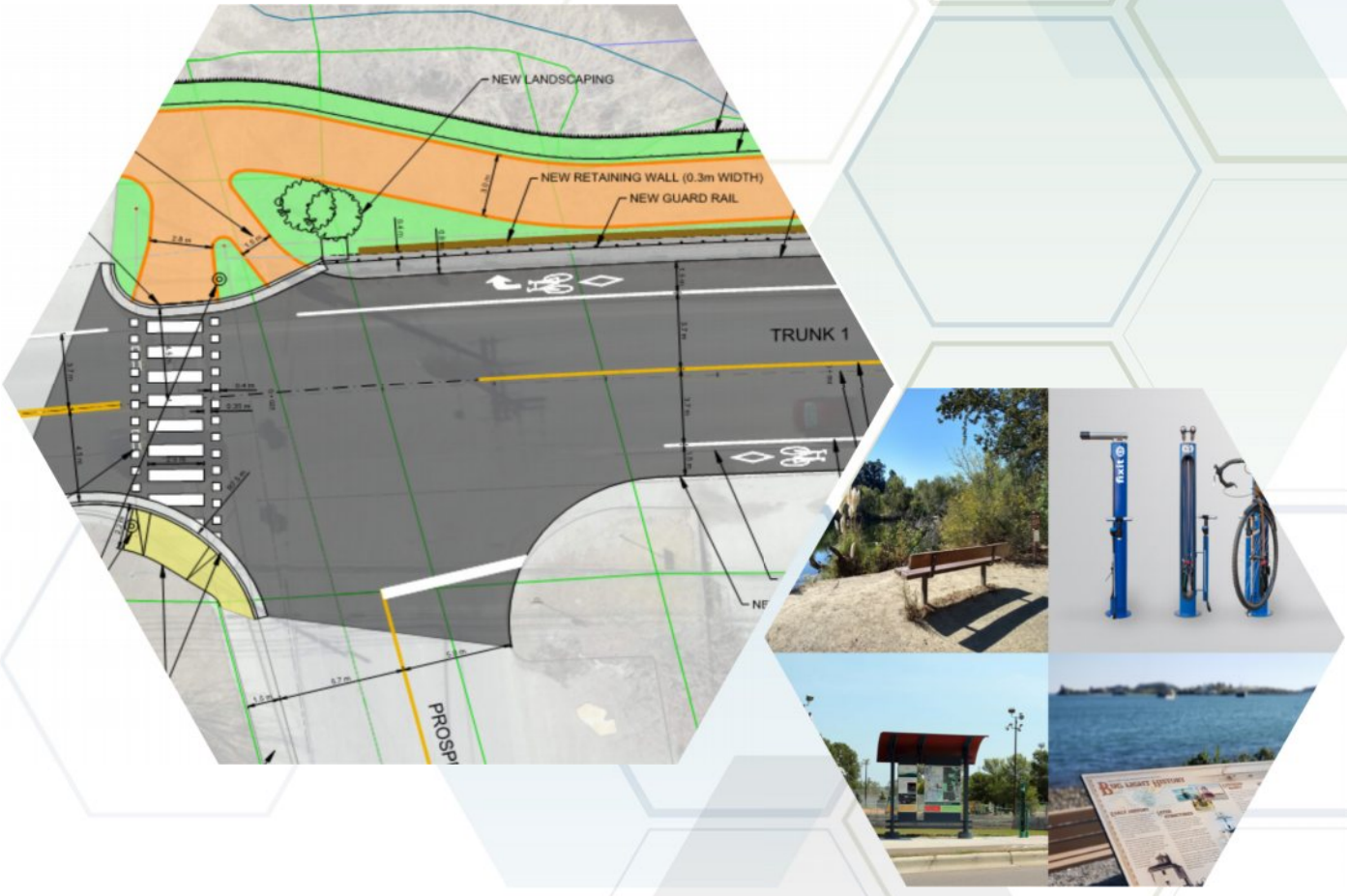
Englobe
englobecorp.com

LAKE MILO ACTIVE TRANSPORTATION MASTER PLAN

Municipality of the District of Yarmouth

FINAL MASTER PLAN REPORT
Project Number 2004888.00



LAKE MILO ACTIVE TRANSPORTATION MASTER PLAN FINAL REPORT

Final Master Plan
Project No. 2004448

FINAL REPORT
February 7, 2022
Revision No.: 0

MUNICIPALITY OF THE DISTRICT OF YARMOUTH

Prepared by:

Adriana Terán, P.Eng.
Transportation Engineer & Deputy Project Manager
Civil and Transportation Engineering

Reviewed by:

Ryan Esligar, P.Eng., M.Sc.E.
Transportation Engineer & Transportation Lead
Civil and Transportation Engineering

Approved by:

Tim Veinot, P.Eng.
Senior Transportation Engineer & Project Manager
Civil and Transportation Engineering

Englobe Corp.
T: 506.693.5893 • **E:** adriana.teran@englobecorp.com |97 Troop Ave • Dartmouth (NS) • Canada B3B 2A7

Revision and Publication Register		
Revision N°	**Date**	**Modification and/or Publication Details**
0	December 17, 2021	Draft Submission
0	February 7, 2022	Final Submission

CONFIDENTIALITY

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 PROJECT DESCRIPTION

1.1 PROJECT BACKGROUND

The Municipality of the District of Yarmouth, together with the Town of Yarmouth, have been developing a framework for an Active Transportation (AT) Master Plan that encourages, supports, and expands the role of AT within their community. According to the Integrated Community Sustainability Plan (ICSP) from 2010, the Municipality's objective is to encourage and support the development of AT systems within and between communities in the Municipality. As a result, Council approved an Active Transportation Master Plan that was developed in conjunction with the Town of Yarmouth.

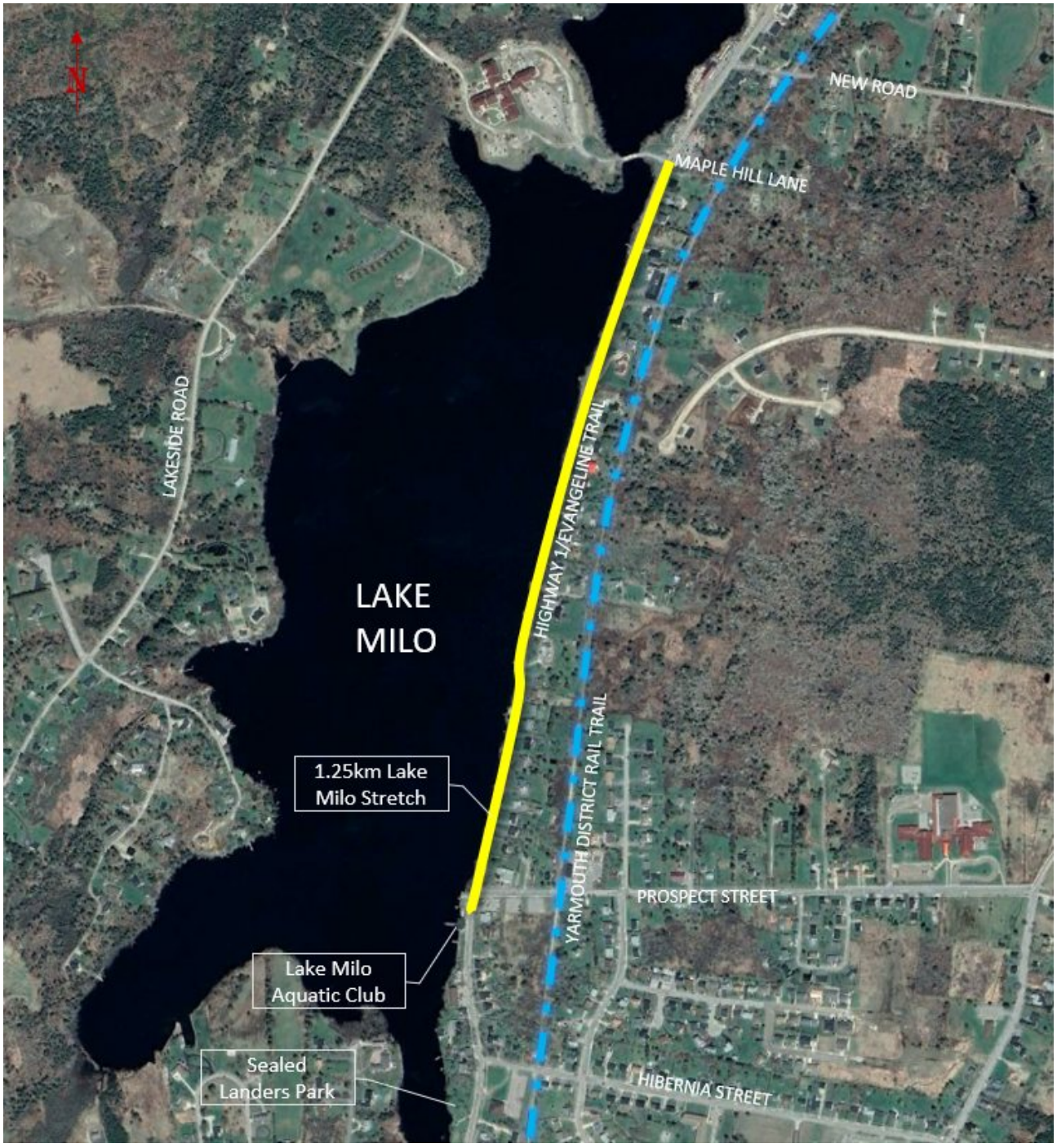
The Lake Milo Active Transportation Master Plan is an early part of the AT initiative for the region. Given the significant benefits of AT along Lake Milo, the goal of this project is to identify a feasible option for the development of an AT facility along Lake Milo from Maple Hill Lane to Prospect Street that also connects to the nearby Yarmouth County Rail Trail. This 1.25km connection forms the Core Area of the project, including short connections across Highway 1, possibly at Prospect Street and Maple Hill Lane, to connect to the existing trails (refer to Study Area map in Figure 1). The Lake Milo Active Transportation Master Plan will require a holistic plan for the corridor that incorporates input from numerous stakeholders and landowners. The resulting plan will provide a reasonable balance between the existing corridor uses and future AT services along the corridor.

Englobe was retained to develop the Lake Milo Active Transportation Master Plan, including the Master Plan Report, conceptual plans, an implementation plan, and high-level Class D financial forecast. This Active Transportation Master Plan Report details the Lake Milo Stretch in its existing state, design options for the new AT facility, and a phased implementation plan for the preferred option.

1.2 STUDY AREA

The Study Area as shown in Figure 1 encompasses the scope of the project as identified by the Municipality. The 1.25 km Lake Milo Stretch is outlined in yellow and is the key focus area for this project. Outlined in blue is the Yarmouth County Rail Trail. The close proximity of the trail to the Lake Milo Stretch, as it is colloquially referred to, presents a unique opportunity to provide a recreational AT loop in the Municipality.

Figure 1 – Study Area



1.3 PROJECT OBJECTIVES AND SCOPE

The main objectives of the Lake Milo AT Master Plan report are to analyze the existing conditions of the Lake Milo Stretch by observing the traffic and active transportation and to analyze the impacts of the proposed corridor improvement options. Key tasks and objectives of this assignment include:

- Englobe staff visited the study area to review existing conditions (March 12, 2021);
- Englobe staff received background data including GIS files for Highway 1;
- Existing information was collected and reviewed, including available traffic data from NSTIR (2018) and previous Transportation Studies and Plans prepared for the area;
- Existing 2021 traffic volumes were collected at selected Study Area intersections by Englobe staff;
- The 2018 traffic data for Highway 1 were compared with the 2021 traffic count obtained at the intersection to estimate COVID-19 adjustment factors. These factors were then applied to all 2021 traffic volumes in an effort to estimate actual traffic demand without COVID-19;
- Pedestrian crossing and vehicle turning movement analyses were completed at the Study Area intersections;
- Development of two AT corridor options to address the challenges of installing AT along Highway 1 while also managing uncontrolled access points;
- Plan and execute a two-phased comprehensive engagement strategy that involves a wide range of predetermined key stakeholders, landowners, and public citizens in the development of the vision and recommendations for the corridor;
- A vehicle speed analysis was performed with data collected by MODY on Highway 1 on June 25 - July 24, and July 26 - August 8, 2021;
- Design criteria and guiding principles shaped the design option evaluation method to evaluate and select a preferred design option;
- An environmental assessment review was performed along Lake Milo to provide better understanding of policy procedures and requirements for Lake Milo AT trail;
- Preparation of Implementation Plan that will inform MODY of the recommended phases to complete the development of the preferred corridor plan with other infrastructure renewal plans; and
- Preparation of Class D cost estimates of the design options.

2 INFORMATION GATHERING

2.1 MAPPING AND TOPOGRAPHIC SURVEY

Mapping and topographic information was collected by the following sources:

- GIS data were provided by MODY and were used to generate Study Area mapping and a topographic surface.
- Data from the Nova Scotia Provincial database was collected for surface elevations.
- A basic topographic survey of the roadway was also completed, picking up the culvert outlets for much of the study area.
- A drone survey was completed to retrieve recent aerial photography and map surface elevations of many notable constraints such as retaining walls, shoreline, and utility poles.

2.2 TRAFFIC DATA

Historical traffic volumes were provided by NSTIR from hourly counts collected in 2018. No other historical traffic data was available through MODY.

The Study Team collected peak hour traffic volume data for Highway 1 at Prospect Street intersection on March 23rd and 24th, 2021.

Speed data was captured by MODY and provided to the Study Team after numerous comments regarding speeding vehicles were made during the project study. Speed data was collected from June 25th – July 4th, 2021 and from July 26th – August 8th, 2021 in two sections of Highway 1. The purpose of the speed data collection was to retrieve the 85th percentile speeds and average speeds of vehicles driving along Highway 1, though additional traffic volume counts were also obtained through this effort.

2.3 UTILITIES

Overhead and underground utilities are located on one or both sides of the roadway throughout the corridor. They pose a challenge for roadway modifications due to the cost for relocations, which will be avoided during this project design. Utility poles have been located and plotted in the mapping as well as underground services. Utilities were mapped on concept designs to better understand constrained design locations and the impacts resulting from the proposed modifications.

2.4 CONSTRAINTS

Overhead utilities, property boundaries, Lake Milo shoreline, the guardrail on the west side of Highway 1, private wharfs, and topography all pose significant constraints to redeveloping the Lake Milo Stretch on Highway 1. A guardrail is installed as a buffer between the lake and travel lanes. The land between Lake Milo and the guardrail varies in distance and elevation. Some sections offer a spacious 6.0+m spacing at grade while other sections drop-off immediately after the guardrail spacing.

Environmental assessment results may also intervene and identifying permissible design options will be a high priority early on. Clearly delineating these constraints on the baseline plans will be necessary to understand impacts, avoidance measures, and related costs. During concept design, constraints were identified on the base plans to identify the workable space and potential impacts.

2.5 LAND USE DESCRIPTION

The land use along Highway 1, specifically at the Lake Milo Stretch, is mostly residential consisting of 37 single-family homes fronting the highway. There is not an empty lot to be found along this scenic stretch and which has a very rural setting. Though mostly residential, there are 7 commercial lots identified within the Study Area as detailed in Table 1. The lands between Prospect Street and Maple Hill Lane are zoned mostly as "Residential General," save for the identified lots zoned as "Commercial Restricted". North of Maple Hill Lane, the area is zoned as "Commercial General".

Figure 2 is from MODY's Municipal Planning Strategy and businesses have been marked for clarification.

Table 1 - Commercial Lots within the Study Area

#	BUSINESS	DESCRIPTION	ADDRESS	DISTRICT
1	Let's Print It Ltd.	Shop	8 Nova Scotia Trunk 1	Dayton
2	Novastar Motel on the Lake	Motel	214 Nova Scotia Trunk 1	Dayton
3	Foster Auto Sales Limited	Car Dealership	340 Nova Scotia Trunk 1	Dayton
4	Villa Saint Joseph-du-Lac	Retirement Living Facility	255 Nova Scotia Trunk 1	Dayton
5	Dayton Fabrics	Shop	261 Nova Scotia Trunk 1	Dayton

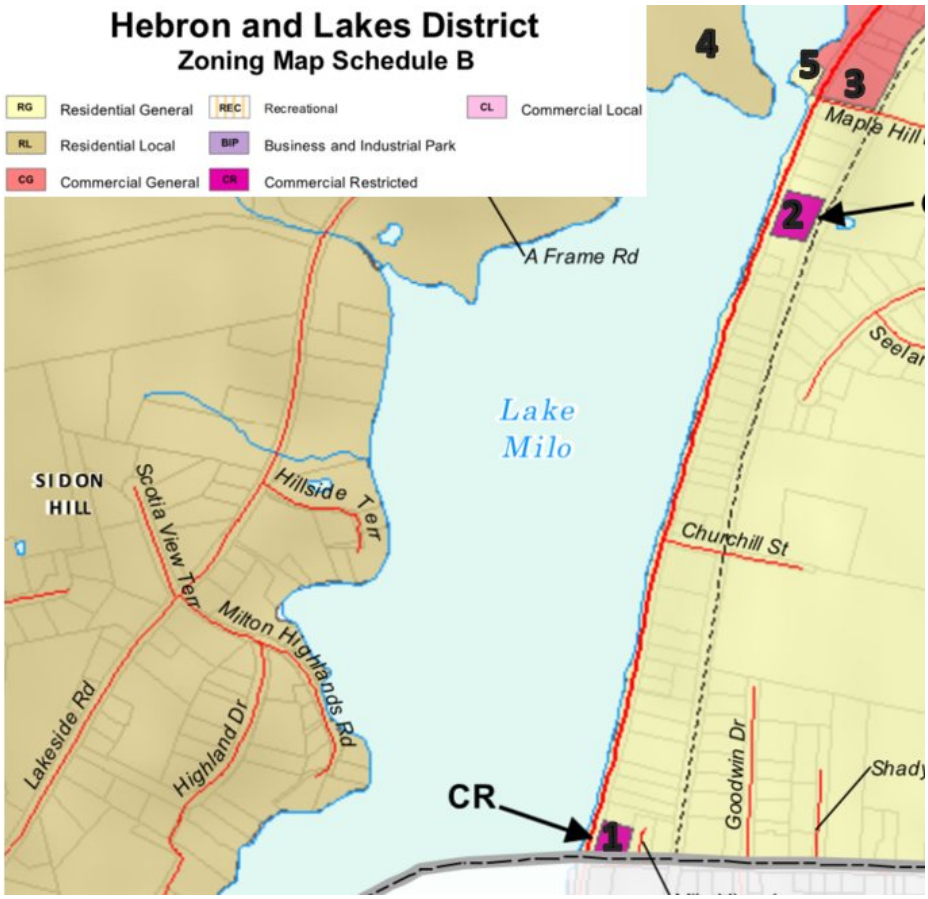


Figure 2 - Zoning Map Schedule B and Businesses

2.6 PREVIOUS PLANS AND STUDIES

Integrated Community Sustainability Plan (2010) – The overarching objective of the Integrated Community Sustainability Plan (ICSP) was to provide direction to the Municipality of Yarmouth on how to strive towards a health conscious and prosperous future. The plan was developed to access tax gas revenues from the government and ties together the importance of developing the economy, environment, and social and cultural dimensions of the Municipality. The ICSP was meant to feed into the Municipal Planning Strategy. In terms of transportation within the Municipality, it recognized the importance of focusing on non-automotive modes of transportation and developing those facilities to mitigate the economic impacts of fuel price increases and the environmental impacts of greenhouse gas emissions. Continued access to communities and their essential services was a priority through the development of regional transit systems, AT infrastructure, and alternative transportation options.

Yarmouth Active Transportation Master Plan (2010) – This plan outlines an interconnected AT network that connects important nodes in the Yarmouth community through accessible AT trails. The plan includes the development of AT facilities such as bike lanes, multi-use trails, and sidewalks to provide sustainable and attractive AT facilities along the shoreline of Nova Scotia. This master plan built upon the vision the Town and Municipality of Yarmouth created during their previous planning efforts in 2009. The goal of the Master Plan was to provide direction for future development of the AT system.

Municipal Planning Strategy (2020) – In 2020, Municipal Council updated the Municipal Planning Strategy (MPS) and Land Use By-Law to replace the MPS from March 2001 that was approved by the Minister of Service Nova Scotia and Municipal Relations. The Council revised MPS incorporates policies of the ICSP under the Municipal Government Act. The purpose of the MPS is to advise and guide land use and development within the Municipality. The MPS provides a framework to accelerate development within Municipal communities by providing clear and direct policy objectives and statements with additional detail so development plans may align with the vision of the community, enhance community lifestyles, and provide high quality working and living environments for both residents and developers for existing and future generations.

Physical Activity Strategic Plan (2019) – A strategic plan prepared by the Physical Activity Strategy Group that enables residents of the Municipality of the District of Yarmouth and the Town of Yarmouth to live active and healthy lives. The focus of the plan is twofold: to support existing users of active transportation facilities and to encourage new users. Recommendations included steps to improve existing facilities, additional wayfinding such as trail heads and more signage along trail routes and communicating the benefits of AT use in the community, among other community engagement strategies.

Strategic Priorities Report (2019) – A Municipal strategic priorities action list developed in collaboration with the Town, the Municipality of Argyle, and the Western Regional Enterprise Network to support both nearby communities and regional efforts on economic development. Eight strategies and guiding documents were listed as actions that support the Municipalities' efforts. Among them are the aforementioned ICSP, the Physical Activity Strategic Plan, and the Yarmouth Active Transportation Master Plan. Council devised an action plan under each initiative to provide a rationale, status update, and next steps.

2.7 ROAD NETWORK DESCRIPTIONS

2.7.1 Street Characteristics

Highway 1 (Evangeline Trail) is designated as a provincially owned and maintained arterial highway that follows the west coast of Nova Scotia and is approximately 1.25km in length in the Study Area. It features one lane in each direction and is oriented in the north-south direction. Highway 1 has a speed limit of 50 km/h from the Town of Yarmouth to approximately 0.39km north of the Town line. The speed limit increases to 60 km/h from this location to the end of the project limit (Maple Hill Lane). It has an asphalt width of approximately 8.5m and gravel shoulders on both sides. Adjacent to the southbound lane of Highway 1 features a 1.9m usable gravel shoulder before a guardrail that provides protection from the steep slope into Lake Milo. There are no sidewalks present and the roadway has open ditch drainage on both sides. There are passing and no passing zones striped as permitted along the highway. Highway 1 serves predominately residential land uses on either side of the District of Yarmouth with commercial land uses in the center of the District, within Dayton. Traffic volumes were recorded by NSTIR in 2018 and showed an average annual daily traffic (AADT) of 7,080 within the Study Area. There is no public transit provided along Highway 1 within the study limits.

