Oxford County
Growing stronger together

2021 CYCLING MASTER PLAN

Phase 2 Report

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SECTION ONE

NETWORK

1.0

Developing the Cycling Network

A network of cycling routes and facilities are core elements of a successful Cycling Master Plan (CMP). If done well, the network provides the necessary direction for municipal staff with regard to design and implementation while also clearly illustrating the intent to provide safe, comfortable and integrated cycling facilities for those who live, work and play within Oxford County.

With its large geographic area and mix of urban and rural conditions, it is important to prioritize investments in cycling infrastructure that will serve the highest need for the largest number of potential cyclists across the County. It should also balance the conditions and context in which the network is being designed and implemented with the desired experience of both current and future users as well as with the objectives of the Plan. There is no “one size fits all” approach to determining both the optimal alignment and facility types of a cycling network. Instead, these decisions must be made based on the needs and desired role of the routes and the objectives of the broader transportation system.

The development of a cycling etwork should be consistent and defensible while also reflecting the priorities, interests and input of County staff, stakeholders and residents. By utilizing the guidelines and standards adopted at the national and provincial level and examining those standards within the context of local best practices, the Network that has been developed for Oxford County reflects a “Made in Oxford” solution. The approach and outcomes are documented in chapter 1.0.

1.1 Development

The identification of cycling improvements requires an iterative approach unique to the municipality is used. The approach should identify a continuous and connected system of cycling routes and facilities which achieve the objectives of the Master Plan. Through extensive consultation with County staff (INTAC) and stakeholders (EXTAC & SAG), two potential network development approaches were identified (outlined below and described in further detail in the Phase 1 report).

Approach #1. Cycling Improvements

Description...

All County roads are considered 'part of the network' and a facility type and phasing strategy is identified for each.

Outcomes...

+ New facilities are built on all County Roads as part of future capital works.
+ Guidance on recommended cycling improvements is focused

Approach #2. Cycling Network

Description...

Identify a recommended cycling network and routes. Projects will be phased as part of an implementation plan and coordinated with other capital projects where possible.

Outcomes...

+ Specific linkages identified along County roads that form a defined cycling network.
+ Implementation plan for the preferred cycling network and routes.

Both options have distinct benefits and challenges which were identified and considered. For the Cycling Master Plan, the preference was to proceed with a hybrid approach which identified a specific network of improvements; focusing on a spine / primary network i.e. minimum grid of strategic improvements complemented by previously planned / existing routes as well as "secondary" enhancements should the spine be achieved / implemented. The details of the assumptions, approach and outcomes are described in more detail in the following sections.

The cycling network development process is based on a number of best practices while also being tailored to the unique context of Oxford County. This means that steps as well as considerations reflect typical network development approaches as adopted by other comparable municipalities.

The approach also reflects provincially accepted design guidelines and standards and the processes and practices recommended within them. When developing the cycling network, four overarching assumptions were confirmed and used as the foundation for route and facility identification.

The assumptions are...

The cycling network system will focus primarily on County roads except for strategic connections that form part of a provincially significant route system.

The cycling network system will include routes that form part of the Ministry of Transportation Ontario (MTO) Province-wide Cycling Network inclusive of routes on County roads and local municipal roads.

The cycling network should include priority / primary linkages that provide adequate separation from motor vehicle traffic and that facilitate connectivity between the County's main urban areas including Woodstock, Ingersoll and Tillsonburg.

The cycling network could include secondary connections that connect to smaller settlement areas – these connections are not the focus of the network but should be reviewed as community interest and demand warrants in the future.

Approach #2 included four steps. Each step included several key inputs and considerations based on the assumptions noted above. The outcomes of the steps supported the iterative process and created design and implementation tools and supports for staff. The details are provided on the following pages.

1.0 Developing

Step 1. Confirm existing conditions

Description...

An inventory of existing conditions was developed and mapped including previously planned and promoted routes, existing infrastructure and roadway shoulder conditions. In addition, the "potential need" for cycling was identified by applying step 1 of the OTM Book 18 process to determine the preliminary level of separation needed.

1

Step 2. Confirm cycling network

Description...

A set of criteria was established and used to select and refine routes to form part of a cycling network for Oxford County. The cycling network is made up of a set of continuous and connected facilities providing direct connection between major destinations. It builds upon the proposed province-wide cycling network

2

Step 3. Network costing

Description...

Based on the cycling routes identified in step 2, capital costs estimates were developed using a set of unit prices. Cost estimates are high-level and developed for the County's consideration to inform future budgets and decision making.

3

Step 4: Network prioritization

Description...

A suggested implementation plan including phasing horizons and priorities for the County's cycling network was developed. The implementation plan is not intended to be prescriptive but rather guide next steps to help the County achieve its cycling goals.

4

1.2 Step 1 Overview

The Cycling Master Plan network development process was unique in that Phase 1 focused on establishing a strong foundation of existing and previously planned conditions. As such, the outcomes of Step 1 of the network development process are presented in the Phase 1 report of the Cycling Master Plan. Oxford County is unique in the sheer volume of routes that have been either implemented or previously planned by the County and its partners (i.e. Tourism Oxford, local area municipalities and the Cycling Advisory Committee).

The intent was to build upon what has already been developed to date – from both construction and planning perspectives. However, in the case of Oxford County, the existing and previously planned routes were so frequent and dense that Step 1 was used to better understand the intent and purposes of these routes relative to the future cycling network for the County and the new objectives and intents. With that in mind, the following are some of the key considerations regarding how existing and previously planned routes were integrated into the development process.

Considerations.

+ Previously planned routes include linkages identified in the MTO Province-wide Cycling Network study and the County's 2014 Trails Master Plan;
+ Promoted routes include linkages that are currently being endorsed by Tourism Oxford (and in some cases, signed with Share the Road signage) as well as routes identified by the County's Cycling Advisory Committee;
+ The inventory of existing cycling and roadway shoulder conditions was informed by in-person field investigations and information on the application of the County's Paved Shoulder Policy; and
+ The level of separation was determined using step 1 of the OTM Book 18 three-step facility selection process and is intended to identify the preliminary need for a cycling facility on County roads.

Before proceeding with specific route refinements it was important to review the previously planned routes relative to one of the key network assumptions – that only County Roads would be addressed / recommended as part of the cycling network.

1.0 Developing

The routes illustrated below represent the previously planned and promoted routes relative to the County road network. While the County acknowledges that there are routes and facilities that have been identified by local area municipalities such as the City of Woodstock and the Town of Ingersoll or through other efforts such as the Cycling Advisory Committee (on local roads), those routes are not under the jurisdiction of the County and would require additional coordination with those partners to facilitate implementation. These routes provided a foundation upon which the preferred cycling network was developed. Figure 1 illustrates all previously proposed, planned and promoted routes that were reviewed in step 1.

Figure 1. Previously Planned and Promoted Cycling Routes

1.3 Step 2 Overview

With a strong foundation of understanding relative to the existing and previously planned / promoted routes in Oxford County, an approach was needed to determine not only the routes that would make up the proposed cycling network but also the facilities that would be identified for those routes relative to the network objectives and design guidelines. A 2-part approach was used to undertake step 2.

First, the approach to select routes requires the identification and application of a specific set of criteria which, when consistently applied, facilitates the application of indicators which routes are evaluated against to determine if the route should proceed as part of the network or if it should be "removed". The criteria were developed based on the understanding that two distinct "networks" were to be identified including a primary or spine network of high order cycling facilities connecting major communities and destinations and a complementary secondary network to provide additional access and connectivity – should interest or demand be demonstrated.

Following the application of criteria and with the identification of preferred routes, preferred facilities were identified building on the initial level of separation and the selection process outlined in Ontario Traffic Manual (OTM) Book 18.

The following are the key considerations that informed step 2 of the process with the outcomes documented in the following sections.

Considerations.

+ Selection of potential routes to form part of the proposed cycling network should take into account the feasibility, connectivity and accessibility of linkages;
+ Identify routes where the desirable facility type could be accommodated within the existing road platform;
+ Identify routes that are easily accessible to residents and can have the greatest community benefit;
+ Identify routes that connect to primary and secondary destinations throughout the County; and
+ Identify high-demand routes that are already being used by cyclists.

Part 1. Confirming Routing

Typically, there are a number of route selection criteria that are identified which can make it challenging to compare, contrast and assess applicability relative to a network. For Oxford County, two core criteria were identified based on the interests and objectives of Oxford County and the needs for future improvement. The criteria are...

Criteria #1

Feasibility

Feasibility speaks to the relative feasibility of the potential route which is based on the outcomes of the inventory of conditions relative to the preliminary recommended level of separation.

The “cost” to implement the desired facility has a considerable impact on whether it is considered feasible. If there is not enough space on the existing road platform, or if surrounding conditions are not supportive of the desired facility, it is expected that the cost to provide the desirable facility type will increase.

The feasibility has an impact on both the route selection as well as the route priorities (outlined in section 2.0 of the Phase 2 report). The results from the assessment of route feasibility are illustrated on the following page.

Criteria #2

Connectivity & Accessibility

Connectivity and accessibility speak to the more experiential criteria of the network. They are multi-faceted and at times subjective based on user needs and preferences; as such, it is not intended to be scientific in nature but rather provide insight on how investments in cycling infrastructure could shape how people get around in the County. Three indicators were used to assess connectivity and accessibility for the purposes of the CMP. They include:

+ Cycling potential refers to areas within Oxford County that are considered “bikeable” based on a typical biking distance of 5 kilometres.
+ Access to destinations looks at connectivity to destinations via potential primary routes and secondary routes.
+ Cycling demand refers to popular routes that are already being used by people on bikes.

The findings from the assessment of these indicators is illustrated and explained in further detail on the following pages.

Criteria #1. Feasibility

As noted above, feasibility was assessed by comparing the existing road and shoulder conditions (as documented through the Phase 1 inventory of conditions) for each route relative to the desired level of separation (determined by applying step 1 of the OTM Book 18 facility selection process).

The results show a potential level of capital investment that would be needed to successfully implement a facility with the desired level of separation based on the existing or available roadway platform. While not an exact "science", the knowledge of design best practices relative to the existing conditions can help to identify a "level" of feasibility or capital investment ranging from high – relatively low cost to achieve implementation; to low – high costs to achieve implementation.

Table 1. Preliminary Feasibility Assessment

Existing Conditions	Shared	Designated	Separated
No shoulder	$	$$$	$$$
Partial gravel shoulder	$	$$	$$$
Full gravel shoulder	$	$$	$$
Partial paved shoulder and gravel shoulder	$	$	$
Paved shoulder	-	$	$$
Urban shoulder	-	$	$$
Bike lane	-	$	$$

$ Low degree of capital investment
$$ Moderate degree of capital investment
$$$ High degree of capital investment

More specifically, routes that have a low degree of capital investment, represent locations where the desirable facility type could be accommodated within the existing road platform and implementation would be easily achieved. Routes that have a high degree of capital investment represent locations where the desirable facility type cannot be accommodated within the existing road platform and implementation is more challenging.

In the context of the Oxford County cycling network, the assessment provides a stronger understanding of potential route improvements based on preliminary demand. There are few routes which require a high degree of investment with the majority found within the urban areas of the County. Most of the routes identified for investment in Oxford County fall into the "Moderate" level of investment category, highlighting the importance of taking a strategic approach to improving the cycling network in Oxford County. Figure 2 illustrates the results of this assessment for all County roads.

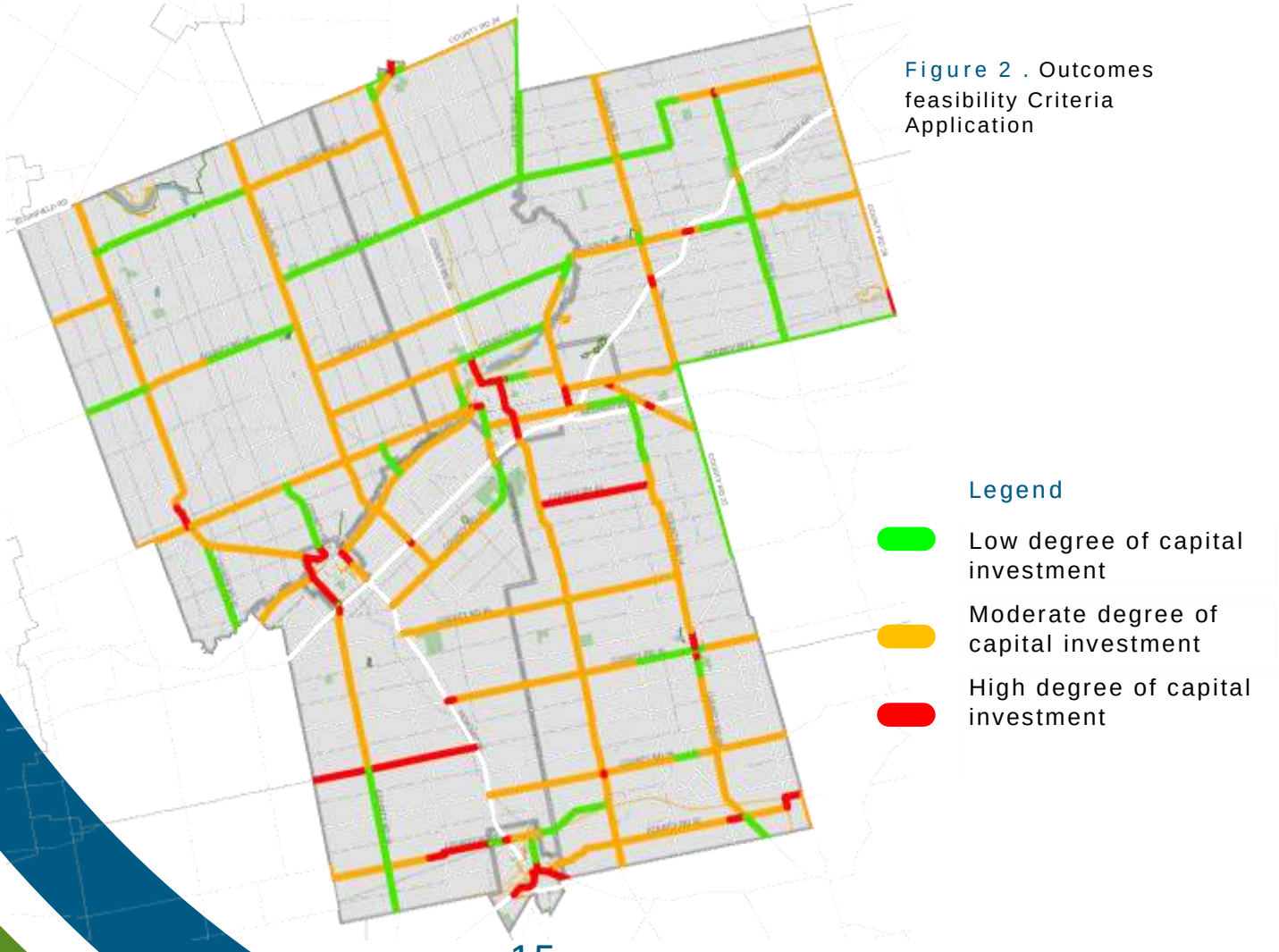


Figure 2 . Outcomes feasibility Criteria Application

It should also be noted that while many of the segments of the proposed network within the urban areas of Oxford County appear as a "high" level of investment, categorization is based on the assumption of constructing what would be deemed a "final" design solution such as a curb separated cycle track, would involve a full reconstruction of the roadway.

This plan presents alternative solutions such as repurposing space within the existing right-of-way through road diets or expanding sidewalks into multi-use pathways, which will provide acceptable solutions in the short-term without relying on major capital investments.

Criteria #2. Connectivity & Accessibility

A cycling trip is only ever as safe as the least safe part of the journey – that is to say that a cycling network is only as strong as its weakest link. For the majority of potential riders, riding on trails, separated cycling facilities or traffic-calmed residential streets represents the level of comfort and safety required for them to feel safe on their bikes.

Regardless of jurisdictional control or other factors, when those kinds of riders encounter a situation where they would be required to ride in a situation where they are encountering higher speeds, higher traffic volumes and less physical separation from automotive traffic, they will often choose to end their ride and turn around.

For Oxford County to take advantage of the potential benefits that cycling can bring, cycling infrastructure needs to form a coherent, cohesive network across the County, providing residents and visitors alike with seamless access to safe cycling facilities.

These changes won't happen overnight, of course, but with the right processes, policies and partnerships in place, Oxford County will be able to build a cycling network that will appeal to more riders and grow its reputation as a great place to ride a bike.

Cycling Potential

Cycling potential refers to the areas of Oxford County which are deemed to be “cyclable” from a best practice perspective. Research shows that most individuals are willing to cycle a distance of 5km or less for a trip, resulting in the creation of an area of access known as a ‘bikeshed’. The riders who fall into this category of cyclists does not include long-distance / high endurance cyclists but rather those who want to cycle for utilitarian trips within their community or for recreation with their families. Within Oxford County, 60% of the County’s population lives in the urbanized areas of Woodstock, Ingersoll and Tillsonburg. Providing opportunities and encouraging cycling as a means of short-distance travel could encourage a greater number of cycling trips throughout the County and support the climate priorities set by Council.

Investment in cycling should not only focus on the built-up areas of Oxford County; however, considering the vast distance within the rural areas and the typical riders, it is anticipated that the greatest community benefit would occur if infrastructure improvements are focused in the County’s most populated areas.

The typical “bikeshed” distance of 5 kilometres was mapped from the County’s urban areas (including Tavistock). It is within these catchment areas that focus should be made on strategic route improvements. In addition, considering the desired and potential use, improvements within these areas should focus on the design needs of cyclists who have less comfort and greater concern.

Within the center of Oxford County, due to the proximity of Woodstock and Ingersoll, there is a clear east-west need for separated cycling linkages which is further reinforced by routing from the Province-wide Cycling network and other County initiatives. In addition, consideration should be given to linking the other built-up areas within the County. Though a further distance, both on and off-road connections are available as well as direct County roads which could be easily improved to accommodate cyclist needs.

Figure 3 illustrates the 5-kilometre catchment areas from Woodstock, Ingersoll, Tillsonburg and Tavistock.

