2022

Strathroy-Caradoc

Recreational Trails Master Plan

GROWING TOGETHER
STRATHROY-CARADOC
URBAN OPPORTUNITY - RURAL HOSPITALITY
Comprehensive Planning for Tomorrow

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Plan Foundations

STRATHROY-CARADOC
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1 Introduction

1.1 Project Context

Strathroy-Caradoc is a vibrant and dynamic community defined by its charming tight-knit feel and scenic countryside. Faced with considerable population growth and a strong demand for outdoor recreation, the municipality has developed a Recreational Trails Master Plan (RTMP) to inform the future of its trails network. Trails are not only a popular recreational resource, but support healthier, more active lifestyles, reduce carbon emissions and provide new opportunities for residents and visitors to discover the local area. The RTMP not only seeks to identify where expansions are most warranted but to adopt new policies and agreements that formalize and enhance the operations of recreational trails that are already well used.

While a cornerstone of the municipality's overall transportation system, trail networks do not function in isolation of the other municipal priorities and intersecting infrastructure. A major priority in designing the RTMP was to develop recommendations that are both aspirational and reflect the realities of the Strathroy-Caradoc context. Listed recommendations were not only targeted to the municipality's expressed trail needs but, reflected a wide range of overlapping local considerations. This included synchronizing the RTMP with the municipality's recent Transportation Master Plan (TMP) and Official Plan update to avoid redundancies and ensure a more concerted policy effort towards new trails initiatives.

The RTMP for Strathroy-Caradoc has a purpose of providing high-level, municipal-wide recommendations for walking and cycling while at the same time addressing the municipality's need to promote an active community. This report provides the first inventory of trails and assessment of trail recreational needs within Strathroy-Caradoc to date, with the aim of identifying opportunities to build upon, connect and make improvements to various existing trail components, much of which are located on Conservation Authority lands, so that they will be experienced as a comprehensive trail system.

1.2 What is a Recreational Trails Master Plan?

A Recreational Trails Master Plan is a strategic planning document that both defines the long-term vision for the municipality's trails network and outlines steps to get there. The RTMP compliments the TMP by providing additional specification over the municipality's existing and proposed trail facilities and policies. While comprehensive, it is essential to specify the document's function and role within broader policies context. Provided below are a list of key points describing what a recreational trails master plan is and is not:

A Recreational Trails Master Plan is…

- A long-term document that outlines the future goals and objectives of a municipality's trails system;
- A functional document which outlines a series of recommendations related to the adoption of trail supportive policies, infrastructure and programs; and
- A technical reference which provides relevant high-level trails guidance

A Recreational Trails Master Plan is not…

- Legal terms of agreement which governs the daily use and operations of trails facilities;
- Specific details related to the construction of individual trail facilities; and
- Design manual to inform the exact design of trail facilities.

1.3 Project Process

As one of many strategic master plan documents, the RTMP was developed to both incorporate and compliment the directions and guidance offered from other relevant planning initiatives. This includes the municipality's TMP, Official Plan and Parks and Recreation Master Plan (PRMP), which all share an objective of promoting trails usage. With all documents having been either developed or recently updated as part of the same municipal comprehensive review, this process of synchronization remained concurrent.

With trails representing just one form of active transportation infrastructure, it was also essential that all RTMP recommendations be closely aligned with those related to the on-road active transportation network. Within the context of Strathroy-Caradoc, this involved proposing a trails network that filled in gaps and expanded upon sidewalks and on-road cycling facilities either already built or, proposed through the municipality's TMP or Middlesex County Cycling Strategy.

The process including confirmation of the Strathroy-Caradoc context and finalize the goals and directions which would inform the plan's development

TRAIL NETWORK DEVELOPMENT PROCESS		
Step		Outcome
1	Engagement Round 1 - Confirm understanding of the Strathroy-Caradoc context & finalize goals and directions to inform the plan's development.	Vision and Guiding Principles for the Final RTMP
2	Identify a set of criteria to help select, assess and refine routes to form part of the preferred Recreational Trails Network	Trail Class Hierarchy & Route Selection Criteria

TRAIL NETWORK DEVELOPMENT PROCESS		
Step		Outcome
3	Undertake field work to investigate existing routes and locations for potential new routes.	Field work documentation
4	Identify existing conditions and routes, and potential candidate routes based on feedback from Engagement Round 1	Draft Proposed Trail Network
5	Apply best practices and understanding of local context to develop an appropriate suite of policy and program recommendations	Draft Policy and Program Recommendations
6	Engagement Round 2 – Present Draft Proposed Trail Network, Trail Class Hierarchy and Draft Policy and Program Recommendations	Refine proposed trails network and hierarchy
7	Confirm the municipality's preferred network including the proposed facility types.	Recreational Trails Master Plan
8	Identify a proposed phasing plan for the City's preferred active transportation network.	Recreational Trails Master Plan

1.4 Project Engagement

Overall, the RTMP's public engagement program featured two distinct phases of engagement, including: Round 1 and Round 2. All held activities were underlined either by the specific phase of the project they sought to inform or a targeted audience that was consulted. Developed as part of a broad municipal review, many activities were not exclusive to the RTMP but sought feedback on a variety of master plan documents under development. Listed in the following table are the targeted audiences that were consulted as part of the RTMP's engagement program:

Consulted Audience	Description and Justification for Inclusion	Events & Communication Methods
Members of Strathroy-Caradoc Council	Provide the plan's final approval and enrich its contents with detailed understanding of the municipality's finances, overlapping priorities and community priorities	Virtual/Presentations (workshops and Council sittings)
Recreational Trails Master Plan Project Team	Decision maker and senior leadership sounding board/approval body and the liaison between the consultant team and Council. Reports to project's overarching municipal steering committee	Virtual meetings, attendance at all major consultation events
Technical Advisory Committee (TAC)	Group of representatives with authority or expertise over key Project outcomes or aspects. Notable parties include members of the local school boards, applicable conservation authorities (St. Clair Region, Upper Thames River, Thames Centre and Lower Thames Valley) and local Utilities provided.	Workshops and meetings held across major stages of project work
Stakeholder Advisory Committee (SAC)	Group of 12-15 representatives who enriched understandings of the local context and provided an additional opinion on key project outcomes and processes. Those featured on the committee included: residents, youth members, landowners, businesses owners and other interested stakeholders.	Workshops and meetings held across major stages of project work
Members of the Public	All those who either live, work or play within the municipality of Strathroy-Caradoc	Virtual Public Information Centers, Online Surveys and Commenting Boards.

1.4.1 Engagement Round 1 – Visioning

The first round of the RTMP's engagement primarily sought to confirm understandings of the Strathroy-Caradoc context and finalize the goals and directions which would inform the plan's development. Serving as the foundation for all subsequent project work, this round of engagement featured a wide variety of meetings and activities. This ensured all targeted audiences were both reached and given an adequate range of communicative means to properly capture the depth of their feedback.

Meeting #1 with RTMP Project Team (February 25, 2021)

To commence the project's engagement program, an initial meeting was held with the RTMP on February 25, 2021. Held remotely, the event sought to confirm the project's underlying goals and better define the current Strathroy-Caradoc trails context. To facilitate relevant discussion, the event featured a series of interactive activities, where participants were invited to share input on the following topics:

What makes Strathroy-Caradoc Unique? How is it Changing?

- Natural landscapes and water courses;
- High-quality community programming and services;
- Diverse collection of communities;
- New residents appreciate mix of urban amenities / small community connections & nature.

How can the RTMP support existing municipal work?

- Set out road map for the future;
- Give direction to diversify inventories;
- Defines expectations for different stakeholders (public and developers);
- Forces municipality to engage more meaningfully with local community;
- Opportunity to be more engaging with underrepresented user groups (i.e., young women).

What principles should the RTMP consider?

- Plan based off socio-demographic profile and to advance inclusivity;
- Leverage trails to promote new economic and tourism opportunities;
- Provide a wider distribution of trails across the municipality;
- Develop more equitable funding models;
- Align with principles of Municipal's Strategic Plan.

RTMP Visioning Workshop (March 18, 2021)

On March 18, 2021, a visioning workshop was held among the RTMP project team and other key stakeholders to formalize an appropriate vision to underline the RTMP. Attendees identified future needs and priorities as they relate to the use of existing

trails, connections to parks, schools, and other destinations, potential trail expansions, wayfinding and signage, safety and security, maintenance and road crossings. Other items raised during the event are as follows:

Needs

- Form better connections between: old and new areas as they develop; rural agricultural areas and urban areas (Mt. Brydges and Strathroy).
- Trails that provide loops around communities and provide more points of access.
- Consistency in trail conditions and standardized trail typologies.
- Facilities that will better accommodate a range of users, with amenities to remove barriers to use (rest areas, even surface, lighting refuges).

Other Important Considerations

- Natural feel and connection with nature.
- Promotion of trails and destination opportunities.
- Support trails with amenities and programming.

Key Words

Using the integrative online polling tool, Menti, the following key words were generated on the topic of the RTMP, with a larger font denoting a greater frequency:

Visioning Survey (April 2021)

To validate the RTMP's draft vision statement and principles with the public, an online survey was launched on the municipality's website throughout April 2021. Relying on a series of confirming questions, the following key insights were provided:

49%
Supportive of Vision Statement

33.6%
Very Supportive of Vision Statement

Most Important Challenge
Trail Maintenance

Most Important Opportunity
Connecting Destinations

Most Important Principle
Appeal to All Users

Suggested changes to RTMP Vision & Guiding Principles

- Promote more regional trail connectors;
- Ensure trails include accessible designs and amenities;
- Promote more equitable trail governance (partner with local clubs and indigenous communities).

Technical Advisory Committee / Stakeholder Advisory Committee Meeting #1 (May 21, 2021)

To gain a more technical opinion on RTMP directives, members of the Technical Advisory and Committee and Stakeholder Advisory Committee were consulted on May 21, 2021. Featuring a series of roundtable discussion on key RTMP topics.

Stakeholder & Technical Advisory Committee Meeting Notes

- Provide a trail connection between Strathroy & Mt Brydges;
- Improve awareness of trail facilities and etiquette;
- Engage youth on the design and placement of trail facilities.
- Mandate trail connection provisions for new developments;
- Coordinate trail implementation with planned utilities expansions.

1.4.2 Engagement Round 2

The second round of the RTMP's engagement primarily sought to confirm preliminary recommendations with municipal staff, members of the public and key stakeholders. Relying on the outcomes of the RTMP's first round of engagement, combined with a thorough understanding of applicable best practices and technical guidance, several intermediate project deliverables were shared. Notable shared deliverables included the draft proposed trail network, trail class hierarchy and draft policy and program recommendations. Compared to the first round of engagement, the following events were intended to inform and confirm components of the RTMP for eventual finalization. Accordingly, the focus was more so on quality over quantity, with fewer activities held yet each one yielding more fulsome discussion.

Meeting #2 with RTMP Project Team and Conservation Authorities (June 2021)

Within June 2021, a meeting was held with members of the RTMP project team and local conservation authorities. Given the two groups shared authority over lands which commonly bear trail facilities, the event provided a vital opportunity to coordinate priorities and concerns related to the expansion and formalization of the municipality's trail network. Notable discussion items included the feasibility of implementing new trail facilities along nearby watersheds, integrating signage and wayfinding systems as well as agreements and costing related to trails maintenance and risk liability.

Technical Advisory Committee / Stakeholder Advisory Committee Meeting #2 (July 13th, 2021)

Held throughout the day on Tuesday July 13th, 2021, the 2nd Technical Advisory Committee (TAC) and Stakeholder Advisory Committee (SAC) sought to gain each group's feedback on the draft trails network and draft list of policy recommendations. Facilitated with the interactive mapping tool, Mural, participants were invited to confirm preliminary planning work and identify and gaps and deficiencies which remained unaddressed. Following the meeting, the presented Mural "board" was kept online for an additional week, to offer attendees (and those unable to attend the meeting) additional time to provide the feedback. A summary of key items raised during the meeting is as follows:

Key Feedback Comments

Strathroy-Caradoc

"Would be great if hydro corridor trail could be used by ATVs. If they had a place to ride, they may stay off other trails"

"Was McEnvoy Road Considered for AT?

"Create an all use trail that extends from Strathroy to Mt Brydges. This would connect two largest community centers in our municipality. Ideally it could connect to the Rotary Trail and SCRCA trail network"

Mount Brydges

"Lots of potential connections around Lions Park Drive"

"Implementation Tools should be included in the Report (e.g., user agreements, land acquisition, leverage NHS)"

Strathroy

"Some conservation authority trails are labelled incorrectly"

"South of Panell Lane connection – staff to look into the feasibility of this connection"

"Build a paved trail link that passes underneath the Victoria St bridge. This would allow safer walking/running/cycling along the Rotary Trail. This link would allow a trail user to walk from Second St to the existing skateboard park without having to deal with car traffic"

"Investigate to acquisition of the Bear Creek Golf Course by either the Conservation Authority or the Municipality. It would be an invaluable addition to our growing trail system. Perhaps the owners might donate these "hazard lands" that are prone to flooding for a huge tax credit?"

"Connector through PSW, would likely need to be raised, costly to install and maintain"

Virtual Public Open House #1 (Thursday July 15th, 2021)

To allow members of the public to also share their feedback on the RTMP's preliminary recommendations, a virtual public open house was held on the evening of Thursday July 15th, 2021. Similar to the previous internal meetings, the following event featured a live presentation as well as online comment boards, using the Mural program. Hosted for a week after the live presentation, the following key comments were generated:

"… pedestrian bridge be added to the conservation area, linking the smaller trail along the south side of the river which has it's entrance in the Conservation Authority building parking lot to the wide trail in the grassy area along the north bank of the river"

" … extend or link onto the southern end of the rotary memorial trail, to ensure that no residents of Strathroy have to travel too far to access it, and to enable pedestrian/active transport connections with minimal road traffic to destinations like the fairgrounds, trout haven …

"We definitely need dedicated cycling lanes within Strathroy and also on rural corridors!"

"… add bicycle infrastructure/facilities like multi-use pathways or just bicycle lanes that are fully separated from traffic along the high traffic main roads like Caradoc and Metcalfe Street … "

1.5 Vision Statement and Guiding Principles

Based off the outcomes of the RTMP's first round of engagement and ongoing discussion with municipal staff, an underlying vision for the document was finalized. A vision is an aspirational statement that outlines the underlying priorities and objectives sought in developing the RTMP. Following a rigorous process of consulting key stakeholders and reviewing the local context, the following vision statement was articulated through a combination of all comments received:

Strathroy-Caradoc trails will provide residents and visitors with a means for recreation and access to parks and natural heritage systems, regardless of their age, ability or skill. Trails will be easy to access and foster an inclusive community that is connected to nature and to one another. Safety, access, and inclusivity will guide the development of the trails system in Strathroy-Caradoc into the future.

To apply this statement more easily within the development of the RTMP's underlying objectives, a series of corresponding guiding principles was also developed. While most pertinent to the Plan's proposed trails network, these items were equally vital in identifying an appropriate scope of program and policy recommendations related to trails promotion.

Proposed Recreational Trails Guiding Principles

1. **Connect Destinations & Nature:** Trails should provide access to important destinations such as parks, natural areas, community centres, schools, shopping and employment areas.
2. **Promote Access & Inclusion:** Trails need to be designed and built around a broad range of users to facilitate and encourage participation. Design and planning for trails should focus on removing barriers to usage, including considerations around seasonal usage, gender, cultural experiences, safety, demographics, and socioeconomics.
3. **Appeal to All Users:** The trail network should appeal to a range of user abilities and interests. The network should consist of various route types, levels of difficulty, and accommodates different modes of travel and recreational experiences.
4. **Enhance User Experience:** Opportunities for supportive amenities such as wayfinding, rest areas, and end of trip facilities will be prioritized to enhance the user experience.
5. **Foster Partnerships**: Explore opportunities to develop new and strengthen existing partnerships to expand, maintain, and provide consistency across the collective trail network.

2

Existing Trails System & Conditions

STRATHROY-CARADOC
RECREATIONAL TRAILS
MASTER PLAN

2 Existing Trail Systems & Conditions

2.1 Existing Trail Network

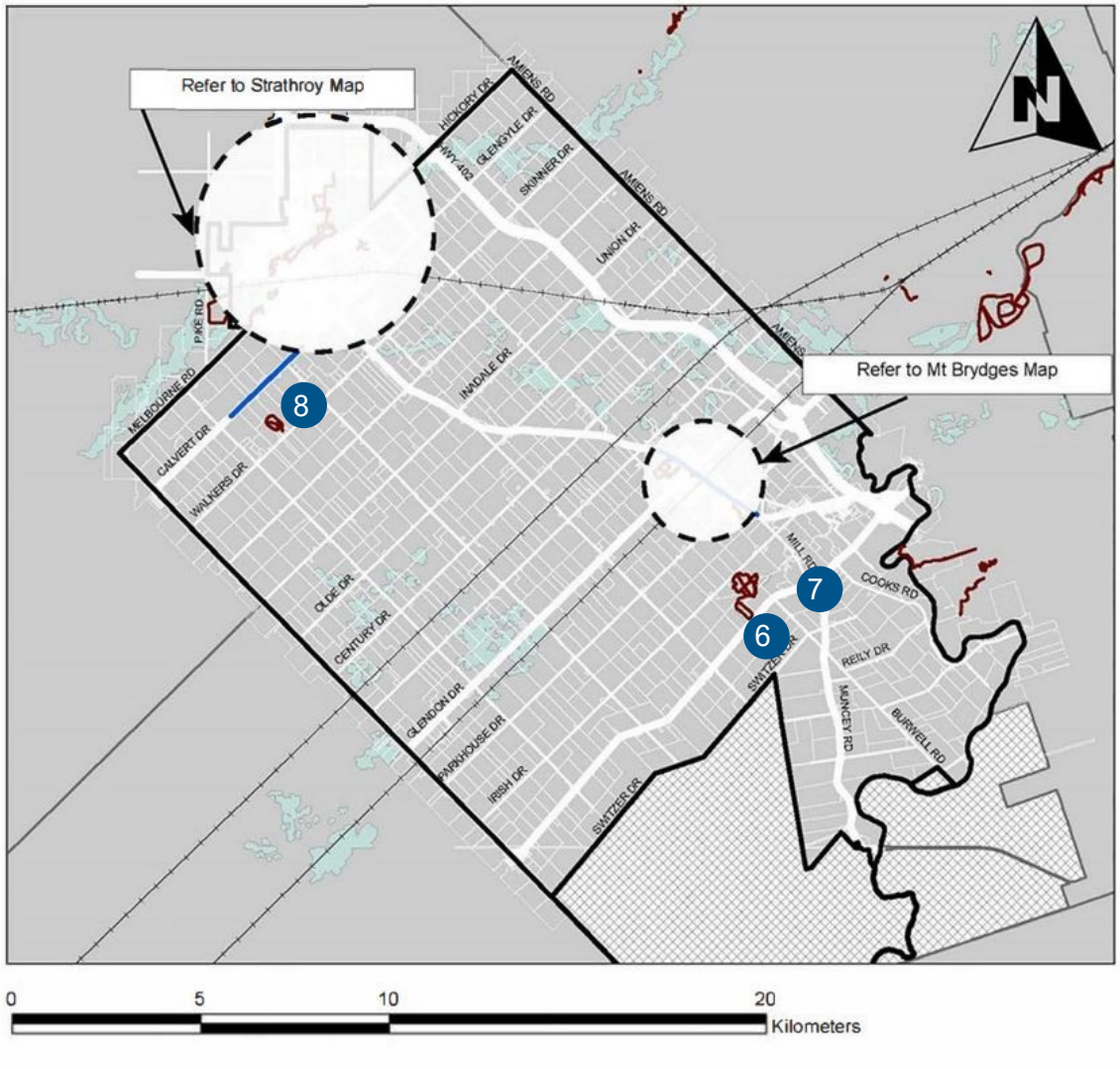
Most of Strathroy-Caradoc's trail systems are located within the municipality's various conservation areas. The key in designing a proposed trail network for Strathroy-Caradoc is a firm understanding of the facilities and amenities that make up Strathroy-Caradoc's existing trails network. These features not only serve as precedents essential in developing locally appropriate design guidelines for new trail facilities and amenities, but useful references in promoting broader network connectivity (i.e. Strathroy Conservation Area, Longwoods Conservation Area, Clark Wright Conservation Area, and Mill Stream Conservation Area). Facilities within these areas are subject to the jurisdiction of both the St. Clair Conservation Authority and Lower Thames Conservation Authority.

Aside from the facilities within these conservation areas, the Rotary Memorial Trail travels through Strathroy-Caradoc and connects to trails within the Strathroy Conservation Area to create a City-wide trail system.

There are opportunities to expand the existing trails network by connecting existing residential areas and residential growth areas to existing trail corridors and creating new linkages in hydro corridors and along natural features. Expanding upon existing trail facilities will help to improve active transportation connectivity within and between communities in Strathroy-Caradoc including communities like Strathroy and Mount Brydges.

Provided on the following pages are maps of the existing trail network, shown at the scale of Strathroy, Mt. Brydges and the entire municipality. Features displayed on these maps relied on the data inputs of various local stakeholders, including the municipality, local conservation authorities and developers of prospective residential neighbourhoods. With no existing geo-spatial data to reference, select features were also drawn based off observations either made using satellite ortho imagery and formal field investigations. Following these maps, a more detailed write-up is provided of the trail facilities located within local conservations – which make up the bulk of existing trails facilities. All maps can also be referenced in Appendix A.

Map of Rural Strathroy-Caradoc Existing Trail Network

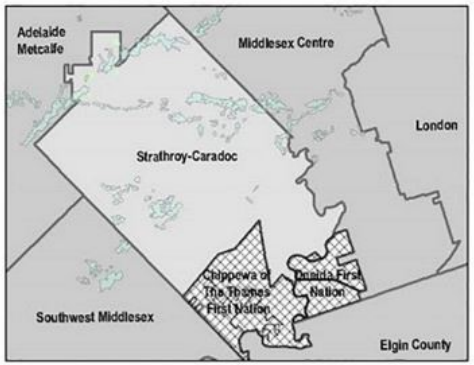


STRATHROY-CARADOC
EXISTING ACTIVE
TRANSPORTATION (AT) ROUTES

Legend

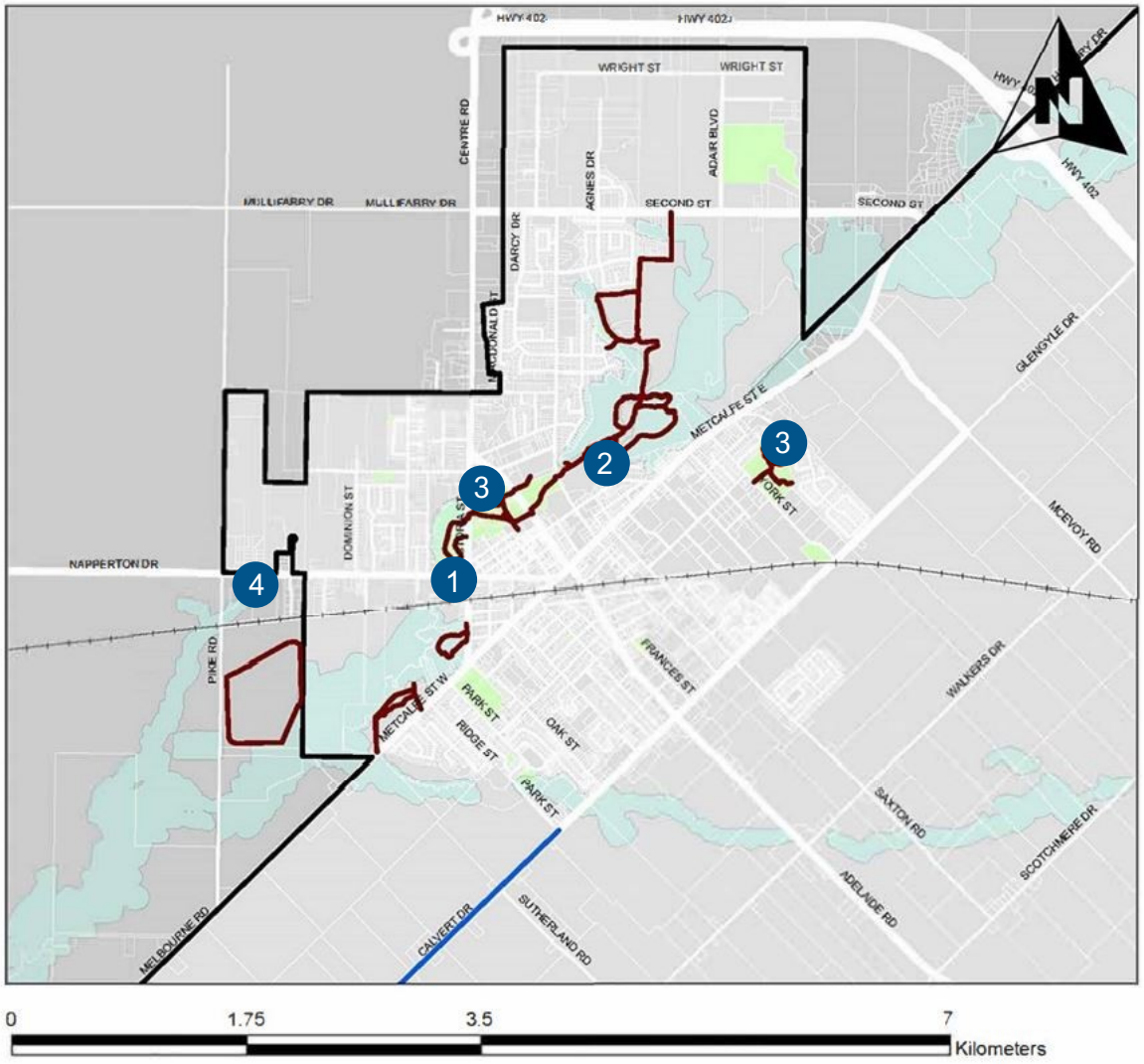
AT Facilities
- Existing Cycling Routes
- Existing Trail Routes

Other Elements
- Railway
- Wetland Areas
- Property Boundaries
- First Nations Territory
- Strathroy-Caradoc Municipal Boundary



Source: Data provided by the Municipality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2021
Project: NAD 1983 UTM Zone 17

Map of Strathroy Existing Trail Network



STRATHROY

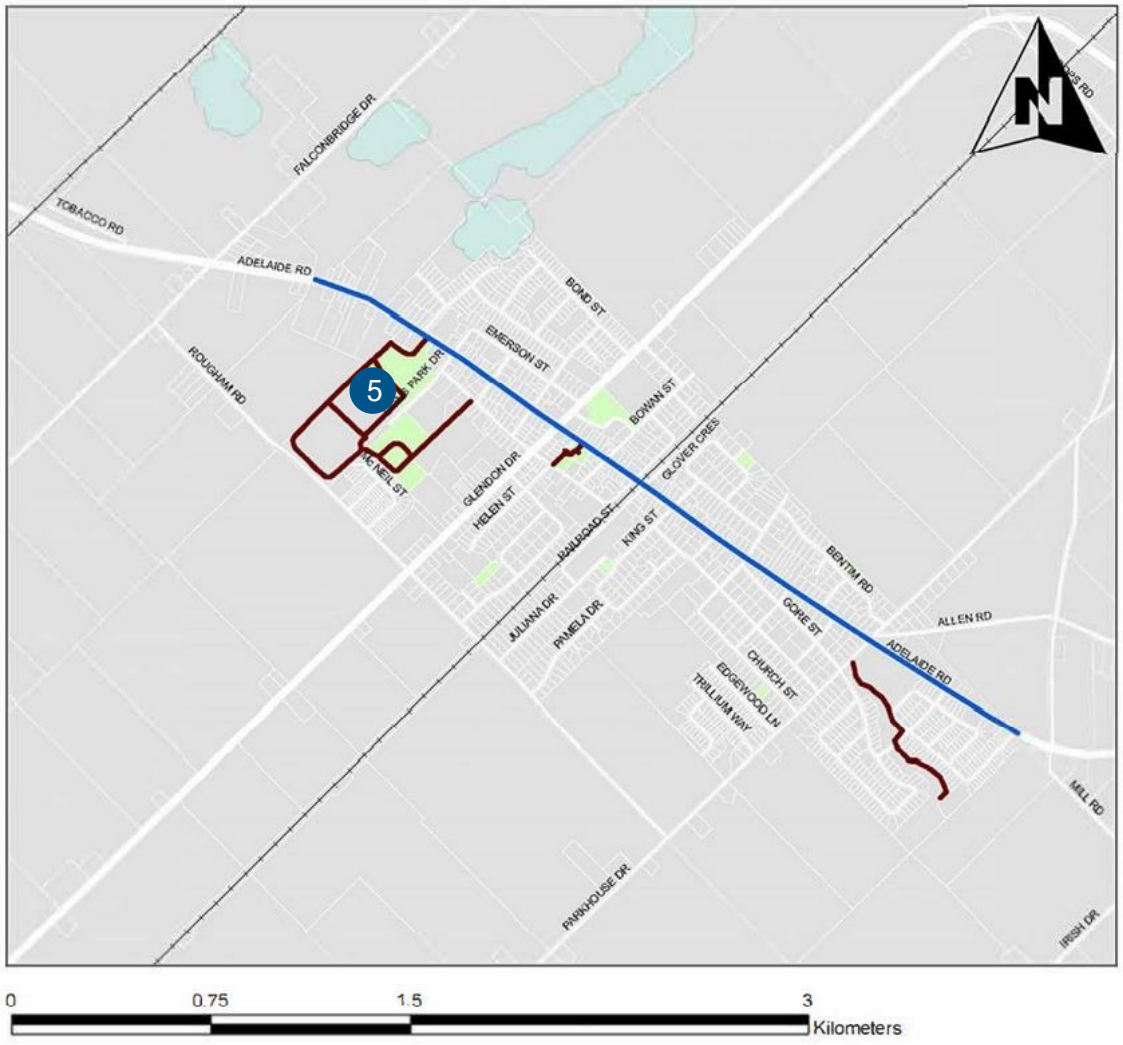
EXISTING ACTIVE
TRANSPORTATION (AT) ROUTES

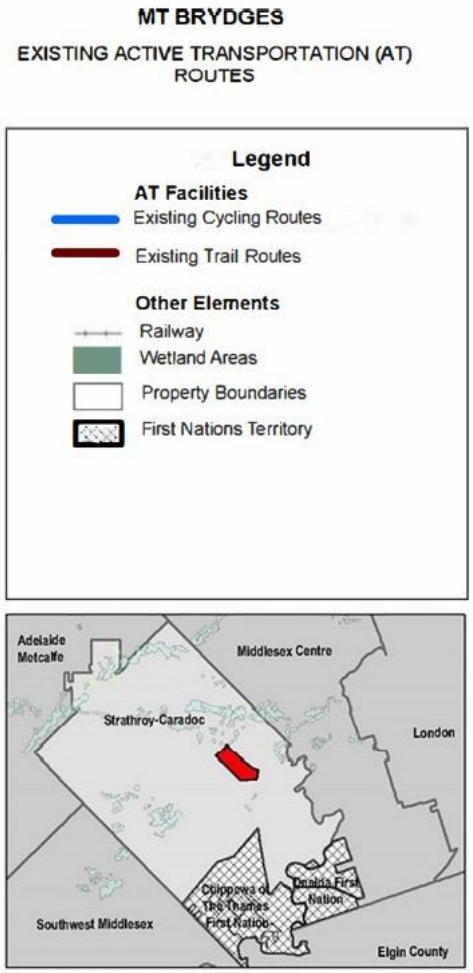
Legend

AT Facilities
- Existing Cycling Routes
- Existing Trail Routes

Other Elements
- Railway
- Wetland Areas
- Property Boundaries
- First Nations Territory
- Strathroy-Caradoc Municipal Boundary

Map of Mount Brydges Existing Trail Network





Source: Data provided by the Municpality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2021
Project: NAD 1983 UTM Zone 17

Opportunities & Constraints Assessment

During the field review, existing trails were assessed to help inform recommendations for trail standards, gap improvements, and opportunities to expand the existing trail system.

