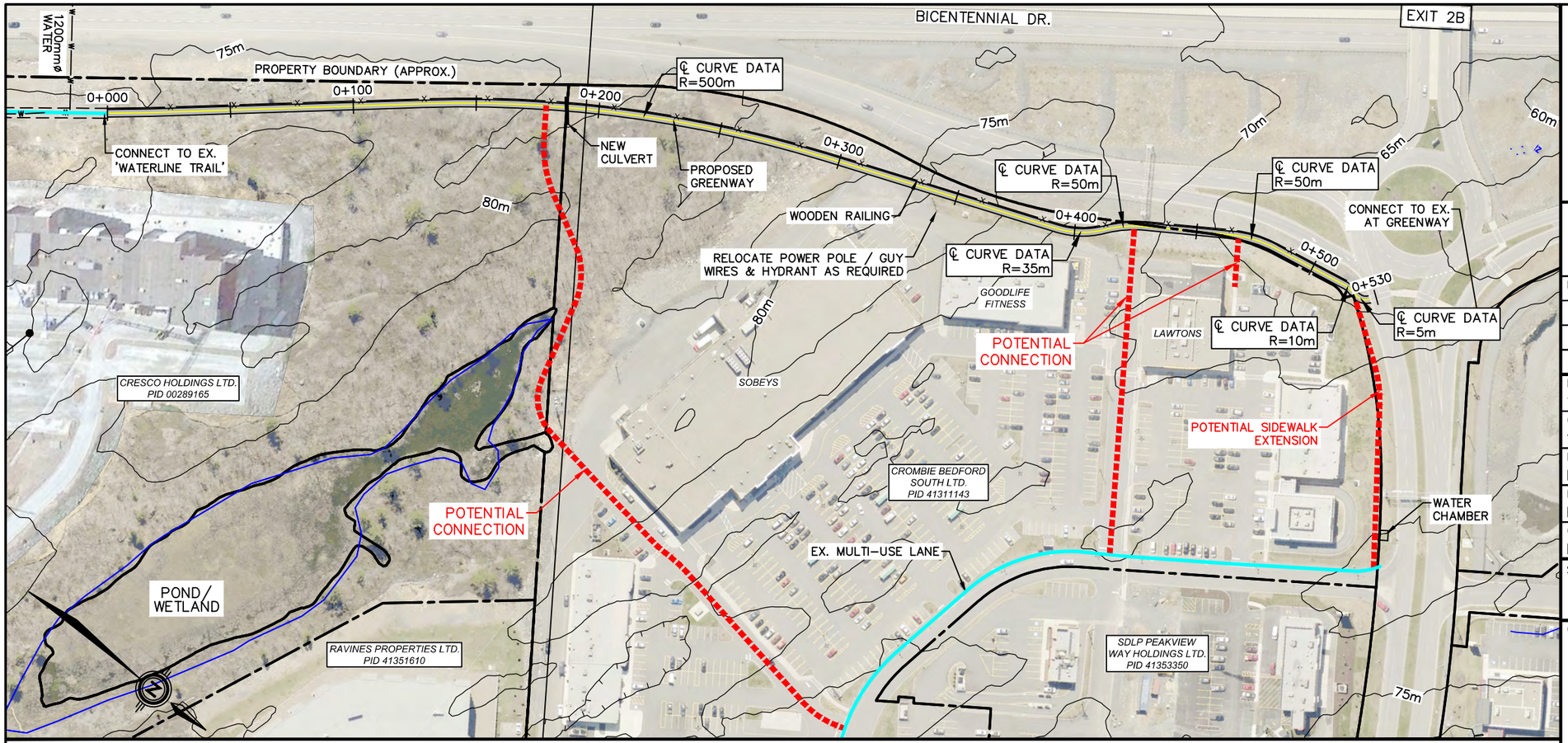
PROJECT:
MAINLAND LINEAR TRAIL

TITLE:
LARRY UTECK TRAIL CONNECTION
PLAN & PROFILE
STA. -0+530 TO 0+000

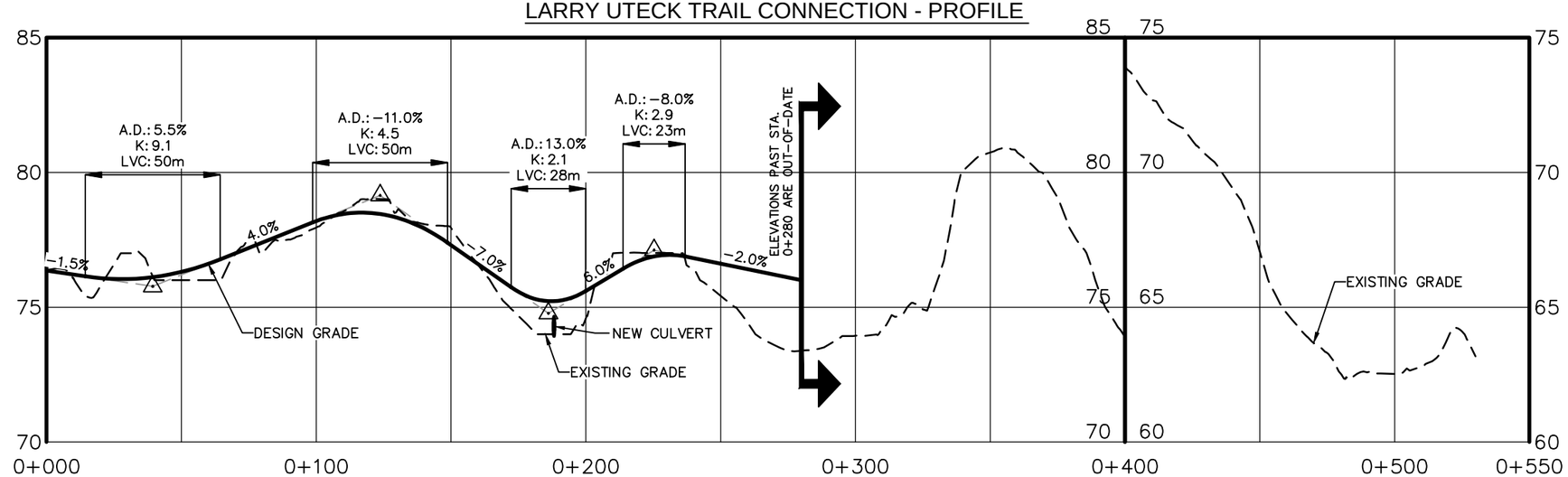
SHEET NUMBER: 6
SHEET #: 6 OF 8

ISSUE: ISSUED WITH FINAL REPORT
DATE OF: 2016/04/25
REV # 1

WSP REF. NO.: ----
K:\DARTMOUTH\2015\151-00734 MAINLAND NORTH LINEAR PARKWAY\11_ DWG\11.7_TRAFFIC\151-00734 - FUNCTIONAL DESIGN.DWG 6 PRINTED: 3:15 PM 2016/04/25 BY: PHIL.NICKERSON



LARRY UTECK TRAIL CONNECTION - PROFILE



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PRELIMINARY

REVISION:		
1	2016/04/25	ISSUED WITH FINAL REPORT
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NO.	DATE	DESCRIPTION

PROJECT NO: 151-00734	DATE: (YYYY/MM/DD) 2016/04/25
ORIGINAL SCALE: 1:2000	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: P. NICKERSON	
DRAWN BY: P. NICKERSON	
CHECKED BY: M. CONNORS	25mm

SCALE: 1:2000 METRIC
40 30 20 10 0 40 80

CLIENT: HALIFAX

CLIENT REF. #: P14-111206-72

PROJECT:

MAINLAND LINEAR TRAIL

TITLE:

LARRY UTECK TRAIL CONNECTION

PLAN & PROFILE
STA. 0+000 TO 0+550

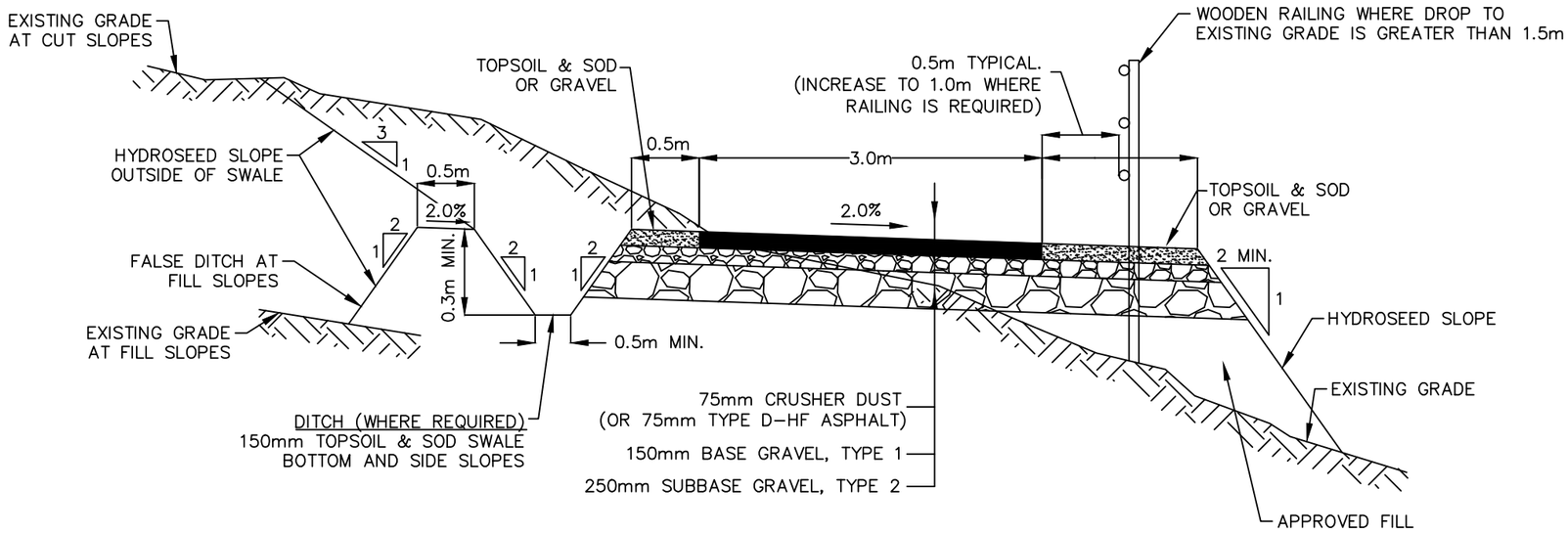
SHEET NUMBER: 7
SHEET #: 7 OF 8

ISSUE: ISSUED WITH FINAL REPORT
DATE OF: 2016/04/25
REV # 1

WSP REF. NO.: ---- K:\DARTMOUTH\2015\151-00734 MAINLAND NORTH LINEAR PARKWAY\11_ DWG\11.7_TRAFFIC\151-00734 – FUNCTIONAL DESIGN.DWG 7 PRINTED: 3:16 PM 2016/04/25 BY: PHIL.NICKERSON

A TYPICAL GREENWAY CROSS SECTION

NTS



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PRELIMINARY

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PROJECT NO: 151-00734	DATE: (YYYY/MM/DD) 2016/04/25
ORIGINAL SCALE: AS NOTED	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: P. NICKERSON	
DRAWN BY: P. NICKERSON	25mm
CHECKED BY: M. CONNORS	

CLIENT: HALIFAX

CLIENT REF. #: P14-111206-72

PROJECT: MAINLAND LINEAR TRAIL

TITLE: TYPICAL GREENWAY CROSS SECTION

SHEET NUMBER: 8

SHEET #: 8 OF 8

ISSUE: ISSUED WITH FINAL REPORT
DATE OF: 2016/04/25

REV # 1

WSP REF. NO.: ---- K:\DARTMOUTH\2015\151-00734 MAINLAND NORTH LINEAR PARKWAY\11_ DWG\11.7_TRAFFIC\151-00734 - FUNCTIONAL DESIGN.DWG 8 PRINTED: 3:16 PM 2016/04/25 BY: PHIL.NICKERSON

Appendix B
Public Consultation Summary

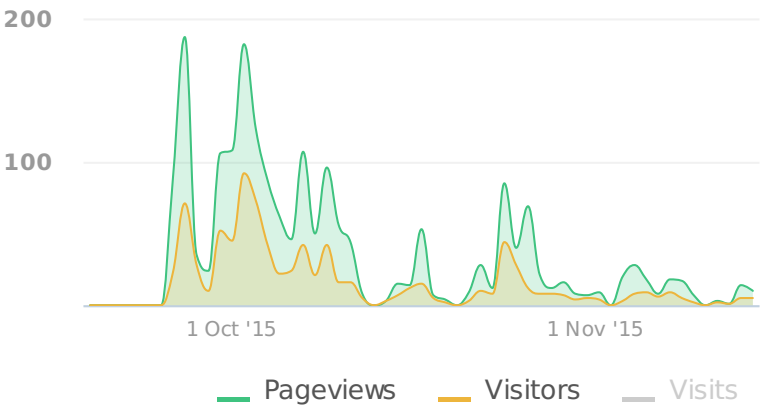
Project Report

01 July 2013 to **12 November 2015**

Shape Your City Halifax

Mainland Linear Trail

Visitors Summary



Highlights

TOTAL VISITS	MAXIMUM SINGLE DAY VISITORS
931	96

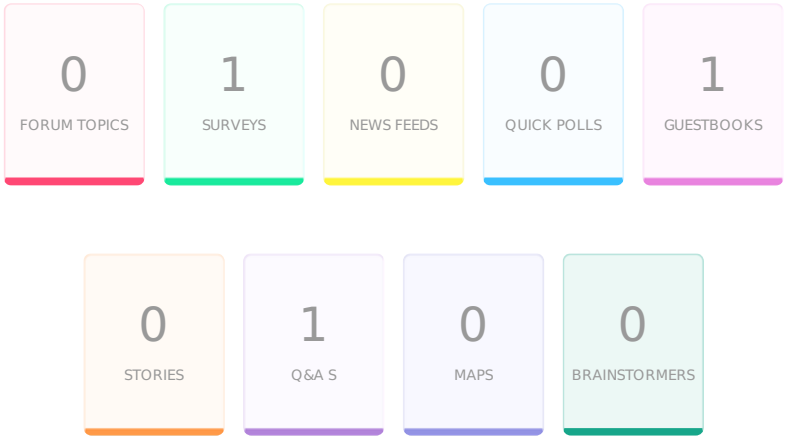
ENGAGED VISITORS	INFORMED VISITORS	AWARE VISITORS
138	354	763

Aware Participants	763
Aware Actions Performed	Participants
Visited a Project or Tool Page	763

Informed Participants	354
Informed Actions	Participants
Performed a video	0
Viewed a photo	57
Downloaded a document	149
Visited the Key Dates page	20
Visited an FAQ list Page	0
Visited Instagram Page	0
Visited Multiple Project Pages	180
Contributed to a tool (engaged)	138

Engaged	138		
Engaged Actions Performed	Registered	Unverified	Anonymous
Contributed on Forums	0	0	0
Participated in Surveys	25	48	67
Contributed to Newsfeeds	0	0	0
Participated in Quick Polls	0	0	0
Posted on Guestbooks	0	0	0
Contributed to Stories	0	0	0
Asked Questions	0	0	0
Placed Pins on Maps	0	0	0
Contributed to Brainstormers	0	0	0

ENGAGEMENT TOOLS SUMMARY



Tool Type	Engagement Tool Name	Tool	Visitors	Contributors		
				Registered	Unverified	Anonymous
Survey Tool	Mainland Linear Trail: Improvements and Extensions	Draft	265	25	48	67

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INFORMATION WIDGET SUMMARY

6	17	0	0	0
DOCUMENTS	PHOTOS	VIDEOS	FAQS	KEY DATES

Widget Type	Engagement Tool Name	Visitors	Views/Downloads
Document	Mainland Linear Trail Connections	75	79
Document	Mainland Linear Trail Poster Displays	48	54
Document	Mainland :Linear Trail Connections (reduced file size)	42	42
Document	Mainland Linear Trail Connections - reduced file size	22	24
Document	Mainland Linear Trail Poster Displays (reduced file size)	18	21
Document	Mainland Linear Trail poster - reduced file size	13	15
Document	deleted document from	1	1
Photo	Mlt2	41	45
Photo	Mlt6	15	17
Photo	Img 8967	10	11
Photo	Img 8952	9	9
Photo	Mlt14	7	8
Photo	Mlt16	7	8
Photo	Img 8951	7	7
Photo	Img 8934	7	7
Photo	Img 8966	7	7
Photo	Img 8930	6	6
Photo	Img 8954	6	6

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INFORMATION WIDGET SUMMARY

Widget Type	Engagement Tool Name	Visitors	Views/Downloads
Photo	Img 8954	6	6
Photo	Img 8965	6	6
Photo	Mlt20	6	6
Photo	Mlt18	5	7
Photo	Mlt19	4	5
Photo	Img 8932	4	4
Photo	Img 8925	3	3
Key Dates	Key Date	20	26

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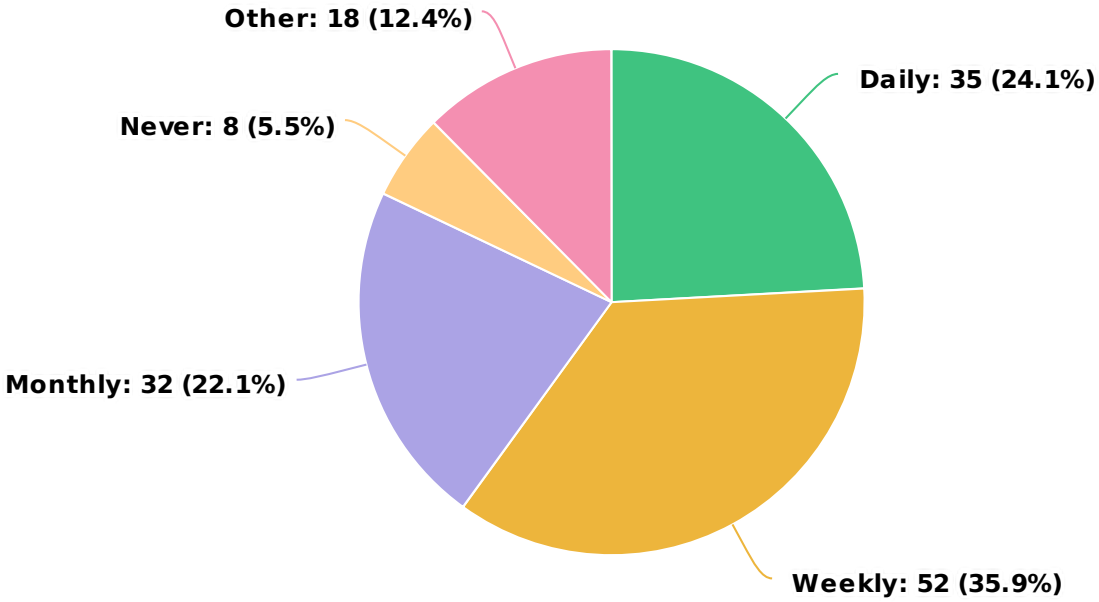
ENGAGEMENT TOOL: SURVEY TOOL