Bikeshed Areas

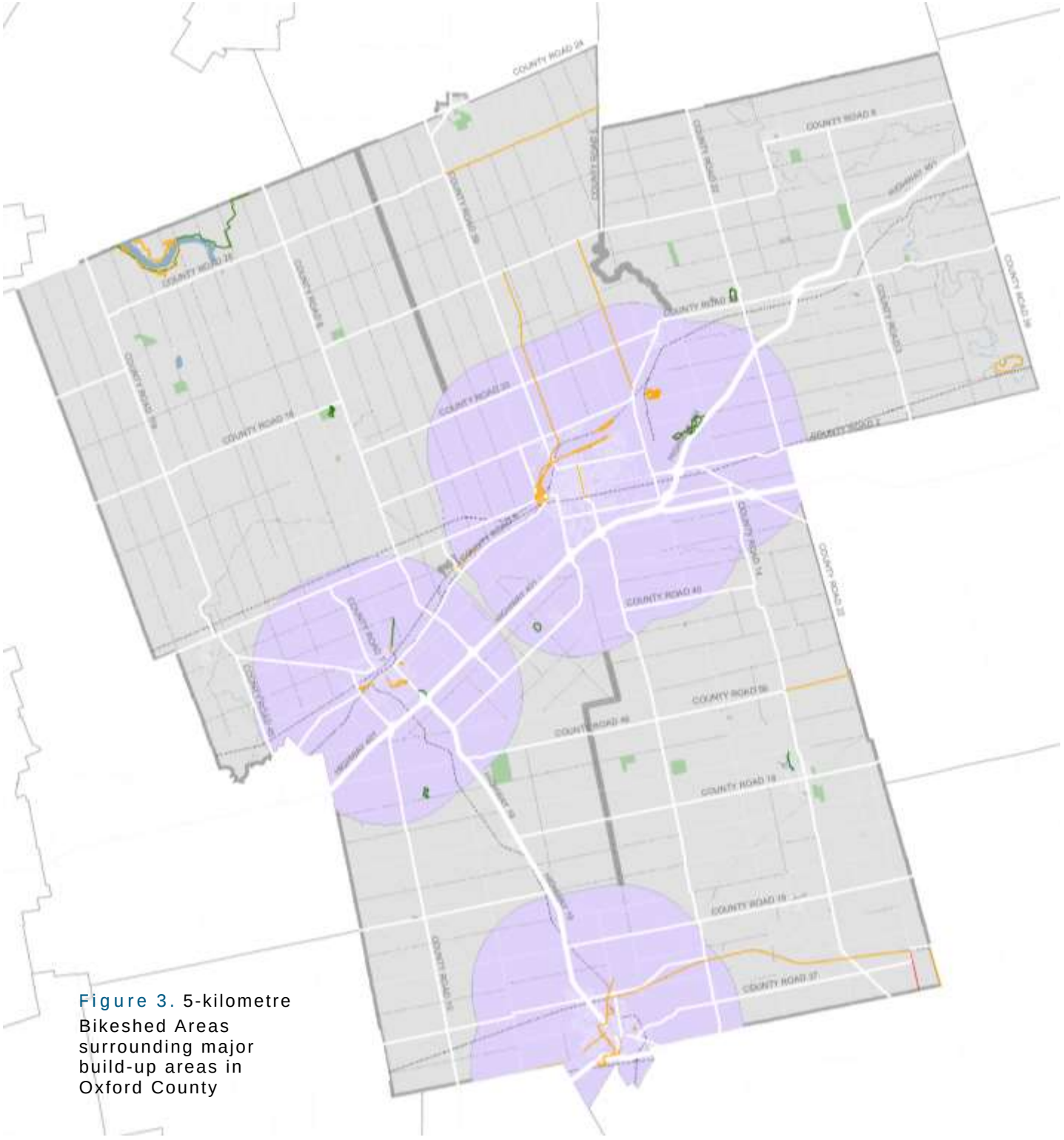


Figure 3. 5-kilometre Bikeshed Areas surrounding major build-up areas in Oxford County

Legend

5 kilometre bikeshed area

Destinations

Building on the idea of cycling potential described above, the approach to network development applied in Oxford County also takes into consideration the location of key destinations that may either drive the demand for cycling as locations for day-to-day trips or may be a cycling destination unto themselves. The development of the primary cycling network for Oxford County was based on connecting a maximum number of primary destinations – community hubs, employment areas and routine amenities like grocery stores, places of worship and schools – to ensure that a higher proportion of short trips made in Oxford County are accessible by bike. As demonstrated through their description, primary destinations serve as major locations for day to day travel, which can also be categorized as “commuting destinations”.

The primary network, when completed, will serve as a series of cycling-focused corridors between these key destinations in the County, making more trips by bike feel safe and accessible for everyday purposes. Unsurprisingly, the “commuter destionations” can mostly be found within the build-up areas of Oxford County including Woodstock, Ingersoll and Tillsonburg. However, some hamlets also include destinations that are required for day to day travel and should also be considered when it comes to identifying primary cycling routes.

Secondary destinations include those that serve the needs of recreational riders and those who ride for sport. These could include recreational trails / trailheads, natural areas, restaurants and other entertainment destinations. The location of these destinations are typically found more within the rural areas of the County with some found within the majority communities. These destinations are the focus of the secondary cycling network connectivity.

Ultimately a trip is determined not only by the experience of the cyclist but the ability to connect and access a destination. The location and type of destination and the route’s ability to connect to it in a manner that is comfortable and efficient is critical to the sucess of the cycling network.

Figure 4 illustrates the commuter (primary) and recreational (secondary) destinations within Oxford County which have been identified based on input provide through the Phase 1 engagement process as well as data provided by County staff.

Cycling Destinations

Figure 4. Recreational and Commuter Destinations in Oxford County

Demand

Strava data was analyzed to identify routes that are popular among cyclists in Oxford County. Strava is a website and mobile application that allows users to track their activity using GPS technologies. As such, Strava is considered and used as a supplementary piece of information along with other tools and datasets to understand user habit and preferences for people of all ages, abilities and interests.

Using the data collected through this subjective information gathering tool, a spatial representation was generated (also referred to as heat mapping) based on volume and frequency of routes travelled. It is important to note that Strava is a voluntary tool and typically used by specific users (sport cyclists). The “heat mapping” is intended to provide a “snapshot” of user trends and be used in addition to other data, information and feedback to identify the “level of demand” for certain routes and / or County roads found throughout Oxford County to determine the overall “need” for improvement.

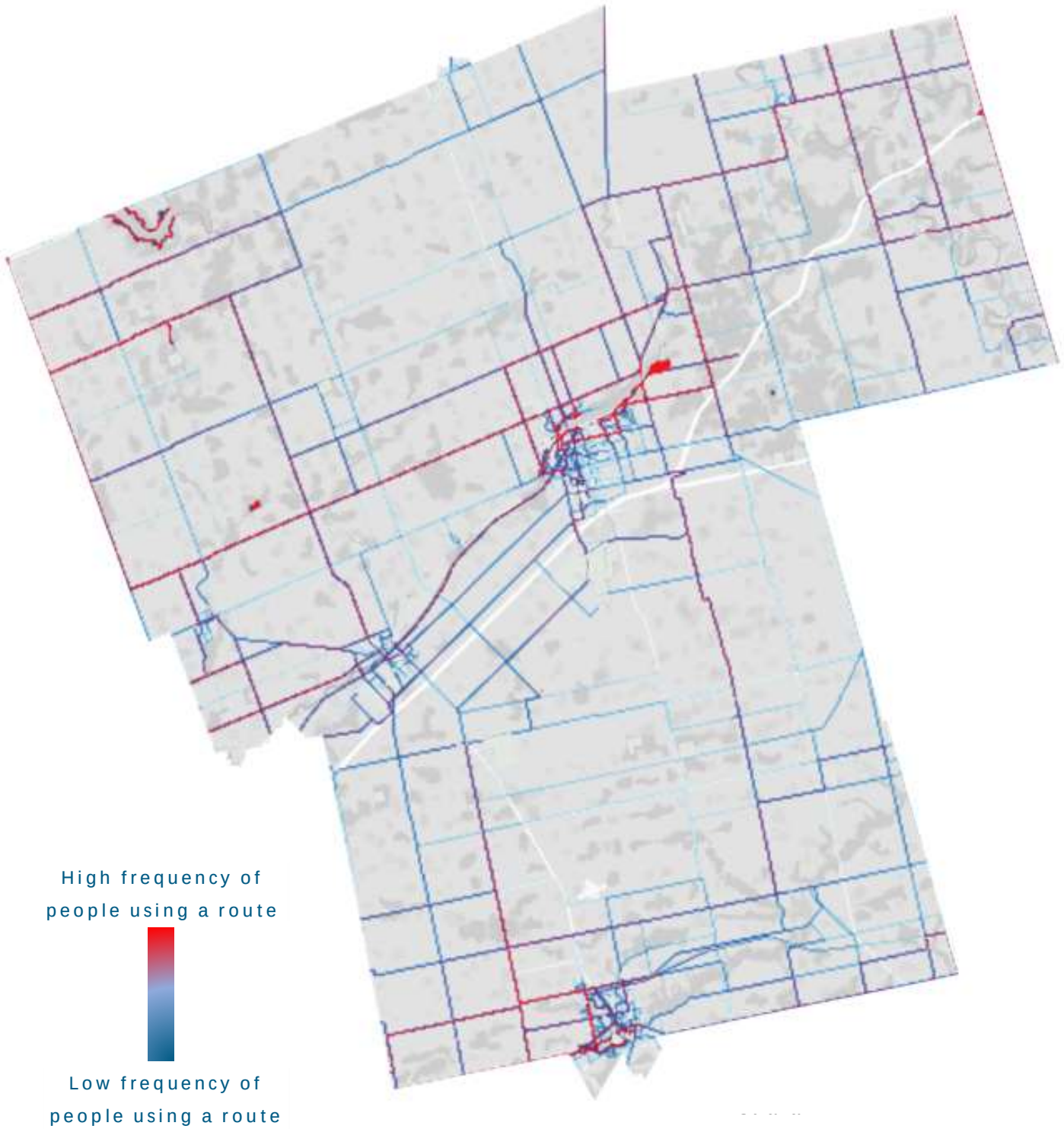
The information collected from Strava was used to better understand where people are currently biking in Oxford County. This is not to say that all popular routes will form part of the primary cycling network; however, the information provides a snapshot of potential areas for investment that support existing demand and travel patters, as well as locations that would benefit from enhanced network connectivity.

Figure 5 illustrates the cycling demand based on Strava data for Oxford County.

Based on the findings of Strava data, highest use is identified within and on the periphery of Conservation Areas (Wildwood and Pittock) and urban areas (Woodstock, Ingersoll and Tillsonburg). Other popular routes could be attributed to rural long-distance cycling to municipal centres and surrounding areas. An important note regarding the information illustrated is that many of the cycling routes that are considered of “high interest” or “high demand” are found along roads that are considered the responsibility of the local area municipalities. While the Oxford County Cycling Master Plan acknowledges the importance and presence of these routes, it is the responsibility of the municipalities to make improvements along these corridors as opposed to the County or could / are already being addressed through routing and signage efforts undertaken by Tourism Oxford.

Oxford County

High Demand Routes



Proposed Cycling Network

A set of routes was identified which form the Oxford County Cycling Network, taking into account the existing and previously proposed routes, the route selection criteria, and input from consultation and engagement undertaken as part of the project process. As noted above, the focus of the proposed cycling network is on a system of primary linkages found on County Roads and secondary linkages that provide additional connectivity County-wide. Considering the province-wide cycling network is assumed to form part of the system there are select local connecting links which have been identified which would require additional coordination with the appropriate area municipalities to facilitate implementation and would be pursued should funding be made available (see section 2.0 for details). In addition, Oxford County continues to pursue additional off-road trail connections which could accommodate cycling in the future. Once connections are identified they will be pursued for implementation at the same time as the Cycling Master Plan. Though not formally part of the cycling network it is a significant opportunity for the County to provide off-road connectivity. An overview of the different network components is provided to the right with the network illustrated in Figure 6. Full sized maps that illustrate the proposed cycling network at a County-wide scale and within each of the local area municipalities are provided in Maps 1a to 1i.

Primary Network

Critical corridors connecting to the urban centres within the County, as well as the Province-Wide Cycling Network and Trans Canada Trail. Focuses on enhanced connectivity to major tourism destinations and potential for utilitarian travel.

189 km

Secondary Network

Corridors that connect smaller settlement areas to the Primary Cycling Network, should there be demand, interest or funding available.

181 km

Local Connecting Links

Part of the cycling network but includes routes on local roads (not under the County's jurisdiction) that form part of the MTO Province-wide Cycling Network.

20 km

Proposed Off-road Trail

Proposed off-road trail from Tillsonburg to Norwich along an abandoned rail corridor.

15 km

Total	405 km

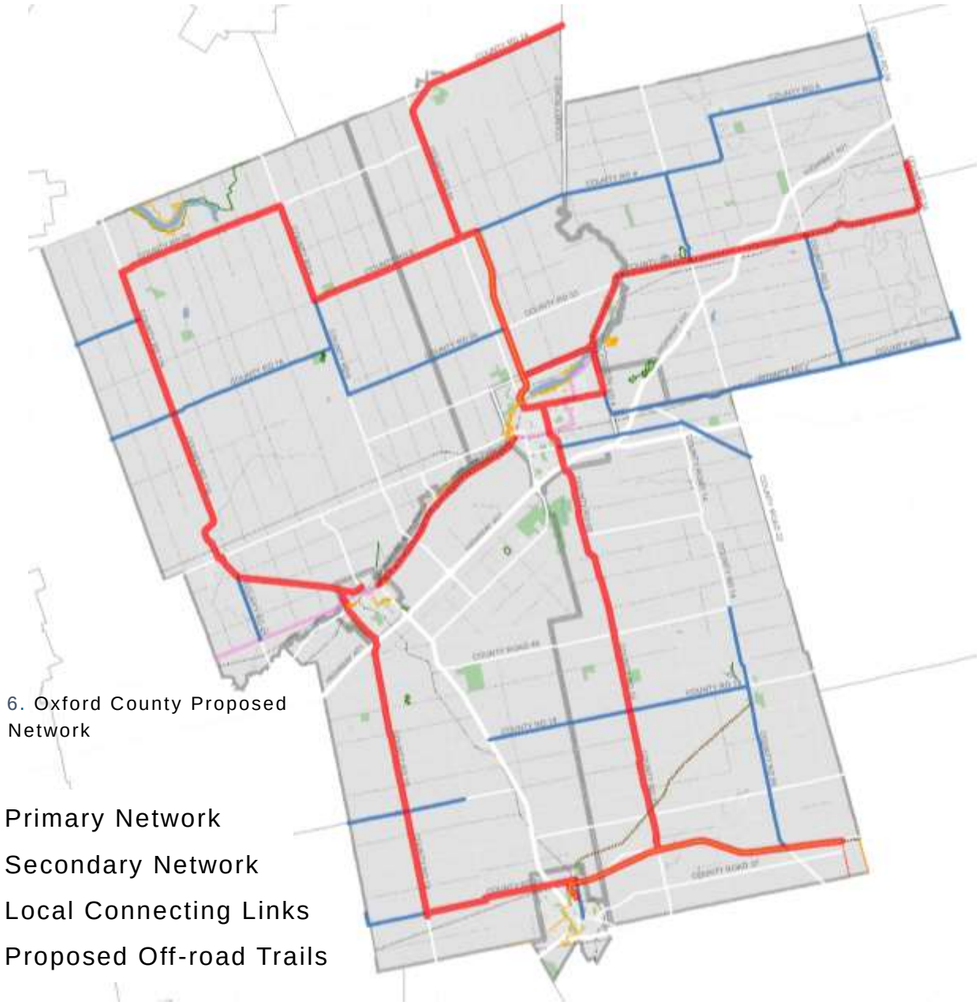
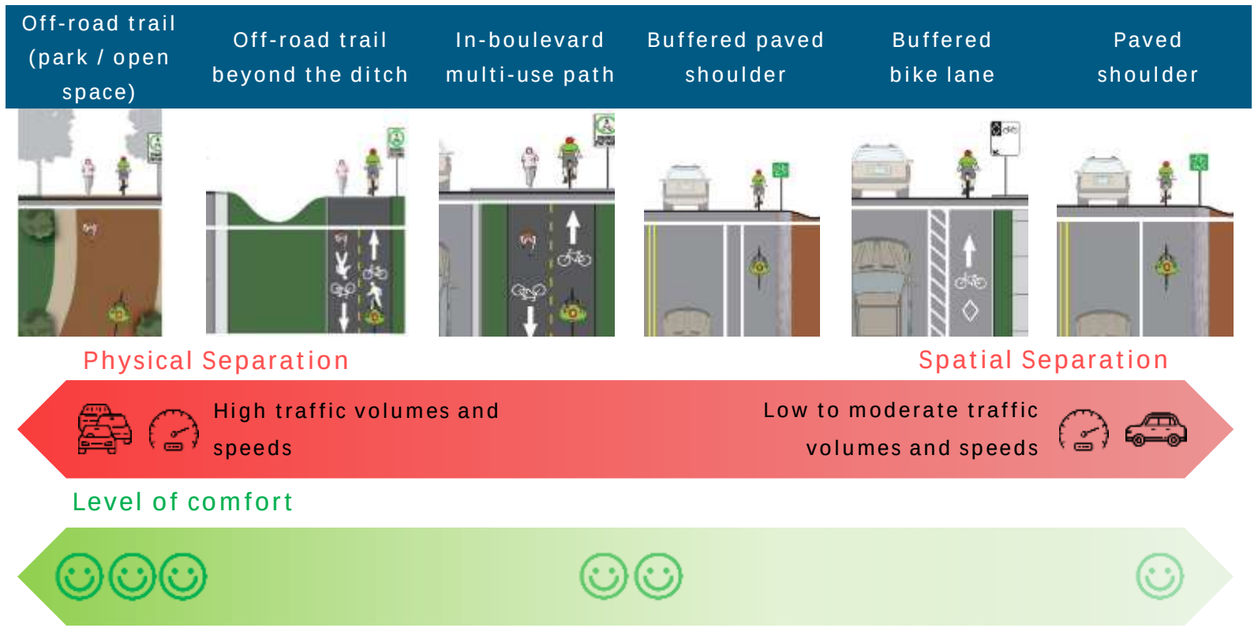


Figure 6. Oxford County Proposed Cycling Network

Part 2. Identifying Design Solutions

Part 2 of Step 2 is the identification of preferred design solutions for the confirmed routes which form the proposed cycling network for Oxford County The assessment of functionality that was completed for the Oxford County Cycling Master Plan builds upon the three-step facility selection process outlined within OTM Book 18 (as illustrated in Figure 7). Step 1 has already been completed in Phase 1 of the process and further confirmed through the application of the feasibility criteria noted in Part 1.

Step 2 includes a more comprehensive investigation of conditions and context as it relates to the roadway that is being addressed and the cycling facility that is being designed. The field investigation that was completed in Phase 1 of the project as well as existing information gathered by the County from past initiatives was used to establish a foundation of considerations to complete Step 2 of the process. Below is an overview / summary of some of the high-level considerations relative to user comfort and safety to help support the identification of potential design solutions.



For the purposes of the Oxford County Cycling Master Plan, a specific facility type has not been identified. The primary cycling network will be designed to provide users with a high degree of comfort based on the existing context of the roadway, while the secondary network is recommended to be implemented in coordination with capital projects, with specific facility types being identified during the design phase of the project. Separation options (including a description and pros and cons for each) are identified in Chapter 3.0 for consideration by the County.