2.1.1 Strathroy

The following sections provide additional details about trail features in each of the trail segments within Strathroy-Caradoc. Refer to 'Existing Trail Network' maps for locations.

1. **Strathroy Rotary Memorial Trail:** The Rotary Memorial Trail commences at the Strathroy Skatepark entrance of Alexandra Park on Albert Street between Carrie Street and Victoria Street. Overall, the trail system is well signed and provides excellent connectivity. The trail surfacing and standards are not consistent throughout and lends to disconnection in the user experience and branding of the trail system. Select sections are paved and while others are stone dust or compacted earthen surface. The northern portion of the trail that extends to Second Street does not have any formal trail surfacing and has the appearance of an informal trail that is less welcoming to users. Improvements should address consistency of trail design standards and increased branding/wayfinding, to complement the existing signage.

2. **Strathroy Conservation Area:** The Strathroy Conservation Area is located within the community of Strathroy, north of the Downtown Strathroy and falls under the jurisdiction of the St. Clair Conservation Authority. The conservation area includes a 3 km trail through a floodplain forest along the north side of the Sydenham River. In addition to provide Strathroy residents essential natural respite, the grounds also serve as a core component of the local trail network. Within the conservation area, trails connect to other areas within the City's trail system, including the Rotary Memorial Trail, the Gemini Sports Complex and various residential neighborhoods. Trails consist of degraded stone dust, compacted earthen surface and boardwalk trails. Older train infrastructure is narrow and there are low lying areas which seasonally become impassible due to flooding. The sections of trail within the conservation area are highly frequented by a range of user demographics and modal types.

3. **Park and Manicured Open Space Trails:** Formalized park spaces (Alexandra Park and Henk Van Dyk Park) have paved asphalt trails to accommodate the higher volume of users and increased accessibility. Associated parking facilities tend to be granular. Consideration should be made to extend the asphalt surfacing to the adjacent sidewalk connect and accessible parking. Strathroy Municipal Cemetery is an example of an alternative public open space that functions as highly accessible walkway spaces that could be connection to existing and proposed trails to leverage the exiting infrastructure into the trail system. The cemetery consists of 3m wide asphalt roadways with physical and regulatory speed controls that lend well to pedestrian and cycling use. Wayfinding signage would be critical to help users feel welcomed in the cemetery for trail use and both alterative and formal park/open spaces will benefit from wayfinding mapping to connect users to adjacent trail infrastructure.

4 **Strathroy Transfer Site:** This infrastructure facility, located off Pike Road, is located outside the formal municipal boundary however is a popular location for bird watching and walking. South of the formal entrance, there is an existing granular parking lot and pedestrian access point to the existing maintenance road network that encircles the ponds. Location within close proximity to residential development and minimal investment required lend it as an excellent candidate for inclusion in the expanding trail system.

2.1.2 Mount Brydges

5 There are minimal municipally owned trails in Mount Brydges, with the entirety of the trail system includes an existing nature trail called the Mount Brydges Lions Park Trail which is accessible from Lions Park. The Trail features approximately 1.4 km of compacted stone dust walking trail, along with a baseball diamond, playground, soccer fields and arena. Trails are very accessible with flat slopes, compacted stone dust/earthen surfacing, wide cross section and access to parking at the trail entrance. The trail is highly accessible and attention to maintenance/lifecycle upgrades should be prioritized in future to maintain this facility as a destination for all ages and abilities.

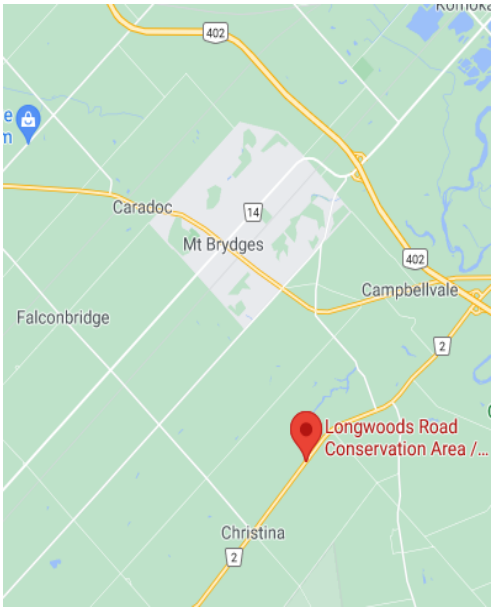
2.1.3 Rural Lands

The rural lands do not currently feature formalized municipal trails, though evidence of trail walkers and cyclist activity is notable on road shoulders, along the active railway line and through private bush lots. Recreational walking was even observed on Adelaide Road, where traffic volumes and speeds are higher.

Additional trail facilities are found within the local Conservation Areas, located in surrounding rural areas. These trails serve as recreation destinations and could be leveraged as part of a greater network through rural trail and bikeway connections. Additional details about these conservation areas are provided below:

6 **Longwoods Road Conservation Area:** The Longwoods Road Conservation Area is located south of Mount Brydges and is under the jurisdiction of the Lower Thames Conservation Authority. The Conservation area offers 7 trails of varying lengths and intensities:

- **Carey Carolinian Arboretum & Trail:** a 0.7 km nature trail through a forest and around 3 Indigenous Longhouse Cabins;
- **Turtle Trail:** a 0.3 km trail through a Carolinian Ecozone forest that connects to the Carey Carolinian Arboretum & Trail;
- **Westwood Trail**: a 0.27 km trail through a forest that connects to the Carey Carolinian Arboretum & Trail;
- **Millstream Trail:** a 1 km trail that travels through a forest and down to a pond with a viewing dock;
- **Longdo Trail**: an easy trail that travels along a forested ravine to Ska-Nah-Doht Village, a reconstructed Haudenosaunee village;
- **Eastwood Trail:** a 0.22 km pathway through the forest that intersects with the Millstream and Pondview Trails; and
- **Pondview Trail:** a 0.6 km trail with some sections travelling through a forest and others overlooking water, that intersects with the Eastwood and Millstream Trails.

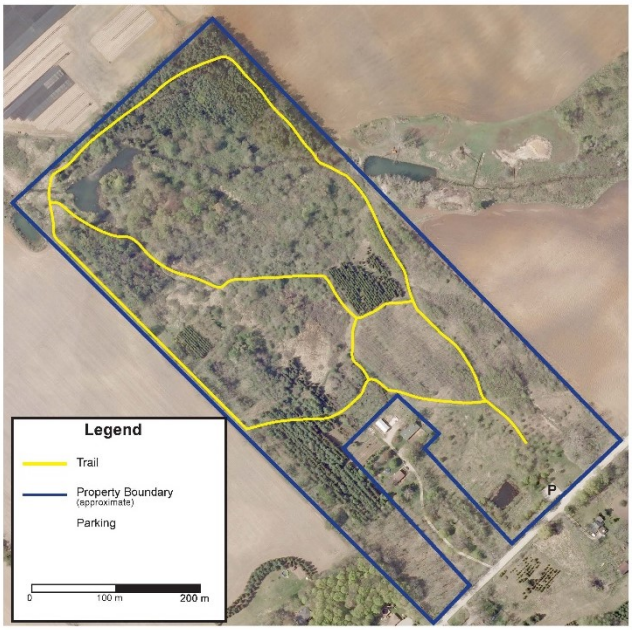


The trails provide opportunities for hiking and many also include educational features relating to First Nations communities and environmental features. Each trail is marked with wayfinding and signage and some of the trails are wheelchair accessible.

7 **Mill Stream Conservation Area**: The Mill Stream Conservation Area is under the jurisdiction of the Lower Thames Valley Conservation Authority and is located within Strathroy-Caradoc. The 10-hectare area accommodates a variety of recreational activities, including hiking trails, birdwatching, a toboggan hill, a picnic shelter, and some designated fishing areas. The Carolinian Forest and ravine also act as a natural corridor link to the Longwoods Road Conservation Area.

8 **Clark Wright Conservation Area :** The Clark Wright Conservation Area, managed by the St. Clair Conservation Authority, is a 50-acre piece of land located south of Strathroy. The Conservation Area includes 3 km of trails that travel through recently reforested lands and a retired pine plantation. The area is a popular destination for recreational hiking and bird watching.

Clark Wright Conservation Area

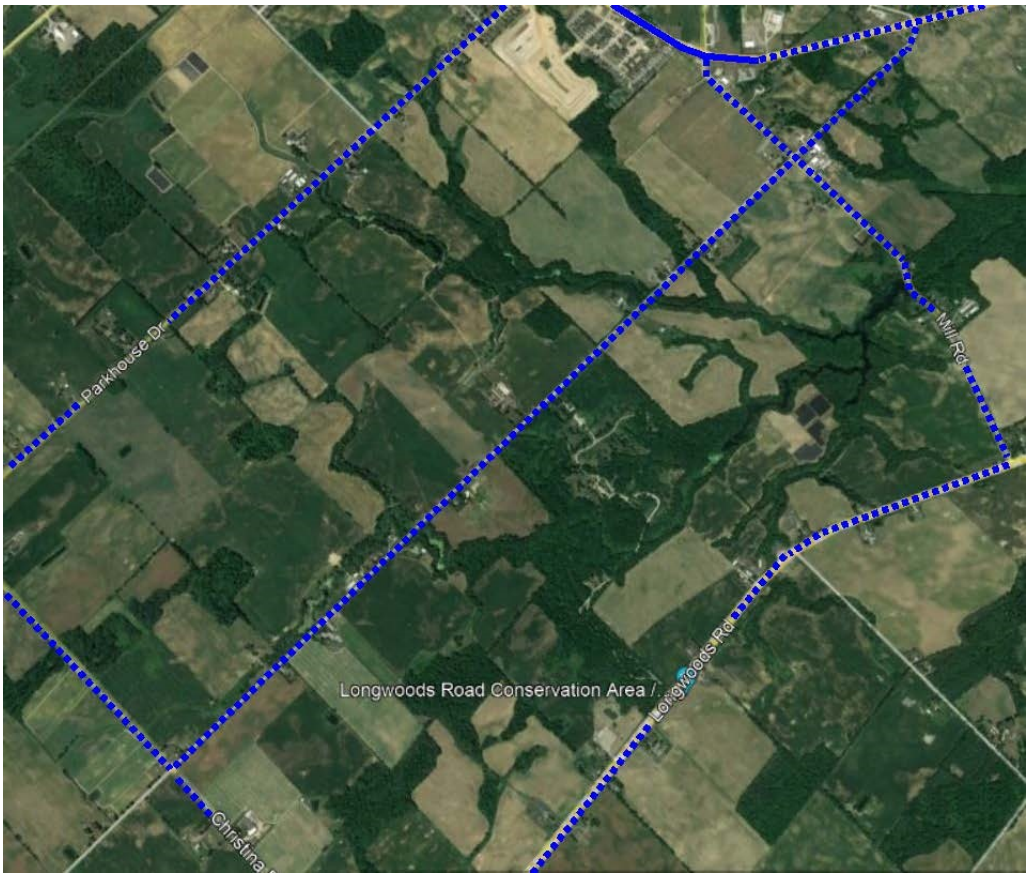


2.1.4 Existing Cycling Routes

The solid blue lines show the location of *existing* on-road cycling facilities while the dashed blue lines show the *proposed* on-road cycling facilities. The red dot indicates the location of the Mill Street Conservation Area. There may be an opportunity to create a cycling connection between Mount Brydges and the Mill Stream Conservation Area. The cycling trail would run from Mount Brydges along Adelaide Road and connect South down Gibson Road to the Conservation Area.

The solid blue lines show the location of *existing* on-road cycling facilities while the dashed blue lines show the *proposed* on-road cycling facilities. The red dot indicates the location of the Longwoods Road Conservation Area. There may be an opportunity to create a cycling connection between Mount Brydges and the Longwoods Road Conservation Area. The cycling trail would run from Mount Brydges along Adelaide Road and connect to the Conservation Area through Parkhouse Drive/Christina Road, and Mill Road.

Possible Cycling Trail Linkage Between Mt Brydges and Mill Stream Conservation Area



Possible Cycling Trail Linkage Between Mt Brydges and Longwoods Road Conservation Area

2.2 Field Investigations

To both affirm and enrich understandings of the Strathroy-Caradoc context, a series of field investigations were completed throughout the RTMP's development. Both the trails network and accompanying policies were intended to be designed around the concerns and needs of the intended trail user. This not only required examining existing conditions from higher-up but also from the ground level. Overall field investigations were completed at two points within the project process, during Phase 1 (February 2021) and Phase 2 (July 2021). Collectively, the exercise informed a more complete understanding of the municipality's existing trail facilities as well as the feasibility in implementing new ones along identified candidate routes.

2.2.1 Phase 1 Field Investigations [February 2021]

For Phase 1, field investigations were completed during the winter, largely within the settlement areas of Strathroy and Mount Brydges as well as select rural sites. While the snow cover obscured certain features, it also provided valuable insight into how the facilities operate in the winter and where targeted interventions could be made to promote all-season access. Having been completed earlier in the RTMP process, results of the following investigations remained essential in understanding where trail expansions should be made to broaden the existing network.

2.2.2 Phase 2 Field Investigations [July 2021]

During Phase 2, field investigations were completed in the summer, within the settlement areas of Strathroy and Mount Brydges. Visits were also made to existing hydro corridors and rail lines, which were identified as ideal sites for regional trail connectors. Rather than inform understandings of the current trails network, this session sought to clarify the conditions of areas where candidate facilities were considered. This included sites lacking information that could not otherwise be verified using satellite imagery or the prior knowledge of municipal staff and/or project team members.








3

Recommended Trails Network

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3 Recommended Trails Network

3.1 Network Development Approach

A cornerstone of the RTMP is a fully-fledged trails network that guarantees a safe and comfortable trails experience for interested users across the municipality. Recognizing that most trail users do not distinguish a difference between trails within the road allowance (on-road), which are typically addressed as part of transportation plans, and more recreation-based trails, it was vital that all networks being assess through the Transportation Plan and RTMP be designed as one integrated system. In practice, this involved prioritizing candidate trails routes that connect to either existing or proposed on-road facilities, such as sidewalks, bike lanes, paved shoulders and other cycling facilities. Other underlying considerations that informed the proposed trails network included constructability (i.e., cost, land ownership and geometric feasibility), proximity to natural amenities and trip generators, and alignment with scheduled capital works.

To ensure a consistent proposed network, a 5-step network development approach was identified and applied in developing the proposed trails network. These steps and their associated actioning are detailed within the table below:

1	Explore road corridors for multi-use pathways (MUPs) to create connectivity.	Begin with a core network of off-road trails within Strathroy and Mt Brydges, whose alignments prioritize using existing conservation lands, unopened road allowances and public lands which connect to existing trail facilities and key destinations. Fill in sections where land is otherwise restricted or unavailable with MUPs along nearby road corridors.
2	Identify alignments to connect communities.	Review property parcel data to identify ideal alignments to construct facilities between sparse destinations (i.e. connection between Mt. Brydges and Strathroy).
3	Identify natural corridors that could support long traversing trail networks.	Identify available corridors and land parcels where new trail facilities can be more easily constructed, either due to lower land acquisition costs or more even terrain. Key examples include active hydro corridors, drainage corridor and unopened road allowances.
4	Identify road corridors for MUPs.	Examine the current and planned road network for opportunities to build new multi-use pathways within their available road rights-of-way.
5	Identify neighbourhood greenways.	Where unfeasible to provide separated trail facilities, such as MUPs or other trail, consider low volume largely residential streets which could operate as shared “neighbourhood greenway” facilities.

3.2 Big Moves

In addition to the outlined network development framework, all proposed trail facilities were guided by a series of aspirational goals and principles, identified as “Big Moves”. These items were collaboratively developed by members of the RTMP Project Team and other municipal staff and reflect both the local context and applicable best practices concerning the design and implementation of trail facilities.

Leveraging Multi-Use Paths (MUPs) within the Active Transportation Network (trails along roadways) to create loops that feed people into the core trails within natural heritage spines formed by river/wetlands, core urban areas, and routes connecting residential areas.

Leverage opportunities with rail and hydro corridor trails to form better connections within and between communities.

Enhance the trails along the natural heritage spine to form continuous network and enhance with tertiary trails.

Policy to ensure all new residential developments include loop or spine trails which will collect and connect residents to the core natural heritage spine network of trails.

Formulate a trail hierarchy that includes frequency of amenities and maintenance expectations for each trial type. Work with Conservation Area to integrate Hierarchy for seamless trail experience.

Within Trail Classification, include parameters such as frequency of rest areas, provisions for lighting/security features, wayfinding, seasonal maintenance expectations, as well as typical cross-sectional design standards.

Develop an integrated trail facility and website platform to inform and engage users, enabling real time exchanges and wellness programming.

3.3 Recommended Hierarchy & Application

In addition to identifying ideal routes for new trail expansions, it is important to assign each an appropriate facility type through a formalized trail hierarchy.

A trail hierarchy is not only useful reference for practitioners responsible for maintaining and designing trail facilities but interested facility users. Publicly labelling trail facilities under a consistent and legible trail hierarchy informs expectations regarding the difficulty and accessibility of different trail facilities. Ultimately, this provides a more predictable and inclusive travel experience to a wider range of users across all segments of the network.

The hierarchy should be treated as a living document and updated to reflect the changing needs of the network and reflect lessons learned.

Key aspects of the Trail Hierarchy:

- Trail design requirements, surfacing, widths, etc.
- Provision and frequency of amenities
- Typical accessibility characteristics and thresholds
- User experience, target users, permitted users
- Seasonal and regular maintenance practices

In coordination with the trail hierarchy and network, Strathroy-Caradoc should develop a trail naming dedication program to honor local residents/features and/or utilizes as a donation revenue stream. This practice will contribute to placemaking, wayfinding, and community engagement.

Overall, a trail hierarchy consisting of five different facility types was developed to characterize different segments of Strathroy-Caradoc proposed trail network. This not only applied to newly proposed trails but existing ones, both formal and informal. A high-level summary of the five trail types and three trail heading types is below, followed by a more detailed table providing full descriptions of each.

Type 1: Urban Trail Multi-Use Paths

The first trail class, “Urban Trail Multi-Use Paths”, includes paved trails found within urbanized areas. These facilities are generally placed within unopened road allowances and public parkland, and as an alternative to sidewalk infrastructure.

Design Standards

- **Width:** 3.0m – 4.0m
- **Surfacing:** Asphalt or Concrete
- **Maintenance:** 4-Season Service (i.e., ploughing, sweeping, regular grass trimming and trail edge maintenance)

- **Accessibility:** Maximum of 5% Slopes or match slopes of road profile where necessary. No stairs permitted, ramps conforming to AODA standards or trial deviations to traverse slope.
- **Lighting/Security:** Fully lit via road or dedicated pedestrian lighting.
- **Amenities:** Moderate frequency of amenities. Examples: trash receptacles at trail entry points, seating at key locations, trash cans easily accessible by service vehicles. Recommended 200m spacing between seating / resting opportunities in targeted areas that would support reduced mobility users.

Precedent facility, Conestoga Blvd Trail, Cambridge, 2018

Type 2: Primary Trail

The second trail class, “Primary Trail”, includes paved facilities or well-maintained compacted stone dust facilities that offer localized connections to residential areas and key travel destinations. These trails should offer the highest level of comfort and accessibility. These trail types are therefore best suited along routes with greater usage, signature trail routes (such as the Rotary Memorial Trail) or areas with high amounts of trip activity.

Design Standards

- **Width:** 3.0m-3.5m
- **Surfacing:** Asphalt or compacted stone dust
- **Maintenance:** 4-Season service (i.e. Ploughing, sweeping, regular grass trimming and trail edge maintenance) with consideration for a partial snow removal level of service depending on location and location specific use type. Annual surfacing management to maintain a higher quality facility and increase accessibility performance- assume targeted topping up of granular surface annually, keeping trail envelope free from obstacles.
- **Accessibility:** Maximum of 5% Slopes (AODA path of travel standards), no stairs permitted, ramps conforming to AODA standards or trial deviations to traverse slope.
- **Lighting/Security:** Fully lit or lighting refuges at regular intervals (where existing utilities or solar can be leveraged). Consideration for emergency call towers as a mitigation tool as network develops and need justified.
- **Amenities:** Highest frequency of amenities (Moderate-high): Examples: waste and recycling facilities at points of entry that are accessible by maintenance vehicles, seating amenities at all trail points of entry and targeting a maximum occurrence of every 200m, considering for provisions for seating every 50m in select areas where there is a higher potential for users with reduced mobility, refuge locations which provide both seating and overhead protection from elements shall be provided every 1000m, and within 200m of the trail facility.


High Glen Park, Town of Markham


Riverside Trail, City of Guelph

Type 3: Secondary Trail

The third trail class, “Secondary Trails”, includes non-paved trails which offer more immediate access to localized natural areas. These facilities are often located along agricultural fields, along watersheds or near woodlots and represent a lower impact form of development. In addition to natural access, Secondary trails compliment “Primary Trails”, in providing additional connections to key destinations and local communities.

Design Standards

- **Width:** 2.5m - 3m width
- **Surfacing:** Compacted stone dust granular surface
- **Maintenance:** Annual/reactive service (i.e., tree hazard removal, seasonal grass trimming and trail edge maintenance). Includes topping up of stone dust surface as necessary, keeping trail envelope free from obstacles (e.g., pruning to maintain clear zone). No snow removal and consideration for snow grooming on designated special use trails.
- **Accessibility:** Maximum of 5-10% Slopes (AODA recreational trail standards) with stair facilities where ramps cannot be accommodated.
- **Lighting/Security:** No lighting on trail, select trailhead lighting.
- **Amenities:** Moderate frequency of amenities. Examples: waste and recycling facilities at points of entry that are accessible by maintenance vehicles, seating amenities at all trail points of entry and targeting a maximum occurrence of every 200m (primarily through use of informal seating stones), refuge locations which provide both seating and overhead protection from elements shall be provided every 1000m, and within 200m of the trail facility.

Etobicoke

Type 4: Woodland / Sensitive Area Trail

The fourth trail class, “Woodland / Sensitive Area Trail”, includes non-paved trails placed directly within woodlots and other naturally immersive areas. Given their immersion with sensitive natural features, these facilities are often constructed using woodchips and/or other materials with minimal development impact. Facilities are either located within dedicated conservation areas or pristine natural settings within more urbanized limits.

Design Standards

- **Width:** 1.2 - 2.0m width
- **Surfacing:** Woodchips, allows for degradation to natural surface (compacted earth) between top ups. Reinforcing geogrid and boardwalks where applicable.
- **Maintenance:** Annual/reactive service (i.e., tree hazard removal). Includes topping up of mulch surface as necessary, keeping trail envelope free from obstacles (e.g., pruning to maintain clear zone).
- **Accessibility:** Targeting of 5-10% Slopes (AODA recreational trail standards), with stair facilities where necessary.
- Lighting/Security: No lighting
- **Amenities:** Low frequency of amenities. Examples: trash receptacles at trail entry points. Seating at key locations (e.g., top of long climb, viewpoint). Natural materials used for seating opportunities.

Hancock Woodlands Park, City of Mississauga

`Type 5: Neighbourhood Greenway

The fifth trail class, “Neighbourhood Greenways”, includes trails established through the enhancement of existing roads, sidewalks and shared on-road cycling infrastructure to improve user experience and safety. This includes enhanced landscaping and the inclusion of geometric traffic calming measures, such as bump-outs, speed humps and targeted signage. These facilities improve connections through and from residential areas, with minimal cost and disruption to the existing area. Neighbourhood Greenways are typically within quiet residential areas and neighbourhoods, where a connection to trail systems are desired without the need for large infrastructure and facilities.

Design Standards

- **Width:** Varies (standard sidewalk or increased width sidewalk to 2.8m)
- **Surfacing:** Concrete sidewalk and/or asphalt
- **Maintenance:** Winter maintenance based on sidewalk and road clearing mandates. Sidewalk clearing should be prioritized in these areas.
- **Accessibility:** Meets municipal sidewalk and roadway standards
- **Amenities:** Wayfinding signage, increased shade tree planting, bench rest area where distance exceeds two average blocks.