2.7.2 Intersection Characteristics

The Prospect Street/Highway 1 intersection is a 3-leg unsignalized intersection. The northbound and southbound traffic on Highway 1 have the right-of-way, with the westbound approach on Prospect Street stop-controlled. There are no auxiliary turning lanes on any of the approaches. An overhead RA-5 crosswalk, with pedestrian pushbuttons, is present across Highway 1 on the southside of the intersection connecting the sidewalk on Prospect Street to the Lake Milo Aquatic Club.

The Maple Hill Lane/Highway 1 intersection is a 3-leg unsignalized intersection. The northbound and southbound traffic on Highway 1 have the right-of-way, and the westbound approach on Maple Hill Lane is assumed to be stop-controlled though there is no stop sign. Maple Hill Lane is a privately owned gravel driveway, with a 25.0m paved section at the intersection and access to the Yarmouth County Rail Trail. There are no auxiliary turning lanes on any of the approaches nor any pedestrian crosswalks.

2.8 ACTIVE TRANSPORTATION

Along the Lake Milo side of Highway 1, is a 1.9m barrier space meant as a usable shoulder for southbound vehicles. It has often been observed that pedestrians will use this space to walk along Lake Milo. The east side of Highway 1 has limited spacing before a deep roadside ditch. A “Walk on Left Facing Traffic” sign is even installed on the east side of the highway facing traffic in the northbound direction, just north of Prospect Street meant to encourage pedestrians to cross Highway 1 and walk in the opposite direction of

oncoming traffic. There are 4 locations where an opening in the guardrail exists for access to boat wharfs, look-offs, an old boat launch, and a pumping station. Locals enjoy these spaces which provide direct access to Lake Milo which is limited along the 1.25km stretch.

Along the western shore, Highway 1 is under review to become part of Nova Scotia's Blue Route network. The Blue Route is a cycling network that identifies on and off-road cycling facilities to connect all of Nova Scotia with one continuous and comfortable route for cyclists. Highway 1 has been identified as an on-road route opportunity. Like the AT goals for the Lake Milo Stretch, the Blue Route also seeks to provide accessibility to cyclists and create important connections between communities and desirable destinations. There is currently a gap in the network within Yarmouth where the Blue Route is under review. It is proposed to follow Lakeside Road into Chegoggin but abruptly ends at Victoria Road as shown in the figure below. On the east side, the Blue Route is proposed to follow the Rail Trail and ends on the northside of Town. South of Town it is proposed to follow the Tusket Falls Trail. This network layout has been under review but a proposed route through Town is outside Provincial jurisdiction and will need to be discussed with the appropriate entities.

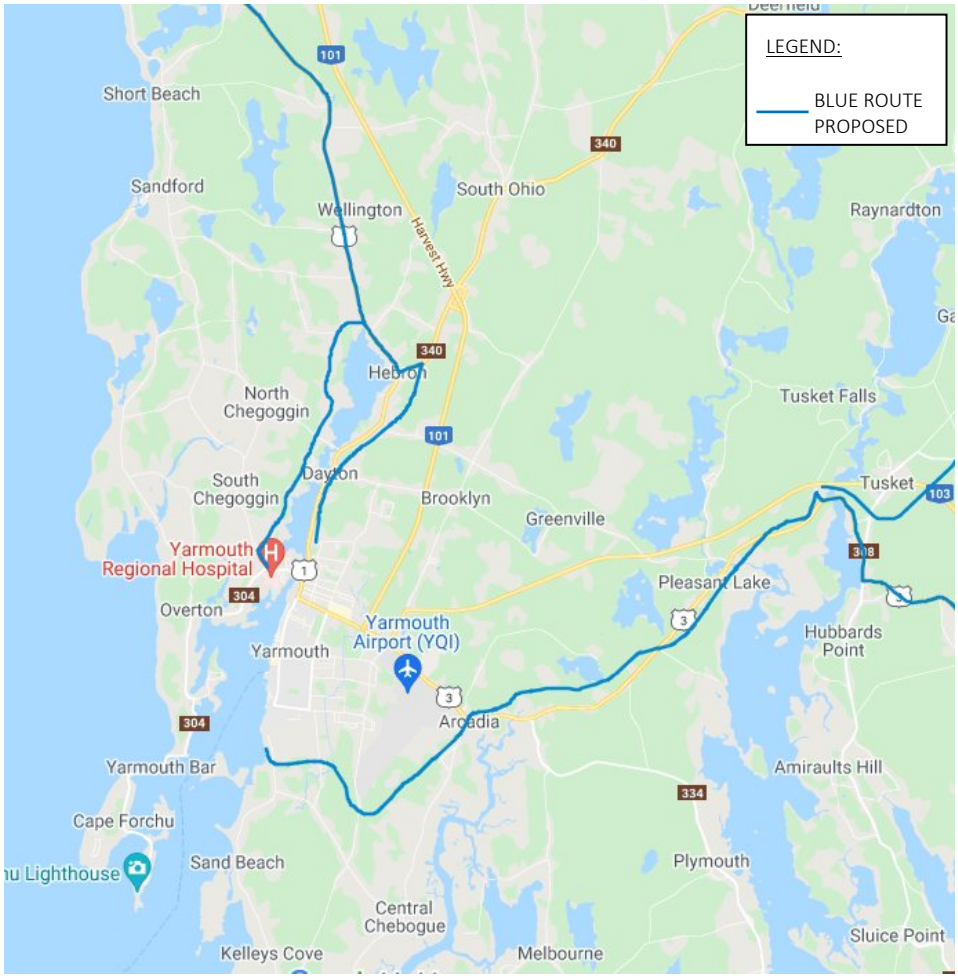


Figure 3 - Nova Scotia Proposed Blue Route

The Yarmouth County Rail Trail is an 87 km multi-use trail that follows the old rail line along the west coast of Nova Scotia from Lower East Pubnico to Norwood. It is a crushed gravel trail solely maintained by volunteers. All types of landscapes are seen along this stretch including coastal, agricultural, and woodland landscapes. It is a treasure of the Municipality of Yarmouth that has tremendous opportunity for AT Strategic Plans in the municipality.

A survey performed in the Physical Activity Strategic Plan in 2014 suggested Yarmouth County Rail Trail is significantly underutilized both recreationally and for transportation. The Physical Activity Strategic Plan was devised to improve usership of AT facilities throughout Yarmouth County. Actions planned around the Rail Trail were to improve awareness of trails and safe places to bike or skateboard, improve route amenities, install additional signage such as mileage or trail etiquette, and start rural walking groups that use the trails when possible. The objective of these actions is to improve awareness of the trail and other safe AT facilities. The Active Transportation Master Plan even recommended improving the trail within the Town of Yarmouth to asphalt.

The Active Transportation Master Plan also considered the close proximity of Lake Milo and the Yarmouth County Rail Trail, stating that this presents “an opportunity to use the Milo Connector Route and the Trail in concert as a looped system.” There is also potential to expand the loop by continuing the future AT facility along Lake Milo to Second Lake and Doctor’s Lake. Loops like these encourage users to enjoy the unique experience of the AT facility while doing all the route planning work for them.

3 EXISTING OPERATIONAL CONDITIONS

3.1 TRAFFIC VOLUMES

The Study Team obtained turning movement counts at the intersection of Highway 1 with Prospect Street on March 23rd and 24th, 2021. Since traffic patterns at the time had decreased significantly due to the current Covid-19 pandemic, the Study Team determined that any data collected in the current condition should be adjusted to better represent typical traffic volumes under normal conditions.

Intersection traffic volumes were adjusted by comparing the 2021 count at the Highway 1/Prospect Street intersection with 2018 traffic data provided by NSTIR for Highway 1, north of Prospect Street. The AM and PM peak hour volumes were compared, and adjustment factors were estimated for each peak hour. The average adjustment factor for the AM peak hour was determined to be 1.30, and the average adjustment factor the PM peak hour was determined to be 1.10. These factors were applied to the Highway 1/Prospect Street intersection so that it may reflect average workday values under normal (non-Covid-19) conditions. The AM peak hour was defined between 8:30-9:30AM and the PM peak was defined from 4:00-5:00PM. The 2021 traffic volume estimates are shown in Figure 4 below and the raw traffic data are included in Appendix A.

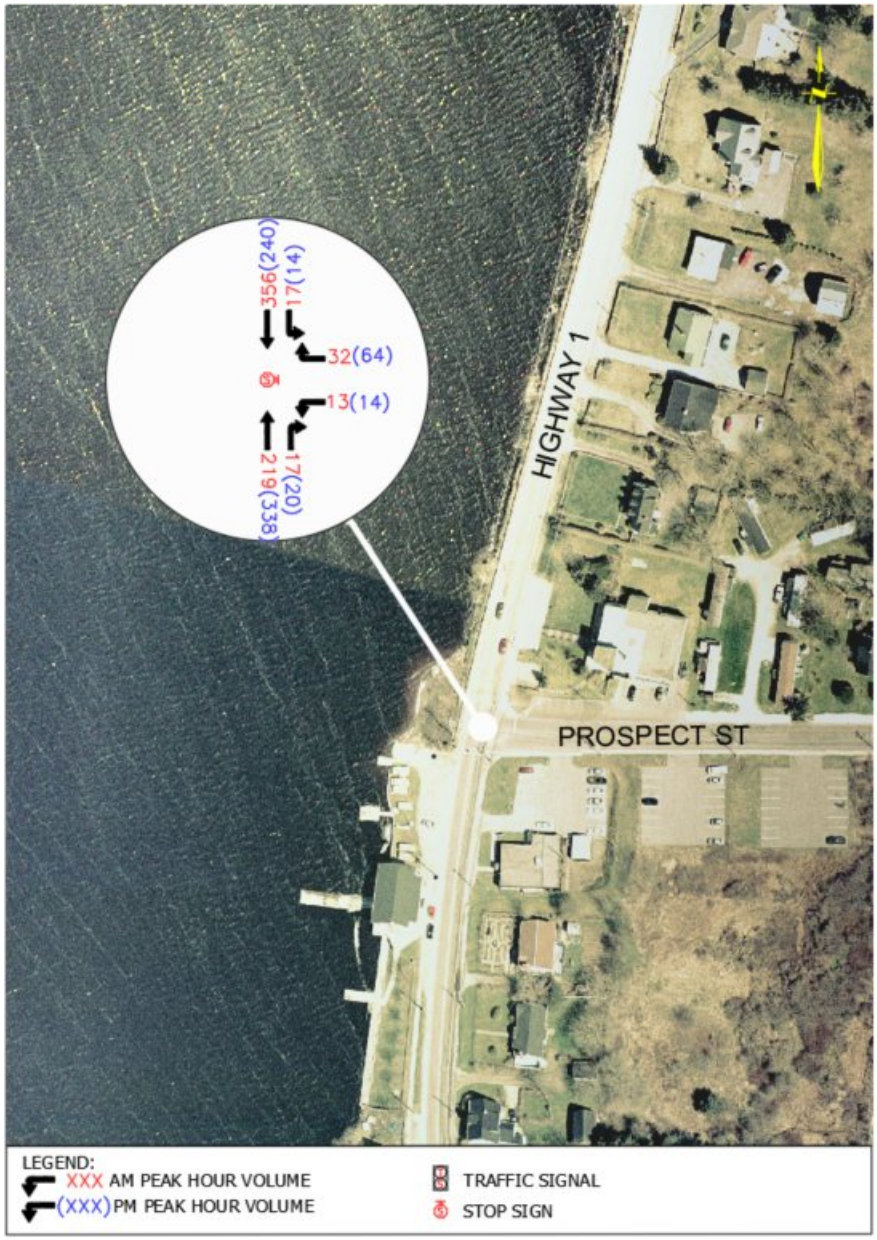


Figure 4 - Highway 1 at Prospect Street 2021 Adjusted Traffic Volumes

The posted speed limit along Highway 1 ranges between 50 km/h near the Town and increases to 60 km/h north of the water pump station along Lake Milo, closer to the Dayton area. It has been noted that observed vehicle speeds often exceed the speed limits. This is not too surprising for a rural highway of this kind that acts as a link between communities. In addition, the spacious unpaved shoulder along the lake side, bounded by a guiderail, does not discourage speeding. Speed data was recorded by the Municipality and the data results are discussed in the next section.

3.2 VEHICLE SPEED ANALYSIS

A vehicle speed analysis was performed on Highway 1 to better understand driver behavior within the project limits. Speed data were collected by the Municipality using a portable SafePace radar sign in two locations: near Prospect Street where the posted speed limit is 50 km/h and near the north end of the project where the posted speed limit is 60 km/h. Data were collected at the southern section of Highway 1 from June 25th – July 4th, 2021 at Civic 35 and from July 26th – August 8th, 2021 near Civic 236 in the northern section.

The purpose of the data collection was to retrieve the 85th percentile speeds, average speeds, and daily traffic volumes. The 85th percentile speed is the speed at or below which 85% of vehicles were travelling. It is also the speed at which TAC recommends a posted speed limit in most cases though there are many roadway parameters that influence the posted speed limit. An 85th percentile speed that is equal to or less than the posted speed limit indicates very strong compliance with the posted speed limit. An 85th percentile speed within 10% of the posted speed limit can be characterized as moderate compliance, while 85th percentile speeds that are >10% higher than the posted speed limit indicates fair to poor compliance. The two latter cases may suggest the need for traffic calming to decrease speeds along the roadway in question or that the posted speed limit should be increased. For Highway 1, an increased speed limit is not recommended given the objectives of the Lake Milo AT Trail and the narrow parameters of the roadway. Table 2 below reports the results of the data collected on Highway 1. Highlights of the findings are as follows:

- Daily traffic volumes range from 2,787 veh/day to 3,128 veh/day;
- Average speeds ranged from 56 km/h to 60 km/h;
- 85th percentile speeds ranged from 63 km/h to 66km/h;
- Lower average and 85th percentile speeds were recorded in the section near Prospect Street but still exceeded the posted speed of 50 km/h. In fact, this section shows poor compliance to the posted speed;
- The northern section of Highway 1 shows average and 85th percentile speeds at or above the posted speed of 60 km/h and has moderate compliance to the posted speed.

Table 2 – Highway 1 Speed Analysis Summary

Measure	Result
SOUTHERN HIGHWAY 1, NEAR CIVIC 35	
Average Daily Volume (veh/day)	3,128
Average Speed (km/h)	56
85th Percentile Speed (km/h)	**63**
85th Percentile Exceeds 50 km/h?	YES
NORTHERN HIGHWAY 1, NEAR CIVIC 236	
Average Daily Volume (veh/day)	2,787
Average Speed (km/h)	60
85th Percentile Speed (km/h)	**66**
85th Percentile Exceeds 60 km/h?	YES

The data suggests poor compliance to the 50 km/h posted speed limit on Highway 1 and moderate compliance to the 60 km/h posted speed limit section where both 85th percentile speeds exceeded 60 km/h. Measures to self-enforce speed limit compliance are recommended, especially for the section signed 50 km/h along Highway 1.

The need for traffic calming is subjective and often considered when street users such as pedestrian, cyclist, and area residents deem traffic volumes or speeds to be inappropriate for the area. For an arterial roadway, such as Highway 1, traffic calming measures are not always the best approach, but rather measures to enforce the posted speed limit. Adjacent land uses can also influence roadway characteristics and speeds. The lack of compliance with the 50 km/h speed limit in the southern section of Highway 1 is likely due to the physical characteristics of the roadway and roadside environment. The mostly straight roadway alignment, wide gravel shoulder on the lakeside, lack of pedestrian facilities, absence of on-street parking, and sparse development traffic and driveways do not promote low speeds. The combination of existing road characteristics and speed data results on Highway 1 make this stretch a good contender for improvement measures to enforce slower speeds.

According to the National Association of City Transportation Officials (NACTO), narrowing lanes to 3.0-3.6m can have a positive impact on a street's safety. This effect gives drivers less buffer area within their lanes, causing them to feel more uncomfortable, and results in naturally slowing traffic down. Slower vehicle speeds provide a more comfortable environment for active transportation users whose experience on an adjacent facility significantly changes and the narrower lanes also provide shorter crossing distances. Studies show this has no change on traffic flow assuming all other traffic controls at intersections stay constant. It is recommended the design options along Highway 1 include narrowed traffic lanes from 3.7m to 3.5m traffic lanes, the minimum recommended travel lane width for a provincial arterial roadway.

3.3 EXISTING CONDITIONS LEVEL OF SERVICE ANALYSIS

Traffic conditions were modelled using Synchro 10, which is a traffic analysis software that use the Highway Capacity Manual (HCM) and Intersection Capacity Utilization procedures.

The intersection performance was evaluated mainly in terms of the level of service (LOS), which is a common performance measurement of an intersection. The LOS is determined based on vehicle delay and is expressed on a scale of A through F, where LOS A represents very short delay (<10 seconds per vehicle) and LOS F represents very long delay (>50 seconds per vehicle at a stop-controlled intersection). A LOS D is often considered acceptable in urban locations; however, some communities will accept a LOS E.

LOS analyses were completed for 2021 Covid-19 adjusted volumes for Highway 1 at Prospect Street intersection. The intersection operates at an overall excellent LOS A during the peak periods. The approaches on Highway 1 perform at LOS A with little to no queueing for turns (0.4m or less). Prospect Street performs at a very good LOS B with up to 12.5 seconds of delay and up to 4.5m of queuing during the peak hours. These delays and queuing are considered short and very acceptable; therefore, no operational deficiencies related to traffic capacity were identified. The LOS results for the 2021 Existing Conditions are provided in Appendix B.

3.4 PEDESTRIAN CROSSING

The intersection of Highway 1 and Prospect Street has a designated crosswalk across the southern leg of the intersection. The existing infrastructure includes overhead pedestrian beacons, ground mounted signs at the crosswalk, and hatched pavement markings, the combination of which do not follow crosswalk best

practices. With the development of the new AT plan, this crosswalk will be an important connection between the existing Yarmouth County Rail Trail and the Lake Milo waterfront.

The crosswalk location and infrastructure were evaluated using the *TAC Pedestrian Crossing Control Guide (3rd Edition)*. This guide provides methodologies that can be used to ensure consistent implementation of pedestrian crossing infrastructure based on pedestrian volumes and demographics, traffic volumes, intersection traffic control, distance from the nearest pedestrian crossing, posted speed limit, and lane configuration.

The existing crosswalk is in a place that makes sense within the community. There are several pedestrian generators in the area that are serviced by this crosswalk, including the Yarmouth County Rail Trail, Lake Milo Aquatic Club, and the Meadowfields Community School. An in-depth study was not conducted to evaluate the location of this crosswalk against TAC's criteria, largely due to pedestrian volumes in the spring not being reflective of pedestrian volumes during the summer peak season, but it is likely that this intersection meets TAC's criteria for crosswalk location.

Pedestrian volumes were collected at this location during the peak hours. A total of 5 pedestrians were recorded from 7:30-9:30AM and 4:00-6:00pm and no cyclists were recorded at the intersection. As mentioned, the count was recorded in the early Spring season on March 23-24, 2021 during the Covid-19 pandemic. Covid-19 restrictions also limited access to the Lake Milo Aquatic Club (LMAC), a large generator for this intersection. The LMAC hosts a number of events including fitness and dance lessons and celebratory parties through the year. In the summertime water events are held including kayak lessons, canoe lessons, lifeguarding swimming lessons, weekly dragon boat racing events, and canoe rentals are available. A lifeguard monitored swim area is open to the public from the last week of June to the first week of September. There are 9 parking spaces provided at the LMAC along the west side of Highway 1. There are two parallel on-street parking spaces on the east side of Highway 1 opposite the LMAC. Aside from these two spaces, parking along the rest of Highway 1 in this area is prohibited except for loading/unloading. Despite these parking restrictions it is not uncommon to see vehicles parked illegally on both sides of Highway 1 in this area. There are two public parking lots located off Prospect Street on the east side of Highway 1 that each hold 16 parking spaces. This means that 74% of the available LMAC parking is located on the east side of Highway 1. For the sake of this analysis, only permitted parking spaces were included. Available parking spaces are shown in Figure 5.

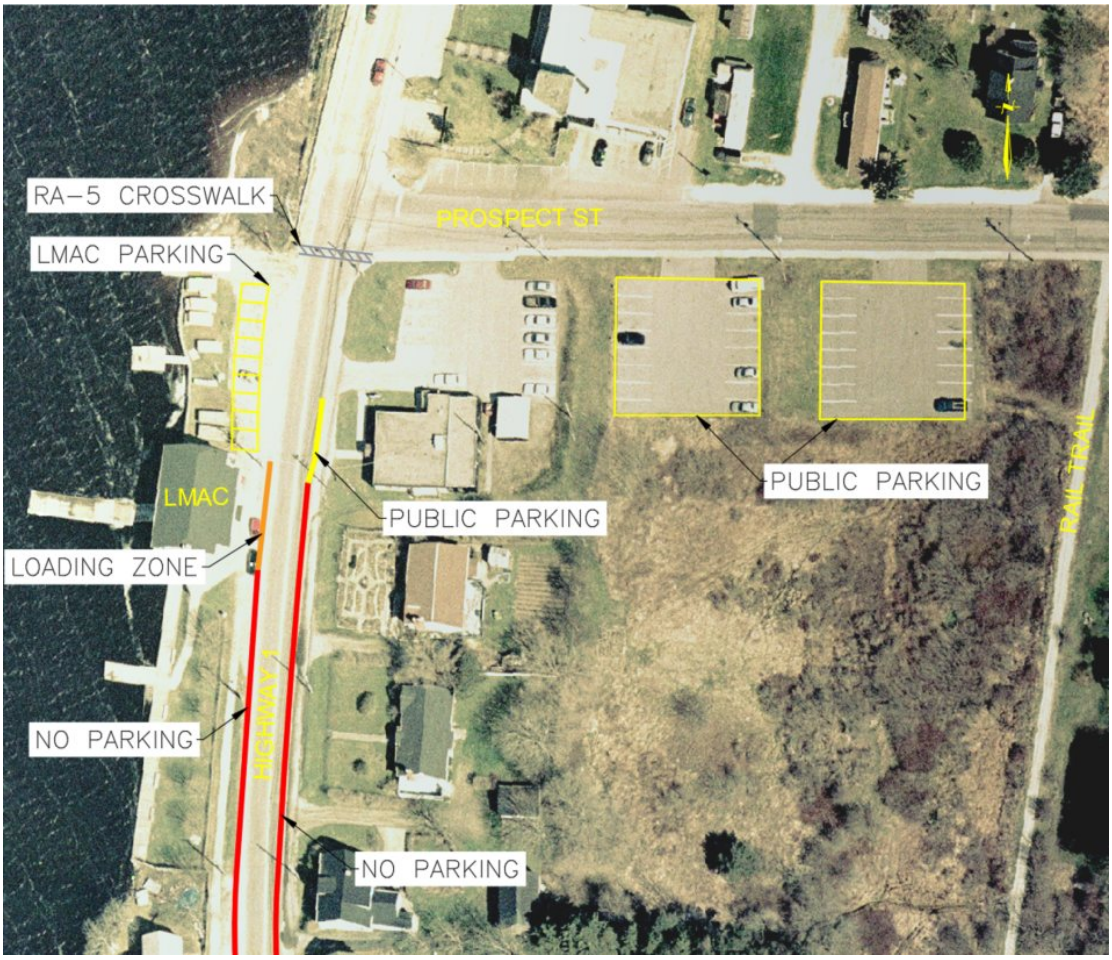


Figure 5 - Parking for the Lake Milo Aquatic Club

User data was received by MODY for the LMAC during the 2019 season, before the Covid-19 pandemic. The data provided included visitor counts to the swim area and the schedule and registrant count for the water events and fitness classes held. The Institute of Transportation Engineers (ITE) Trip Generation Manual reports on an analysis of mode shares for baseline site trip generations of different land uses. According to ITE, 96% of trips generated to baseline sites are by vehicle while the other 4% are by some type of active mode (cycling or walking). On the busiest week of the 2019 Summer (July 7-13, 2019) the average daily visitor count was recorded as 163. This suggests the crosswalk could see up to 116 pedestrians accessing the LMAC's swimming area alone. This count increases should an event or program be run during the busy public swim hours. It should be noted that vehicle occupancy was not considered in this analysis as available parking spaces at the LMAC are still limited regardless of how many occupants are in each vehicle.