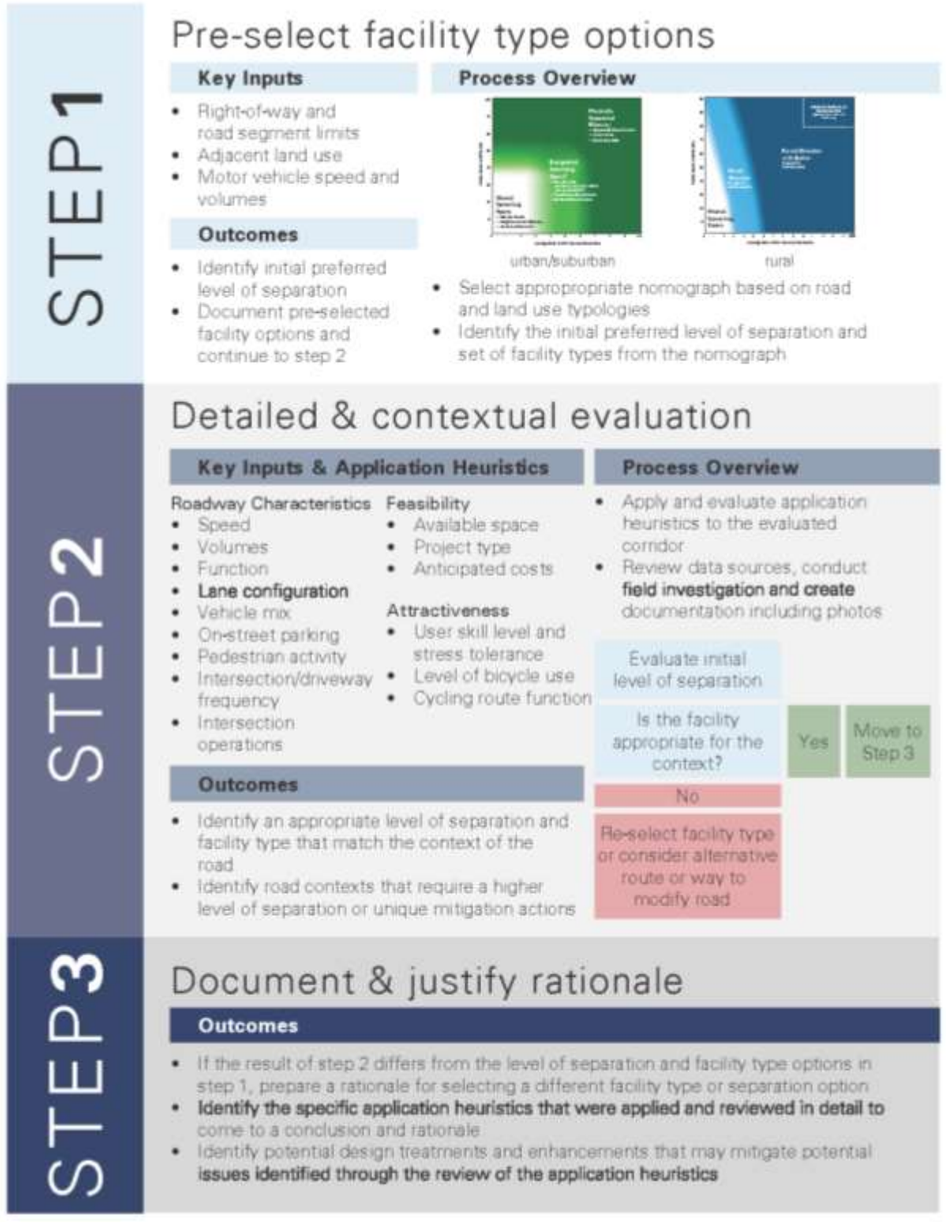


Figure 7. OTM Book 18 Facility Selection Process

While the Cycling Master Plan does not provide specific recommendations regarding facility types, the results of Step 2 of the OTM Book 18 facility selection process have been documented in some detail for the County's use as they proceed with the implementation of the Cycling Master Plan. Table 2 summarizes the considerations which will have the most significant impacts on the potential cycling facility design for each of the proposed primary routes that form the proposed cycling network.

Table 2. Preliminary Assessment of Route Functionality for Primary Cycling Routes

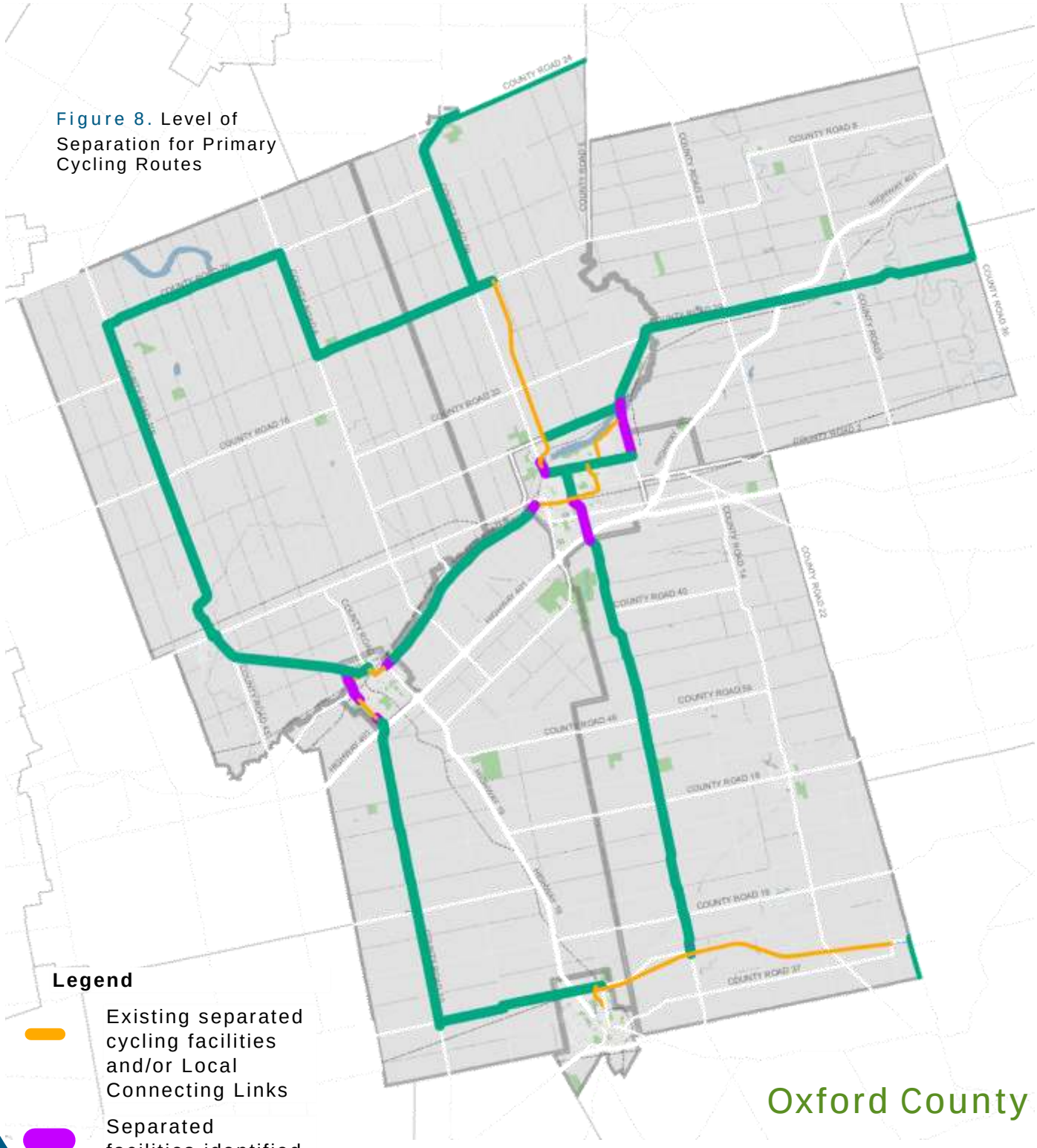
Road Name	Posted Speed	Average Annual Daily Traffic	Lane Configuration	On-street parking
19th Line (County Road 119)	50, 80	5,300	2 lanes	May be permitted on urban shoulders in hamlets
37th Line (County Road 6)	80	5,200-6,600	2 lanes	No
Allen Street (County Road 119)	50	4,200	2 lanes	May be permitted on urban shoulders in hamlets
Base Line	80	-	2 lanes	No
Beachville Road (County Road 9)	50, 80	5,500-6,400	2 lanes	No
Bell Street (County Road 119)	50	5,500	2 lanes	No
Blandford Street (County Road 4)	50	4,500-5,300	2 lanes	May be permitted on urban shoulders in hamlets
Brownsville Road (County Road 20)	50,80	2,000	2 lanes	No
Cedar Street	50	8,100-9,400	4 lanes	No
Charles Street (County Road 9)	50	5,500-6,400	4 lanes	No
Culloden Line (County Road 10)	50, 80	3,300-4,800	2 lanes	No
Devonshire Avenue	50	6,600-19,200	2 lanes plus centre left-turn lane along corridor	No
Dundas Street East	50	13,500	2 lanes	Yes (marked on-street parking)
County Road 59	50, 80	4,400-9,600	2 lanes	No
Huron Street	50	8,100-9,400	2 lanes plus centre turn lane and bike lanes	No
Ingersoll Road	50	-	4 lanes	No
Ingersoll Street	50	7,200-7,600	4 lanes	No

Road Name	Posted Speed	Average Annual Daily Traffic	Lane Configuration	On-street parking
Loveys Street (County Road 8)	50	2,600	2 lanes	Yes (urban shoulder)
Main Street (County Road 18)	50	-	2 lanes	Yes (marked on-street parking)
North Street East	50	6,000	2 lanes plus bike lanes	No
Norwich Avenue (County Road 59)	60	15,900-18,800	2 lanes	No
County Road 13	80	5,200-7,300	2 lanes	May be permitted on urban shoulders in hamlets
County Road 29	50, 80	3,800-5,400	2 lanes	May be permitted on urban shoulders in hamlets
County Road 4	80	5,200-10,300	2 lanes	No
County Road 8	80	2,500	2 lanes	No
Oxford Street East/West	50	3,800-5,400	2 lanes	Yes (urban shoulder)
County Road 88	80	2,500	2 lanes	No
County Road 96	50, 80	1,600-2,600	2 lanes	No
Trussler Road	80	6,200	2 lanes	No
Vansittart Avenue	50	16,000	2 lanes	No
West Street North/South (County Road 13)	50	7,300	2 lanes	No
Wilson Street	50	8,100-9,400	4 lanes	No

Figure **8** illustrates the outcomes of step 2 of the 3-step facility selection process, which identifies an appropriate level of separation that matches the context of the road, specifically for the primary network. This map is informed by key inputs and application heuristics found in Table 2, namely the posted speed of the road and vehicular volumes, both of which identify an appropriate level of separation for cycling facilities. While a designated level of separation has been identified for some of the routes that makeup the primary cycling network, this “recommendation” represents only the minimum improvement that could be accommodated. The majority of Oxford County’s primary network connects communities through rural landscapes, requiring a different suite of considerations in terms of the types of facilities that should be selected. Based on the selection criteria for rural roads from OTM Book 18, the majority of Oxford County’s primary cycling network would be well served with the provision of wide, buffered paved shoulders – although a higher degree of separation can always be pursued where desired.

The intent of Oxford County’s primary cycling network is to provide a high-quality system of routes to major destinations with the intent of accommodating safe and comfortable travel by cyclists. As such, all of the routes illustrated below should have, at a minimum, a spatial separation i.e. a painted buffer line and / or rumble strip. Where cycling demand is high or where motor vehicle volumes are high, the County should consider implementing physical separation such as bollards, planters, or a cycling route outside of the road right-of-way to provide a safer, more comfortable user experience in those areas, particularly those within or near the County’s urban centres.

Figure 8. Level of Separation for Primary Cycling Routes



Oxford County

Cycling Route Level of Separation

2

SECTION TWO

IMPLEMENTION

2.0

Implementation

A well-considered implementation strategy that accounts for as many variables as possible will enhance the likelihood that the proposed cycling network gets built, and that the goals and vision outlined in the CMP are achieved. Effective implementation strategies provide direction, including a prioritized list of potential investments, while still maintaining a degree of flexibility to allow for the implementation through coordination with capital projects. A prioritized yet flexible implementation plan positions Oxford County to take advantage of future funding opportunities from higher levels of government.

While the CMP outlines the steps involved in moving a project from conception to reality, its implementation recommendations are not intended to be prescriptive. Details involving specific costs, phasing and project scope remain left to the tendering, design and subsequent construction activities arranged by the County for each individual segment listed within the proposed cycling network.

The following CMP chapter includes a series of suggested practices, frameworks and considerations to guide the implementation of the CMPs recommendations. This plan is informed by understandings of costs based on industry trusted estimates and funding, the County's existing finances and those of comparable municipalities. The plan also incorporates guidance from OTM Book 18, which outlines preferred cycling facility design solutions for Ontario.

2.1 Step 3 & 4 Overview

The information contained within Chapter 2.0 of the Phase 2 report represent Steps 3 and 4 of the network development process. The following is an overview of the considerations for these steps with the outcomes documented in the following sections.

Phasing Considerations.

+ The County's strategic objective is to focus on a network of primary routes. As such, implementation of the cycling network **will focus on routes included in the County's primary cycling network;**
+ The implementation plan consists of two phases: short term (within 10 years) and long term (beyond 10 years). It is expected that the short-term horizon would begin in 2023, giving an opportunity for County staff to integrate cycling projects into the annual capital budget review process for the following year; and.
+ An implementation plan is not prescriptive, nor does it commit the County to a schedule of projects or budget. The implementation plan should be reviewed on an annual basis to reflect resources, capacity and opportunities that can be leveraged at that time.

Costing Considerations.

+ A typology of unit costs was developed based on the various levels of separation. These unit prices were applied for each proposed route included in the cycling network;
+ Unit costs represent blended rates for different cycling facility categories (e.g. shared routes, designated routes, and separated routes); and
+ Cost estimates included in this report are high-level and reflective of a master plan scope. Cost estimates could vary on a project-by-project basis, the surrounding conditions and the application of specific design enhancements that would be determined through future detailed design assignments.

The following sections provide a more detailed overview of the work that was completed to complete steps 3 and 4 of the process and the outcomes of that work as it relates to the Cycling Master Plan.

2.2 Infrastructure Action Plan

The Oxford County Cycling Network is comprised of 405 kilometres of cycling facilities that are broken into four components – primary linkages, secondary linkages, local connecting links and additional off-road trails. The following infrastructure action plan that is deemed to be successful and implementable will need to provide options and alternatives to support implementation.

For the purposes of the Oxford County infrastructure action plan, there are two distinct horizons which have been identified with focus placed on the implementation of the 189 kilometres of primary cycling network over a 10-year period starting in 2023 and spanning to 2033. The implementation of the primary cycling network is intended to be undertaken in parallel with the County's paved shoulder policy, with wide buffered paved shoulders being appropriate along most segments of the cycling network as determined through the County's capital budget process.

Beyond the first 10 years, the implementation of the remaining 181 kilometres of secondary connections can be prioritized. It should be noted that routes on the Secondary network should be considered for the inclusion of new cycling facilities (paved shoulders, signed routes etc) when these routes are scheduled for capital works, even if the primary network is not yet completed. While the Primary network represents routes of significant enough importance to justify pursuing the improvements as standalone projects in some cases, the secondary network should be thought of as a guide for where new cycling facilities can be added when a road is being reconstructed.

Both elements of the ultimate network have been reviewed and priorities have been identified to support future decision making. The priorities identify the order in which Oxford County is recommended to pursue implementation. This is not meant to be prescriptive but a recommendation for the County's consideration.

The priorities are based on the project objective and network criteria. The criteria considerations are not a perfect application and not equally considered. Some routes may be high priority because they are considered "quick-wins" and relatively easy to improve from a feasibility perspective while others may be higher in cost but considered a significant priority for the County and its partners.

The following sections provide a detailed overview of the action plan and the considerations for implementation.

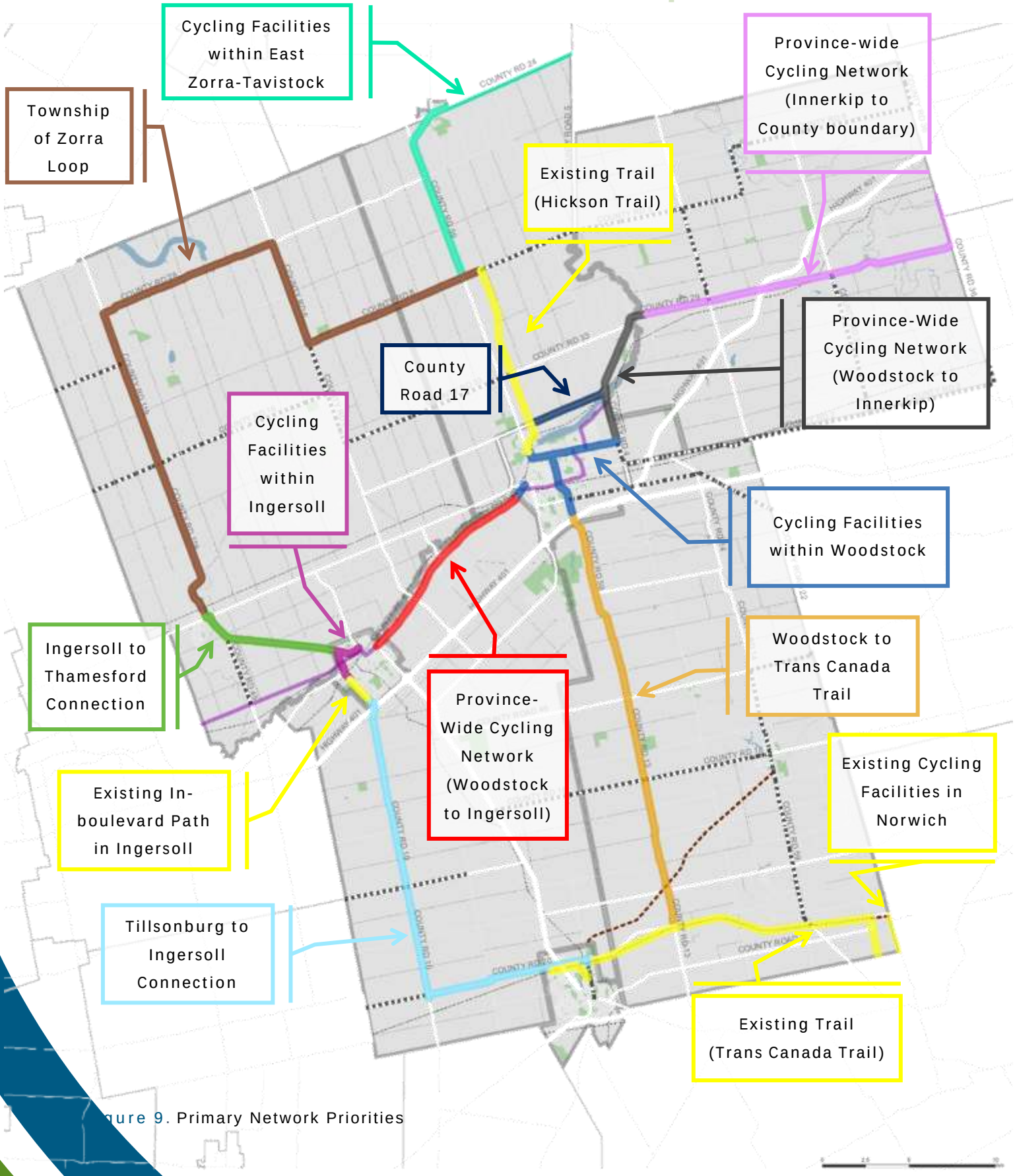
Primary Network Priorities

As noted above, the 189 kilometres of proposed primary cycling linkages have been prioritized to provide County staff with the necessary information to inform future capital budgets and plans over the next 10 years – starting in 2023. A map of the different primary network segments is presented below, inclusive of existing off-road trail segments in yellow which represent the priorities that have been identified for Oxford County.

The priorities that have been identified do not always reflect individual links as shown in the mapping. The implementation of individual links in isolated areas throughout Oxford County could cause a lack of connectivity and continuity which could have adverse effects on the cycling experience for users. As such, some of the routes have been combined to present priority "loops" or "links" which together form strong connections between major communities and to critical community destinations. The prioritization of the primary network focuses on the County's goals of connecting the urban areas of Woodstock, Ingersoll, and Tillsonburg, as well as leveraging the Province-Wide Cycling Network to implement a cycling spine network.

The intent of the priorities is not to have one project implemented "per year". By identifying the critical loops and links; the full breadth of projects may need to be implemented over the course of 1-2 years. However, the list of priorities does reflect the order in which the primary network and the loops / routes associated with it are proposed to be implemented by the County.