Wortley Village Heritage District
Conservation Plan

Trail Classification Chart	Urban Multi-Use Paths (Type 1)	Primary Trail (Type 2)	Secondary Trail (Type 3)	Woodland / Sensitive Area Trail (Type 4)	Neighbourhood Greenway (Type 5)
DEFINITION / DESCRIPTION					
GENERAL FUNCTION	Enhancement of existing road network, sidewalks and road infrastructure, to improve user experience and safety. Key connector between dedicated active transportation networks.				
LOCATION	Road Corridor/Maintenance Access	Open Space/Dedicated Corridors	Open Space/ Dedicated Corridors / Naturalized Areas	Woodlot/Sensitive Naturalized Areas	Residential Neighbourhood Streets and Connecting Routes
USER / USER EXPERIENCE					
ANTICIPATED LEVEL OF USE	Moderate	Moderate-High	Moderate	Low	Moderate
USERS/USER GROUPS	Accommodates all user groups, all users and ability, families, with more appeal to commuting or destination driven function Pedestrian, mixed uses, vehicular for servicing. Suitable for users with little to no trail experience	Accommodates all user groups, all users and ability, families, with more appeal to commuting or destination driven function Pedestrian, mixed uses, vehicular for servicing. Suitable for users with little to no trail experience	Accommodates most user groups, families Pedestrian, mixed use, vehicular for servicing in some locations.	Experience/stamina required, experienced hikers Pedestrian, but may include special use trails (e.g., catering to walking, hiking, fitness etc.) Some use may be restricted / prohibited	Accommodates all user groups, may include mixed uses where the route is a connecting link to other trail network or on-road facility Pedestrian, mix uses. Note: cyclists in this condition are on the roadway and thus triggering a moderate trail rating for those users.
ACCESSIBILITY	Meets or exceeds path of travel accessibility requirements (less than 5% slope)	Meets or exceeds path of travel accessibility requirements (less than 5% slope)	Meets or exceeds minimum accessibility requirements for recreational trail facilities (can exceed 5% with amenity accommodations to a maximum of 10% slopes)	Meets accessibility requirements for recreational trail, however low in accommodating where feasible. Maintaining natural heritage values takes precedence.	Meets municipal sidewalk and roadway standards
WAYFINDING / SIGNAGE	Highest frequency, at trail entry points, trail intersections, key decision points and at regular intervals between intersections. Designed to meet or exceed AODA requirements at trailheads and entrances	High frequency, at trail entry points, trail intersections, key decision points. At regular intervals where there are long distances between intersections. Designed to meet AODA requirements at trail entrances May include supplemental destination signage to key attractions.	Moderate frequency, at all trail entry points, trail intersections and key decision points. Occasional markers where there are long distances between trail intersections. Designed to meet AODA requirements at trail and entrances	Low frequency, at trail entry points and key decision points. May include occasional markers along long stretches between trail intersections (may include simple trail blazes). Designed to meet AODA requirements at trail and entrances	Low frequency, at entry points and connection point to Type 1, 2, 3 and 4 trails. Designed to meet AODA requirements at trail and entrances

Trail Classification Chart	Urban Multi-Use Paths (Type 1)	Primary Trail (Type 2)	Secondary Trail (Type 3)	Woodland / Sensitive Area Trail (Type 4)	Neighbourhood Greenway (Type 5)
LIGHTING	Fully lit by either roadway or dedicated pedestrian lighting	Lighting pedestrian lighting or lighting refuges at key locations where existing utilities or solar can be used	Lighting not provided, with the exception of select trailhead lighting	Lighting not provided	Lighting provided by existing street lighting
AMENITIES	**Benches:** Transit stops, formal seating every 500m **Refuge (Shelter locations):** Shelter or public facility, identified on digital mapping, and/or key locations not exceeding every 1000m, and major trail heads and destinations **Washrooms:** Location of public washrooms identified on digital mapping, portable outhouse units at key locations **Charging stations (mobility aid devices, electric assist bicycles, handheld devices):** Major furnishing nodes, major bike parking locations	**Benches:** Every 200m (80% formal 20% informal), all points of entry, Every 50m in park settings. Any additional lookout/feature nodes. **Refuge (Shelter locations):** At transit hubs **Washrooms:** Locations of public washrooms identified on digital mapping **Charging stations (mobility aid devices, electric assist bicycles, handheld devices):** None	**Benches:** Every 200m (20% formal, 80% informal), all points of entry. Any additional lookout/feature nodes, top and bottom of slopes exceeding 8% **Refuge (Shelter locations):** Shelter or public facility, identified on digital mapping, and/or key locations not exceeding every 1000m **Washrooms:** Locations of public washrooms identified on digital mapping **Charging stations (mobility aid devices, electric assist bicycles, handheld devices):** Key locations	**Benches:** Every 200m (100% informal), all points of entry, any additional lookout/feature nodes, top and bottom of slopes exceeding 8% **Refuge (Shelter locations):** Large trail heads **Washrooms:** Locations of public washrooms identified on digital mapping **Charging stations (mobility aid devices, electric assist bicycles, handheld devices):** None	**Benches:** Little to no frequency **Refuge (Shelter locations):** None **Washrooms:** None **Charging stations (mobility aid devices, electric assist bicycles, handheld devices):** None

TECHNICAL					
PROFILE/LONGITUDINAL SLOPE	5% maximum or match existing road profile.	5% maximum	5% maximum where feasible Maximum slope 10% over short distances Provide rest area (e.g., level area) every 30m where running slope exceeds 5%	Exceeds 5% depending on location/context. Maximum slope 10% over short distances Note: over 12% may be subject to ongoing erosion if runoff is not diverted off trail at regular intervals	Match existing road profile
SURFACE	Hard surface: 90mm asphalt (typical) May include concrete, coloured and patterned concrete to suit urban design	Typically, hard surface (i.e., 90mm asphalt) or compacted stone dust May include granular surface in context specific locations	Compacted stone dust surface (i.e., limestone screenings, granite screenings) Granular A, clear stone, wood boardwalk in context specific locations Limestone screenings should not be used in floodplain areas or where drainage flows directly to watercourses. In these locations trail hardening with asphalt or geogrid reinforcement over short distances where erosion is an ongoing issue and cannot be mitigated by re-routing, and for trails within floodplain areas	Natural surface (earthen, grass), woodchips May include granular (stone dust screenings, clear stone), or wood boardwalk in context specific locations	Existing or widened concrete sidewalks. Existing road surfacing. Additional paint markings and signage.
BASE DEPTH	300mm Increase to 350mm for trails intended to include vehicular service / full-service access May include Recycled Concrete Material (RCM) to OPSS 1010 Specification	300mm Increase to 350mm for trails intended to include vehicular service access May include Recycled Concrete Material (RCM) to OPSS 1010 Specification	0-150mm	None- existing compacted soil. Vegetation clearing may be required to establish base	Existing sidewalk or road base
VERTICAL CLEAR ZONE	3.5m minimum	3.0m minimum	2.4m minimum	2.4m minimum	2.4m – 3.5m depending on context
HORIZONTAL CLEAR ZONE	1.2m Standard, 0.6m Minimum	1.2m Standard, 0.6m Minimum	0.8m Standard, 0.6m Minimum	0.8m Standard, 0.6m Minimum	1.2m Standard, 0.6m Minimum
SETBACKS FOR LANDSCAPING	1.5m	1.5m	1.5m	0.6m	0.6

MAINTENANCE	4-seasons maintenance with moderate frequency (e.g.bi-weekly to weekly) Ploughing in winter, sweeping as required in other seasons, regular grass mowing and trimming along trail edges, regular trimming, weeding of plant beds	4-Season service (i.e. Ploughing, sweeping, regular grass trimming and trail edge maintenance) with consideration for a partial snow removal level of service depending on location and location specific use type. Annual surfacing management to maintain a higher quality facility and increase accessibility performance-assume targeted topping up of granular surface annually, keeping trail envelope free from obstacles.	Annual/reactive service (i.e., tree hazard removal). Includes topping up of stone dust surface as necessary, keeping trail envelope free from obstacles (e.g., pruning to maintain clear zone).	Lowest level of service (e.g. to remediate significant erosion, remove obstacles on trail bed) Lowest frequency of maintenance (e.g. annually or as required for emergencies) No winter maintenance	Winter maintenance based on sidewalk and road clearing mandates. Sidewalk clearing should be prioritized in these areas.

ACTION ITEM

Strathroy-Caradoc is recommended to implement a Trail Classification Table, such as the one above, into the Official Plan to guide future trail development projects and recommended routes in the RTMP.

3.4 Trailheads and Highlighting Points of Entry

Trailheads are an important component of placemaking and wayfinding. Whether minor in nature, or featuring more complex amenities, all points of entry from a roadway or parking area should feature trailhead amenities.

Three types of trailhead facilities are recommended to accommodate different types of trail connections and to provide flexibility to accommodate budget availability.

The table below outlines the trailhead types, typical application and amenities that each should include. Note, at a minimum, Trailhead Type C standards should be applied to all points of entry if there is deviation from the recommended application parameters. Approximate trailhead locations can be referenced in Proposed Trails Maps in Appendix A.

Table: Trailhead Type & Application

Trailhead Type	Application	Amenities
Trailhead Type A	Feature entrances such as those in prominent locations, where parking facilities can be accommodated, and at destination trails that do not have reasonable active transportation connectivity to collect users.	• Large trail branding signage with map feature of immediate and community routes, accessibility information, regulatory signage • Parking for 3 – 5 cars • Formal Seating/Rest Refuge • Control barrier • Bicycle parking
Trailhead Type B	Where the point of entry will benefit from detailed user experience and wayfinding information such as more complex trail sections or where the provision of amenities is inline with user demand.	• Trail branding signage, map of immediate route, accessibility information, regulatory signage • Parking for 1-3 cars, which may include on street parking or independent trail parking • Formal or Informal Seating/Rest Refuge • Control barrier • Bicycle parking
Trailhead Type C	Any trail entry point that does not warrant a Type A or B.	• Trail branding signage accessibility information, regulatory signage • Informal Seating/Rest Refuge • Control barrier

Trailheads can be an opportunity for revenue generation and should not be overlooked as part of an ongoing funding resource. Similar to potential trail naming programs, a clear policy and procedure should be developed to govern the format and content parameters that the municipality determines appropriate for Strathroy-Caradoc.

3.5 Future Trail Linkages

To fulfill the Recreational Trails Master Plan's goal of providing all residents with close access to trail facilities and amenities, a series of future trail linkages have been identified. It will be important early on to consult with impacted land owners, taking into account any concerns that affected parties may have. Consulting early on in the development of these trail linkages will allow for future opportunities to grow the trail network and provide relationships for possible land acquisitions or funding opportunities. All linkages were identified through a robust planning process, which include a wide range of considerations that reflect local concerns and aspirations related to current and future trails use. These facilities can be broadly categorized between aspirational projects that traverse much of the municipal area and more immediate, local linkages and circulators. To promote broader connectivity all trail facilities were aligned with existing on-road and off-road facilities and routes, as well as those proposed as part of Middlesex County Cycling Strategy and newly updated Strathroy-Caradoc Transportation Master Plan.

3.5.1 Strathroy

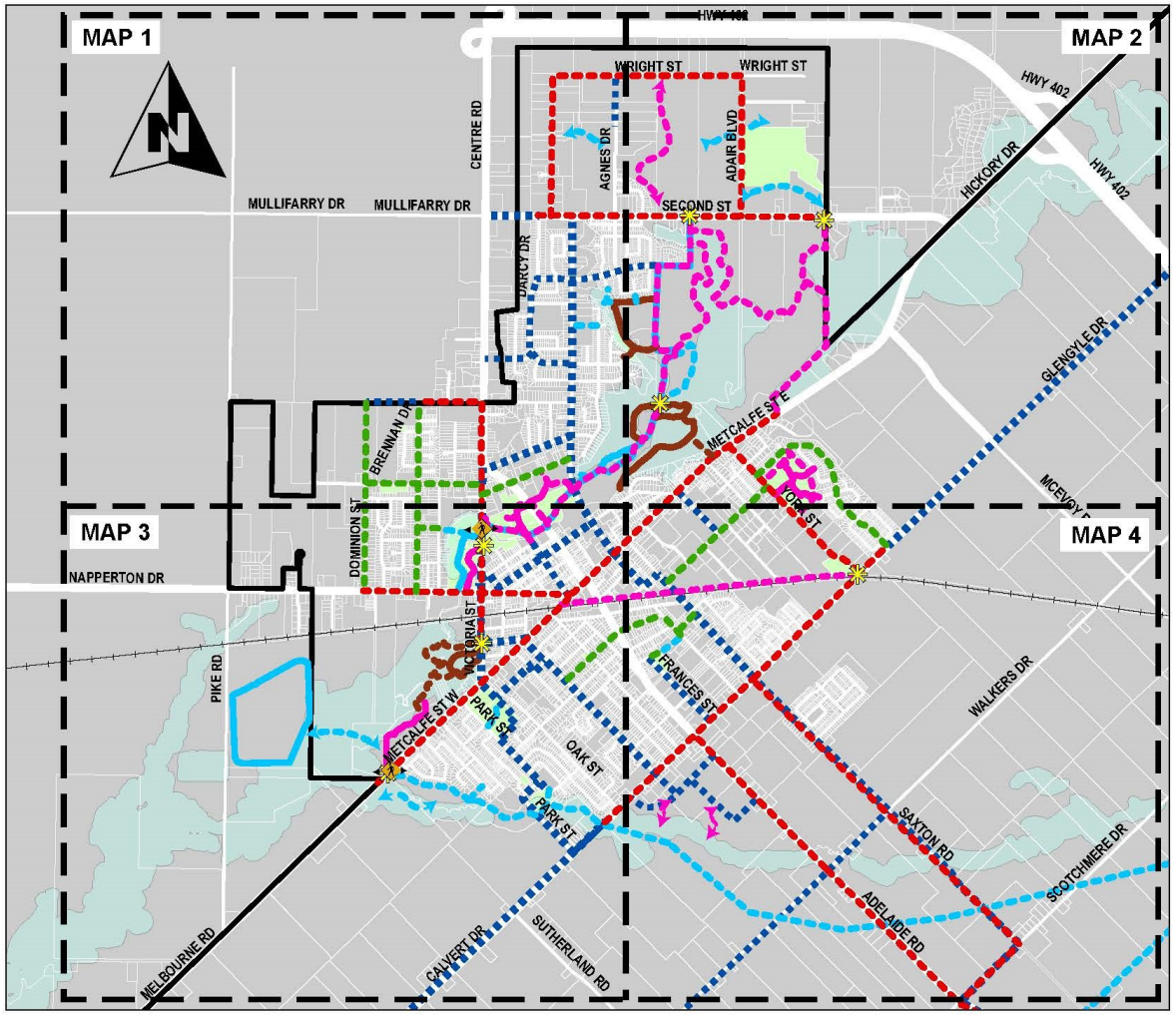
Representing Strathroy-Caradoc's most populated centre, the proposed trail network was designed to maximize access to the town's various travel destinations and promote connectivity between its various neighbourhoods. As the backbone of the Town's current trails network, many facilities expand the Rotary Trail and Strathroy Conservation through the current Sydenham watershed to reach more communities. Additional, facilities were also proposed to improve active transportation permeability among the town's various residential areas and service an eventual trail connection between Strathroy and Mt Brydges. Other defining priorities and considerations include the following:

- Establish a key grid and perimeter of trail facilities across the entire Strathroy area;
- Plan network to service current major travel destinations and travel corridors as well as areas slated for new development;
- Weave together different residential neighbourhoods using cost-effective neighbourhood greenways; and
- Provide high-quality, separated trail facilities along major travel corridors, including Victoria Street, Carrol Street, Second Street and Metcalfe Street.

A complete breakdown of proposed trails within Strathroy has been broken down by trail type and length is provided in the following table. Appendix B includes a detailed overview of each proposed trail.

Trail Type		Proposed Length (KM)
	URBAN TRAIL (TYPE 1)	12.42
	PRIMARY TRAIL (TYPE 2)	7.15
	SECONDARY TRAIL (TYPE 3)	11.58
	WOODLAND TRAIL (TYPE 4)	2.06
	NEIGHBOURHOOD GREENWAY (TYPE 5)	8.45

PROPOSED TRAIL NETWORK IN STRATHROY



0 1.75 3.5 7 Kilometers

STRATHROY
PROPOSED TRAIL FACILITIES

Legend

Trail Facilities

Existing	Proposed	
		In-Boulevard Multi-Use Path
		Primary Trail (Trail Type 2)
		Secondary Trail (Trail Type 3)
		Woodland Trail (Trail Type 4)
		Neighbourhood Greenway (Trail Type 5)

Enhanced Pedestrian Crossing (Location and Type to be Determined)

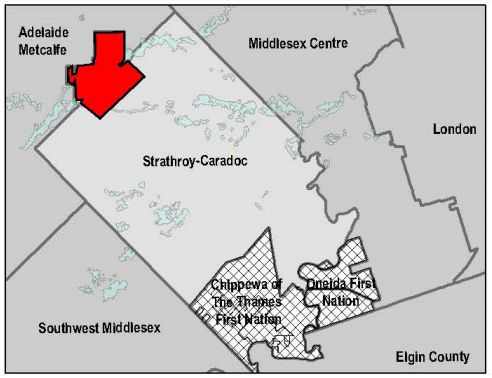
Trailhead Type A/B
*Trailhead Type C at all roadway crossings

On-Road Active Transportation Route

Existing	Proposed	
		On-Road Route

Other Elements

Railway
Wetland Areas
Property Boundaries
First Nations Territory
Strathroy-Caradoc Municipal Boundary



Source: Data provided by the Municpality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2022
Project: NAD 1983 UTM Zone 17

3.5.2 Mount Brydges

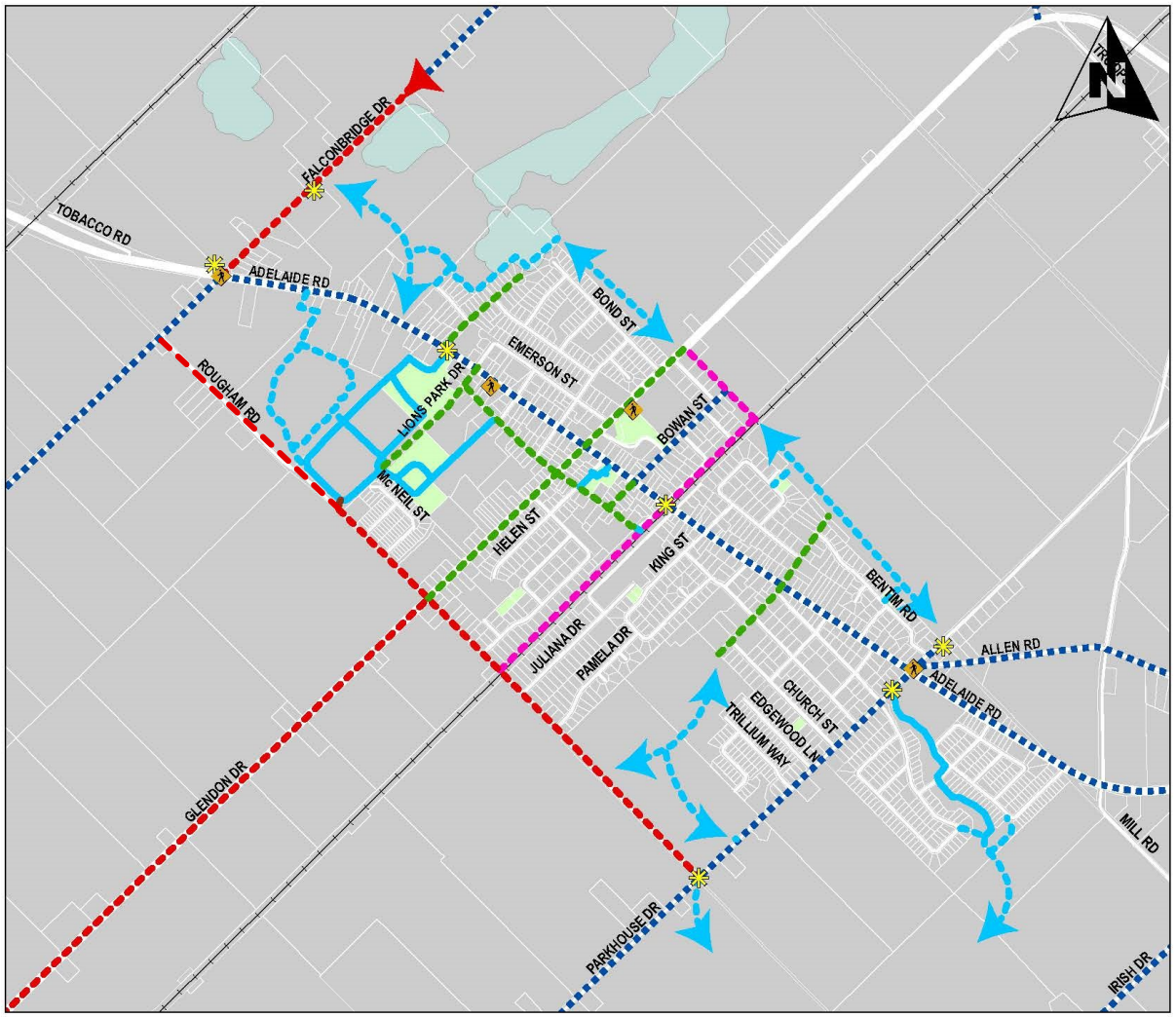
As the Municipality's second most populated centre, Mt Brydges proposed trail network was designed to promote active transportation connectivity between the town's various new and existing residential neighbourhoods. Many of the proposed facilities are either provisioned within newly planned subdivisons or rely on the corridor of current rail lines or watershed areas. A key focal point in designing this section of the network was the Cardoc-Community Centre (Lions Park), which remains a key recreational hub and features the town's only existing trail facilities. Other defining priorities and considerations include the following:

- Forming a rough perimeter around the community and facilitate an eventual trail connection between Strathroy and Mt. Brydges;
- Expand the existing trails system surrounding the Caradoc-Community Centre with new woodland trail facilities;
- Plan network to service current major travel destinations and travel corridors as well as areas slated for new development;
- Weave together different residential neighbourhoods using cost-effective neighbourhood greenways; and
- Provide high-quality, separated trail facilities along corridors with heavy vehicular traffic, including Parkhouse Drive, Glendon Drive, Cristina Road and Falconbridge Road.

A complete breakdown of proposed trails within Mt. Brydges has been broken down by trail type and length is provided in the following table. Appendix B includes a detailed overview of each proposed trail.

Trail Type		Proposed Length (KM)
	URBAN TRAIL (TYPE 1)	5.88
	PRIMARY TRAIL (TYPE 2)	1.67
	SECONDARY TRAIL (TYPE 3)	4.44
	WOODLAND TRAIL (TYPE 4)	1.49
	NEIGHBOURHOOD GREENWAY (TYPE 5)	2.67

PROPOSED TRAIL NETWORK IN MOUNT BRYDGES



MT BRYDGES
PROPOSED TRAIL FACILITIES

Legend

Trail Facilities

Existing / Proposed

- In-Boulevard Multi-Use Path
- Primary Trail (Trail Type 2)
- Secondary Trail (Trail Type 3)
- Woodland Trail (Trail Type 4)
- Neighbourhood Greenway (Trail Type 5)
- Recommended Enhanced Pedestrian Crossing (Location and Type to be Determined)
- Trailhead Type A/B
  *Trailhead Type C at all roadway crossings

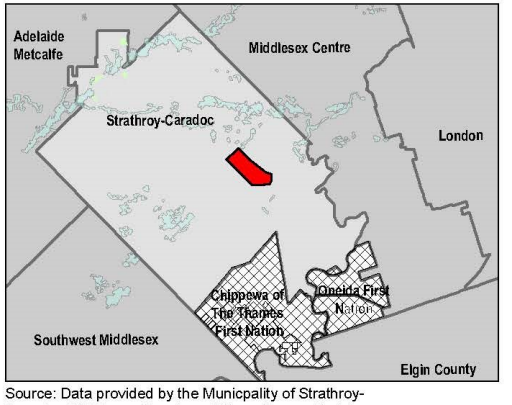
On-Road Active Transportation Routes

Existing / Proposed

- On-Road Routes

Other Elements

- Railway
- Wetland Areas
- Property Boundaries
- First Nations Territory
- Strathroy-Caradoc Municipal Boundary



Source: Data provided by the Municpality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2022
Project: NAD 1983 UTM Zone 17

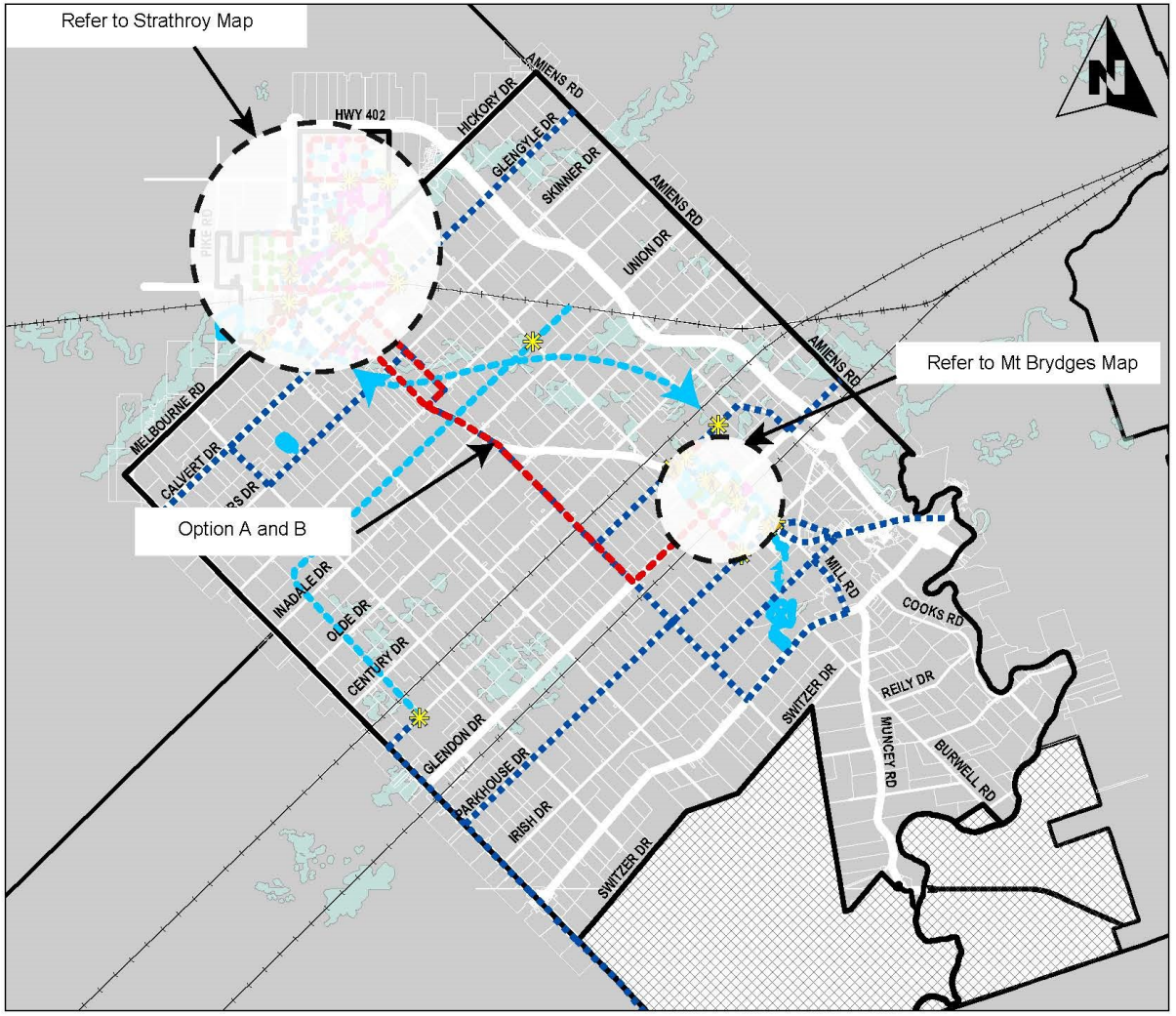
3.5.3 Municipal Wide Connectors

Complementary of the facilities proposed within both Strathroy and Mt. Brydges, a select number of trail facilities were also proposed within the rural lands that surround them. This included a proposed trail connection between the communities of Strathroy and Mt. Brydges, which was frequently identified as a major priority throughout the RTMP's consultation. Completing this connection with a trail facility represents a signature trail expansion to the Strathroy-Caradoc network, creating a comfortable and scenic trail experience accessible to users of all ages and abilities. Other proposed facilities would offer active transportation connections to key rural destinations, including local Conservation Areas and small Hamlets. Given their substantial implementation costs (due to length and property acquisition requirements), these facilities were largely aligned within existing hydro corridors, drainage corridors and unopened road allowances with less feasibility constraints.

A complete breakdown of proposed trails within Rural Areas has been broken down by trail type and length is provided in the following table. Appendix B includes a detailed overview of each proposed trail.