This data suggests that the demand for pedestrian crossings at the crosswalk is significantly higher during the summer compared with the traffic data that was collected in March 2021. The crosswalk treatment at Highway 1 and Prospect Street will be further analyzed during the AT detailed evaluation. Data for the LMAC is summarized in Table 3.

Table 3 – Lake Milo Aquatic Club Data for Summer Months of 2019

Summer Event	Max Visitor Count (per Event)	Frequency
Swim Area	254	Daily Jun-Sept
Dragon Boat Drop-Ins	18	Two per week
Canoe & Kayak Programs (Age 7-10)	59	Four per week
Canoe & Kayak Programs (Age 11-17)	12	Four per week
Fitness Classes	26	Three per week

4 ENGAGEMENT – PHASE 1

The first phase of engagement involved stakeholder interviews, letters to landowners and an accompanying survey. The goals of the first phase of engagement were to raise awareness about the project, gauge interest with surrounding landowners, and identify any opportunities and constraints.

4.1 SURVEY RESULTS

A survey was conducted with local landowners in June 2021 with 14 residents submitting responses. See survey results in Appendix D.

Respondents to the survey consistently cited the proposed active transportation route as a beautiful way to enter or exit the Town of Yarmouth and unanimously support the development of the plan. They see Lake Milo as an incredible community asset, both in terms of its scenic beauty, as well as the recreational opportunities it presents.

Nearly two thirds of survey respondents currently walk or cycle along this route, but the vast majority feel uncomfortable when doing so. Those who do not currently walk or cycle this route would like to do so but cite traffic and safety as the primary reasons for avoiding it.

When asked about the preferred infrastructure for the Lake Milo AT Route, respondents expressed strong preference for protected, separate AT infrastructure with a paved multi-use pathway or boardwalk being the top choices, followed by a protected bike lane and a curbed sidewalk (see table below). A painted shoulder was the least preferred of the options.

Table 4 - Preferred Infrastructure Survey Results

How likely are you to use this type of active transportation infrastructure along Lake Milo?					
FACILITY TYPE	VERY LIKELY	SOMEWHAT LIKELY	NEUTRAL	SOMEWHAT UNLIKELY	VERY UNLIKELY
Protected Bike Lane	43%	7%	14%	0%	36%
Paved Multi-Use Pathway	64%	14%	7%	0%	14%
Curbed Sidewalk	43%	7%	7%	0%	43%
Painted Shoulder	7%	7%	36%	14%	36%
Boardwalk	64%	7%	14%	0%	14%
Protected Bike Lane	43%	7%	14%	0%	36%

Survey respondents would like to see the Lake Milo AT Plan fit in with existing infrastructure to create a more cohesive network. Specific connection points mentioned include:

- Old Cotton Mill/Water St.
- Extending the project focus to include New Rd.
- Rail trail connections at key intersections
- More east-west connections - specifically using Prospect St. as a key connector

In addition to adding connections to the broader AT network in Yarmouth, respondents were asked about issues and opportunities that this project could present (see table below).

Table 5 - Issues and Opportunities with AT network along Lake Milo Survey Results

POSSIBLE ISSUES	POSSIBLE OPPORTUNITIES
Parking	Viewing Areas/Benches/Picnic Spots
Stormwater Management	Crosswalks at Key Intersections
Steep Slope of Shoreline & Vegetation	Streetscaping (Planters, Banners, Lighting, Garbage Cans, etc.)
Increased Garbage	Bury Above Ground Utilities
Obstructing Historic Community Water Access Points	Formalizing Community Water Access Points

The most prominent issues mentioned by respondents were parking, stormwater management, slope of the shoreline, increased garbage as use increases, and possible obstruction of historic community access points to Lake Milo. Opportunities were mostly related to complementary infrastructure and amenities, such as benches, designated viewing areas, streetscaping improvements, crosswalks, traffic calming measures, and formalizing community access points to Lake Milo. One resident suggested burying above ground utilities in order to recapture some land area within the right of way and remove possible obstructions.

There were concerns around creating a “destination” that people would drive to and the possible safety issues that could arise if visitors started parking along the shoulder of the road. Current parking at the Aquatic Club is already at capacity during the summer months and peak times, according to survey respondents, and additional parking options should be considered to accommodate visitors and reduce the nuisance for landowners along the road. The increase in foot traffic also raised concerns about increased garbage along the shoreline, which could be mitigated by adding garbage cans along the route at certain intervals.

Stormwater management featured prominently in resident responses with specific mention of regular roadway flooding at the intersection with Prospect Street during heavy precipitation events. The slope of the shoreline was also cited as a possible challenge, as the drop off to the water can be steep and vegetation dense. When thinking about access to the water, residents felt it was important to keep historic access points open and accessible, and noted the opportunity to formalize some access points for swimmers, boaters and fishers. Ownership of the existing docks along the lake is unclear and residents want to know what activities are permitted and where.

Despite some possible issues, residents were unanimous in their support of the project and would like to see an AT plan that allows people of all ages and abilities to enjoy the shoreline of Lake Milo. That being said, accessibility was mentioned by multiple respondents as an important consideration. The Villa seniors complex at the northern extreme of the study area houses a number of residents whose needs (motorized and non-motorized mobility assisted devices) should also be considered in the plan.

4.2 STAKEHOLDER & LANDOWNER INTERVIEWS

Similarly, to the results of the survey, those interviewed were supportive of the project and excited by its prospect.

Local landowners are using the informal docks regularly - mooring motorboats, launching sailboards (for windsurfing), swimming, and fishing. They care for the docks and invest in their continued maintenance, despite the fact that they do not own them. Informal rules, such as “swimming on the left and fishing on the right” have developed over the years and provide some separation of uses so everyone can enjoy their chosen activity. There isn’t a strong feeling of ownership over the docks (from those we heard from) but ensuring access to them remains intact is important to residents. Access to the lake is an important part of the culture, and quality of life, within the study area.

There is an area along the northeastern shoreline where the grade slopes more gently into the water and is a preferred place for swimmers. This area was characterized as a small, pebbled “beach” where it is safer and easier to enter and exit the water. Access to this space is important to residents.

The proximity of the seniors complex, the Villa St Joseph du Lac, is an opportunity to provide more accessible active transportation routes to and from the facility for staff, residents and their visitors. The Villa has multiple seniors who have electric scooters that allow them more independence and mobility. Many are currently driving along the unpaved shoulder of Highway 1 and feel unsafe and uncomfortable with the current conditions. The preferred facility choice for these residents (and those in non-motorized mobility assisted devices) would be a multi-use pathway, due to the smooth surface. Bumps from sidewalks and boardwalks can cause challenges for wheelchair users and increase pain and discomfort.

The second phase of public engagement will be open to the wider community and focus on the preferred design options. The second phase of engagement and the results are discussed in Section 6.

5 HIGHWAY 1 AT CORRIDOR CONCEPTS

The design options being considered to provide active transportation along Lake Milo on Highway 1 have been briefly described including the improvements and implications associated with each option. Each option that is introduced considers a Blue Route facility through the corridor for cyclists since Highway 1 in Yarmouth has been identified as a link for the existing Blue Route network. Concept drawings are also provided in Appendix C. Cross-sections of the two options are provided in below.

5.1 CORRIDOR OPTIONS

OPTION 1 – SPACIOUS MULTI-USE PATH & THE BLUE ROUTE

Option 1 provides a spacious multi-use pathway between Lake Milo and Highway 1 to accommodate pedestrians and cyclists through the corridor. A 4.0m multi-use path is proposed from Prospect Street to Maple Hill Lane/The Villa driveway. Paved shoulders are recommended at 1.2m and the two travel lanes are narrowed to 3.5m. Travel lanes of 3.7m are maintained at the beginning and end of the project limits where space permits. On the east side of Highway 1, a 0.5m unpaved buffer is proposed. On the west side of Highway 1, a 1.2m guardrail spacing is proposed before 0.3m retaining wall and 0.3m buffer. On the west side of the multi-use path, A 0.3m buffer is proposed before a pedestrian rail/fence. There's approximately a 1.0m buffer to accommodate utility poles and the pedestrian fence before a sloped shoreline drops into Lake Milo. The multi-use path is proposed at grade with the roadway. A maximum drop of 0.9m may be used in constrained locations.

OPTION 2 – MULTI-USE PATH, BIKE LANES & THE BLUE ROUTE

Option 2 also provides a multi-use pathway at 3.0m wide accompanied with 1.5m paved shoulders meant as unidirectional cycling facilities on Highway 1. On the east side of Highway 1, a 0.5m unpaved buffer is proposed followed by 1.5m paved and striped shoulder for cyclists. Two travel lanes are narrowed to 3.5m widths. Travel lanes of 3.7m are maintained at the beginning and end of the project limits where space permits. On the west side, a 1.5m paved and striped shoulder is proposed followed by 1.2m guardrail spacing, 0.6m buffer and retaining wall, and the 3.0m multi-use path. Adjacent to the multi-use path is a 0.3m buffer before the pedestrian rail/fence. There is approximately a 1.0m buffer to accommodate utility poles and the pedestrian fence before a sloped shoreline drops into Lake Milo. The multi-use path is proposed at grade with the roadway. A maximum drop of 0.9m may be used in constrained locations.

Figure 6 - Lake Milo AT Plan Blue Route Cross-sections

5.2 QUANTITIES

All design options experience several conflicts with existing infrastructure along the corridor as well as limitations due to the existing right-of-way. These conflicts include utility poles, drainage grates, etc., that conflict with the proposed design elements (i.e., multi-use path, guardrail, etc.) Table 6 below outlines a few quantities of existing infrastructure that were identified along the corridor for each option.

Table 6 – Design Option Quantities

Quantity	Option 1 - Blue Route Multi-Use Path	Option 2 – Blue Route Bike Lanes and Multi-Use Path
Utility Pole (Vertical & Horizontal Impacts)	10	10
Roadway Guiderail Replacement	1,199 (m)	1,199 (m)
Cross Drain/Culverts	7	7
Wharf Access	3	3
Lakeshore Encroachment	25,800 (m^3)	25,800 (m^3)
Manhole	17	17
Sewage Pump Station	1	1
Retaining Structure	1,192 (m)	1,169 (m)

5.3 COST ESTIMATES

A high-level cost estimate was drafted for each active transportation option. The cost estimates assumed a dropped 0.9m trail adjacent to the roadway and filling along the shoreline for the full 1.169km of the project. Rip rap along the new shoreline, a costly item, is also assumed for the entire project length. A 20% contingency and engineering allowance is included in both estimates. The cost estimate has assumed "worst case" scenario should the entire shoreline need excavating and filling. In reality, there is usable shore as well as both options maintain the proposed trail at road level for most of the project. Detailed design is expected to lower the cost estimate for both options. Additional cost estimate detail is provided in Appendix E of this memo.

Table 7 - Design Option Cost Estimates

Conflict Type	Option 1 - Blue Route Multi-Use Path	Option 2 – blue route Bike Lanes and multi-use path
Total Cost	$6.3M	$6.4M

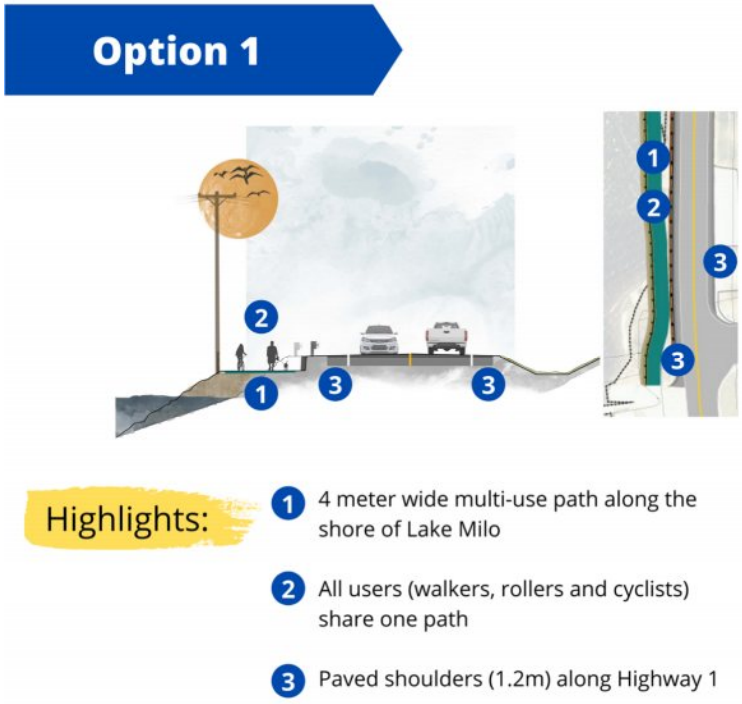
The design option estimates do not include property acquisitions and HST. There is some opportunity to avoid a few of the previously mentioned constraints which were not considered in these estimates. Detailed design will clarify avoidable constraints with utilities and other infrastructure.

6 ENGAGEMENT – PHASE 2

The second phase of engagement involved a presentation and Q&A of the design options on October 4th, 2021, updated content on the municipality's website, a public survey, user group discussions, and additional stakeholder engagement. There was also an additional landowner letter to provide details about the Phase 2 engagements and invite these stakeholders to participate in engagement activities. The goals of the second phase of engagement were to clearly present the two design options to the public, identify a preferred option, get feedback from specific user groups, and continue to engage with stakeholders and build project awareness.

6.1 SURVEY RESULTS

A survey was conducted from October 4th until October 31st, 2021 detailing the design options (see Figure 7 below) and asking respondents to select a preferred option and offer any additional feedback. The survey also included a question asking about preferred amenities.



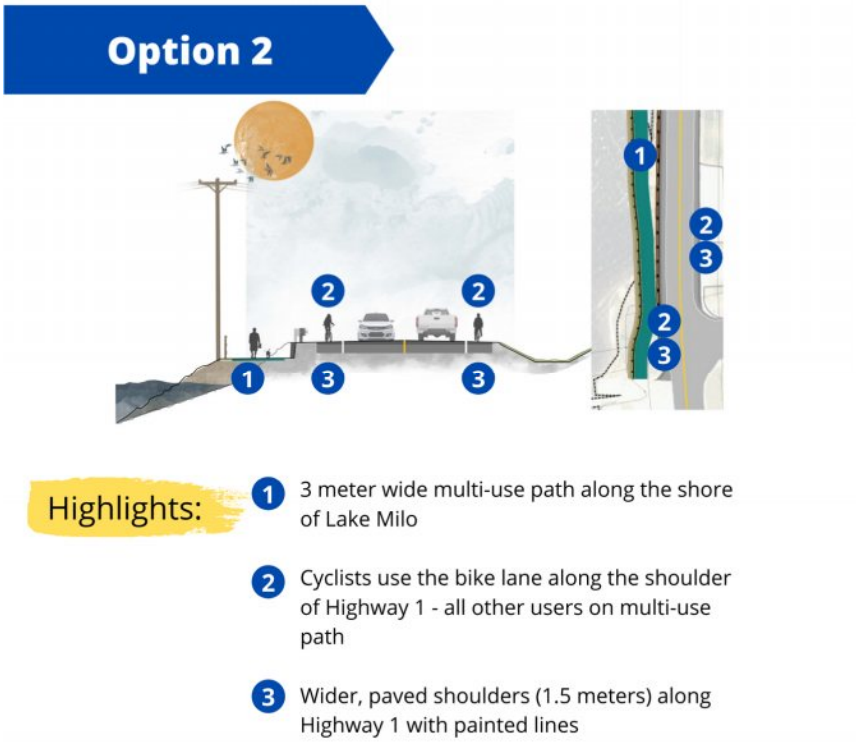
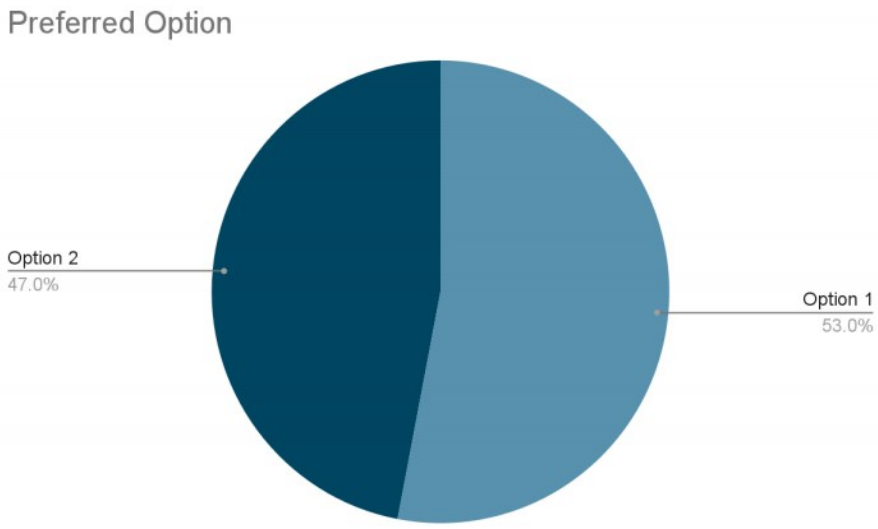


Figure 7 - Phase 2 Public Engagement Materials

The survey had 185 respondents - with 53% preferring Option 1 and 47% preferring Option 2 (see all survey data in Appendix C).



The main divergence in opinion between the two options had to do with bike safety. Some proponents of Option 1 - with all users sharing a 4m wide multi-use path - suggested that an additional dividing line be added to separate users. Others cited this as the safest option for children and less avid cyclists. Those who preferred Option 2 - with bike lanes along the road for cyclists - felt it safest to separate slower pedestrian traffic from cycling traffic. Many self-identified cyclists preferred Option 2 because they feel the speed that they reach is not compatible with a shared use facility and stated their preference for being on the road for this reason. Five respondents who preferred Option 2 also wanted to see additional protection for cyclists than just a painted line. Suggestions included adding physical barriers or posts to better delineate the bike lane from the roadway.

Some respondents who preferred Option 1 would be happy with Option 2 if recreational cyclists were still permitted on the multi-use trail and not required to use the paved shoulder (which is currently included within Option 2). This would need to be clearly communicated to the public if Option 2 is the final choice.

When asked about amenities they'd like to see along the Lake Milo Active Transportation Route, benches (155 respondents), garbage cans (155 respondents) and lighting (139 respondents) were the top three choices, followed by landscaping and beautification, lookoff(s), and interpretive signage. See Figure 8 below. Respondents who spoke about lighting wanted to see ground lighting when possible and two noted that lighting should be adherent to accessibility guidelines (i.e., no LED overhead lights).

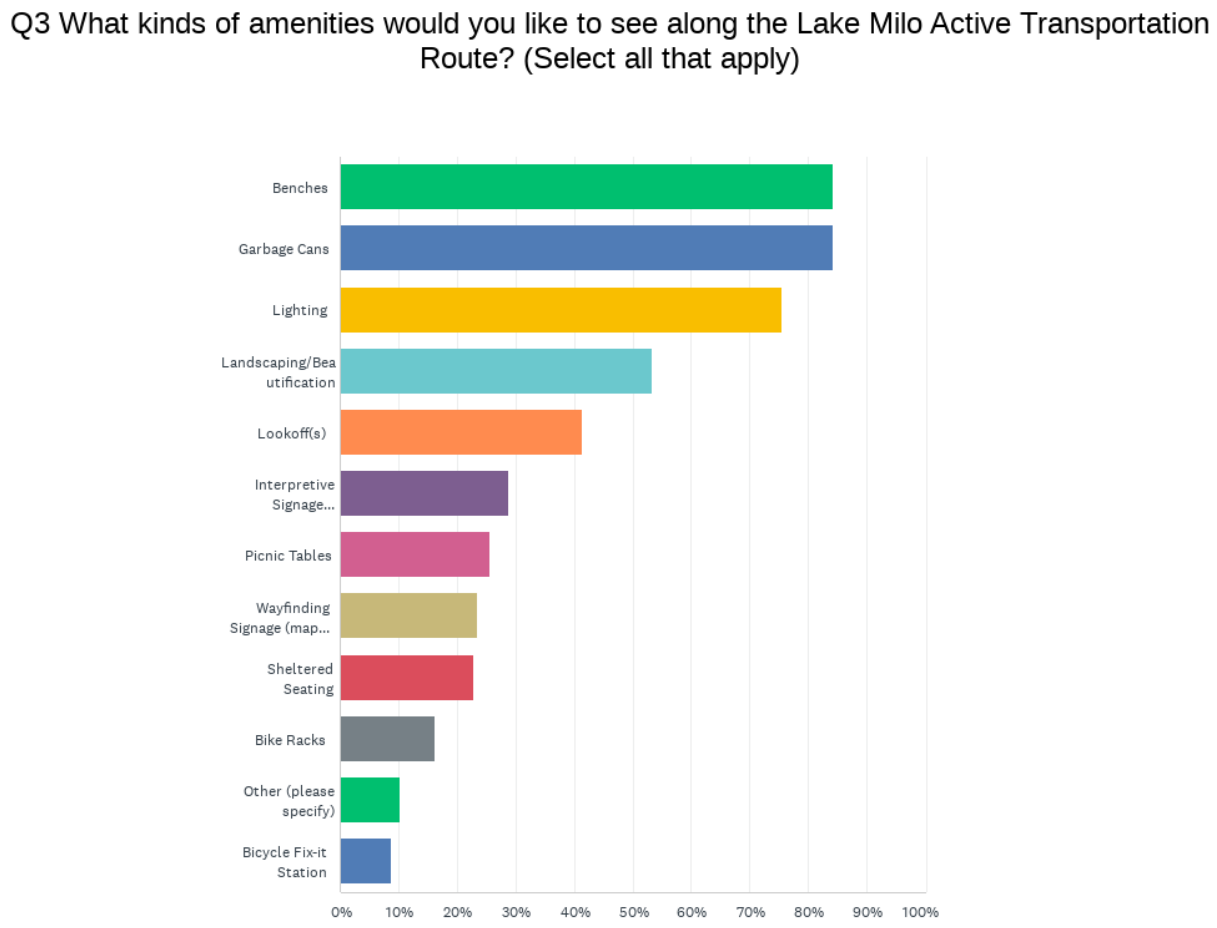


Figure 8 - Phase 2 Public Survey Response on Lake Milo AT Amenities

In addition to the list above, respondents suggested adding swimming lanes to the lake, commercial kiosks to provide bike or kayak rentals or food services, washrooms, water refill stations, distance markers, fitness stations, and pet waste bag dispensers.

