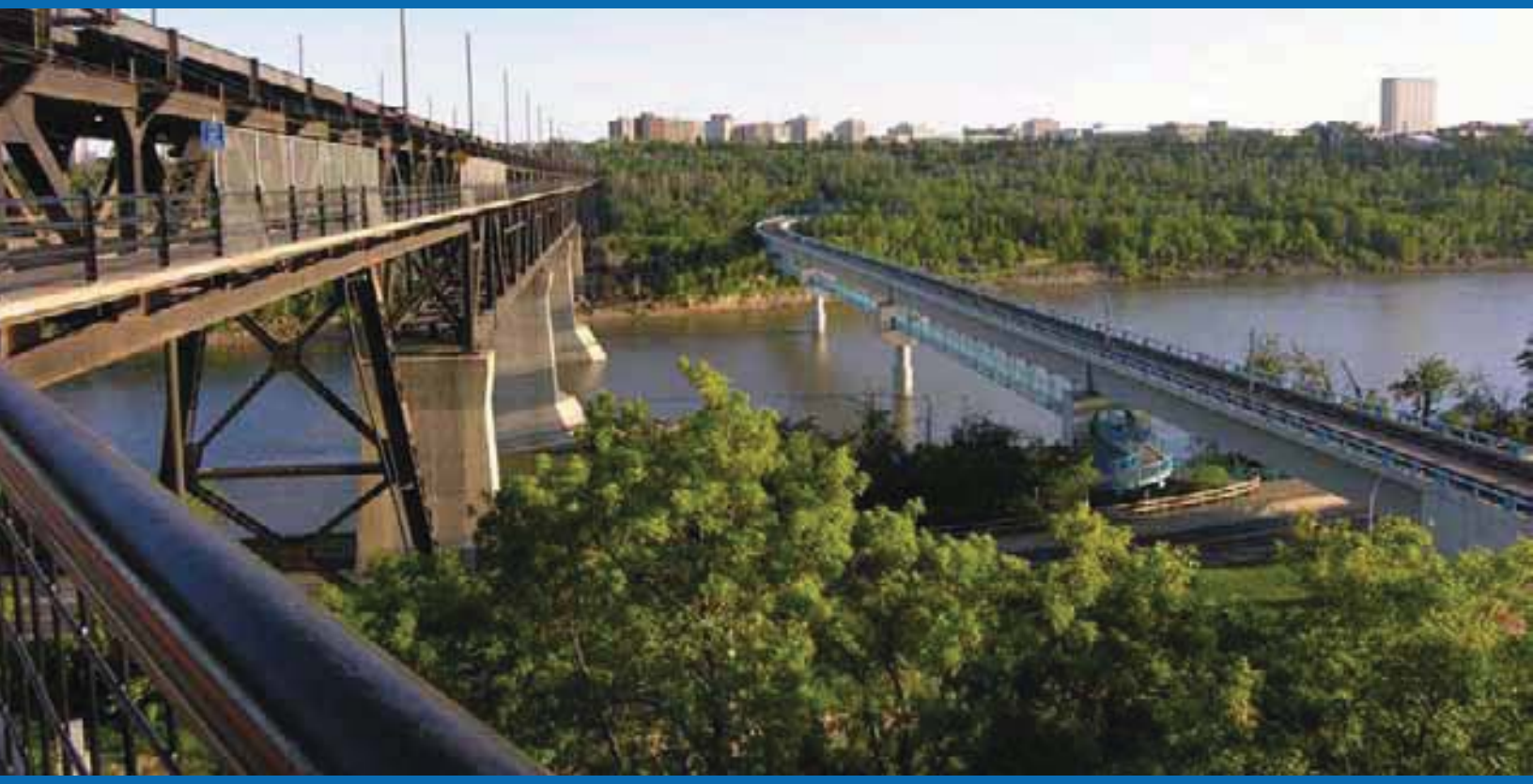
THE CITY OF Edmonton



CYCLE EDMONTON:
Bicycle Transportation Plan

Summary Report

2009

Stantec

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This document is the summary for the Cycle Edmonton: Bicycle Transportation Plan . It summarizes the information and recommendations included in Cycle Edmonton: Bicycle Transportation Plan – Technical Report, under separate cover.