Tool title/name: Mainland Linear Trail: Improvements and Extensions

VISITORS 265	CONTRIBUTORS 140	CONTRIBUTIONS 141

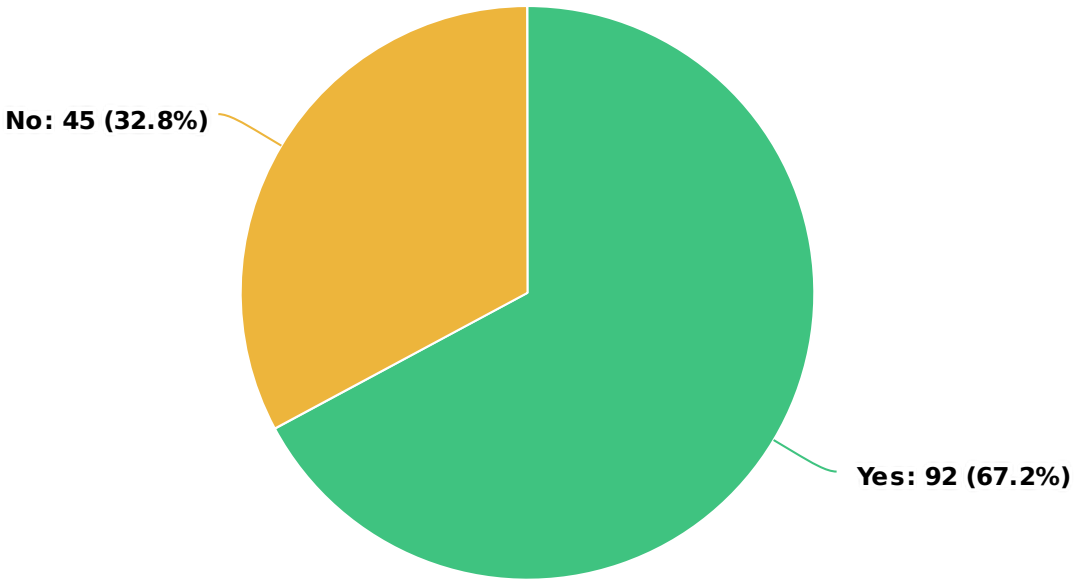
How often do you use the Mainland Linear Trail?

Optional question



Do you use the Mainland Linear Trail during the winter?

Optional question



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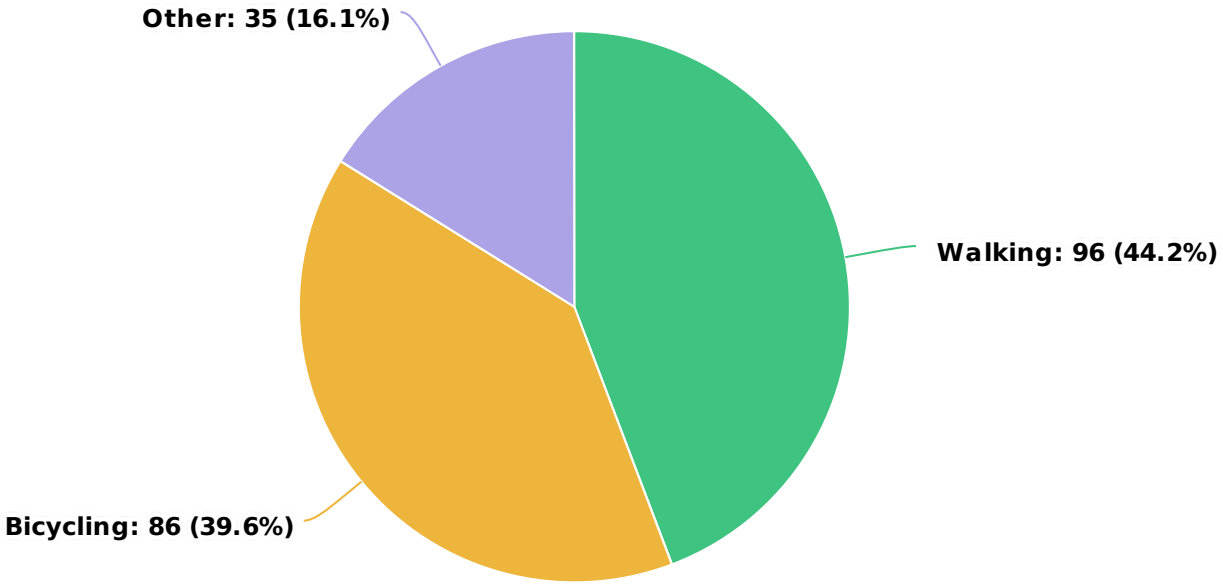
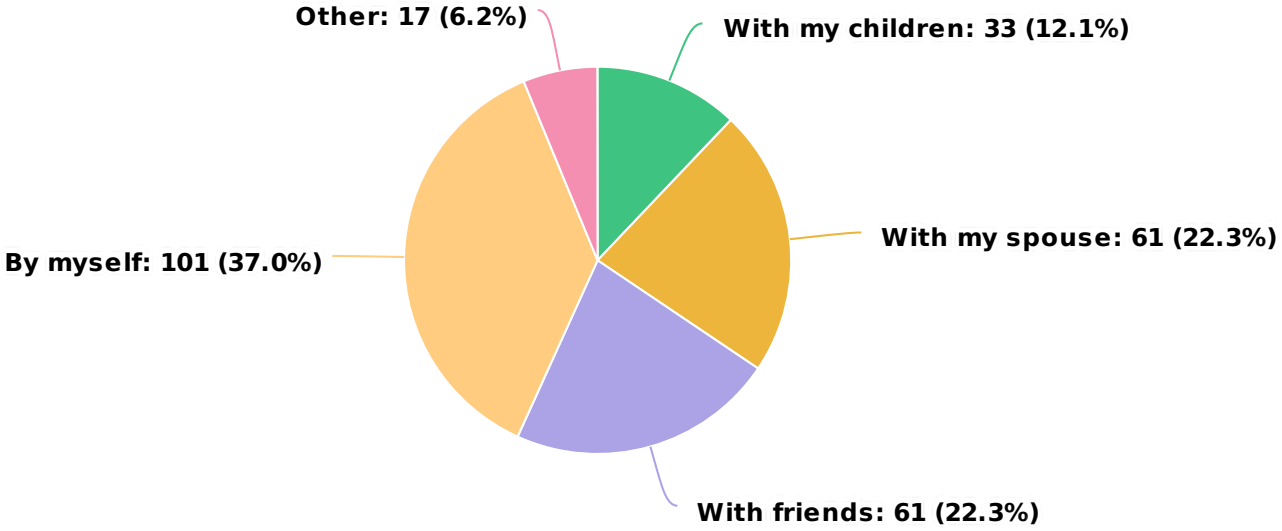
What mode(s) do you use on the Mainland Linear Trail? Select all that apply.

Optional question



With whom do you use the Mainland Linear Trail? Select all that apply.

Optional question



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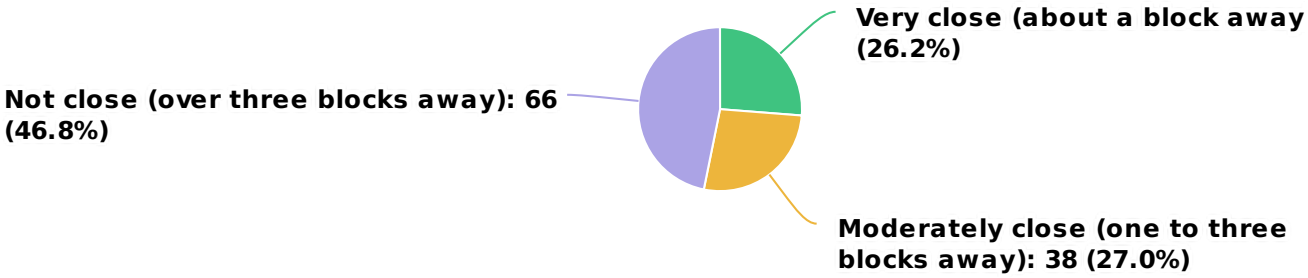
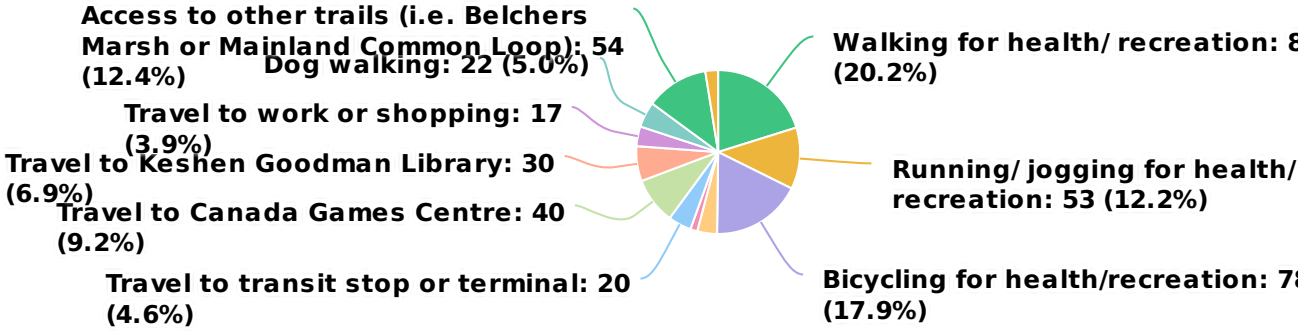
How close do you live to the Mainland Linear Trail?

Optional question



Why do you use the Mainland Linear Trail? (Select all that apply)

Optional question



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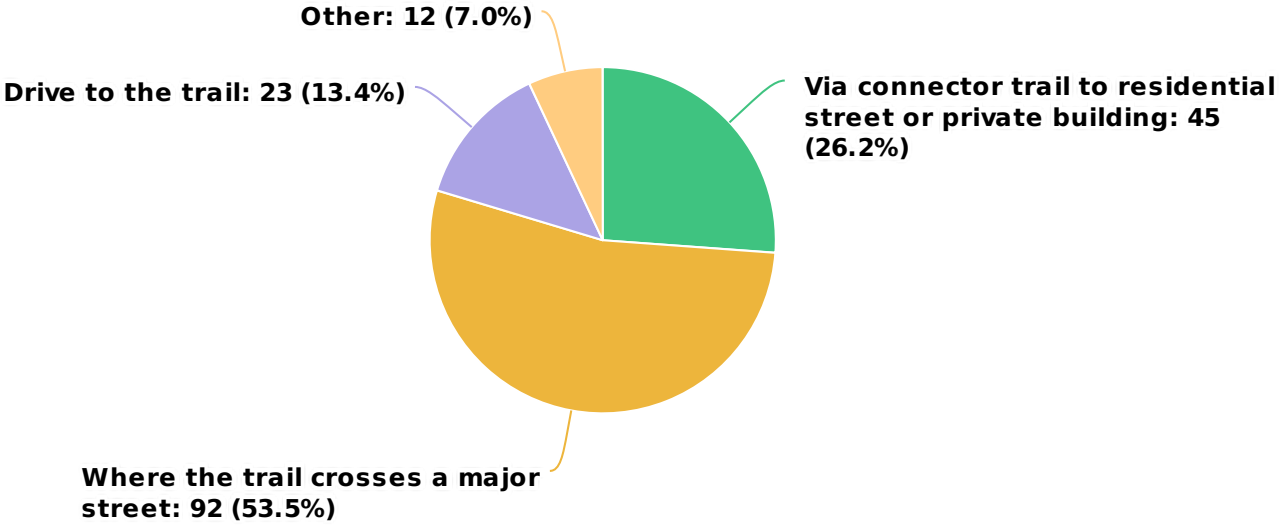
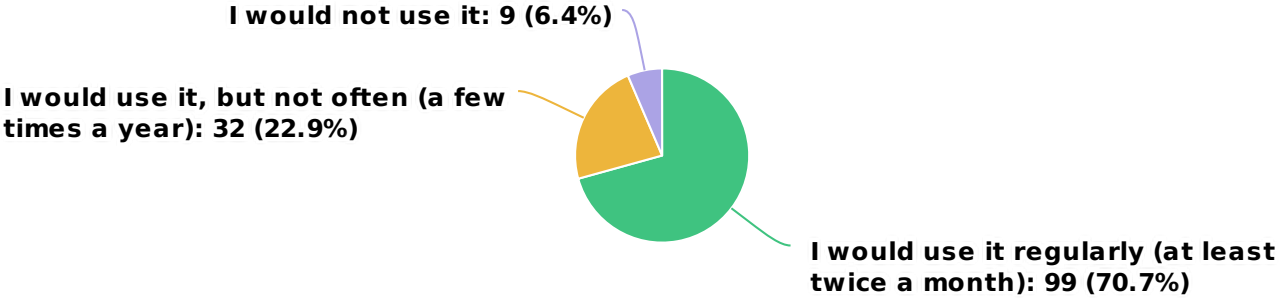
How do you access the Mainland Linear Trail?

Optional question



If the Mainland Linear trail was extended south, to the Chain of Lakes Greenway, how likely are you to use it?

Optional question



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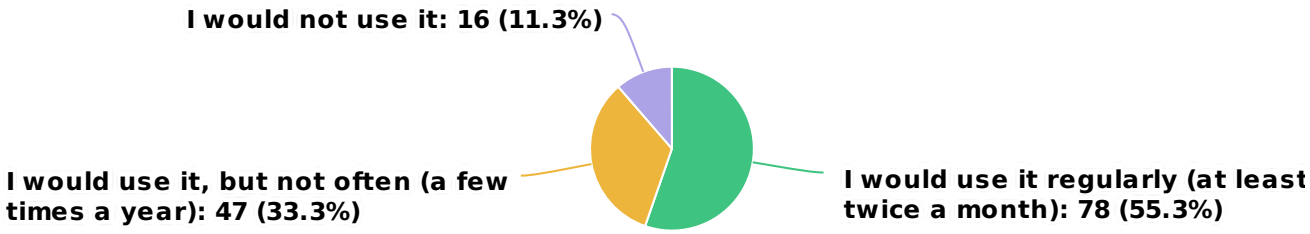
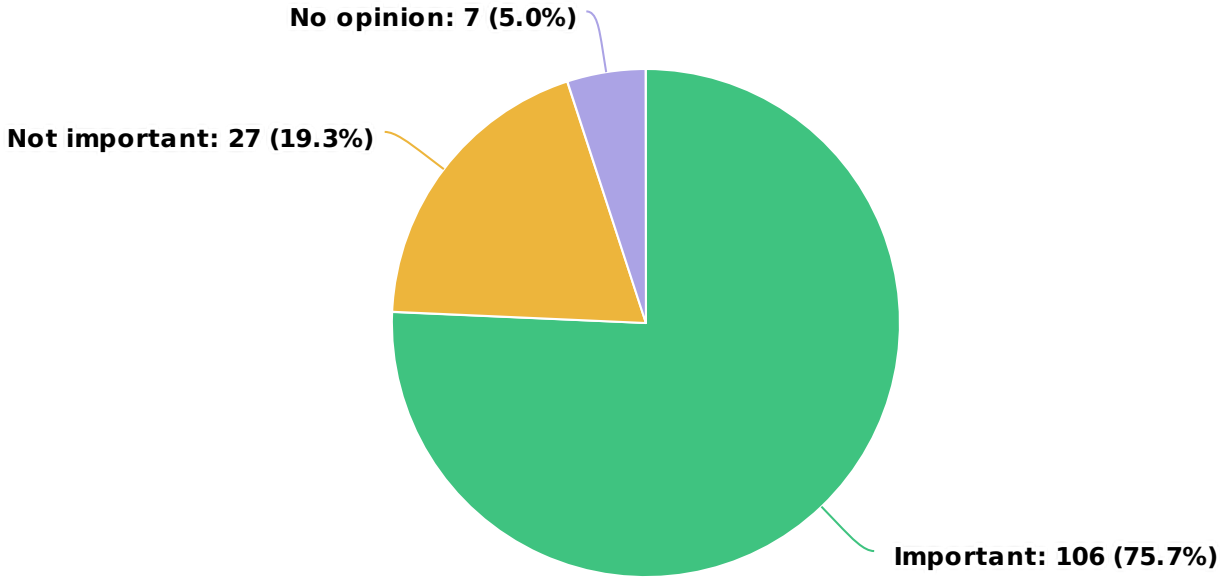
If the Mainland Linear Trail was extended north, to Kearney Lake Road and Larry Uteck Boulevard, how likely are you to use it?

Optional question



The Mainland Linear Trail currently has a crusher dust surface. How important is the surface of the Mainland Linear Trail to you?

