August 2012
Planning and Development Services

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1.0 Introduction:

1.1 Plan Orientation:

Active transportation (AT) is recognized nationally and internationally as a positive and desirable component of a community. Based on considerable interest and support from academia, the public sector, and others with a vested interest in health and active lifestyles, as well as sustainability, demonstarted by recent AT research, plans, and infrastructure upgrades, reducing vehicle dependence by providing AT opportunities has transcended as a contemporary planning principle.

Influenced by the strong presence of AT and in an effort to foster a healthy and active Amherst, the Town has prioritized development of an Active Transportation Plan, referred to herein as "the Plan."

The Plan is designed to guide physical infrastructure improvements for walking and cycling for both utilitarian and recreation use within Town boundaries. A system of routes, design guidelines, and implementation recommendations make up what is referred to as *the Plan*. A background study is also included. The Plan is based on an eleven year initiative and key sources of information used in development of the Plan are Canadian municipal Active Transportation Plans, AT literature, public participation, and consultation with interested departments and agencies.

For effective implementation of the Plan, significant collaboration among stakeholders is strongly recommended. All Town departments, executive staff, other interested organizations, and members of the public should be included in the review and formulation of the Plan's policies, and any other component necessary for generating support and interest in implementing this Plan.

A common theme in AT literature is the need for a comprehensive promotion plan to support physical improvements. The conclusion is that a community can have excellent AT facilities but without support on the use and benefits of these facilities, the facilities could go unused. The Plan includes a few recommendations but generally promotion of AT is outside the scope of this plan. As the literature suggests, it is highly recommended that a comprehensive promotional plan be developed to accompany this Plan.

It should be noted that safe pedestrian road crossings and safe routes to School are often discussed in terms of AT but generally not included in AT plans. A network concept plan and facility design guidelines typically define an AT plan and these provided the opportunity for additional components.

It should also be noted that aesthetic standards and higher density regulations for new development to encourage AT is also a well documented topic. This land use planning issue is outside the scope of the Plan. Further study is recommended to clearly articulate the relationship between AT and the built environment, to encourage supporting amendments to Town planning policy and regulations.

1.2 Active Transportation Defined

According to Transport Canada "Active Transportation is human powered travel. The term refers primarily to walking and cycling, but also to wheel chairing, in-line skating, skateboarding, cross-country skiing and even kayaking or canoeing."

AT plans are typically designed for a combination of cycling and walking activities such as in the case of Bridgewater and HRM, or for cycling only, as demonstrated by Fredericton, Vancouver, Victoria, and Ottawa.

1.3 Goal and Objectives

How the Plan was developed:

To ensure the Plan was designed to meet the defined goal and objectives, the goal and objectives were directly applied at different points of the Plan development process. The goal and objectives of the Plan were used as a reference for selecting background topics and used to devise implications from background data to design the network plan, guidelines, and policy recommendations. Implications applied to the Plan are not documented separately but represented in the Plan itself.

The goal and objectives were defined based on the Town's vision for an active and healthy Amherst and an economically efficient plan, combined with a review of Canadian municipal AT plans and the need to coordinate past Town cycling and walking plans.

Goal:
The goal of the plan is to promote cycling and walking for living, working, and playing by providing an efficient and effective network of interconnected and continuous cycling and pedestrian routes which link neighbourhoods and major destinations.

Objectives:
The Plan objectives are as follows:

- to develop a connected and continuous town-wide cycling and pedestrian network with safe, comfortable, and direct routes.
- make efficient use of existing infrastructure by avoiding retrofits, using the existing road network, and incorporating existing trails and plans that meet the Plan goal.

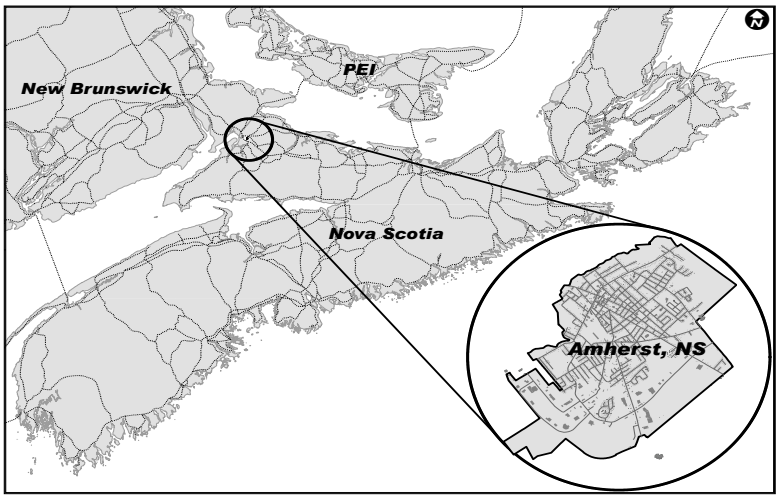
1.4 Benefits

Benefits transcend environmental, economic, and social issues. The benefits are extensive and well documented. Below are only a few examples of the benefits associated with AT:

- including off-road multi-use trails is recognized as one of the factors frequently cited as defining a high quality of life within a community.
- improves public health by fighting obesity and chronic illness like heart disease and Type 2 Diabetes.
- offers independent mobility to children, youth, seniors, low-income families and persons with disabilities.
- reduces the cost of transportation and attracts tourists.
- enhances street life, increasing citizen interaction, and improves personal security.
- It is emission-free, making it a mechanism for minimizing effects of climate change and reducing air pollution.

1.5 Local Context:

Amherst is located in the northwestern Cumberland County of Nova Scotia, Canada. Amherst is the first town in Nova Scotia when traveling from New Brunswick on the TransCanada Highway. It is seen from midway across the Cape of Chignecto, a predominantly marsh land area. Amherst is the largest town in the Cumberland County and incorporated in 1889. Amherst to mark the career of Jeffery, Baron Amherst (1717 – 1797), a prominent military figure for the British Forces of North America.



2.0 Background

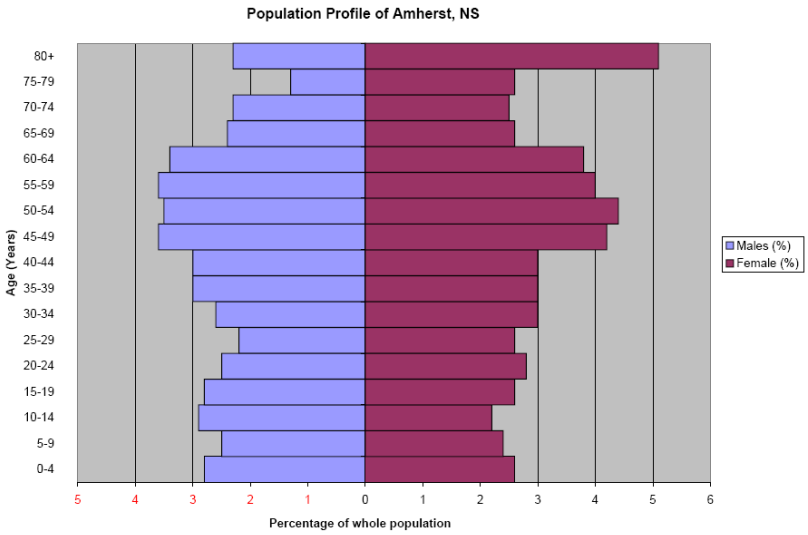
The background is a summary of results from a study of issues related to the Plan goal and objectives. The information will form the design implication used in development of the network plan, design guidelines, and policy components.

2.1 Population Structure:

This section provides insight into "who do we plan for."