Some respondents raised environmental concerns around the construction of the project, particularly around infilling and possible sedimentation in the lake. One respondent suggested that the project could negatively impact the lake's health and would rather see the pathway built on the inland side of Highway 1. Another respondent suggested that environmentally friendly and durable materials should be used when constructing the trail and its amenities whenever possible.

Another major concern for some respondents was the cost of the project, and they felt that the expense should be an important factor when determining the final design option. See full survey responses in Appendix D.

6.2 STAKEHOLDER & USER GROUP INTERVIEWS

Three user group discussions were hosted to obtain feedback on the design options from the perspective of different user groups - those primarily using the water (swimmers, fishers, and boaters), those who run or walk along this stretch, and those who cycle it.

Users were supportive of the project and excited about the prospects it creates for recreation in the community. Overall, users were happy to see either design implemented, but the majority felt that separating active transportation users from traffic (Option 1) was the best and safest option. Users felt that ATV use should not be permitted on the multi-use path and that this should be made clear through posted signage or other deterrents.

Users spoke at length about their desire to see swimmers and fishers accommodated in the design for the Lake Milo Active Transportation Route. Though out of the immediate scope of work for this project, they would like to see swimming lanes added to the lake to formalize the use of this space. It was suggested that lanes could be added between two of the recreational docks, creating a programmed space for this activity. Distance markers were requested, as Lake Milo is commonly used by triathletes and this feature would assist with training. They would also like to see a "T" or "L" shaped dock incorporated into one or more of the docks to accommodate recreational fishing and ensure that this use does not conflict with swimmers or other recreational users. One user suggested adding buoys to the eastern side of the lake to define the space, keeping swimmers safe from boating traffic. Balancing user interests was noted as a potential challenge with this project, and something that should be considered throughout the design process to accommodate differing needs.

Throughout the Phase 2 consultation, stakeholders were invited to offer any additional feedback or ask questions to the engagement team. Three residents reached out to provide feedback.

One resident, the owner of the NovaStar Motel on Highway 1, is interested in investing in infrastructure on the lake to provide additional recreation services to guests. They are interested in continued communication with the municipality about how they might be able to align their plans with this project.

Another resident was in touch to express their concern around the cost of the design. They wanted to see a simplistic design with the guardrail moved closer to the road and the other side become a crushed gravel pathway. They wanted to see the money from a more elaborate trail spent on a recreation facility for the community.

A third resident reached out to the project team seeking some clarifications. This resident had questions around the impacts of the project on their property: if the roadway would be moved closer to the houses along this stretch, what the flooding and drainage implications might be, if there would be continued access to the docks and how homeowners along this stretch of road would be able to access the pathway. The resident would like to see traffic calming measures incorporated into the overall design as well, as well as crosswalks to allow safer road crossings at key locations.

7 GUIDING PRINCIPLES & THE PREFERRED OPTION

Community ideals, the active user, and provincial requirements were incorporated into the guiding principles that shaped the design options for the Highway 1 active transportation facilities. This section will highlight the guiding principles behind this project so to assist the Municipality with identifying which AT option best aligns with the goals for the future of the Lake Milo Stretch. The Lake Milo Active Transportation project aims to address the following:

- Providing better accessibility for all ages and abilities: the everyday users of the pedestrian facilities along Lake Milo Stretch;
- Creating a public space for folks to easily access the space and meander through safely with spacious barriers from vehicle traffic;
- Prioritizing cycling connectivity through the Lake Milo Stretch and add access to the Yarmouth County Rail Trail which brings recreational and avid cyclists from around Nova Scotia to and from Yarmouth;
- Maintaining wharf and Lake Milo access where access currently exists to continue to encourage Lake use for recreational activities such as triathlons, boating, swimming, fishing, and Aquatic Club events;
- Minimizing utility conflicts as per the needs of the Municipality and considering the constructability of the proposed option.

These project ideals are predominately based on the Municipal Planning Strategy, the Yarmouth Active Transportation Master Plan, and public engagement feedback. These published documents provide guidance for community-based approaches to encourage walking or rolling on Municipal AT facilities. To evaluate the options for the Lake Milo stretch, an evaluation matrix was established with the guiding principles as the building blocks. A few iterations of the project criteria were created that incorporated ideals from the supporting documents that would be beneficial along Highway 1. These were then narrowed to the short list provided in Table 8. Overlapping criteria were combined and those that did not provide much merit to Lake Milo were removed. The short list consists of seven criteria that were used to evaluate the design options while emphasizing the intention of this project.

A valued weight has been assigned to each criterion by the project team using the guiding principles to influence the priorities for the AT facility. For example, active transportation criteria were heavily weighted as they are the ultimate objective for this project. Each option was then scored based on a 1-5 scale, with 1 being poor and 5 being exceptional in terms of the criteria considerations. These scores were then multiplied by the category weights and added together to determine the overall score for each option. The option that scores highest best aligns with the overall objectives of this project.

The Study Team went through the exercise of weighting the criteria and scoring each design option. The Study Team then reviewed their initial findings and preferred option with the Municipality. It is encouraged that the Municipality run through the exercise themselves and revise the scoring as necessary to align with their objectives for the area. The various uses of the Lake Milo Stretch and mentioned ideals should influence the scoring weights. Table 8 below shows the criteria weights and scores according to the Study Team's analysis.

Table 8 – Highway 1 Active Transportation Guiding Principles Matrix Evaluation

Guiding Principles	Criteria Weight	Option 1 - Blue Route Multi-Use Path	Option 2 – Blue Route Bike Lanes and Multi-Use Path
Pedestrian experience, walkability, and comfort	30	4	5
Bicycle movement, comfort, and safety	25	4	5
Accessibility for all users	20	5	5
Opportunities for landscaping and streetscaping (signage, seating, etc.)	15	4	4
Traffic Calming Management	10	5	4
Conflict Impacts	15	2	2
Constructability	10	3	3
TOTAL WEIGHTED SCORE	**625**	**490**	**535**
Ranking		***2***	***1***

The results show Option 2 (The Blue Route Bike Lanes and Multi-Use Path) ranked higher than Option 1 (The Blue Route Multi-Use Path) by 45 points. This is predominately due to the scores Option 2 received for the pedestrian experience and bicycle movement. When considering the design options, both offer a vast improvement to the existing state of Highway 1 in this section. However, when comparing Option 2 to Option 1, Option 2 provides a more comfortable overall experience for both pedestrians and cyclists because it dedicates a facility to each user. Though cyclists are still permitted on the multi-use path, cyclists using Highway 1 as a cycling thoroughfare have the option to use the bike lanes to get to/from their destinations. This reserves the 3.0m multi-use path for those looking for a leisurely outdoor experience for both cyclists and pedestrians. For this reason, Option 2 scored higher and is the preferred design option of the Study Team based off the Guiding Principles evaluation.

8 ADDITIONAL ASSESSMENTS

As part of the scope for the Lake Milo AT Master Plan, additional assessments were requested as necessary during the project analysis. Safe pedestrian crossing must also be considered to access the proposed Lake Milo AT Trail. Additionally, the work planned along Lake Milo must follow environmental procedures so as to cause little disturbance to the natural habitat found here.

8.1 PEDESTRIAN CROSSING ASSESMENT

Highway 1 has an average annual daily traffic (AADT) of 7,080 vehicles per day. TAC recommends that a passive crosswalk with ground mounted signs and zebra crosswalk marking is the minimum appropriate treatment for a 2-lane roadway signed at 50 km/h that sees an AADT of this value. TAC does state that road authorities can use more enhanced forms of crosswalks if they are applied consistently throughout the network. This location would be best served by a more enhanced RRFB (rectangular rapid flashing beacon) treatment for the following reasons:

- This crosswalk will be an integral component of Lake Milo's AT network that services large volumes of pedestrians during the summer peak period;
- Drivers have become accustomed to looking for a pedestrian beacon at this crosswalk, so installing a treatment without a beacon may make drivers less attentive to pedestrians at the intersection; and
- Traffic volumes on Highway 1 are not high enough to warrant an overhead pedestrian beacon treatment, similar to what is currently installed at the intersection.

Additionally, NACTO identifies in their *Urban Bikeway Design Guide* that active warning beacons are typically installed for the following applications:

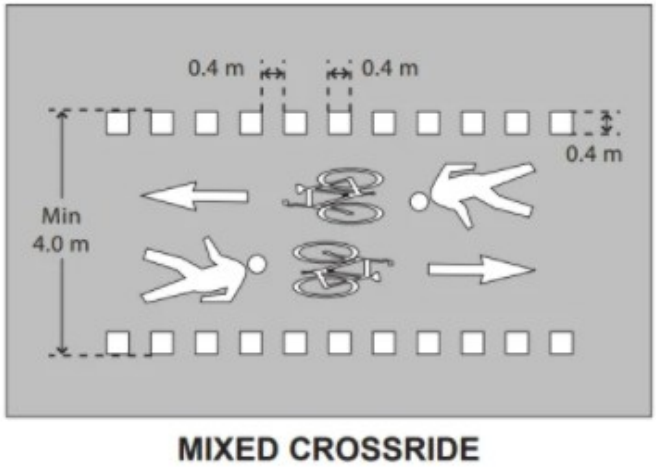
- At high-volume pedestrian crossings, or priority bicycle route crossings;
- Where bike facilities cross a road at a mid-block location or at intersections where signals are not warranted; and/or
- At locations where driver compliance to bicycle/pedestrian crossings is low.

While there are no known issues with driver compliance to the existing crossing at this intersection, it is a high-volume crossing on a priority bicycle route at an intersection where traffic signals are not warranted. This further confirms that an RRFB treatment would be appropriate for this crosswalk.

In general, the municipality should follow the guidance from TAC's *Pedestrian Crossing Control Guide (Third Edition)* and *Manual of Uniform Traffic Control Devices for Canada* for implementing signage and pavement markings for this crosswalk. Some of the high-level changes to the existing infrastructure that will be required include:

- The pavement markings at the crosswalk should be upgraded to zebra crosswalk markings;
- Pedestrian crosswalk ahead signs (WC-2R) should be installed in advance of the crosswalk in both directions;
- Vehicle passing restrictions from both approaches should be implemented;
- The overhead beacons should be replaced with an RRFB system; and
- The pedestrian pushbutton locations should be made accessible to all road users.

Lastly, since this crosswalk is intended to connect multi-use facilities, the municipality should consider implementing a modified version of zebra crosswalk markings that include cross-ride markings (a.k.a. Elephant's feet), as shown in the figure below. These marking are intended to indicate that the crosswalk accommodates both pedestrians and cyclists. This crosswalk is located within the Town limits and therefore, the Town should be consulted during final design. Recommended improvements at this intersection are illustrated in Appendix C.



Source: Manual Uniform of Traffic Control Devices for Canada 2021

Figure 9 – Example of Cross-Ride Markings (Elephant's Feet)

A second location for crossing has been considered at Highway 1 between Maple Hill Lane and The Villas driveway. Currently, the demand for crossing at this location is not expected to be high. There are no pedestrian facilities on either side of Highway 1 at this location, however, the Yarmouth County Rail Trail is accessible through Maple Hill Lane. Currently, the AT design options abruptly end at The Villas driveway where active users can access the Villas development or return southbound where they came from on the new trail. The Municipality has suggested a unique opportunity to provide a looped AT system between Lake Milo AT facility and the Yarmouth County Rail Trail. It is logical that a crosswalk between the driveways would be well used for these reasons.

For this section of highway, TAC recommends that an enhanced crosswalk with ground mounted signs and zebra crosswalk marking is the minimum appropriate treatment for a 2-lane roadway signed at 60 km/h. Vehicle passing restrictions is also required from each approach. Recommended features of the crosswalk at Prospect St are recommended here with the exception of the installation of overhead "RA-4" signs to consider this an "enhanced crosswalk". To remain consistent with the recommendations at the crosswalk at Prospect Street, the installation of RRFBs is also acceptable.

Highway 1 is owned and maintained by the province in this section. The recommendations of improvements for a crosswalk between The Villas driveway and Maple Hill Lane will have to be submitted and approved by NSTIR. MODY will likely be responsible for the maintenance of the crosswalk.

8.2 ENVIRONMENTAL ASSESMENT

Based on the current concept design options, the anticipated process to engage with the Provincial Regulators and Federal Authorities to verify submission requirements and to support acquisition of the anticipated Provincial and Federal approvals that would be required is summarized below.

Based on our review, this project should not trigger the Nova Scotia *Environmental Assessment Act*, although Provincial permits through Nova Scotia Environment and Climate Change (NSECC) may be required based on the final design chosen. Also, the project should not trigger a Federal Environmental Assessment under the *Impact Assessment Act*. Although, since the project will be partially funded by the federal government and may require a federal permit, engagement with Federal Authorities will be required. This engagement will lead to a Federal Environmental Effects Screening process (sometimes required through more than one Federal Authority).

Given the complexity of the provincial and federal permitting, it's important that an environmental team continue to work closely with the planning and design team so that process can be streamlined, and that detailed design will incorporate required Federal and/or provincial requirements. These submissions require a certain level of detail before submissions can be made. Regardless of Provincial or Federal jurisdiction, consultation with the Indigenous groups will mostly likely be required. This can be supported through engagement activities by MODY however, this consultation must also be conducted by the Provincial and/or Federal government (through lead Departments/Authorities) since it is a legal obligation for the Provincial and Federal government(s). The table below provides the recommended entities and timeline which to follow for environmental assessment. This table is not all inclusive and additional submittals and reviews may be required.

Table 9 - Environmental Assessment Regulatory Agencies & Timeline

REGULATORY AGENCY	TIMELINE
PROVINCIAL	
NSECC Water based permit, which may include: - Watercourse Alteration (of physical lake shore/shallow lake bottom) - Bridge (or other structure) installation - Culvert Installation - NSECC engages Fisheries and Oceans Canada (DFO) for review	60-day review period once submitted
FEDERAL	
Infrastructure Canada (or other funding body such as Transport Canada) - Will require a Project Description for review. Next steps are determined based on other Federal Authority participation.	Generally within 30 days

REGULATORY AGENCY	TIMELINE
PROVINCIAL	
Fisheries and Oceans Canada (DFO) – extent of participation depends on the amount of work that is required below the ordinary high-water mark. • Request for Review (for all work near water) and will result in: 1. Letter of Advice (no permit required) or 2. *Fisheries Act* Authorization (permit) • *Fisheries Act* Authorization requires additional specialized studies, including: 1. Fish and Fish Habitat survey 2. Habitat Compensation Proposal	RFR - Generally 2 weeks FA Authorization - may be as long as 6 months
Transport Canada (through Navigation Protection Program (NPP)) • Determine if the project is classified as Minor Works or if work is above the ordinary high-water mark, if not then application is required under the *Canadian Navigable Water Act* (CNWA). • CWNA Application Requires Project details, design details, stakeholder details. Any further information requirements (i.e., environmental screening documents) would be requested following this submission. • CWNA Notification of Work Occurs after an approval (if any) is issued.	Internal review Generally 2 weeks to 1 month Minimum 30-day comment period
OTHER	
Environmental Assessment, under the *Impact Assessment Act* – not currently expected to be required based on the current project. • Will be verified through the course of the Federal Authority consultation and permit acquisition.	
Environment and Climate Change Canada (ECCC) likely has no direct role (unless species at risk are present), although ECCC will likely be consulted through the other Federal Authorities • Will be verified through the course of the Federal Authority consultation and permit acquisition.	
Nova Scotia Lands and Forests (DNR) likely has no direct role (unless species at risk are present), since there appear to be no beaches present (disturbance is a regulated activity). • Will be verified through the course of the Provincial consultation and permit acquisition.	

REGULATORY AGENCY	TIMELINE
PROVINCIAL	
Archaeology Assessment will likely be required to support the Provincial or Federal permit acquisition process, including engagement with Indigenous groups. A permit through Communities Culture and Heritage is required for this work, but is directly obtained by the Archaeologist retained to conduct the work.	Approximately 1-month for the study and up to 4 months for CCH to approve the report.

9 IMPLEMENTATION

The Lake Milo AT facility would require upgrades to both the street as well as construction of the trail. These two activities provide a natural separation that could become phases of the work. The following is a preliminary outline for the implementation of this project. Two overall phases are anticipated: Phase 1 – Highway 1 roadway work improvements; Phase 2 – Active transportation facility and shoreline improvements. Phase 2 can be adjusted to accommodate additional phasing as funding allows.

9.1 PRELIMINARY PROJECT PHASING

Phase 1: Based on the Highway 1 widening outlined in the concept plans (Appendix C), the travel way would be adjusted to provide the paved shoulders on both sides and would result in the centerline being shifted slightly. This would be done using existing grades and carrying the crown of the road to the centerline. The guardrail relocation would be included in this phase of the work. It is expected that NSTIR would prefer to construct this all at once, so that there will only be one disruption to traffic. The width that is available for the conceptual road is approximately 12.0m wide. A temporary two-way road (minimum lane width of 2.5 m) would require approximately 6.0m at a controlled and slowed speed. This leaves approximately 6.0m available for construction activities. Alternatively, it is possible to divert traffic to a route on Brooklyn Road by using either Prospect Street or Hibernia Street inside the Town boundary and emerging back with Highway 1 at New Road inside the District of Yarmouth boundary.

Phase 2: The second phase of work is the installation of the active transportation path. Phase 2 provides a natural separation between mode types (vehicles from active transportation users). Construction activity will be increased in the area involving increased truck traffic. The trail will result in the widening and raising of land to match into the current road. Approval will be necessary from several government agencies including Federal and Provincial departments. Watercourse Alteration Approval will be required from Nova Scotia Environment/Fisheries and Oceans/Natural Resources/Transport Canada for adding fill into Lake Milo. The work could begin on either end of the improvement area. Work will progress from the end along the lake and can be adjusted to match available funding.

One of the primary tasks with the shoreline work will be to protect the lake during construction. At a minimum, the work can only be done at a time of year that will minimize threat to aquatic life. This is generally between June 1st and September 30th. As well, the use of silt curtains and clean, non ore-bearing granular materials will be required. Once approval is given to alteration along the lake, shoreline reconstruction should proceed all at the same time, which will allow any remaining work to be undertaken without delay when Municipal funds become available.

9.2 PHASING AND COST ESTIMATES

The phases have been broken down further into four phases and can be further divided in order to match available funding. The phases that are presented here are as follows:

1. Upgrades to Highway 1 (including widening and relocation of the guardrail) ~ $2.1 million
2. Shoreline Infill and Protection ~ $1.99 million
3. AT Trail Construction Station 0 to 600 m ~ $1.15 million
4. AT Trail Construction Station 600 to 1200 ~ $1.15 million

These values are conceptual and have a 20% Contingency and Engineering Allowance included.

Although the AT trail work is separated into two phases for costing, any smaller portion can be estimated by using the ratio of trail for this concept plan, as the level of detail has not been provided to discern for this concept phase of the project.

10 SUMMARY AND RECOMMENDATIONS

10.1 SUMMARY

The Lake Milo Active Transportation Master Plan is an early part of the Municipality's AT initiative for the region. Given the significant benefits of AT along Lake Milo, a feasible option for the development of an AT facility along Highway 1 was reviewed, designed, and analyzed in this report. Englobe developed the Lake Milo Active Transportation Master Plan, including the Master Plan Report, conceptual plans, an implementation plan, and high-level Class D financial forecast. Additionally, input from numerous stakeholders and landowners was received during a two-phased public engagement process performed by Upland. This input helped provide a balanced option that both considered the publics needs and technical design requirements along Highway 1.

Previous studies showed Highway 1 as an ideal AT connection for a number of reasons: to complete the provincial Blue Route cycling connection, to provide a missing AT facility that has been demanded by citizens and AT users, to provide a loop system between an AT facility on Highway 1 and the Yarmouth County Rail Trail located 140m east, and to enhance the community by providing access to a unique lakeside experience. The existing cross-section of Highway 1 has an asphalt width of approximately 8.5m with gravel shoulders on both sides; the westside of Highway 1 features a 1.9m usable gravel shoulder before a guardrail provided as protection from the steep slope into Lake Milo. This shoulder space, intended for distressed vehicles and snow storage, is also being used as a pedestrian facility and provides an opportunity to bridge a gap in the AT system for the Municipality.

Multiple analyses and public engagement were performed to design the optimal AT solution along this 1.25km stretch of lakeside roadway. The next section below are the recommendations that came as a result of these evaluations performed and responses to engagement. The final design option recommended best encompasses the requests of the locals (including property owners), the Municipality, and the Town, while meeting the design standards required by the province and other best practices.