Figure 9 illustrates the priority loops / routes that makeup the primary cycling network action plan. Table 3 provides a detailed overview of the routes / connections that are included within each of the categories, the recommended improvements and considerations / rationale for its priority selection.



gure 9. Primary Network Priorities

Table 3. Overview of Primary Network Priorities

Priority	Project	County Road	From	To	KM	Feasibility	Rationale
1	Province-wide Cycling Network (Woodstock to Ingersoll)	County Road 9 (Township of South-west Oxford)	Harris Street (Township of Ingersoll)	Main Street (City of Woodstock)	13.6km	Moderate	+ County Road 9 forms part of the MTO Province-Wide Cycling Network + Facilities a critical connection between Woodstock and Ingersoll, the two largest settlement areas within Oxford County + Addresses the County's strategic objective to focus on a network of primary routes that connect the three urban areas: Woodstock; Ingersoll and Tillsonburg
2	Province-wide Cycling Network (Woodstock to Innerkip)	County Road 4 (City of Woodstock and Township of Blandford-Blenheim)	Blandford Road (Township of Blandford-Blenheim)	Devonshire Avenue (City of Woodstock)	8.5km	Moderate-High (location-specific)	+ Connect Ingersoll and Woodstock with Innerkip, extending the completed portion of the MTO Province-Wide Cycling Network within Oxford County + Connect residential hamlet of Innerkip with Woodstock and destinations beyond
3	Province-wide Cycling Network (Innerkip to County boundary)	County Road 29 & Trussler Road	Blandford Road (Township of Blandford-Blenheim)	Piper Street (Township of North Dumfries Boundary)	21km	Low-High (location-specific)	+ Connect Ingersoll, Woodstock and Innerkip to Region of Waterloo, extending the completed portion of the MTO Province-Wide Cycling Network within Oxford County + Connect Drumbro with Innerkip, Woodstock, and destinations beyond + Connect with secondary network linkages, providing connectivity to Princeton, Bright, and Plattsville
4	Woodstock to Trans Canada Trail	County Road 13 & County Road 59	Juliana Drive (City of Woodstock)	Trans Canada Trail (Township of Norwich)	25.1km	Moderate	+ Forms the core north-south linkage as part of the primary network + Provide direct connectivity between Woodstock and Tillsonburg via Trans Canada Trail + Addresses the County's strategic objective to focus on a network of primary routes that connect the three urban areas: Woodstock; Ingersoll and Tillsonburg
5	County Road 17	County Road 17 (City of Woodstock)	Vansittart Avenue (City of Woodstock)	County Road 4 (City of Woodstock)	4.8km	Moderate	+ Provides a connection from Hickson Trail to the Province-Wide Cycling Network while avoiding travel through downtown Woodstock. + Connects to new and planned residential development in Woodstock
6	Cycling Facilities within East Zorra-Tavistock	County Road 59 & County Road 24	County Road 8 (Township of East Zorra-Tavistock)	County Road 5 (Township of East Zorra-Tavistock)	19km	Moderate	+ Provides a direct connection from Tavistock to Woodstock through connection to the Hickson Trail + Connects users into Waterloo Region
7	Cycling Facilities within Woodstock	Devonshire Avenue (City of Woodstock)	Vansittart Avenue (City of Woodstock)	County Road 4 (City of Woodstock)	5km	High (assumes implementation of road-diet)	+ Key east-west corridor within Woodstock + Overlapping segment with Province-Wide Cycling Network + Road-diet should be considered for this corridor as an interim solution – separated facilities recommended with reconstruction. + Devonshire Avenue has the potential to serve a large number of potential cyclists

Priority	Project	County Road	From	To	KM	Feasibility	Rationale
7	Cycling Facilities within Woodstock	Huron Street/Wilson Street/Cedar Street/Norwich Avenue (City of Woodstock)	Devonshire Avenue (City of Woodstock)	Juliana Drive (City of Woodstock)	3.6km	High (assumes implementation of road-diet)	+ Key north-south corridor in Woodstock + Provides connection between Devonshire Avenue and County Road 59, providing onward connectivity toward Tillsonburg + Road-diet should be considered for this corridor as an interim solution - separated facilities recommended with reconstruction. + This corridor has the potential to serve a large number of potential cyclists
		Vansittart Avenue (City of Woodstock)	Frederick Street (City of Woodstock)	Devonshire Avenue (City of Woodstock)	0.7km	Moderate (assumes implementation of in-boulevard MUP)	+ Offers connecting between proposed on-road facility along Devonshire Avenue and the Hickson Trail + Provides direct connection across the CP rail line and the Pittock Conservation Area lands + This corridor has the potential to serve a large number of potential cyclists
		Ingersoll Road	Dundas Street (City of Woodstock)	Anderson Street (City of Woodstock)	0.7km		+ Planned for resurfacing and Road Diet in 2024, will connect County Road 9 to local routes within Woodstock.
8	Cycling Facilities within Ingersoll	Bell Street (Town of Ingersoll)	Scourfield Drive (Town of Ingersoll)	Thames Street North (Town of Ingersoll)	1.6km	Moderate-High (assumes implementation of in-boulevard MUP)	+ Provides connectivity within northwest Ingersoll + Connects to network segment leading to Thamesford + Connects to network segment along Ingersoll Street
		Ingersoll Street North (Town of Ingersoll)	Bell Street (Town of Ingersoll)	Thomas Street (Town of Ingersoll)	1.9km	Moderate-High (assumes implementation of in-boulevard MUP)	+ Extension of existing in-boulevard multi-use path north along Ingersoll Street North to Bell Street + Provides north-south connectivity along the west side of Ingersoll and adjacent industrial land uses + Connects to future linkage to Tillsonburg via County Road 10 & County Road 20
9	Ingersoll to Thamesford Connection	County Road 119, Allen Street, and Dundas Street East	McCarty Street (Township of Zorra)	Scourfield Drive (Town of Ingersoll)	9.9km	Moderate	+ Connects the Thamesford settlement area with the Town of Ingersoll + Provides broader connectivity along the Province-Wide Cycling Network via other cycling facilities in Ingersoll
10	Township of Zorra Loop	County Road 6, County Road 8, County Road 28, County Road 119	Hickson Trail (Township of East Zorra-Tavistock)	McCarty Street (Township of Zorra)	46.1km	Moderate-High (location-specific)	+ Recreational route within the Township of Zorra + Provides connectivity to Thamesford and the Hickson Trail for recreational cyclists
11	Tillsonburg to Ingersoll Connection	County Road 10 & County Road 20	Clarke Road (Town of Ingersoll)	Tillsonburg Boundary (Town of Tillsonburg)	28.4km	Low-High (location-specific)	+ Provides a direct connection between Tillsonburg and Ingersoll via County Roads + Serve serves as a recreational route for cyclists looking to travel longer distances + Addresses the County's strategic objective to focus on a network of primary routes that connect the three urban areas: Woodstock; Ingersoll and Tillsonburg

Paved Shoulder Policy

This Plan was developed in a fashion designed to work in tandem with the County's paved shoulder policy, although the implementation of the primary cycling network will require some additional considerations related to pavement surface width where platform widths permit.

As adopted in 2015, Oxford County has a policy to pave 1.0m shoulders on County Roads that can accommodate that surface width. Figure 10 identifies County roads that can accommodate 1.0m paved shoulders. County Roads depicted in green have a pavement width of at least 8.7m, those depicted in orange can accommodate a paved shoulder, and those depicted in red cannot accommodate a paved shoulder without intervention (likely in the form of road reconstruction).

As part of the implementation of the primary cycling network cycling facilities, it is recommended that the County implement wide, buffered paved shoulders on roads that fall within the primary cycling network. The locations where a 1.0m paved shoulder has been implemented through the existing policy reflect County Roads that have been upgraded to accommodate cycling to some degree, but those accommodations fall short of OTM Book 18 guidance, and were completed more with the intent of increasing the lifespan of the roadway. As such, the paved shoulder policy should be revised to accommodate high-quality cycling facilities along the primary cycling network, expanding the paved shoulders to a minimum of 1.5m with at least a 0.5m buffer on either side of the road.

In most cases along the Primary Cycling Network, the addition of wider shoulders with resurfacing or reconstruction is not projected to add substantially to the existing costs of paved shoulders, and this marginal increase should be seen as a worthwhile trade off to create a high-quality cycling experience across the County.

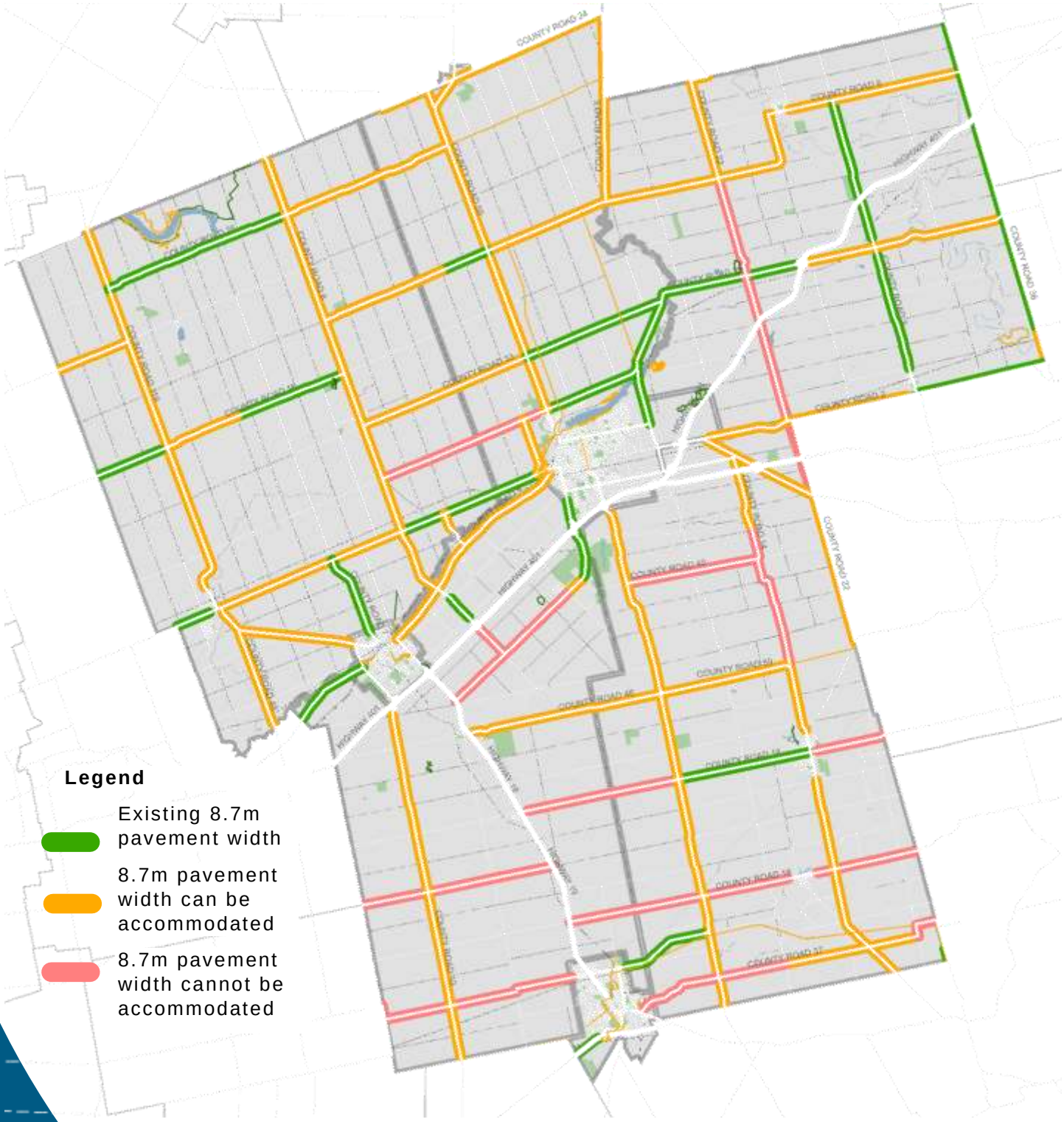


Figure 10. Status on the application of the County's Paved Shoulder Program

Secondary Network

The secondary network does not technically have a timeline associated with its implementation. The secondary network – as noted above – is meant to be prioritized for implementation only after the primary cycling network has been implemented. That is not to say, however, that the Secondary Network should not be implemented with appropriate facilities, including paved shoulders or signed routes, when roads are identified for capital improvements. Routes on the secondary network have not been prioritized, but any road listed in Table 4 should receive added consideration for cycling facilities any time road works are planned along that route.

Table 4. Overview of the Secondary Network

Road	From	To	KM
County Road 18	County Road 59	Highway 19	16.2
Tillson Avenue	Trans Canada Trail	Oxford Street	2.2
County Road 59	County Road 21	Trans Canada Trail	15.3
County Road 8	Hickson Trail	County Road 36	29.3
County Road 3	County Road 29	County Road 2	8.3
County Road 4	Devonshire Avenue	County Road 2	1.4
County Road 2	County Road 4	County Road 36	21.9
County Road 6	County Road 8	County Road 33	6.1
County Road 33	County Road 6	Hickson Trail	10.4
County Road 22	County Road 8	County Road 29	5.6
County Road 24	County Road 59	County Road 5	8.9
County Road 45	County Road 119	Road 60	4.1
County Road 25	County Road 119	County Boundary	4.1
County Road 20	County Road 10	County Boundary	3.5
County Road 27	Dereham Line	County Boundary	7.3
County Road 21	County Road 14	County Boundary	3.9
County Road 15	County Road 59	County Road 14	8.3
County Road 55	County Road 14	County Boundary	4.8

Road	From	To	KM
County Road 36	County Road 134	Township Road 2	1.2
County Road 36	County Road 8	County Boundary	2.8
County Road 16	County Road 6	County Boundary	15.1

2.3 Costing & Funding

Costing and funding the Cycling Master Plan should reflect the direction and content provided in section 2.2 – the proposed infrastructure action plan and should also address the planning and programming considerations and recommendations outlined within the Phase 1 report.

A costing and funding strategy is only as effective as the details and flexibility it provides. A master plan is not meant to provide a comprehensive overview of specific construction and coordination costs associated with these recommendations. It is however, meant to provide a high-level overview of potential cost impacts which will need to be reviewed and confirmed once the County determines when projects or initiatives proceed.

The information contained within a master plan should be used to help inform specific implementation priorities and timelines but should not determine whether a project proceeds. Costing information listed should be used to start the conversation around funding and budgeting options and alternatives – both internal and external.

The costing information that has been developed for the County was developed based on many inputs and assumptions. The following is a summary of those considerations:

+ Costing was developed using unit prices gathered through the published experiences of other municipalities in Southern Ontario.
+ These costs should be the foundation for annual budgetary discussions and decisions made by County staff and be revised as needed to reflect up to date information.
+ The costs are not meant to be prescriptive but provide a preliminary estimate of the potential implementation costs.
+ The costing information has been embedded into Table 5, which identifies the costs of the different network components that make up the primary network.
+ The costs do not include voluntary efforts made by County staff or supports “in kind” from community members and partners.

+ Costs associated with the maintenance of physical infrastructure will vary depending on maintenance vehicles within the County's fleet, staff availability, as well as weather conditions. The listed costing does not provide recommendations on the types of maintenance vehicles or tools that would be needed to facilitate seasonal maintenance for the cycling network. Additional information regarding maintenance of the network is provided in Section 2.6.

The costing and funding information has been organized into two unique segments: costs associated with implementing cycling infrastructure; and costs associated with implementing and carrying out cycling and active transportation programming.

The implementation of a comprehensive cycling master plan – including proposed infrastructure improvements, programming and outreach, will require additional investment from the County along with support from partners. The following section will identify the overall costs associated with both the infrastructure and programming recommendations as outlined in both the Phase 1 and Phase 2 reports as well as recommended approach to address future funding of the recommendations for the County's review, consideration and adoption.

Infrastructure Costing

Costing for infrastructure recommendations have been developed only for the primary network. It is assumed that any improvements to roads along the secondary network would be incorporated into the capital works costs associated with those projects, particularly within the 10 year planning horizon of the first phase of this Plan.

The total cost of implementing the primary cycling network is about $28 million dollars, excluding the cost of implementing connecting local linkages that make up the Province-Wide Cycling Network on local roads. This cost-estimate assumes a per kilometre cost of $150,000 for buffered paved shoulders added to an existing road platform or the creation of a multi-use path on one side of an existing roadway.

Table 5 outlines the total cost of implementation for the primary cycling network, based on the 11 network segments based on their implementation priority. Cycling facilities along the Province-Wide Cycling Network represent the highest priority for the County. The identification of prioritized network segments provides County staff with direction around the implementation of cycling facilities and demonstrates projects that have been thought-out and are ready to receive funding to move them towards design and construction.

Not included in this table is the cost of implementing the proposed off-road trail between Tillsonburg and Norwich. The proposed off-road trail facility is estimated to cost approximately $1.5 million dollars, assuming a per kilometre cost of $102,500 for an off-road multi-use trail outside of road right-of-way on abandoned rail bed.

Table 5. Estimated Costs for the Primary Network

Network Components	Total KM	Total Cost
Priority #1 Province-Wide Cycling Network (Woodstock to Ingersoll)	13.6	$2.04M
Priority #2 Province-Wide Cycling Network (Woodstock to Innerkip)	8.5	$1.28M
Priority #3 Province-wide Cycling Network (Innerkip to County boundary)	21.0	$3.15M
Priority #4 Woodstock to Trans Canada Trail	25.1	$3.77M
Priority #5 County Road 17	4.8	$0.72M
Priority #6 Cycling Facilities within East Zorra-Tavistock	19.0	$2.85M
Priority #7 Cycling Facilities within Woodstock	9.3	$1.40M
Priority #8 Cycling Facilities within Ingersoll	3.5	$0.52M
Priority #9 Ingersoll to Thamesford Connection	9.9	$1.48M
Priority #10 Township of Zorra Loop	46.1	$6.92M

Priority #11 Tillsonburg to Ingersoll Connection	28.4	$4.26M
Total	189.2	$28.38M

Programming Costs

The options for programming support outlined in the Phase 1 Report are characterized by a high degree of flexibility. Depending on public health guidance and the County's desire to implement new programming supports, a complete rollout of the educational and encouragement options as presented would require the hiring of 0.5-1.5 Full Time Employment (FTE) to focus on additional cycling efforts, including cycling education in schools. The additional staff position would need to be outlined in the annual Business Plan & Budget for Oxford County as per the Full-time Equivalent Plan and should be targeted for the 2023 budget cycle.

It is suggested that Oxford County begin by hiring a Cycling Community Connector as a summer student and provide a small discretionary budget of $10,000 to be allocated for programs and projects at the direction of the Oxford County Cycling Advisory Committee and other County Staff and consider scaling up staffing and financial support for cycling based on the success of that initial investment.

In addition to the staffing support, the complete suite of programs would cost an additional $30,000 per year to support the purchase of new materials such as bike racks or bike valet materials, the development and distribution of promotional materials and other costs associated with helping to deliver events across the County.

Unlike the infrastructure costing, programming costing can be more difficult to estimate considering the range of potential options, tools, tactics and measures that could be implemented. Where possible, best practices from comparable programs have been reviewed to identify potential cost impacts; however, the cost and budget for Oxford-specific programming will need to be reviewed and confirmed once the County and its partners decide to move forward with a specific program.

Potential community partnership internal and external to Oxford County should be reviewed and consulted to determine the level of support – monies, in-kind resources and / or volunteers / staffing – which could be provided in addition to the investments made by Oxford County.

Funding Considerations

Funding considerations refer to the tools and avenues that can be used by Oxford County to annually address the costs associated with the implementation of the infrastructure and programming recommendations. There are two types of funding which typically are explored. One of the sources comes directly from Oxford County i.e. internal funding sources. The other sources come from other levels of government and public / private partnerships i.e. external funding sources.

The intent is for the Cycling Master Plan to build upon existing internal and external funding sources that are either already being used to fund cycling or cycling-related projects and to explore the identification of new or alternate uses for existing funding sources to address cycling costs.

At a high level, the most effective approach would be for Oxford County to identify an annual budget to support the implementation of the Cycling Master Plan specifically focusing on the network and proposed infrastructure improvements while exploring other external opportunities – through partnerships – to support programming and outreach. The following provides a more detailed overview of the internal and external funding sources and their application relative to the proposed recommendations.

The intent is to provide the County with flexible funding avenues and considerations from which they can draw upon on an annual basis. While the hope is that dedicated funding sources will be identified on an annual basis, there may be unique funding sources based on the priorities that have been identified and new opportunities that emerge.