Optional question



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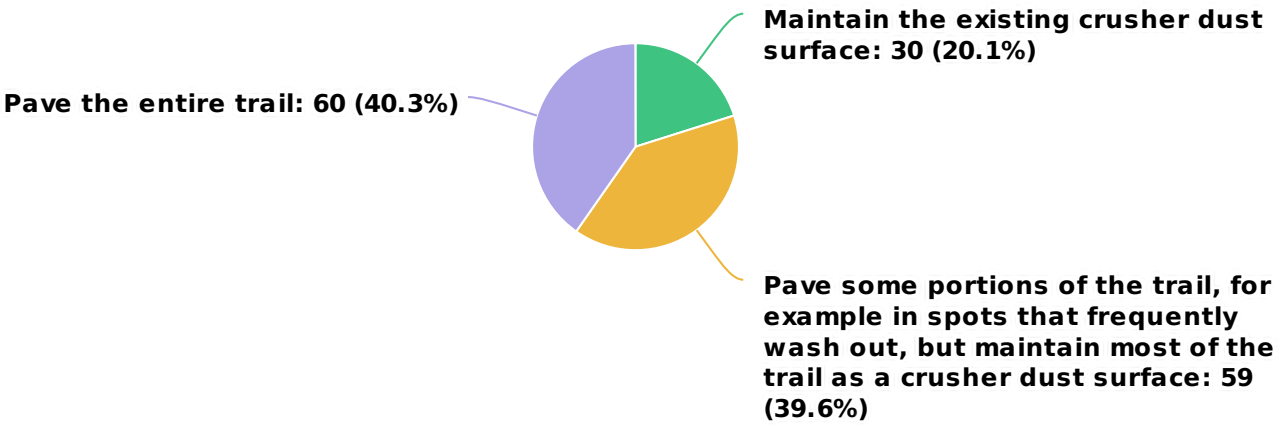
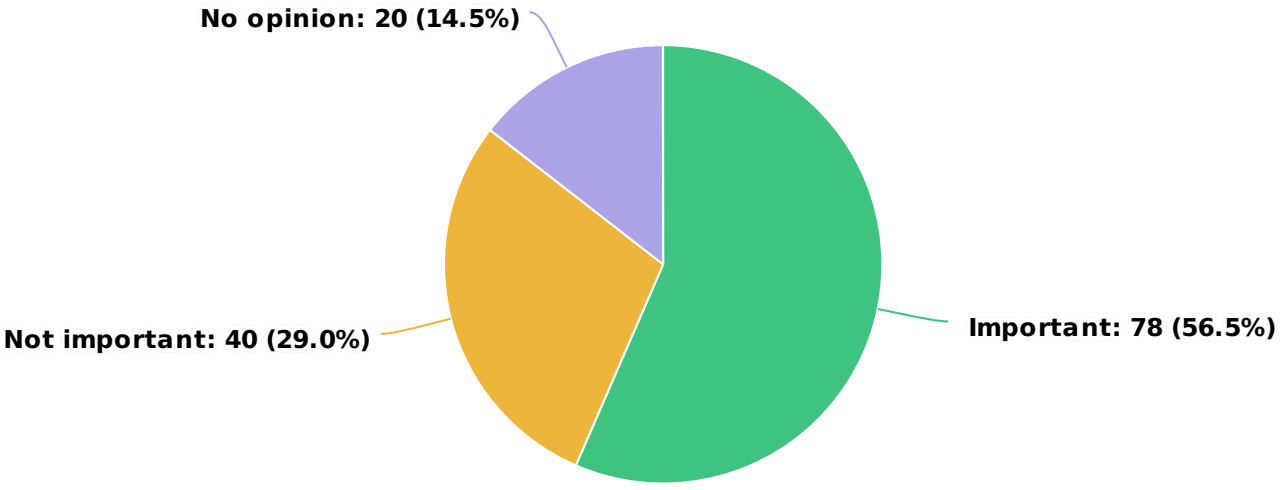
Some greenways similar to the Mainland Linear Trail have asphalt surfaces and others have crusher dust gravel. Which statement best describes your opinion on what the surface should be?

Optional question



Paving the Mainland Linear Trail would make it accessible to people using inline skates and could make it more accessible to those with mobility challenges. How important is it to you to make the trail more accessible to other active modes by paving it?

Optional question



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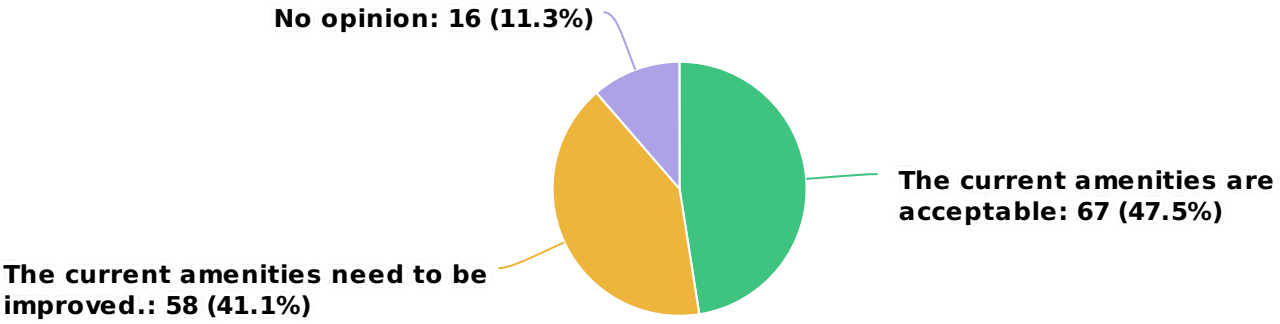
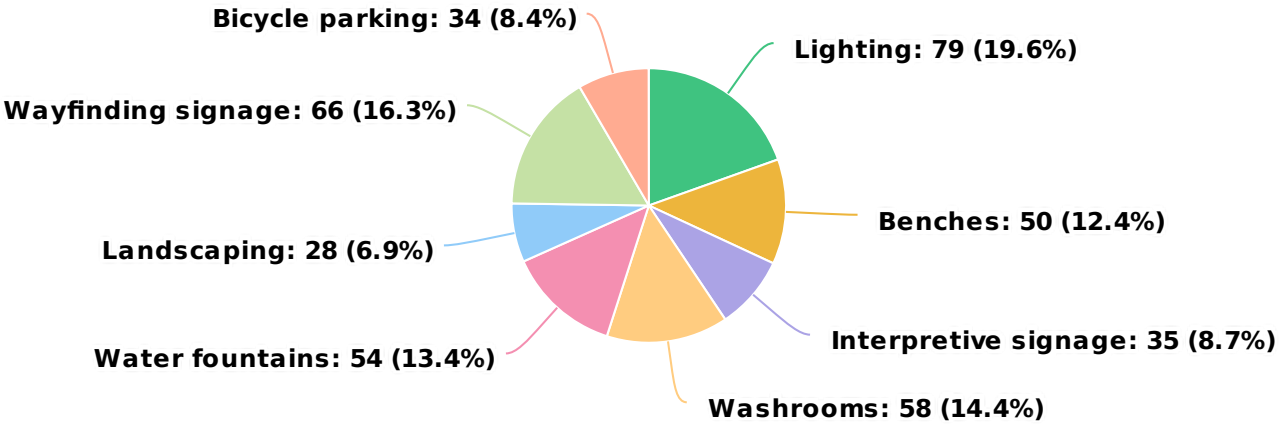
How would you rate the existing amenities (e.g. benches, trash cans, directional signage and bicycle parking) on the Mainland Linear Trail?

Optional question



What types of amenities should be added to the Mainland Linear Trail? Select all that apply.

Optional question



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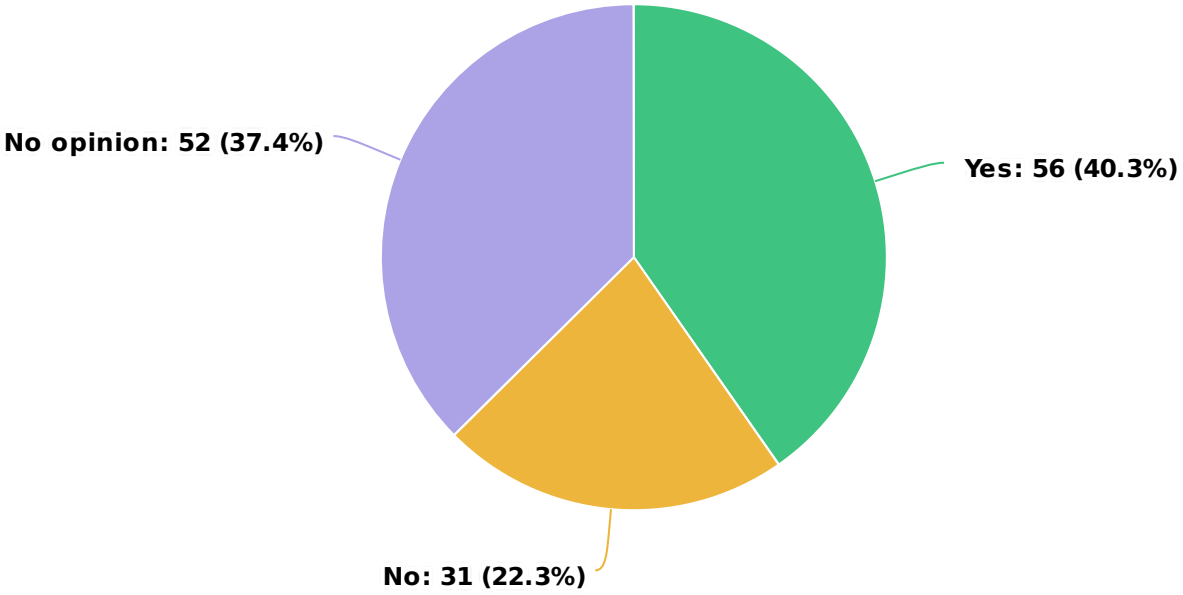
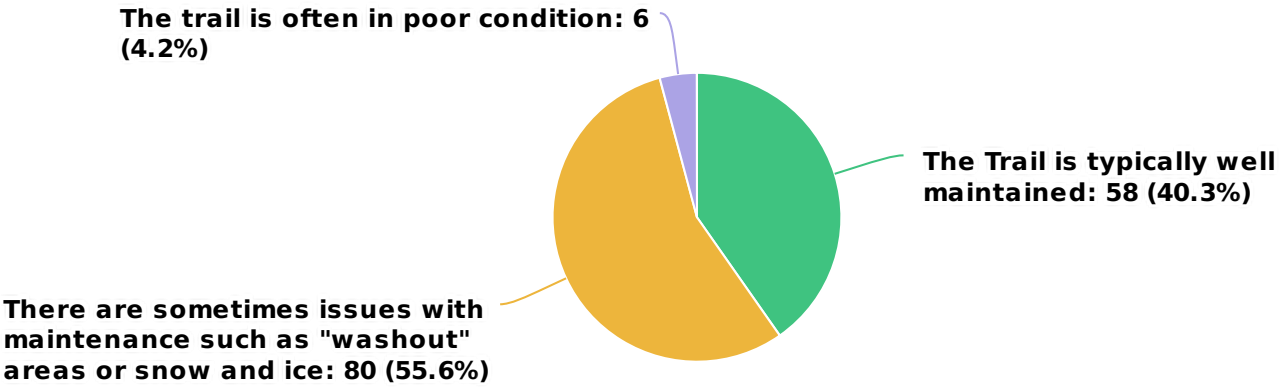
There are a number of different names used for the Mainland Linear Trail. These include "Powerline Trail", "Mainland Linear Trail", and "Mainland North Linear Parkway". The municipality is working to clearly differentiate the different types of "trails" by referring to the wider routes as "greenways". Should the Mainland Linear Trail be renamed?

Optional question



How would you describe the condition of the Mainland Linear Trail?

Optional question



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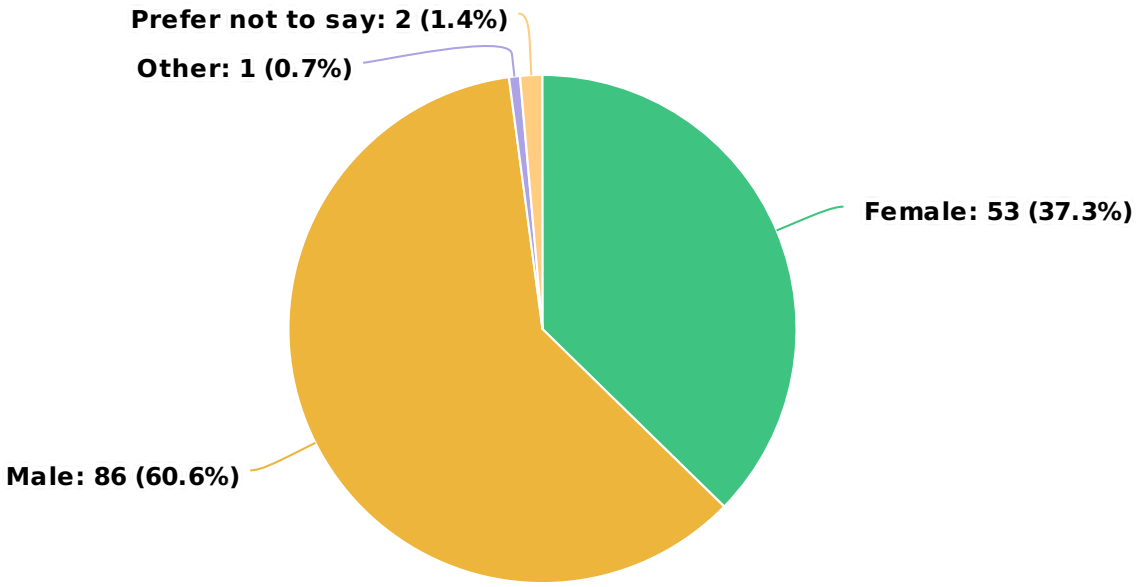
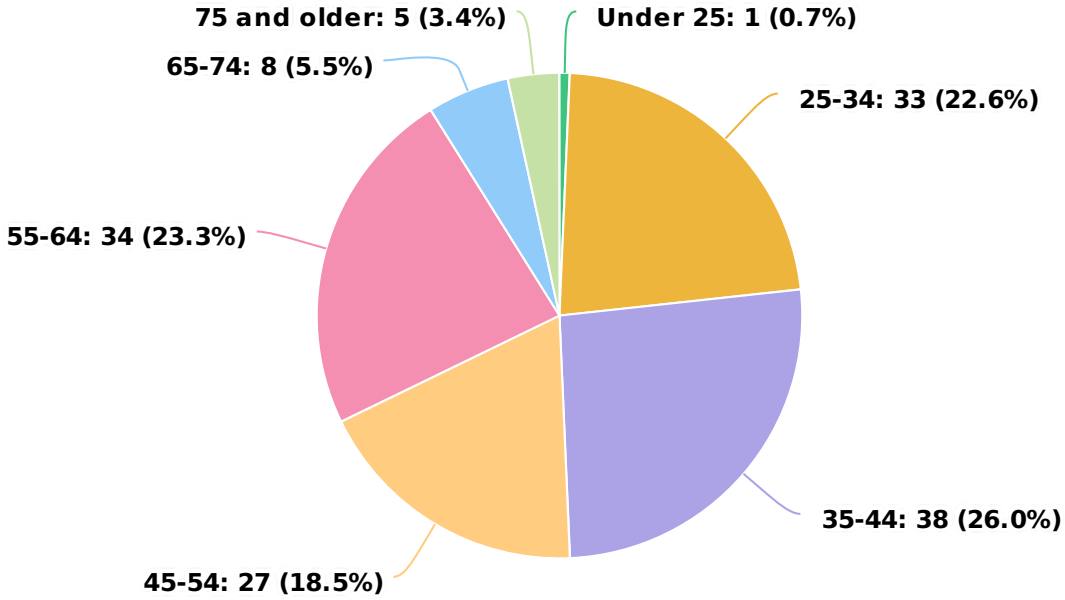
What is your gender?

Optional question



What is your age?

Optional question



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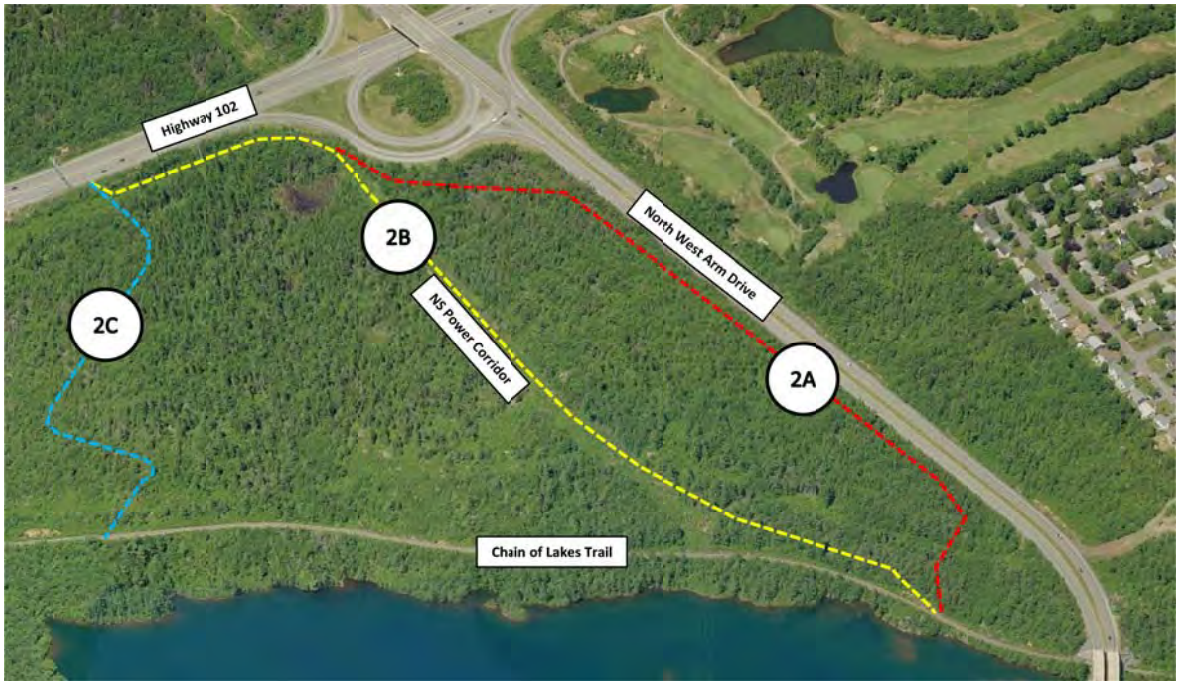
	Where should Connections to the Trail be?	What Amenities Should be Added?	What should trail surface be?	Miscellaneous
Trail Near Park West School	No need for more formal connections Informal connections are uninviting when overgown with brush and covered in snow Lack of access points along trail between Langbrae Drive and Radcliffe Drive Access should be improved near Park West School Include more "sub-trails" where possible (more natural) More connections needed south of Lacewood Drive Hard to access Mainland Common fields during winter Multiple street crossings provide easy access points Access difficult during winter Connection next to Park West School is often overgrown Improved access next to Park West School	More lighting along the trail Washrooms Lighting Benches along southern portion of the trail Washrooms Washrooms Benches Garbages should be maintained more frequently Lighting Wifi along trail Litter cleanup Lighting - but either light all of it or none of it "On-Leash" signage "On-Leash" signage Benches will help seniors more garbage cans Dog bag stations Improved maintenance of grass	Paved for AT, crusher dust for recreation Paved Existing surface is nice and rustic Existing surface is preferred Pave it IF winter maintenance improves Existing surface is fine. Don't waste the money Pave it IF winter maintenance improves Keep crusher dust on flat sections Pave it IF winter maintenance improves Paved -- will help with strollers Existing Paved Gravel surface makes it feel like a "Trail" Paved Existing Pave it IF winter maintenance improves	Connect to COLTA Improve winter maintenance Clean up dead wood along trail
Trail Near Lacewood Terminal and Terminal	Access difficult during winter Access difficult during winter More connections needed south of Lacewood Drive More connections needed south of Lacewood Drive More wooded connector trails Hard to access Mainland Common fields during winter More connections needed north of Lacewood Drive Improve connections to apartment buildings	Washrooms Lighting Washrooms Washrooms but no portable toilets "On-Leash" signage Lighting Water fountains, especially near Lacewood Terminal Washrooms Water fountains more garbage cans Lights to improve comfort / safety	Pave it IF winter maintenance improves Pave Pave would help wheelchairs Pave steep slopes to avoid washouts Keep crusher dust Unpaved feels more natural Unpaved is more comfortable to walk on Pave half and leave half gravel	Winter maintenance improvements Winter maintenance improvements Clean up dog waste
Larry Uteck Sobeys	Many new residents coming to Bedford West Connect to the great trails in Ravines Park Improved connectivity to residential neighbourohoods			Currently a lack of trails in the Larry Uteck area Existing trails in Larry Uteck area are very informal and hard to run on Trail system in Larry Uteck area not good for adults or children Inadequate trail system in Larry Uteck area Education is important to promote safe trail use Huge demand to be tapped into with improved trails Trail etiquette needs to improve Current trail network in Larry Uteck area very poorly connected Enforcement -- no more motorized bicycles!
Open House (CG Centre)	Reopen Berkshire Close walkway Reopen Berkshire Close walkway, kids cannot access school Mary Clayton Park Access to Mainland Common area (opposite MC Park)	Water fountains every km Wayfinding signage Benches Lighting Garbage bins Dog bag stations Washrooms Maps at trail entrances Distance markers Garbages cans Benches Lighting Add lighting but not to bridge Trash bins Lights for safety	Paved - year round cycling Paved - improved stroller access Crusher dust Crusher Dust or other soft equivalent' Crusher dust Crusher dust Paved in areas used primarily for commuter trafffic. Crusher dust elsewhere	Police bike patrols to improve safety and comfort