The Town with a population of 9, 505 has experienced generally no population growth, only a small decline in population since 1966 in which the population was 10, 788.

Many small Nova Scotia communities are faced with significant population decline which is not the case for Amherst. Based on 2011 Statistics Canada data, the population pyramid below illustrates an absence of any significant disproportion in the Town's population. The pyramid displays the distribution of the population by age (the cohorts) and by gender. The population pyramid describes the Town on the basis of age and gender distributions. The cohorts are broken into equal intervals of five years with an open ended top category. The line down the centre indicates the proportion of the cohort that is male or female. The population of each cohort illustrates the proportion of total population. Youth (10 to 19) and elders (75 +) represent approximately 21.3 % of the total population. Based on general mobility data and this population data, an AT implication is that just over a quarter of the Town's population is most likely to not rely on vehicle use for transportation.



2.2 Past Trail Plans

This section reports existing and planned trails and includes results of a consultation with the County.

Centennial Trail Program:

Consists of a series of six loops, on-road and off-road, for both recreation biking and walking. Some sections exist and developed annually as funding comes available. Funding, priorities, and land availability are barriers to carrying out trail construction. For example, more complex trail ideas which include sections extending beyond Town boundaries and located in environmentally sensitive marsh lands require land acquisition and multiple partnerships with the Town including Ducks Unlimited, the Canadian Wildlife Services, and the County.

Tantramar Marsh Trail – Center First: Downtown Amherst Action Strategy:

The Tantramar Marsh Trail is a recommendation from the Center First: Downtown Amherst Action Strategy and a sub-set Public Realm Beautification, Infill, and Open Space Strategy. The recommendation is for a multi-use trail loop around a section of the marsh with direct connection to the downtown. This is also an idea proposed by staff previous to the Center First Strategy, which demonstrates the appeal of integrating the natural asset with the Town. The completed north section of the Centennial Trail provides scenic views of the marsh and is located adjacent to the Downtown. Implementing the "marsh loop" will only duplicate an existing trail which is currently underutilized. Instead better connection from the Centennial Trail to the Downtown should be made.

Eddie Road Route:

The Eddie Road Route is a staff envisioned future connection. The proposed multi-use trail runs along Eddie Road to Mount Whatley Road, the route of the Cross Boarder Challenge, a 10 Km race and part of Run Nova Scotia Series. Also proposed by Town staff is a route along Eddie Road and West along Mount Whatley Road to the Provincial Visitor Centre. This route is envisioned as providing cycling enthusiasts with a scenic connection from the Centre to Town.

The County

The County has direction to undertake a county-wide trail network plan. A system of multi-use trails which include connections to the Town was envisioned as being part of the plan. Potential points of connection with the Town are South Albion St., Robert Angus Drive, East Victoria St., and West Victoria St. To create a safe and accessible route to the hospital, the South Albion link would be high priority. This route is viewed as dangerous and infrastructure upgrades have previously been considered by the Town and County. High costs will be associated with overcoming physical barriers on this route.

2.3 Public Participation

The following data is a summary of results from public input collected during two public consultation sessions. A concept map visually summarizes suggested key destinations and connections. Three pre-defined issues guided discussion and feedback during the sessions:

1. Cycling and walking routes to connect key destinations.

2. Opportunities for cycling, sidewalk, and trail extensions.

3. Physical barriers and solutions to effective cycling and walking routes.

Key destinations:

The Industrial Park, a key employment area, should connect to a cycling route to encourage cycling to work. Tupper Street and Chandler Street, the main roads of the Industrial Park, have existing design elements for safe cycling and walking such as lighting, a wide road, and low traffic volume.

Other key destinations identified include the downtown, Town parks, Dickey Brook Road, schools, the highway commercial area, and medical clinics. Low income areas should be well connected to the network to provide an affordable transportation option.

Opportunities for extensions - utilitarian trips:

- Make Downtown more accessible especially for seniors with cycling routes and sidewalk extensions to adjacent neighbourhoods.
- Connect seniors to shopping and connect seniors to seniors.
- Connect residential areas to shopping on Robert Angus Drive and South Albion.
- Link the Hospital to Robert Angus Drive.
- Link soccer fields to Robert Angus Drive.
- Connect new subdivisions to schools.

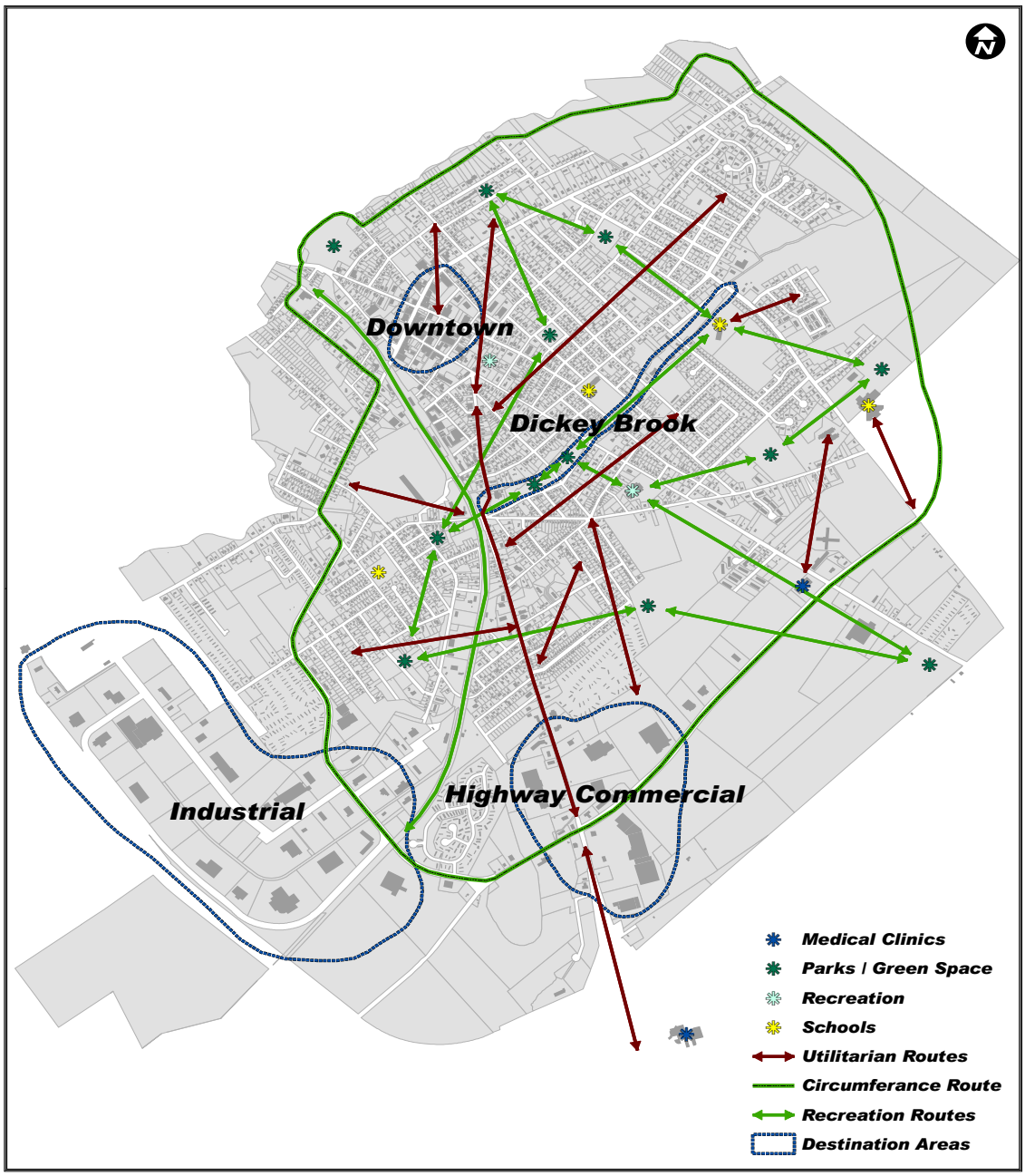
Opportunities for extensions - recreation:

- Connect multi-use trails to parks for pleasant resting and play areas, an aesthetically pleasing route, and better access to parks.
- Create a route for cycling and walking around the circumference of the Town connecting the industrial Park, the existing Centennial Trail in the north, and Robert Angus Drive. The continuous Town perimeter route would connect to neighborhoods less traffic and fewer crossings.
- Most dedicated recreation cyclists want to follow continuous routes that extend beyond the Town boundary.
- The Amherst Point Bird Sanctuary has significant recreation potential and is currently underutilized. This site offers walking, skating, cycling, and cross country skiing, and is a natural amenity and recreation area that should be made more accessible.

Physical barriers and solutions to effective routes:

- ATV use on Centennial Trial between Motor Street and Freeman Street requires RCMP enforcement. A partnership with the RCMP will lead to effective enforcement.
- Poor snow clearing results in inaccessibility to sidewalks, a significant concern for pedestrians and scooters who are made to share the road with vehicles during winter conditions.
- Route and site design should reflect Amherst's high senior population and should be designed appropriately to accommodate seniors' needs.

Concept Map: Publicly Defined Key Destinations and Future Connections



2.4 Best Practice Principles:

Safety, connectivity, accessibility, and aesthetics are commonly used principles in AT plans and the basis of discussion in AT literature. The following section summarizes principles in terms of design solutions.

Safety:

A well designed safety focused transportation network is a top priority in AT design and key to maximizing facility use. AT safety is generally discussed in terms of criminal activity and sharing the road with vehicles. Below is a summary of the design solutions related to crime prevention. This summary does not report safety related to sharing the road with vehicles. Recommended facility types are based on Canadian municipal AT plans. This area of AT has varying perspectives and no consensus on best safe design solutions. The Toronto Cycling Strategy recommends documenting accidents or public safety concerns to guide physical improvements for enhanced safety as information comes available.

Crime Prevention Through Environmental Design (CPTED), is a design solution approach for minimizing risk to safety. CPTED is a concept rooted in Criminological theory. It is an idea which has evolved over time with variations and refinements to the original concept. Preventing opportunity for criminal activity through environmental design techniques remains the primary idea.

CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts by affecting the built, social, and administrative environment. Common CPTED principles and techniques that have physical design implications for this Plan are documented below. Further review of CPTED will demonstrate the full list of principles.

Natural Surveillance:
The idea is to 'see and be seen' by maximizing sight lines in and out of a space. Barriers are lack of people and reduction of sight lines.

Territorial Reinforcement:
Distinguishes public and private space and fosters residents' interaction, vigilance, and control over the neighborhood. Places that are seen as being owned by someone sends out a message that this place has guardianship. This can be achieved by signage, flower beds, regular lawn and garden care, and avoiding large physical barriers.

Maintenance:
A poorly maintained place projects an image of disorder and neglect. A cared for space is maintained by regular maintenance and by keeping areas clean and graffiti-free.

Connectivity:

Connectivity optimizes proximity for convenience and achieved by integrating many linkages. An example of this is the fused grid, a street network design of continuous and discontinuous streets with discontinues streets supplemented by pedestrian links. Similarly, a continuous ring connecting key destinations is an alternative design documented in the Victoria Cycling Plan. Furthermore, a well documented strategy for maximum connectivity is reducing the effect of intersections as barriers to the network.

Aesthetics & Accessibility:

This principle refers to promoting use and optimizing the users experience by establishing inviting and convenient facilities. Where possible, facilities should take advantage of natural geography such as water courses and parks which create pleasant environments. User comfort and convenience is also an important consideration. Facilities must be wide enough to accommodate intended users, and vertical clearance must be adequate, especially in areas with significant tree canopy. Furthermore, cycling and walking must be able to compete with other modes of transportation in terms of efficiency (time, money, and space), and be designed to accommodate all types of competencies and abilities.

2.5 Rails with Trails

Trails located along active railbeds and within the rail right-of-way is a sought after solution to integrating trail systems within a community. Limited space, existing design, and land acquisition issues combined with centrally located and wide railroad span, makes rail right-of-ways an ideal location for trails. Furthermore, trails are recognized as an important part of a network as it provides a comfortable learning environment for begin-

ner cyclists and is a safe and scenic route option. The following is the results of a review of municipal experiences of Rails with Trails.
A review of Rails with trails In Canada show that municipal efforts to implement Rails with Trails is being challenged by the private sectors concern for safety. For example, continuation of Rails with Trails in BC is currently being stalled by CN's recent safety concerns and unwillingness to continue agreements for further trail development. In response, the Union of British Columbia Municipalities, through a 2010 resolution, has endorsed Rails with Trails and is calling for legislative amendments to the Canadian Transportation Act to authorize provincial and local governments to place trails within rail right-of-ways. This would give municipalities the authority to develop trails within the rail right of way regardless of CN's position.

HRM is well experienced in dealing with CN for its ongoing AT network initiative. HRM reports that a sound plan will benefit a case for sale of land by CN.

2.6 Network Concept

AT plans generally include a network plan. Network plans are typically a system of routes consisting of a hierarchy of two different systems, a primary and secondary system. Primary system is "the spine," which are direct links from individual neighborhoods to key commercial and employment destinations. The secondary system is the "Neighborhood" or "local" routes, which are links within individual neighborhoods connecting nieghbourhood destinations such as parks and schools, and which also feed into the larger "spine" route.

The two systems typically follow a community's existing road network and development pattern and includes a combination of on-road and off-road facility types. The location of off-road routes, is limited to parks, railroad corridors, or redeveloping properties.

3.0 Network Plan

3.1 Network Plan

The network plan is designed based on a set of network development application tools. Tools applied in developing the network include a *Network Development Approach* and a *Cycling Selection Model*. Both tools are detailed in the following section.

Cycling Network Plan

Walking/Pedestrian Network Plan

3.2 Network Development Approach

The network development approach is designed based on implications drawn from background data and the goals and objectives of the plan. Implications are applied through a set of iterative steps used to develop the network.

Step 1:
Prepare a Cycling Route Selection Model* using key AT principles and establish detailed evaluation criteria.

Step 2: Prepare candidate routes, including multi-use trails, using general insight developed from background data.

Step 3:
Evaluate each cycling route for inclusion in the network based on the *Cycling Route Selection Model* and the following steps:

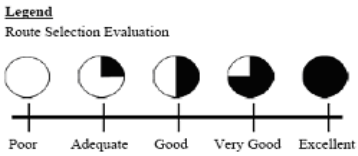
- travel all segments of each candidate route (ground proof by driving)
- asses each route using the selection criteria
- accept or reject each candidate route

Step 4:
Following identification of the cycling route, identify and include missing connections in the Town's existing sidewalk system on arterial and collector streets. Roads in the industrial park are collector roads but excluded from adding connections to the sidewalk network due to low density and road conditions suitable for walking.

Cycling Route Selection Model
As illustrated in the table below, a point scale ranking system was a screening-decision making tool used during assessment of candidate routes to determine routes for inclusion in the network plan.