Trail Type		Proposed Length (KM)
	URBAN TRAIL (TYPE 1)	1.24
	PRIMARY TRAIL (TYPE 2)	0.00
	SECONDARY TRAIL (TYPE 3)	24.66
	WOODLAND TRAIL (TYPE 4)	0.00
	NEIGHBOURHOOD GREENWAY (TYPE 5)	0.00

PROPOSED MUNICIPAL-WIDE TRAIL NETWORK



STRATHROY-CARADOC
PROPOSED TRAIL FACILITIES

Legend

Trail Facilities

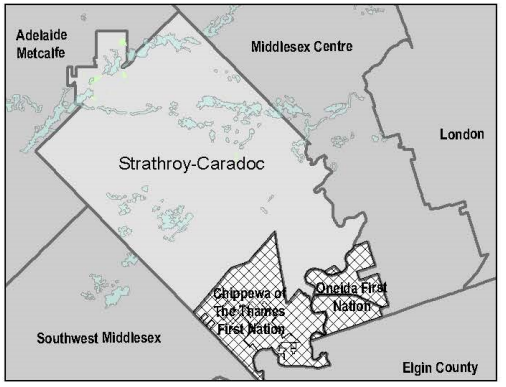
Existing	Proposed	
		In-Boulevard Multi-Use Path
		Primary Trail (Trail Type 2)
		Secondary Trail (Trail Type 3)
		Woodland Trail (Trail Type 4)
		Neighbourhood Greenway (Trail Type 5)
		Trailhead Type A/B

On-Road Active Transportation Routes

Existing	Proposed	
		On-Road Routes

Other Elements

- Railway
- Wetland Areas
- Property Boundaries
- First Nations Territory
- Strathroy-Caradoc Municipal Boundary



Source: Data provided by the Municpality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2022
Project: NAD 1983 UTM Zone 17

3.6 Special Project Considerations

RAIL WITH TRAIL

Two rail with trail projects have been recommended for the railway corridor extending from Metcalfe Street East to Carroll Street in Strathroy, and from Roughham Road to Chestnut Street (extending to future community perimeter trails) in Mount Brydges. These projects are important because they would provide excellent connectivity within the centre of each community. The Mount Brydges corridor appears to have adequate space on the Southwest side of the rail line, with the possibility of utilizing Railroad Street right-of-way to avoid conflicts with the parallel ditches and to provide an increased buffer for the trail. The Strathroy corridor offers a unique opportunity with a parallel property allowance along the rail line that would reduce the design and approval measures associated with the rail property.

Strathroy-Caradoc will need to complete a feasibility assessment as part of the development of this trail section with a focus on determining key safety design parameters related to the speed and frequency of rail use.

The following are typical requirements for trail projects within active rail corridors:

- Offset distance from the centreline of track to the edge of trail (typically 3m for low speed/frequency lines)
- Barrier between trail and rail. This can be achieved by grade separation; however, a barrier railing is often required. The design of the rail needs to facilitate access to avoid a person becoming 'trapped' near the rail, such as a tube rail fence over a chain link fence. The type of barrier may need to be more secure in areas where rail speed is higher.
- Crossings of the rail line that meet the rail at 90 degrees with clear sightlines and which forces users to stop (single p-gate, double p-gate, signage, possible light/arm electrification).
- Active transportation appropriate surfacing at crossings.

Example: Guelph Trans Canada Rail with Trail

HYDRO CORRIDOR TRAIL & AGRICULTURAL LANDS

A potential trail route has been proposed within the hydro corridor, running between Pike Road and McEvoy Road. The proposed trail will traverse agricultural fields and may impact landowners/farmers and snowmobile clubs; thus, this alignment should be viewed as aspirational rather than a certainty, with consideration for targeting acquisition of sections over the long term. The current use for agriculture increases the complexity, both from community optics and directly with the farmer/farming corporation. Rigorous consultation must be completed early in the process to foster support and confirm viability. Key to the successful implementation of a trail through or adjacent to agricultural lands is to understand the needs and concerns of each property and collaborate with landowners/farmers to develop possible solutions.

When developing trails through or adjacent to agricultural activities, it is best practice to install barriers on both sides of the trail to restrict trail users from accessing fields, typically with cedar post and page wire fencing. Access gates to facilitate the crossing of agricultural vehicles are required, and consultation with farmers is needed to determine location and size of these gates. The trail at these locations should be constructed with a more substantial base or reinforced (asphalt or geogrid). The total width of the corridor needed is approximately 6m to accommodate a 3m wide trail.

Hydro corridors are popular locations to implement trails as there is only one landowner to address for approvals and land use agreements. For this corridor, the land is currently being utilized for agricultural production under land use agreements between the hydro authority and adjacent landowners. In order to address approvals with the hydro authority, designs and studies will need to be submitted and a land use agreement established. The requirements and process are standardized, however retaining a design consultant that has familiarity with the process would be beneficial to help Strathroy-Caradoc navigate the complexity of the requirements. A high-level feasibility study is often recommended as a first step. Studies that will be required includes; Stage 1 archaeology and First Nations outreach, ecological screening, geotechnical study, and design submissions. Studies that may be required include Electromagnetic Field (EMF) study, stage 2 archaeological assessment, Screening Activity Report (SAR), arboricultural report, and local health agency approvals. It is important to discuss current land use agreements to establish timeline parameters and contractual requirements that may impact the proposed trail project. Typically, there is a timeframe required to provide notice of a termination of the current agreement and there may be long term requirements, such as crossing access, that need to be maintained. In terms of design, the trail will need to allow for an offset buffer from the towers (typically 15m, however exceptions are often made) and there are limitations regarding tree planting and other

structures. Hydro corridors are commonly utilized for other utilities such as natural gas and those agencies will require consultation as well. Typically, gas lines will have an easement and clear parameters as to what can be built on them. Ideally, the trail should remain outside the easement and each crossing of the easement will require approval. Daylighting of the gas line may be required to confirm depth of infrastructure and the natural gas authority may require the municipality to enter into a legal agreement that clearly outlines the rights and responsibilities of both parties (including the right to remove the trail for maintenance).

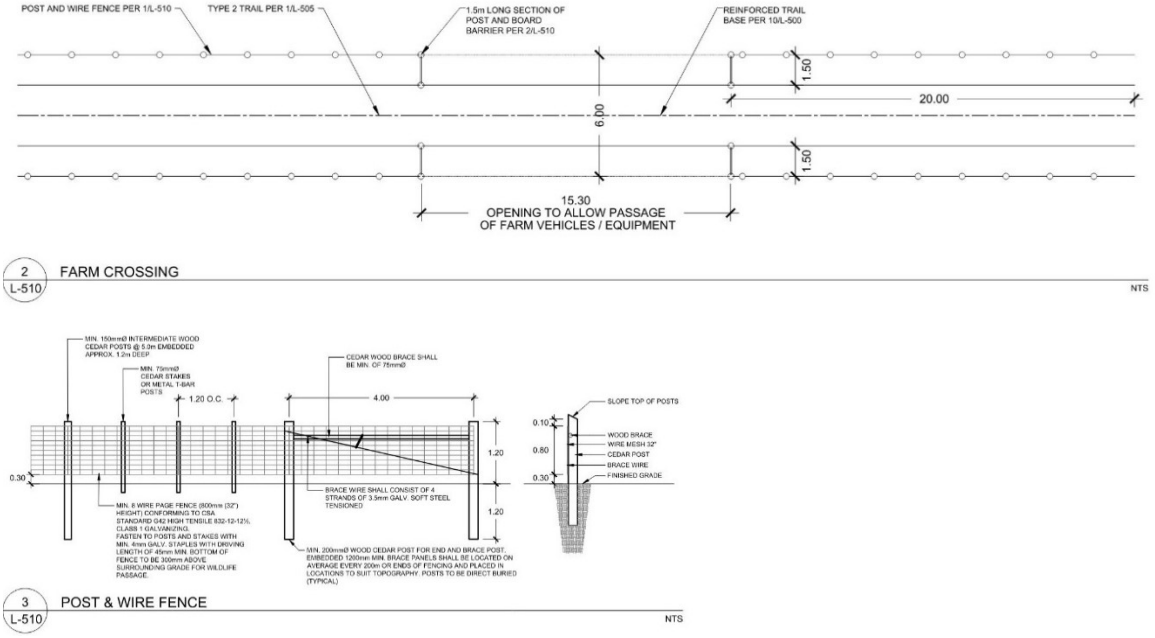
Finch Hydro Corridor – future Toronto expanded network

Consider identifying special uses for this destination trail such as off-leash dog use and ATV use. If ATV use is identified, consider two alignments to separate users and mitigate maintenance/safety issues for pedestrians.

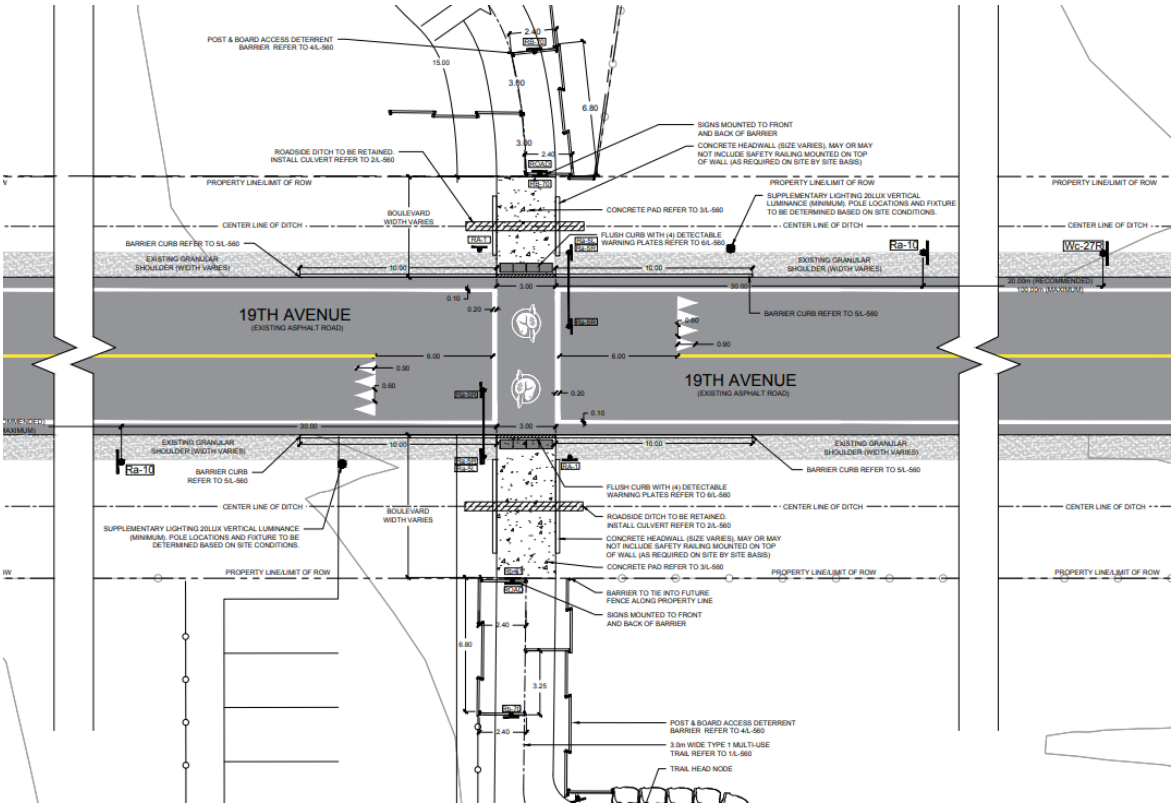
Typical requirements and actions include:

- Complete a preliminary design to inform discussions
- Pre-consultation with hydro authority to identify process, required studies, and details of current/future land use agreements.
- Consult with impacted landowners, all applicable agencies, and staff to complete a constraints/needs assessment.
- Identify if special uses will be permitted (off-leash, ATVs, etc)
- Inform land users of timeline for agricultural use change.
- Obtain approvals and permits for studies, design, and construction.
- Finalize land use agreements
- Allow for 3-4 months of construction.

The following images are example design approaches to barrier fencing and rural road crossings.



EXAMPLE OF DETAIL TRAIL WITH FENCING (UNGATED PASSAGE) THROUGH AGRICULTURE FIELDS



EXAMPLE OF DETAIL TRAIL CROSSING OF RURAL ROAD THROUGH AGRICULTURE FIELDS

TRAVERSING LANDS BETWEEN STRATHROY AND MOUNT BRYDGES

Developing a quality off road trail experience between Strathroy and Mount Brydges is a way to provide a destination for rural community members and redirect users away from road shoulders. This can be achieved in two ways, by an off-road facility or a separated facility that utilizes the road right of way (refer to Options A and B labeled in the Municipal Wide trail maps in sections 3.5.2 and 3.7.1.

The proposed off-road trail alignment is demonstrated as a conceptual route, however is intended to utilize natural drainage corridors, watersheds, woodlots and hedgerows. These features often limit agricultural and land development uses through regulated buffers or incompatible conditions, providing opportunities for trail alignments. Where necessary, this trail would utilize low volume roadways as shared use or with a parallel facility. The ability to obtain land use agreements or procurement will be the leading factor in determining the exact trail route. Similar to the proposed hydro trail, the need for assess and level of separation between the trail and agricultural land uses will need to be assessed, including provisions for access. This extends to access for activities such as drainage maintenance and woodlot management.

The option which utilizes the road corridor would require a separated trail facility and in most cases the right-of-way would allow for a trail separated by the road drainage ditch. In situations where space is restricted, a paved shoulder could be utilized with barriers type separation in accordance with Ontario Traffic Manual Book 18. This trail may be less appealing to pedestrian users, however, would be welcomed by cycling enthusiasts. The greatest benefit to this alignment is that it eliminates the risks and expenditures related to dealing with multiple landowners. Design and construction of this type of trail is likely to require utility relations, drainage modifications, and retaining walls which are related to the roadway design cross section and utility corridor function.

> *ACTION ITEM*
>
> *It is recommended that Strathroy-Caradoc complete a feasibility study of both options and engage the public in a consultation process in order to identify a preferred approach. A hybrid option may be identified as an option to mitigation compounded problem areas.*

RAIL CROSSINGS

Where the trail network crosses active railway line crossing designs / design upgrades must follow Transport Canada Grade Crossing Standards (2019) as amended.

The requirements for trail crossings at railway lines will vary depending on the speed and frequency of rail service on the line in question. Crossings can range from simple signage to signalized lights to barrier arms. Depending on how the trail interfaces with the

crossing, users may need to be controlled with forced mechanisms to slow speed and create awareness such as single and double barrier gates, signage, line paint, etc. beyond the standard rail crossing infrastructure.

Surfacing controls are important to improve accessibility and overall user experience. Surface treatment between/abutting a track is highly regulated, however there are several options to choose from that vary in cost and performance, including concrete, rubberized matting, metal grading, etc.

Rail crossings and proposed rail crossing locations can be referenced in Appendix A Maps. Rail type and approximate cost, along with detailed trail overviews are located in Appendix B.

Unsignalized Pedestrian Rail Crossing (Left: fenced corral, Rohnert Park – photo: Press Democrat) + (Middle: use of bollards and line paint, Bike WalkKC) + (Right: Double 'P' Gate, Guelph Trans Canada Rail with Trail)

Track Crossing Material Alternatives to Asphalt (Left: Concrete) (Right: Rubberized Matting)

3.7 Implementing the Network – Phasing and Costing

3.7.1 Network Phasing

Recognizing that all RTMP network recommendations cannot be built at once, individual facilities were assigned among the three implementation horizons of: short-term, medium-term and long-term. This phasing process relied on the same considerations and principles which informed how the RTMP network was developed and was closely coordinated with the phasing of the TMP and the two plans will need to be supported by each other through their implementation.

Provided below is a summary of the criteria generally used to inform how different segments of the Recreational Trail Network were phased:

Short-Term Horizon (0-5 Years)

- Facilities that represent "quick-wins" given their low cost and high feasibility relative to their benefit to overall network connectivity and user comfort (i.e., Neighbourhood Greenways);
- Facilities likely to service a high degree of demand, based on their proximity to key travel destinations and travel corridors (i.e., Second Street Urban Trail); and
- Facilities flagged by municipal staff or members of the public as key priorities (i.e., upgrades to Rotary Trail System).

Medium-Term Horizon (6-10 Years)

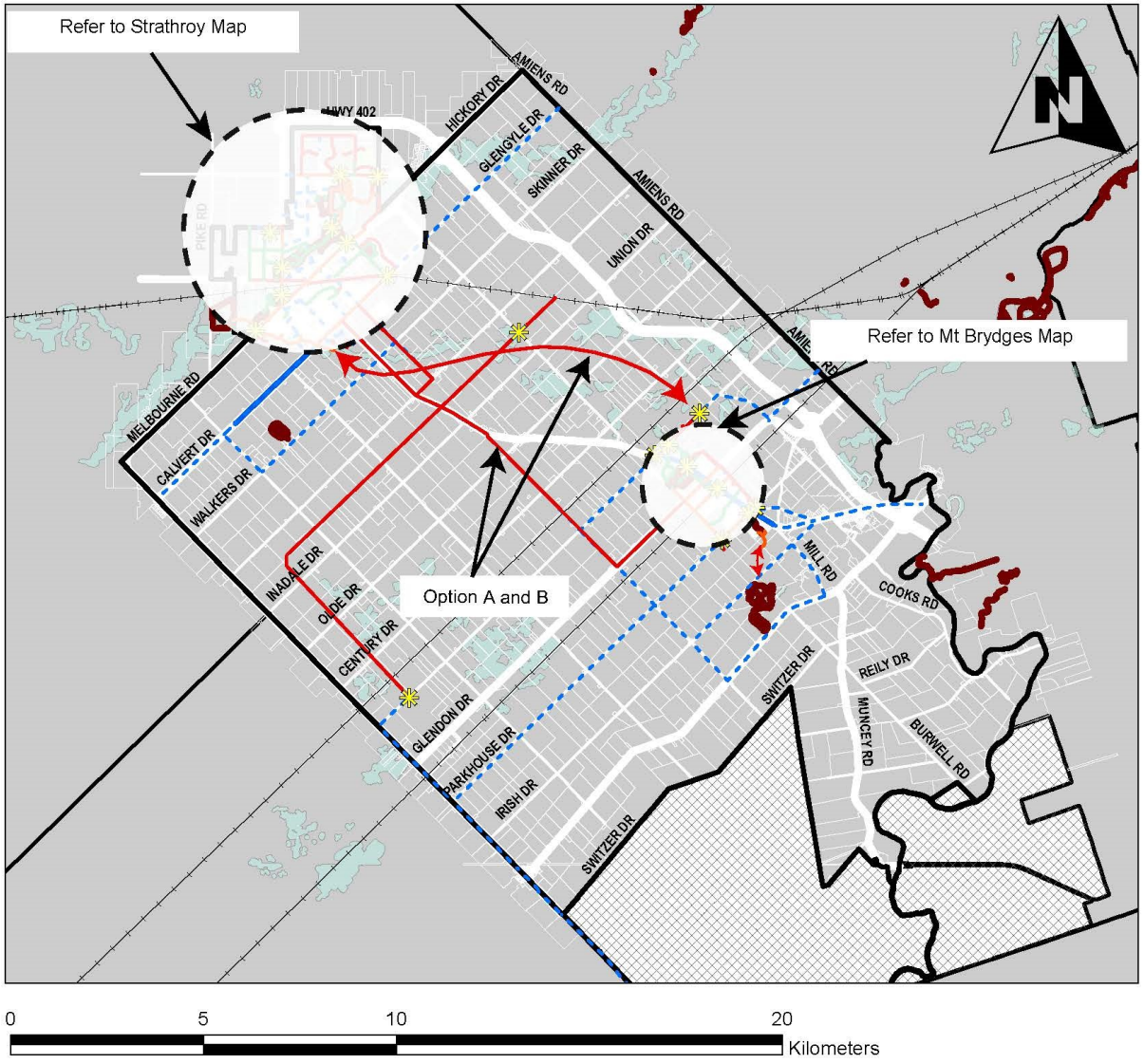
- Facilities that provide a substantive network improvement yet are forestalled due to cost and construction challenges.
- Facilities whose cost and usage is contingent on the completion of newly planned subdivisions and redevelopment areas.

Long-Term Horizon (11+ Years)

- Facilities with substantive cost and construction challenges (i.e., trail link between Strathroy and Mount Brydges);
- Facilities that serve as a secondary route within the overall network; and
- Facilities which require the buy-in and coordination of additional stakeholders (i.e., primary trails along rail corridors).

Supplementary to the following criteria, projects that directly connect to each other were often phased together to encourage construction streamlining and to avoid creating network dead heads. Maps depicting RTMP segments by their respective phasing, is provided below, with a complete breakdown by each section of the municipality (Strathroy, Mount Brydges, and Rural Areas). A cost estimate has also been included in this section along with external funding resources. In addition, a detailed breakdown of estimated costs by trail can be referenced in Appendix B.

PROPOSED MUNICIPAL-WIDE PHASING PLAN



STRATHROY-CARADOC
PROPOSED TRAIL ROUTES PHASING

Legend

Existing AT Facilities

- Existing Trail Facilities
- Existing On-Road Routes

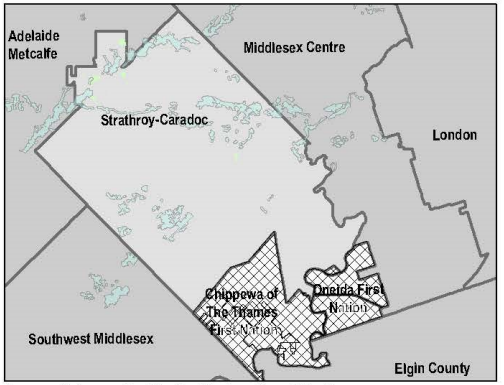
Proposed AT Facility Phasing

- Short Term Projects (0-5 Years)
- Medium Term Projects (6-11 Years)
- Long Term Projects (11+ Years)
- Proposed On-Rod Routes

Other Elements

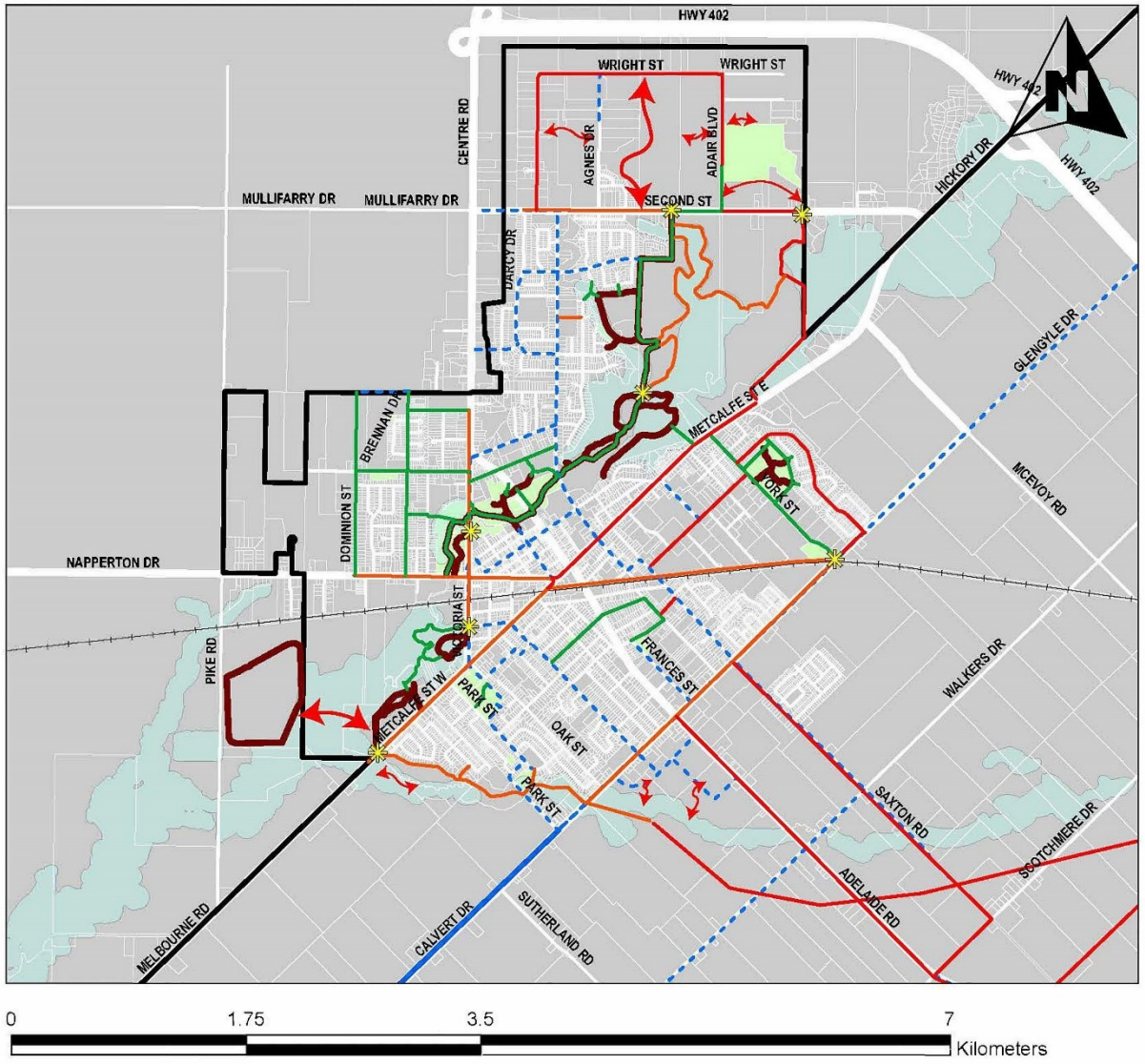
- Railway
- Wetland Areas
- Strathroy-Caradoc Municipal Boundary
- First Nations Territory

Note: Green streets may be implemented in phases with signage, minor improvements in the short term and more substantial upgrades through road reconstruction. Phasing timeline reflects minor improvements such as signage, tree planting and speed changes.



Source: Data provided by the Municpality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2022
Project: NAD 1983 UTM Zone 17

PROPOSED STRATHROY PHASING PLAN



STRATHROY
PROPOSED TRAIL ROUTES PHASING

Legend

Existing AT Facilities

- Existing Trail Facilities
- Existing On-Road Routes

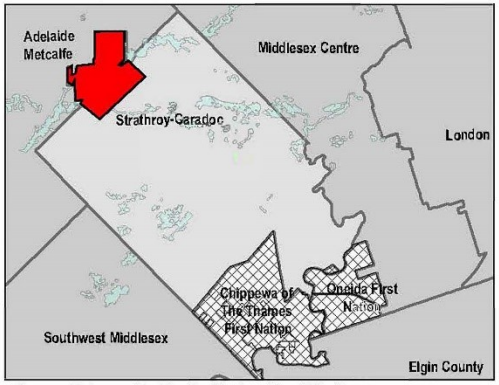
Proposed AT Facility Phasing

- Short Term Projects (0-5 Years)
- Medium Term Projects (6-11 Years)
- Long Term Projects (11+ Years)
- Proposed On-Road Routes

Other Elements

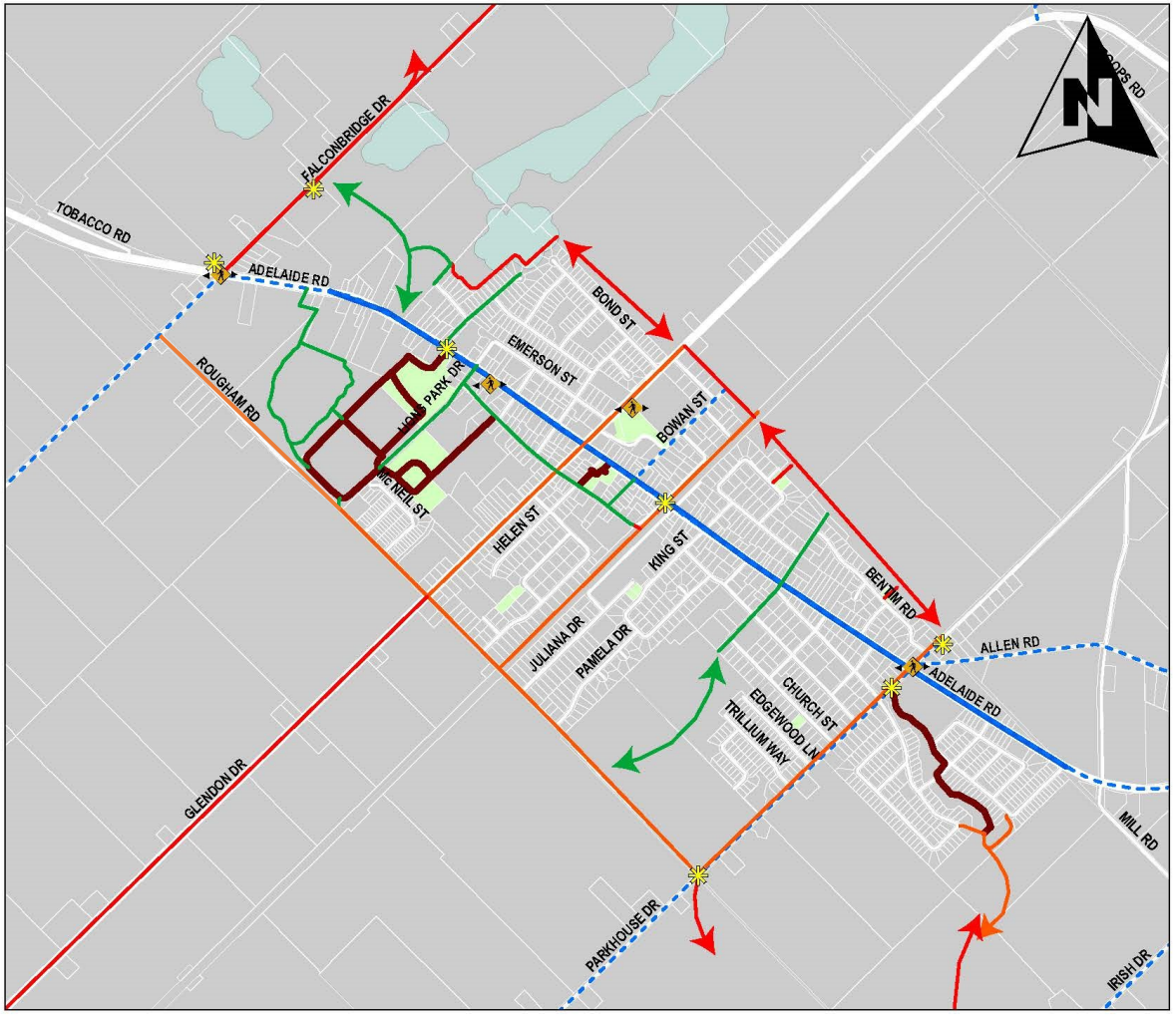
- Railway
- Wetland Areas
- Strathroy-Caradoc Municipal Boundary
- First Nations Territory

Note: Green streets may be implemented in phases with signage, minor improvements in the short term and more substantial upgrades through road reconstruction. Phasing timeline reflects minor improvements such as signage, tree planting and speed changes.