Appendix C
Phase 1 Report: Review of Conceptual Alignment Options (2015)



Final Report

Functional Plan: Mainland North Linear Parkway Trail
Phase 1 Report: Review of Conceptual Alignment Options

May 2015

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Appendix A: Conceptual Alignment and Profile Sketches

1.0 Introduction

WSP is currently preparing a functional planning study for upgrades to the Mainland North Linear Parkway Trail (MNLPT) in Halifax. The Study includes route assessment, development of functional designs / cost estimates, and consultation for three proposed AT connections including (i) a connection south to the Chain of Lakes Trail, (ii) a connection north to the 'Waterline Trail', and (iii) a connection between the Waterline Trail and the Larry Uteck AT Greenway. The project will also consider the existing MNLPT, including review of options for enhancing the facility through the addition of amenities and neighbourhood connections.

This report has been prepared to provide an overview of the conceptual design options that have been reviewed for each of the three proposed AT connections. Review and evaluation of each option has been completed based on background research (property ownership, GIS mapping information, record drawings), site investigations, stakeholder consultation, and preliminary engineering. Based on the results of this conceptual alignment review, the Project Steering Committee will select a preferred option for each of the three proposed AT connections that will be carried through to more detailed investigation as part of this Study.

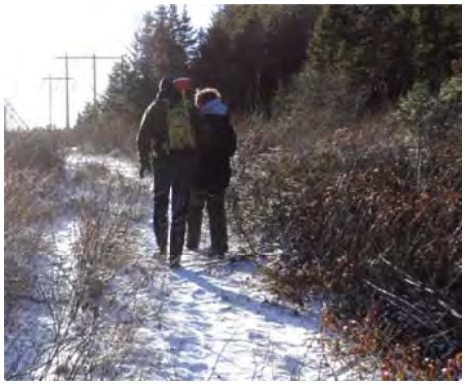
2.0 Background Review

2.1 Compile Data & Information

Review and evaluation of potential connection options can be aided considerably by the use of digital mapping data including property boundary information, Lidar topographical data, GIS layers, and aerial photography. This information was obtained from HRM Business Intelligence & Data Services and compiled in base drawings for each Study Area.

2.2 Site Investigations

WSP completed initial site investigations at the three proposed AT connection options on Friday, January 23, 2015. Each location was explored on foot to obtain photos and review potential alignment options.



2.3 Review Previous Plans, Studies, and Policies

In order to gain an appreciation for the context of the project and incorporate any pertinent information, a background review of the following documents and policies was completed:

- *Making Connections: 2014-19 Halifax Active Transportation Priorities Plan* (Halifax Regional Municipality, 2014)
- *Bayers Road / Highway 102 Corridor Study* (Stantec, 2009) [Selected components]
- *Ramsbrook Court – Access to Mainland North Linear Trail:* February 24, 2015 HRM Staff Report
- Nova Scotia Transportation and Infrastructure Renewal Policies[1]:
    - *Trail Policy* (November 2012)
    - *Trail Construction / Maintenance and Trail Crossings Policy* (November 2012)
    - *Sidewalk Construction and Maintenance* (March 2011)

3.0 Stakeholder Consultation

Consultation sessions were held during February and March 2015 with several key stakeholders. The intent of these meetings was to introduce the project and identify opportunities and constraints related to each connection option. At each meeting, WSP provided a project overview, which was followed by questions and discussion that focused on the specific interests of each stakeholder to the project. The following sections summarize the information that was obtained from each stakeholder group.

3.1 Nova Scotia Transportation and Infrastructure Renewal

Nova Scotia Transportation and Infrastructure Renewal (NSTIR) own and maintain 100-Series highways in the province, including Highway 102 in the Study Area. Since all three AT connections either cross or run directly adjacent to Highway 102, NSTIR is a major stakeholder. WSP's meeting with NSTIR's local Area Manager and Development Engineer focused on the following issues:

- Future Expansion of Highway 102 Corridor: NSTIR has long-term plans for expansion of the Highway 102 Corridor, which will result in eventual highway widening and interchange modifications.

[1] NSTIR policies are available online at http://novascotia.ca/tran/

- Trail Development within Highway ROW: There are several issues that must be considered when attempting to place a trail within a highway ROW ranging from safety to maintenance to drainage impacts.
- At-Grade Crossings: Each of the three AT connections being investigated could potentially require an at-grade street crossing at a Highway 102 interchange.
- Grade Separated Crossing: At least one location may require crossing Highway 102. NSTIR requires that any crossing of 100-series highways be grade separated.
- Applicable Policies: There are multiple NSTIR policies that must be considered including the *Trail Policy*, *Trail Construction / Maintenance and Trail Crossings Policy*, and the *Sidewalk Construction and Maintenance and Crossing Policy*.

3.2 Municipal Staff

HRM Staff are responsible for a wide range of issues associated with the project. A brief description of each municipal unit that was consulted along with their specific interest / role in the project is listed below:

- Transportation Planning: The proposed connections should be in line with objectives outlined in the *Municipal Planning Strategy* and *Active Transportation Plan*.
- Regional Trails: Facility design standards and implementation of HRM's Greenway Network Vision.
- Development Planning: Opportunities and constraints associated with planned developments in the Study Area.
- Real Property Planning: Property ownership and its impact on each connection.
- Traffic & ROW Services: Consideration of at-grade street crossings and potential impacts on road and intersection capacity.
- Parks: Interaction of existing and potential neighbourhood connections with parks.
- Operations / Maintenance: Consideration of maintenance requirements (i.e. snow clearing).

3.3 Halifax Water

A south connection to the Chain of Lakes Trail will likely run across a large parcel that Halifax Water owns and maintains as reserve watershed lands. Given the sensitivity associated with the watershed lands, it is Halifax Water's mandate to limit development as much as possible. Development of a connection across the watershed will require cooperation with the Water Commission.

3.4 Nova Scotia Power

Nova Scotia Power has a major power corridor running across Halifax Water's watershed lands south of the existing terminus of the MNLPT. The power corridor, which is located within an easement, provides a direct connection south to the Chain of Lakes Trail. Development of a trail connection within the power corridor will require cooperation with Nova Scotia Power and adherence to any applicable standards and policies. The existing section of the MNLPT is located within a power corridor.

3.5 Local Trails Groups

Trails groups provide support that is critical to the development of AT connections. The MNLPT and Chain of Lakes Trail – two of the best used AT facilities in the region – are supported by the Halifax North West Trails Association and Chain of Lakes Trail Association, respectively. The Groups' in-depth knowledge of the trails and user behaviours are valuable to consider in assessing all aspects of the project.

4.0 Chain of Lakes Trail Connection

Development of a connection south to the Chain of Lakes Trail will provide an important link that enables safe and convenient access between two of the region's most important AT facilities. Part of a major AT greenway spine, it would connect major suburban communities including Spryfield, Fairview, and Clayton Park.

4.1 Design Considerations

4.1.1 *Highway 102*

Highway 102 presents the most significant challenge to the connection south to Chain of Lakes Trail. Since a crossing of the highway must be grade separated, a bridge structure will be required. At present, a crossing of Highway 102 in the vicinity of the North West Arm Drive interchange would require a span of 5-6 traffic lanes. However, NSTIR has future plans to widen Highway 102 in this area that will increase the cross section to 8-10 lanes, in addition to a new off-ramp running just south of the mainline lanes. Though there is not currently a timeline in place for this widening, NSTIR will require that any crossing of the highway be sufficiently long to accommodate these future widening plans.

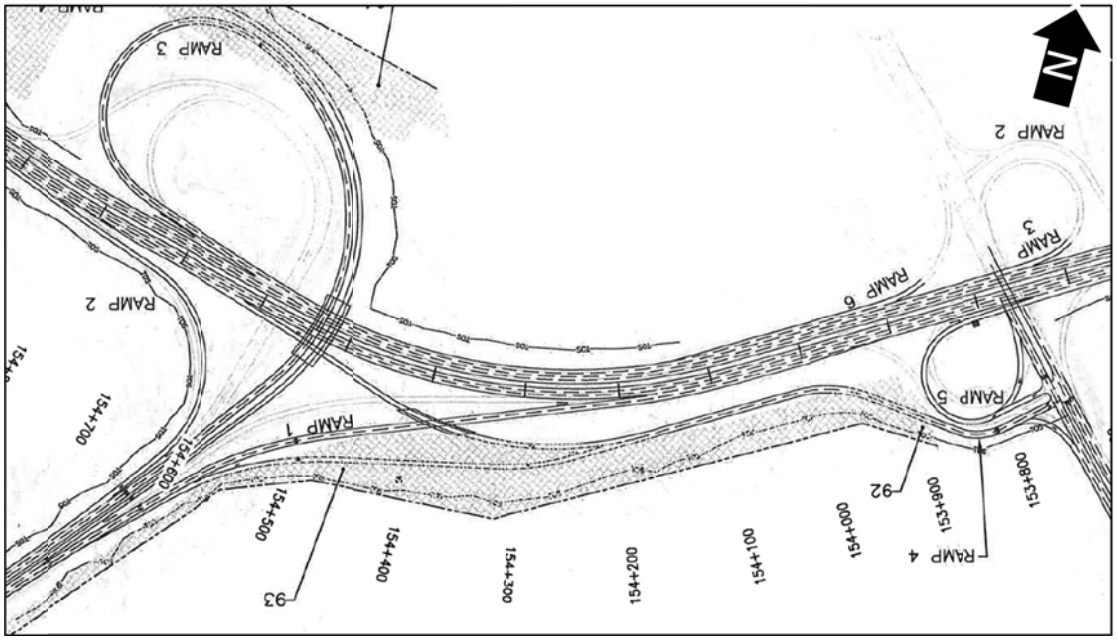


Figure 4-1: Conceptual Plan: Highway 102 North of Highway 103
Source: *Bayers Road / Highway 102 Corridor Study* (2009) – Sheet 09b

4.1.2 *Watershed Lands*

The majority of the land in this segment of the Study Area is owned by Halifax Water, serving as a backup water supply. Consultations with Halifax Water have indicated that although they are very hesitant to permit any development within the watershed, given the significant regional benefit associated with the potential AT connection, they are open to considering options.

Halifax Water's primary concerns are related to potential degradation in water quality resulting from increased access to the land by the general public and further exposure of acid bearing rock resulting from disturbance of the ground. As a result, it is their preference that any potential trail development be as direct as possible and stay either within the power corridor or closer to the edges of the property – preferably along the west side of North West Arm Drive. Fencing would reduce the potential for users straying from the trail, but may be contentious due to the potential impact on aesthetics.

4.1.3 *Nova Scotia Power Corridor*

Nova Scotia Power runs transmission lines down an easement across the watershed lands. The easement, approximately 20m wide, is cleared of large trees and includes transmission lines on wood utility poles as well as other power infrastructure. The existing section of the MNLPT was developed along the same power corridor (north of Highway 102).

Looking north along the Nova Scotia Power Corridor from just north of Highway 102

Unlike rail corridors, power corridors do not necessarily have relatively flat terrain, but rather tend to follow a direct alignment with less consideration of topography. The power corridor's alignment has relatively gentle grades south of Highway 102, becoming quite steep as it approaches the Chain of Lakes Trail. Excavation around the transmission poles will be restricted, which may limit the ability to create a gentle trail profile, and may also present additional challenges during detailed design. The power corridor's clear cut terrain may reduce trail construction costs and limit further land disturbance, but is not ideal from the perspective of trail aesthetics. Alignments that run through the wooded areas would provide an improved environment for users.

Trail development in power corridors in Nova Scotia is not subject to a formal policy, and is considered on a case by case basis. The following are issues that must be considered:

- Ground Clearance Standard: Nova Scotia Power requires a minimum ground clearance height between the ground and transmission lines. Any changes to the ground profile resulting from trail construction would need to conform to these minimum standards.
- Liability Concerns: Though Nova Scotia Power will consider the use of its land for trail development in some instances, there is concern about potential liability issues due to increased access of the public and the presence of high voltage infrastructure.
- Potential Shared Benefit: Development of a trail within the power corridor could also provide improved access for Nova Scotia Power maintenance vehicles. Potential for cost sharing should be considered.
- Safety: Operating heavy equipment during construction of the trail around / under transmission lines may have safety concerns.

4.1.4 *Topography*

The terrain within the watershed lands, including steep slopes, watercourses, and swampy areas, is challenging for trail development. The existing grade slopes down from Highway 102 to the Chain of Lakes Trail, dropping 30-60m in different locations. As a result, development of an alignment suitable for AT (maximum grade of 5%) will likely require some meandering and switchbacks to provide more length to develop the elevation drop. These maximum slopes may need to be exceeded to avoid excessive switchbacks; rest areas may need to be provided periodically along steep sections.

4.1.5 *Connection to Mount Royale Subdivision*

The Mount Royale subdivision, located at the south end of the existing MNLPT alignment, does not presently have a formal connection to the trail. A planned connection via Ramsbrook Court was eliminated due to the need for a stormwater retention pond on the proposed property.

Recent discussions between HRM Staff and Halifax Water have given rise to the potential for a connection via a stormwater easement that runs along the south edge of the Mount Royale subdivision (south of Bently Drive). The Halifax Water easement runs across a parcel that is owned by Nova Scotia Power. It is currently used as an informal trail connection.

Though installation of a formal trail in this location would – at present – provide a convenient connection primarily for a small number of residents, its potential significance may be considerably greater with connection of the MNLPT south to the Chain of Lakes Trail.

4.2 Alignment Options

4.2.1 *Existing Trail Limits to Highway 102*

The two preliminary alignments north of Highway 102 that have been considered at this stage are illustrated in Figure 4-2 and summarized in Table 4-1. Conceptual alignment sketches and alignment profiles are also provided in Figures A-1 and A-2 (Appendix A), respectively.