VISION

Communities that are bicycle friendly are seen as places with a high quality of life. This often translates into increased property values, business growth, and increased tourism. Bicycle friendly communities are places where people feel safe and comfortable riding their bikes for fun, fitness, and transportation. More bicycling in communities results in reduced traffic demands, better air quality, and improved public health. – Your Guide to Becoming a Bicycle Friendly Community, The League of American Bicyclists.

In many ways, Edmonton is a bicycle friendly city offering many of the key elements that support this perception among residents and visitors alike. However, some existing bicycle supportive elements are not as visible or well understood as they could be. As with many young cities built during an era heavily influenced by the automobile, Edmonton has significant room for improvement in order to be broadly and consistently experienced as bicycle friendly. Progressing in this area requires a combination of public demand, political will, and technical understanding.

An over arching vision for Edmonton and the region is a bicycle friendly city where more people cycle more often.

PURPOSE AND SCOPE

Edmonton's current Bicycle Transportation Plan was created in 1992. Its Planning, Engineering, Education, Encouragement, and Enforcement goals have helped create a city that supports cyclists better than it did 20 years ago. Building on the success of the 1992 Plan, further examination of cycling practice and infrastructure is required to support the growing numbers of commuter and recreational cyclists in Edmonton.

In the 16 years since the previous Bicycle Transportation Plan was adopted, the field of bicycle transportation planning and engineering has advanced significantly. A key reason for updating the Bicycle Transportation Plan is to consolidate the gains benefiting experienced cyclists while appealing to an additional broader demographic of potential cyclists who are open to considering the bicycle as an alternative mode of transportation.

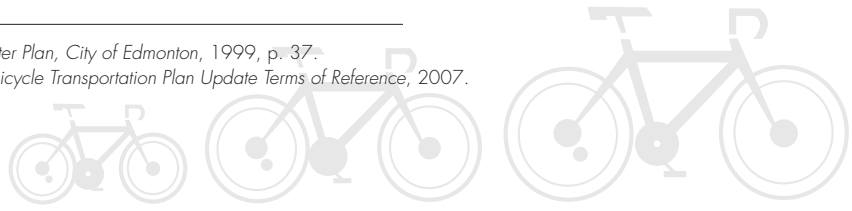
Further to advancements in the provision of bicycle facilities, Edmonton's 1999 Transportation Master Plan outlines a strategic goal of providing bicycle facilities to accommodate the travel needs of Edmontonians.

> *Provide an integrated system of roadway, public transit, pedestrian, and bicycle facilities to accommodate the travel needs of citizens, businesses, and visitors.*[1]

The purpose of the Cycle Edmonton - Bicycle Transportation Plan Update stems directly from the 1999 Transportation Master Plan. The Terms of Reference for the Bicycle Transportation Plan Update states: "review and establish a new strategic direction, outlining principles and goals for bicycle transportation within the City of Edmonton… integrating bicycles into the transportation system through the development of a comprehensive cycle route map…(and) ensur(ing) that the bicycle can be used as a safe and convenient travel option in the future".[2]

An update of the 1999 Transportation Master Plan is currently underway, entitled Transportation Master Plan/Moving Edmonton, and its direction is consistent with the existing policy noted above. Key themes emerging from the update include the need for the City of Edmonton to increase its sustainability with a goal of reducing reliance on single occupant vehicles. Additionally, the Transportation Master Plan/Moving Edmonton identifies a transportation system that supports healthy, active lifestyles as an important priority. Encouraging cycling and active transportation and improving these networks will be a key strategy in achieving these objectives.

1 *Transportation Master Plan, City of Edmonton*, 1999, p. 37.
2 *City of Edmonton, Bicycle Transportation Plan Update Terms of Reference*, 2007.



PAST SUCCESSES

Edmonton has great potential to improve as a bicycle-friendly city and has an excellent foundation for doing so. Substantial context and policy support exist for bicycle transportation including an established bicycle transportation plan and many bicycle-supportive facilities, programs, and initiatives.