Internal Funding Options

Internal funding options for the Cycling Master Plan are all funding sources committed by the County through the County's annual budget process. The following is an overview of the existing funding sources that could be drawn upon within the County's budget structure as outlined in the annual Business Plan and Budget.

Capital Budget

Funding committed by Council for the capital plan is the most significant internal funding source, allowing for funds to be dedicated towards implementing physical components of the proposed cycling network. Capital budgets are determined on an annual basis as part of the annual Business Plan and Budget. Each department identifies a specific allocation of the County's resources from a public perspective. In 2021, Public Works – which is leading the majority of the implementation of the infrastructure component the Cycling Master Plan is anticipated to be allocated 53% of the County's budget. Policy revisions and updates would likely need to be addressed through the Community Planning Budget while some of the more strategic initiatives such as programming would be addressed though Strategic Initiatives.

Transportation System Planning, Community Planning, Management and Maintenance is identified as a Public Health and Safety priority as part of the core Oxford County services; providing the foundation of coordination between multiple County departments such as Public Health, Tourism, Public Works, etc.

More specifically, consideration should be made for tailored funding sources within the budget including the identification of budget allocation as part of the Transportation Services for infrastructure implementation as part of "various County Road Improvements" and through Fleet Management for maintenance practices and fleet vehicles. The construction projects as identified in the 2021 budget have already been reviewed and considered and are reflected in the priority projects as outlined in Section 2.2. Economies of scale can also be realized by leveraging other capital projects which have an impact on County Roads such as Bridges and Culverts as well as Water and Waste Water.

In addition, other unique opportunities may be available on an annual basis beyond monies including staffing alternatives. In the 2021 budget Tourism identified a new position for a Student.

This student could be part of a reporting structure associated with the implementation of components of the Cycling Master Plan or provide the necessary supports to a staff member for Public Works as noted / recommended above.

Development Charges

Developments charges is one of the sources of revenue for the capital budget but depending on the details of Oxford County's development charges by-law, opportunities may be available to amend the by-law to provide expanded coverage for cycling facilities – both on and off-road. Similar to the recommendation found within the Trails Master Plan, Oxford County should review the existing Development Charges by-law to confirm whether there are opportunities for amendments to support the implementation of cycling priorities and projects in areas where new development is being planned and implemented.

Operating Budget

Also contained within the Annual Business & Budget Plan are the detailed pertaining to the operating budget. The operating budget is typically used to address elements of maintenance and day-to-day operations for cycling infrastructure which would be addressed through the "operating expenses" component of the plan as well as for major infrastructure capital expenses.

New Funding Sources

Beyond the existing internal funding sources, Oxford County is recommended to pursue the identification of a cycling-specific fund which focuses on the implementation of programming and outreach initiatives (as outlined in Phase 1) as well as supporting local investment in cycling and active transportation.

More specifically, the County is recommended to identify a lump sum amount of monies which can be accessed by both Oxford County and its municipal partners to support programs and infrastructure. This follows the lead of other upper-tier governments, including Essex County and Simcoe County to create funding streams that support both the expansion of cycling supportive infrastructure County-wide as well as programming and promotion of cycling beyond existing efforts.

Creating a programming and partnership program, would allow for a fixed amount of annual monies to be dedicated to cycling specific implementation whether it be programming or infrastructure implementation. A commitment to area municipalities would be made to provide matching funding for eligible trails or cycling projects (for example, a paved shoulder that connects to a Primary County cycling network route) which can accelerate the implementation additional cycling improvements on

critical local connections and can clearly demonstrate the County's commitment to playing a leadership role on the cycling file. It is suggested that Oxford County allocate $150,000 annually and make up to $20,000 (as part of the $150K) available to each local municipality every year for eligible projects.

In addition, the County would establish guidelines for what determines a projects eligibility. Ideally, projects should provide meaningful connections between local cycling routes and routes that are of County-wide significance to help create a complete cycling network across Oxford County and within its constituent municipalities.

External Funding Options

External funding options represent funding streams that are provided from sources external to Oxford County. These options can be broken down into the following three categories: federal funding streams; provincial funding streams; and local external funding steams.

Federal Funding Steams

+ Active Transportation Fund
+ Federation of Canadian Municipalities (FCM) funding streams
+ Investing in Canada Program
+ Healthy Communities Canada Funding Initiative
+ Green Municipal Fund
+ Federal Gas Tax

Provincial Funding Streams

+ Province-wide Cycling Network Funding
+ Provincial Gas Tax
+ Ontario Trillium Fund
+ Ontario Rural Economic Development Fund
+ Tourism Development Fund

Local External Funding Steams

+ Trans Canada Trail
+ Service Club Support
+ Corporate Environmental Funds
+ Private Citizen Donation
+ Opportunities for cost-sharing with lower-tier and neighbouring municipalities

The Ministry of Transportation Ontario (MTO) is considered to have the greatest potential for financial support over the implementation of cycling infrastructure. MTO has indicated a potential willingness to fund active transportation infrastructure within corridors and connections that align with the province-wide cycling network. This includes along Ministry owned corridors or at infrastructure / barriers such as major highway overpasses. There is a tremendous opportunity to leverage the County's 41.9km of proposed cycling facilities along the Province-Wide Cycling Network. Infrastructure costs associated with

implementing the Province-Wide Cycling Network within Oxford County is estimated at over $6.5 million dollars. The County is encouraged to seek provincial funding for cycling projects that fall within this network, reducing the County's financial commitment.

In addition, the Ontario Cycling Strategy offers various cost-sharing schemes with municipalities to fund new cycling infrastructure projects. Beyond the MTO, support should also be leveraged from the provincial Tourism Development Fund, given active transportation's role as a touristic enterprise, as well as funding opportunities from Trans Canada Trail.

At the Federal level, the Active Transportation Fund provides $400Million over 5 years for new active transportation projects across Canada. The Public Transit Infrastructure Fund has also been used by municipalities to fund active transportation connections to serve the first and last mile connections to transit, creating significant opportunities for Oxford County to seek external funding to support the implementation of this Plan.

2.4 Implementation Strategy

Implementing the CMP should be a collaborative and coordinated effort between the County and its partners. Through the development of the Cycling Master Plan it became clear that more structure and process to support the coordination is needed. A clearly defined process and set of supportive tools is recommended for implementation as part of the Cycling Master Plan implementation strategy to facilitate day-to-day coordination and communication and to ensure that the work done is consistent with the Master Plan recommendations and objectives. The implementation strategy is made up of three components which address the implementation of infrastructure and programming as well as the overall management of the master plan implementation process.

Implementation Process

A recommended process to support next steps related to strategic planning, feasibility assessment and functional design, preliminary and detailed design, construction and post-completion of cycling infrastructure.

Program Process

Information on the Municipal Class Environmental Assessment (MCEA) as large scale infrastructure projects require the completion of an Environmental Assessment the MCEA Act.

Managing the CMP

Tools to support on-going coordination and implementation of cycling infrastructure and could also be used beyond the lifespan of the CMP to management the County's assets.

Project Implementation Process

To ensure that there is on-going commitment to the implementation of the Cycling Master Plan, it is important that there is a consistent and common understanding of the process that will be used to facilitate implementation.

Ontario's leading resource for the design, application and operation of cycling infrastructure, OTM Book 18, outlines a step-by-step process to guide next steps from the planning and design stages, through the construction and post-completion. Details on this process and each step are contained in OTM Book 18, Section 8.1.

The process should be adopted or be used as a reference by County staff as they proceed with the implementation of the Master Plan. This is primarily applicable to the proposed infrastructure improvements but also reflects the necessary consultation and engagement activities that should be adopted to maintain communication with the community.

Phase 1. Strategic Planning

+ Project is selected in fulfillment of the network and priorities outlined within the adopted Master Plan.
+ Project is scheduled in coordination with other major capital projects to minimize expenses otherwise spent on other municipal priorities.

Phase 2. Feasibility Assessment

+ A complete understanding of the local community's existing conditions, both physical and cultural, gathered motor vehicle volumes, pedestrian and cyclist volumes, collisions, frequency of trucks and buses, parking supply and demand, etc.
+ The project location is visited and experienced from the perspective of a cycling user.
+ A robust public consultation strategy is devised to gain a greater depth and spread of public knowledge.
+ A feasibility study is undertaken, with consideration given to existing bikeway design guidelines, available road widths, utilities infrastructure, topography, costs and potential revenue sources. Results of which are then detailed in a formal report.

Phase 3. Design

+ The project's detailed design is then developed, incrementally, towards three progressive stages of percentage completion: 30%, 60% and 90% / 100%.

30% Detailed Design

+ Builds upon the pre-functional design, illustrating the project at a higher-level plan view. Defining details include: the location of parking, travel lanes and, cross sectional designs - particularly where the facility's alignment are most constrained.

60% Detailed Design

+ Involves a more refined concept and a respective construction phasing schedule. Defining details include: Curb radii, traffic signal layouts, landscaping plans and signage layouts.

90% / 100% Detailed Design

+ Provides a draft 100% submission, including all details necessary to construct the proposed project. Defining details include item specifications, quantities, cost estimates, a complete drawing package, all necessary permits and licenses, a utility relocation plan, arborist plan and post construction monitoring program.

Phase 4. Construction

+ Project is tendered out and implemented in accordance with it's approved detailed design
+ Construction related activities are tailored to the conditions of the project site.
+ Construction contingency plans are devised to proactively manage unexpected circumstances and minimize the potential extent of schedule and cost impacts.
+ Daily construction activities are routine monitored to ensure compliance with specified guidelines and instructions.

Phase 5. Post-Completion

+ Facility is fully constructed and opened to the public following a momentous ribbon-cutting ceremony.
+ Facility is routinely evaluated based on its ridership, comfort, safety and accessibility. Suggested data collection methods include installing automatic bicycle counters and distributing user satisfaction surveys.
+ Responsive to the results of its preliminary evaluation, the facility is incrementally modified through design interventions or the adoption of new supportive policies.

2.0 Implementation

Large scale infrastructure projects require the completion of an Environmental Assessment under the Municipal Class Environmental Assessment Act. Depending on the scale of the project it may be required to complete at a minimum, two of the five phases of the MCEA. Through the completion of the CMP, Oxford County has sufficient documentation to demonstrate that the technical and consultation requirements of Phases 1 and 2 of the MCEA process have been completed. With the adoption of the CMP, Oxford County is committed to completing further assessment and evaluation of potential environmental impacts as a project proceeds through the implementation process to determine appropriate next steps as it relates to the MCEA process.

The phases that are required be completed are determined based on the schedule of project which is determined based on the anticipated or expected budget of the assignment. Two of the four schedules are considered “pre-approved” which means that the proposed project does not require significant changes to the roadway or where the traffic impacts have been studied and mitigated. A description of the four schedules is provided below:

+ Schedule A and A+ projects (pre-approved) and the requirements would be met if it were to have been identified through a master planning process, such as the CMP;
+ Schedule B projects which have a value of $2.4M or less; and
+ Schedule C projects which have a value of over $2.4M.

Schedule A and A+ projects are considered pre-approved and do not require a full Class EA. Pre-approved projects include those where the proposed project does not require significant changes to the roadway or where traffic impacts have been studied and mitigated.

Based on the proposed level of separation for primary cycling routes identified in the CMP, it is expected that these cycling projects would fall under Schedule A or A+. Some of the larger projects could be considered a Schedule B or C project but based on the identified facility types in this plan, that categorization would be unlikely.

The following is an overview of the remaining steps that could need to be completed for Schedule B and C projects.

Schedule B

+ Prepare notice of study completion to review agencies and the public;
+ Opportunity for order request to Minister within 30 days; and
+ Order either granted or if not, proceed with phases 3, 4 and 5 of the MCEA process.

Schedule C

+ Phase 3: Prepare alternative design concepts for preferred solutions including the identification of alternatives, inventory of impacts, consultation and determine environmental significance;
+ Phase 4: Completion of the environmental study report with opportunities for 30-day public review; and
+ Phase 5: The completion of drawings and tender documents prior to construction.

As the County proceeds with the implementation of the primary cycling network, the specific MCEA schedule will need to be confirmed and next steps identified based on the necessary requirements outlined within the Municipal Class Environmental Assessment Act. The documentation provided as part of the Cycling Master Plan should be included as part of the initial documentation for these future projects.

Program Implementation Process

The Oxford County Cycling Master Plan provides an action plan not only for the implementation of infrastructure projects but also for the programming and outreach recommendations outlined in the Phase 1 report. A phased or staged / tiered approach to implementation is recommended to support a flexible and integrated approach for the County and its partners as it relates to programming.

Similarly, a five-phase implementation process has been identified for the County's adoption. The approach is based on the principles and practices of community based social marketing (CBSM). CBSM is an approach which aims to implement initiatives at a localized and targeted scale with the purpose of changing behaviours. The approach is described in detail below.

Phase 1. Identifying Priorities

+ Depending on the available budget – as determined through the annual budgeting process – the County is to select the preferred programs / initiatives that they wish to pursue, consistent with the action plan outlined in the Phase 1 report.
+ The County should engage members of the Cycling Advisory Committee and other key stakeholders to determine the preferred programs.

Phase 2. Identifying Objectives and Audiences

+ Once the priority initiatives have been confirmed, the County should review and confirm the objectives of the initiative and define the appropriate target audience that is meant to be engaged through the program – their location, communication preferences, outreach methods, etc.
+ Opportunities and challenges should be identified as well as the desired behaviour change which will help to guide and assess the final outcomes.

Phase 3. Determining Pilot Area and Techniques

+ The location or locations where the program will be implemented are to be identified as well as the recommended tactics for implementation. Details are provided in the Phase 1 report.

+ The pilot area could be the entire County of could be a specific community within the County of Oxford depending on the available budget and interest from partners to support implementation at the local level.

+ Stakeholder interviews with local area municipal staff during the development of the CMP indicated interest for a more coordinated approach to the implementation of programming which could be achieved by initiating a pilot implementation of programs followed by wider implementation in other community based on level of up-take and “success”.

Phase 4. Consultation and Input

+ As needed, additional input may be gathered from key partners and external agencies depending on the project / initiative that is being implemented.

+ Potential partners are outlined within the Phase 2 report and should continue to be monitored and managed throughout the implementation process.

Phase 5. Monitoring and Evaluating

+ Similar to the post-completion assessment for infrastructure projects; programs and initiatives should be monitored and evaluated to determine their level of success within the community.

+ The Cycling Advisory Committee and other partners should identify a means of monitoring and evaluating the programming aspect specifically of the CMP including the identification of key indicators which represent community objectives and an annual report to Council to document outcomes and lessons learned.

Master Plan Management

Management of the CMP will require on-going coordination and tools to support and facilitate future implementation, operations and maintenance. The following are a set of tools that are recommended to be used to support the County's management of the CMP.

Communication Database

Through the development of the Cycling Master Plan a considerable contact list was developed and maintained. The contact list provides a database of resources and references which serve as a tool to support next steps relative to communication and outreach.

The contact list should continue to be used to support the implementation of the Cycling Master Plan as the County and its partners proceed with the implementation of the programming recommendations outlined in the Phase 1 report. Where needed, contact information should be updated and organized within the database to ensure that relevant partners are identified and communicated with throughout the implementation process.

Mapping Database

The management of cycling-related information is contained within a GIS database. The database was developed based on information collected during the study duration and contains updated information including the proposed cycling network and routes. The database has been designed to be used as a tool to be integrated into the County's asset management process and practices.

Management Database

An Excel-based network management spreadsheet was created to contain the same information as the GIS database. As the GIS database is managed and updated so should the spreadsheet. The database not only contains project information relative to each proposed route and the priorities, it also contains information related to costing including the unit costs that were used to prepare the infrastructure costing.

The information contained within the database should be reviewed and revised as needed on an annual basis to ensure that the information contained within it – whether it be contact information, data layers or routing details and costing – is consistent with preferred County processes, practices and decisions that have been made. For example, as the primary network is implemented, the GIS database will need to be updated to reflect these routes as "existing" and further updated in the excel spreadsheet to be consistent with the GIS database.

2.5 Coordination Strategy

The successful implementation of any cycling plan relies on clear delineation of responsibilities. If a task does not find itself on someone's "To-Do" List, it is unlikely that the task will get done. This is especially true with a CMP that focuses on all aspects of creating an enhanced cycling environment which supports and fosters a greater cycling culture.

For Oxford County to effectively focus on all aspects of what makes a place great for cycling, there needs to be a deliberate strategy to both coordinate existing efforts and plan new programs. This will require internal coordination to plan and deliver effective cycling programs as well as an intentional strategy to build capacity in external partner agencies.

The following section provides an overview of the proposed approach to coordinate the implementation of Oxford County's Cycling Master Plan including internal and external roles and responsibilities and strategic partnerships with local stakeholders and area municipalities.

Internal Structure

As has been illustrated through the development of this plan, the responsibility for enhancing the cycling environment in Oxford County does not sit exclusively in any one department. Public Works, Community Planning, Strategic Initiatives, Tourism, Communications and Engagement and Transportation Staff have all been deeply involved in the creation of this plan – and they will also need to be involved in its implementation.

The following are some highlights of the proposed approach that has been identified for Oxford County regarding internal coordination and decision making:

Tactic #1: Internal Working Group

+ It is strongly recommended that the County strike an internal staff working group or senior leadership committee to support the implementation of the Cycling Master Plan, particularly in the early days following the approval of the Plan by County Council. This team should include staff or senior management from each department that was engaged in the development of the plan, with the explicit goal of holding one another accountable for the actions as outlined in the final plan as approved by Council.
+ A representative from the senior leadership / staff Cycling Master Plan implementation working group be identified and / or continue to serve as the supervisory body for the proposed Cycling Community Connecter Summer student in tandem with the Oxford County Cycling Advisory Committee.

Tactic #2: Dedicated Staff Member

+ To facilitate the day-to-day implementation of the Cycling Master Plan, recommendations have been made for Oxford County to identify an existing staff member to be responsible for day-to-day coordination with the potential to expand into a greater role. As the role and responsibility for the Cycling Community Connecter grows, it may be more prudent to include that staff person on the Implementation Team. Particularly if the role grows to be closer to a Full-Time position, it will make sense for the staff person to have more of a voice around the table to guide the implementation since they will be the person who is closest to the various initiatives taking place.
+ Regardless of where the Cycling Master Plan Coordinator sits in the organizational structure or what level of staffing commitment they are granted, one thing that is clear is the need for that centralized, coordinating staff resource to help move forward the various initiatives contained in this plan. It is strongly recommended that the Community Connecter be a priority for Oxford County moving forward to assist with the implementation of this plan.

Tactic #3: Clear Roles & Responsibilities

When it comes to improving the cycling experience in Oxford County, many departments and stakeholders will have a role to play. Similar to the senior leadership working group, the intent of defining clear roles and responsibilities is to ensure that the necessary aspects of CMP implementation are clearly communicated and understood. These suggestions are not meant to be prescriptive, since shifting resources might necessitate departments providing assistance as required, but they reflect both best practices from similar regional municipalities and existing roles within Oxford County.

Due to the multidisciplinary nature of cycling and active transportation, we recommend that the County's Strategic Initiatives department be tasked with leading the implementation of the CMP once it has been approved.

With the CMP addressing many of the priorities of the Future Oxford Community Sustainability Plan, and with Strategic Initiatives having prior experience with coordinating the implementation of a plan that similarly transcends County departments, they are best situated within the County structure to coordinate with the various departments and external stakeholders to move this plan from a vision to reality, refer to Table **6**.