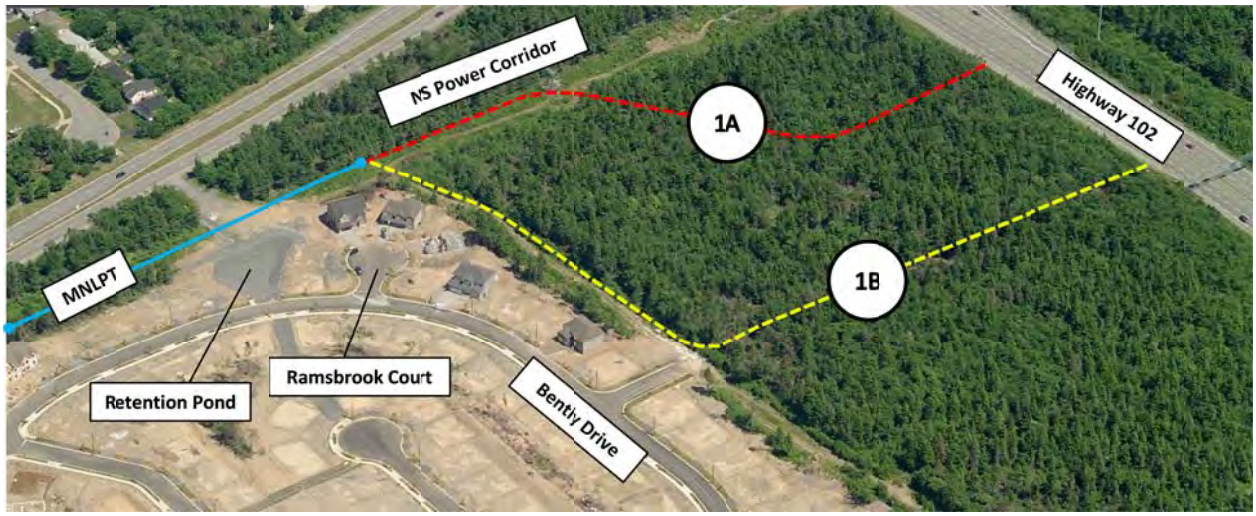


Figure 4-2: Conceptual Alignment Options: MNLPT to Highway 102

Table 4-1: Conceptual Alignment Options: MNLPT to Highway 102

Option	1A. Nova Scotia Power Corridor	1B. Halifax Water Easement / Lands:
Description	Extend the MNLPT south from its existing limits along the NS Power corridor, diverting to the west to a Highway 102 crossing point.	Extend the MNLPT west from its existing limits, formalizing a trail along the Halifax Water sewer easement at the south boundary of the Mount Royale Subdivision. Divert the trail south to a Highway crossing point.
Advantages	• Provides a direct, natural extension of the MNLPT from its existing limits to the most narrow cross section of Highway102; • Running through clear cut power corridor may decrease construction costs; • Grades are mostly favorable	• Provides formal connection to the trail from Mount Royale Subdivision; • Grades are favorable between subdivision connector and Highway 102; • Surface conditions are generally good, no watercourse crossings observed; • Mixed forest dominated by semi/mature conifers; not too dense to compromise visibility or security.
Disadvantages	• Guy wires, utility poles, and fenced enclosure area may restrict the alignment and provide unfavorable aesthetics; • Alignment runs across Halifax Water lands; • May require a small watercourse crossing; • Does not provide a formal connection to the Mount Royale Subdivision	• Connection is less direct for through traffic; • Intermittent rock outcrops (3m+/-) were observed. • Trail construction expected to be more expensive

4.2.2 *Highway 102 Crossing Options*

Potential options for crossing Highway 102 are summarized in Table 4-2:

Table 4-2: Highway 102 Crossing Options

Option	A. New AT Bridge	B. Existing North West Arm Drive Overpass Structure	C. Future North West Arm Drive Overpass Structure
Description	A new dedicated AT bridge structure across Highway 102. In order to shorten the span as much as possible and take advantage of natural topography, the bridge would likely need to be located west of the assumed desire line.	The existing structure could potentially be modified to accommodate an AT connection along its west side, either on-street or by using a supplementary bridge structure cantilevered off the side of the existing structure.	NSTIR is planning to replace the existing overpass structure to accommodate future widening plans (timeline undetermined). Replacement of the structure, and potential reconfiguration of the interchange, should provide opportunity to integrate an AT connection.
Advantages	• Relatively direct connection • Dedicated for AT users, it would limit conflicts with vehicles.	• Direct connection between the existing MNLPT alignment and north-south desire line.	• Direct connection between the existing MNLPT alignment and north-south desire line.
Disadvantages	• An approximately 50-60m span across 8-10 lanes, it would constitute a major bridge structure Preliminary cost estimates completed by NSTIR indicate a cost of approximately $1.8M. • Constrained by future Highway 102 widening plans. • Presence of existing overhead electrical wires on either side of Highway 102 may introduce conflicts.	• AT users would need to cross multiple high volume, high speed ramps on either side of the structure. • May not be structurally feasible based on structure type.	• AT users may need to cross multiple high volume, high speed ramps on either side of the structure. • There is no current timeline for replacement of the existing structure. • Coordination required with NSTIR, as well as potential cost sharing.

4.2.3 *Highway 102 Crossing Location*

To minimize approach grades to the bridge structure, it is advantageous to seek a crossing location at which elevations along the Highway are as close as possible to the assumed finish grade of the bridge structure. It is also preferable to locate the crossing away from the two adjacent interchanges to limit the required span length.

Based on preliminary review and site investigations, a potential crossing location was identified approximately halfway between the Highway 102 interchanges at North West Arm Drive and Highway 103, just east of the highway sign structure. A rock outcrop on the north side of Highway 102 at this location provides a high point that is advantageous for approach grades. Located between the interchanges, this location also limits crossing distance as it avoids interchange ramps.

Potential Highway 102 Crossing Location

4.2.4 *Highway 102 to Chain of Lakes Trail*

Connection south from Highway 102 to the Chain of Lakes Trail requires crossing Halifax Water's backup watershed lands. The lands are undeveloped, with the exception of an easement owned by Nova Scotia Power that serves as a hydro transmission corridor. Terrain generally slopes to the south toward the Chain of Lakes Trail, with steepest grades at the south end. The three preliminary alignments that have been considered at this stage are illustrated in Figure 4-3 and summarized in Table 4-3. Conceptual alignment sketches and alignment profiles are also provided in Figures A-1 and A-2 (Appendix A), respectively.

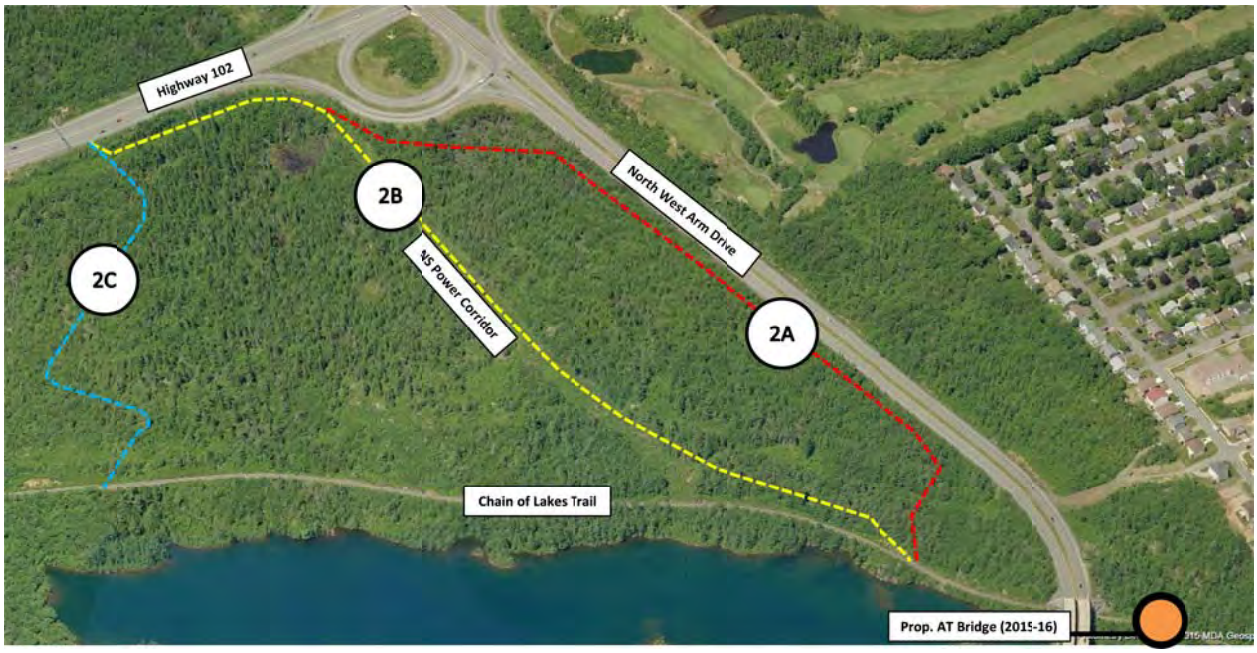


Figure 4-3: Conceptual Alignment Options: Highway 102 to Chain of Lakes Trail

Table 4-3: Conceptual Alignment Options: Highway 102 to Chain of Lakes Trail

Option	2A. Adjacent to North West Arm Drive	2B. NS Power Corridor	2C. West Connection
Description	Develop a new trail alignment running along the west side of North West Arm Drive, separated by a forested buffer.	Develop a trail within the NS Power corridor where grades allow, diverting to the east further south where terrain is more challenging.	Develop a new trail alignment extending southwest from Highway 102 to connect with the Chain of Lakes Trail west of First Chain Lake.
Advantages	• Direct connection between Highway 102 and the primary desire line to the east of the Chain of Lakes Trail; • Potential for good aesthetical value; • Limits additional development of watershed lands, which accommodates Halifax Water concerns (limits impact to watershed); • Grades are generally favorable, with the exception of the south end. • Consistent terrain should be beneficial for design and construction.	• Direct connection between Highway 102 and the primary desire line to the east of the Chain of Lakes Trail; • Limits additional development of watershed lands, which accommodates Halifax Water concerns; • Less clearing required; • Potential for shared benefit with Nova Scotia Power for access by maintenance vehicles; • Grades are generally favorable, with the exception of the south end.	• Shortest connection between Highway 102 and Chain of Lakes Trail (only slightly); • No watercourse crossings expected.
Disadvantages	• Grades along the southern half of the corridor are very steep; switchbacks are likely to be required to meet design standards; • Proximity to the roadway may be unpleasant for users. • Impacted by watercourse crossing and nearby wetland area	• Rolling terrain and presence of overhead power infrastructure may complicate design and construction; • Grades along the southern half of the corridor are very steep; switchbacks are likely to be required to meet design standards; • Impacted by watercourse crossing and nearby wetland area • Cooperation required with Nova Scotia Power; • Aesthetics may be impacted by power corridor terrain.	• Does not serve the primary north-south desire line. • Grades along the southern half of the corridor are very steep and maybe unsuitable for trail development; • Runs across Halifax Water lands

5.0 Waterline Trail Connection across Kearney Lake Road

The MNLP currently ends at Parkland Drive, approximately 500m south of Kearney Lake Road. Extension of the facility north from its current terminus provides opportunity to connect to Kearney Lake Road and the 'Waterline Trail', an informal trail along a major Halifax Water corridor that abuts Highway 102.

5.1 Design Considerations

5.1.1 *Kearney Lake Road*

Connection between the existing MNLPT and the Waterline Trail will require crossing Kearney Lake Road, a 4-lane arterial street that intersects with Highway 102 (Exit 2) and is subject to relatively heavy traffic volumes. The Kearney Lake Road crossing is expected to be at-grade, occurring either at the northbound exit ramp or the Parkland Drive intersection, both of which are signalized. The NB exit ramp intersection does not currently have a crosswalk or pedestrian signal equipment on the Kearney Lake Road westbound approach, which would need to be added.

Looking west along Kearney Lake Road toward the Highway 102 Exit 2 Interchange

Sidewalk on the north side of Kearney Lake Road does not extend past the Chateau Bedford driveway. West of the driveway, there appears to be room to potentially extend the sidewalk or develop a multi-use trail. The hotel has recently installed a set of wooden stairs that connects from the bottom of the slope up to the hotel parking lot.

Looking west on Kearney Lake Road

5.1.2 *Property Ownership*

Land is constrained along Highway 102, particularly adjacent to the Quality Inn in the southeast quadrant of the Exit 2 interchange. There is a pinch point behind the Quality Inn parking lot that appears to constrain development of an off-street trail connection. The pinch point may be passable but will likely require a loss of parking area and/or garbage storage, utility pole relocation, extension of culvert, or encroachment on Highway 102 ROW.

Looking north along Highway 102 NB Exit Ramp from just north of Quality Inn

5.1.3 *Highway 102*

Running the alignment adjacent to Highway 102 is advantageous as it provides the most direct connection; however, it also presents challenges due to the need to conform to NSTIR standards. In general, NSTIR does not permit the installation of AT facilities along 100-Series highways; however, they will consider some alternatives on a case by case basis. Discussions with NSTIR Staff have indicated that the preferred minimum separation distance between the traveled way and an AT facility should be 10m. NSTIR also indicated that it prefers any development occur away from the ditch side in order to limit any impact to drainage.

Looking south along Highway 102 NB Exit Ramp

Looking south along Highway 102 NB On-Ramp

5.1.4 *Future Interchange Plans*

NSTIR has future plans to replace the interchange to accommodate road widening on Kearney Lake Road. As illustrated in the conceptual sketch in Figure 5-1, future plans include a new structure to accommodate Kearney Lake Road widening as well as realigned and widened ramps (Figure 5-1). Overall, the interchange upgrades would be expected to have minimal impact on the potential trail alignment options.

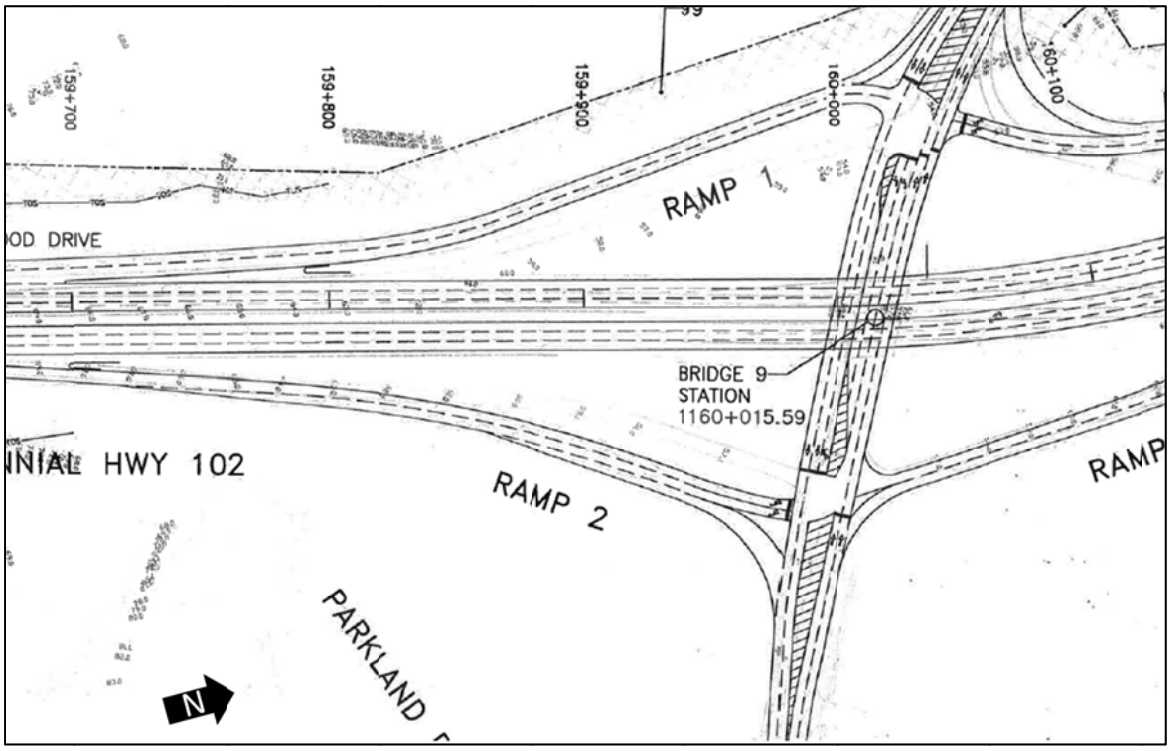


Figure 5-1: Conceptual Plan: Highway 102 at Kearney Lake Road
Source: *Bayers Road / Highway 102 Corridor Study* (2009) – Sheet 16

5.1.5 *Drainage at Quality Inn*

NSTIR Staff indicated that there are ongoing drainage concerns in the vicinity of the Quality Inn property. Parts of the hotel property have been subject to periodic flooding in this area. There is an approximately 600mm diameter concrete storm pipe outlet at the ditch that appears to discharge from the street storm system to the highway ditch Visual inspection suggests that the ditch does not slope away from outlet as expected. Trail installation in this area may require realignment of the highway ditch; detailed design may need to consider impacts to the storm drainage system.

5.1.6 *Parkland Drive*

The MNLP currently ends at Parkland Drive, approximately 500m south of Kearney Lake Road. Parkland Drive is a very wide 2-lane street with sidewalks on both sides. Though its width offers considerable potential in terms of the ability to install an on-street bike facility or potentially a separated trail, its alignment leads east of the desire line for north-south travel, and presents challenges in crossing Kearney Lake Road.

Looking south on Parkland Drive

5.1.7 *Commercial Driveways*

There are several commercial developments across from the Parkland Drive intersection on Kearney Lake Road. Wedgewood Plaza has a major driveway that sits directly opposite Parkland Drive, and the Chateau Bedford hotel has a driveway approximately 75m west of the intersection. Both driveways are relatively steep, with no sidewalk present.

Looking south on the Chateau Bedford / Wedgewood Plaza Driveway

Looking north to the Chateau Bedford Parking Lot

5.1.8 *Connection to Waterline Trail*

The connection from the Exit 2 NB exit ramp intersection to the Waterline Trail is relatively steep, and excavation is expected to be limited due to the presence of a 1200 diameter water main in the area. Consideration will need to be given to ways to minimize slope through this section and potentially add railings and/or rest areas.

5.2 Alignment Options

5.2.1 *MNLPT to Kearney Lake Road*

The three preliminary alignments that have been considered at this stage are illustrated in Figure 5-2 and summarized in Table 5-1. Conceptual alignment sketches and alignment profiles are also provided in Figures A-3 and A-4 (Appendix A), respectively.