Two phases of engagement were completed during the project. The first phase of engagement involved stakeholder interviews, letters to landowners and an accompanying survey. The goals of the first phase of engagement were to raise awareness about the project, gauge interest with surrounding landowners and identify any opportunities and constraints. Respondents to the survey consistently cited the proposed active transportation route as a beautiful way to enter or exit the Town of Yarmouth and unanimously support the development of the plan. Nearly two thirds of survey respondents currently walk or cycle along this route, but the vast majority feel uncomfortable when doing so.

Two design options were considered to provide active transportation along Lake Milo on Highway 1. Each option considers a Blue Route facility through the corridor for cyclists to complete the cycling network in Yarmouth as identified on Blue Route mapping plans. *Option 1* provides a spacious 4.0m wide multi-use pathway between Lake Milo and Highway 1 to accommodate pedestrians and cyclists through the corridor and recommends paving 1.2m shoulders along 3.5m travel lanes on Highway 1. *Option 2* also provides a multi-use pathway at 3.0m wide accompanied with 1.5m paved shoulders adjacent to 3.5m travel lanes. The paved shoulders are meant as unidirectional cycling facilities on Highway 1. In Option 1, the Blue Route is identified along the multi-use path with all AT users. In Option 2, the Blue Route is identified along Highway 1.

A high-level Class D cost estimate was drafted for each active transportation option and showed little difference between the two projects (less than $63,000). The guiding principles behind this project were

used to identify which AT option best aligns with the goal for the future of the Lake Milo stretch. An evaluation matrix was established with seven guiding principles criteria to evaluate the options along Lake Milo. After scoring the options within the evaluation matrix, the results showed Option 2 (The Blue Route Bike Lanes and Multi-use Path) ranked higher than Option 1 (The Blue Route Multi-use Path) by 45 points. This is predominately due to the scores Option 2 received for the pedestrian experience and bicycle movement.

The second phase of engagement involved a presentation of the design options, a public survey, user group discussions and additional stakeholder engagement. There was also an additional landowner letter. The goals of this phase were to clearly present the two design options to the public, identify a preferred option, receive feedback, and build project awareness. User groups were supportive of the project and excited about the prospects it creates for recreation in the community. The survey had 185 respondents - with *53% preferring Option 1* and *47% preferring Option 2*. The main divergence in opinion had to do with bike safety. Overall, users were happy to see either design implemented, but the majority felt that separating all active transportation users from traffic (Option 1) was the best and safest option. When asked about amenities they'd like to see along the Lake Milo Active Transportation Route, benches, garbage cans and lighting were the top three choices, followed by landscaping and beautification, lookoff(s), and interpretive signage.

10.2 RECOMMENDATIONS

When comparing the two design options, Option 2 provides a more comfortable overall experience for both pedestrians and cyclists because it dedicates a facility to each user. Though cyclists are still permitted on the multi-use path, cyclists using Highway 1 as a cycling thoroughfare have the option to use the bike lanes to get to/from their destinations. This reserves the 3.0m multi-use path for those looking for a leisurely outdoor experience for both cyclists and pedestrians. For this reason, Option 2 is the preferred design option of the Study Team based off the Guiding Principles evaluation.

Two crosswalks are recommended at the two project limits of Highway 1. The first crosswalk is recommended to replace the existing overhead RA-4 crosswalk signal at Prospect St. An enhanced RRFB (rectangular rapid flashing beacon) crosswalk is recommended with ground mounted signs and cross-ride crosswalk markings. This treatment would go above the minimum treatment required by TAC. This crosswalk is located within the Town limits and therefore the Town should be consulted during final design. The second crosswalk location is recommended between The Villas driveway and Maple Hill Ln. Similarly, RRFB treatment and cross-ride crosswalk markings are recommended. Highway 1 is owned and maintained by the province in this section. The recommendations of improvements for a crosswalk in this location will have to be submitted and approved by NSTIR. MODY will likely be responsible for the maintenance of the crosswalk.

Appendix A: Traffic Volume Data

Crandall Engineering
1234 Place

Omaha, Alabama, United States 12345
506-857-2777 pa@crandallengineering.ca

Count Name: Lake Milo AT
Site Code:
Start Date: 03/23/2021

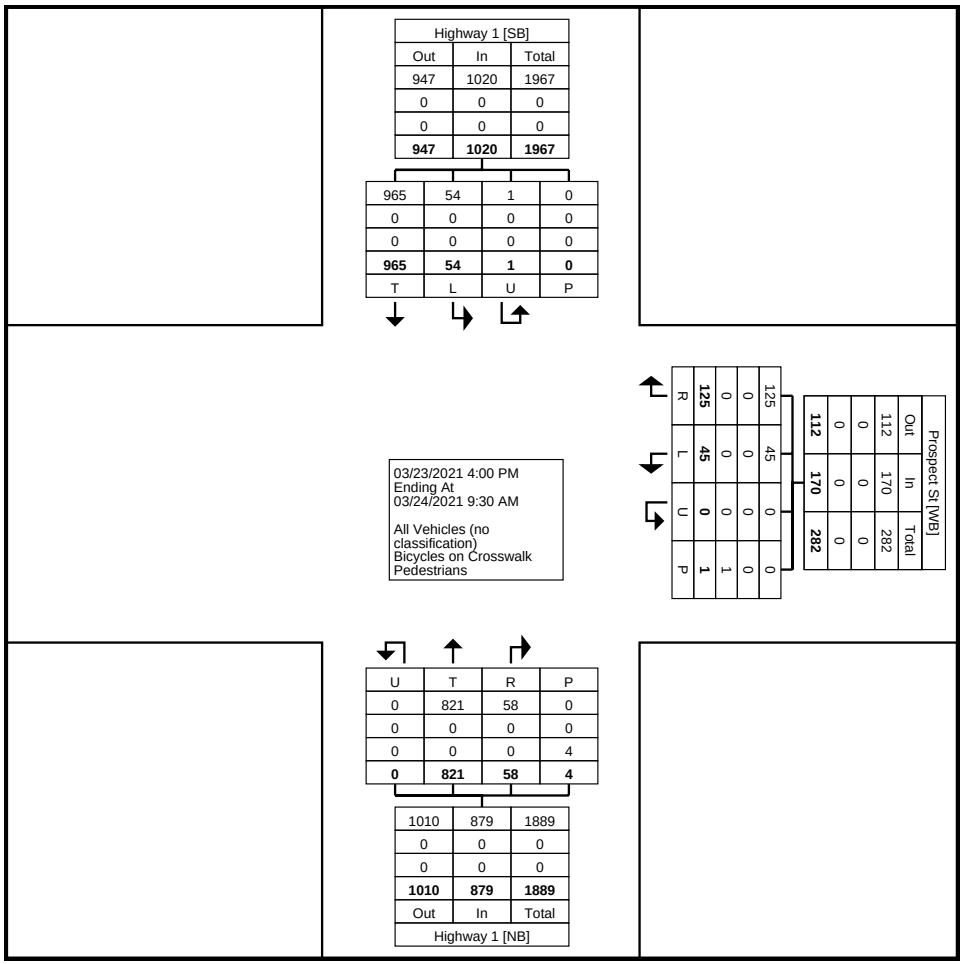
Turning Movement Data

Start Time	Highway 1 Southbound					Prospect St Westbound					Highway 1 Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
4:00 PM	58	2	0	0	60	13	3	0	0	16	6	87	0	0	93	169
4:15 PM	71	6	0	0	77	18	3	0	0	21	2	88	0	0	90	188
4:30 PM	47	3	0	0	50	17	2	0	0	19	6	77	0	0	83	152
4:45 PM	42	2	0	0	44	10	5	0	0	15	4	55	0	0	59	118
Hourly Total	218	13	0	0	231	58	13	0	0	71	18	307	0	0	325	627
5:00 PM	53	4	0	0	57	5	7	0	0	12	9	51	0	0	60	129
5:15 PM	44	5	0	0	49	4	1	0	0	5	2	48	0	0	50	104
5:30 PM	56	4	0	0	60	3	3	0	0	6	3	59	0	0	62	128
5:45 PM	46	2	0	0	48	6	4	0	1	10	3	46	0	0	49	107
Hourly Total	199	15	0	0	214	18	15	0	1	33	17	204	0	0	221	468
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:30 AM	77	3	0	0	80	5	1	0	0	6	2	37	0	0	39	125
7:45 AM	95	5	0	0	100	6	0	0	0	6	3	36	0	0	39	145
Hourly Total	172	8	0	0	180	11	1	0	0	12	5	73	0	0	78	270
8:00 AM	63	4	0	0	67	6	2	0	0	8	5	34	0	2	39	114
8:15 AM	45	1	0	0	46	8	4	0	0	12	0	38	0	0	38	96
8:30 AM	64	5	0	0	69	9	3	0	0	12	2	41	0	1	43	124
8:45 AM	76	2	1	0	79	4	3	0	0	7	4	44	0	0	48	134
Hourly Total	248	12	1	0	261	27	12	0	0	39	11	157	0	3	168	468
9:00 AM	64	3	0	0	67	6	2	0	0	8	5	44	0	1	49	124
9:15 AM	64	3	0	0	67	5	2	0	0	7	2	36	0	0	38	112
Grand Total	965	54	1	0	1020	125	45	0	1	170	58	821	0	4	879	2069
Approach %	94.6	5.3	0.1	-	-	73.5	26.5	0.0	-	-	6.6	93.4	0.0	-	-	-
Total %	46.6	2.6	0.0	-	49.3	6.0	2.2	0.0	-	8.2	2.8	39.7	0.0	-	42.5	-
All Vehicles (no classification)	965	54	1	-	1020	125	45	0	-	170	58	821	0	-	879	2069
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Crandall Engineering
1234 Place

Omaha, Alabama, United States 12345
506-857-2777 pa@crandallengineering.ca

Count Name: Lake Milo AT
Site Code:
Start Date: 03/23/2021



Turning Movement Data Plot

Crandall Engineering
1234 Place

Omaha, Alabama, United States 12345
506-857-2777 pa@crandallengineering.ca

Count Name: Lake Milo AT
Site Code:
Start Date: 03/23/2021

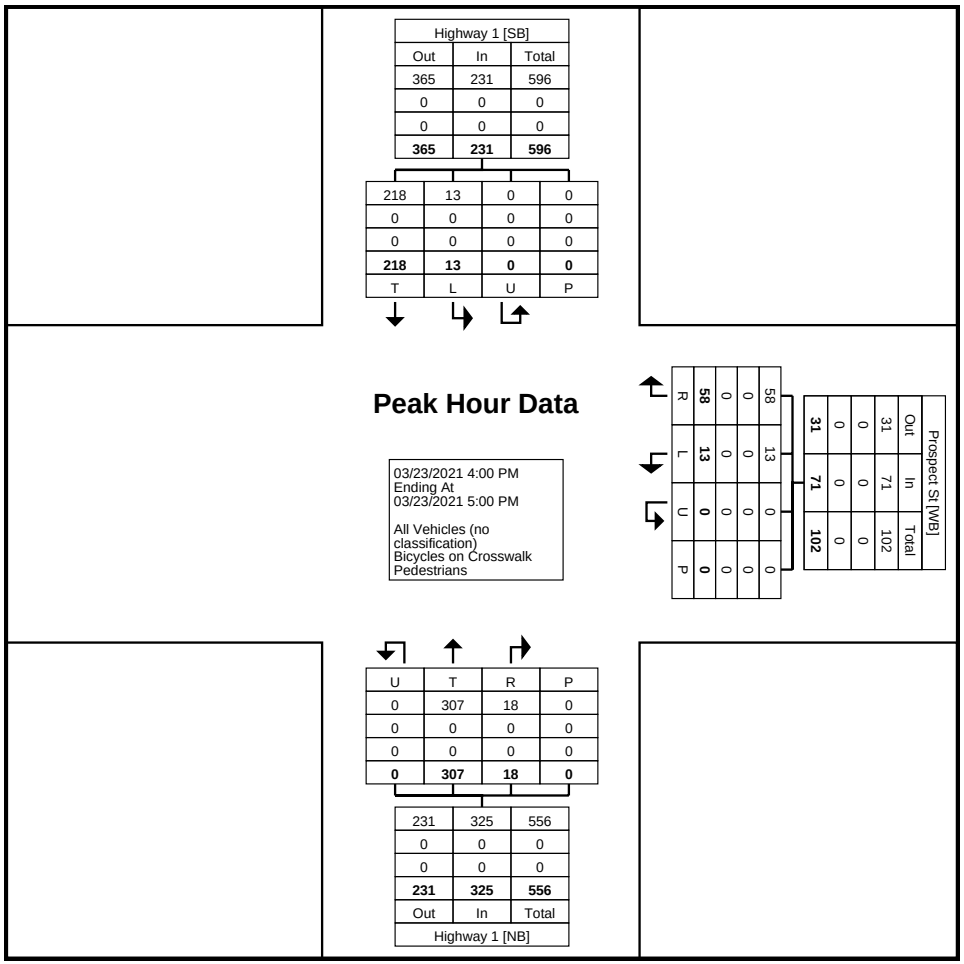
Turning Movement Peak Hour Data (4:00 PM)

Start Time	Highway 1 Southbound					Prospect St Westbound					Highway 1 Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
4:00 PM	58	2	0	0	60	13	3	0	0	16	6	87	0	0	93	169
4:15 PM	71	6	0	0	77	18	3	0	0	21	2	88	0	0	90	188
4:30 PM	47	3	0	0	50	17	2	0	0	19	6	77	0	0	83	152
4:45 PM	42	2	0	0	44	10	5	0	0	15	4	55	0	0	59	118
Total	218	13	0	0	231	58	13	0	0	71	18	307	0	0	325	627
Approach %	94.4	5.6	0.0	-	-	81.7	18.3	0.0	-	-	5.5	94.5	0.0	-	-	-
Total %	34.8	2.1	0.0	-	36.8	9.3	2.1	0.0	-	11.3	2.9	49.0	0.0	-	51.8	-
PHF	0.768	0.542	0.000	-	0.750	0.806	0.650	0.000	-	0.845	0.750	0.872	0.000	-	0.874	0.834
All Vehicles (no classification)	218	13	0	-	231	58	13	0	-	71	18	307	0	-	325	627
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Crandall Engineering
1234 Place

Omaha, Alabama, United States 12345
506-857-2777 pa@crandallengineering.ca

Count Name: Lake Milo AT
Site Code:
Start Date: 03/23/2021



Turning Movement Peak Hour Data Plot (4:00 PM)

Crandall Engineering
1234 Place

Omaha, Alabama, United States 12345
506-857-2777 pa@crandallengineering.ca

Count Name: Lake Milo AT
Site Code:
Start Date: 03/23/2021

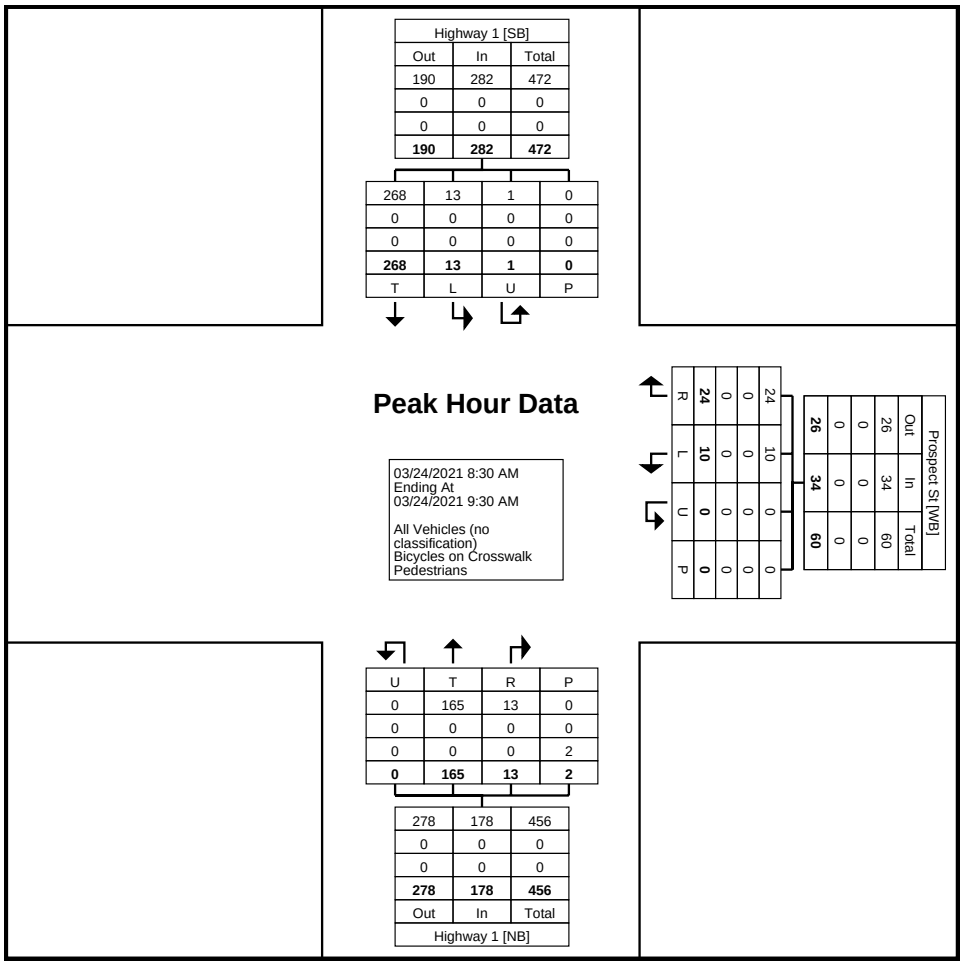
Turning Movement Peak Hour Data (8:30 AM)

Start Time	Highway 1 Southbound					Prospect St Westbound					Highway 1 Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
8:30 AM	64	5	0	0	69	9	3	0	0	12	2	41	0	1	43	124
8:45 AM	76	2	1	0	79	4	3	0	0	7	4	44	0	0	48	134
9:00 AM	64	3	0	0	67	6	2	0	0	8	5	44	0	1	49	124
9:15 AM	64	3	0	0	67	5	2	0	0	7	2	36	0	0	38	112
Total	268	13	1	0	282	24	10	0	0	34	13	165	0	2	178	494
Approach %	95.0	4.6	0.4	-	-	70.6	29.4	0.0	-	-	7.3	92.7	0.0	-	-	-
Total %	54.3	2.6	0.2	-	57.1	4.9	2.0	0.0	-	6.9	2.6	33.4	0.0	-	36.0	-
PHF	0.882	0.650	0.250	-	0.892	0.667	0.833	0.000	-	0.708	0.650	0.938	0.000	-	0.908	0.922
All Vehicles (no classification)	268	13	1	-	282	24	10	0	-	34	13	165	0	-	178	494
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Crandall Engineering
1234 Place

Omaha, Alabama, United States 12345
506-857-2777 pa@crandallengineering.ca

Count Name: Lake Milo AT
Site Code:
Start Date: 03/23/2021



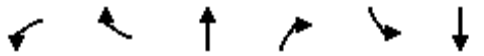
Turning Movement Peak Hour Data Plot (8:30 AM)

Appendix B: LOS Reports

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	32	219	17	17	356
Future Volume (Veh/h)	13	32	219	17	17	356
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.71	0.71	0.91	0.91	0.90	0.90
Hourly flow rate (vph)	18	45	241	19	19	396
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	684	250			260	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	684	250			260	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	94			99	
cM capacity (veh/h)	408	788			1304	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	63	260	415
Volume Left	18	0	19
Volume Right	45	19	0
cSH	622	1700	1304
Volume to Capacity	0.10	0.15	0.01
Queue Length 95th (m)	2.7	0.0	0.4
Control Delay (s)	11.4	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	0.5
Approach LOS	B		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

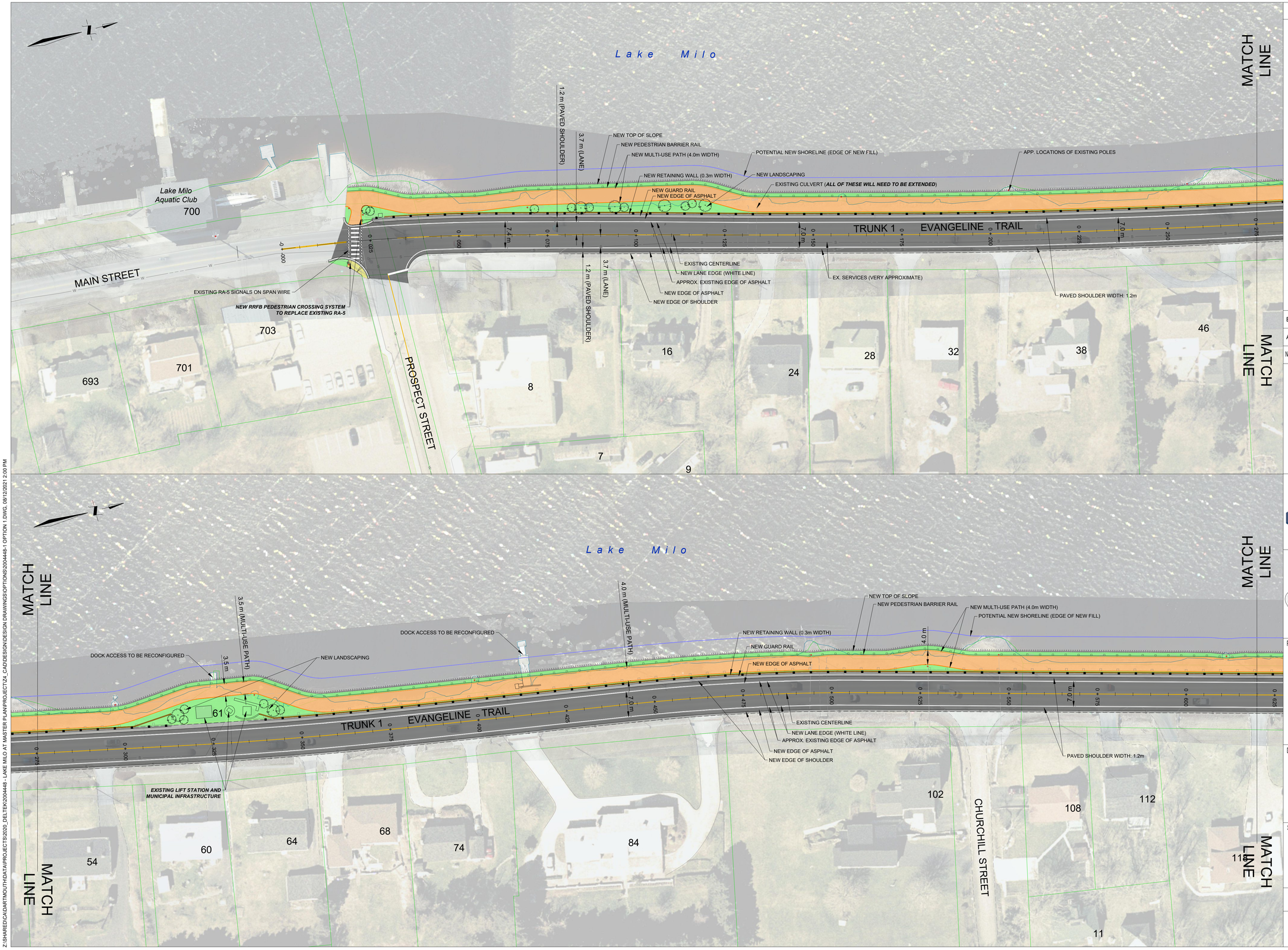


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	64	338	20	14	240
Future Volume (Veh/h)	14	64	338	20	14	240
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.87	0.87	0.75	0.75
Hourly flow rate (vph)	16	75	389	23	19	320
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	758	400			412	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	758	400			412	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	88			98	
cM capacity (veh/h)	368	650			1147	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	91	412	339
Volume Left	16	0	19
Volume Right	75	23	0
cSH	573	1700	1147
Volume to Capacity	0.16	0.24	0.02
Queue Length 95th (m)	4.5	0.0	0.4
Control Delay (s)	12.5	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	12.5	0.0	0.6
Approach LOS	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C: Design Option Concept Drawings



NOTES

LEGEND:

Existing

- Property Line
- Shoreline
- Edge of Road
- Driveway
- Guard Rail
- Utility Pole
- Streetlight
- Fire Hydrant
- Manhole
- Catchbasin
- Sanitary Sewer Line
- Storm Sewer Line
- Water Line

Proposed

- Shoreline
- Edge of Asphalt
- Guard Rail
- Multi-use Path
- Pedestrian Barrier Rail
- Retaining Wall

NO.	DATE	REVISIONS	BY	APPR.
B.0	DEC 08/21	ISSUED FOR INFORMATION	JTGB	AT
A.0	SEP 14/21	ISSUED FOR INFORMATION	JTGB	AT

MUNICIPALITY OF THE DISTRICT OF YARMOUTH
truly connected

Englobe

PRELIMINARY ONLY
DATE PLOTTED: Dec 08, 2021
NOT TO BE USED FOR CONSTRUCTION

PROJECT TITLE

LAKE MILO
ACTIVE TRANSPORTATION PLAN

YARMOUTH N.S.