Source: Data provided by the Municipality of Strathroy-Caradoc, Middlesex County and Open Source Portals
Map plotted on May 2, 2022
Project: NAD 1983 UTM Zone 17

PROPOSED MOUNT BRYDGES PHASING PLAN



MT BRYDGES
PROPOSED TRAIL ROUTES PHASING

Legend

Existing AT Facilities

- Existing Trail Facilities
- Existing On-Road Routes

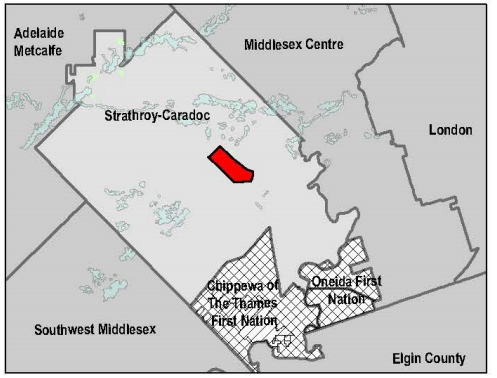
Proposed AT Facility Phasing

- Short Term Projects (0-5 Years)
- Medium Term Projects (6-11 Years)
- Long Term Projects (11+ Years)
- Proposed On-Rod Routes

Other Elements

- Railway
- Wetland Areas
- Strathroy-Caradoc Municipal Boundary
- First Nations Territory

Note: Green streets may be implemented in phases with signage, minor improvements in the short term and more substantial upgrades through road reconstruction. Phasing timeline reflects minor improvements such as signage, tree planting and speed changes.



MUNICIPAL-WIDE PHASING PLAN

Facility Type	Proposed Length (km)									Total Proposed Length			
	Short-Term (0-5 Years)			Medium Term (5-11 Years)			Long-Term (11+ Years)						
	Strathroy	*Mt Brydges*	*Rural Areas*	*Strathroy*	*Mt Brydges*	*Rural Areas*	*Strathroy*	*Mt Brydges*	*Rural Areas*	*Strathroy*	*Mt Brydges*	*Rural Areas*	*Total*
Urban Trail (Type 1)	0.72	0.00	0.00	9.30	1.29	0.00	2.40	4.59	1.24	12.42	5.88	1.24	**7.12**
Primary Trail (Type 2)	3.20	0.00	0.00	0.00	0.36	0.00	3.95	1.31	0.00	7.15	1.67	0.00	**1.67**
Secondary Trail (Type 3)	1.98	0.00	0.00	7.59	4.41	0.00	2.01	0.03	24.66	11.58	4.44	24.66	**29.10**
Woodland Trail (Type 4)	1.32	1.49	0.00	0.74	0.00	0.00	0.00	0.00	0.00	2.06	1.49	0.00	**1.49**
Neighbourhood Greenway (Types 5)	8.45	2.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.45	2.67	0.00	**2.67**

3.7.2 Cost Estimates

Implementing the proposed trail network will require funds and resources from the Municipality and its partners. Annual funding for construction, maintenance, operation, and programming should be identified in the annual budgeting process to strategically implement the trail network over time. Strathroy-Caradoc should seek additional funding sources, such as from the Provincial or Federal government, to maximize budget efficiencies and coordination with other major projects.

The cost estimates within this plan are not intended to represent the total cost that Strathroy-Caradoc must shoulder, but a foundation to ensure the Municipality is equipped to leverage external funding opportunities as they arise and to set realistic goals for what will be internally funded.

Based on facility assignments and proposed phasing, a total cost estimate to implement the network was determined. In addition to using industry leading facility unit costs based on the precedence of comparable projects, cost estimates relied on a series of assumptions:

- Unit prices gathered from recent tenders and projects of similar scope in Ontario;
- Costs are not intended for functional design purposes as they only include the costs of installation of facilities;
- Costs are not meant to be prescriptive but provide a preliminary estimate of the potential implementation costs;
- Assumption that facilities are implemented across typical environmental conditions and topography, and;
- Best practices from past initiatives completed by comparable municipalities and may vary depending on capacity and availability of funds.

A complete breakdown of how this costing was completed, including applied per linear kilometer unit costs, is summarized below. Costs are broken down by owner, as assumed by the jurisdiction of the roadway or area where the on-road and off-road trail facility is proposed, respectively. Given these assumptions, it is vital that the Municipality consult with all relevant stakeholders to determine a more accurate cost, based off confirmed cost-sharing agreements.

Recreational Trails Cost Matrix

	Trail Type	Proposed Cost									Total Proposed Costs			
		Short-Term (0-5 Years)			Medium-Term (6-10 Years)			Long-Term (11+ Years)						
		Local	County	Conservation Authority	Local	County	Conservation Authority	Local	County	Conservation Authority	Local	County	Conservation Authority	**Total**
RTMP Recommendations	Urban Trail (Type 1)	$ 216,083.75	$ -	$ -	$ 3,175,251.73	$ -	$ -	$ 2,470,155.01	$ -	$ -	$ 5,861,490.50	$ -	$ -	**$ 5,861,490.50**
	Primary Trail (Type 2)	$ 640,888.80	$ -	$ -	$ 72,156.36	$ -	$ -	$ 1,050,897.67	$ -	$ -	$ 1,763,942.82	$ -	$ -	**$ 1,763,942.82**
	Secondary Trail (Type 3)	$ 198,194.65	$ -	$ -	$ 1,212,483.63	$ -	$ -	$ 2,670,272.25	$ -	$ -	$ 4,080,950.52	$ -	$ -	**$ 4,080,950.52**
	Woodland Trail (Type 4)	$ 70,243.38	$ -	$ -	$ 18,475.05	$ -	$ -	$ -	$ -	$ -	$ 88,718.43	$ -	$ -	**$ 88,718.43**
	Neighborhood Greenway (Types 5)	$ 128,988.18	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 128,988.18	$ -	$ -	**$ 128,988.18**
Totals		**$ 1,254,398.76**	**$ 0**	**$ 0**	**$ 4,478,366.77**	**$ -**	**$ 6,191,324.93**	**$ 0**	**$ 0**	**$ 11,924,090.40**	**$ 0**	**$ 0**		**$ 11,924,090.40**

ITEM	DESCRIPTION	UNIT	UNIT PRICE RANGE	PRICE USED	COMMENTS / ASSUMPTIONS
2.1	**Urban Trail (Trail Type 1)** - Two Way Active Transportation Multi-use path within road right-of-way	linear KM	$275,000 - $375,000	$300,000	3.0m wide hard surface pathway (asphalt) within road right of way (no utility relocations). Price depends of scale / complexity of project and if existing sidewalk is being removed (i.e. crushing of existing sidewalk and compacting for trail base).
2.2	**Primary Trail (Trail Type 2)** - Hard Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in Urban Setting (Upgrade existing granular surface)	linear KM	$150,000 - $225,000	$200,000	Includes some new base work (25% approx.), half of the material excavated is removed from site. Price depends of scale / complexity of project.
2.3	**Secondary Trail (Trail Type 3)** - Upgrade existing granular surface trail to meet 3.0m wide compacted granular trail standard	linear KM	$75,000 - $125,000	$100,000	Includes some new base work (25% approx.) and an average of 20 regulatory signs per kilometre. Price depends of scale and existing trail conditions e.g. width, slope, location of trail, etc.
2.4	**Woodland Trail (Trail Type 4)** - woodchip trail (new)	linear KM	$25,000	$25,000	1.5-3m wide mulch or compact dirt surface with 0-10% slope, reactive maintenance. Assumes $8/sm, $25/linear meter, $25,000 /Km
2.5	**Neighbourhood Greenway (Trail Type 5)** - Signed Bike Route with Sharrow Lane Markings *Intended to supplement a signed bike route in specific locations. Not intended to be a stand-alone facility type.*	linear KM	$11,600	$11,600	Price for both sides of the road, includes route signs every 500 metres and sharrow stencils every 75 metres as per OTM Book 18 guidelines. Price includes: - $300 per sign x 4 signs (2 signs on each side of the road) - $400 per stencil marking x 26 (13 stencils on each side of the road)

3.7.3 External Funding Options

A review of external funding options was conducted to identify different options available. Strathroy-Caradoc is encouraged to monitor available funding opportunities within and external to the Municipality, and to utilize the information contained within this plan to support funding applications. The following is a list of potential external funding sources that could be explored however, they are subject to change and should be reviewed again prior to applications. It is important for Strathroy-Caradoc to seek a diverse range of funding sources for the various initiatives and programs highlighted in this plan and external sources are an effective way to reduce the Municipality's costs while being an opportunity to develop new partnerships. Listed below are some suggested funding opportunities that could be pursued to support proposed plans.

Potential Funding Opportunities	
Funding Opportunities	**Additional details**
Federal Active Transportation Fund	For additional details regarding the Active Transportation Fund refer to: https://www.infrastructure.gc.ca/trans/active-actif-eng.html
Canada Community-Building Fund / Provincial Gas Tax	For the federal Canada Community-Building Fund program please refer to: https://www.infrastructure.gc.ca/plan/gtf-fte-eng.html For the provincial program refer to: http://www.mto.gov.on.ca/english/service-commitment/gas-tax-program.shtml
Federation of Canadian Municipalities Green Municipal Fund	For additional details regarding the Green Municipal Fund and potential funding alternatives refer to: https://fcm.ca/home/programs/green-municipal-fund.htm
Federal and Provincial Infrastructure / Stimulus Programs	For Federal Government infrastructure stimulus fund details refer to: https://www.canada.ca/en/office-infrastructure.html For Provincial Government infrastructure stimulus fund details refer to: https://www.ontario.ca/page/ministry-infrastructure
Ontario Trillium Foundation	For details regarding potential funding alternatives refer to: https://otf.ca/
Ontario Rural Economic Development Program	For details refer to: http://www.grants.gov.on.ca/GrantsPortal/en/OntarioGrants/GrantOpportunities/PRDR006918
Ontario Sport and Recreation Communities Fund	As part of the Ontario Sport and Recreation Communities Fund: https://www.ontario.ca/page/rural-economic-development-program
Tourism Economic Development and Recovery Fund	For additional details regarding the Tourism Development fund refer to: https://www.ontario.ca/page/available-funding-opportunities-ontario-government#section-26
Service Club Support	Organizations such as the Rotary who often assist with highly visible projects at the community level.
Corporate Environmental Funds (e.g., Shell, TD, MEC, etc.)	For example refer to: https://www.shell.ca/en_ca/sustainability/communities/funding-guidelines-process.html for Shell Canada's Social Investment Program or https://www.td.com/corporate-responsibility/fef-grant.jsp for TD's Friends of the Environment Foundation Grant
Private Citizen Donation / Bequeaths	Can also include tax receipts for donors where appropriate.

4

Trail Policy, Planning and Programming

STRATHROY-CARADOC
RECREATIONAL TRAILS
MASTER PLAN

4 Trails Policy, Planning and Programming

The Recreational Trails Master Plan (RTMP) has been developed to align with trail and active transportation supportive policies and plans from all levels of government. The intent of the strategy is to leverage plans, policies and guidelines at the local, regional, and provincial levels for their capacity to support the achievement of the overall vision and goals of trails in Strathroy-Caradoc. Where support is lacking, opportunities to improve or enhance these documents – through the required planning approvals processes - are identified. The strength and success of any Master Plan is dependent on the support of complimentary policy and planning practices within the Municipality. Recommendations for Trails Policy, Planning and Programming are outlined in more detail below.

4.1 Considerations when Planning and Programming for Trails

4.1.1 Understanding the User and Expanding User Potential

Pedestrians and cyclists are the primary user groups that were considered when identifying and selecting preferred trail connections and design concepts for Strathroy-Caradoc. Within these two user groups there are sub-groups which have their own unique interests and preferences.

When designing trails, consideration should be made for the appropriate user in order to determine how the facility should be designed, the amenities to compliment and enhance the route and other key features. Though there are a few unique users, typically trails accommodate a range of user groups. It is important to consider and balance the various users and their interests and preferences when determining an appropriate design.

PHOTO: ROTARY MEMORIAL TRAIL, STRATHROY CONSERVATION AREA | 2021

WALKERS

Walkers can be defined by their trip type including recreational or utilitarian (to work, school, or other frequented destination). Utilitarian walkers typically walk within urban areas and tend to use sidewalks, parking lots and plazas, as well as trails where they are convenient, well designed and properly maintained. Trails can sometimes provide a convenient “short cut” compared to traveling on the sidewalk network to get to their destination. The average walking distance for elderly persons and preschoolers is 190 metres between rest opportunities. As such, a common trend in current trail master planning is to space at a maximum of 200 metre intervals and at every trail entrance point.

USERS WITH MOBILITY IMPAIRMENTS

Walkers and users with mobility aids (e.g., wheelchairs and power chairs) have a wide range of interests and motives (i.e., leisure, relaxation, socializing, exploring, nature connection, meditation, fitness, or dog walking). Persons with hidden mobility disabilities (able to walk independently but only for a short distance and to stand unsupported but only for a brief time) experience difficulties and are dissuaded from participating in walking when the distances between rest exceed 15-20 metres (Riddle 2019).

HIKERS

Hikers are a group that often enjoy being challenged by their terrain and may cover long distances while willing to walk on sections of a rural roadway or shoulder considered less safe or interesting by occasional leisure walkers. Hikers take trips that may range between 5 and 30 km in length, may be more keenly interested in natural features, are often more adept at map reading, are more self-sufficient than leisure walkers, may takes less use of offered amenities, and can be attracted to more difficult routes.

RUNNERS & JOGGERS

Although the primary motivation for joggers and runners may be fitness, they may share more in terms of profile characteristics with distance hikers than they do with leisure walkers. This group typically is accomplishment oriented, enjoy travelling on trails at higher speeds for distances between 3 and 15 km or more, often avoiding hard surfaces such as asphalt and concrete and many prefer to run on granular, natural (earth) and turf surfaces which can provide a more cushioning effect.

CYCLISTS

The average travel speed for a cyclist on a trail is in the range of 15-20 km/h, although they may reach speeds in excess of 30 km/h traveling downhill on some trails. Where higher speeds are a potential issue on trails, speed limits and warnings should be posted to discourage fast riding and aggressive behaviour. Some bicycles are designed to travel easily over stone dust and gravel surfaces (e.g., all-terrain, hybrid or mountain bikes), whereas, narrow-tired touring and racing bicycles require very compacted granular surfaces or hard surface pavements such as asphalt. The mechanical efficiency of the bicycle allows users of all ages to travel greater distances at a higher rate of speed than pedestrians, and distances covered vary widely from a few kilometers to over a hundred depending on the experience level and motivation of the individual cyclist.

E-BIKES & OTHER ELECTRONICALLY ASSISTED USERS

Electronically assisted devices (bikes, scooters) can open the trail experience to users who may otherwise 'hang up their helmets'. E-bikes and other assisted devices are a 'game changer' in removing barriers cycling and keeping persons with mobility limitations active in the community.

When considering the growing use of electronically assisted devices, their ability to travel at higher speeds can cause concern over user conflicts, in particular vision/hearing impaired users. However, consider these modes with the same lens as other human propelled mobility options, which carry similar risks and mitigation options, such as trails that struggle with high speed/volume of cyclists. All trail users need to respect the range of abilities in users along trails and safety of others and user conflicts should be monitored and new mitigation tools may need to implement such as etiquette rules, semi-separated facilities, speed postings, etc.

The benefits for facilitating inclusion far outweigh the potential negatives (perceived and actual) in supporting e-bike use within the Strathroy-Caradoc trail system.

Infrastructure to support e-bikes are important to facilitate users, including charging amenities and rental opportunities. E-bikes are a 'game changer' in removing barriers to cycling, and keep persons with mobility limitations active in the community.

4.1.2 Overcoming Barriers

Just as people with disabilities experience social and environmental barriers to full participation in society, they can also experience barriers to full participation and enjoyment of parks and trails. Creating parks and trail networks that support people of all abilities is based on the fundamental right to quality of life, individual empowerment, respect and dignity for all people, and the guarantee of equal access to and participation in society.

One of the goals of the Recreational Trail Master Plan is to provide greater access to trails and facilitate a connection to nature, including persons with disabilities, by incorporating the following accessibility guidelines for trails and trail facilities.

Barriers are not only physical, and future trail design and programming needs to consider mechanisms for mitigating barriers to use. Barriers can be derived from differing cognitive abilities and mental processes experienced by potential trail users. Barriers can be socially based and stem from issues related to income, language, race, religion, sexual orientation, health, and gender.

Examples of common barriers of use related to trails include:

- Concern or fear of a new trail experience for reasons of accessibility and/or other anxieties;
- Fear for safety after sundown and/or in secluded areas;
- Unavailability or unknown locations of rest areas and distances when selecting a route;
- Inability to read English for navigation and trail information purposes;
- Access in areas where people live and work, in particular low-income areas and factory/industrial employment areas;
- Worry over judgement and/or suspicion when using the trail; and
- Concern over access to amenities such as washrooms and drinking water.

ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT

As a vital form of public infrastructure, it is essential that all trail facilities be planned and designed to accommodate the needs and abilities of all potential users. This not only maximizes the utility of such public investments but affirms broader municipal imperatives related to supporting diversity and inclusion. Within Ontario, these requirements are not only encouraged but codified under provincial law through the Accessibility for Ontario with Disabilities Act (AODA). Through the legislation, a specific target has been set of making the entire province accessible to people with disabilities by 2025.

"The people of Ontario support the right of persons of all ages with disabilities to enjoy equal opportunity and to participate fully in the life of the province." The stated goal of the AODA is "to make Ontario accessible for people with disabilities by 2025." (Accessibility for Ontarians with Disabilities Act, 2004)

To action AODA in practice, the Government of Ontario has also adopted The Accessibility Standards for the Built Environment. This accompanying document serves as a key technical reference which prescribes specific guidelines and standards needed to ensure universal barrier-free access. Forms of public infrastructure to which these standards apply include both on-road and off-road active transportation infrastructure such as multi-use trails. Importantly, however, these standards only apply to projects involving either new construction or extensive renovation.

For multi-use trail facilities specifically, AODA provides guidance on a wide range of design considerations. As a legislative requirement, the municipality should apply guidelines outlined in the Built Environment Standards as a minimum unless the trail's location, surrounding environment or desired user experience warrants their exceedance.

In addition to adhering to AODA, all trail signage and wayfinding should be easily understood and detectable by users of all abilities. This includes using simplified text, visual icons and clear and contrasting colours which ensure that signage and mapping / messaging is informative, legible and visible. Wayfinding and signage systems should also clearly communicate which trails are accessible so that users can make an informed personal decision about which pathways they will use. Another important consideration to inform a more equitable inclusive approach to designing the trails network is through applying principles to Universal Trail Design. Like AODA, Universal Trail Design is a concept that takes into consideration the abilities, needs, and interests of the widest range of possible users. Regarding trail and multi-use pathway design, this includes planning and developing a range of facilities that can be experienced by a variety of users of all abilities. Shown below are some key considerations that inform a Universal Trail Design Approach:

KEY CONSIDERATIONS FOR A UNIVERSAL TRAIL PLANNING APPROACH

Barrier Free	Safety	Cognitive	Socioeconomic	Cultural
Lack of uneven surfaces and grades Wide entrance and exist points. Greater trail widths to accommodate mobility devices.	Application of CPTED principles to minimize safety risks through greater passive surveillance Improved lighting. Lack of or illumination of all non-visible areas.	Ensure trail alignments are direct and more intuitive to navigate. Appropriate use of trail signage and markings to assist navigation.	Ensure trails provide adequate coverage within underserviced areas.	Ensure trail signage is translated in a wider range of languages and makes use of universally understood symbols and icons

4.1.3 Consultation & Outreach

The legislation requires local municipalities to consult with the accessibility community as part of the design and development process for the construction of new trails and significant redevelopment of existing trails. Source the local accessibility community and/or where applicable committees to provide vision and direction to staff and Council regarding accessibility and engaging the committee early in the design process is an effective method of sharing information and receiving feedback to inform the design.

Consultations typically focus on elements of the design feasibility to meet accessibility requirements in the design of a new trail or trail improvement, and where requirements can be practicably met, consulting on design criteria such as:

- Trail slope, the need for and location of ramps on the trail.
- The location and design of rest areas, passing areas, viewing areas, amenities along the trail and other pertinent trail features.
- Information related to accessibility that will be included on signage.
- Surface materials, including trail surfacing, tile wayfinding bars /decision trees, tactile warning plates and other crossing amenities.

Considerations should be made to include outreach to marginalized community members and those that may utilize the recreational trails to facilitate access to community resources and other commuter functions. These individuals may face barriers to participation or may not feel as thought they are stakeholders with validity to provide input. Outreach should be targeted and designed to meet the needs of the particular group, avoiding reliance on general community outreach and typical consultation practices.

4.1.4 Addressing Barriers Based on Gender, LGBTQ+ And Marginalized Community Members

Trails may be underutilized by certain groups such as women, teen girls, LGBTQ+ and marginalized community members. These groups may not feel physically safe or welcome on recreational trails, especially those that are unlit, unmarked, or are located farther from urban areas. There may be a lack of interest if this public infrastructure is not designed to meet their unique needs or interests. Identification of and consultation with these groups should be undertaken to understand how trails may be designed to promote safety, inclusion, and overall participation. Design elements like clear and consistent signage, communication about trail surfacing and lighting, mapping that shows community

> *ACTION ITEM*
>
> *Connect with community to identify specific barriers and mitigative actions specific to Strathroy-Caradoc user needs. Go to your more vulnerable and underrepresented populations – don't rely on open outreach, you want to here from those that don't use the trail. Think outside the box.*

connections and exit points, emergency call boxes, and open sightlines make trail infrastructure more accessible to women and gender minorities. Programming Technology may also remove access barriers for underrepresented user groups and designing for crime prevention are discussed in the design guideline section.

4.2 Activities & Programming

The success of a trail plan goes beyond the implementation of infrastructure. Initiatives that encourage people to use trails and educate people on safe and responsible trail use are critical to establishing long-term community and behavior change.

Strathroy-Caradoc has a strong connection to high quality and active living with its access to natural areas, parks and trails developed within conservation lands. The municipality's ability to draw both tourism and permanent residents is increasingly more desirable for young families and working professionals as people look to move out of nearby urban centres. As the municipality and its partners continue to grow the network of comfortable, accessible trails within Strathroy-Caradoc, there is an opportunity to spur behaviour change through the use of targeted, thoughtful programs designed to get people thinking about active travel and trail use more often. Utilizing promotion and marketing opportunities to leverage interest is another avenue which could be explored by staff and partners.

INTERACTIVE USER PROGRAMMING

Recreational and web-based programing for trail systems provides ample opportunity to draw in users, promote overall trail use, and remove user barriers which may have existed within the trail system. Incorporating programming activities into the trail experience can help draw in a multitude of users to the trail system in a dynamic and interactive way. These programs can be pivoted to target and attract specific user groups to the community's trail system and promote opportunities for people in the community to share experiences and connect with one another. This is especially useful in reducing barriers for different age demographics, like teenagers, to get outside and benefit from collective social experiences, fitness opportunities, and educational resources. Targeting trail use from different demographics can be as simple as creating walking groups for specific age groups, genders, and interests. Walking groups can include storytelling walks for children, self-esteem walks for teenaged girls, moms, and stroller walks, or walks for people new to the community.

Programing can be leveraged to shift users from busy sections of a trail and encourage use in underutilized areas where increased traffic is desired. Interaction can be further encouraged through the implementation of physical permanent or temporary signage along a trail that links users to activities on a municipal website, social media group, or other app platform. A 'spot and share' program, for example, can encourage the documentation of seasonal nature photos and social media sharing along the trails. Photo sharing can target themed educational opportunities, like the documentation of migratory birds, and can vary seasonally to attract users throughout the year. Fitness programming can also be used to encourage off season use of trails. Trail users can be encouraged to

log and share location specific fitness achievements and photos as they travel throughout the trails.

Activities and programing can be used to remove barriers to participation and help to form social connections with other members of the community. Activities can be themed to respond to different seasons, or to other events and activities that are occurring within the community. Trail tourism can be a multi-disciplinary approach that combines the expertise of Strathroy-Caradoc's different departments and local conservation authorities to determining the best means to attract users through specific trail programming. For example, a partnership between the recreation department, parks facility operations and the conservation authorities may find combined programming opportunities to attract atypical trail users and provide them with a reason to experience local trails. Activities could include the temporary installation of game or challenge stations throughout the trail system. Stations can be based on nostalgic games and include oversized lawn components, spray lining on turf, or provide signed or digital signage to describe the intention of the challenge.

STAFFING RESOURCES

It is important to recognize that the delivery of new programs, including the coordination efforts that must take place between internal and external stakeholders within the Strathroy-Caradoc, will require additional staff resources and support. For that reason, it is strongly recommended that the municipality establish a Community Trails and Active Transportation Coordinator position to support the new programs, monitoring, and furthering implementation of the master plan.

The importance of this staff resource is paramount to the successful management and growth of the municipality's culture of active transportation and trails use. Strathroy-Caradoc should consider starting out with a relatively small investment – potentially through the use of a Summer Student position (potentially funded by the Canada Summer Jobs Grant) to provide support for programming from May to September. As the benefit of the position becomes clearer and the level of programming increases, the municipality should consider expanding the position with the eventual goal of having a full-time Trails and Active Transportation Coordinator position to:

- Liaise between different municipal departments to ensure that active transportation and trails are being considered in new roadway projects, land development, and recreational programing.
- Strengthen connections between external stakeholders, including the SDJ and St. Clair Region Conservation Authority, Rotary Club of Strathroy, and Southwestern Public Health to facilitate opportunities for trail improvements, monitoring community impacts, and to develop new programs;
- Seek funding opportunities through the growing number of streams being developed and delivered by higher levels of government to support trail development and active transportation;
- Serve as the City Staff resource for the trail advisory group(s) and a direct contact for community groups/members.

LEVERAGING PARTNERSHIPS & VOLUNTEERS

Leveraging volunteers and local community organizations/businesses for support is a beneficial tool to reduce costs and increase quality of a trail system. There is often a willingness within a community to contribute, however a disconnect in connecting interest with actionable projects/activities. Facilitating partnerships and volunteer activities should be addressed on two fronts; with a direct contact person for inquiries of this nature, and a posted list of future projects or activities that are under consideration. Community groups in particular are often looking for projects to adopt and having a 'wish list' of prioritised items desired for the trail system can help connect the level/type of contribution interest with they item most needed. Information can be publicly posted or circulated annually to local organizations and interest groups.

The disconnect between municipal and conservation authority trail segments, whether gaps or inconsistent infrastructure, can be overcome through a change in the approach to facility management and/or coordinated efforts. This Recreational Trails Master Plan will provide a framework for a collective vision and Strathroy Caradoc should work with the agencies to foster a partial or full adoption of the plan. Understanding that there may be special requirements for conservation lands, these items should be appended to the plan as or when they are agreed upon. The public does not necessarily perceive the jurisdictional differences in these trail segments and a successful system will shift the focus from qualities of the facilities to placemaking and experiential characteristics.