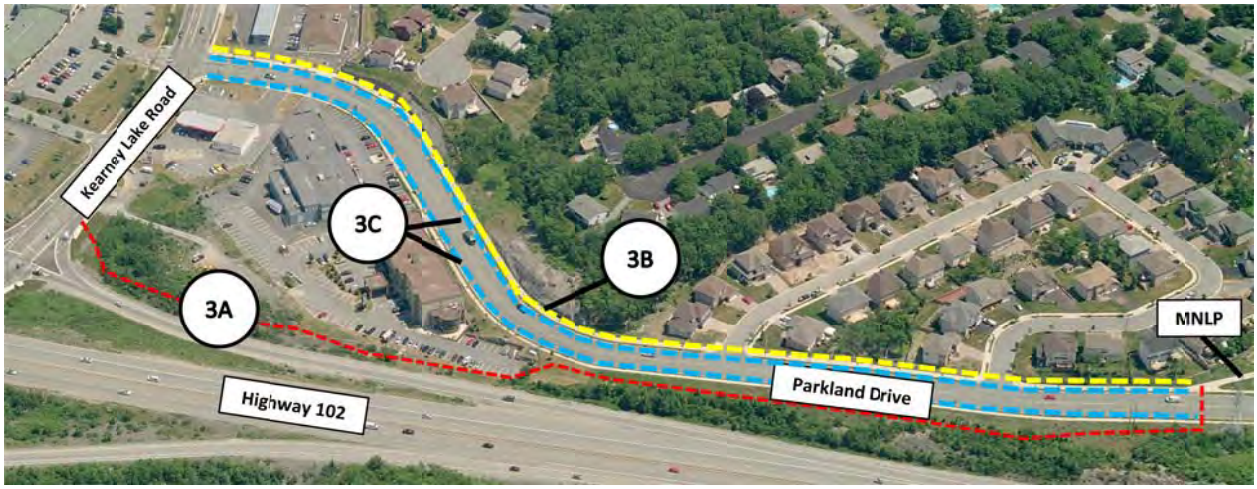


Figure 5-2: Conceptual Alignment Options: MNLPT to Kearney Lake Road

Table 5-1: Conceptual Alignment Options: MNLPT to Kearney Lake Road

Option	3A. Off-Street Trail Connection Along Highway 102	3B. Off-Street Trail along Parkland Drive	3C. On-Street Bicycle Lanes on Parkland Drive
Description	Separated trail located between Parkland Drive and Highway 102, running north from the existing MNLPT limits to Kearney Lake Road. Add a trail crossing on Parkland Drive at the existing MNLPT limits.	Reconfigure the existing sidewalk and grass strip as a multi-use trail (3-4m wide) on the east side of Parkland Drive between the existing MNLPT limits and Kearney Lake Road.	Mark on-street bicycle lanes on Parkland Drive between the existing MNLPT limits and Kearney Lake Road. Consider adding a trail crossing on Parkland Drive at the existing MNLPT limits.
Advantages	• Direct off-street connection between the existing MNLPT limits and the Waterline Trail; • Off-street connection is more attractive to a wider range of users relative to an on-street connection; • Horizontal and vertical separation from Highway 102 and Parkland Drive in most areas.	• Direct off-street connection between existing MNLPT limits and Kearney Lake Road; Off-street connection is more attractive to a wider range of users relative to an on-street connection;	• Maintains a degree of continuity of MNLPT; • Improved comfort for cyclists, particularly ascending the hill; • Minimal cost;
Disadvantages	• Very steep grades (>9%); switchbacks are likely to be required to meet design standards; • Land constraints may be present and require acquisition of property; • Potential drainage issues at Quality Inn; • Cooperation required with NSTIR;	• Steep grades in some places (~8%) to follow Parkland Drive profile; • Limited line of sight around corners may cause safety concerns for AT users; • Less direct connection for users to/from the Waterline Trail; • Requires connection on or adjacent to Kearney Lake Road from Parkland Drive to Highway 102 NB ramps intersection; • Intersection of trail and Kearney Lake Road may be challenging; • Existing trees and utility poles may need to be removed / relocated; • Minimal separation from traffic on Parkland Drive	• Steep grades in some places (~8%); • Less direct connection for users to/from the Waterline Trail; • Requires connection on or adjacent to Kearney Lake Road from Parkland Drive to Highway 102 NB ramps intersection; • Relatively awkward transition at the Kearney Lake Road – Parkland Drive intersection; • Lack of separation may not be appealing to novice cyclists, which could lead to cycling on the sidewalk.

5.2.2 *Kearney Lake Road to Waterline Trail*

The two preliminary alignments that have been considered at this stage are illustrated in Figure 5-3 and summarized in Table 5-2. Conceptual alignment sketches and alignment profiles are also provided in Figures A-3 and A-4 (Appendix A), respectively.

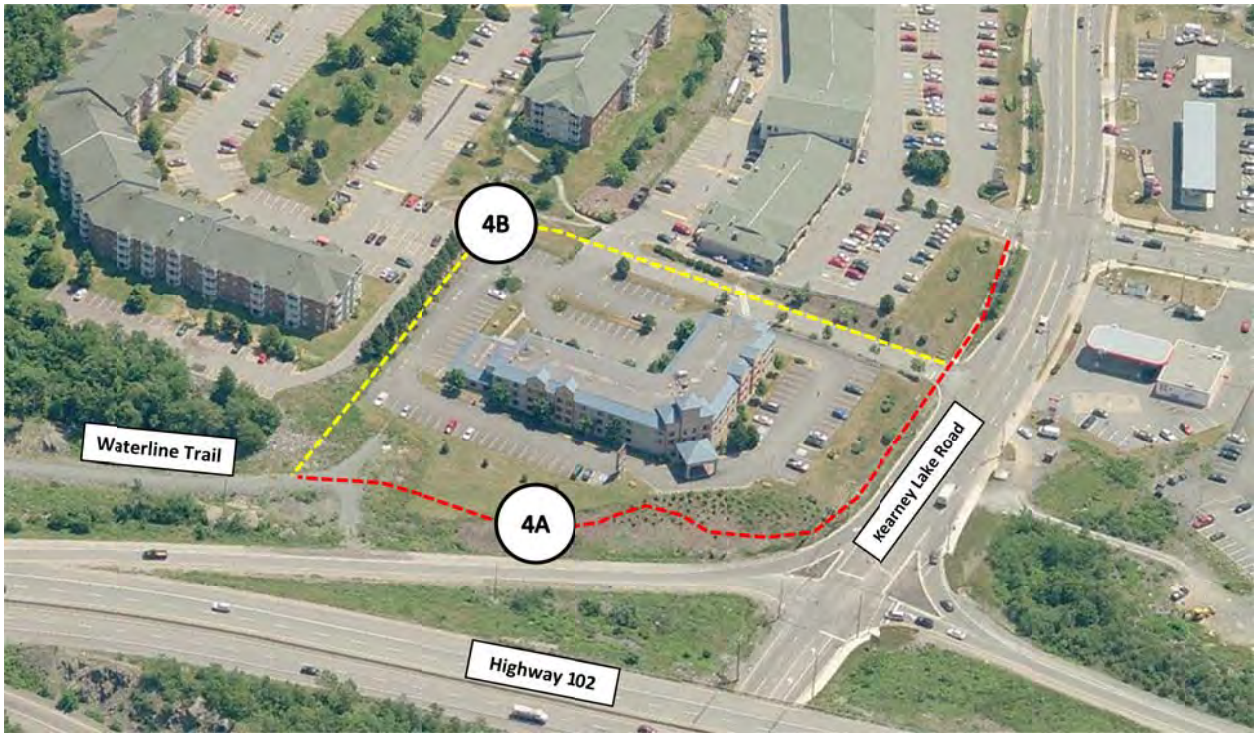


Figure 5-3: Conceptual Alignment Options: Kearney Lake Road to Waterline Trail

Table 5-2: Conceptual Alignment Options: Kearney Lake Road to Waterline Trail

Option	4A. Off-Street Trail Connection Along Parkland Drive / Highway 102	4B. Connection Through Commercial Driveways
Description	Separated trail running along the north side of Kearney Lake Road west from Parkland Drive, and along the east side of Highway 102 north to the Waterline Trail.	Signed on-street route through hotel or strip mall driveway / parking lots.
Advantages	• Maintains visible continuity of the facility; • Off-street connection is attractive to a wider range of users relative to an on-street connection; • Minimal conflicts with vehicles;	• Maintains some visible continuity of the facility; • Improves access to trail from commercial properties
Disadvantages	• Very steep grades (~10%); switchbacks are likely to be required to meet design standards; • Land constraints may be present and require acquisition of property; • Cooperation required with NSTIR; • Slope along Highway 102 NB on-ramp may require retaining walls; • There is a major water main that runs beneath the Highway 102 NB on-ramp that could restrict the trail profile.	• Awkward transition between two higher order facilities; • Limited opportunity for addition of sidewalks; • Potential conflicts with vehicular traffic; • Requires cooperation with property owners.

6.0 Waterline Trail Connection across Larry Uteck Drive

With the recent completion of a greenway facility on Larry Uteck Boulevard extending to West Bedford, there is increased potential associated with connecting south to the Waterline Trail to create an overall connected facility. The Waterline Trail terminates approximately 500m south of Larry Uteck Boulevard. Between its terminus and Larry Uteck Boulevard, there is a commercial area and several ongoing residential developments. The area is physically constrained along the edge of the Highway 102 corridor.

6.1 Design Considerations

6.1.1 *Larry Uteck Boulevard Crossing*

Connection between the Waterline Trail and Larry Uteck Greenway will require crossing Larry Uteck Boulevard either at the Exit 2B interchange or Starboard Drive, both of which are roundabouts. Interaction with traffic may be a concern at Exit 2B, particularly given the volume and speed of traffic exiting Highway 102 and the proximity of the crossing to the ramp. There are existing crosswalks at both locations; however, there is limited connectivity.

Existing crosswalk on Highway 102 NB Exit Ramp – Larry Uteck Boulevard Intersection

6.1.2 *Highway 102*

Running the alignment adjacent to Highway 102 is advantageous as it provides the most direct connection; however, it also presents challenges due to the need to conform to NSTIR standards. In general, NSTIR does not permit the installation of AT facilities along 100-Series highways. However, they will consider some alternatives on a case-by-case basis. Discussions with NSTIR Staff have indicated that the preferred minimum separation distance between the traveled way and an AT facility should be 10m. NSTIR also indicated that it prefers that any development occur away from the ditch side in order to limit any impact to highway drainage.

The majority of the section along Highway 102 has good horizontal and vertical separation from the traveled way. It appears that development of a trail along the top edge of the rock cut could be a feasible option. Closer to Larry Uteck Boulevard, space is more constrained and separation between the exit ramp and potential trail alignment are considerably less; however, this area is

adjacent to an exit ramp where vehicle speeds are reduced and includes a section of ramp with curb and gutter rather than ditches.

Looking north on Highway 102 from near the existing Waterline Trail Terminus

Looking north along the Highway 102 NB Exit Ramp

6.1.3 *Future Interchange Plans*

The Highway 102 – Larry Uteck Boulevard interchange was built very recently and has incorporated projected long-term capacity requirements in its design. It is expected that all ramps and intersections will remain in their current location (Figure 6-1). The Highway 102 overpass structure has adequate width to accommodate future widening plans.

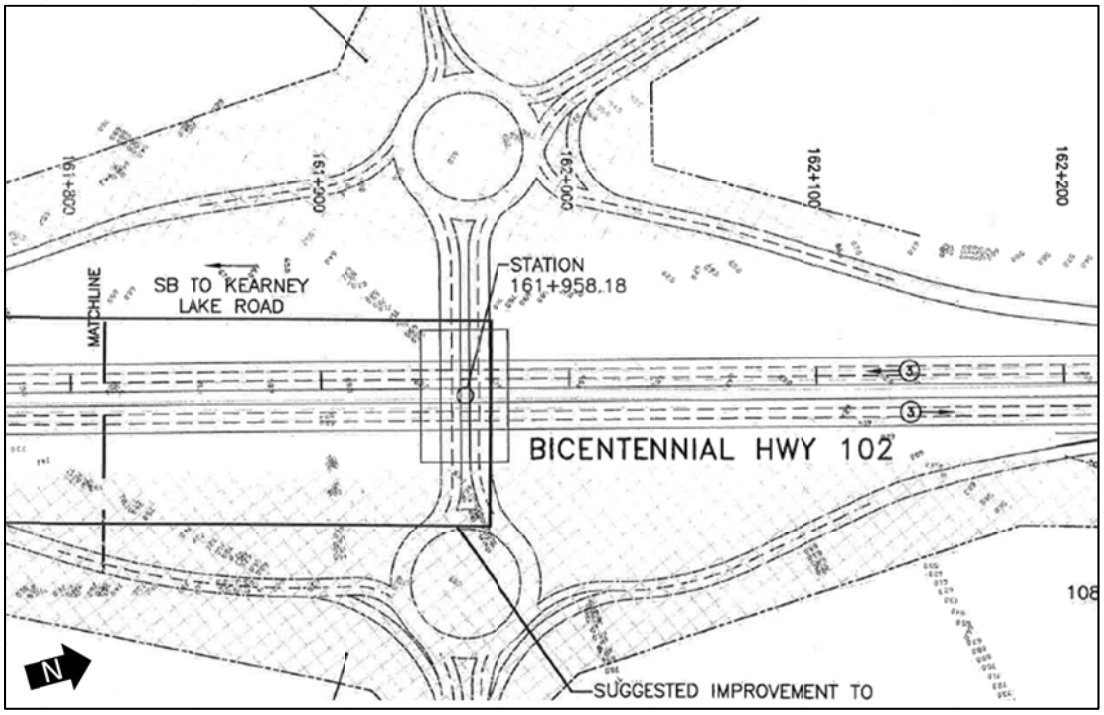


Figure 6-1: Conceptual Plan: Highway 102 at Larry Uteck Boulevard
Source: *Bayers Road / Highway 102 Corridor Study* (2009) – Sheet 19

6.1.4 *Starboard Drive*

Starboard Drive extends south from Larry Uteck Boulevard into a developing residential / commercial area. It has a wide 2-lane cross section and sidewalks on both sides. Its north-south alignment makes it an alternative for extending the Waterline Trail north toward Larry Uteck Boulevard. Connectivity from the waterline trail to Starboard Drive crosses several properties and would need to consider future developments in the area.

Looking north on Starboard Drive

6.1.5 *Property Ownership*

Lands along the Waterline Trail are primarily owned by developers. As a result, land acquisition may be required. Discussions with HRM indicated that there are current agreements in place that provide HRM with the first right of refusal for the opportunity to purchase land for an AT facility within a certain time frame.

Approaching Larry Uteck Drive, lack of dedicated ROW for an AT facility requires that the trail be located either adjacent to the highway ramp / ditch or on lands owned by the owner of the commercial development (Crombie Bedford South Ltd.). The commercial lands offer a very good alternative that provide horizontal and vertical separation from ramp traffic.

Looking south along the Highway 102 NB Exit Ramp.

6.2 Alignment Options

6.2.1 *Waterline Trail to Larry Uteck Drive*

The two preliminary alignments that have been considered at this stage are illustrated in Figure 6-2 and summarized in Table 6-1. Conceptual alignment sketches and alignment profiles are also provided in Figures A-5 and A-6 (Appendix A), respectively.

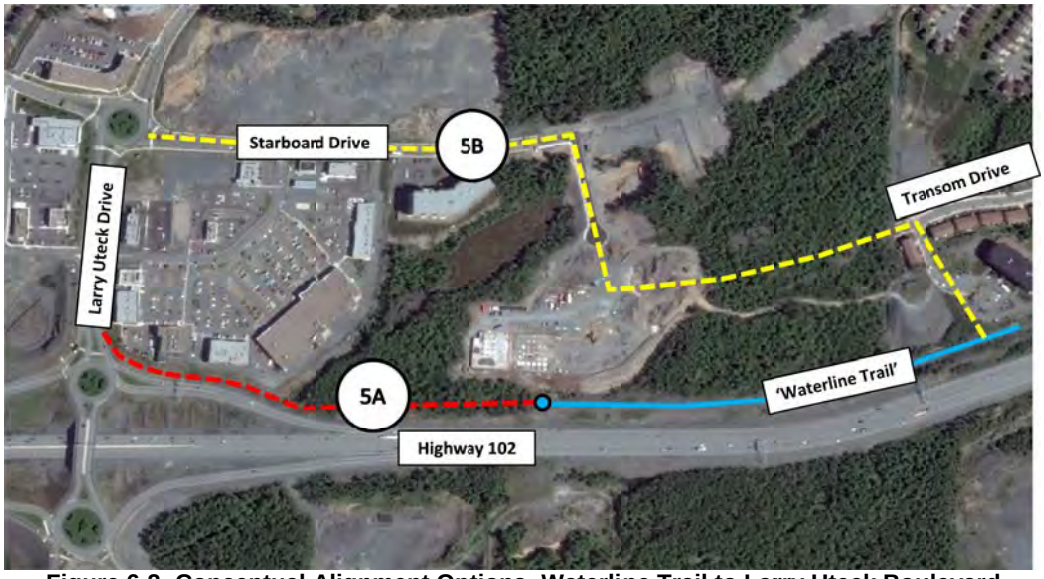


Figure 6-2: Conceptual Alignment Options: Waterline Trail to Larry Uteck Boulevard

Table 6-1: Conceptual Alignment Options: Waterline Trail to Larry Uteck Greenway

Option	5A. Off-Street Trail Connection Along Highway 102	5B. Connection Via Starboard Drive
Description	Separated trail running parallel to Highway 102, extending north from the existing limits of the Waterline Trail to Larry Uteck Boulevard. It is expected that the trail would run along the top of the rock cut further south, and potentially move onto the developed area on the back edge of the commercial development.	Connect to Starboard Drive via Friesian Court and Transom Drive. Install on-street bicycle lanes or signed bicycle route to complement existing sidewalks.
Advantages	• Direct off-street connection between the existing Waterline Trail and Larry Uteck Greenway; • Off-street connection is more attractive to a wider range of users relative to an on-street connection; • Grades are generally favorable; • Consistent terrain profile expected to simplify design and construction; • Good access to adjacent developments • Good horizontal and vertical separation from Highway 102.	• Maintains a degree of continuity of the facilities; • Improved wayfinding and comfort for cyclists; • Minimal cost for a large portion of the route; • Grades are generally favorable.
Disadvantages	• Land constraints may require acquisition of property; • Requires roundabout crossing; may be a concern due to traffic volumes and speeds; • Cooperation required with NSTIR and adjacent property owners; • Proximity to the roadway may be unpleasant for users	• Disjointed connection for users to/from the Waterline Trail; • Requires roundabout crossing; • Lack of separation may not be appealing to novice cyclists, which could lead to cycling on the sidewalk. • Cooperation required from property owners to make connection from Waterline Trail to Friesian Court. Land acquisition may be required. • Future extension of Transom Drive may not be compatible with AT design.

7.0 Summary, Recommendations, and Conclusion

7.1 Summary

WSP is currently preparing a functional planning study for upgrades to the Mainland North Linear Parkway Trail (MNLPT) in Halifax. The Study includes route assessment, development of functional designs / cost estimates, and consultation for three proposed AT connections including (i) a connection south to the Chain of Lakes Trail, (ii) a connection north to the 'Waterline Trail', and (iii) a connection between the Waterline Trail and the Larry Uteck AT Greenway. The project will also consider the existing MNLPT, including review of options for enhancing the facility through the addition of amenities and neighbourhood connections.

This report has been prepared to provide an overview of the conceptual design options that have been reviewed for each of the three proposed AT connections. Review and evaluation of each option has been completed based on background research (property ownership, GIS mapping information, record drawings), site investigations, stakeholder consultation, and preliminary engineering. Based on the results of this conceptual alignment review, the Project Steering Committee will select a preferred option for each of the three proposed AT connections that will be carried through to more detailed investigation as part of this Study.

7.2 Recommendations

Conceptual options for each proposed connection have been developed and reviewed in order to provide the Project Steering Committee with adequate information to determine which concepts are preferred for more detailed analysis. Based on WSP's analysis, the following conceptual options are recommended to be carried the through to functional design phase of the project.