DRAWING TITLE

BLUE ROUTE OPTION 1
STN 0+000 TO STN. 0+625

Scale	Drawn By	Design By
5m 0 10m (1:500 FULL SCALE)	JTGB	JTGB
	Checked By: AT	Cadd Check: - - -
	Sheet 15 of 20	

File Name: 2004448-1 OPTION 1.DWG

Drawing No.: T15

Z:\SHARED\CAD\ARTMOUTH\DATA\PROJECTS\2020_DELTEK\2004448 - LAKE MILO AT MASTER PLAN\PROJECT\T24_CAD\DESIGN\DESIGN DRAWINGS\OPTION3\2004448-1 OPTION 1.DWG, 08/12/2021 2:00 PM

NOTES

LEGEND:

Existing

- Property Line
- Shoreline
- Edge of Road
- Driveway
- Guard Rail
- Utility Pole
- Streetlight
- Fire Hydrant
- Manhole
- Catchbasin
- Sanitary Sewer Line
- Storm Sewer Line
- Water Line

Proposed

- Shoreline
- Edge of Asphalt
- Guard Rail
- Multi-use Path
- Pedestrian Barrier Rail
- Retaining Wall

NO.	DATE	REVISIONS	BY	APPR.
B.0	DEC 01/21	ISSUED FOR INFORMATION	JTGB	AT
A.0	SEP 14/21	ISSUED FOR INFORMATION	JTGB	AT

MUNICIPALITY OF THE DISTRICT OF YARMOUTH
truly connected

Englobe

PRELIMINARY ONLY
DATE PLOTTED: Dec 08, 2021
NOT TO BE USED FOR CONSTRUCTION

PROJECT TITLE

LAKE MILO
ACTIVE TRANSPORTATION
PLAN

YARMOUTH N.S.

DRAWING TITLE

BLUE ROUTE OPTION 1
STN 0+625 TO STN. 1+310

Scale	Drawn By	Design By
5m 0 10m (1:500 FULL SCALE)	JTGB	JTGB
	Checked By: AT	Cadd Check: - - -
	Sheet 16 of 20	

File Name: 2004448-1 OPTION 1.DWG

Drawing No.: T16

Z:\SHARED\CAD\ARTMOUTH\DATA\PROJECTS\2020_DELTEK\2004448 - LAKE MILO AT MASTER PLAN\PROJECT\T24_CAD\DESIGN\DESIGN DRAWINGS\OPTIONS\2004448-1 OPTION 1.DWG, 08/12/2021 2:01 PM

Lake Milo

Lake Milo
Aquatic Club

NEW SHORELINE
(EDGE OF NEW FILL)

NEW TOP OF SLOPE

NEW PEDESTRIAN BARRIER RAIL

NEW LANDSCAPING

4.0 m

NEW RETAINING WALL (0.3m WIDTH)

NEW GUARD RAIL

NEW EDGE OF STREET

NEW CURB AND PATHWAY
WITH PEDESTRIAN RAMP

2.8 m

0.4 m

0.9 m

1.2 m

3.7 m

TRUNK 1 EVANGELINE TRAIL

EXISTING RA-5 SIGNALS ON SPAN WIRE

4.5 m

0.4 m

0.35 m

0+025

0+050

MAIN STREET

0+000

4.5 m

2.5 m

R7.5 m

2.2 m

NEW CENTERLINE
EXISTING CENTERLINE

NEW LANE EDGE (WHITE LINE)

APPROX. EXISTING EDGE OF STREET

NEW EDGE OF STREET

NEW RRFB PEDESTRIAN CROSSING SYSTEM TO REPLACE EXISTING RA-5

NEW CURB AND SIDEWALK
WITH PEDESTRIAN RAMP

5.0 m

5.7 m

1.5 m

PROSPECT STREET

EXISTING SIDEWALK

Z:\SHARED\CAD\ARTMOUTH\DATA\PROJECTS\2020_DELTEK\2004448 - LAKE MILO AT MASTER PLAN\PROJECT\T24_CAD\DESIGN\DESIGN DRAWINGS\OPTIONS\2004448-1 OPTION 1.DWG, 08/12/2021 2:02 PM

NOTES

LEGEND:

Existing

- Property Line
- Shoreline
- Edge of Road
- Driveway
- Guard Rail
- Utility Pole
- Streetlight
- Fire Hydrant
- Manhole
- Catchbasin
- Sanitary Sewer Line
- Storm Sewer Line
- Water Line

Proposed

- Shoreline
- Edge of Asphalt
- Guard Rail
- Multi-use Path
- Pedestrian Barrier Rail
- Retaining Wall

NO.	DATE	REVISIONS	BY	APPR.
B.0	DEC 08/21	ISSUED FOR INFORMATION	JTGB	AT
A.0	SEP 14/21	ISSUED FOR INFORMATION	JTGB	AT

MUNICIPALITY OF THE DISTRICT OF
YARMOUTH
truly connected

Englobe

PRELIMINARY ONLY
DATE PLOTTED: Dec 08, 2021
NOT TO BE USED FOR CONSTRUCTION

PROJECT TITLE

LAKE MILO
ACTIVE TRANSPORTATION
PLAN

YARMOUTH N.S.

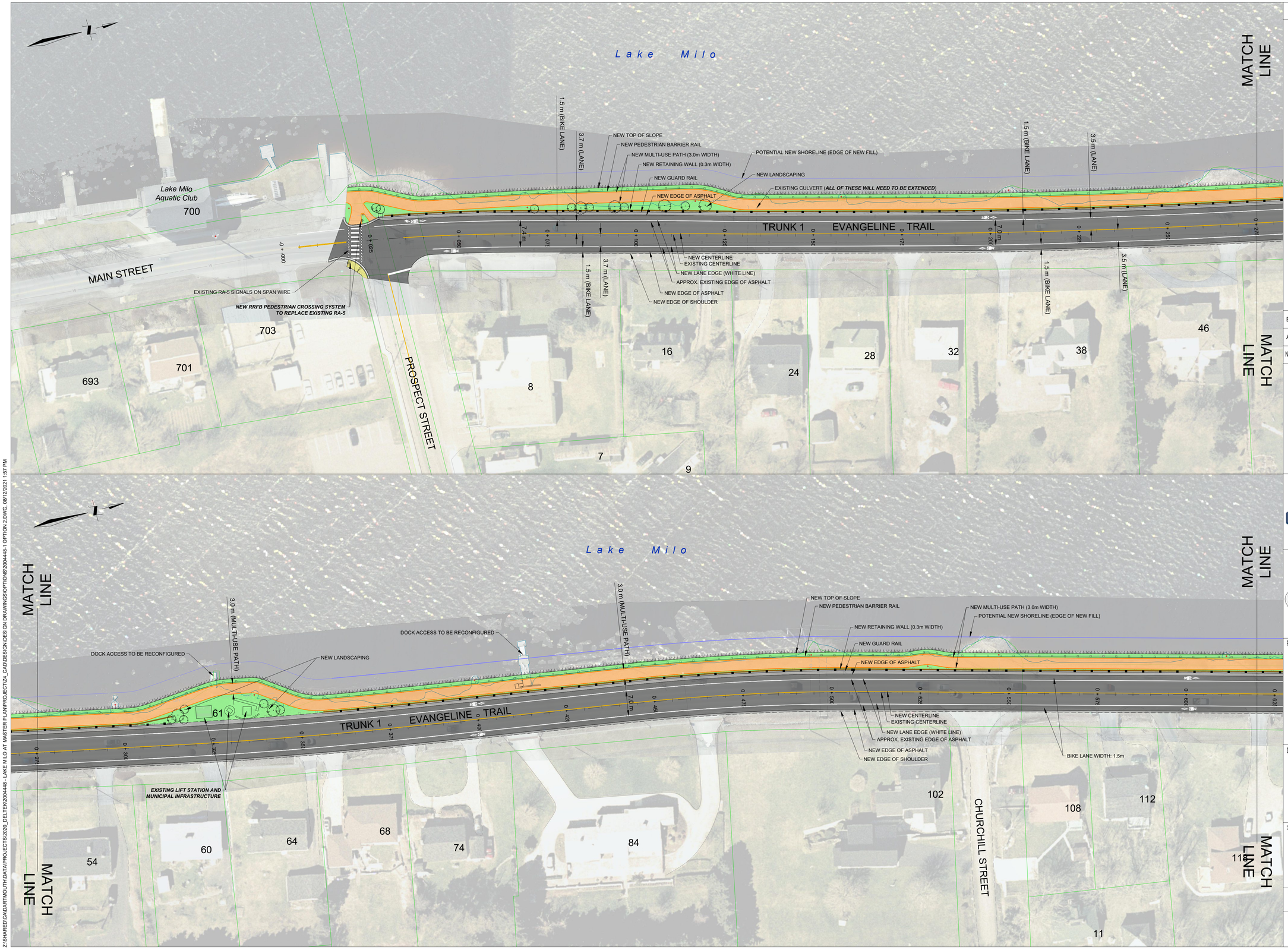
DRAWING TITLE

BLUE ROUTE OPTION 1
MAIN STREET AND PROSPECT
STREET
INTERSECTION

Scale	Drawn By	Design By
5m 0 10m (1:500 FULL SCALE)	JTGB	JTGB
	Checked By: AT	Cadd Check: - - -
	Sheet 19 of 20	

File Name
2004448-1 OPTION 1.DWG

Drawing No.
T19



NOTES

LEGEND:

Existing

- Property Line
- Shoreline
- Edge of Road
- Driveway
- Guard Rail
- Utility Pole
- Streetlight
- Fire Hydrant
- Manhole
- Catchbasin
- Sanitary Sewer Line
- Storm Sewer Line
- Water Line

Proposed

- Shoreline
- Edge of Asphalt
- Guard Rail
- Multi-use Path
- Pedestrian Barrier Rail
- Retaining Wall

NO.	DATE	REVISIONS	BY	APPR.
B.0	DEC 08/21	ISSUED FOR INFORMATION	JTGB	AT
A.0	SEP 14/21	ISSUED FOR INFORMATION	JTGB	AT

MUNICIPALITY OF THE DISTRICT OF YARMOUTH
truly connected

Englobe

PRELIMINARY ONLY
DATE PLOTTED: Dec 08, 2021
NOT TO BE USED FOR CONSTRUCTION

PROJECT TITLE

LAKE MILO
ACTIVE TRANSPORTATION PLAN

YARMOUTH N.S.

DRAWING TITLE

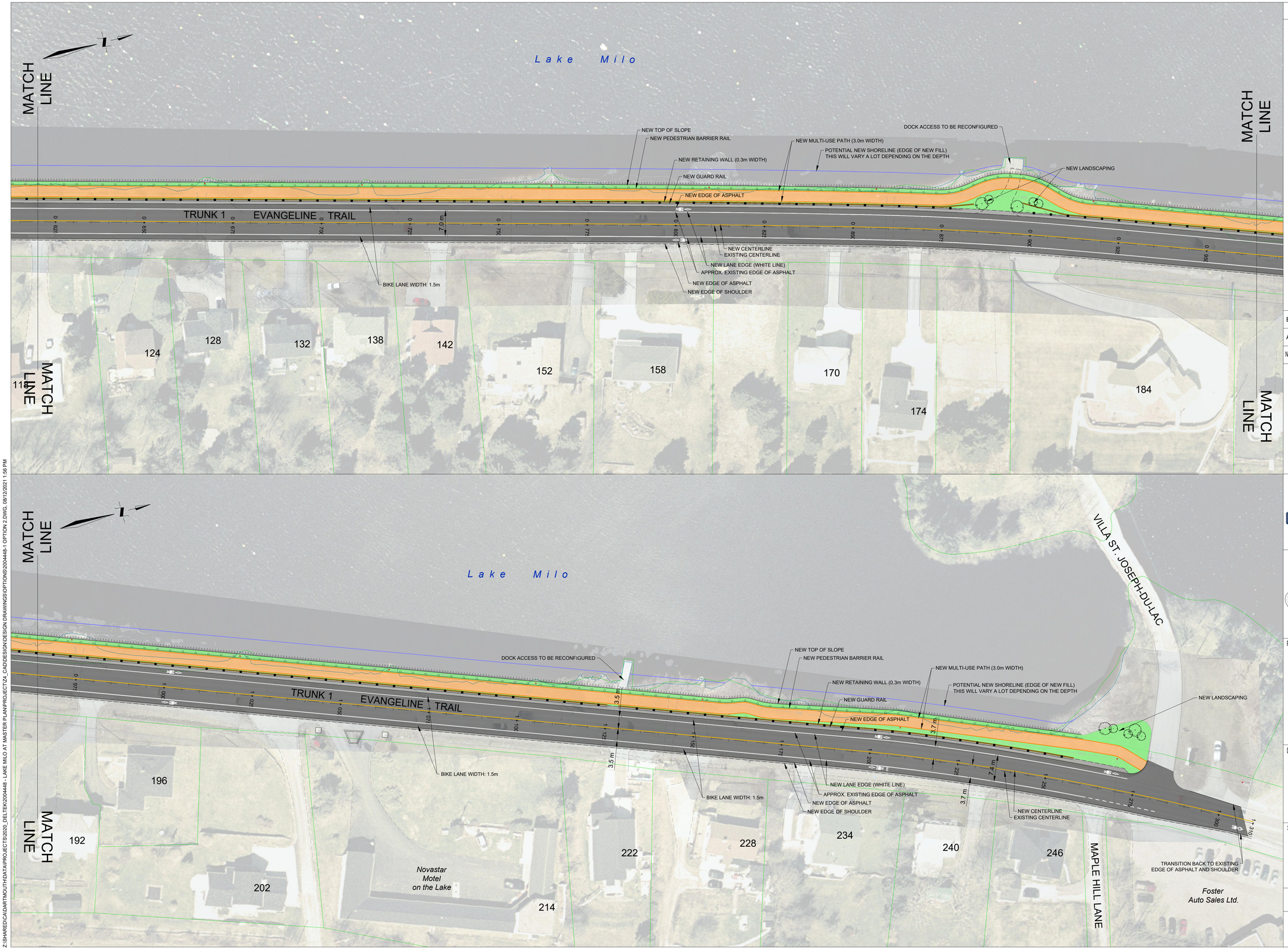
BLUE ROUTE OPTION 2
STN 0+000 TO STN. 0+625

Scale	Drawn By	Design By
5m 0 10m (1:500 FULL SCALE)	JTGB	JTGB
	Checked By: AT/TV	Cadd Check: - - -
	Sheet 17 of 20	

File Name: 2004448-1 OPTION 2.DWG

Drawing No.: T17

Z:\SHARED\CA\DARTMOUTH\DATA\PROJECTS\2020_DEL\TEK\2004448 - LAKE MILO AT MASTER PLAN\PROJECT\T24_CAD\DESIGN\DESIGN DRAWINGS\OPTION\S\2004448-1 OPTION 2.DWG, 08/12/2021 1:57 PM



NOTES

LEGEND:

Existing

- Property Line
- Shoreline
- Edge of Road
- Driveway
- Guard Rail
- Utility Pole
- Streetlight
- Fire Hydrant
- Manhole
- Catchbasin
- Sanitary Sewer Line
- Storm Sewer Line
- Water Line

Proposed

- Shoreline
- Edge of Asphalt
- Guard Rail
- Multi-use Path
- Pedestrian Barrier Rail
- Retaining Wall

NO.	DATE	REVISIONS	BY	APPR.
B.0	DEC 01/21	ISSUED FOR INFORMATION	JTGB	AT
A.0	SEP 14/21	ISSUED FOR INFORMATION	JTGB	AT

MUNICIPALITY OF THE DISTRICT OF YARMOUTH
truly connected

Englobe

PRELIMINARY ONLY
DATE PLOTTED: Dec 08, 2021
NOT TO BE USED FOR CONSTRUCTION

PROJECT TITLE

LAKE MILO
ACTIVE TRANSPORTATION
PLAN

YARMOUTH N.S.

DRAWING TITLE

BLUE ROUTE OPTION 2
STN 0+625 TO STN. 1+310

Scale	Drawn By	Design By
5m 0 10m (1:500 FULL SCALE)	JTGB	JTGB
	Checked By	Cadd Check
	AT/TV	---
	Sheet 18 of 20	

File Name
2004448-1 OPTION 2.DWG

Drawing No.
T18

Z:\SHARED\CAD\ART\MOUTH\DATA\PROJECTS\2020_DELTEK\2004448 - LAKE MILO AT MASTER PLAN\PROJECT\24_CAD\DESIGN\DESIGN DRAWINGS\OPTION\S\2004448-1 OPTION 2.DWG, 08/12/2021 1:56 PM

Lake Milo

Lake Milo
Aquatic Club

NEW SHORELINE
(EDGE OF NEW FILL)

NEW TOP OF SLOPE

NEW LANDSCAPING

NEW PEDESTRIAN BARRIER RAIL

BIKE LANE RAMP

NEW RETAINING WALL (0.3m WIDTH)

NEW GUARD RAIL

NEW EDGE OF STREET

NEW CURB AND PATHWAY
WITH PEDESTRIAN RAMP

3.0 m
0.4 m
0.8 m
2.8 m
1.5 m
1.5 m
3.7 m
0 + 050
0.4 m
0.35 m
0 + 025
4.5 m
3.7 m
1.5 m
2.5 m
R7.5 m
2.2 m
0 + 000

TRUNK 1 EVANGELINE TRAIL

MAIN STREET

NEW CENTERLINE
EXISTING CENTERLINE

NEW LANE EDGE (WHITE LINE)

APPROX. EXISTING EDGE OF STREET

NEW EDGE OF STREET

EXISTING RA-5 SIGNALS ON SPAN WIRE

***NEW RRFB PEDESTRIAN CROSSING SYSTEM
TO REPLACE EXISTING RA-5***

NEW CURB AND SIDEWALK
WITH PEDESTRIAN RAMP

5.0 m
5.7 m
1.5 m

PROSPECT STREET

EXISTING SIDEWALK

NOTES

LEGEND:

Existing

- Property Line
- Shoreline
- Edge of Road
- Driveway
- Guard Rail
- Utility Pole
- Streetlight
- Fire Hydrant
- Manhole
- Catchbasin
- Sanitary Sewer Line
- Storm Sewer Line
- Water Line

Proposed

- Shoreline
- Edge of Asphalt
- Guard Rail
- Multi-use Path
- Pedestrian Barrier Rail
- Retaining Wall

NO.	DATE	REVISIONS	BY	APPR.
A.0	DEC 08/21	ISSUED FOR INFORMATION	JTGB	AT

MUNICIPALITY OF THE DISTRICT OF
YARMOUTH
truly connected

Englobe

PRELIMINARY ONLY
DATE PLOTTED: Dec 08, 2021
NOT TO BE USED FOR CONSTRUCTION

PROJECT TITLE

LAKE MILO
ACTIVE TRANSPORTATION
PLAN

YARMOUTH N.S.

DRAWING TITLE

BLUE ROUTE OPTION 2
MAIN STREET AND PROSPECT
STREET
INTERSECTION

Scale	Drawn By	Design By
5m 0 10m (1:500 FULL SCALE)	JTGB	JTGB
	Checked By: AT	Cadd Check: - - -
	Sheet 20 of 20	

File Name
2004448-1 OPTION 2.DWG

Drawing No.
T20

Z:\SHARED\CAD\ART\MOUTH\DATA\PROJECTS\2020_DEL\TEK\2004448 - LAKE MILO AT MASTER PLAN\PROJECT\Z4_CAD\DESIGN\DESIGN DRAWINGS\OPTION2\2004448-1 OPTION 2.DWG, 08/12/2021 1:51 PM

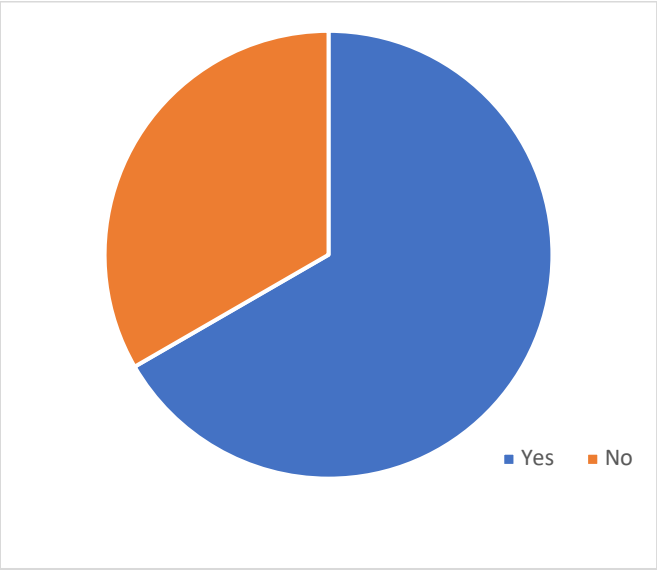
Appendix D: Public Engagement Survey Results

Lake Milo Landowner Questionnaire - Results

Q1. What do you like most about living along Lake Milo?