Each evaluation factor is equally weighed. A point scale ranking (poor to excellent) was applied to information gathered for each evaluation factor and criteria. Potential routes less desirable compared to similar routes were eliminated from inclusion.

FACTOR	EVALUATION CRITERIA	ROUTE ASSESSMENT	
		A	B
Safety	- Are there numerous mid-block crossings? - Is there a high volume of automobiles? - Is there sufficient right of way width to accomodate cycling facilities? - Does the route provide a safe crossing of major barriers? - Are there poor site-lines? - Will the route maximize visiblility in and out of the space.		
Connectivity	- Does the route provide a vital connection to existing routes and paths? - Does the route provide direct access to major destinations and does the route connect major nodes?		
Aesthetics	- Does the route provide acess to Amherst's scenic routes, vistas, and destinations? - Does the route provide diversity of experience?		
Accessibility	- Is the route impeded by numerous stop signs? - Is the route impeded by numerous closely spaced traffic control signals? - Does the route provide a direct path to the destination?		
DECISION		 Route Recommended	 Route Not Recommended



4.0 Design Guidelines for Cycling Facility Design

A cycling facility is any physical facility that provides for the exclusive or semi-exclusive use of bicycles. The guidelines are meant to guide construction of cycling facilities within the identified cycling network. The guidelines presented in this section cover a variety of facility components ranging from facility types to physical barriers and bike parking facilities.

Aside from multi-use trails pedestrian facilities are typically sidewalks, a commonly constructed facility type which is not included in the design guidelines. The barriers, signage, and rest area guidelines do related to pedestrian facilities and should be applied in the construction of the walking network plan.

4.1 Facility Types:

This section outlines common facilities types used for cycling networks and the appropriate location for each type within the existing road network.

Bike Lane:
A bike lane is a designated space on the road, separated from vehicle traffic and designed for one-way cycling. A bike lane is delineated by visual road treatments including a painted line, texturing, colouring, a physical barrier such as a curb, or raised lanes known as "cycle tracks". To separate vehicle traffic from the cycle lane, on –street parking can be used in addition to the above mechanisms. The bike lane is generally identified with signs or bike stencils painted directly on the lane.

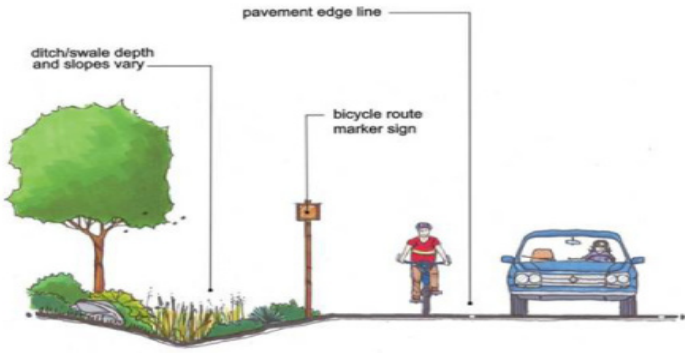
Typically located on curb and gutter roads, and most appropriate for arterial and collector roads, main sections of the network connections expected to experience higher cyclist and or motor vehicle volumes.

Furthermore, raised pavement markings (e.g., reflectors and truncated domes), can cause steering difficulty for bicyclists, and should not be used to delineate bicycle lanes.

Signed Only/Shared Lane:
A shared lane is travel lane shared by vehicles and cyclists. There is no visual or physical barrier between cyclists and vehicles. Traffic calming measures such as roundabouts at intersections are used to reduce vehicle traffic and favor bicycle movements.

Generally located on a quiet side street where motor vehicle traffic volume and speed is low such as quieter residential streets, or where volume is high and speeds are low such as streets locate din the downtown. On these roads, due to traffic conditions, there is no need to build a designated bike lane. Signed only routes can be located on roads with standard and wide curb lane widths.

Paved Shoulder
A paved shoulder facility type is a marked edge line, typically a painted line, on an existing road with no curbs. Signs should be used to indicate the presence of cyclists. Typically located on rural roads with no curb.



Multi-use Trails
A multi-use trail is a separate facility from which all motorized traffic is excluded and generally designed for slow recreation riding. Two lanes wide enough for walking and cycling in either direction may take the form of a path in open space areas, parks, or rail corridors.

Paved multi-use trails is the best option for encouraging widespread use. A paved surface opens a facility up for wheelchair, rollerblader, stroller, and novice cyclist use. Off-road paved multi use trails are excellent conditions for learning how to cycle.

Providing a space for beginners to become confident cyclists encourages network use, as reported in the Victoria Master Cycling Plan.

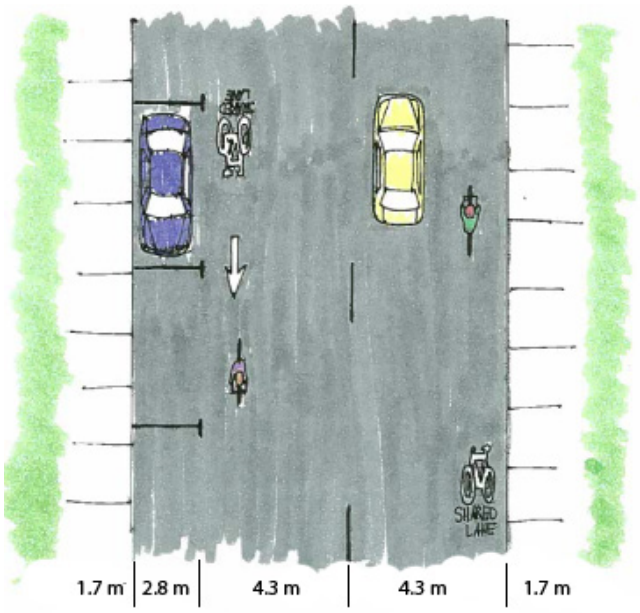
4.2 Width Range Standrads:
Transportation Association of Canada (TAC) standards and standards common to AT plans are included below.

Cycling Facility	Width Range
Motor Vehicle travel lane (not including gutter dimensions)	3.0 to 3.7 m
On street parking	2.5 to 2.8 m
Marked bicycle lane width	1.5 to 2 m
Shared lane and no parking	≥ 4.25 m
Shared lane with parking	6.6 to 7.1 m
Paved Shoulder	2.5 m (≥ 60 km/hr with adjacent 0.5 granular shoulder
Multi-Use Trail	4 m

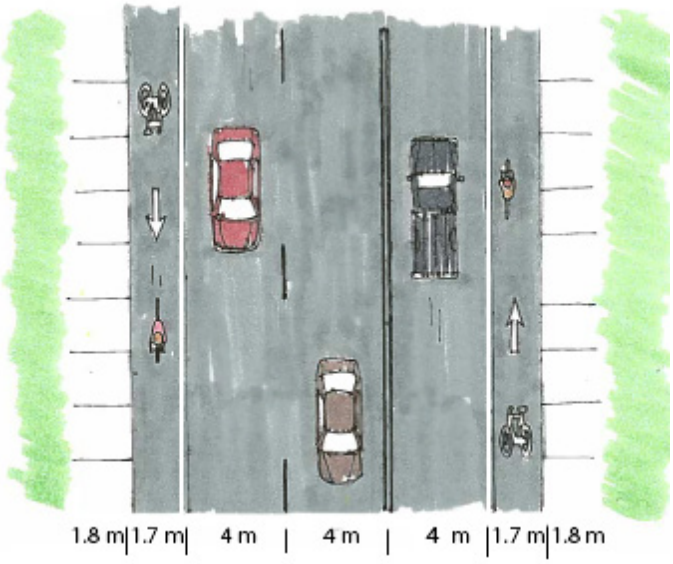
4.2 Cycling Facility Scenarios
To further demonstrate facility types and standards, various road right of way scenarios with applied facility type and standard measurements are illustrated below.