7.2.1 Chain of Lakes Trail Connection

It is recommended that the following are considered for further review:

- Connection of the Mainland North Linear Parkway Trail (MNLPT) south to Highway 102 via (i) the Halifax Water easement running along the south side of Bently Drive and (ii) an alignment across Halifax Water lands. This option formalizes the water easement as an AT facility and provides a good neighborhood connection to the Mount Royale subdivision. It also aligns well with what appears to be the optimum location for a Highway 102 crossing;
- Dedicated AT bridge crossing Highway 102;
- Connection from Highway 102 to the Chain of Lakes Trail via an alignment parallel to North West Arm Drive. This option follows the expected desire line, limits impact on the watershed lands, and is preferable to the power corridor both in terms of trail aesthetics and constructability.

Figure 7-1: Recommended Alignment Option: MNLPT Connection to Chain of Lakes Trail

7.2.2 *Waterline Trail Connection across Kearney Lake Road*

It is recommended that the following are considered for further review:

- Connection of the MNLPT north to Kearney Lake Road via an AT facility along Parkland Drive either in the form of a separated trail or on-street bicycle lanes. This option improves connectivity to both the Waterline Trail and to destinations in the Kearney Lake Road area. Though a separated connection along Highway 102 would provide a more direct route, it is expected that property constraints and drainage issues may limit its feasibility.
- Connection from the Parkland Drive – Kearney Lake Road intersection north to the Waterline Trail via a separated trail facility running along the north side of Kearney Lake Road and the east side of the Highway 102 NB on-ramp. Though construction of a trail along the highway ramp may pose challenges, linkages through commercial driveways does not appear to be a suitable long-term solution.

Figure 7-2: Recommended Alignment Option: MNLPT Connection to Waterline Trail

7.2.3 *Waterline Trail Connection across Larry Uteck Drive*

It is recommended that the following are considered for further review:

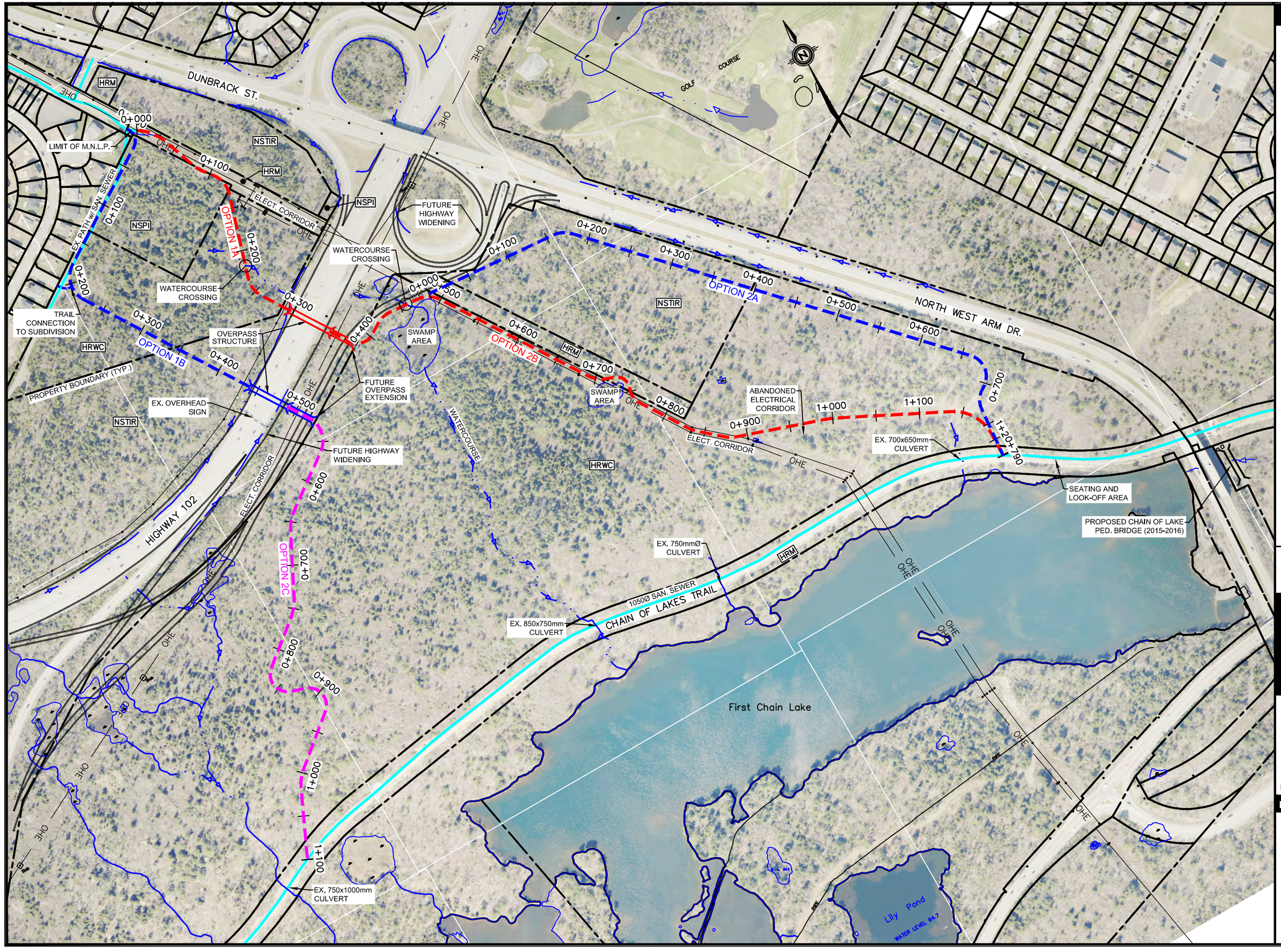
- Connection of the Waterline Trail north to Larry Uteck Boulevard via a trail running along the east side of Highway 102, extending up to the existing crosswalk at the intersection of Larry Uteck Boulevard and the Highway 102 NB exit ramp. Where possible, the alignment should shift away from the highway ramp onto the back edge of the adjacent

commercial properties. This option provides direct connectivity and is preferred to a more circuitous on-street route through adjacent streets and/or developments.

Figure 7-3: Recommended Alignment Option: Waterline Trail Connection to Larry Uteck Greenway

7.3 Conclusion

The analyses included in the Phase 1 report provides the Project Steering Committee with information intended to assess the available connection options and determine which are preferred for further analysis as part of Phase 2 of this planning project. Upon endorsement of or amendment to these recommendations, we will proceed to Phase 2.



LEGEND

- PROPERTY BOUNDARY
- EXISTING TRAIL OR PATH
- OHE — OVERHEAD ELECTRICAL
- DITCH / WATERCOURSE
- CONCEPTUAL TRAIL ALIGNMENTS
- NSTIR/HRM — PROPERTY OWNER IDENTIFIER

Notes:

1. All property boundaries shown are approximate only and may not reflect changes made since 2007.
2. Proposed alignment layouts and pavement markings are conceptual and representative only.
3. Background aerial photography is for information purposes only and does not necessarily reflect the current existing condition.

Drawn: PSN

Engineer: MIC

FIGURE A-1

CHAIN OF LAKES TRAIL CONNECTION - PLAN VIEW

MAINLAND NORTH LINEAR PARKWAY

HALIFAX

MAY 2015

NOT TO SCALE

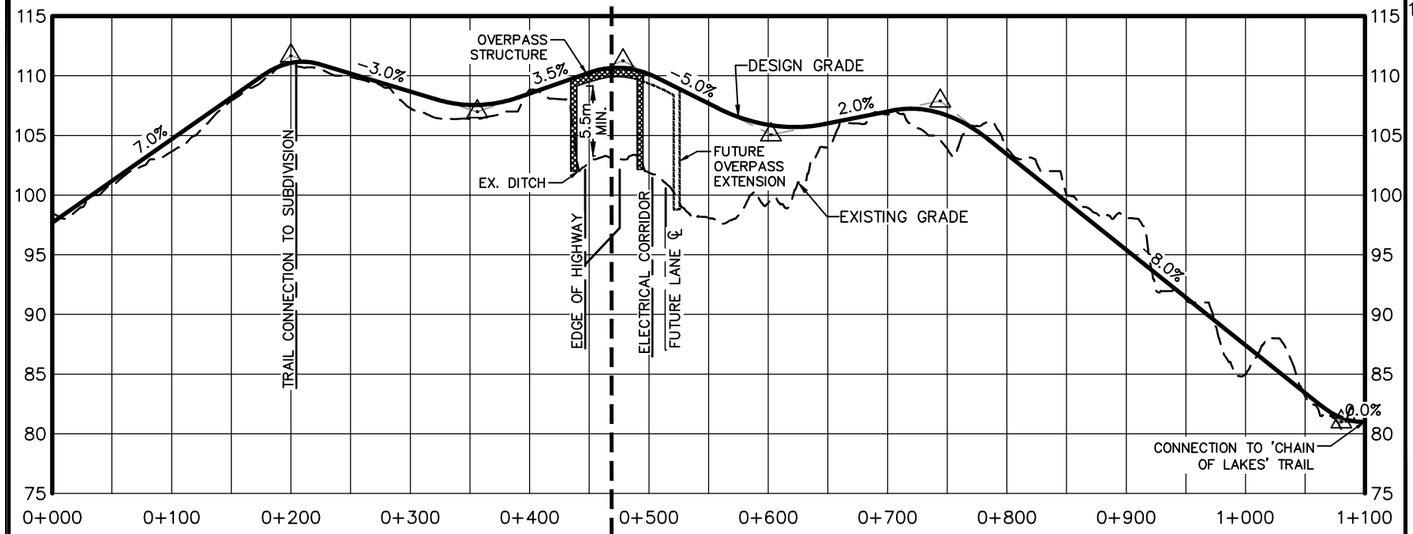
WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

Sheet:1-Plan

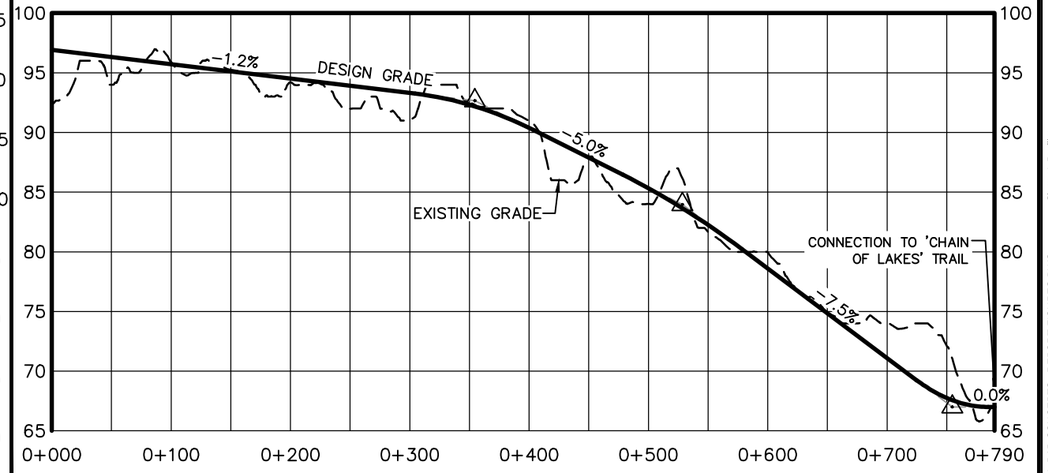
FILE: K:\DARTMOUTH\2015\151-00734 MAINLAND NORTH LINEAR PARKWAY\11_ DWG\11.1_CONCEPT_PLANS\151-00734_P&P CONCEPTS - REPORT FIGURES.DWG

OPTION 1B PROFILE

OPTION 2C PROFILE

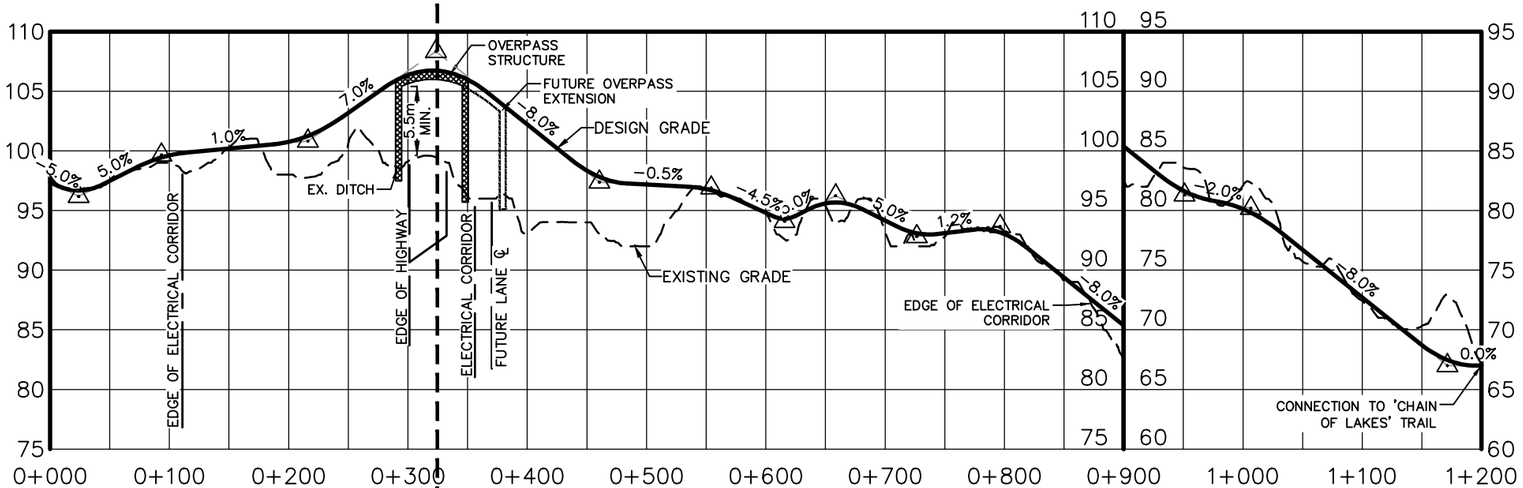


OPTION 2A PROFILE



OPTION 1A PROFILE

OPTION 2B PROFILE



Notes:

1. All existing and proposed profiles are conceptual and preliminary only.

Drawn: PSN

Engineer: MIC

FIGURE A-2

CHAIN OF LAKES TRAIL CONNECTION - PROFILE VIEW

MAINLAND NORTH LINEAR PARKWAY

HALIFAX

MAY 2015

SCALE: Horiz. 1:5000 Vert. 1:500

WSP

1 SPECTACLE LAKE DRIVE
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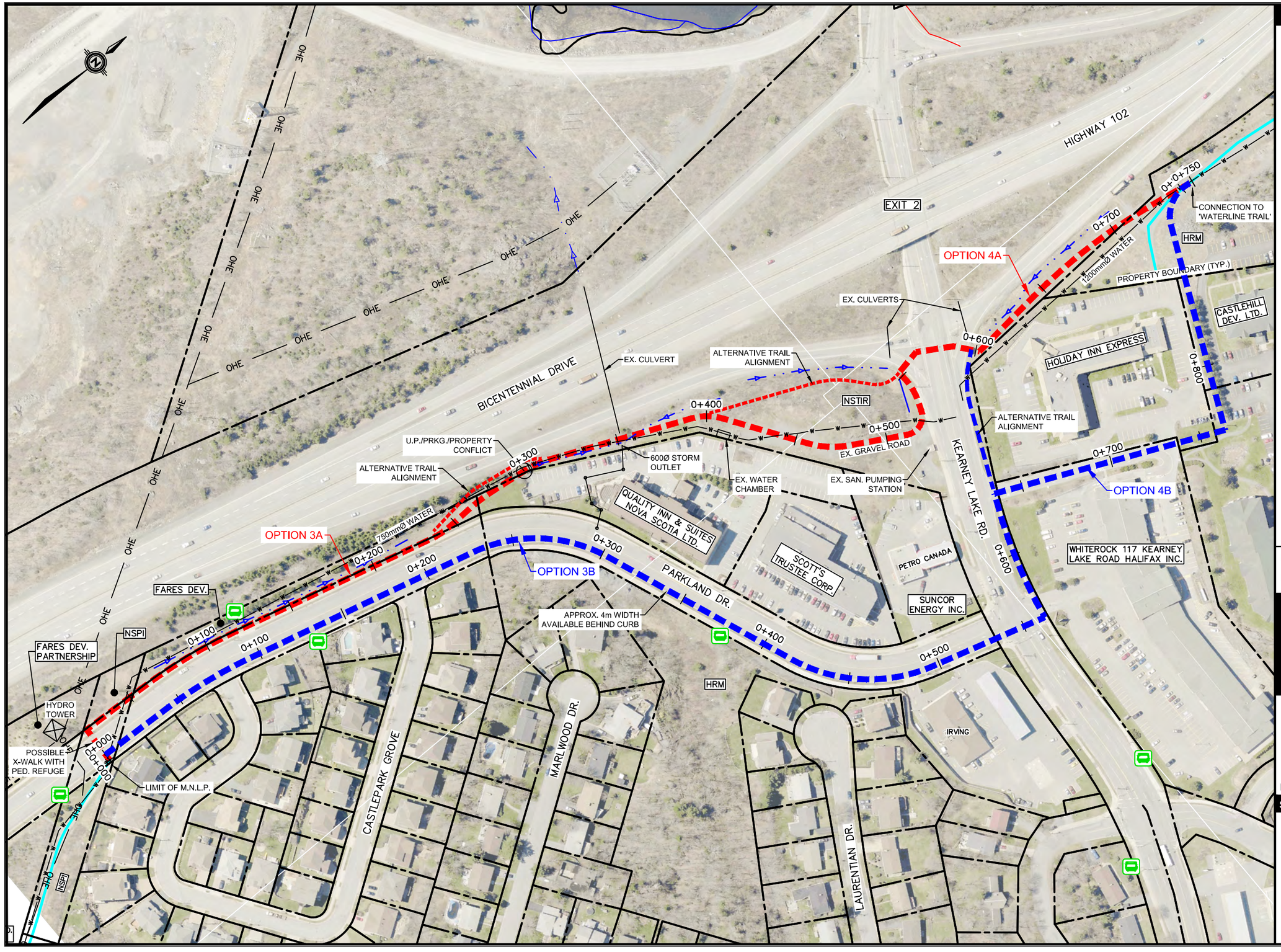

LEGEND

- PROPERTY BOUNDARY
- EXISTING TRAIL OR PATH
- OHE — OVERHEAD ELECTRICAL
- DITCH / WATERCOURSE
- CONCEPTUAL TRAIL ALIGNMENTS
- BUS STOP
- NSTIR/HRM — PROPERTY OWNER IDENTIFIER

Notes:

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3. Background aerial photography is for information purposes only and does not necessarily reflect the current existing condition.