Close to town and enjoy the view of the lake.
The view of the lake and see children learning to boat. I love the dragon boat races. The view of this lake is incredible.
View
Living along Lake Milo for 12 years now, my wife and I take in the and its beautiful views. It changes moment to moment, day after day and through every season watching boating and swimming is very enjoyable.
Peace and quiet Lakeview location to town
close to town and view of the lake
I love the views and the opportunity for recreation on the water. I love to see people out on the water.
Access to the lake and the view
I do not live along Lake Milo...we own a commercial building at the bottom of Prospect Street. I love this area, as I believe we are very fortunate to have a lake so accessible, just on the outskirts of our town. For people travelling into our community from Route one it offers a great view as you enter the town.
We are a long term care facility at the end of Lake Milo, our residents enjoy the views of the lake.
The water view, especially in the evening. Sitting out front and watching the sunset.
I have a business along lake milo
The Lakeview, water sports (swimming, windsurfing, kayaking and motor boating) , having water access Directly in front of our home, rails to trails in backyard used every day, proximity to services, and jogging along the lake
The view and quiet.

Q2. Do you or members of your household currently walk or cycle along Lake Milo?



Q3. If not, please describe your reasons.

Road is too busy for safe walking and biking. I use the trail for both.
In recent years the highway has become very busy. As an elderly couple we prefer the WALKING TRAIL. There is no other alternative. That being said, a path along the edge of the water would be ideal.
because traffic is too busy and no place to walk, shoulder is narrow
No sidewalk
I have a business along lake milo, I don't walk or cycle

Q4. If so, please describe your experience. For example, destinations, frequency, route, your level of comfort, etc.

I prefer walking along the lake but it is hard with my little dog. One dude has some space to walk safely but the return side is so narrow. I do not always feel safe. I would feel so much safer if we had two real sidewalks.
Dangerous due to no sidewalk
very dangerous stretch of highway
We walk only infrequently along Lake Milo because of the heavy vehicle traffic. We have a dog to walk but I don't feel safe with her walking along the lake by the road. We do cross the road from our place and go to a wharf and boat launch (Section 4) so she can swim but I feel we could get much better use of the lake than we do. We also take her swimming at the boat launch near the Lake Milo Boat Club.
I run the this stretch of road several times a week. I am comfortable for the most part, as there is adequate shoulder when heading North from town. However, this could be greatly improved by adding proper infrastructure. This would allow users to get close to the guardrail, which would increase separation from car traffic and improve overall safety. The opposite side of the road (running south towards town from Dayton is challenging) especially during peak traffic. We tend to avoid this direction because the shoulder is not adequate for allowing cars to pass by you safely). Often we will use the trail to head towards town from Dayton.
We have residents that have access to leave the property (motorized scooter) and there are barely any shoulder to the road which makes it unsafe for these cognitive residents
We rarely walk along the water, unfortunately, due to the amount of traffic. I would love to feel safe walking my dog along there. Instead, we often opt for the trail (old train tracks) at the back of our property.
Biking Isn’t safe as too much traffic and narrow shoulder, needs a biking lane to be safe. Not safe for walking dog or children. I like to jog around the lake at times and run the lake mile stretch but have to keep moving on and off pavement for traffic. I would like to be able to jog a loop lake mile stretch and hook onto the trail
We walk as anyone would. I have concerns about losing property if the road is expanded though. I would like to see bike lanes or sidewalk but not a boardwalk that will impact the residential area of Dayton. We would lose privacy and potentially property. We have the rail trail right behind so find very little need to walk on the road.

Q5. How likely would you be to use the following types of active transportation infrastructure along Lake Milo?

	Very Likely	Somewhat Likely	Neutral	Somewhat Unlikely	Very Unlikely
Protected Bike Lane	40% [6]	6.67% [1]	20% [3]	0% [0]	33.33% [5]
Paved Multi-Use Pathway	60% [9]	20% [3]	6.67% [1]	0% [0]	13.33% [2]
Curbed Sidewalk	40% [6]	13.33% [2]	6.67% [1]	0% [0]	40% [6]
Painted Shoulder	6.67% [1]	6.67% [1]	40% [6]	13.33% [2]	33.33% [5]
Boardwalk	60% [9]	6.67% [1]	13.33% [2]	0% [0]	20% [3]

Q6. What additional route connections do you think should be made to improve links to important destinations?

Connection to the rail trail would be nice

I think the route should seamlessly lead to the town walkways. We moved here 30 years ago, hoping for a safe walkway along the lake. Please make this happen.

Boardwalk, sidewalk, access to the lake

Looking at the map provided, the. Path/Trail should be extended to the NEW ROAD.

connect up town to downtown trail at cotton mill looping back to trail on tracks with places to stop and enjoy the lake. Have a couple boat access points along the lake. The milo boat club is busy and congested.

It would be nice to have a tie-in to the rail trail with distance markers for mapped-out trail routes. We use the rail trail on a daily basis. You could also look at a tie-in to the multi-use trail on Pleasant Street via Prospect Street. I would love to see some distances mapped out for various routes. An around-the-lake trail would also be good, but there is a lot more involved in that. Also, a defined link to the Water Street trail would be good. My husband and I sometimes like a longer walk and will drive to a destination, leave a car, walk home and pick up the car later. For example, we have driven to South Ohio, left a car at the Esso and walked home which was about 10 km.

Overhead bridge from rail trail to milo stretch for safe crossing

It would be awesome to be able to create loop. ie. leave town and run/walk along Milo stretch with new infrastructure and somehow connect to the old railway to return to town.

paved route to shopping area (Mall/stores ect)

You need to figure out where people are going to park their cars if you build this. Can the parking at the Milo boathouse handle extra vehicles? Or the parking lots on Prospect? We live pretty much at the far end (section 5) and are a bit concerned that people will park along the side of the road opposite the boardwark/sidewalk/whatever you build. This will be a problem.

Airport stretch connected to Stars Rd.,needs a biking walking jogging multipurpose lane.

Connect rails to trails to the Pleasant Street path. If building the Milo waterfront project connect to it the trail and pleasant street and town side walks to make a long multi-purpose trail

Q7. Please describe any other issues or opportunities you'd like to see explored along the Lake Milo route? For example storm water drainage, driveways, lake access, landscaping, environmental stewardship, etc.

Would be nice to see the stretch landscaped and bushes trimmed. Possibly a bench or two.

I trust that your team will make all of the right environmental choices.

Lake access

A lot of decisions will have to be considered when determining what side of the road is selected. Our preference would be on the west side of the highway, overlooking the water. Ideally, a boardwalk of a suitable width will allow for carriages, bikes and pedestrians. There must be a prohibition on all motorized vehicles with the exceptions of electric wheelchairs.

While considering the current capacity of the infrastructure, we would like to discuss driveway accesses, lake access at critical points and boat launches. Storm drainage has been an misuse for years as water comes down key areas after heavy rains. The lack of maintenance on the shoulder margin and outside the steel vehicle barriers detracts from peoples' enjoyment. Suitable landscaping and environmental considerations would make maintenance less costly.

We highly recommend the burial of all above-ground utilities, ideally on the east side of the shoulder of the road.

lake access and if there is construction fill in the ditch under ground culverts don't take land from the front of my property. It will be contested in court if were to happen.

drainage at prospect st, water pools on main st
access to lake
retaining wall in front of house

I would love to have more lake access. I never know if we are allowed to put a raft in the water, for example, although I know some people do. It would be great to be able to keep a kayak or canoe stored safely so we didn't have to bring it back home each time. Do homeowners have any rights to the lakefront directly across the road from their homes? It would be nice to be able to sit directly at the waterside. Would definitely like to have distance markers; we like to know how far we are walking. Something else that would be nice would be something like a gazebo or seating along the lake to take in the view or for people to rest if needed. Garbage cans along the route would be a necessity as well as poop bag dispensers. Landscaping would be necessary since there is quite a bit of brush along that stretch right now. That's all I can think of off the top of my head.

It would be nice to have the lake easily accessible to us, especially our children who enjoy fishing, kayaking etc

The over growth and steep bank are challenging .

More signage about sharing the road with cyclists and runners would be an asset and improve safety in this area.

There are drainage issues in the parking area along Milo in front of our building that need to be addressed. Lots of pooling and slow drainage after heavy rains.

I would love to see a section of the railway trail paved. ie 1.5 km section from Prospect st. heading North. This would help encourage even more users and alleviate issues with erosion and large puddles after heavy rains. It would also make for better terrain, by eliminating the many dips and bumps that are now there.

There is alot of water collection along the milo stretch in heavy rains, more drains should be created

Overall, I'm excited about the idea of a boardwalk along this stretch. But after living here for over a decade, I have a few concerns:

As already stated, parking is a concern.
I'm also concerned about garbage. Littering along this stretch of the road is a huge issue. I know, because I pick up the garbage along my stretch. There is also garbage that has gone directly into the lake that I can see, but can't clean up because I can't get to it. Right now, the bushes are helping to catch some of it, but if you are going to remove the bushes and shrubs, even more plastic garbage is going to end up directly in the water. Garbage cans that are regularly emptied by municipal staff would be necessary if the number of walkers is going to increase. I also think signage about fines for littering would be a good idea. Dog poop bags would also be a good idea, because I predict a lot more dog walkers will go along this path instead of the trail in the back.
Also, lighting for those who would walk at dusk will need to be considered. There are "dark patches" along the route.
I do think there is the opportunity here to make this a very scenic walking path along the water, and you could possibly even add a few hanging baskets or banners like they do in the downtown core. It could be very pretty and get a lot of use, if it's well designed and looked after properly.
Some areas need better drainage. Crosswalk with lights or overpass for lake access near The Villa. Reduce speed limit
Speed reduction measures. I think a sidewalk would be nice or a multi use lane but would rather not see a full on board walk unless it was over the water.

Q8. Do you have any other comments about the Lake Milo area and design for a walking and cycling route?

I look forward to seeing the proposed design ... it would be wonderful to see this happen as many more people would enjoy the lake
Only comment is less studies and more concrete plans. Please do it.
I believe it would be well used as it is a high traffic area. I love it here
Depending on the final design, we would hope there would perhaps be 3 or 4 look-offs or places a person could fish or picnic.
I hope, in your consultation process you provide for a Focus Group that might bring out other options that would affect the overall project design and location.
Thank you for this opportunity to participate.
as I said use what is within the limits of the road right of way I think it would be best placed on the lakeside do not block view of the lake or access. Or obstruct passage to the lake from homes along milo.
Busy stretch of highway and side walks are a necessity for safety
Safety is a big priority. Cars speed along here now at scary rates. Maybe some traffic calming measures could be implemented because people will likely have to cross the road at some point to get to a board walk.
I would love to participate on any committees you might form. I am so excited about this opportunity to make more use of the lake!
My greatest concerns are my children’s safety and ease of use, and also as much as we love this location, we aren’t sure about having an influx of people hanging around where it’s usually more private.
I am so excited to hear that there is now some potential for enhancing this space and area. I really believe this area will "come to life" and get used even more if the proper infrastructure is put in place. These improvements will promote more involvement with healthy and active lifestyle. Also,

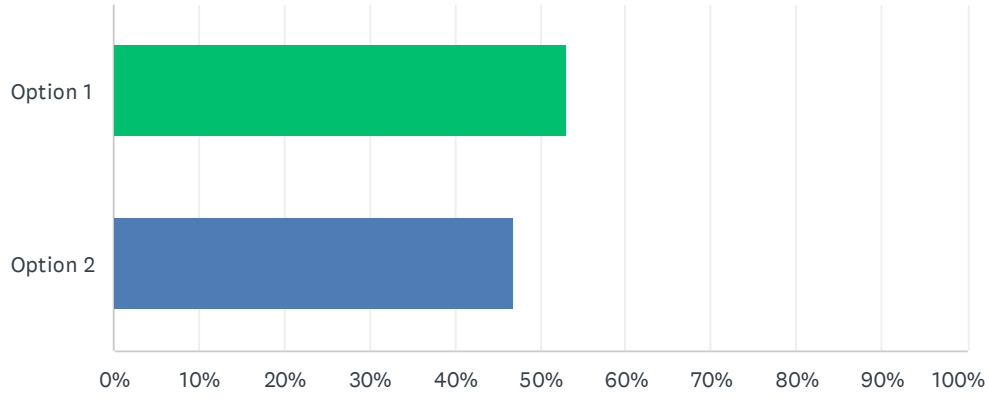
it truly enhances the beauty of our community when projects like these are completed. This is a high traffic area. When people see these improvements it makes them want to experience them!

I honestly think that the priority should be to make it an ideal walking route. Round trip, it's 2.5 km, which is a good little walk for many people, and I think a lot of us would get out and walk that stretch regularly. For the sake of 2.5 km, I'm not sure that cyclists would bother to veer off the paved road, especially if they need to be dodging walkers and dogs the entire time. I imagine most of them will stay on the side of the road. People here seem to be quite good about giving them enough space when they pass in vehicles.

Looking forward to the town hall on this next week. Thank you for asking our input. I just hope the homeowners on this route do not lose too much driveway, or land in the process or have the road widened. There are already too many properties in Yarmouth that are pretty much right on a road. The road speed limits would for sure have to be adjusted as well or enforced.

Q1 After considering the two design options, which do you prefer for the Lake Milo Active Transportation Route?

Answered: 183 Skipped: 2



ANSWER CHOICES	RESPONSES	
Option 1	53.01%	97
Option 2	46.99%	86
TOTAL		183

Q2 Do you have additional feedback on the design options that you'd like to share?

Answered: 98 Skipped: 87

#	RESPONSES	DATE
1	Extra lighting along the path for safety during before dawn and after dusk activity.	10/28/2021 11:04 PM
2	cyclist going out of town would need to cross traffic in option one this is unsafe with all the traffic on this road	10/28/2021 7:13 PM
3	No	10/28/2021 10:33 AM
4	I feel as if cyclist benefit from staying on the road Spode to running off on to the path and back on the road , we frequently meet them on this stretch coming from or going to much further destinations	10/27/2021 11:56 PM
5	I think the first option could make it abit safer for children	10/27/2021 7:15 PM
6	No	10/27/2021 1:47 PM
7	Proceed	10/27/2021 11:40 AM
8	Option 2 would be better with some type of physical barriers between cars and cyclists, not just a line on the road	10/27/2021 9:09 AM
9	No	10/27/2021 7:00 AM
10	Make it as wide as you can but have it for everyone including bikes. Safer for them too.	10/26/2021 11:16 PM
11	Road safety for cyclists deserve more then painted lines, for example pylons or barriers. If it's only painted lines it must be a very wide birth.	10/26/2021 10:50 PM
12	I think there is a great opportunity to make the path leading edge with a couple of gazebos and interpretive signage with accessibility in mind. The latest environmentally friendly and durable materials should be used . Innovative lighting should be introduced that does not impact or increase light pollution, add a few fitness station activities as well!	10/26/2021 10:02 PM
13	I think having the cyclists and walkers on the same path may put both at a greater risk of incident. I like the idea of the cyclists having their own path as most other towns/area have.	10/26/2021 9:37 PM
14	Is 4 m necessary? Concerned about possible need for infilling.	10/26/2021 9:20 PM
15	I would like a line in the middle of the path to help people stay safe. I want signage that give speed limit on your bike/rollerblades. Recommend that bikes have a bell to use when passing someone.	10/26/2021 9:17 PM
16	why destroying the shore by filling it in just go on the other side and take some of the land on that side stop destroying the environment or take the money and pave the stupid roads in town	10/26/2021 8:53 PM
17	—	10/26/2021 7:00 PM
18	Some access to the lake along the path.	10/26/2021 6:19 PM
19	no	10/26/2021 6:01 PM
20	N/a	10/26/2021 5:43 PM
21	Reminds me of lake banook. Great spot	10/26/2021 5:40 PM
22	no	10/26/2021 5:37 PM
23	Keeping the bike lanes separate from the other multi-use/walking lane seems to make the most sense from a safety standpoint. Most cyclists traveling that route are going at an increased speed and combing them on the same lane as people walking dogs, etc. doesn't	10/26/2021 4:32 PM

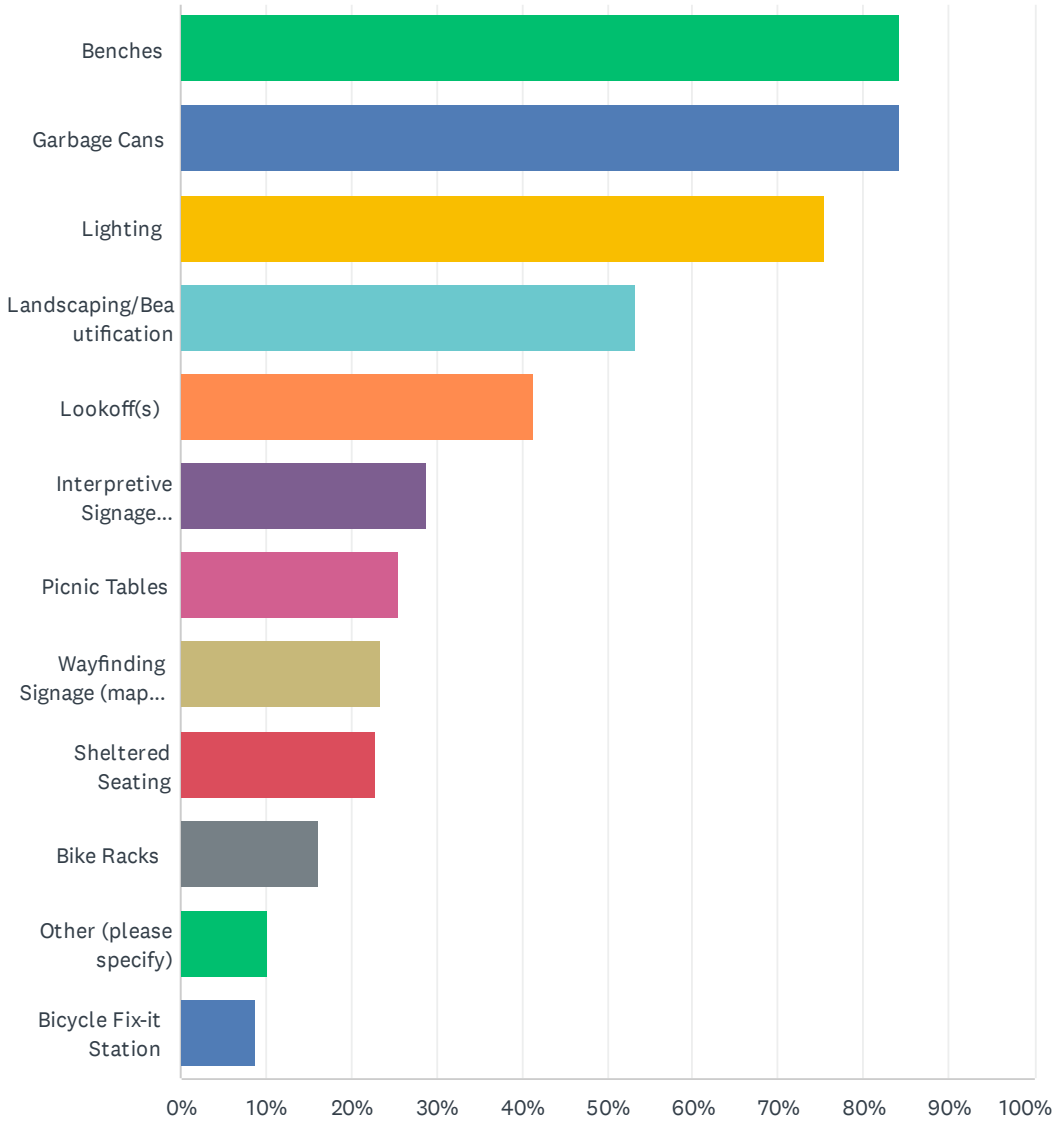
	seem like the better of the two options, so keeping them safely in their own designated lanes should work better.	
24	Sitting area, doggie bags,	10/26/2021 4:09 PM
25	i think its better to have the 4m wide path and bikers can go on there rather than being on the road with the cars	10/26/2021 3:56 PM
26	Option 1 offers more space as a muti-use trail; however bith offer a better option than what is vurrently available. Both options appear to offer a safer alternative than what is current. One must also factor in costs. What is the cost for either option?	10/26/2021 3:43 PM
27	N0	10/26/2021 3:43 PM
28	I like cyclists kept separate.	10/26/2021 2:49 PM
29	Keep the pathway about 2 metres from the highest water level on the Lake	10/26/2021 2:41 PM
30	I think option 1 gives a much wider trail but will still allow cyclist to use the paved shoulder on the road if they choose to. Sometimes you want to go fast, so the paved shoulder would be the place to do that. You don’t want to be weaving in and out of people at high speeds.	10/26/2021 2:41 PM
31	No	10/26/2021 12:50 PM
32	no	10/26/2021 12:41 PM
33	No	10/26/2021 12:38 PM
34	No	10/26/2021 12:28 PM
35	No	10/26/2021 12:11 PM
36	I would rather have the bicycles separate from the walking path	10/26/2021 12:05 PM
37	I just find cyclists make it hard to share road, pathways, etc	10/26/2021 11:55 AM
38	I am a longboard this will be great for me!	10/26/2021 11:46 AM
39	Thank you for getting community input	10/26/2021 11:41 AM
40	More room for drivers	10/26/2021 11:37 AM
41	Looks Great	10/26/2021 11:19 AM
42	Option 1 seems like a safer option for cycling with children.	10/26/2021 10:52 AM
43	just curious if they do option 1, and a cyclist needs to cross the street to get to where they're going, are they just going to have to cut in front of traffic? I imagine it would only be people living in the area, but a designated crosswalk maybe half way down the stretch might be useful?	10/26/2021 10:28 AM
44	No	10/26/2021 10:26 AM
45	Both are great options as this stretch really needs the added lane for non motor vehicles. I personally prefer option 1 as it provides a more inviting space for people to share the way, such as Multi use side walk following the north end of pleasant Street	10/26/2021 10:08 AM
46	N/A	10/26/2021 9:39 AM
47	No	10/26/2021 12:01 AM
48	No	10/25/2021 11:09 PM
49	I believe children and young families could still use the multipurpose trail for a family bike ride however a significant number of avid cyclists would prefer to remain on the road with traffic therefore giving them a wider shoulder would be safer for everyone.	10/25/2021 10:33 PM
50	I'm thinking adults using the trail for transportation will be travelling faster so should have a separate lane. Putting everything together could be frustrating and unsafe for both cyclists and foot traffic.	10/25/2021 6:53 PM
51	Cyclists on the road make me nervous, would rather see them on a separate path	10/25/2021 5:45 PM