Department	Suggested Role
Strategic Initiatives	+ Serve as home department for Coordinator position + Coordinate Funding programs + Distribute supportive grants to external stakeholders to deliver cycling programming + Ongoing outreach to stakeholders to facilitate implementation of programming components of the CMP + Supporting role in data collection and evaluation of investments as part of the CMP
Tourism Oxford	+ Planning and implementing wayfinding signage, particularly along touring routes. + Promotion and outreach, including the development and distribution of promotional materials.
Public Works	+ Asset management and infrastructure planning + Construction and maintenance of cycling facilities + Assist in delivery of Funding programs + Lead role in coordinating data collection and evaluation of new investments
Community Planning	+ Address policy changes to support cycling + Ensure the recommendations of the CMP are appropriately considered as part of the development review process and other County and area municipal planning related projects, initiatives, measures and processes, where appropriate.
Communications and Engagement	+ Development and distribution of promotional materials + Ongoing support for evaluation and monitoring efforts, especially resident surveys

Table 6. Overview of internal roles and responsibilities

Partnerships

As Highlighted in the Phase 1 Report, moving this plan from vision to reality will require the input from both internal and external partners in Oxford County. Potential partners have been organized into primary and secondary partners based on the level of involvement and input they may have on a project by project basis. Some may be involved as a regulatory or approval body and others may be responsible for providing input based on context sensitive considerations / issues. Table 7 lists potential primary and secondary partners that could contribute to the implementation of various elements of the Cycling Master Plan.

	Primary Partners	Secondary Partners
Potential Role	Review and provide input to projects that directly or indirectly impact lands under their jurisdiction. Generally, a lead role related to Engineering, and a supporting or delivery role related to Encouragement and Education. A shared lead role related to Evaluation.	Engaged primarily for 'soft' elements of the Strategy. Generally, a lead role related to Education or Encouragement and a supporting role related to Engineering. A shared lead role related to Evaluation.
Potential Partners	+ Oxford County + Local Municipalities + Oxford County Tourism + Southwestern Public Health	+ OPP – Oxford Detachment + Conservation Authorities + Ministry of Transportation + School Boards + Local Businesses + Cycling Clubs and Interest Groups + Council Committees + Citizens

Table 7. Overview of potential partners to support implementation

Beyond the tactics listed as part of the internal structural recommendations, the County should seek to establish and chair an Inter-Municipal Working Group comprised of Primary Partners identified above including; County and local municipal staff representatives, representatives from Oxford County Tourism and Southwestern Public Health. This group should meet at least twice annually, potentially in concert with the Oxford County Cycling Advisory Committee, and should have a mandate to:

+ Share information related to capital project plans that may include a cycling component, and coordinate where feasible to realize potential efficiencies and optimize implementation of continuous and seamless cycling routes;
+ Coordinate on external funding opportunities and priority setting;
+ Develop and deliver cycling encouragement, education and promotion programs;
+ Share experiences and lessons learned from construction, operation and maintenance of cycling facilities; and
+ Keep up to date on emerging trends in planning and design of cycling facilities.

Once established, it is suggested that the Cycling Community Connecter serve as the Chair of this Committee, ensuring that proposed actions that emerge from the committee are implemented in a timely fashion.

The County should also be prepared to support its partners in the development and implementation of new cycling programs to support the overall objectives of the CMP. In some jurisdictions, small granting programs have had considerable success in bolstering support for cycling programs, expanding capacity of community partners and increasing the availability of cycling programs. Details of potential funding strategies to support municipal investment in programming and infrastructure are provided in Chapter 2.2.

2.6 Operational Strategy

Beyond the implementation of physical infrastructure, there should be consideration for the on-going operations and monitoring of the County's assets to track the lifecycle of infrastructure and where investments could be made in the future. This is not a new concept for the County – the current Asset Management Plan already establishes level of service standards for various components of County infrastructure including the road network. The level of services standards identified in the Asset Management Plan take into consideration regulatory requirements such as the Province's Minimum Maintenance Standards (MMS) for Municipal Highways (O. Reg. 239/0) and the Accessibility for Ontarians with Disabilities Act, as well as corporate goals, and public needs.

When the Asset Management Plan is next updated, the level of service standards should be reviewed and updated (if appropriate) to reflect expansion of the cycling network and new infrastructure. Additional consideration should be given to revising the rating system for the County's road network to remove active transportation as a negative impact to the overall score of a road / corridor.

As the plan notes, increased demand and use of a route by people on bikes could increase the need for increased level of service. However, the level of service standard would be no different than the standard set-out in the Province's MMS which the County already adheres to. In addition, there has been significant research and case studies completed by other municipalities and agencies across the province which have demonstrated the benefits of investing in cycling / active transportation infrastructure including but not limited to the longevity / lifecycle of municipal infrastructure and increased economic stimulus. Oxford County is well-positioned to reap these benefits with an existing Paved Shoulder Policy in place (through its implementation provides designated routes for cyclists) and an emerging cycle tourism industry.

Table 8 outlines asset management assumptions and typical service life for elements of a cycling network. This information is based on best practices outlined in OTM Book 18 and should be reviewed by staff to manage the implementation and operations of cycling infrastructure in the County.

Table 8. Typical Assessment Management Strategies

Type	Useful Life	Asset Management Strategies
Asphalt bikeway	25 years	Minor repairs Resurfacing Rehabilitation Full-depth replacement
Concrete bikeway	50 years	Minor repairs Replace deteriorating segments Full replacement
Bridge (bike or motor vehicle)	25–75 years	Bridge repairs Minor rehabilitation Full replacement
Culvert	25–50 years	Culvert repair Minor rehabilitation Full replacement
Painted Line Markings and Symbols	1–2 years	Refresh annually or depending on wear
Durable Line Markings, Symbols and Green Surface Treatments	3–7 years	Depends on type, weather conditions, amount of wear, preparation of surface during application
Signage	20 years	Replace damaged or faded signs
Physical separation (bollards, curbs, planters, etc.)	Until damaged	Repair or replace damaged or missing bollards and other separators

To supplement these assessment management assumptions, consideration should be given to the maintenance of cycling infrastructure. The information presented in the following table outlines estimated maintenance costs for elements of a cycling network; this information should be used to inform discussions between staff that will have a role in the on-going maintenance and operations of cycling infrastructure in the County. A well-maintained cycling network demonstrates the County's commitment to providing high-quality cycling routes and ensuring cycling is a viable mode of transportation year-round.

Table 9. Typical Maintenance Costs for a Cycling Network

Item	Unit Price	Assumptions
Painted Line Markings	$2.5 / m	All facility types except Off-Road Trail Painted Line Markings are optional for In-Boulevard Multi-Use Paths
Cold Plastic Line Markings	$5 / m	All facility types except Off-Road Trail Cold Plastic Line Markings are optional for In-Boulevard Multi-Use Paths
Painted Stencils	$50 / each	All facility types except Off-Road Trail and Urban Shoulder Painted Stencils are optional for In-Boulevard Multi-Use Paths
Cold Plastic Stencils	$275 / each	All facility types except Off-Road Trail Cold Plastic Stencils are optional for In-Boulevard Multi-Use Paths
Route Sign	$260 / km	All facility types A signage and wayfinding strategy may be appropriate for Off-Road Trails
Sweeping Costs	$2,400 to $4,000 / km	All on-road facility types

In addition to the operational considerations of cycling infrastructure, a monitoring plan is an important component post-implementation to track overall success of the CMP. A monitoring plan promotes data-driven decision making and allows County staff to appropriately allocate financial and staff resources to implement cycling projects. A monitoring plan should be measurable and manageable to ensure it can be meaningfully rolled-out and applied by County staff.

The following performance measures are recommended to track the success of implementing the CMP and cycling projects in the County. These performance measures build upon recommendations contained in the County's 2014 Trails Master Plan and have been adapted to reflect best practices that have emerged since that time.

Table 10. Suggested Performance Measures

Performance Measure	Measurement
Use	+ % of all trips + Cyclist count key corridors + Distance travelled to use trail + % of children that bike to school + % of residents who commute by bike + % of elderly residents who bike + Duration of a bike trip
Network	+ KM of on-road facilities added + KM of off-road facilities added
Investment	+ $ investment in cycling / 1000 residents
Comfort and Convenience	+ # of key destinations found along a cycling route
Partnerships and Recognition	+ # of events organized for cycling promotion + Bicycle Friendly Community Status
Outreach	+ Availability / # of maps distributed + Creation of cycling specific newsletters + Creation of educational brochures

Performance Measure	Measurement
Public Engagement	+ # of engagement opportunities + # of education or training opportunities + # of schools participating in cycling education programs + # of trail or cycling clubs / 1000 residents
Tourism	+ # of people who come to Oxford for cycling + $ amount / tourism spent
Safety	+ # of reported cyclist collisions, injuries and fatalities + # of fatalities / 10,000 cyclists + # of campaigns undertaken + # of events attended
Citations and Ticketing	+ # positive reinforcement tickets distributed + sidewalk cycling tickets issued + drivers ticketed for unsafe share the road practices (e.g. obstructing bike lanes, not passing safely)

Staff are encouraged to track the measures on a yearly basis and report to Council to provide updates on the implementation of the CMP and its success. This annual report could be used to demonstrate improvements in cycling and other 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 used to inform future improvements

3

SECTION THREE

DESIGN

3.0

Designing the Network

Together, Chapters 1.0 and 2.0 of the Phase 2 report are meant to be used as tools to support the day-to-day coordination and implementation of the Oxford County cycling network. In addition to the details on practice and process it is important to ensure that the Cycling Master Plan remains consistent with design best practices and provincially / nationally accepted guidelines and standards.

In recent years, there has been a growing recognition across North America that when it comes to growing cycling, user experience makes all the difference. As noted in the Phase 1 Report of the Cycling Master Plan, one of the goals of the Oxford plan and network is to identify cycling routes and facilities that are designed with the anticipated user in mind, and their experiences from the start of their cycling trip to the end of their journey should be considered. In practice, this means ensuring that when a facility is intended to serve riders of all ages and abilities, every aspect of the facility – from the level of separation from traffic to the signage and wayfinding along the corridor to the bike parking options at the users' destination – is considered from the perspective of the target user.

Bearing these goals in mind, this Chapter presents Oxford County with a summary of relevant design guidelines – consistent with provincially and nationally accepted documents – which reflect the recommendations and priorities of the Master Plan.

3.1 Guidelines & Standards

The Oxford County cycling network was developed using the most relevant and up-to-date design guidelines and standards as demonstrated in the use of the OTM Book 18 three-step facility selection process documented in Chapter 1.0 and 2.0. Similarly, as the County moves forward with the proposed cycling network, reference should continue to be made to information contained in international, national and provincial guidelines and standards, with the provincial guidelines being most applicable to this plan.

The Cycling Master Plan is not about reinventing the wheel or requiring the County to make significant changes to their existing standards. More so, it is about leveraging existing guideline documents that can serve as a complement to County resources and references. Nine applicable guideline documents are summarized below with the most relevant and applicable being the provincial guidelines and standards which are reflective of the unique, Ontario context in which Oxford County is found.

Table 11. Cycling Facility Guidelines and Standards

International	National	Provincial
		
+ National Association of City Transportation Officials (NACTO) Urban Bikeways Design Guide and Urban Street Design Guide + American Association of State Highway and Transportation Officials (AASHTO)	+ Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads + Transportation Association of Canada (TAC) Bikeway Traffic Control Guideline for Canada	+ OTM Book 18: Cycling Facilities + OTM Book 15: Pedestrian Crossing Treatments + MTO Bikeways Design Guidelines + Accessibility for Ontarians with Disabilities Act – Built Environment Standards

As noted above, the provincial guidelines and standards and the most applicable and should be used as the primary resource to support the implementation of Oxford County's cycling network. In the development of these guidelines; however, national and international guidelines and best practices were reviewed and integrated further reinforcing the relevant use and application of the provincial documents. Within the provincial documents there is a considerable amount of information which speaks to the design of every and all aspect of a cycling network including facilities, amenities, signage, maintenance, etc. It can be challenging to fully understand all of the relevant and applicable sections of these documents which could result in a lack of uptake and application. The following table has been prepared for Oxford County which highlights the relevant sections / content of the provincial guideline documents relative to the recommended cycling network and content of the Cycling Master Plan.

	Buffered bike lane	In-boulevard multi-use path	Paved shoulder / Buffered paved shoulder	Bike lane	Off-road trail	Intersection treatments
OTM Book 15: Pedestrian Crossing Treatments (2016)	n/a	n/a	n/a	n/a	n/a	+ S. 4.1 (Classification of Pedestrian Crossing Facilities) + S. 6.2.1 (Geometric Design Components) + S. 6.2.4 (Pavement Markings) + S. 6 (Pedestrian Crossing Facility Design: Controlled Crossings) + S. 7 (Pedestrian Crossing Facility Design: Uncontrolled Crossings)
OTM Book 18: Cycling Facilities (2020)	S. 4.3 (Physically Separated Bikeways) S. 4.4.2 (Buffered Bike Lane)	S.4.3.4 (In-boulevard multi-use paths)	S. 4.5.4 (Paved Shoulder)	S. 4.4.1 (Conventional Bicycle Lanes)	S. 4.3.4 (In-Boulevard Multi-use Path)	+ S. 6 (Intersections and Crossings)
MTO Bikeways Design Manual (2014)	S. 4.4 (Separated Bicycle Lane)	S. 5.1 (Active Transportation Path)	S. 4.2 (Signed Bike Route with a Paved Shoulder)	S. 4.3 (Bicycle Lane)	S. 5.1 (Active Transportation Path) S. 5.2 (Off-Road Multi-Use Trail)	+ S. 4.6 (Intersections, Interchanges and Channelizations) + S. 5.3 (Crossings at Roadways and Interchange Ramps)
AODA Built Environment Standards	n/a	n/a	n/a	n/a	S. 2.2 (Recreational Trails)	+ S. 2.1.5 (Curb Ramps) + S 2.1.6 (Depressed Curbs) + S.2.1.7 (Accessible Pedestrian Signals at Street Crossings)

Table 12. Overview of Cycling Infrastructure and Applicable Design Guidelines

3.2 Cycling Facility Design

Oxford County's Cycling Master Plan is meant to be a flexible document which provides enough direction to support day to day implementation while also allowing for staff to adapt as needed to changing conditions within the context of accepted design guidelines and standards. The content of section 3.1 is meant to provide a high-level overview of applicable content from these guidelines; while the following sections are meant to highlight specific content and guidelines references relative to the proposed cycling network. Oxford County has made a commitment to provide the community with high-quality facilities along the primary cycling network while also exploring opportunities to enhance routes along the secondary network where feasible. The proposed cycling network intentionally does not recommend proposed facility types as it is the County's preference that the preferred treatment be determined once the route moves through to the detailed design and construction stages of implementation. The content of the following sections provides an overview of the applicable design treatments for the routes that make up the primary and secondary cycling network.

Primary Cycling Route Design Alternatives

All primary cycling routes are recommended to be separated from other motor vehicle traffic on the roadway that the route is being proposed. This separation could take the form of **spatial** separation such as a buffer, or **physical** separation such as bollards, curbs or the provision of a separate space (ie a multi-use path). This approach is both consistent with the provincial guidelines but is also a commitment made by Oxford County to its residents and visitors regarding the desired cycling experience as one that is considered both comfortable and safe. While separation techniques vary between rural and urban / suburban contexts and is dependent on the potential impacts to operations and use of the roadway; all forms of separation require a horizontal buffer between the on-road facility and the adjacent motor vehicle lanes. As Oxford County proceeds with the implementation of the proposed cycling network the preferred type of separation will need to be determined. An overview of the types of separation and considerations for application are presented below following by potential application relative to the proposed primary cycling network.

Table 13. Overview of Separation Techniques

	Painted Buffer[a]	Parking Lane	Flex Bollards	Planters	Pre-cast Concrete Curb	Cast-in-place Concrete Curb	Rubber Curb	Concrete Barrier	Guide Rail	Mountable Curb[b]	Barrier Curb[b]
Protection from Vehicles	none	✓✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓	✓✓
Ease of Implementation	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓	✓	✓
Pedestrian Permeability	✓✓✓	✓✓	✓✓✓	✓✓✓	✓	✓	✓	✓	✓	✓✓✓	✓✓
Capital Cost (Retrofit)[c]	$	$	$	$$	$$	$$$	$$	$$	$$$	$$$	$$$
Maintenance Cost	$	$	$$$	$$$	$$	$$	$$	$	$$$	$	$
Suitable Posted Speed (km/h)	≤ 40	≤ 50	≤ 60	40—60	40—60	≥ 40	≤ 40	≥ 50	≥ 60	≤ 40	≥ 40
Aesthetic Value	✓✓	✓✓	✓	✓✓✓	✓✓	✓✓✓	✓✓	✓	✓	✓✓	✓✓✓
Suggested Minimum Width (m)[d]	0.3	0.6	0.3	1.0	0.3	0.3	0.3	1.0	1.0	Varies[e]	Varies[e]

Table 4.2 in OTM Book 18 – Summary of Benefits and Costs of Various Separation Techniques

a. A painted buffer used without other vertical forms of separation is not considered a physically separated bikeway. Note: Any separation technique that incorporates a painted buffer is likely to require regular repainting maintenance.
b. A bikeway separated by this curb type is considered a cycle track.
c. Costs for facility construction vary depending on whether it is a retrofit or reconstruction project. Cycle track costs are typically lower for reconstruction or new construction projects. Refer to Section 8 for more information.
d. The preferred buffer width is 1.0 m for all physically separated bicycle lanes.
e. Buffer width varies by context. In some cases, a railing or fence within the buffer may be appropriate. Refer to Section 4.3.5 in OTM Book 18 for details.

Table 14. Advantages and Disadvantage for Separation Techniques

Painted Buffer Advantages: inexpensive to implement, can be combined with strategically placed planters and/or flex bollards. Disadvantages: need to update markings, no physical separation unless combined with planters, bollards or other forms of separation.	**Parking Lane** Advantages: easily implemented as a form of separation since they require only pavement markings. Disadvantages: without physical separation between the parking lane and the bikeway, there is a risk that parked motor vehicles will encroach on the bikeway; and parked motor vehicles can obstruct visibility of people riding bikes, especially children.	**Flex Bollards** Advantages: high visibility through all seasons, bollard spacing may accommodate bicycle maneuverability, waste collection, driveways, etc., comparatively easy to install / remove, flexible nature of bollards poses minimal safety risk to cyclists. Disadvantages: not as durable as other separators, if spaced at larger intervals, may not always discourage encroachment; minimal aesthetic appeal.	**Planters** Advantages: aesthetic appeal, flexible spacing, high visibility. Disadvantages: may reduce visibility of cyclists depending on planter height, requires high degree of maintenance, may need to be removed and stored off-site during winter months.
Pre-cast Concrete Curb Advantages: moderately easy and inexpensive to install, flexible in terms of continuity (thereby permitting some bicycle maneuverability, waste collection, etc.), highly durable. Disadvantages: minimal aesthetic appeal, may require bollards to mark introduction / discontinuation points during winter; hard surface poses potential (minor) safety risk to cyclists.	**Cast-in-Place Concrete Curb** Advantages: durable and effective at preventing motor vehicle encroachment and could be combines with other forms of separation for extra durability. Disadvantages: require extra consideration for drainage, since they are not permeable like other separation techniques; they also should be clearly marked to increase visibility to snow removal operators.	**Rubber Curb** Advantages: may be used in conjunction with bollards to add extra separation in specific locations. Disadvantages: less durable than concrete (requires more maintenance) and may have greater exposure to damage from snow clearing.	**Concrete Barrier** Advantages: very effective at preventing encroachment, low cost to maintain separator, high year-round visibility; aesthetics may be improved through mounted flower baskets. Disadvantages: if used continuously, may have negative impact on drainage, bicycle maneuverability, waste collection and transit stop access; not aesthetically appealing; may reduce visibility of cyclists in some cases.
Guide Rail Advantages: effective at preventing motor vehicle encroachment and are durable. Disadvantages: low aesthetic appeal and more prone to damage than concrete; rails should also be applied to both sides of a guard rail to avoid exposing people riding bike to shard edges.	**Mountable Curb** Advantages: allows people riding bikes to move comfortably between the two a cycling facility and a motor vehicle travel lane. Disadvantages: mountable curbs are susceptible to encroachment from stopped and parked vehicles and offer little physical separation from motor vehicle traffic. They also carry a higher implementation cost and require extra considerations for drainage.	**Barrier Curb** Advantages: durable, low maintenance cost, highly effective at preventing bicycles / motor vehicles from crossing over the barrier, may be recessed at transit stops. Disadvantages: creates difficulties for curbside waste collection, driveway access, bicycle manoeuverability, drainage; expensive if added as a retrofit; difficult to remove, hard surface poses potential (minor) safety risk to cyclists.	