Drawn: PSN

Engineer: MIC

FIGURE A-3

WATERLINE TRAIL CONNECTION - PLAN VIEW

MAINLAND NORTH LINEAR PARKWAY

HALIFAX

MAY 2015

SCALE: 1:2000

WSP

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
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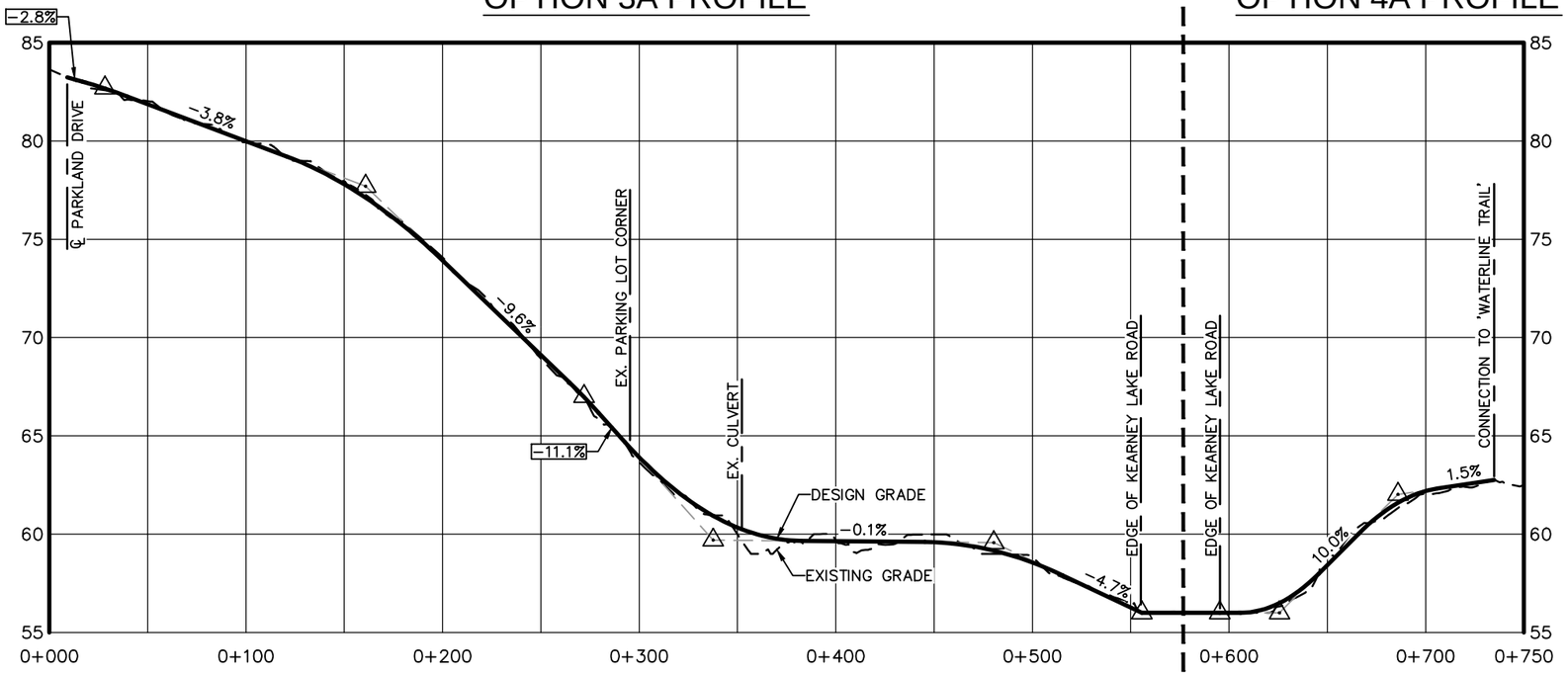
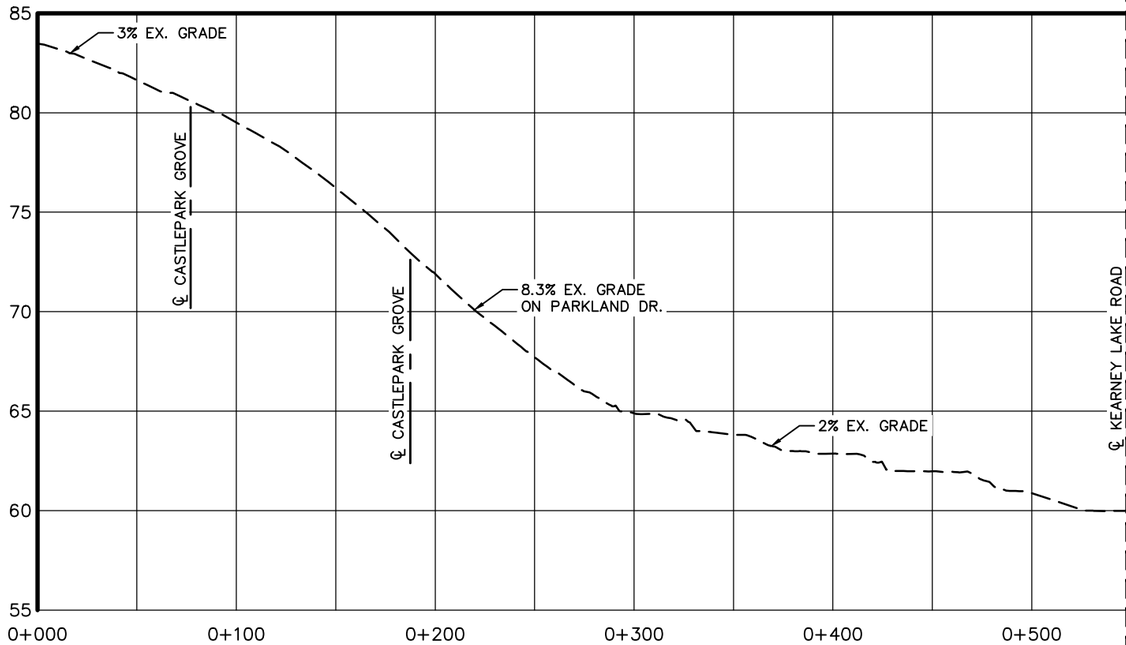
OPTION 3A PROFILE

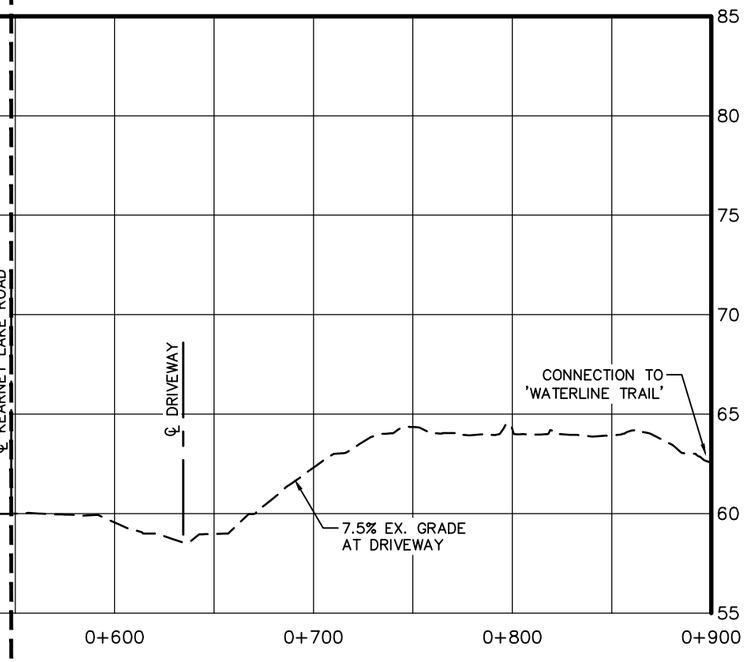


OPTION 4A PROFILE

OPTION 3B PROFILE



OPTION 4B PROFILE



Notes:

1. All existing and proposed profiles are conceptual and preliminary only.

Drawn: PSN

Engineer: MIC

FIGURE A-4

WATERLINE TRAIL CONNECTION - PROFILE VIEW

MAINLAND NORTH LINEAR PARKWAY

HALIFAX

MAY 2015

SCALE: Horiz. 1:3000 Vert. 1:300

WSP

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

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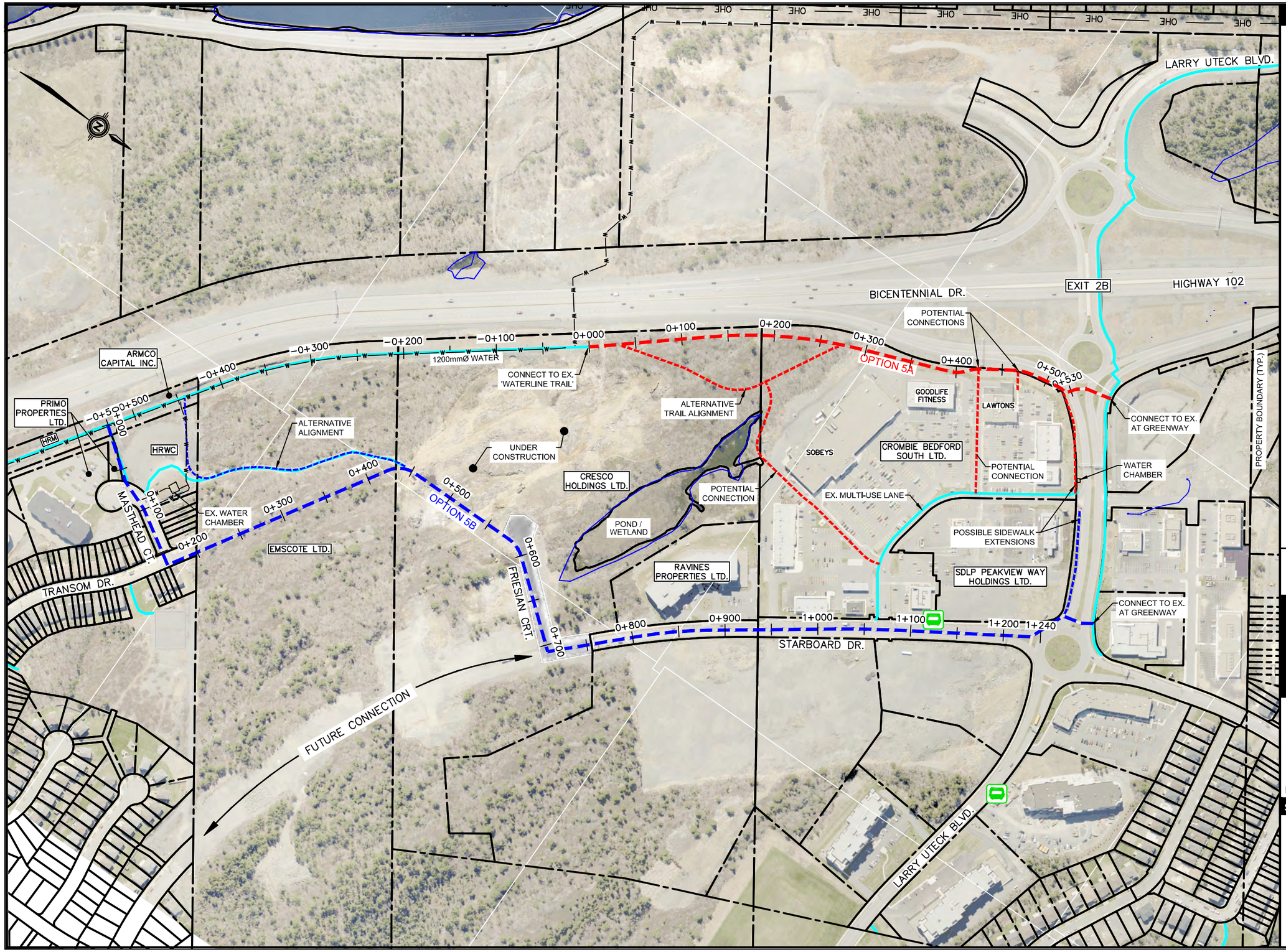

LEGEND

- PROPERTY BOUNDARY
- EXISTING TRAIL OR PATH
- OHE — OVERHEAD ELECTRICAL
- DITCH / WATERCOURSE
- CONCEPTUAL TRAIL ALIGNMENTS
- BUS STOP
- NSTIR/HRM — PROPERTY OWNER IDENTIFIER

Notes:

1. All property boundaries shown are approximate only and may not reflect changes made since 2007.
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3. Background aerial photography is for information purposes only and does not necessarily reflect the current existing condition.

Drawn: PSN

Engineer: MIC

FIGURE A-5

LARRY UTECK GREENWAY CONNECTION - PLAN VIEW

MAINLAND NORTH LINEAR PARKWAY

HALIFAX

MAY 2015

SCALE: 1:2000

WSP

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
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Sheet:3-Plan

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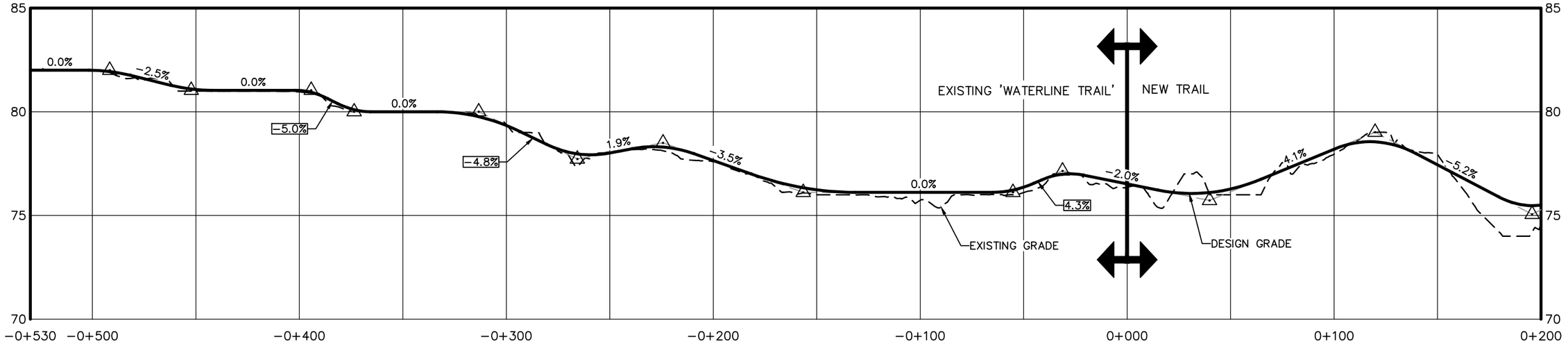
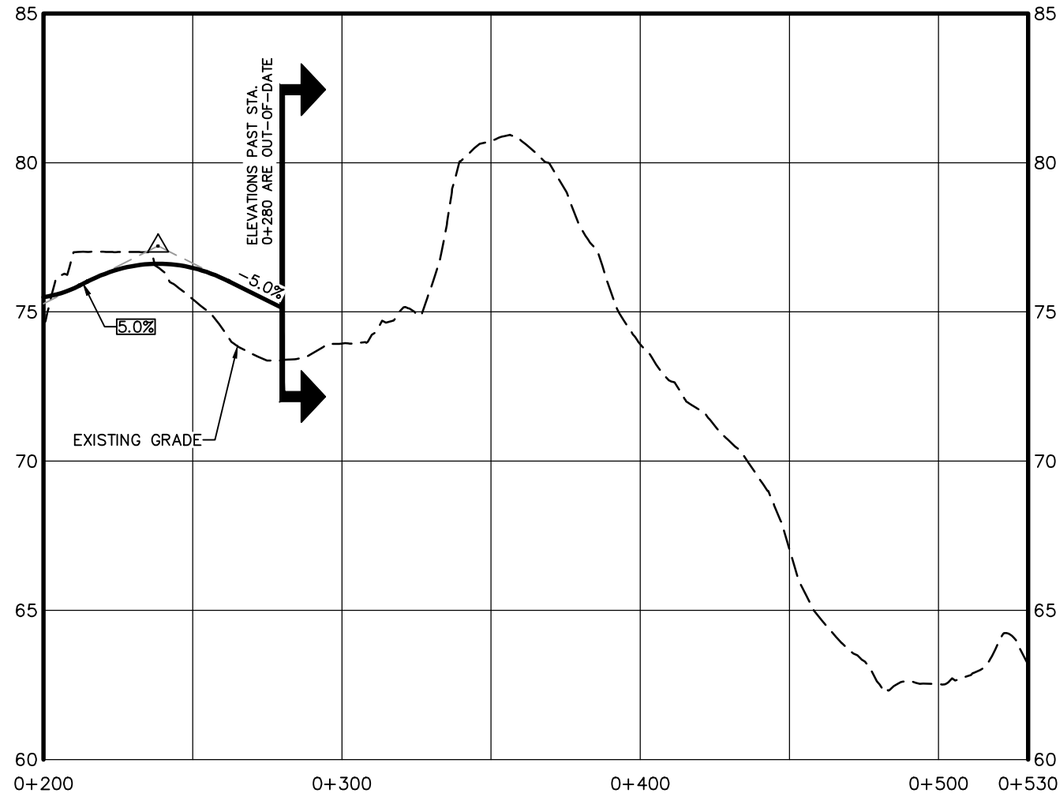
LARRY UTECK GREENWAY CONNECTION - OPTION 5A PROFILE





EXISTING SURFACE PROFILE NOT AVAILABLE FOR OPTION 5B ALIGNMENT AT THE CONNECTION TO LARRY UTECK BLVD.

Notes:

1. All existing and proposed profiles are conceptual and preliminary only.
2. Existing profile not available for Option C2 alignment.

Drawn: PSN

Engineer: MIC

FIGURE A-6

CONNECTION TO LARRY UTECK GREENWAY - PROFILE VIEW

MAINLAND NORTH LINEAR PARKWAY

HALIFAX

MAY 2015

SCALE: Horiz. 1:3000 Vert. 1:300

WSP

1 SPECTACLE LAKE DRIVE
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FILE: K:\DARTMOUTH\2015\151-00734 MAINLAND NORTH LINEAR PARKWAY\11_ DWG\11-1_CONCEPT_PLANS\151-00734_P&P CONCEPTS - REPORT FIGURES.DWG Sheet:3-Profile