When it comes time to constructing Amherst's cycling facilities, the plans, similar to the illustrations below, will be designed by applying the appropriate facility type to the existing road network, while considering facility standard width ranges. This can be done on a phase by phase basis.

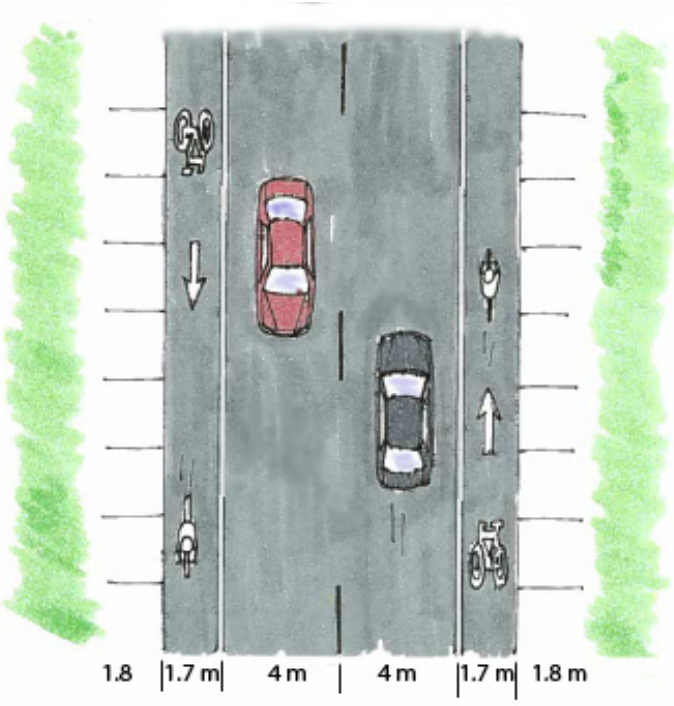
Shared lane with parking on ≥ 15 m Right of Way



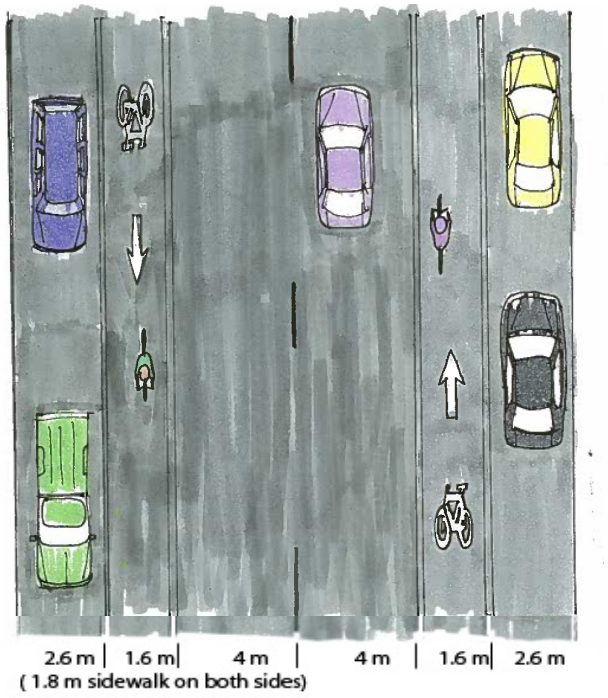
Bicycle Lane on ≥ 20 m Right-of-Waywith three motor vehicle traffic lanes



Bicycle lane on ≥ 15 m Right of Way



Bicycle lane with parking on both sides on ≥ 20 m Right of Way



4.3 Intersections

Intersections are significant points of danger and motorists and cyclist education is necessary to improve safety at intersections. Appropriate signage should be carefully incorporated into intersections.

Additional standards apply to standard width range for bicycle facilities at intersections. The *Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads, section 3.4.7.2, Intersections with Bike Lanes*, should be reviewed for right and left turn standards. This document is available at the Transportation and Public Works Department. Section 3.4.7.2, Mid-Block Bike Path Crossing should also be reviewed where necessary, as well as 3.4.7.7 Railway and Streetcar Crossings.

4.4 Lighting:

For safety and security lighting is an important feature for walking and cycling facilities, however, due to costs, off-road trails are rarely lit. The estimated up front cost of an underground lighting fixture, the preferred option for maintaining the natural environment, is $ 2000 and $40,000 per km.

To avoid high costs and ensure safety, facilities should be located close to street lights where possible. If lighting fixtures are considered, solar powered lighting fixtures may save on long term energy costs.

4.5 Snow Clearing:

The high cost of snow clearing means a primarily seasonal Network is recommended with:

- Clearing only multi-use Trails that are part of the spine network and link to sidewalks.
- Posting seasonal use signs to avoid liability.
- Extend system use by an annual well-timed early spring clearing to clean up snow mounds in areas with minimal sun exposure.

4.6 Rails with Trails:

Because of an existing lack of consensus on acceptable setback distance between rail and trails, the distance should be determined on a case-by-case basis and the following factors consider:

- Type, speed, and frequency of trains in the corridor;
- Separation technique;
- Topography;
- Sight distance;
- Maintenance requirements; and
- Historical problems.

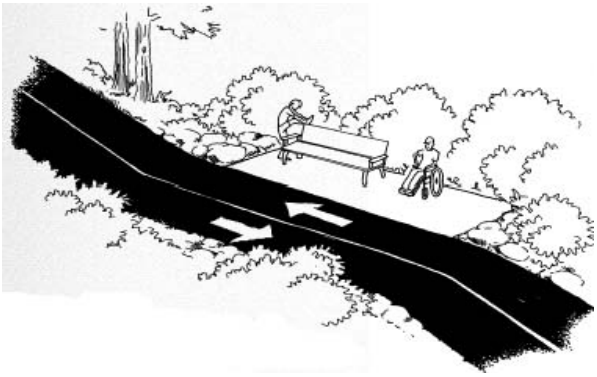
Another determining factor may be corridor ownership. Trails proposed for privately-owned property will have to comply with the railroad's own standards. The Town needs to be aware that the risk of injury should a train derail will be high, even for slow-moving trains. Discussions about liability assignment need to factor this into consideration.
In many cases, adequate setback widths, typically 7.6 m (25 ft) or higher, can be achieved along the majority of a corridor. However, certain constrained areas will not allow for the desired setback width. Safety should not be compromised at these pinch points and additional barrier devices should be used, and/or additional right-of-way purchased.

4.7 Rest Areas

Periodic shaded rest areas are beneficial for all on and off-road facility users, particularly for people with mobility impairments that expend more effort to walk than other pedestrians. The frequency of rest areas should vary depending on the terrain and intended use. For example, heavily used facilities should have more frequent opportunities for rest. Rest areas provide an opportunity for users to move off the trail, instead of remaining on the trail to stop and rest.
In general, rest areas should have the following design characteristics:

- A firm and stable surface;
- A width equal to or greater than the width of the trail segment leading to and from the rest area;
- A minimum length of 1.525 m (60 in);
- A minimal change of grade and cross slope on the segment connecting the rest area with the main pathway; and
- Accessible designs for amenities such as benches, where provided.