Off-road Trail
implemented outside of the road right-of-way

Example: Meloche Road, Town of Amherstburg

Before

After

Context-specific considerations:

+ The off-road trail is located outside of right-of-way in addition to existing paved shoulders.
+ The off-road trail is a short link (approximately 530 metres) to a recreational complex.

Off-road Trail
implemented within the road right-of-way

Example: Regional Road 85, St. Jacobs in Waterloo

Before

After

Context-specific considerations:

+ The off-road trail has implemented within road right-of-way, adjacent to the property parcel.
+ The trail surface is mostly granular with select / few locations that are paved.

Two-way pathway
implemented on one side of the road

Example: Pelmewash Pkwy, Lake Country, British Columbia

Before

After

Context-specific considerations:

+ Two-way pathway implemented along one side of the road through reallocation of road space, micro surfacing, epoxy-bonded curb, landscaping and flexible bollards in selection locations.

In-boulevard multi-use pathway in a rural setting

Example: Fountain Street South, City of Cambridge

Before

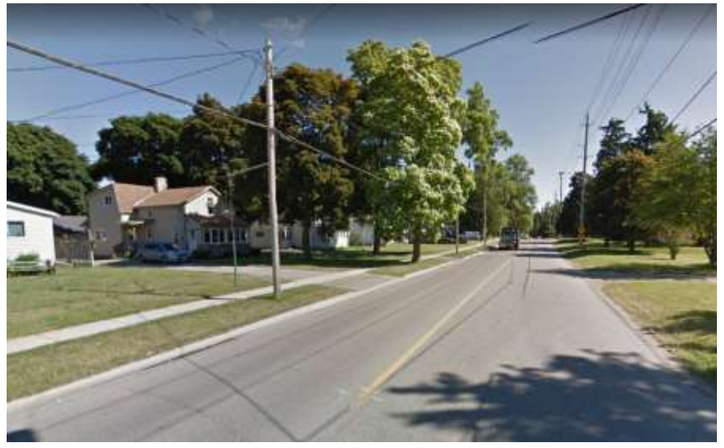
After

Context-specific considerations:

+ Implemented on both sides on the road (implemented behind roadway curb).
+ Implementation of the pathway was undertaken as part of road urbanization project.

In-boulevard multi-use pathway in an urban / suburban setting

Example: Woolwich Street, City of Kitchener



Before

After

Context-specific considerations:

+ In-boulevard multi-use pathway implemented on one side of the road.
+ Implementation by replacing the existing sidewalk with an in-boulevard multi-use pathway.

Buffered bike lanes with physical separation

Example: Colborne Street, City of London

Before

After

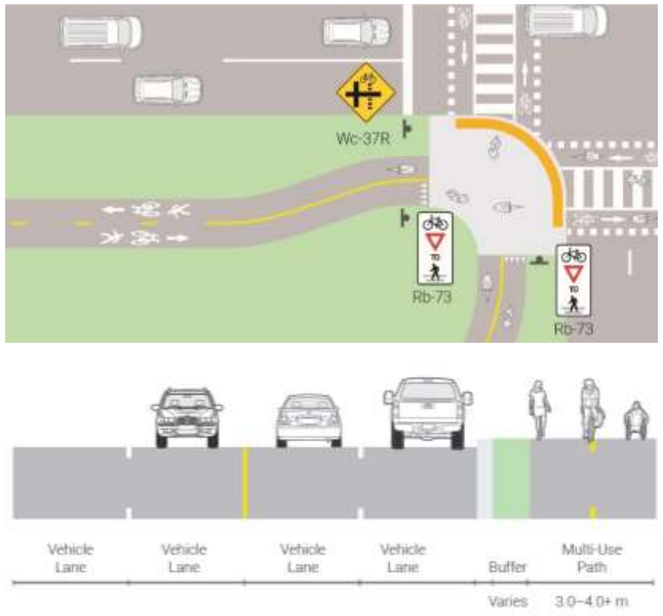
Context-specific considerations:

+ Implementation through road diet; pre-cast concrete curbs with flexible bollards on top.
+ Green pavement surface implemented through intersections and at high-volume driveways.

Secondary Cycling Routes

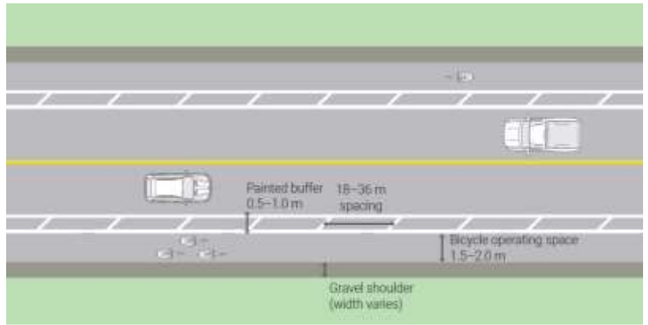
The routes that make-up the secondary network serve as connecting links to the spine / primary network to other community destinations. Secondary routes should be evaluated based on the speed and volume of motor vehicle traffic, and consideration should be given to providing designated facilities where possible. An overview of the potential design treatments for the secondary routes is provided below. As noted in Chapter 2.0, Oxford County is already implementing paved shoulders on County roads through the paved shoulder policy adopted as part of the Transportation Master Plan. The paved shoulders that are referenced below are consistent with the treatment implemented by the County; however, the minimum or accepted width is wider (1.5m – 2.0m) and would be preferred for updates made when implementing the secondary cycling network.

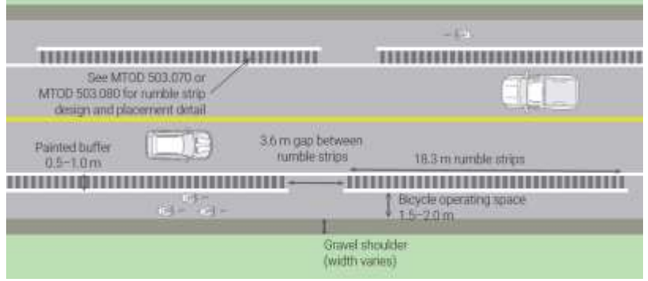
In-boulevard multi-use pathways



Example: Bayview Avenue, Town of Aurora

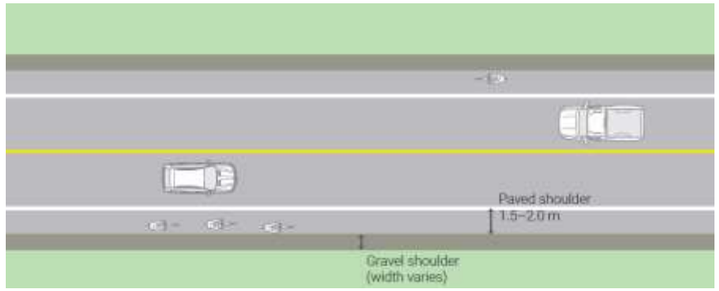
Buffered paved shoulders





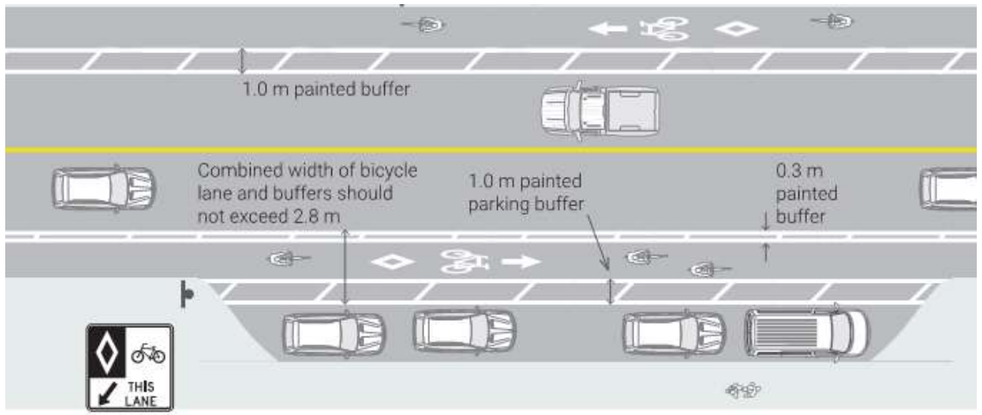
Example: County Road 50, Essex County

Paved shoulders

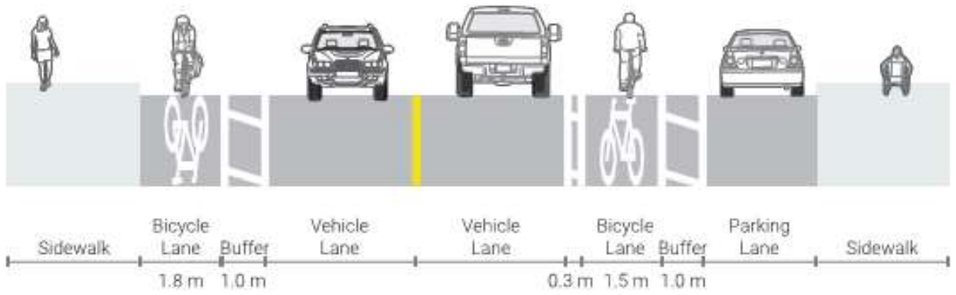


Example: Champlain Road, Town of Penetanguishene

Buffered bike lanes

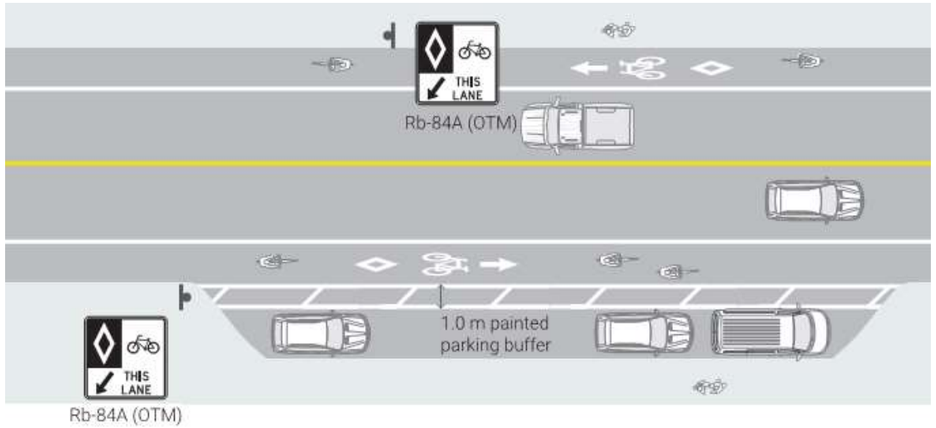


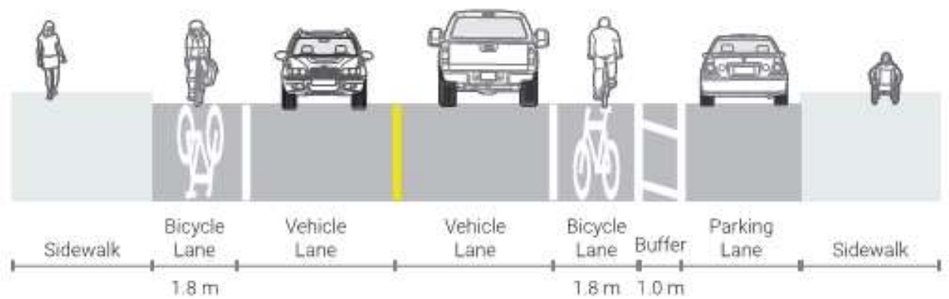
Rb-84A (OTM)



Example: Belmont Avenue, City of Kitchener

Bike lanes





Example: Springbank Avenue, City of Woodstock

3.3 Intersections & Crossings

Some of the most complex and high-risk areas of a cycling network are locations where there is a high level of interaction with other road users and where the various road users as well as the cyclists are meant to make a decision which could impact other road users which typically occurs at intersections. An intersection is particularly challenging in that it is the nexus of different road types i.e. local and County which has additional impacts on the users and uses. At an intersection there are two types of design considerations which need to be addressed. The first is the approach to the intersection by the cyclist and the second is how cyclists are physically accommodated as they cross the intersection. The most appropriate design treatments from OTM Book 18 have been highlighted below and should be considered for implementation at the same time as the proposed cycling network or once network linkages have been implemented. There may be a number of treatments along one corridor and the application should consider the continuity of the network as well as the experience of the users along the route and approaching the corridor.

Intersections

Beyond mere pavement markings, the geometric properties of the cycling facility and roadway can be modified to improve the safety of comfort of cyclists as they approach an intersection. The intersection treatment chosen depends on a variety of factors, including: motor vehicle volumes and speeds; space availability; and traffic operations.

Setback crossings

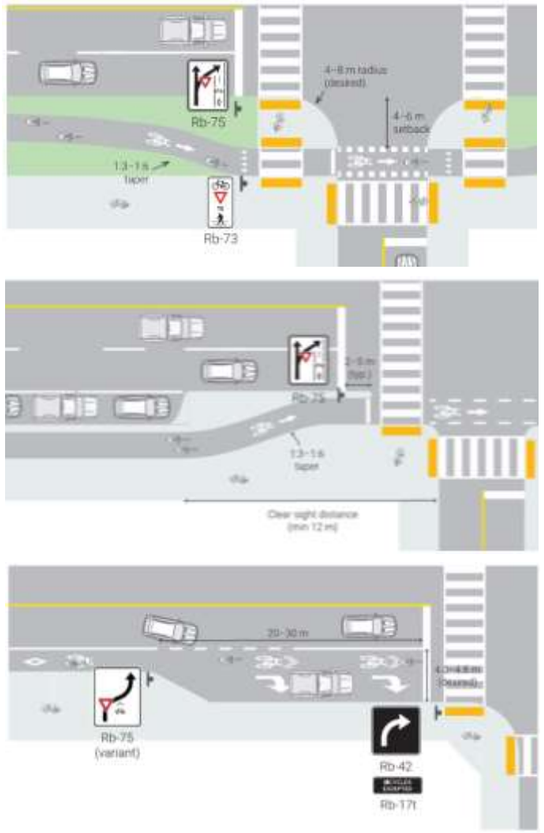
+ Cycling facility is 4 to 6 m offset from the parallel motor vehicle travel lane. Applicable for separated facilities such as cycle tracks and multi-use pathways.

Adjacent crossings

+ Cycling facility crosses intersection adjacent to (or with minimal setback from) the adjacent motor vehicle travel lanes. The cycling facility is either directly adjacent to or offset no more than 1m from the parallel travel lanes.

Between through and turn lane

+ Cycling facility approaches between a through lane and a dedicated turning lane. This design should only be used when dedicated right turn lanes are present and the posted speed limit is less than 50 km / h.



Crossings

To assist people on bike transvering difficult crossings through a designated space. Comprised mostly of pavement markings and signage, treatments are relatively inexpensive. There three types of treatments facilities which can be implemented to improve crossings for cyclists.

Separate crossride

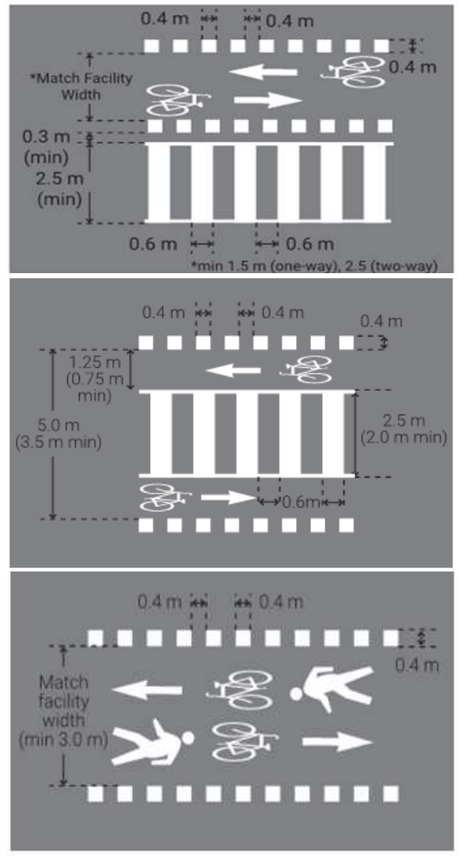
+ Separate space provided for cyclists and pedestrians, typically used when modes approach crossing in separated facilities
+ Can be designed as either one-way or two-way.

Combined crossride

+ Cyclist crossings provided on either side of crosswalk and are typically used in conditions where pedestrians and cyclists approach the crossing on a shared facility.
+ Tactile Surface Indicators (TWSI) should be implemented along full-length of initial mixing area.

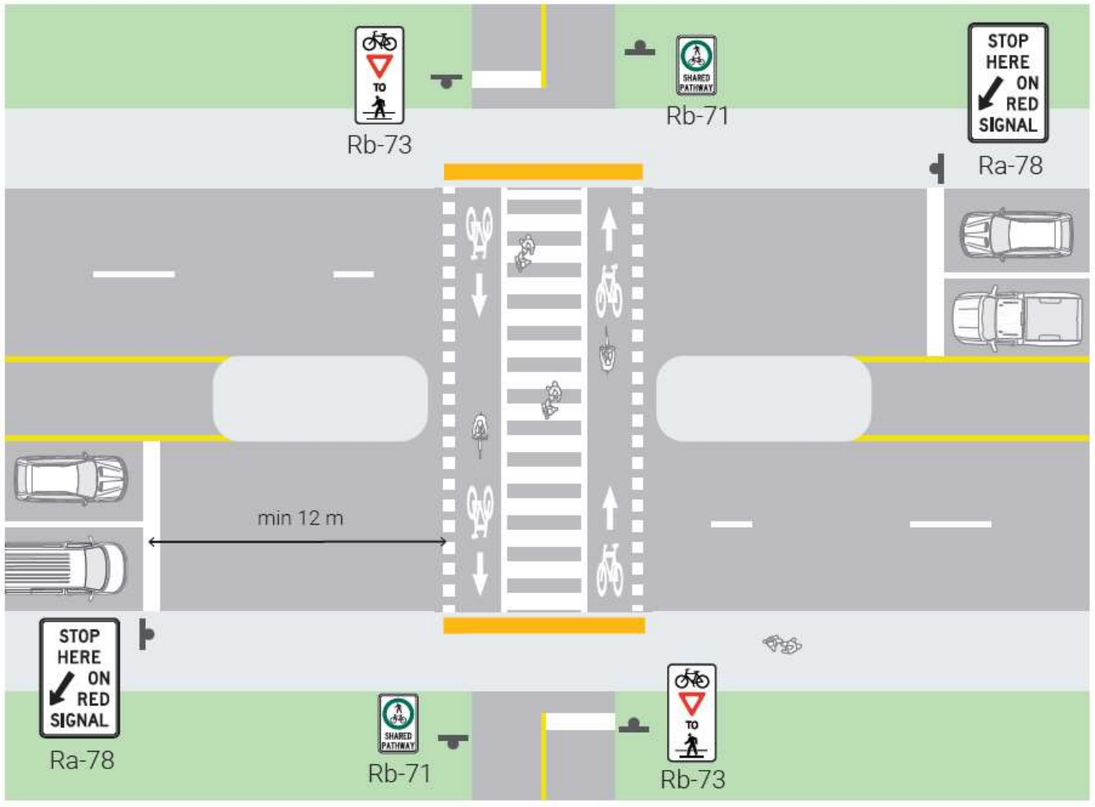
Mixed crossride

+ Intended for use at low-volume crossings (or where cyclist volumes are high and pedestrian volumes are low, where pedestrians and cyclists are approaching the crossing on a shared facility such as a MUP.
+ Not permitted at signalized intersections.