52	Bikes shouldn't be with people that are just walking . Someone could get hurt .	10/25/2021 5:45 PM
53	Only that do option 2 but make it optional for bike traffic to allow for slower paced inexperienced cyclists/ families to have the option to use the multi-use trail instead of teh bike lane. Still make the paved shoulder bike lane a safe and easy choice for most cyclists.	10/25/2021 5:39 PM
54	No	10/25/2021 4:45 PM
55	No,hope it turns out in a positive way though	10/25/2021 4:43 PM
56	Having the bike lane separate from the road itself seems like a better option, this style of transportation routes has been used in many European countries and is highly successful.	10/25/2021 4:37 PM
57	no	10/25/2021 4:04 PM
58	Option 1 seems to make the most sense. It would be great to have it :)	10/25/2021 3:33 PM
59	No	10/25/2021 3:23 PM
60	With option 1. How would you prevent cyclists from using the multi use lakeside trail anyway? I'm not seeing the true difference to be able to cite them as 2 different options.	10/25/2021 3:00 PM
61	More space may provide a better lakefront experience for users.	10/25/2021 2:48 PM
62	Option 2 is safer, in my opinion, as I believe Cyclists need their own space to travel in due to their high speed of travel. I do not believe that serious cyclists will want to navigate travel through an area that includes walkers, runners, and skateboarders etc.	10/18/2021 4:26 PM
63	I am the owner of Novastar Motel and would like to synchronize our creational water access floating dock in to this great project. How would we discuss with municipility about our interests?	10/18/2021 3:36 PM
64	It is not very clear from your graphics. Is the path below street level??? Also, this survey is BURIED on this website -- it's not easy to find.	10/11/2021 4:35 PM
65	Thanks	10/9/2021 8:52 AM
66	I think it would be preferable to separate pedestrian and cycling traffic for safety....	10/8/2021 1:40 PM
67	No	10/7/2021 9:08 PM
68	No	10/7/2021 8:14 PM
69	it's better to have the bikes off the road	10/7/2021 4:32 PM
70	No	10/6/2021 10:22 PM
71	no	10/6/2021 10:12 PM
72	I like the bikes off the road.	10/6/2021 8:53 PM
73	No	10/6/2021 8:02 PM
74	I think the bike on the shoulder of the road is better if there is enough room for 1.5m shoulders	10/6/2021 7:39 PM
75	No	10/6/2021 12:40 PM
76	I feel that the bikers would still use the lower walkway for the better view so just put them down there anyway.	10/6/2021 12:35 PM
77	no	10/6/2021 8:55 AM
78	Keep vehicles and pedestrians as separate as possible	10/6/2021 8:23 AM
79	No	10/6/2021 7:19 AM
80	I like keeping cyclists away from vehicular traffic. People do not respect bike lanes.	10/6/2021 7:16 AM
81	Please do not pollute the water during construction.	10/6/2021 6:41 AM
82	Any opportunity to move the powerlines off the lake shore .Joint use with Bell and Eastlink on the opposite side ?	10/5/2021 11:37 PM
83	No	10/5/2021 9:25 PM

84	No	10/5/2021 8:59 PM
85	No	10/5/2021 8:53 PM
86	No	10/5/2021 7:38 PM
87	Option 1 seems safer for all since option 2 does not include a barrier for the bike lanes	10/5/2021 7:18 PM
88	No	10/5/2021 6:39 PM
89	No	10/5/2021 6:06 PM
90	No	10/5/2021 5:01 PM
91	Option #1 is the better one in that it keeps both cyclist and people off the road.	10/5/2021 4:41 PM
92	This option allows younger cyclists a safer environment to bike on and hopefully keeps the high speed cyclist off the multi user trail	10/5/2021 4:12 PM
93	Does the design include any "bump-outs" or sections of dock where peope could access the water for fishing? That might be a well-used feature.	10/5/2021 3:28 PM
94	please include garbage cans in several locations to prevent litter in the lake. Please also include receptacle for dog waster. Benches along the way for folks to stop and have a few would be nice or a few small out cropped areas. The opportunity also exits here to have 2 swimming lanes. There are several people who do long distance swims daily in the lake several months of the year.	10/5/2021 3:17 PM
95	A separate lane 4m wide would be nice for family’s with strollers and bikes with room to meet or pass others.	10/5/2021 2:51 PM
96	No	10/5/2021 2:07 PM
97	No	10/5/2021 1:36 PM
98	Cost should be in the decision making equation	10/4/2021 6:47 PM

Q3 What kinds of amenities would you like to see along the Lake Milo Active Transportation Route? (Select all that apply)

Answered: 184 Skipped: 1



ANSWER CHOICES	RESPONSES	
Benches	84.24%	155
Garbage Cans	84.24%	155
Lighting	75.54%	139
Landscaping/Beautification	53.26%	98
Lookoff(s)	41.30%	76
Interpretive Signage (cultural/historical/nature interpretation panels)	28.80%	53
Picnic Tables	25.54%	47
Wayfinding Signage (maps, signage to key destinations)	23.37%	43
Sheltered Seating	22.83%	42
Bike Racks	16.30%	30
Other (please specify)	10.33%	19
Bicycle Fix-it Station	8.70%	16
Total Respondents: 184		

#	OTHER (PLEASE SPECIFY)	DATE
1	leave it as it is and build on the other side of the road	10/26/2021 8:53 PM
2	Connect to the rails trail.	10/26/2021 6:19 PM
3	washrooms	10/26/2021 2:42 PM
4	I don’t think it should be over done. Trying to cram too much in makes it start to look ugly. Some low bollard lighting would be nice. Not sure people really need a map these days. Everyone has a smartphone. No need for bike racks as people are mostly passing through since there is nothing to stop for. No need for a look off since the whole trail will already be a look off. Don’t see a need for fixit stations either. People can do that at home.	10/26/2021 2:41 PM
5	Mileage markers	10/26/2021 12:50 PM
6	I wanna see areas built better for from the shore fishing	10/26/2021 9:46 AM
7	Look Offs / Rest Stations where individuals can get off the main trail to fix a bike, sit & rest,	10/25/2021 10:33 PM
8	Water fountain for filling a water bottle would be a dream.	10/25/2021 6:53 PM
9	Washroom facilities available year round	10/25/2021 5:39 PM
10	Potential for seating for events like dragon boat races or sailing or swim events etc.	10/25/2021 2:48 PM
11	Full recycling stations should be included, in addition to garbage cans	10/18/2021 4:26 PM
12	Signs with measured distances	10/12/2021 6:19 PM
13	Dog poop bags	10/11/2021 4:35 PM
14	Would be nice to have a few "bump out" docks with benches, and docking for kayaks, canoes, seafood, other appropriate watercraft	10/8/2021 1:40 PM
15	Docks that can be used for swimming or kayaking	10/6/2021 7:39 PM
16	Water fountain	10/6/2021 8:23 AM
17	washrooms	10/6/2021 6:41 AM
18	Washrooms	10/5/2021 1:36 PM

19	Water bottle fountain/filling station	10/4/2021 6:47 PM

Q4 Is there anything else you would like to share about the Lake Milo Active Transportation Route?

Answered: 76 Skipped: 109

#	RESPONSES	DATE
1	No	10/28/2021 10:33 AM
2	Great idea	10/27/2021 7:15 PM
3	No	10/27/2021 1:47 PM
4	No	10/27/2021 7:00 AM
5	Get it done.	10/26/2021 11:16 PM
6	Sounds like a great initiative.	10/26/2021 9:37 PM
7	Nice to know it is coming; speed it up, please.	10/26/2021 9:20 PM
8	It’s something I’ve been imagining for a long time. I think it will be enjoyed and will improve our health by giving more exercise.	10/26/2021 9:17 PM
9	nope just stop destroying the environment you have the old train tracks	10/26/2021 8:53 PM
10	-	10/26/2021 7:00 PM
11	The sooner the better. Let's go!	10/26/2021 6:19 PM
12	no	10/26/2021 6:01 PM
13	This is long overdue. I am excited to see the project finished!	10/26/2021 5:48 PM
14	N/A	10/26/2021 5:43 PM
15	Very excited for this project	10/26/2021 5:40 PM
16	no	10/26/2021 5:37 PM
17	Can’t wait to see the finished project!	10/26/2021 4:32 PM
18	No	10/26/2021 4:09 PM
19	I think it is well over do.	10/26/2021 3:43 PM
20	No	10/26/2021 3:43 PM
21	Great idea. Hope it happens	10/26/2021 2:49 PM
22	It's been more than 10 years in the making...time to get it done. Political will is the only thing holding this project up. Remember Mariner's on Main? Time to get it done!	10/26/2021 2:41 PM
23	A proper landscaping plan will make all the difference. The milo stretch is loud. Lots of cars and fast moving. Would be good to see if some landscaping could be done between the road and the trail to reduce the noise.	10/26/2021 2:41 PM
24	No	10/26/2021 12:50 PM
25	no	10/26/2021 12:41 PM
26	No	10/26/2021 12:38 PM
27	No	10/26/2021 12:28 PM
28	No	10/26/2021 12:27 PM
29	Love it!!	10/26/2021 12:11 PM

30	Thx	10/26/2021 12:05 PM
31	Great ideas!	10/26/2021 11:46 AM
32	Looking forward to it!	10/26/2021 11:41 AM
33	people have been talking about this for years, glad to see it in the works! great job!	10/26/2021 10:28 AM
34	No	10/26/2021 10:26 AM
35	No	10/26/2021 5:19 AM
36	We should have much more bikr lanes	10/26/2021 1:04 AM
37	No	10/26/2021 12:01 AM
38	No	10/25/2021 11:09 PM
39	It is VERY exciting to see active transportation being a priority for our communities. It would be wonderful to see students, adults & families able to be protected & have a safe route to travel. Keep up the good work!	10/25/2021 10:33 PM
40	I think it's a great idea. It would be neat to know the fact it was a trolly/train route. Mileage markers along the route would be neat too.	10/25/2021 6:53 PM
41	no , i can't wait to see it done .	10/25/2021 5:45 PM
42	Amazing plan - love it! The whole region will benefit. :)	10/25/2021 5:39 PM
43	No	10/25/2021 4:45 PM
44	no	10/25/2021 4:04 PM
45	No	10/25/2021 3:23 PM
46	Great project. Love to see the final product!	10/25/2021 3:00 PM
47	Glad to see this happen. Lighting should be Starlight Designation friendly.	10/25/2021 2:48 PM
48	This is an exciting project that will improve the safety of this beautiful area. A proper infrastructure will attract even more users. I really enjoy running in this area, but there are some safety issues at the moment. I came within inches of being struck by an erratic motor vehicle in this area the other day, which was very unnerving. I believe these enhancements are much needed for the safety of all! Thanks to all that are associated with taking on this great initiative! This will be an awesome asset to our community!	10/18/2021 4:26 PM
49	Creational water access docks	10/18/2021 3:36 PM
50	So excited to see this being developed!	10/12/2021 6:19 PM
51	Thanks	10/9/2021 8:52 AM
52	Would like to see bouys for swimming in the lake.	10/8/2021 4:41 PM
53	Wondering if it would be possible/useful to have some sort of small commercial infrastructure....like small kiosks that could be rented out to sell food, local art, etc, or rent out watercraft, bikes, etc..... maybe a couple of locations with a few clustered together...possibly combined with seating and docking as I noted earlier	10/8/2021 1:40 PM
54	No	10/7/2021 9:08 PM
55	No	10/7/2021 8:14 PM
56	No	10/6/2021 10:22 PM
57	No	10/6/2021 8:53 PM
58	No	10/6/2021 8:02 PM
59	it’s a wonderful idea	10/6/2021 7:39 PM
60	No	10/6/2021 12:40 PM
61	I think it is a wonderful Idea. In florida they actually have a "marked" bike lane and you are in	10/6/2021 12:35 PM

	danger of getting hit by a bike if you walk in that lane. Maybe it could be signified as bikes only lane so they wouldn't have to dodge around people walking.	
62	No Atv use on this route.!	10/5/2021 11:37 PM
63	No	10/5/2021 9:25 PM
64	No	10/5/2021 8:53 PM
65	No	10/5/2021 7:38 PM
66	NA	10/5/2021 7:18 PM
67	No	10/5/2021 6:39 PM
68	No	10/5/2021 6:06 PM
69	No	10/5/2021 5:01 PM
70	excellent idea	10/5/2021 4:41 PM
71	No	10/5/2021 4:12 PM
72	Get it done ;).	10/5/2021 3:28 PM
73	Great project, something for MODY and Town residents to all look forward to.	10/5/2021 3:17 PM
74	No	10/5/2021 2:07 PM
75	No,thanks	10/5/2021 1:36 PM
76	Great project. At some point the trail will narrow in the Town, and bikes will have to go back to the road.	10/4/2021 6:47 PM

Appendix E: Detailed Cost Estimate for Options

Lake Milo Active Transportation Plan
Option - 1
Yarmouth
COST ESTIMATE - 2021-10-27
Project No.: 2004448-1

Englobe

Item No.	Description	Unit	Cad Quantity	Estimated Quantity	Unit Price	Total Cost
	Mob/demob	lump sum	1.0	1.0	$ 30,000.00	$30,000
	Traffic Control	lump sum	1.0	1.0	$ 150,000.00	$150,000
	Asphalt Cold Milling	sq.m.	12345.0	12345.0	$ 6.00	$74,070
	Common Excavation	cu.m.	1935.0	1935.0	$ 10.00	$19,350
	Shore Line Fill	cu.m.	25800.0	25800.0	$ 25.00	$645,000
	Shore Line Armour Stone	tonne	19814.4	19814.4	$ 80.00	$1,585,152
	200mm Gravel Type 1 - Roadway	tonne	5925.6	5925.6	$ 25.00	$148,140
	350mm Gravel Type 2 - Roadway	tonne	10369.8	10369.8	$ 25.00	$259,245
	50mm Asphalt Type C - Roadway	tonne	1481.4	1481.4	$ 160.00	$237,024
	100mm Asphalt Type B - Roadway	tonne	2962.8	2962.8	$ 160.00	$474,048
	100mm Gravel Type 1 - Roadway Shoulder	tonne	526.3	526.3	$ 25.00	$13,158
	100mm Asphalt Type B - Multi-Use Trail	tonne	1206.7	1206.7	$ 160.00	$193,075
	150mm Gravel Type 1 - Multi-Use Trail	tonne	1810.1	1810.1	$ 25.00	$45,252
	Retaining Wall	lin.m.	1192.0	1192.0	$ 600.00	$715,200
	Topsoil and Hydroseed	sq.m.	10320.0	10320.0	$ 7.00	$72,240
	Allowance for Reinstatment of Asphalt Driveways	sq.m.	208.0	208.0	$ 50.00	$10,400
	Allowance for Reinstatment of Gravel Driveways	sq.m.	512.0	512.0	$ 25.00	$12,800
	Signing	lump.sum	1.0	1.0	$ 5,000.00	$5,000
	Lighting	lump.sum	1.0	1.0	$ 25,000.00	$25,000
	Striping and Pavement Markings	lump.sum	1.0	1.0	$ 8,000.00	$8,000
	Roadway Guiderail	lin.m.	1199.0	1199.0	$ 175.00	$209,825
	Removal of Existing Guiderail	lump.sum	1.0	1.0	$ 6,000.00	$6,000
	Trail Handrail	lin.m.	1224.0	1224.0	$ 35.00	$42,840
	Culvert Replacement (c/w headwalls) - 0+130 - 1200mm dia.	lin.m.	22.0	22.0	$ 700.00	$15,400
	Culvert Replacement (c/w headwalls) - 0+490 - 1200mm dia.	lin.m.	22.0	22.0	$ 700.00	$15,400
	Culvert Replacement (c/w headwalls) - 0+665 - 1050mm dia.	lin.m.	22.0	22.0	$ 620.00	$13,640
	Culvert Replacement (c/w headwalls) - 0+750 - 1050mm dia.	lin.m.	22.0	22.0	$ 620.00	$13,640
	Culvert Replacement (c/w headwalls) - 0+860 - 1200mm dia.	lin.m.	22.0	22.0	$ 700.00	$15,400
	Culvert Replacement (c/w headwalls) - 0+975 - 1050mm dia.	lin.m.	23.0	23.0	$ 620.00	$14,260
	Culvert Replacement (c/w headwalls) - 1+145 - 1200mm dia.	lin.m.	23.0	23.0	$ 700.00	$16,100
	Precast Headwalls and grates (all pipes)	each	14.0	14.0	$ 5,000.00	$70,000
	Utility Pole Renewal	unit	10.0	10.0	$ 5,000.00	$50,000
	Benchs	unit	7.0	7.0	$ 3,000.00	$21,000
	Existing Sanitary Sewer Manhole Adjustments	unit	17.0	17.0	$ 500.00	$8,500
	Dock Removal and replacements	unit	3.0	3.0	$ 3,000.00	$9,000
	Sediment Control (silt curtain, hay bales etc.)	lump.sum	1.0	1.0	$ 10,000.00	$10,000
					SUBTOTAL:	$5,253,159
					20% CONTINGENCY	$1,050,632
					GRAND TOTAL:	**$6,303,791**

Lake Milo Active Transportation Plan
Option - 2
Yarmouth
COST ESTIMATE - 2021-10-27
Project No.: 2004448-1

Englobe

Item No.	Description	Unit	Cad Quantity	Estimated Quantity	Unit Price	Total Cost
	Mob/demob	lump sum	1.0	1.0	$ 30,000.00	$30,000
	Traffic Control	lump sum	1.0	1.0	$ 150,000.00	$150,000
	Asphalt Cold Milling	sq.m.	13200.0	13200.0	$ 6.00	$79,200
	Common Excavation	cu.m.	1935.0	1935.0	$ 10.00	$19,350
	Shore Line Fill	cu.m.	25800.0	25800.0	$ 25.00	$645,000
	Shore Line Armour Stone	tonne	19814.4	19814.4	$ 80.00	$1,585,152
	200mm Gravel Type 1 - Roadway	tonne	6336.0	6336.0	$ 18.00	$114,048
	350mm Gravel Type 2 - Roadway	tonne	11088.0	11088.0	$ 25.00	$277,200
	50mm Asphalt Type C - Roadway	tonne	1584.0	1584.0	$ 160.00	$253,440
	100mm Asphalt Type B - Roadway	tonne	3168.0	3168.0	$ 160.00	$506,880
	100mm Gravel Type 1 - Roadway Shoulder	tonne	526.3	526.3	$ 25.00	$13,158
	100mm Asphalt Type B - Multi-Use Trail	tonne	911.3	911.3	$ 160.00	$145,805
	150mm Gravel Type 1 - Multi-Use Trail	tonne	1366.9	1366.9	$ 25.00	$34,173
	Retaining Wall (0.9m high 1.17 km)	lin.m.	1169.0	1169.0	$ 650.00	$759,850
	Topsoil and Hydroseed	sq.m.	10320.0	10320.0	$ 10.00	$103,200
	Allowance for Reinstatment of Asphalt Driveways	sq.m.	208.0	208.0	$ 50.00	$10,400
	Allowance for Reinstatment of Gravel Driveways	sq.m.	512.0	512.0	$ 25.00	$12,800
	Signage	lump.sum	1.0	1.0	$ 5,000.00	$5,000
	Lighting (allow light every 2 pole 30m apart = 20 lights)	lump.sum	1.0	1.0	$ 25,000.00	$25,000
	Striping and Pavement Markings	lump.sum	1.0	1.0	$ 8,000.00	$8,000
	Roadway Guiderail	lin.m.	1175.0	1175.0	$ 175.00	$205,625
	Removal of Existing Guiderail	lump.sum	1.0	1.0	$ 6,000.00	$6,000
	Trail Handrail	lin.m.	1247.0	1247.0	$ 35.00	$43,645
	Culvert Replacement (c/w headwalls) - 0+130 - 1200mm dia.	lin.m.	22.0	22.0	$ 700.00	$15,400
	Culvert Replacement (c/w headwalls) - 0+490 - 1200mm dia.	lin.m.	22.0	22.0	$ 700.00	$15,400
	Culvert Replacement (c/w headwalls) - 0+665 - 1050mm dia.	lin.m.	22.0	22.0	$ 620.00	$13,640
	Culvert Replacement (c/w headwalls) - 0+750 - 1050mm dia.	lin.m.	22.0	22.0	$ 620.00	$13,640
	Culvert Replacement (c/w headwalls) - 0+860 - 1200mm dia.	lin.m.	22.0	22.0	$ 700.00	$15,400
	Culvert Replacement (c/w headwalls) - 0+975 - 1050mm dia.	lin.m.	23.0	23.0	$ 620.00	$14,260
	Culvert Replacement (c/w headwalls) - 1+145 - 1200mm dia.	lin.m.	23.0	23.0	$ 700.00	$16,100
	Precast Headwalls and grates (all pipes)	each	14.0	14.0	$ 5,000.00	$70,000
	Replacement utility poles	unit	10.0	10.0	$ 5,000.00	$50,000
	Benchs	unit	7.0	7.0	$ 3,000.00	$21,000
	Existing Sanitary Sewer Manhole Adjustments	unit	17.0	17.0	$ 500.00	$8,500
	Dock Removal and replacements	unit	3.0	3.0	$ 3,000.00	$9,000
	Sediment Control (silt curtain,silt fence, hay bale structures, etc.)	lump.sum	1.0	1.0	$ 10,000.00	$10,000
					SUBTOTAL:	$5,305,266
					20% CONTINGENCY	$1,061,053
					GRAND TOTAL:	**$6,366,319**