Benches can be particularly important for people with disabilities, who may have difficulty getting up from a seated position on the ground. Some benches should have backrests to provide support when resting, and at least one arm rest to provide support as the user resumes a standing position. Accessible seating should provide the same benefits as seating for users without disabilities. For example, providing a wheelchair space facing away from the intended view would not be appropriate. Garbage receptacles are necessary to keep routes clean.



4.8 Signage:

The goal of incorporating signage into facility design is to achieve a high level of legibility and comprehension for user safety and convenience. Typical categories of signs include: navigation, warning, connections, and points of interest. Signage should be designed according to national and provincial regulations. For national sign regulations refer to Transportation Association of Canada (TAC) *Bikeway Traffic Control Guidelines for Canada*. For provincial standards refer to *Nova Scotia Traffic Sign Regulations*.

Navigation Signs:

Displays destinations and distances. A more detailed design includes route destination and direction, simplified route map, and distances to major cross streets and neighborhood. This sign acts as a visual cue for motorist awareness, and used by cyclists for user ease and accessibility. Displayed in locations leading to and along a cycling route, and where multiple routes intersect, "decision points".

Warning Signs:
Warning signs convey the following messages to both motorists and cyclists:

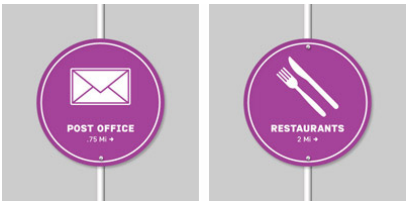
- Draw driver attention to the presence of cyclists on the road.
- Warn cyclists of busy intersections where cross traffic does not stop.
- Alert drivers to a bike crossing area
- Advise motorists to "share the road"

Warning signs are typically displayed near bicycle trip generators such as schools, parks, and other activity centers, and also located at major streets approaching a route. Largest and most basic of road signs are pavement markings.

Pavement marking should be applied using appropriate materials and should be a size and colour to make them highly visible. For example Vancouver uses bright colours to mark hazardous bike lane area, such as at intersection crossings.

Connections:
Point cyclists to nearby routes and integrate individual routes into broader network.

Points of Interest:
Highlight points on or near the route of relevance to cyclists. These can include, but are not limited to libraries, post offices, restaurants, museums or tourist information offices.



All Signage:
Signs must be located so they are conspicuous, legible, and comprehensible. For example signs should be located so that trees and other signs do not block them; located in advance to allow adequate response time; and maintained to avoid saturation to maintain credibility.

Gateway Signage:
Significant signage at entrances to trails enhances safety and aesthetics. Signage is a design device for preventing opportunity for criminal activity. It is a territorial reinforcement tactic that sends a message of ownership and guardianship Furthermore, gateway signage creates an inviting and attractive space.

4.9 Barriers:

Avoiding large physical barriers is a design device to achieve Territorial Reinforcement, a CPTED design principle to prevent criminal activity. The idea behind this principle is that a place has guardianship as its seen as being owned and maintained by someone.

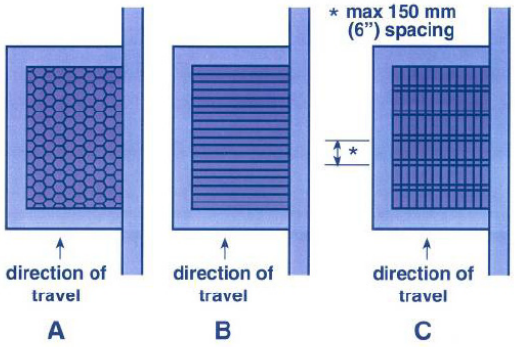
Below is an example of an existing physical barrier at an entrance to the Centennial Marsh Trail on Motor Street. The gates and fencing form a large unattractive obstacle resulting in an uninviting entrance. The entrance poorly distinguishes public and private space. Upon entering the area, it is unclear as to whether or not this is a public space. Instead the area should be open with attractive gateway signage.

A physical barrier can be though of as anything that discourages use. The example below demonstrates an aesthetic barrier which diminishes the aesthetic quality of a place.

4.10 Drainage Grates:

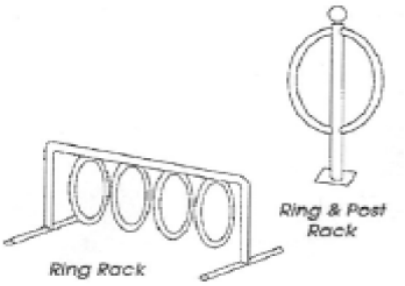
Bicycle lanes should be provided with adequate drainage to prevent ponding, washouts, debris accumulation, and other potentially hazardous situations for cyclists.

When an immediate replacement of an incompatible grate is not possible, a temporary correction of welding thin metal straps across the grate perpendicular to the drainage slots (4 to 5 inches apart, centre to centre spacing) should be considered. Bicycle lanes should also have smooth riding surface, and utility covers should be adjusted flush with the street surface.



4.11 Bike Parking:

Basic bike parking is typically a bike stand on the sidewalk, which should be no more than 10 to 15 meters from a building's main entrance. This facility supports short term 2 hour parking and is typically a ring-and-post design, a ribbon, or a ring rack.



Long term parking for employees, students, residents, and others requires a secure weather-protected location from the elements. These facilities typically include bicycle lockers and shelters.

Furthermore, the following points should be considered for optimum parking facilities.

Parking facilities should:

- Be located in areas that deter theft and vandalism such as in full public view where they can be viewed by passers-by, fellow workers, ect.
- Present no hazard to pedestrians.
- Be easily accessible from the road or bicycle route.
- Be attractive in design.
- Be as close as possible to the cyclist's destination.
- Have appropriate security lighting, where possible.
- Be located at all buildings or intervals in high density areas such as the downtown.

5.0 Implementation

This section provides recommendations for effective implementation of the Plan's network and design guidelines.

5.1 Partnerships, Education, and Promotion

As mentioned in the introduction, this Plan focuses on physical improvements and promotion is outside the scope of project work. This section was developed to emphasize the significance of promotion and education in AT planning and includes potential partnerships and courses of action.

The Town does not have to promote AT on their own. Partnerships can extend outside of Town departments and include agencies with a vested interest in health and wellness. The Town could actively consult a variety of potential partners including:

- The Cumberland Health Authority
- Canadian Cancer Society, Northern Region
- Maggie's Place
- Empowering Beyond Barriers Society
- Cumberland Early Intervention Program
- Highland View Regional Hospital
- the Municipality of the County of Cumberland
- Chignecto-Central Regional School Board

The Chignecto-Central Regional School Board is an example of how a potenital partner could support the Town's AT Plan. With a focus on safety and promotion of AT, the School Board could provide students, particularly elementary students, with cycling education such as CAN-BIKE safety courses, incorporate cycling into physical education curricula, or develop targeted safety material to distribute to students.

The Town could encourage the private sector to partner with the Town to develop a Bike share program. This program is convenient and economical for anyone who makes frequent trips around the Town. Members of Bikeshare can borrow a bike up to three days. Bikeshare hubs are connected by an online database which allows members to use any one of the destination or pick up points.

The Town should set an example to encourage other agencies to take action in supporting AT and facility use by expanding internal partnerships and current AT programs. For example, the Town could provide incentive programs or application of support facilities (showers and bike racks) to motivate employees to cycle or walk to work.