PHOTO: ROTARY MEMORIAL TRAIL, STRATHROY CONSERVATION AREA | 2021

4.3 Official Policy Considerations

Strathroy-Caradoc has a strategic opportunity through a joint process of master planning initiatives driven alongside the Official Plan update. Supporting documents at the local, regional, and provincial levels clearly demonstrate an interest and commitment in establishing a safe and comfortable active transportation network that incorporates principles of universal accessibility.

The implementation of policy will work to strengthen the guiding principles and goals of this plan and support successful implementation and long-term functionality.

How will the Recreational Trail Master Plan be strengthened by policies?

To ensure consistent support for recreational trails throughout municipal land use and infrastructure policies, an Official Plan and other implementing policy documents (e.g., secondary plans, community improvement plans) should support active modes. There are three overarching categories: visioning, a dedicated section, and integrated policy, which address active transportation throughout an Official Plan.

It is beneficial to have elements of each of the three categories to ensure the Official Plan is a robust policy tool that achieves a municipality's recreational trail objectives.

- **Visioning**

  The visioning category includes motherhood statements or preamble text which are incorporated throughout the Official Plan.

- **A Dedicated Section**

  A dedicated section means a section within the Official Plan, as identified in the Table of Contents, dedicated to recreational trail policies.

- **Integrated Policy**

  There is an opportunity to have specific policies that speak to recreational trails throughout the various infrastructure and land use policies in an Official Plan.

At the outset of an Official Plan a vision represents an aspirational statement that identifies what is important to a community, now and in the future. Goals and objectives are more detailed statements that identify how the vision may be implemented and directions for developing land use policies. Under this objective, a number of strategies are listed including providing access to natural, creating better connectivity, and removing barriers to users.

Policies related to recreational trails can also be tied to a specific land use category or geographic area of a municipality (e.g., a specific provision area). These policies can reflect the unique needs of an area(s) and ensure that context-appropriate recreational

trail principles and infrastructure is achieved. Further, an Official Plan can identify specific routes and corridors which should be protected for recreational trail needs.

> *ACTION ITEM*
>
> *Consider utilizing trails mapping to strengthen the Official Plan using outlined policies.*

4.4 General Policy Recommendations

The following are recommendations for consideration to inform future Municipal guidelines, projects, partnerships, and standards. This does not include specific policy language but considerations which could help to inform the development of future policies. Recommendations have been linked to each of the plan's guiding principles.

1. Connect Destinations & Nature: Trails should provide access to important destinations such as parks, natural areas, community centres, schools, shopping, and employment areas.

- Provide an active transportation system which support a reduction in automobile dependence and to develop greater support for multiple transportation modes, including walking and cycling.
- Access to trails shall be provided to all residential neighbourhoods from a local roadway, minimize crossings and alignments along collector and arterial roadways. Access to a recreational trail facility or associated infrastructure facilitating to a recreational trail connection (pedestrian and cycling facility) shall be provided within a 10-minute walk (approximately 1000m) radius of all residential properties.
- Recreational trails shall be developed within protection buffers between natural features (woodlots, wetlands, cultural meadows) and new and/or re-development lands; connecting to existing trail infrastructure, forming linkages to destinations, or creating independent trail destinations.

2. Promote Access & Inclusion: Trails need to be designed and built around a broad range of users to facilitate and encourage participation. Design and planning for trails should focus on removing barriers to usage, including considerations around seasonal usage, gender, cultural experiences, safety, demographics, and socioeconomics.

- Develop and maintain active transportation network that is safe and accessible. Pedestrian level routes, including recreational trails, that link neighborhoods to amenities, transit, and community resources shall meet AODA standards for 'barrier-free path of travel' while other active transportation routes may conform to AODA

standards for 'recreational trail' and Ontario Traffic Manual (OTM) Book 18: Cycling Facilities.

- Recreational trails shall lend consideration to programming and supportive amenities which address removal of barriers to use and attract underrepresented community demographics. Target demographics should consider visible minorities, LGBTQ+, low in-come, women and teen girls, persons with cognitive and physical differences; and relay on direct consultation.
- Create active transportation planning objectives that supports social inclusion. Clearly connect active transportation infrastructure plans with social inclusion/equity. It would be valuable to improve the municipality's understanding of communities that are underserved by active transportation infrastructure and identify an approach to improve these areas through policy and planning.
- Recreational trails, where cyclists are permitted, and all other cycling facilities shall permit the use of electrical assisted bicycles to facilitate greater participation in recreational and commuter cycling. Electric assist cycles permitted within municipal facilities shall be regulated by electric motor size (in Watts), max pure electric driving speed and facility use speeds. Suggested parameters for by-laws include: propelled by an electric motor, be fitted with pedals that can propel it, the electric motor must not exceed a maximum continuous rated power of 450W, and the electric motor must not offer pure electric driving force beyond a speed 35kph.

3. Appeal to All Users: The trail network should appeal to a range of user abilities and interests. The network should consist of various route types, levels of difficulty, and accommodates different modes of travel and recreational experiences.

- Recreational trails shall provide for a range of difficulty and experience types, recognizing that trail segments may not accommodate or permit all user types. Trail wayfinding signage and supportive digital platforms shall communicate level of challenge and accessibility parameters, specific to trail segments and in a manner that will appropriately inform users (such as at every trail point of access). This shall include; trail width, surface type, elevation change, slope, barriers, location/duration of high slopes/barriers, location or frequency of rest areas, emergency and safety provisions.

4. Enhance User Experience: Opportunities for supportive amenities such as wayfinding, rest areas, and end of trip facilities will be prioritized to enhance the user experience.

- Trails shall accommodate rest and refuge opportunities to help remove barriers and support a wide range of abilities. Seating amenities shall be provided at all trail points of entry and targeting a maximum occurrence of every 200m, considering for provisions for seating every 50m in select areas where there is a higher potential for users with mobility impairments. Refuge locations which provide both seating and overhead protection from elements shall be provided every 1000m, and within 200m

of the trail facility, however, are not required to have a primary function for the trail system.

- Bike racks, bike repair stations, benches, pedestrian-scale lighting, and other walking/cycling amenities are examples of supporting infrastructure that enhance active transportation facilities. As these features are integral to encouraging residents and visitors to travel using active modes, an assessment of amenity needs shall be completing for all new and existing trail segments and be considered an essential piece of infrastructure if identified.
- Recreational trails shall be equipped with full lighting infrastructure when a trail facilitates access to public transportation and/or performs a commuter function for residents. Partial lighting infrastructure and/or emergency contact totems shall be applied at entrance or intersectional nodes in response to concerns over safety and/or in areas where night use is frequent.
- Single source website or application-based wayfinding tools shall be provided for all trail facilities that are publicly accessible within the municipality.

5. Foster Partnerships: Explore opportunities to develop new and strengthen existing partnerships to expand, maintain, and provide consistency across the collective trail network.

- A recreational trails advisory group shall be coordinated by Strathroy-Caradoc staff and include representatives from trail infrastructure partners, including the St. Clair Conservation and the Lower Thames Conservation Authorities, representatives from local community groups, and community members at large. The primary purpose of the group shall be to provide an advisory role regarding trail infrastructure and act as a liaison for community and external funding/resource partnerships.
- Develop an agreement or coordinating body between the conservation authorities and the municipality to facilitate a joint trail management and development approach. As trails are an integral community amenity, consideration should be made for the municipality to take over the trail assets with the conservation lands with the Conservation Authorities limiting contributions to cost-sharing and advisory.

4.5 Crossing Privately Held Lands: Acquisitions and Agreements

Often land ownership can present a barrier to establishing connectivity and a quality trail system. There is a tendency to reroute recreational trails onto road corridors to convey users at the expense of the quality of the user's experience. This is especially prevalent when addressing trail connections across agricultural land uses. Although establishing agreements or procuring land can present financial and political challenges, it is an investment that should be considered to aid in the development of high-quality trail systems where warranted.

Below we present different types of agreements, as well as the opportunities and constraints that each option offers with regards to trails.

LAND ACQUISITION

Land can be acquired in full (purchasing the entire land parcel) or in part (through a land severance). Full acquisition or severance offers the most flexibility and security for future trail operations. The municipality may consider developing a donation policy or protocol that offers a commemorative opportunity to the benefactor in exchange for land provided for the use of a trail. This may include naming of a trail section, signage, recognition events or tax receipts for the donation of land. An increasingly common form of land donation is to Will sections of the land to Strathroy-Caradoc upon a benefactor's death. This can provide a lasting legacy, particularly for residents who have a deep connection to Strathroy-Caradoc's trails network.

It should be noted that the purchase of land can require a larger upfront sum of money and a willingness from the owner for sale. Expropriation is always an option; however, it is often deemed cost prohibitive for the purpose of trails.

EASEMENTS AND USE/MAINTENANCE AGREEMENTS

Easements or agreements can be more appealing to a landowner as they can be engineered to permit continued ownership and control of the land – establishing differing rights and responsibilities for both the land "owners" and the "holders" of the easement. This poses risk to the municipality for connectivity and infrastructure investment losses if the owner wishes to terminate the agreement or ownership changes. This can be mitigated through long term contracts and incorporation of financial penalties for contract termination. Regardless of contract terms, there will be an end date for renewal and associate risk for termination. Easements and use agreements do not grant exclusive rights to land and the easement holder has limits to access control. Common accommodations for trail easements include gated access for farm or logging vehicular access/crossings, maintenance access, occasional use of the trail by modernized vehicles (which may not be permitted by others on the trail), and temporary closure for short term activities such as hunting or logging.

Agreements need to clearly establish responsibility for maintenance and liability. Often trail agreements cover the width of the trail plus an offset of land on either side of the trail. It is recommended that the offset provide adequate space for management of hazard trees, drainage improvements and other possible construction access needs. A total width of 10m is correct, however, may warrant an increase to 20-30m for tree hazard management purposes. For narrow properties, it is advisable for one party to take full responsibility for maintenance as logistics and perception of responsibility are diffident to separate.

Formal easements transfer liability from the landowner to the party who is facilitating the use, providing they establish 'interest' in the land; however, responsibility needs to be clearly established in all agreements. In instances where there is an established (winter) seasonal agreement with an organization such as OFSC, there is an opportunity to leverage the existing connection/contract as a foundation to a four-season agreement to expand access for a new trail. The trail agreement would need to be a stand-alone

document; however, it can be informed by the parameters of the existing agreement that is satisfactory to the owner.

CROSSING AGRICULTURAL LANDS

When addressing crossings of productive farmlands, there are many functional and ethical conflicts to consider. Trails along farm fields, even when used for crop production, should be fenced and provisions for access/crossing gates provided for conveyance of farm equipment. It is best to locate the drainage along less productive and/or inhibiting alignments, such as along existing woodlots, creeks, drainage conveyances, utility corridors, and within/adjacent to road right of ways. Note when recreational trails are associated with road corridors, they should be designed with physical buffer such as a ditch or vegetation separating the facility from road use conflicts and improving the experience. Alternately, prefabricated barriers such as flex bollards are needed to protect trail users and discourage short term vehicular intrusions.

DEVIATION TO ROAD OR SIDEWALK

In some instances where land is not obtainable, where it is cost prohibitive or where future development is likely to facilitate a connection, it may be necessary to route parts of the trail onto existing roads and/or sidewalks to provide connectivity. While this type of deviation creates a disconnect in the user experience, it can be mitigated by providing landscaping improvements, increased separation between drivers and trail users and additional signage to guide users. Deviation may not be appropriate in all cases, for instance, where traffic volumes and speeds are particularly high. In this case, the creation of an in-boulevard multi-use trail within the road right of way but set back from the road platform may be considered as an acceptable alternative.

Difference between easements, land use agreements & Licenses – it is important that the terms clearly establish an “interest” in the land. Some agreements and most licenses do not clearly establish an ‘interest’ which poses a risk to nullifying future use if the land where to change hands, regardless of investments made. Strathroy-Caradoc should discuss these implications with legal representation when drafting contracts for land use.

> *ACTION ITEM*
>
> *Complete a risk analysis for each location as the context will likely dictate the option. Prioritize land use agreements as a low-cost option. Always develop formal contracts and clearly indicate responsibilities for maintenance and liability. Deviation to a road or sidewalk is a last priority and should be avoided as it deviates from the goals of the recreational trail system.*

4.6 Risk Management

To minimize and avoid potential liabilities related to personal injury along trail facilities, it is vital that legal risks be proactively considered and planned for. Adhering to widely accepted design, construction and maintenance standards are one of several strategies to manage this risk. Aside from ensuring the proper design, signage and operation of active transportation and recreation facilities, measures should be taken to address potential hazards stemming from accidents, theft, vandalism, and other issues.

Some general strategies which could be used to reduce risk and minimize the liability associated with providing designated trail facilities are listed below:

1 Improve the physical environment, increase public awareness of the rights and obligations of users and improve access to educational programs	**2** Maintenance operations should conform to accepted / best practice standards, and a maintenance program that is achievable for the municipality should be developed, documented and acted on.	**3** If hazards cannot be immediately removed, they should be isolated with a barrier or identified with warning signs.
4 Written records of all monitoring and maintenance activities should be documented and maintained.	**5** Monitor trails on a regular basis to document the physical conditions and operations of the route. All reports of hazardous conditions received should be promptly and thoroughly investigated.	**6** Avoid using descriptions such as “safe” or “safer” when describing trails when promoting their use. Identify practices that enable users to assess their own capabilities or level of comfort and make their choices accordingly.
7 Ensure signage, mapping and promotional materials associate the term ‘Recreational’ with trails and the trail network.	**8** Maintain proper insurance coverage as a safeguard against having to draw payments for damages from the public treasury.	

Through the *Ontario Trails Act*, there were amendments to various Acts that have a bearing on recreation trails, including the *Occupiers Liability Act* and *Trespass to Property Act* which help to protect owners of properties that contain public trails as well as adjacent landowners, and provide stiffer penalties for those that trespass on private property, vandalize or cause damage to property. Insurance coverage is often added to the liability insurance Municipalities already carry for their other public parks and open space. The risk management and liability prevention strategies identified above should be reviewed

and incorporated into day to-day decision making processes where applicable when planning, designing and operating trails within Strathroy-Caradoc.

4.6.1 Regulation & Enforcement

To further minimize liabilities and safeguard against potential damages to trail facilities, it is vital that the municipality adopt a comprehensive enforcement regime to ensure proper trail use. This can include leveraging the support of local law enforcement, including police or by-law officers, to regularly inspect facilities and enforce their proper use. Given the municipality's small size relative to the extent of its trail network, it is also suggested that partnerships be established with the Strathroy-Caradoc Police Department to acquire additional resources.

Within the context of Ontario, there are a series of key legislative acts which stipulate how trail facilities should operate including, their jurisdictional status. Through the adopted Ontario Trails Act, several amendments were made to various existing forms of legislation that bare impact on recreation trails. This included the *Occupiers Liability Act*, *Public Lands Act* and *Trespass to Property Act*, which define the rights of private property that either contain or are adjacent to public trails and authorize the issuance of fines for those that trespass on private property (i.e., go off trail property onto private lands), vandalize or cause damage.

MOTORIZED VEHICLE USE ON TRAILS

Approaches for deterring off-road motorized vehicle use should be developed for the trail system. Several jurisdictional bodies, as well as public opinion gathered, state that off-road motorized vehicle use is not only against municipal by-laws but leaves other users feeling unsafe and is a liability for Strathroy-Caradoc. As the trail system develops, this may become an increased issue, in particular where private properties have direct access to trails or adjoining naturalized buffers. A management plan for deterring use should include aspects of the following as required:

- Determination of reporting strategy (e.g., direct to police, police alerts municipal staff of actions or direct to municipality reporting system)
- Educational signage onsite outlining trail use rules and reporting strategy (signage can contain QR code with quick reporting link)
- Increased police checks of the area
- Resident education on trail use rules and reporting strategy through Homeowner Brochures in problem areas and general digital postings
- Use of trail sensor cameras to strategically monitor unauthorized usage trends and maximize efficiency of police efforts (sensor cameras should only be used with public support and clear signage at locations)

4.7 Monitoring the Recreational Trail Plan for Success

A monitoring plan can be used to support the evaluation of master plan success. Establishing measures to assess progress can help Strathroy-Caradoc staff prioritize future projects, rationalize investments, and appropriately allocate resources. Research indicates that meaningful performance measures can help to:

- Demonstrate the value to citizens and elected officials;
- Track the success of a program or facility;
- Inform smart investments through data-driven measures of success;
- Comply with funding requirements;
- Produce a better built environment for active transportation; and
- Capture the value of new and innovative datasets and data collection.

The type of performance measures applied by municipalities can vary depending on desired outcomes and data available. Performance measures are becoming more widely used and to be effective should be incorporated into existing planning process. Municipal staff are encouraged to track the measures on an annual basis, and regularly report on the indicators as they relate to the plan objectives. Performance measures can also be tracked by partners and stakeholders, such as the trails committees, to better inform the impact that the investments made as part of this plan are having on those organizations. This annual report could be used to demonstrate the meaningful improvements and to publicly demonstrate return on investment. Through the life cycle of the strategy, the performance measures should be re-evaluated on a regular basis, and the data should be used to inform future improvements.

REPORT ON IMPLEMENTATION AND PROGRESS

Strathroy-Caradoc should consider preparing annual reports detailing their progress towards achieving the goals and objectives of this Plan for the first five-ten years of its implementation. These annual reports can highlight the new infrastructure investments that have been brought online, the ways that new programs and partnerships are reaching more residents in the community and the overall trends in transportation behaviour as the Strathroy Caradoc's network of trails and active transportation infrastructure becomes more robust.

This report can provide a powerful accountability tool for Strathroy-Caradoc – it helps to build trust and awareness about how the RTMP is being implemented, and what the results of the associated investments are. The report will provide an annual snapshot of the state of trails in Strathroy-Caradoc, helping to create community excitement as the culture of active transportation grows, and serving as a marketing tool.

It is recommended a trail maintenance log and data collection system be adopted to document maintenance activities. The log should be updated when features are repaired, modified, replaced, removed, or when new features are added. Accurate trail logs also become a useful resource for determining maintenance budgets for individual items and tasks, and in determining total maintenance costs for the entire trail. In addition, they are a useful source of information during the preparation of tender documents for trail

contracts, and to show the location of structures and other features that require maintenance.

Leveraging technology to collect managing data can be a powerful tool to finding efficiencies and more accurately budgeting for need. Digital dashboard style programs can be an effective interface for staff to organize inputs and action items. This type of technology can be linked to digital trail logging, user reporting systems, and on-site sensors (such as waste bin sensors) to create the ability for on-demand service and strategic deployment of resources. On demand service styles can replace regular maintenances practices and reduce overall demand on resources.

UNDERTAKE SURVEY OF RESIDENTS

Another approach to monitoring the overall active transportation network is to conduct a survey of Strathroy-Caradoc residents on a regular basis. Such surveys could be carried out on an annual or bi-annual basis and ask residents about what they like and dislike about the network. The results can then be used to inform short-term actionable items that respond to the immediate needs and requests of residents, contingent on the scale and scope of the project. Surveying of residents ensures regular dialogue between Staff and the users of the network themselves

MONITORING REVIEW OF TRAIL ASSETS

As part of the successful implementation of this plan, it is recommended that supplementary monitoring efforts be undertaken by staff to gain a better understanding of the recreational trails network and how it's being used. Similar to how staff monitor a road network for deficiencies such as potholes and broken streetlights in need of repair, trails and trail road crossings also require monitoring to ensure issues are promptly addressed. Doing so ensures that trail facilities remain in a state of good repair and can continue to accommodate the needs of people using it.

Monitoring efforts should be formalized into a procedural and form-based format on the part of volunteers and staff that currently maintain the trails. Regular communication and coordination can help ensure that the municipality can rely upon accurate information to react to issues quicker and ensure that the facilities remain maintained.

PROVISION OF PERMANENT DATA COLLECTION TOOL

Permanent automated data collection tools can allow staff to effectively monitor the trail network in real time and collect a significant amount of data with which to inform decision making.

Automated trail counters are pieces of monitoring infrastructure that count the number of pedestrians and cyclists on an off-road trail. Staff would be able to retrieve data from the automatic trail counter to review pedestrian and cyclist data over the long-term and assess a facility's use. Monitoring equipment will allow for better informed decision making through real-time data.

> *ACTION ITEM*
>
> *Create performance monitoring strategies that leverage data collection from staff and the public. Use data to inform the need for action and allocation of resources. Be accountable for the success of the trails; acknowledge weaknesses and set goals to move forward. Transparency with the public can be a tool to leverage partnerships and share a sense of ownership with community members.*

5

Trail Design Guidelines

STRATHROY-CARADOC
RECREATIONAL TRAILS
MASTER PLAN

5 Design Guidelines & Trail Amenities

There are many design elements to consider when designing trail infrastructure. In order to enhance users' experience, enjoyment and safety, the design of the trails network in Strathroy-Caradoc should be based on the specific type of user and the desired user experience where possible, as well as other high-level design principles. The design of trail infrastructure would be founded on best practices, lessons learned from comparable municipalities, as well as context-specific solutions.

The purpose of the guidelines outlined below is to assist staff in making informed decisions about trail designs for Strathroy-Caradoc. Information below is based on current best practices and provides guidance for a range of conditions typically encountered in a municipal-wide network. The intent is to have regard for the individual guidelines while considering the context of individual site conditions to arrive at the most appropriate solution. In some cases, an interim solution may be appropriate where the desired long-term solution cannot be achieved in the short term. However, the interim solution should meet users' needs to the greatest extent possible without compromising user safety. The municipality is encouraged to continue to explore and adapt trail planning and design trends as they emerge to best serve trail users and the community as a whole.

5.1 Designing for Accessibility & Inclusion

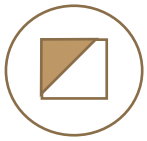
Universal design refers to the design of facilities, services, programs and products that can be used by all people, to the greatest extent possible, without the need for adaptation or specialised design. The intent of universal design is to accommodate the broadest spectrum of people through a single, all-encompassing design, rather than through the provision of multiple elements specially designed for use by distinct groups.

Universal design is governed by seven principles:

- **Equitable use:** provide opportunity for trail users to access, share and experience the same sections of trail rather than providing separate facilities;
- **Flexibility in use:** provide different options for trail users in order to accommodate a variety of experiences and allow for choice;
- **Simple, intuitive and perceptible information:** whether conveying trail information through signage, maps or a web site, communicate using simple, straightforward forms and formats with easy-to-understand graphics and/or text;
- **Tolerance for error:** design trails and information systems so as to minimize exposure to hazards, and indicate to users' potential risks or challenges that may be encountered;
- **Low physical effort**: trails may provide for challenge but should not exceed the abilities of the intended users; and where appropriate, rest areas should be provided; and

- **Size** and **space for approach and use**: trails and amenities should provide for easy access, comfort and ease in their usage.

KEY CONSIDERATIONS FOR ACCESSIBILITY & INCLUSION DURING DESIGN

	Minimum trail clear width of 1.0m
	Minimum trail head room clearance of 2.1m above trail
	Surfaces are to be firm and stable with minimal glare
	Preferred maximum running/longitudinal slope of 5%; with up to 10% acceptable over short distances
	Maximum cross slope of 2%
	High tonal or textural changes to distinguish the edge
	Openings must be perpendicular to path of travel and must not allow passage of an object that has a diameter of more than 20mm
	Signage must include specific information (See signage section below), be high contrast and written in sans-serif font

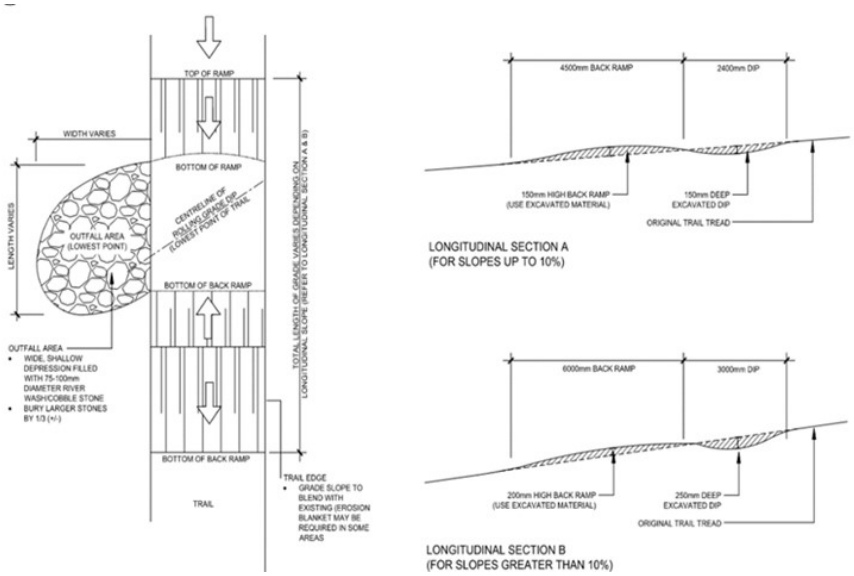
5.2 Addressing Trails on Slopes

TRAILS ON SLOPES

Designers should utilize the most current standards available during the detailed design phase for new trails and improvements to existing trails.

The Act also recognizes exceptions where accessibility requirements can be waived. The exceptions generally relate to locations where:

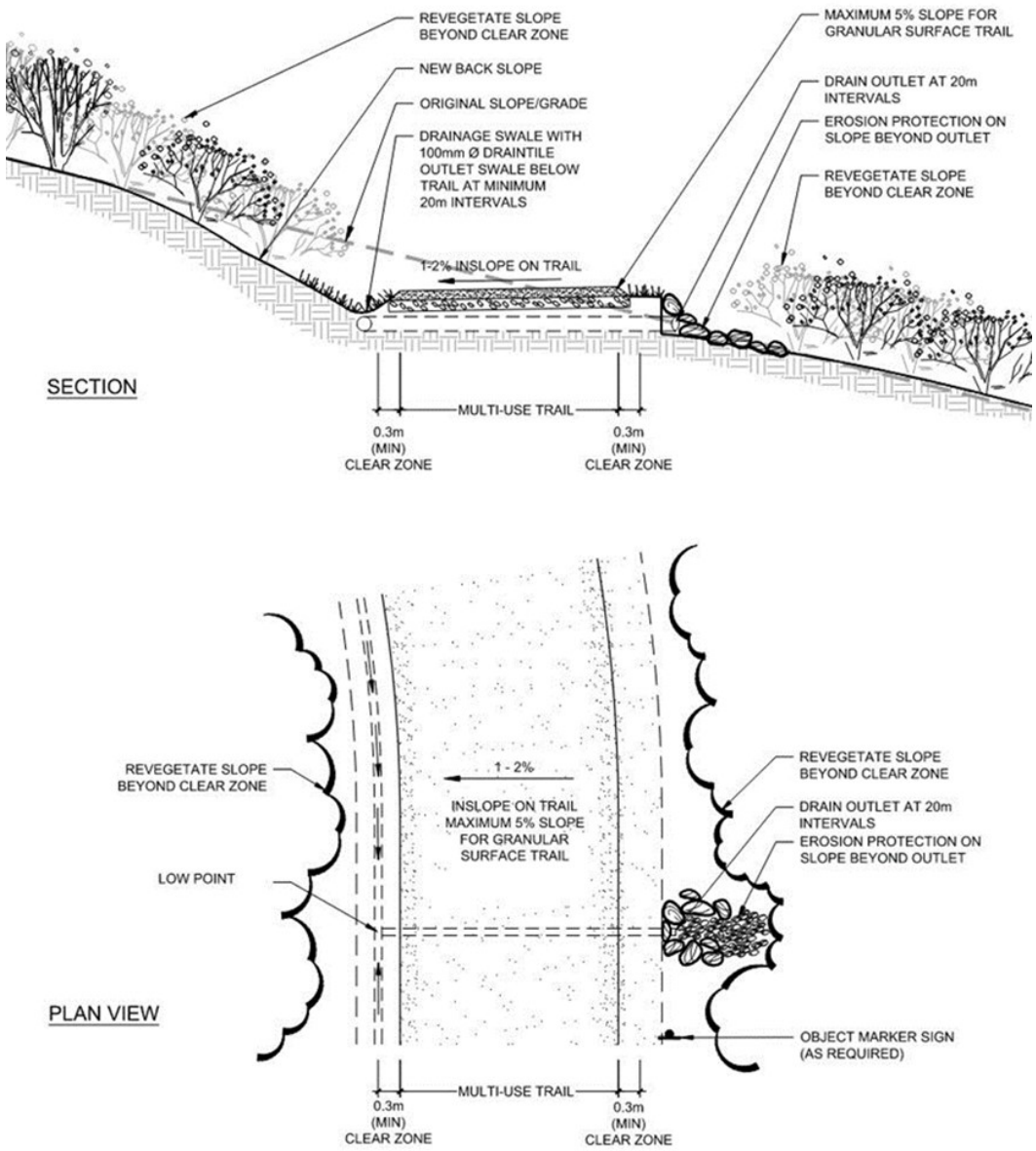
- The impact of trail construction would adversely affect protected natural or cultural heritage resources, and these effects cannot be reasonably mitigated.
- It is not practical to comply with the requirements, or some of them, because existing physical or site constraints prohibit modification or addition of elements, spaces or features that would be required to meet accessibility requirements.