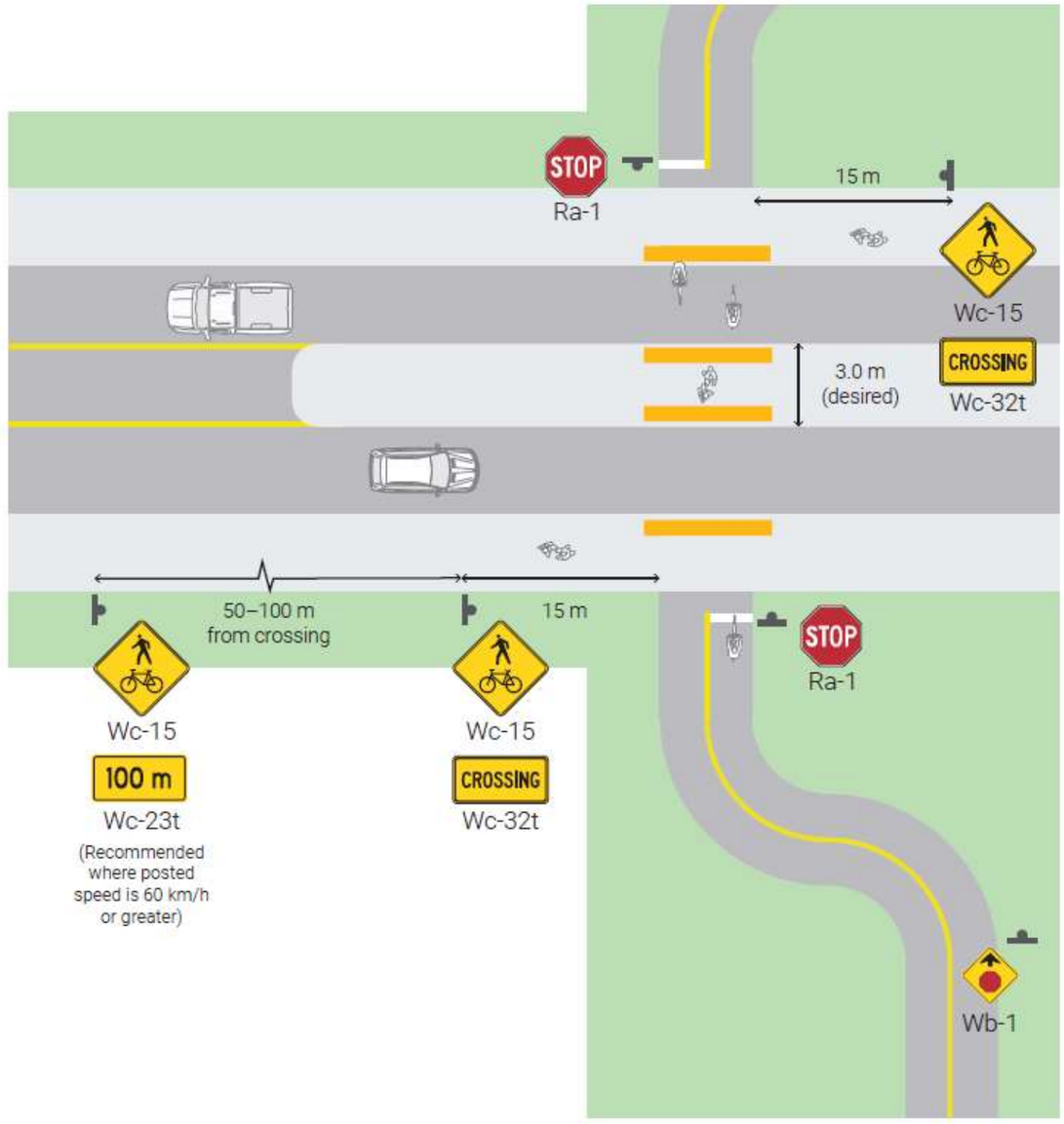


Midblock crossings

Midblock crossings allow cyclists (and pedestrians) to crossroads at locations other than signalized intersections, typically to connect to an adjacent trail / path and / or to connect to a destination. There are two types of midblock crossings: signal controlled and uncontrolled. The following figures demonstrate a typical cross-section for each type of midblock crossing. Additional reference should be made to OTM Book 18, section 6.8.3 for additional guidance on the selection and applications of midblock crossing types.



Midblock signalized crossing



Uncontrolled Midblock Crossing with Median Refuge

Trail Crossings

The proposed cycling network for Oxford County includes locations where a route crosses with an off-road trail such as the Hickson Trail and Trans Canada Trail. Consideration should be given to enhancing trail crossings at these locations to alert motorists of potential cyclists (and pedestrians) crossing, increase the visibility of users at this location, and to provide clear guidance for cyclists and pedestrian when crossing the roadway. Trail crossings at minor and major roads could include:

+ Creation and maintenance of an open sight triangle at each crossing point;
+ Trail access barriers;
+ Signage along the road in advance of the trail crossing to alert motorists to the crossing;
+ Signage along the trail to alert trail users of the upcoming roadway crossing;
+ Alignment of the trail crossing point to achieve as close to possible a perpendicular crossing of the roadway, to minimize the time that trail users are in the traveled portion of the roadway; and
+ Curb ramps on both sides of the road to ensure accessibility.

Typical signage that is installed on the approach to trail crossings and at trail crossings includes:

Roadway Signage

Wc-15 (OTM)
600mm x 600mm

Wc-32t (OTM)
300mm x 600mm

Pedestrian and Bicycle Crossing Ahead Sign

+ Warning sign to inform motorists of a crossing ahead
+ Table 15 provides a summary of the minimum advance distance for installation of Pedestrian and Bicycle Crossing Ahead signs (Wc-15) and accompanying tab Crossing sign (Wc-32t) on roadways with posted speed limits at 50, 60 and 80 km/h.
+ Although not a requirement, in addition to installing the Pedestrian and Bicycle Crossing Ahead Sign in advance of a trail crossing, it is recommended that a duplicate of this sign be installed within 15m of the actual trail crossing on both approaches to inform motorists of the actual trail crossing location.

Table 15. Minimum Distance for Installation of Pedestrian and Bicycle Crossing Ahead Sign

Road posted at 50 km/h	Road posted at 60 km/h	Road posted at 80 km/h
140 metres in advance + at trail crossing	225 metres in advance + at trail crossing	335 metres in advance + at trail crossing

Trail Signage

Wc-28(OTM)
350mm x 200mm

Wait for Gap Sign

+ Wait for Gap sign intended to warn pedestrians and cyclists, intending to cross the trail at a roadway, that they do not have the road right-of-way and must wait for a gap in traffic sufficiently large to ensure a safe crossing.
+ Typically implemented along the trail at the crossing of a roadway and installed below the stop sign on the same pole.

Ra-1 (TAC)
300mm x 300mm

Stop Sign

+ Stop sign is intended to warn pedestrians and cyclists that they must stop before crossing the trail at the roadway.
+ Typically implemented along the trail at the crossing of a roadway.

Wb-1 (OFSC)
300mm x 300mm

Stop Ahead Sign

+ Stop Ahead sign is intended to warn pedestrians and cyclists of an approaching Stop sign (Ra-1).
+ Typically implemented along the trail 100m to 120m before a Stop sign.

Additional details regarding different types of signage that are typically implemented as part of a cycling network are described in section 3.4.

3.4 Signage & Wayfinding

Equally vital to a successful cycling network is a comprehensive and intuitive signage and wayfinding system. Signage and wayfinding are in essence communication tools to appropriately communicate the intended experience, use and / or next steps on a cyclists' journey.

An effective wayfinding system is comprised of signs, pavement markings and other tools to help cyclists navigate to destinations along a network regardless of their familiarity with a community. These features should provide clear and concise information on how to use cycling facilities, access key destinations and how traffic within the facility is to operate. When developed and deployed well, wayfinding raises the visibility and awareness of cycling with a community and can serve to encourage new ridership while also assisting those who are already cycling.

There are a number of different types of signage which can be implemented; however, at the core there are two types:

Regulatory signage which are the signs that are required to be implemented by the provincial government based on the roadway function and facility type; and

Wayfinding signage which refer to signage which communicates the different decision points or next steps that need to occur along the network.

In the context of Oxford County, the signage that has been implemented is primarily Share the Road signage – which is regulatory in nature – and branded wayfinding which has been developed and implemented by Tourism Oxford with consideration for cycle tourism. Within the 2014 Trails Master Plan, some trail specific signage and wayfinding guidance was provided focusing primarily on trail wayfinding and signage.

Through the Cycling Master Plan, the intent is to continue the efforts of Tourism Oxford to continue the identification and promotion of cycle tourism routes to encourage economic growth and awareness; and to continue the implementation of trail specific signage as new trails are implemented. For the purposes of the proposed cycling network, Oxford County is responsible for the implementation of regulatory signage consistent with the signage requirements of the facilities that are implemented and the provincial guidelines. They County may also wish to pursue the implementation of a branded wayfinding program once elements of the primary cycling network have been implemented and / or the system has been completed.

A successful signage and wayfinding systems is equally contingent on a set of planning principles that reflect applicable best practices and, consideration of the users needs and experiences. Listed below are select fundamentals that should guide all signage related decisions

+ Connected: should guide cyclists between any set of possible points within a cyclist network
+ Intuitive: should be placed in advance of major decision points to support seamless transition between network segments
+ Legible: should be simple and easy to interpret
+ Consistent: should bare consistent designs to minimize confusion and meet users' expectations
+ Relevant: should provide direction to popular routes and destinations

Considering the number of different signage types, simplicity and clarity should always be paramount and consideration should be given to developing complementary communication tools to explain the intended use and meaning of the signage either through virtual media or community outreach. An overview of the different types of signage within the categories noted above is provided below.

Regulatory Signage

Bicycle Route Marker sign

Wc-15 (OTM)
450 mmm x 450 mm

Facility Type	Application
+ Signed bike route + Urban shoulder + Paved shoulder + Buffered paved shoulder	+ 20-30 metres in advance of and following intersections / decision points + 3 signs per kilometre on urban roads + 1 sign per kilometre on rural roads

Reserved Bicycle Lane sign

Rb-84 (OTM)
600 mmm x 600 mm

Rb-84a (OTM)
600 mmm x 600 mm

Rb-84t (OTM)
200 mmm x 600 mm

Rb-85t (OTM)
200 mmm x 600 mm

Facility Type	Application
+ Bike lane + Buffered bike lane + Cycle track	+ Where the bike lane is immediately adjacent to the curb, the ground-mounted version (Rb-84a) should be installed. + Where the bike lane is not + adjacent to the curb (e.g. when a parking lane + is present) the over-head mounted version of the + sign (Rb-84) may be used. + Signs should be placed downstream of each major intersection, at a maximum of 15 metres from the end of the curb radius.

Shared Pathway sign

Rb-71 (OTM)
300 mmm x 450 mm

Facility Type	Application
+ In-boulevard pathway	+ Installed along in-boulevard multi-use paths to indicate that users are expected to share the space on the path. + The sign may be placed + on the far side of intersections and other decision points.

Dismount and Walk sign

Rb-70 (OTM)
300 mmm x 300 mm

Facility Type	Application
+ In-boulevard pathway + Off-road trail	+ Installed at locations where it may be beneficial for safety, e.g. where a path transitions to a sidewalk, where a designated crossing has not been provided. + Use discretion when installing this sign and only as a temporary solution / last-resort option; compliance with this sign is generally poor and instructing people dismount may create additional barriers for people using bikes as a mobility aid, who may have considerable difficulty dismounting.

Wayfinding Signage

Each of the following wayfinding signage types must be appropriately designed and positioned within the network, to guarantee intuitive and consistent navigational support. This includes placing signs at key locations and at consistent intervals, as recommended within Table 16 below:

Table 16. Placement of Wayfinding Signage

Decision	Turn	Confirmation	Road Name Plate	Trailhead	Pavement Marking
Placed 40-50 metres before a decision point between routes	Placed 5-10 metres in advance of turning points	Placed 20-30 metres after a change point and repeated every kilometer or at a higher frequently	Intersections where street name plates occur	Start and end of trail and at major road crossings and entry points	Typically for cycling routes on quiet streets

Decision Signs

Purpose: Provides direction at key junctures, directs cyclists to key destinations and allows cyclists to orient themselves.

Turn Signs

Purpose: Combined with directional pavement markings to direct cyclists across turns in a bikeway's alignment.

Confirmation Signs

Purpose: Reinforces the location of a cycling facility and its direction of travel after turns and to all nearby traffic.

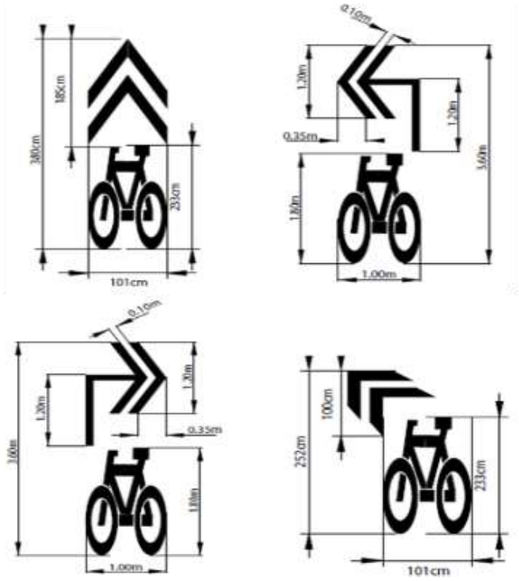
Road Name Plate

Purpose: Identifies the location of a cycling route in a minimalist format to reduce signage clutter.

Trailheads

Purpose: Mark major entrances or gateways to trail facilities (though this CMP is specific to the on-road network, trails provide vital cycling connections).

Pavement Markings



Purpose: Can support wayfinding signage to ensure turns are not missed and can assist with cycling positioning along shared facilities.

A successful signage and wayfinding systems is equally contingent on a set of planning principles that reflect applicable best practices and, consideration of the users needs and experiences. Listed below are select fundamentals that should guide all signage related decisions

+ Connected: should guide cyclists between any set of possible points within a cyclist network
+ Intuitive: should be placed in advance of major decision points to support seamless transition between network segments
+ Legible: should be simple and easy to interpret
+ Consistent: should bare consistent designs to minimize confusion and meet users' expectations
+ Relevant: should provide direction to popular routes and destinations

3.5 Bicycle Parking

Complimentary to facilities which support safe and comfortable cyclist travel, infrastructure must be provided to facilitate the secure storage of the bicycle at the end of the trip. With every cycling trip beginning and ending with a need to store a bike, bike parking is a necessary provision for encouraging individuals to take up cycling.

Bicycle parking should include options and alternatives for both short-term and long-term parking. While equally important, both types of bicycle parking possess unique planning and design considerations. Similar to OTM Book 18 for cycling facility design; the Association of Pedestrian and Bicycle Professionals (APBP) have prepared guidelines which address the provision of bicycle parking. This resource is considered the most applicable reference for Canadian and American municipalities and is reflective of national and international best practices.

An overview of the applicable design and implementation considerations for short and long-term bicycle parking from the APBP guidelines is provided in Table 17 below.

Table 17. Overview of Short and Long-Term Bike Parking

	Short-term	Long-Term
Duration	<2 hours	>2 hours
Fixtures	Single bike racks Lined bike racks Bike Corrals	Bike lockers Bike racks in a secured area
Protection	Unsheltered or partially sheltered	Fully enclosed shelter
Security	Unsecured, passive surveillance ("eyes on the street")	Secured or actively surveyed through: individual secured units, shared secured space, valet bike parking
Land-use	Commercial/Retail Medical Parks Community Centers Transit	Residences Workplaces Transit Stations

Source: APBP

When providing bicycle parking, the location, quantity and design of bicycle parking should be based off both existing as well as potential demand. More specifically, the following should also be considered:

+ Bike parking space requirements by land-use;
+ Long-term bike paring requirements at major travel destinations;
+ Short-term bike parking for all other land-uses;
+ Site planning requirements / standards; and
+ Bike rack and locker design requirements / standards.

Similar to the OTM Book 18 three-step facility selection process; APBP provides a framework to support the selection of preferred bicycle parking treatments. The framework offers a general guideline on how the County may best identify, plan for, budget and implement vital bike parking provisions. This five-step process should be used by the County when determining the implementation of bicycle parking options. Focus should be placed on identifying bicycle parking options at major community destinations (at a minimum) with additional options along the proposed network and / or within a 1-kilometre catchment of network linkages.

1. Identify the location: Determine and document the location where bicycle parking is desired – either by request from the public or from strategic improvement as identified by the County.

2. Identify the land-use and applicable policy: Refer to the applicable land-use as per the Official Plan and determine the appropriate bicycle parking requirements based on policy guidance.

3. Determine the short or long-term parking needs: Refer to the requirements in applicable regional and or local land use policy to identify appropriate short and long-term parking needs.

4. Identify design solutions and parking options: Identify the preferred design solutions and alternatives and confirm the application of those solutions and context specific design impacts.

5. Implement and communicate: Implement the bicycle parking and undertake community communication and promotion to encourage use.

At a minimum, similar to the cycling routes themselves, all bicycle parking infrastructure must be of highest-quality to ensure it effectively satisfies demand. While all features should be uniquely tailored to their contexts and intended users, they should equally embody a set of universally accepted criteria.

Listed below are a series of criteria which define high-quality bicycle parking as outlined by the Association of Pedestrian and Bicycle Professionals. Common bicycle unit design types are also provided, where such criteria should be applied:

APBP Bike Parking Design Criteria

Cost: Consider bike parking on a “cost per bike parked” metric, especially in situations where larger, higher-volume bike racks might be useful. Higher unit costs for high-volume racks are often offset by their ability to park more bikes.

Space efficient: footprint should use available space efficiently, which should include how the rack will occupy space when occupied by bikes

Maintenance: should be resistant to vandalism and erosion from inclement weather. Bike racks without moving parts will also have lower maintenance requirements.

Materials: stainless steel should be preferred as it is durable and resistant to cutting. Metal with a galvanized finish is a lower cost alternative

Aesthetics: should feature a design and finish that complements streetscaping.

Security and Detectability: design should provide two points of contact with a locked bicycle, be fastened to the ground and be located in areas with high volumes of pedestrian traffic

Safety: should be designed to be cane detectable and located outside of the pedestrian clearway.

Usability: should be intuitive to use properly.

Capacity: should be able to hold as many bikes as advertised by the manufacturer.

1. Inverted U

Common style appropriate for many uses, two points of ground contact. Can be installed in series to create a free-standing customizable bike corral

2. Post & Ring

Common style appropriate for many uses: one point of ground contact. Less prone to unintended perpendicular parking compared to Inverted U units.

3. Wheelwell-Secure

Includes an element that cradles one wheel. Design and performance vary by manufacturer. Typically contains bike wells, desirable for long-term parking and in large-scale installations.

Expanding Access to Bike Parking

Installing Bicycle parking on County-owned facilities is a positive step, but it will not address the deficiencies in availability of safe, secure bike parking facilities that exist across the County's vast geography. For the County to play a leadership role in developing Bike Parking capacity, it is suggested that Oxford County work with its municipal partners and local businesses to secure a large order of pre-approved bike racks, which can be offered to private landowners for a reduced cost thanks to bulk purchase pricing. This model of enhancing access to bike parking has been deployed in numerous communities across Ontario, most notably the City of Sudbury and the City of Thunder Bay, where municipal staff also provide guidance and assistance to install the bike racks, even if placed on private property. This can be a cost-effective way to expand bike parking within Oxford County while also building new partnerships with local businesses and landowners