Transport Canada addresses education and promotion of AT by recommending removal of non physical barriers by "addressing the attitudes, awareness, understanding or skills of potential pedestrians and cyclists" and by develop the following:

- campaigns (e.g. Bike to Work Week) that raise awareness and encourage people to try new ways of getting around
- walking or cycling maps that highlight recommended routes including sidewalks, trails, bike lanes, and roads with wide curb lanes or paved shoulders
- promotional events to mark milestones (e.g. approval of a cycling plan, opening of a new trail, publication of a walking map) and attract media attention that can raise awareness and build public support for future measures
- awards that recognize the contributions of key individuals and organizations
- cycling skills courses that teach cyclists to ride safely on the road
- educational campaigns that encourage drivers to treat cyclists and pedestrians with care and courtesy

5.2 Funding Sources

Potential funding sources offered by a variety of organizations are documented below. Program or mandate details, status of funding plans, and web site details are included for each source. It's important to note that the information in this section is relevant to the 2012 date of project development.

Green Municipal Fund (GMF) – Through GMF, the Federation of Canadian Municipalities provides funding for "development or completion of walking and cycling networks and systems planned around travel to work, school, shopping or culture, that promote safety, accessibility and viable alternatives to car travel."
(http://gmf.fcm.ca/Funding-Opportunities/Funding-projects.asp)

ecoMOBILITY - The program will provide financial support to municipalities and regional transportation authorities for transportation demand management (TDM) projects that reduce emissions by shifting personal automobile travel to other modes, reducing the number and length of car trips, and shifting trips to less congested times and routes. (http://www.tc.gc.ca/eng/programs/environment-ecomobility-menu-eng-1934.htm)

M**oving On Sustainable Transportation (MOST)** – "Transport Canada created the Moving On Sustainable Transportation (MOST) funding program to promote awareness of sustainable transportation issues and encourage concrete action by Canadians." Funding associated with this program is no longer available. Transport Canada may provide similar grants in the future. (http://www.tc.gc.ca/eng/programs/environment-most-contactandquestions-176.htm#q5)

Age Friendly Community (AFC) – "funding is provided for projects that create or adapt structures and services to be accessible to, and inclusive of, seniors with varying needs and abilities in order to promote healthy active ageing." (http://www.gov.ns.ca/seniors/age_friendly_program.asp)

Cumberland Health Authority, Community Health Board – "Offer representation of health and community interests for the geographic area; develop profiles of existing health care services and recommend ways of enhancing these services; develop, coordinate and support the implementation of a community health plan; identify factors that influence health and ways to make us healthier; foster community development through participation and partnerships; and support initiatives that focus on health promotion, health care prevention, and health care services." (http://www.cha.nshealth.ca/ccha/community_partners/soar.htm)

Green Infrastructure Fund (GIF) – "Through Canada's Economic Action Plan, the federal government established the Green Infrastructure Fund. This five year program specifically targets projects that will improve the quality of the environment and lead to a more sustainable economy over the long term. The Green Infrastructure Fund supports projects that promote cleaner air, reduced greenhouse gas emissions and cleaner water." Much of the funding has been allocated at the time of AT Plan development. (http://www.buildingcanada-chantierscanada.gc.ca/creating-creation/gif-fiv-eng.html)

Equilibrium – a project which provides financial support to community initiatives with measurable improvements over current approaches in a variety of land and resource use areas including sustainable transportation. (www.ecoaction.gc.ca/equilibrium-eng.cfm)

Other Potential Funding Sources:
Provincial Recreation/Physical Activity Project Funding:
http://www.gov.ns.ca/hpp/publications/Project_Funding_Guidelines_and_Application.pdf

Planning Assistance Program:
http://www.gov.ns.ca/hpp/publications/PASR-CapitalGrants-Planning-Assistance-Guidelines.pdf

Regional Development Program:
http://www.gov.ns.ca/hpp/publications/Regional_Development_Program.pdf

5.3 Policy:

Some of the policy recommendations below are amendment ready, while most are general recommendations for drafting more detailed amendments following further review and consultation with relevant Town bodies and stakeholders.

For successful implementation of this Plan, an open participatory process should be applied. Development of policy should include a collaborative and consultative approach with affected Town departments. Furthermore, to promote and evaluate support for improved cycling and walking facilities, other interest groups and agencies should be consulted for feed back and the Plan should be subject to the existing approval process including review by the Planning Advisory Committee and public consultation before being considered by council.

New Development:

1. All subdivision development applications and Development Agreements should be subject to an

AT review as part of the approval process. The review process would gage the suitability of proposals against the goals and objectives of the AT Plan. The Town should require developers to dedicate land for active transportation or cash in lieu of such land.

2. The Town should require new development to include bicycle parking spaces for a variety of land uses (Ottawa provides a good example of land use requirements for bicycle parking spaces).

Private Land:

3. Commence formal discussions with private land owners to secure easements, options or agreements of purchase and sale where network connections are required.

4. The Town should partner with other NS municipalities through the Union of NS Municipalities to endorse Rails with Trails by calling for legislative amendments to the Canadian Transportation Act to authorize provincial and local governments to place trails within rail right-of-ways.

Standards and Maintenance:

5. Adopt the guidelines as provided by this Plan for development and maintenance of the recommended cycling and walking network.

6. Ensure general provisions for streets are amended to incorporate the AT Plan.

7. The Town should ensure the safe and comfortable seasonal operation of the cycling and walking network through monitoring of maintenance practices.

Support, Education and Training:

8. The Town should support efforts to achieve an environmentally responsible and healthier population by encouraging residents and visitors to choose cycling or walking as part of a commuting and fitness regime.

9. Continue to support and include new cycling education programs and cycle skills training initiatives such as the Bike Rodeo to raise awareness of safe cycling practices for all road and pathway users and the public.

Cooperation, Collaboration, and Engagement:

10. The Town should recognize cycling and walking as important elements towards maximizing efficient operations of the transportation and land use system, by helping to reduce space for parking, and being supportive of more intensive land use practices.

11. Adopt the International Charter for Walking (ICW), as suggested by Transport Canada's Rural and Small Communities Guide, "several Canadian municipalities that are working to improve active transportation have adopted the ICW. This policy statement defines a community as pedestrian friendly in principle, and reinforces a sense of collaborative determination to bring about change". See International Charter for Walking. www.walk21.com

County Routes:

12. Support inter-municipal cycling tourism and travel by coordinating with the County to establish bicycle route connections.

Enforcement:

13. Request the Town Police Services build upon cycling and pedestrian safety by enhanced enforcement of ATV use on off road routes, and continued effective enforcement of motorists.

5.4 Phasing Plan

Cycling Network Prioritized Phases:
The cycling network plan should be constructed on a phased basis. Sections of the network have been assigned to phases and prioritized to focus development over an eleven year period. Each phase is assigned to a time frame. Eleven phases were identified in total.

Phases are prioritized relative to the AT Plan goal so that more functional routes which provide for living, working, and playing, and which are primary links in the network are developed first.

Regardless of phases, where road construction is proposed along the cycling and pedestrian routes, the Town should combine upgrades.