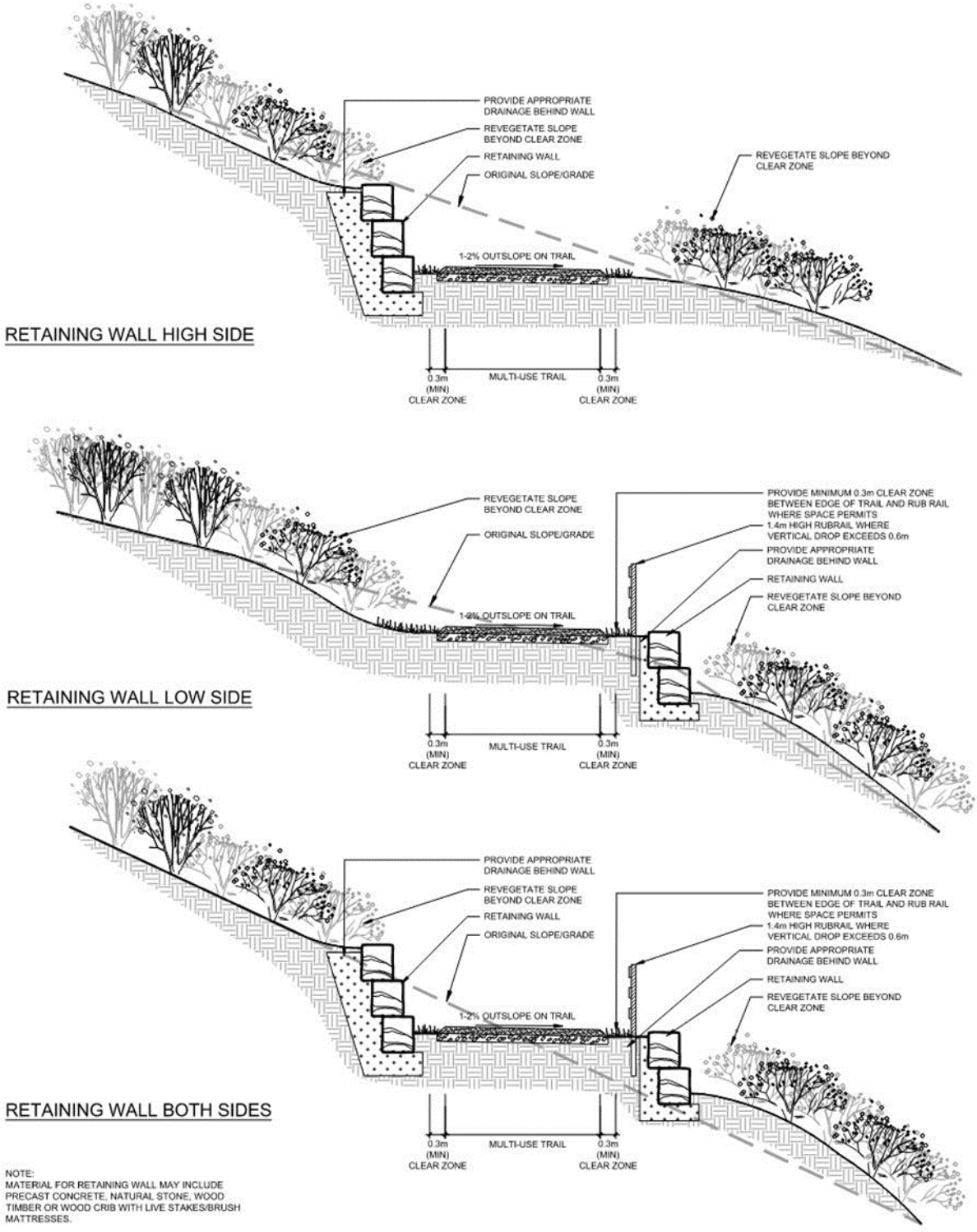
Slope management approach displayed in detail for trail design

> *ACTION ITEM*
>
> *Implement recommended strategies and policies to achieve an accessible and inclusive trail system, and tailor to the needs of the site and heritage. Provide detailed information about accessibly and the anticipated trail experience on a dedicated trail web page, including mapping and photographs of the trails.*

The following images provide examples of construction approaches to constructing more sustainable trails in difficult areas.



Trail on slope with drainage pipe



Trail on slope with retaining walls

5.3 Crossings

Inevitably the trail network will need to cross roads and natural features such as waterways and other physical barriers. In these cases, a design feature will be needed to guide users from one part of a trail to another. By implementing crossings that reflect the surrounding conditions a greater sense of connectivity can be achieved. The following are design guidelines related to types and conditions of trail crossings. The implementation of these types of trail enhancements can be costly. Where possible, the trails network should make use of existing bridges, controlled road crossings or lower volume road crossing locations where appropriate locations. In cases where this is not possible a new structure will be needed, and its type and design needs to be assessed on an individual basis.

Informal Water Crossing in Strathroy-Caradoc – Potential Future Crossing Location

The Recreational Trail Plan does not indicate specific types of crossings or specific locations, however, Proposed Trail Maps in Appendix A have approximate and recommended crossing locations and types. The plan provides high level alignments and Strathroy-Caradoc will be required to further investigate each crossing in the timeframe of implementation and respond to the safety, environmental sustainability, and user needs. Modifications may be required to proposed trail alignments in response to the outcomes of investigations, and it is the connectivity function over the exact alignment that is the critical element. Rerouting of a trail could offer cost saving opportunities; however, decision makers must be mindful of the behaviour of users and willingness to deviate from desired lines.

5.3.1 Road Crossings

In locations where a trail intersects with a roadway, the flow of pedestrian, cyclist and vehicular traffic will need to be managed. The crossing treatment selected generally depends on the type of road being crossed (e.g., low volume local street vs. urban arterial); number of lanes being crossed; traffic volume and vehicle operating speeds; sight lines; and the anticipated volume of trail users. More significant improvements are recommended for crossings with multiple lanes, higher traffic volumes and higher operating speeds. The following table outlines a range of at grade crossing types that correspond with roadway classification and character and includes typical considerations for their application. They are arranged in order from crossings of low volume rural roads

to high volume multi-lane urban roads. There are six examples of road crossing approaches for consideration by the municipality as they implement the trails network.

ADVANCED WARNING SIGN

- 2-lane road cross-section
- Good sight lines (no horizontal or vertical curves in road that obstruct visibility of trail users or oncoming vehicles)
- Low motor vehicle traffic volume
- Low to moderate pedestrian volume (consider existing conditions and potential future demand)
- Rural setting, or residential neighbourhood in urban setting

MEDIAN REFUGE

- 2-lane or multi-lane cross-section
- Generally good sight lines (no horizontal or vertical curves in road that obstruct visibility of trail users or motorists), though could be used on 2-lane roads where there are minor sight line limitations
- Low motor vehicle traffic volume
- Low to moderate pedestrian volume (consider existing conditions and potential future demand)
- Rural, urban fringe or urban setting (e.g., collector or minor arterial road in urban setting)
- Low to moderate cost to install

PEDESTRIAN CROSSOVER

- 2-lane or multi-lane cross-section
- Type ‘A’, ‘B’ ‘C’ or ‘D’ as per Ontario Traffic Manual Book 15
- Good or slightly obstructed sight lines
- Moderate motor vehicle traffic volume
- Low to moderate pedestrian volume (consider existing conditions and potential future demand)
- Urban or urban fringe setting (e.g., collector or minor arterial road in urban setting)
- Moderate cost to install

MID-BLOCK PEDESTRIAN SIGNAL (WITH OR WITHOUT CENTER MEDIAN)

- Multi-lane cross-section
- Applied in conditions with good sight lines or compromised sight lines (other factors have greater influence on decision than sight lines)
- Moderate to high motor vehicle traffic volume
- Moderate to high pedestrian volume (consider existing conditions and future demand)

- Urban or urban fringe setting (e.g., arterial road in urban setting)
- No signal-controlled nearby (e.g., within 200 m of trail crossing point)
- Moderate to high cost to install

INTERSECTION PEDESTRIAN SIGNAL

- Multi-lane cross-section
- Applied in conditions with good sight lines or compromised sight lines (other factors have greater influence on decision than sight lines)
- Moderate to high motor vehicle traffic volume
- Moderate to high pedestrian volume (consider existing conditions and future demand)
- Urban setting (e.g., arterial road)
- Trail crossing cannot be routed to a nearby stop-controlled intersection (e.g., within 200 m of trail crossing point)
- Note that signal control can also assist motor vehicles entering the arterial from the side street
- Moderate to high cost to install

CROSS RIDES

- 2-lane or multi-lane cross-section
- Applied in conditions with good sight lines or compromised sight lines (other factors have greater influence on decision than sight lines)
- Moderate to high motor vehicle traffic volume
- Moderate to high pedestrian and cyclist volume (consider existing conditions and future demand)
- Urban or urban fringe setting (e.g., arterial road in urban setting)
- Designed as per Ontario Traffic Manual Book 18
- Bicycle crossing signal head (additional to pedestrian crossing signal head) which permits cyclists to ride through the pedestrian crossover area without contravening the *Highway Traffic Act*
- Moderate cost to install when retrofitting an existing signalized crossing, moderate to high cost to install for locations where no signals exist

The following are some considerations for the design of roadway trail crossings:

- Creating and maintaining open sightline triangles for trail users to see approaching vehicles and for trail users to be seen by oncoming vehicular traffic
- Access barriers such as swing gates or bollards at trail access points to prevent unauthorized vehicles from entering the trail; and act as a visual be cue to trail users that they are approaching an intersection with a roadway.

- Caution signs along the roadway in advance of the crossing point to alert motorists to the upcoming crossing
- Caution signs along the trail to alert users of the upcoming roadway crossing
- Aligning the crossing point to achieve as close to possible a perpendicular crossing of the roadway to minimize the time that users are in the traveled portion of the roadway
- A concrete ramp in the boulevard and curb ramps on both sides of the road to allow users to enter and cross the roadway efficiently and quickly
- Tactile warning surface indicators which are mandatory for signalized crossings and recommended for unsignalized crossings
- Pavement markings where appropriate and to delineate a crossing; These should only be considered at crossings where there is some form of vehicle control in place (e.g. stop sign, or traffic signal). Pavement markings should not be used at uncontrolled trail intersections with roads (i.e., free flowing vehicular traffic that is not controlled by a stop sign or traffic signal). Trail users are required to stop and wait for a gap in traffic at uncontrolled intersections. Pavement markings at uncontrolled crossings may give trail users the false sense that they have the right-of-way over motor vehicles, which is contrary to the *Highway Traffic Act*.

In some locations signing on the trail may not be enough to get trail users to stop before crossing the road. Under these circumstances or in situations where the sight lines for motorists are reduced and/or where there is a tendency for motorists to travel faster than desirable, the addition of other elements into the trail crossing may be necessary. Changing the trail alignment may help to get trail users to slow and stop prior to crossing. Changes to the streetscape may also provide a visual cue and traffic calming effect for vehicles.

In addition to the general design guidelines and the roadway crossing considerations outlined above, there are other specific crossing features and design considerations that may need to be addressed as the municipality proceeds with the implementation of the master plan.

5.3.2 Grade Separated Crossings

Preferred due to directness and improved user experience by keeping the alignment entirely off-road with a grade-separated crossing from motor vehicle traffic. While this introduces more cost and complexity, it is considered a long-term solution that can be implemented as part of a road reconstruction. An underpass must be wide and tall enough for pedestrians and cyclists travelling in both directions to pass through safely. Vaulted or elliptical cross-sections are preferable to rectangular cross-sections for maximizing natural lighting. Regardless of the shape, the recommended width is 5 m. This includes 0.5 m of horizontal clearance when a cycling facility is adjacent to a wall, in addition to the width of the active transportation facility. A narrower tunnel increases the risk of accidents due to a combination of descent speed, low light, and the presence of sidewalls. A vertical clearance of at least 3 m throughout the tunnel will help ensure user comfort and optimal natural light.

Image: Example of underpass elevation profile design parameters

As with ramps for bridges and overpasses, the grade on the approaches to an underpass should be no greater than 5% to meet AODA requirements.

When the sightlines are not ideal—for example, when space constraints require an approach with a tight curve at the tunnel entrance—several measures can be used to improve the situation:

- Vandal-proof convex mirrors
- Markings that clearly separate traffic in each direction and discourage passing, such as a yellow centreline or a double line with a hatched buffer zone
- No passing signs at critical locations

CULVERT OPENING TYPOLOGIES

LEFT: Vaulted/arched underpass (Source: Velo Quebec) RIGHT: Rectangular Opening

Lighting in most cases should be included in underpass tunnels, regardless or how short they are in order to remove barriers to more cautious users. Lighting can be more than just safety, and as an attraction can increase safety by bringing more users into the space at night. Lighting as a feature can mitigate user fear, limit vandalism/crime and provide a 'destination' for users rather than a questionable point of passage. Underpasses without lighting will become an issue and installation of lighting afterwards has significantly increased costs. Plan for lighting as part of the initial project!

Example of Brockville former train tunnel lighting which provides an upbeat and user-friendly experience for travel

5.3.3 Water and Wet Area Crossings

Where trails pass through sensitive environments such as marshes, swamps, or woodlands with many exposed roots, an elevated trail bed or boardwalk is sometimes required to minimize impacts on the natural feature. If these areas are left untreated, trail users tend to walk around obstacles such as wet spots, gradually creating wider or multiple meandering footpaths through the surrounding vegetation, resulting in vegetation trampling and damage.

On trails built in sensitive natural areas, sections with challenging surface (rocks and roots) or erosion/flooding issues, a low-profile boardwalk may be appropriate and requires modest engineering to develop an appropriate design. For trails with more frequent usage, cyclist traffic, and maintenance vehicle access, a more sophisticated design and installation is necessary. This is likely to include engineered footings, abutments, structural elements and railings.

Helical piles are an alternative foundation methodology that is cost effective, and a low impact installation compared to concrete footings. Piles are drilled into the ground with a small skid steer or mini excavator then left in place to serve as the foundation. Helical piles allow for a narrower disturbance area and reduced numbers of trips to haul in concrete and haul out fill generated by pier excavations. Where finished boardwalk surfaces are less than 60cm above the surrounding grade a curb along the edge of the boardwalk will prevent users from rolling off the edge. Where the difference in grade exceeds 60cm, a railing should be provided. Boardwalks can be suitable for recreational motorized vehicle use however, will be subjected to more ‘wear & tear’ and thus need to be constructed with a more robust design. Considerations for steel joist structures and concrete abutments can aid in increasing longevity and mitigating maintenance repairs.

PHOTO OF A BOARDWALK TRAIL (WITH HELICAL PILES) AT THE UNIVERSITY OF GUELPH ARBORETUM

For areas where water is more of a concern and recreational vehicle impact may require increased mitigation, prefabricated bridges offer increased lifespan and lower maintenance over their lifecycle. A bridge doesn't necessarily need to span a creek or river but can offer a problem-solving tool for seasonal wet areas that are prone to flooding or washout. Prefabricated pedestrian bridge structures, in particular those that utilize weathering steel and wood decking, are the most cost-effective structures provided by the market.

A 'pony truss' or 'H-section' bridge style can span up to 55m and are the most economical design choice. For larger spans, a full 'box truss' is required and can span up to 80m. Alternately, custom bridges can offer more flexibility for architectural design features and are less limiting in maximum free span; however, tend to cost exponentially more in design and installation costs.

When spanning greater distances, assess both the material costs and design/approval costs for structures. This can help determine whether it is best to add an in-water pier or design a more extensive structure for a single span. Typically, the use of piers and prefabricated structures is a more cost-effective solution opposed to a large spanning structure, however there are several variables such as environmental sensitivity and aesthetic considerations that should be recognized when making the decision.

PHOTOS OF PONY TRUSS AND H-SECTION BRIDGES

ACTION ITEM

Monitor user behaviour and use RTMP recommendations to create well-designed crossings and bridges.

5.4 Access Barriers & Gates

Access barriers are intended to allow free flowing passage by permitted user groups and restrict access by user groups that are prohibited. Barriers typically require some mechanism to allow access by service and emergency vehicles. Depending on site conditions, it may also be necessary to provide additional treatments between the ends of the access barrier and edge of the multi-use trail right-of-way to prevent bypassing of the barrier altogether. Additional treatments may consist of plantings, boulders, fencing or extension of the barrier treatment depending on the location.

There are many design alternatives for trail access barriers, and some have proven to be more successful than others. They can generally be grouped into three categories:

- Bollards
- Offset Swing Gates; and,
- Single Swing Gates.

Each access point throughout the Strathroy-Caradoc trails network should be evaluated to determine which type of barrier is the most appropriate and what additional treatment(s) may be required to discourage unauthorized users from bypassing the barrier. Gates are a least preferred option as they require cyclists to dismount, and often do not accommodate larger bikes (e.g., cargo bikes, trailers).

Bollard at trail entrance

Bollards

The bollard is the simplest and least costly barrier. The structure can range from permanent, direct buried wood or metal posts, to more intricately designed cast metal units that are removable by maintenance staff. An odd number of bollards (usually one or three) can be placed in the multi-use trail bed to create an even number of “lanes” for users to follow as they pass through the barrier.

Although the removable bollard system provides flexibility to allow service vehicle access, they can be difficult to maintain as the metal sleeves placed below grade can be damaged by equipment and can become jammed with gravel and debris from the trail bed.

Swing Gates

A single swing gate combines the ease of opening for service vehicle access, with the ease of passage of the bollard. Gates also provide a surface / support for mounting signage. The swing gate should provide a permanent opening to allow permitted users to flow freely through the barrier. The width of the permanent opening must be carefully considered so that it will allow free passage by wheelchairs, wide jogging, cargo bikes, double strollers and bicycle trailers and electric scooters, yet prohibit access by unauthorized vehicles such as snowmobiles and all-terrain vehicles. Note that where snowmobiling are permitted, and during winter months the swing gate portion of the barrier is locked in the open position to allow free passage for trail groomers and snowmobilers with a valid permit from the Ontario Federation of Snowmobile Clubs (OFSC).

The offset gate is similar to the single swing gate, except that barriers are paired and offset from one another. Although they can be effective in limiting access by unauthorized users and can be easily opened by operations staff, some groups including cyclists, especially cyclists pulling trailers and wheelchair users, can have difficulty negotiating the offset swing gate if the spacing between the gates is not adequate. In urban areas, the single swing gate or bollard is quite effective for most applications. For large parks, park service access/pathway routes, more rural settings and locations where unauthorized access is an ongoing problem, a more robust single swing gate should be employed.

Offset P-gates at road crossing

Heavy-duty swing gate

Example of Staging Area, Silvercreek Park, Guelph, ON

5.5 End of Trip Facilities

Network continuity, connectivity and feasibility are further enhanced through the implementation of trail amenities. In some cases, amenities can be a determining factor for trail users and cyclists as they meet a variety of accessibility needs. Trail amenities can reinforce Strathroy-Caradoc's commitment to promoting active transportation and recreation and may include lighting, seating/rest areas, parking areas, signage, bicycle parking, loading or unloading areas, garbage receptacles, washroom and amenity buildings and gates/access barriers.

Trail amenities can be implemented individually or as a grouping of amenities commonly referred to as a staging area. Staging areas are nodes throughout the trail network where users can travel to, or where groups can meet to begin their journey on the trail. An even distribution of staging areas in the rural parts of the community will provide multiple meeting and access points to the trail system. In urban areas existing community centres are excellent candidates for trail staging areas as they often have many of the necessary amenities. A typical staging area will include the following elements:

- Parking for automobiles – parking capacity will vary depending on the location of the staging area. A minor staging area may accommodate five to eight cars, whereas a major staging area may accommodate over 30 cars. Spaces for trailers may be included at rural staging areas where equestrian and/or snowmobile use is permitted on the trail
- Waste receptacles – located where they can be easily accessed by service crews and at regular intervals, typically grouped with other amenities such as benches, etc.
- Information/trailhead signage complete with mapping
- Bicycle parking facilities
- Seating – may also include picnic tables
- Washrooms – should be considered for all staging areas. Seasonal, portable toilets are sufficient at small rural staging areas; and
- Potable water – optional, typically only at major urban staging areas (e.g., community centres).

Example of trail amenities including shelter, picnic table and flat boulder seating

In the urban areas of Strathroy-Caradoc, staging areas could be integrated into many of the existing park spaces and recreational destinations. Once the master plan has been adopted the municipality should undertake and identify a set of strategic priorities for future staging areas.

There are a number of trail amenities which could be incorporated into the overall design of the trail. The following are some examples of different types of trail amenities and best practice considerations for selecting trail amenities:

- Provide trail amenities in strategic locations along the trail route (e.g., break up long distances between destinations with rest areas and/or interpretive nodes);
- Cluster trail amenities around key destinations to enhance comfort and enjoyment at trip generators (e.g., around trailheads and staging areas);
- Consider maintenance requirements for amenities, including whether seasonal or year-round use is planned
- Where consultation and coordination is required with other parties or agencies prior to the installation of amenities, ensure that consultation occurs early in the process to ensure agreement over amenity location and design.

Seating provides the opportunity to pause along the trail at points of interest or just to rest. Young children, older adults and those with disabilities will need to rest more frequently than others. Benches are the most common form of seating, but walls of appropriate height and width, large flat boulders, and sawn logs are some alternatives depending on the trail setting. The design of seating areas and lookouts should include a level area beside the bench with a curb or other appropriate wheel stop for mobility-assisted devices. For heavily used routes it is reasonable to provide some form of seating every 250 – 500m.

Example of Staging Are

Refer to 3.4 Trailheads and Highlighting Points of Entry for proposed trailhead facility types.

5.6 Lighting

Lighting within trail systems must be carefully considered to ensure environmental and financial factors are well managed. Lighting costs and environmental concerns can be mitigated with the use of diffused lighting, energy efficient bulbs and motion sensors. Women and people with young families are more likely to use a trail if lighting is provided, especially when daylight hours are reduced. Lighting a trail, in part or full, can remove barriers to recreational and commuter trail use. Consider lighting all urban trails, in particular those that facilitate connections to the train station, amenities and community services. If full lighting is not feasible, consider 'refuge' lighting key areas at regular intervals to provide safe landing points. Solar lighting options are increasing in function and decreasing in cost, with options to delay light activation to concentrate seasonally limited battery function when needed most. Solar is an excellent solution for remote trailheads and short sections of trail that present safety/vandalism concerns.

Lighting plays a key role in preventing crime in and around trail networks and park spaces. Adequate lighting allows people to see and be seen and gives people time to respond to what is around them. Light features also illuminate potential hazards on trails such as rocks and branches so that they can be avoided. Personal safety is increased through the illumination of sightlines, pathways, and possible entrapment areas and hiding places.

While illuminating entire trails is not standard practise in trail development, trail lighting is often recommended in key locations such as:

- Main connections to important attractions such major parks
- Celebratory spaces and waterfront promenades that have regular activity after dusk
- Trails that serve important commuter and school routes, where lighting may be needed to provide guidance during periods of low light (e.g., fall and winter when days are shorter)
- Trails that provide a commuter/access function, connecting people to transit, groceries, etc.
- As refuge nodes/urban trailheads where intermittent lighting is more feasible.

LIGHTING AS CRIME PREVENTION

Lighting plays a key role in preventing crime in and around trail networks and park spaces. Adequate lighting allows people to see and be seen and gives people time to respond to what is around them. Light features also illuminate potential hazards on trails such as rocks and branches so that they can be avoided. Personal safety is increased through the illumination of sightlines, pathways, and possible entrapment areas and hiding places.

5.7 Wayfinding

Wayfinding helps people know where they are, where they want to go and how to get there. Effective wayfinding design improves the use and experience of spaces and reduces confusion for trail users. Design elements such as signs, maps, road markings and sight lines provide wayfinding and directional support for trail users. Wayfinding features can also attract people to use new trails and trail networks by illustrating the length, slope and surfacing characteristics of the trail, as well as exit points and destinations along the way. Trails that provide wayfinding features to show how individual routes connect to larger trail networks can encourage more people to use active forms of transportation. Wayfinding should be an integral part of the trail design to improve safety, navigability, and educational opportunities.

Wayfinding is divided into four processes:

- Orientation: understanding where you are in relation to where you want to be
- Route decision: deciding how best to get to the destination point
- Route monitoring: checking to see along the route that you are on the right path
- Destination recognition: being able to recognize when you have reached your destination

Recommended Wayfinding per trail type is included in the Material and Amenity table in Section 6, and recommended Wayfinding and cost estimates for each proposed trail are included in Appendix B.

5.7.1 Wayfinding & Accessibility

Wayfinding design must be universally understood to truly be effective and inclusive for all visitors. Trails should be open and welcoming to people with varying levels of mobility, hearing, vision and language. In short, all levels of ability and understanding should be taken into consideration when designing wayfinding features such as signage and maps.

Some examples of wayfinding features that can be utilized to increase accessibility include:

- Non-visual cues such as audio signals or material change at intersections can improve safety for visually impaired people;
- Clearly delineating between accessible routes and non-accessible routes can improve usability and safety for people with mobility restrictions;
- Using universally understood symbols or icons on wayfinding features can make it easier for people who speak a different language to find their way around.

5.7.2 Trail Signage Design Considerations

Trail sign types typically include trailhead / etiquette signs, regulatory signs, gateway signs, directional signs, and interpretive / informational signs. The following are some guidelines that should be taken into consideration for the development of trail signage:

- Trail signage should be designed as a "family" of signs with different purposes and messages. Wayfinding signs should be designed with a unified theme for ease of recognition and navigation
- Trails require clear information about how to navigate the route, how to use the trail infrastructure, and how to observe proper trail etiquette
- All trail signs should be clearly visible along the route and should be designed to be understood by the widest range of users possible
- The use of graphic symbols, sharp contrasts in colour, tactile elements and wire connections for audible signage should be considered in the design
- Other types of signs or sign elements to consider include site-specific warning signs to provide information (e.g., narrow paths, accessibility conflicts)
- Allowing advertisements or company sponsorships may be useful to offset costs of trail maintenance and improvement
- Conservation Authorities are responsible for developing, maintaining, providing wayfinding within their properties. Within Strathroy-Caradoc two Conservation Authorities are represented: St. Clair Conservation Authority and Lower Thames Conservation Authority. These agencies are important partners in developing a comprehensive wayfinding strategy given the majority of the destination trails in rural areas of the are on lands owned and managed by the Conservation Authorities.

5.7.3 Types of Signage

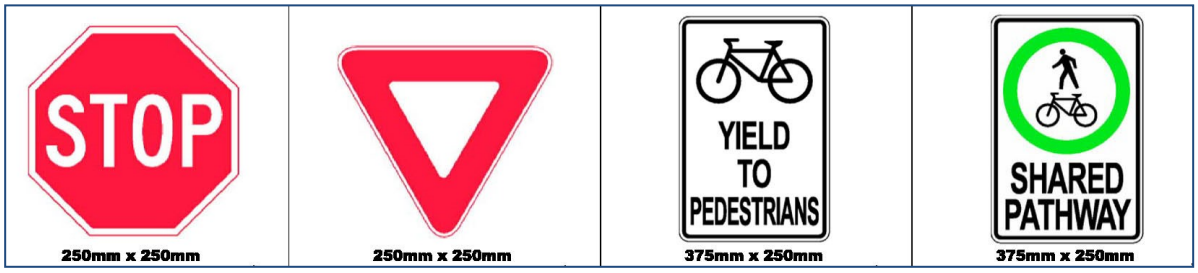
Trailhead signs are typically placed at key destinations to orient users upon arrival. These introduce users to the network through mapping and other trail information, including trail rules and etiquette. According to the *Accessibility for Ontarians with Disabilities Act*, trailhead signage must indicate the length of the trail; type of surface; average and minimum trail width; average maximum running/longitudinal and cross slope; and the location of amenities (where provided). Signage must have text that has a high tonal contrast with background colours to facilitate visual recognition, and text must use a sans serif font. Trailhead signs should be placed so they are clearly visible and provide landmarks for trail users, and where visible from nearby roadways they also serve as a form of branding for the trail.

Trailhead signs may also include warnings about poisonous plants, information about the trail's ecology and how to minimize environmental impact, historical information, a community bulletin board to inform trail users of upcoming events along the trail, a directory of key destinations, and a point of contact for trail maintenance issues.

Directional signs should be used throughout the trail at regular intervals of uninterrupted segments and at pathway intersections. Directional signs provide users with reassurance that they are following the designated trail network. Coupled with directional signs, distance markers placed incrementally along a trail can enhance the user's experience if they are using the trail for exercise. Frequent and accurate markers can also help in the case of an emergency, especially if they are recorded with a GPS device and incorporated into a digital mapping format.

Interpretive or informational signs can be used in combination with directional signs or on their own to educate users of points of interest along the trail, such as natural and cultural heritage features. These signs provide specific educational information about points of ecological, historical and general interest, as well as current land uses along the corridor depending on the interpretive program and complexity of information to be communicated.

Regulatory signs are intended to restrict aspects of travel and use along the trail. Signage restricting or requiring specific behavior is not legally enforceable unless it is associated with a provincial law or municipal by-law, etc. Where applicable, it is recommended that authorities discreetly include the municipal by-law number on signs to reinforce their regulatory function. Standard regulatory signs are aluminum plate blanks of varying dimensional size with a painted or reflective sheeting surface. Regulatory signs call attention to a traffic regulation concerning a time or place on a route and are installed in an optimal location most visible to trail users. Generally, these signs are rectangular shape except for stop and yield signs. For most trail applications the size can be reduced from the specified size for signs used along roads (i.e., 50% smaller). Typically, they are individually mounted on a metal post or custom wood post; grouped on a metal post or custom wood post; or grouped on a custom sign board, so long as the sign message is clearly visible.



5.8 Leveraging Technology

There are several emerging technologies and innovations that can be incorporated into the design of new trails and improvements to existing trails that can enhance the user experience, promote use and widen inclusivity of the trails network. Technology is a tool to be leveraged to address a problem and implementation needs to result in specific outcome. Recognizing that technology-based applications can have high capital, staffing, and training investments costs, the benefits need to be tangible and in magnitude with the problem they are addressing. There is no denying technology is fun and the enthusiasm for technology-based solutions will garnish a high impact amongst current and future generations of young trail users. Consider how technology can expand the traditional parameters of a trail function and programming – reaching more people in meaningful ways, while reducing demands of maintenance and operational practices.

Below are examples of how technology can be incorporated into a trail system.

- Waste and parking management through sensors and dashboard systems to enable ‘as needed’ maintenance service with strategic deployment and better track

frequency of use. Companies such as eleven-x in Waterloo, Ontario offer wireless real-time data solutions that are adaptable to existing amenities/systems.

- Charging stations that offer USB ports (for phones, tablets), E-bike rapid charge ports. Stations can be solar or hardwire powered. Charge stations come in standalone towers or can be found integrated with multi-function site furnishing.
- Electric car charging in appropriate locations/parking lots.
- Wi-fi can draw users to a trail system and enable accessibility aid devices. Small cellular broadcast devices require little power and can be standalone units or integrated with furnishings such as those made by Seedia which collect data from, and output directed messaging to users.
- Digital mapping such as Google Street view for trails and 360-degree imagery will allow users to preview the challenges ahead and participate virtually in the beauty of Strathroy-Caradoc trails when they are unable or for education purposes.
- User count displays, such those offered by Eco-Counter provide data that will inform operational management while promoting the success of the trail system.
- Heated Surfaces: for snow removal: electric or geothermal systems, snow melting mats
- Innovative Trail Surfacing: texture applications and finishes utilizing renewable/recycled materials and permeable paving. Innovative surfacing can include using sustainable products and local sourcing with the goal of reducing the environmental impact and supporting local economy.
- Electric bikes and Scooter Share Programs: Micro-mobility solutions can provide viable transportation options for short trips.
- User Engagement through Interactive Elements: Can incorporate games and challenges to provide entertainment or purpose to trail use. Fitness challenges through checkpoint stations, scavenger-hunts, light sensors, electronic marker stations, and other interactive elements to increase participation, engagement, and sharing through web/app platforms.
- Solar Lighting: Can solve power source issues. Not suitable for wooded areas, unless larger panel (outside tree canopy) feeds multiple units.
- LED: Low energy, offer more programing options and colour spectrum control.
- Concerns with Lighting: May interfere with sensitive flora & fauna, consider location and need.
- Interactive Lighting: options, beyond functional, can be a visual feature and/or support a public art feature. Light features can be permanent, seasonal or temporary. Dynamic lighting is an excellent way to activate a space in winter. Features can utilize existing structures or vegetation or be stand alone units that may serve a sculptural function during the day.

ACTION ITEM

Use wayfinding, technology, and amenities to create more inclusive and user-friendly trail designs.

5.9 Crime Prevention Through Environmental Design (CPTED)

Reducing risk to users and promoting safety will be considered when selecting and designing individual trail routes.

To the extent possible, trails should be designed to allow users to feel comfortable, safe, and secure. Principles of Crime Prevention Through Environmental Design (CPTED) provide guidance on how to consider and appropriately design with comfort and safety in mind.

CPTED should be considered and appropriately applied to help address security issues concerning the use of these facilities, particularly in locations where trails are infrequently used, isolated or in areas where security problems have occurred in the past.

There are four core CPTED principles which include:

1. NATURAL ACCESS CONTROL: Deters access to a target and creates a perception of risk to the offenders.

   GOAL: MINIMIZE OPPORTUNITIES FOR CRIME

2. NATURAL SURVEILLANCE: The placement of physical features that provides for natural visibility.

   GOAL: DETER CRIME

3. TERRITORIAL REINFORCEMENT: Defines clear borders of controlled space from public to semi-private to private to understand ownership.

   GOAL: TO ENCOURAGE PEOPLE TO REPORT/ PREVENT CRIME

4. MAINTENANCE: Allows for the continued use of space for its intended purpose.

   GOAL: CREATE A 'CARED FOR' IMAGE & SENSE OF PLACE WHICH HELPS REINFORCE PRINCIPLE 3

Understanding how these principles translate to Municipal planning and design is important to help inform future next steps. Some specific design considerations that have been employed by municipalities include:

- Increasing visibility by ensuring routes pass through well-used public spaces.
- Providing the ability to find and obtain help: Signage that tells users where they are along the trail system.

- Providing “escape” routes from isolated areas at regular intervals.
- Maintaining sight lines and sight distances to allow good visibility by users.
- Providing trailhead parking in highly visible areas.
- Minimizing routes that pass through or along features that create hiding places such as breaks in building facades, stairwells, dense shrubs and fences.
- Illuminate possible places where intruders could hide
- Designing underpasses and bridges so that users can see the end of the feature as well as the area beyond
- Installing signs near entrances to isolated areas can be used to inform users that the area is isolated and suggest alternative routes.
- Ensuring high levels of visibility in all space design through the use of lighting, open corridors and the elimination of sight blocking barriers.

SECURITY

Security and crime prevention through environmental design are always a concern when designing trail systems. Because of the strong connection between our natural heritage systems and trails, site lines and access to people can be limited. As we are encouraging populations to utilize trails for commuting and general transportation, security measures can support users less included to risk off peak hours or secluded sections of trail.

Example of how a Wattway Pack can power a security camera.

One of the key considerations for security measures is selecting a system that can be successfully administered and maintained. Some systems require greater monitoring by staff. It is also important to communicate the level of service being provide by the security measures to the public, ensuring expectations are transparent and fair.

Benefits:

- Removes barriers of use through provision of emergency help
- Supports evening and winter use
- Can be utilized to monitor problems areas (cameras)
- Solar powered options
- Can supplement for lack of lighting
- Dashboards offer an integrated interface for information and control of all your smart solutions, rather than independent systems provided by the manufacturers. A dashboard can consolidate the information provided by other systems and/or receive the information directly.

5.10 Trails in Natural Areas

Natural areas provide opportunities to enjoy and interpret nature and participate in activities that may not be possible in more traditional parks. Striking the balance between providing public access and the need to conserve and/or protect the natural resources can be a difficult goal, especially in situations where there is an established urban area nearby or surrounding the feature.

Where this is the case, this increases the pressure on the very resource that users seek and enjoy. Where trails are in natural areas it is important that they be properly aligned and designed, and the area is monitored for the effects of inappropriate use and/or overuse. Regular monitoring will alert trail managers to locations where users may be straying off the trail or taking short cuts so that mitigation strategies can be developed before significant damage to soils and vegetation occurs. If trails are not carefully planned, designed, constructed, and maintained in these areas users will create their own desired line foot trails, sometimes in sensitive locations where it would be preferable not to have trails at all. The addition of carefully considered plantings can provide a natural deterrent to the development of these informal and unwanted trails in natural settings. Proper planning, design, and construction of trails, coupled with public education can assist with creating the balance between use and protection.

In some cases, trails and people should not be in sensitive natural areas. Vegetation communities that are highly sensitive to disturbance and narrow, constrained wildlife corridors are two examples where trails may not be appropriate. In these cases, it is advisable to provide alternative trail routes and information (e.g., signing, public information campaigns, etc.) explaining the management decision to exclude trails from the area. When designing trails through sensitive natural heritage features the following general considerations should include:

- Route or reroute to avoid the most sensitive and/or critical habitats
- Consider and evaluate alternative routes and design treatments
- Use previously disturbed areas where possible and appropriate
- Maintain natural processes and incorporate habitat enhancements
- Compliment and highlight natural features through interpretation.

Where proposed trail routes pass through sensitive natural areas an Environmental Impact Study should be completed to assess the potential impact of the trail, identify mitigation strategies and design and construction requirements prior to approval.

Planning for trails early in the development process ensures that linkages are in the best locations and that they are implemented outside of the most sensitive and protected environmental features. One solution to the challenge of placing trails within environmental buffers is to dedicate linear trail blocks parallel to environmental buffers during the subdivision planning process. This enables construction of the trail as part of the development of the neighbourhood when area grading is taking place. Dedicated blocks also allow homebuyers to clearly see planned trail locations and think about implications the trail may have on the use/enjoyment of their property prior to making a purchase.

6

Maintenance & Lifecycle Management

STRATHROY-CARADOC
RECREATIONAL TRAILS
MASTER PLAN

6 Maintenance & Lifecycle Management

6.1 Maintenance Management

Guiding next steps in the management and maintenance of trails, Strathroy-Caradoc should consider adopting a trail maintenance log to document maintenance activities. The log should be updated when features are repaired, modified, replaced, removed, or when new features are added.

Accurate trail logs also become a useful resource for determining maintenance budgets for individual items and tasks, and in determining total maintenance costs for the entire trail. In addition, they are a useful source of information during the preparation of tender documents for trail contracts, and to show the location of structures and other features that require maintenance.

Leveraging technology to collect managing data can be a powerful tool to finding efficiencies and more accurately budgeting for need. Digital dashboard style programs can be an effective interface for staff to organize inputs and action items. This type of technology can be linked to digital trail logging, user reporting systems, and on-site sensors (such as waste bin sensors) to create the ability for **on-demand service and strategic deployment of resources**. On demand service styles can replace regular maintenances practices and reduce overall demand on resources.

Reducing maintenance through strategic infrastructure investments, including trail realignment, surface treatment and use of structures should be considered for areas of reoccurring maintenance issues.

Using the maintenance strategies outline within the trail plan as well as any existing trail infrastructure maintenance practices should be a starting point from which a trail specific maintenance plan and budget be developed. In addition, annual maintenance budgets should be refined to accommodate the maintenance of trail facilities. As the proposed trail network is implemented the trail budget should increase to address the increasing number / length of trail facilities that have been implemented.

6.1.1 Maintenance Service Response

The table below provides an overview of maintenance tasks and frequencies that should be executed as part of standard trail facility care.

FREQUENCY	MAINTENANCE TASK
IMMEDIATE (within 24 hours of becoming aware of the situation through a "hotline", email or other notification or observation)	– As a minimum, mark, barricade and sign the subject area to warn trail users or close the trail completely until the problem can be corrected. – Remove vegetation and/or windfalls, downed branches etc., where traffic flow on the trail is being impaired or the obstruction is resulting in a sight line issue. Remove hazard trees that have been identified. – Repair or replace items that have been vandalized or stolen/removed. This is especially important for regulatory signs that provide important information about trail hazards such as road crossings, steep grades, and sharp curves. – Removal of trash in overflowing containers or material that has been illegally dumped. – User safety addressed for obstructed drainage systems causing flooding that poses a hazard to trail users or that is resulting in deterioration that poses an immediate safety hazard. – Monitor trail areas and structures that are prone to erosion after severe summer storms and repair as required. – Repairs to structural elements on bridges such as beams, railings, access barriers and signs.
REGULARLY (weekly / biweekly / monthly)	– Trail patrols/inspections should review the trail conditions (as often as weekly in high-use areas), to assess conditions and prioritize maintenance tasks and monitor known problem areas. – Mow grass along edges of trails (in parks and open meadow settings only). Depending on the trail location, this may be done weekly, bi-weekly, or monthly and the width can vary according to the location (typically 0.5 to 1.0m). This helps to keep the clear zone open and can slow the invasion of weeds into granular trail surfaces. Not all trails will have mown edges. In woodland and wetland areas, pruning and brushing is typically the only vegetation maintenance to be undertaken. – Regular garbage pickup (10-day cycle or more frequent for heavily used areas). – Repair within 30 days or less, partially obstructed drainage systems causing intermittent water backups that do not pose an immediate safety hazard, but that if left unchecked over time will adversely affect the integrity of the trail and/or any other trail infrastructure or the surrounding area.

FREQUENCY	MAINTENANCE TASK
ANNUALLY	– Conduct an annual safety audit. This task can be efficiently included with general annual safety audits for parks and other recreation facilities. – Evaluate support facilities/trailside amenities to determine repair and/or replacement needs. – Examine trail surface to determine the need for patching and grading. – Grading/grooming the surface of granular trails and topping up of wood chip trails. – Pruning/vegetation management for straight sections of trail and areas where branches may be encroaching into the clear zone. This task is more of a preventative maintenance procedure. Cuttings may be chipped on site and placed appropriately or used as mulch for new plantings. Remove branches from the site unless they can be used for habitat (i.e., brush piles in a woodlot setting) or used as part of the rehabilitation of closed trails. Where invasive species are being pruned and/or removed, branches and cuttings should be disposed of in an appropriate manner. – Inspect and secure all loose side rails, bridge supports, decking (ensure any structural repairs meet the original structural design criteria).
EVERY 3 TO 5 YEARS	– Cleaning and refurbishment of signs, benches and other trailside amenities.
EVERY 10 TO 20 YEARS	– Resurface asphalt trails (assume approximately every 15 years). – Major renovation or replacement of large items such as bridges, kiosks, gates, parking lots, benches etc.
COST EFFECTIVE	– Patching/minor regarding of trail surfaces and removal of loose rocks from the trail bed. – Culvert cleanout where required. – Top up granular trail surfaces at approaches to bridges. – Planting, landscape rehabilitation, pruning/beautification. – Installation/removal of seasonal signage.

6.2 Seasonal Maintenance

Seasonal maintenance should be informed by user experience and need, with realistic expectations outlined to the public. Each trail typology in the trail hierarchy provides a recommendation for the level of seasonal maintenance that should be expected, including winter maintenance, and this information should be made available to trail users. Seasonal maintenance includes; vegetation clearing along edge zones, hazard tree removal, surfacing repairs, signage repairs, and winter snow removal.

PRIORITIES FOR SNOW AND DE-ICING

Winter snow removal should be executed for trails that serve a conveyance function - commuter function and/or connect users to key services/infrastructure, with a strong recommendation that such trails be paved with asphalt. All trails within road corridors (Type 1 – Urban Trail Multi Use Pathway) should received snow removal and de-icing treatment, and a strong recommendation for full to partial snow clearing for other key trails (Type 2 – Primary Trail).

With snow removal comes and expectation of salt/sand and this is not advised in environmentally sensitive areas. There is also an expectation for response timing and frequency that needs to balance staffing and budgetary abilities. Level and frequency of maintenance should be clearly communicated on trail websites and trailhead signage.

Consider a 'partial clearing' approach for off-road conveyance routes to set realistic expectations for snow mitigation style. Granular trails can be plowed with a raided blade, facilitated control over build up vs full clearing. This can be a valuable tool for controlling the build up of uneven icy trials that can form with intermittent warm to cold fluctuations. Leaving some snow cover on trails can provide excellent traction for users and continue to facilitate a range of users.

FACILITATING WINTER MOBILITY USES

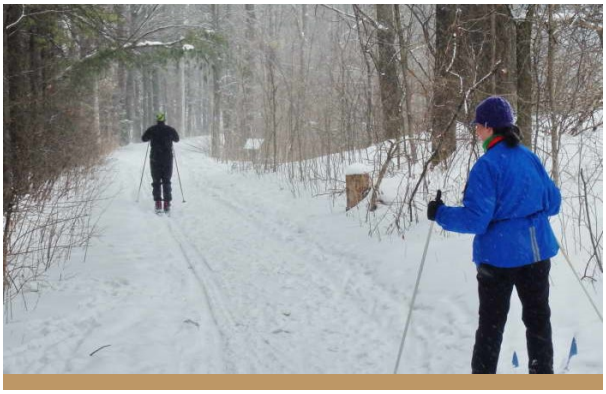


PHOTO: ENJOYING WINTER TRAILS | 2021

Snow covered trails offer recreation enthusiasts an exciting way to experience the winter months. Snowshoeing, cross-country skiing, and shuttling users in sleds are great examples of activities that require snow to be left on trails. Trails which serve less of a conveyance role, such as Type 3: Secondary Trails and Type 4: Woodland/Sensitive Area Trails, should not receive snow clearing treatments to facilitate these alternative seasonal uses. Note, select maintenance should be considered in areas or at times of year when icy build up presents a barrier to most uses.

Frequent pedestrian traffic can impede uses such as cross-country skiing and consideration should be lent to assigning specific trail sections for restricted use. Trail grooming should be considered for trails such trails and could be supported by volunteers and/or informal 'user pass' donation style programs. Consider winter programming to encourage use in this off season, including event based, group activities and self-running activities that are geared to highlighting the joys of winter trail use.

Wayfinding signage is very important along trails that will not be winter maintained, and an increased frequency of directional markers and informational posting should be included along these trail types.

6.3 Material Lifecycles

As trail amenities, surfacing and signage, especially nodal areas such as trailheads, are a key aspect of trail infrastructure and function as a marketing agent for the greater trail system, it is critical that maintenance practices exemplify the standard of quality Strathroy-Caradoc wishes to deliver. Trail amenities tend to be highly used and exposed to harsh elements, thus are more heavily impacted by wear and tear and vandalism. Identifying and managing the level of repair/replacement required is influenced by the frequency of use, type of user, and size/complexity of amenity programming. Assumptions can be made to provide baseline expectations for allocation of maintenance resources, however monitoring and collecting data on demands is necessary to inform the increase or decrease of future resource allocation.

When selecting materials and products, balancing lifecycle duration, capital costs and maintenance costs is important. Overall, selections that reduce capital, maintenances and overall labor budgetary costs is best, however there maybe items where maintenance costs are preferred to higher capital investments and can have other benefits. Such an example is often the choice between paved and granular trails and parking areas. Granular surfaces require greater maintenance, however, are lower cost to install and have environmental benefits through infiltration and material composition.

As most damage is caused due to winter related impacts, inspection of all amenities and surfacing should occur each spring prior to increase in trail users as the weather turns more favorably. All damaged or hazardous conditions/features should be removed, identified or signed appropriately on site to inform users that rectification is in progress. This action both limits the potential risk factor the failure has incurred and supports the municipality's commitment to the upkeep of the trail system. The table below outlines key areas of consideration for amenity and material selection, and guided the selection of each element for the project sheets of each proposed trail in Appendix B, including cost.

KEY AREAS OF CONSIDERATION FOR MATERIAL & AMENITY SELECTION					
FEATURE	INFRASTRUCTURE/MATERIALS	BENEFITS	LIMITATION	LIFE CYCLE	MAINTENANCE
Parking, Drop off Areas & Loading Zones	Granular	– Permeable – Low cost to install and maintain	– Ruts and potholes form seasonally – Increase risk for slip, trip and falls. – Less conducive to snow removal. – Harder to delineate parking stalls to maximize use.	5 -10 years	– Annual infill of potholes and ruts. – Regrading and granular top up to 'reset' life cycle.
	Asphalt/Tar and Chip	– Able to delineate stalls and maximize capacity. – Conducive to snow removal	– Impermeable – Need for drainage management/infrastructure	15-25 years	– Minimal to no maintenance.
	Permeable Systems (pour in place, modular paver and/or reinforced grids which support granular surfaces)	– Permeable – Able to delineate stalls and maximize capacity. – Conducive to snow removal	– Higher cost – Susceptible to sediment clogging voids	15 -40 years	– Power washing to clear voids and maintain drainage function (frequency depending on winter maintenance and sediment flow into paved area)
Rest Area	Prefabricated Benches & Tables	– Facilitate accessible seating options. – Manufacturer warranty and replacement parts – Defines and encourages site use – Wide range of material options that can increase longevity and/or ease of maintenance and partial replacement.	– Susceptible to vandalism, theft, and degradation by elements, material composition considerations are important. – Need to be kept in good condition or are strong negative reflection on the trail system.	8-15 years	– Minimal annual inspection for defects
	Informal Seat Stones	– Durable and low-cost option – Can facilitate a dual purpose for access barriers	– Does not provide additional accessibility and comfort features	None	– No maintenance
	Lawn Area	– Multi-purpose – picnic, child/dog friendly, area to prepare for trail activity outside of active vehicular areas.	– Requires some maintenance to enable a desirable level of function.	None	– Mowing every 3-4 weeks at a minimum

KEY AREAS OF CONSIDERATION FOR MATERIAL & AMENITY SELECTION					
FEATURE	INFRASTRUCTURE/MATERIALS	BENEFITS	LIMITATION	LIFE CYCLE	MAINTENANCE
					– Over seeding and week management every 2-5 years to maintain/improve quality.
Lighting	LED	– Low energy, low operational cost – LED lower cost savings benefits are reached with longer running lights such as at trailheads.	– Higher procurement cost	10-15 years bulb 35-45 years Poles	– Monitoring for bulb replacement and vandalism
	Conventional Power	– Reliable and best suited for facilities highly used in winter evenings – Lower capital costs and operational knowledge	– Higher operational costs	N/A	– N/A
	Solar Power	– Lower operational costs – Positive sustainability optics	– Higher capital cost and operational knowledge needed – Increased maintenance and vandalism volubility	N/A	– Cleaning to remove dust – 2-5-year cycles reflective of seasonal rainfall
Signage	Detailed Maps/Information	– Large scale points of information, including trail mapping, interpretive information, user information – Key amenity to any trailhead that offers route options or multiple destinations, or feature.	– Larger and/or more complex construction – higher maintenance and replacement cost. – Require specialized skills to design.	N/A Depends on materials and design.	– Minimum seasonal inspection for vandalism and/or degradation. – Monitoring for content update needs (approx. 2-5-year cycles).
	Wayfinding/Placemaking	– Minor signs are intended as a simple directional communication or placemaking identifier. – Often single post or simple construction – low maintenance and replacement cost.	– Are limited in the information they can communicate.	5-10+ years	– Minimum seasonal inspection for vandalism and/or degradation.
Waste Management	Standard Waste Bins	– Important tool to reduce littering. – Low cost install and replacement. – Fit well with standard waste collection practices – Can range from barrel bins to more elaborate models with restricted lids.	– Service collection is onerous as locations can be high in number and spread out. Limited winter maintenance can impede seasonal specific servicing. – Minimal capacity and or long durations between serviced lead to overflow and/or odors.	10-15 years	– Functional maintenance per capacity projections - model specific – General inspections with waste pick up for repair or replacement needs.
	Innovative Waste Bins	– Important tool to reduce littering. – Improve feasibility of waste sorting options through collection efficiencies. – Reducing waste collection frequency: – Censored waste/recycling bins that inform the need for emptying through a centralized dashboard.	– Service collection is onerous as locations can be high in number and spread out. Limited winter maintenance can impede seasonal specific servicing. – Can require changes to standard practices, equipment and/or 3rd party collection. – Can require specialized equipment for monitoring or collection.	10-20 years	– Functional maintenance per capacity projections or censor notifications - model specific – General inspections with waste pick up for repair or replacement needs.

KEY AREAS OF CONSIDERATION FOR MATERIAL & AMENITY SELECTION					
FEATURE	INFRASTRUCTURE/MATERIALS	BENEFITS	LIMITATION	LIFE CYCLE	MAINTENANCE
		– Large, semi-underground waste collection systems (i.e. Molock, Earthbin) that allow for more waste storage while reducing unwanted smells. – Independent pet waste collection, consider waste to energy conversion systems that showcase green initiatives while encouraging use. – Often more durable than standard bins	– Pet collection/energy conversion systems require a process facility within regionally located near collection areas.		
Gates	Metal Gates	– Can be selectively removed/opened for seasonal or maintenance access. – Long lasting, low maintenance.	– Hinge and lock mechanisms are susceptible to damage and degradation.	15-25 years	– Rust protection and hinge maintenance as needed – anticipate minor repair action every 5 year (based on weather degradation and salt.
	Wood or Metal/Wood Combination Gates	– Can be selectively removed/opened for seasonal or maintenance access.	– Hinge and lock mechanisms are susceptible to damage and degradation. – Less durable and long lasting, susceptible to impact damage and weather degradation.	10-15 years	– Post replacement and hinge maintenance as needed – based on weather degradation and salt.
Barriers	Bollards – Metal or Concrete	– Removeable options available to facilitate maintenance and other situational access.	– Partial barrier, does not restrict all access – Not suitable for seasonal removal.	15-30 years	– Damage repair as needed.
	Post/Post and Cable Post and Page Wire	– Low cost barrier that restricts most access	– Does not restrict pedestrian access.	15-20 years	– Select post replacement and cable/page wire repair after 5-10-year mark or in response to vandalism/inappropriate use. – Cable tensioning units can be installed to aid with periodic tightening and will increase overall lifespan.
	Natural Stone	– Durable and low-cost option – Good for restricting access by vehicles.	– Partial barrier, does not restrict all access	None	– No maintenance
Shelter	Prefabricated – Metal	– Encourages gathering and provides weather refuges. – Helps to protect information/wayfinding signage. – Pre-engineered, warranted, vandal resistant.	– Contractor or supplier install needed – Can accommodate undesired activity such illegal actions and homeless shelter.	25 - 35 years	– Bi-annual touch up painted over paint damage after warranty period (often 10 years).
	Custom - Wood	– Encourages gathering and provides weather refuges.	– Can accommodate undesired activity such illegal actions and homeless shelter.	15-25 years	– Varies largely based on construction materials and design.

KEY AREAS OF CONSIDERATION FOR MATERIAL & AMENITY SELECTION					
FEATURE	INFRASTRUCTURE/MATERIALS	BENEFITS	LIMITATION	LIFE CYCLE	MAINTENANCE
		– Can be installed by volunteers and easily repaired.	– Less durable and more susceptible to vandalism and weather degradation.		– Smaller structure should be inspected annually after initial 5 years.
Potable Water	Simple Hose Bib/Tab or Bottle Fill Station	– Provide water for users or pets – Desirable amenity at remote or high-volume trailheads. – Best paired with other park and open space amenities to aid feasibility.	– Seasonal, more specialized, maintenance required – Public health risks to water quality, which require monitoring and reporting. – Additional infrastructure required to service. – Susceptible to vandalism	N/A Depends on system.	– Fall decommissioning to empty lines – Spring flush and testing prior to potable use. – Consider non-potable or labeling as such to encourage use for pets and clean up only if there is a risk concern.
Washrooms	Portable	– Rental/3rd party maintained – Can be limited to specific seasons when service is desired. – Ability to scale up or down based on location need.	– Lower standard facility that can be undesirable by users. – Less control over maintenance due to rental contract structure. – Standard models are not accessible, upgrading options recommended.	N/A	– Periodic inspection and relay of issues to service provider.
	Permanent	– Higher quality amenity, higher user satisfaction. – More flexibility for dual purposes and accessibility. – Better addresses higher volumes of use – such as major trailheads.	– Require greater infrastructure and maintenance. – Increased costs to install and maintain. – Increased responsibility for care and maintenance. – Can accommodate undesired activity such illegal actions and homeless shelter.	30-40 years	– Daily to weekly inspections and cleaning, depending on use and vandalism occurrences. – Daily locking/opening if evening use is not desired. – Select replacement of fixtures after 10 years. – Seasonal decommissioning if not heated.

ACTION ITEM

Use the recommended Maintenance strategies and tailor as-needed to promote trail-use, enhance longevity and expand trail networks.