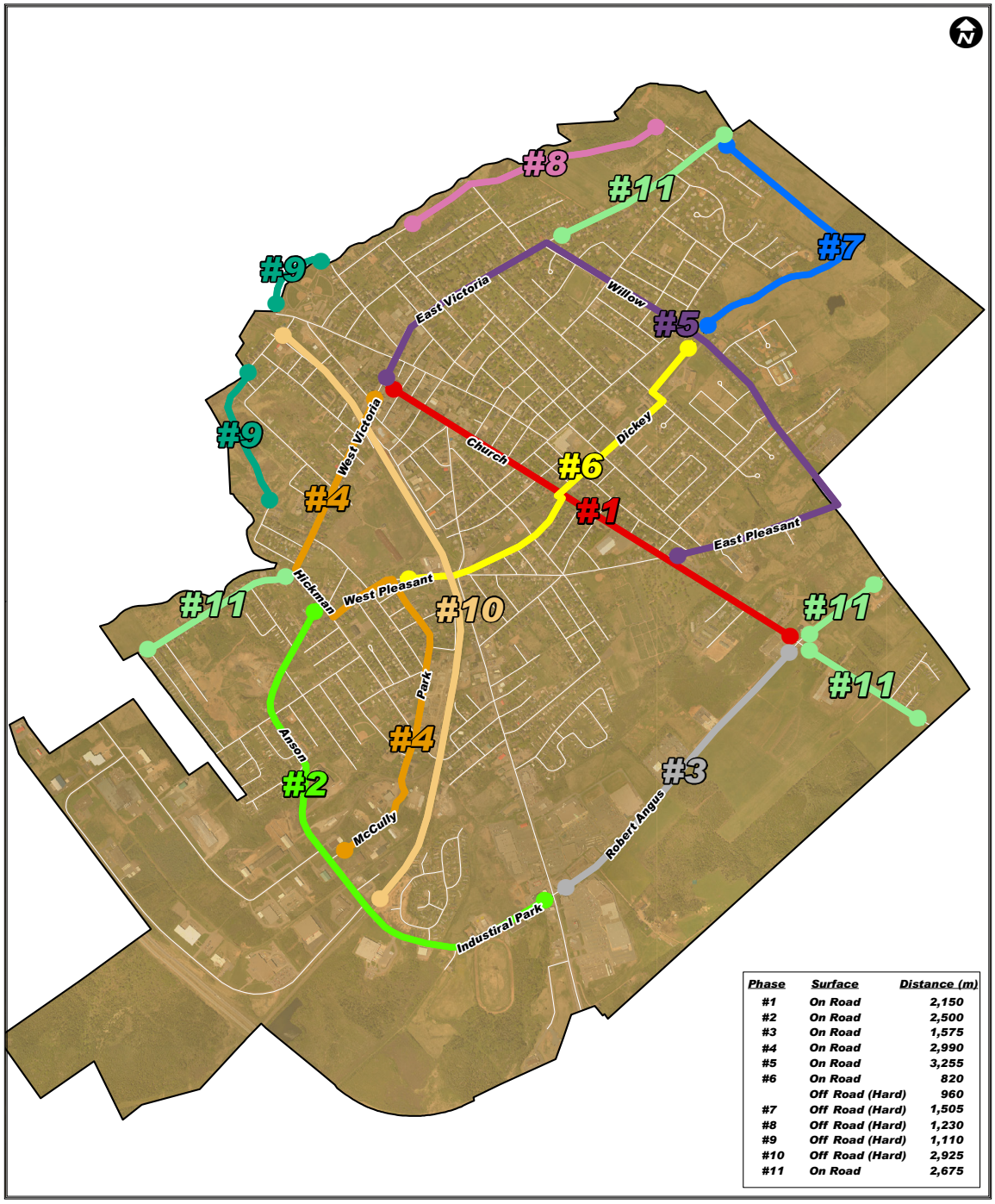
This section includes a phasing plan chart and cycling network prioritized phases map. The phasing plan chart below shows the length, suggested facility type, and time frame for each phase, while the cycling network prioritized phases map shows the street that sections of the network are assigned to in the phased priority plan. Suggested facility type should be evaluated by a detailed review of existing road conditions.

Phasing Plan Chart:

PHASE	LENGTH	FACILITY	TIME FRAME
Phase 1	2.2 km	Add bicycle lane markings & signage both directions, and or add shared lane markings & signage	1-2 years
Phase 2	2.5 km	Add multi-use trail markings to existing street*	1-2 years
Phase 3	1.6 km	Add bicycle lane markings & signage both directions, or paved shoulder and signage	2-5 years
Phase 4	3 km	Add bicycle lane markings & signage both directions, and or add shared lane markings & signage	2-5 years
Phase 5	3.3 km	Add bicycle lane markings & signage both directions, and or add shared lane markings & signage	2-5 years
Phase 6	.9 km on-road), 1 km (off-road)	Add bicycle lane markings & signage both directions, and or add shared lane markings & signage, off-road multi-use trail	2-5 years
Phase 7	1.5 km	Off-road multi-use trail hard surface conversion & add signage	5-7 years
Phase 8		Off-road multi-use trail hard surface conversion & add signage	5-7 years
Phase 9	2.3 km	Off-road multi-use trail hard surface	5-7 years
Phase 10		Add bicycle lane markings & signage both directions	7-10 years
Phase 11	3 km	Off-road multi-use trail hard surface	10 years

*Multi-use trails are typically for off-raod routes, however, to avoid constructing a long stretch of sidewalk, this facility type should be integrated into the existing street right of way for this section. In the future a strip of landscaping or raised surface, similar to a sidewalk, can be used to delineate the multi-use trail from the street.

Cycling Network Prioritized Phases



Phase	Surface	Distance (m)
#1	On Road	2,150
#2	On Road	2,500
#3	On Road	1,575
#4	On Road	2,990
#5	On Road	3,255
#6	On Road	820
	Off Road (Hard)	960
#7	Off Road (Hard)	1,505
#8	Off Road (Hard)	1,230
#9	Off Road (Hard)	1,110
#10	Off Road (Hard)	2,925
#11	On Road	2,675

Walking Network Prioritized Phases
The walking network plan includes existing sidewalks and trails, missing sidewalk connections, and future trails.

Currently, sidewalk construction in Amherst generally follows a process of completing links in the existing sidewalk network in the order of: arterial roads, collector roads, and lastly local roads. Alternatively, to better meet local needs, sidewalks should be prioritized based firstly on providing greater accessibility to school age and senior residents. These groups are less likely to have access to vehicle use and make up a little less than quarter of the Town's total population. Missing sidewalk connections near schools and areas of high senior population, as well as a connection to the hospital would provide greater accessibility for these groups.

Secondly, sidewalk links that provide better connections to existing recreation opportunities such as trails, parks and recreation fields should be prioritized.

Walking Network Prioritized Phases

5.5 Cost Assumptions

Estimated construction costs based on incorporating cycling facilities within the existing paved street right of way has not been determined as the facility type has not been confirmed. It is highly recommended that council commit to annual cost review and funding over the eleven year implementation plan.

Estimate costs for the construction of various facility elements as reported by Town Engineering services have been provided in the table below. The table is a tool to be applied to cost estimates and a more detailed list of costs should be prepared on a phase by phase basis as facilities are determined. The complete cost list should include components from the Plan's design guidelines such as costs for removal of existing barriers, signage, including gateway signage, and rest areas. Ideally, when funds are available, streets should be retrofitted for best facility design.

Cost Guide:

ITEM	Unit Cost	COST
Bicycle lane markings (White painted line on street/trail)		$500 /km
Painted stencile markings	$20	
Add paved shoulder		$ 75/m provided the existing shoulder gravels are sufficient and no widening required
Off-road multi-use trail (asphalt, 4.0 m wide)		$200 /m (30 cm of gravel, 50mm of asphalt)
Off-road multi-use trail (soft surface)		$31, 000
Bicycle locker (2 bikes)	$3, 000	
Street Widening		$1000/m (storm sewers/new street structure/ driveway adjustments)

For the walking network, each meter of sidewalk will cost $ 93.72. This cost excludes new multi-use trail links. Council should commit $ annually to ensure thewalking network is completed with the 11 year phased cycling plan.