CYCLING FACILITIES IN EDMONTON

City of Edmonton data indicates there is a total of 4,090 km of roadway within the boundaries of Edmonton as of 2007. Within the above physical infrastructure, street-oriented bicycle facilities include:

- 6 km of on-road contra-flow bike lanes
- 105 km+ of signed on-street bike routes
- 100 km+ of shared-use sidewalks or multi-use trails along road right-of-way
- 6 km of bus/taxi/bike lanes

Also within the overall roadway inventory, there are approximately 200 km of arterial roads with wide curb lanes in one or both directions. These roads reflect one of the major recommendations of the *1992 Bicycle Transportation Plan*, which called for curb lanes to be 0.5 m wider than adjacent lanes on all new or repaved arterial roads, thus providing more space for bicycles to share the curb lane with motor vehicles.

Off-road bicycle facilities include:

- 135 km of multi-use trail in the river valley (55 km paved, 80 km granular)
- 460 km+ of single track/unimproved trails within the river valley (0.5 m width or greater)
- 30 km+ of paved trail/sidewalks along pipeline/utility rights-of-way
- 10 km of granular trails along pipeline/utility rights-of-way

These facilities serve a diversity of cyclists throughout the year.

1992 BICYCLE TRANSPORTATION PLAN

The current state of cycling in Edmonton owes much of its success to the achievement of the broad goals of the *1992 Bicycle Transportation Plan*. Its section on awareness and education for cycling safety and efficiency has helped to create a diverse and well-established cycling community.

The education and encouragement goals of the *1992 Bicycle Transportation Plan* encompass a broad range of community and municipal level cycling advocacy. Partnerships with the Edmonton Police Service, Safety Councils, Alberta Education, Alberta Transportation, the Solicitor General, City Council, and internal City of Edmonton departments such as Transportation, and Parks and Recreation were referenced for cross promotion in bicycle advocacy.

Educational programs for safety, awareness, and promotion of cycling were recommended for specific user groups, such as new motorists and transit operators, as well as the general public.

Bicycle parking and change facilities were recommended at all City owned buildings and in all new non-residential developments. An amendment to the Land Use Bylaw requiring bicycle parking was also recommended. Partnership with Edmonton Transit System (ETS) to provide bicycle parking and bicycle accommodation on Light Rail Transit (LRT) vehicles was also advocated. A perspective on recreational cycling was explored by recommending the rehabilitation of the Argyll Velodrome and the creation of mountain bike and road racing circuits.

Safety advocacy through enforcement of existing and new bylaws is contained in the enforcement goal including a need for clarity and review of where bicycles are allowed to operate according to the Highway Traffic Act, *Traffic Bylaw #5590*, and *Parks Bylaw #2202*. Key partnerships for these initiatives included the Edmonton Police Service, Alberta Transportation, and the City of Edmonton Transportation department.

A review of design standards for infrastructure potentially used by bicyclists was a part of the *1992 Bicycle Transportation Plan*. This included recommendations for bicycle parking racks and stations, drainage grate design and placement, railing heights on bridges, curb ramp grade and height, pavement marking types, and an extensive review of lane and trail widths with an emphasis on wider curb lanes as a bicycle transportation facility. Maintenance practices such as snow clearing and spring street sweeping were strongly advocated.

PUBLIC TRANSIT

Bicycling integrates well with transit as a mode of transportation. Transit is most effective for moderate and long distance trips on busy corridors, while cycling is effective for shorter distance trips with multiple stops. Combining transit and cycling can provide a high level of mobility comparable to automobile travel with the addition of social, health, and environmental benefits. Steep grades in and out of the river valley can be prohibitive to making connections across the city, and transit offers an alternative to negotiate such barriers. Cyclist access is also an issue in suburban areas where densities are low or moderate and destinations are dispersed and more difficult to service by transit. This is of particular importance when considering Edmonton as a regional cycling centre, recognizing the need to provide city centre access to and from outlying areas like Sherwood Park and St. Albert.

There are various plans, programs, and facilities developed by the City of Edmonton that currently integrate bicycles with ETS. Bike racks are available on Routes 1, 4, and 9 buses. Cyclists and their bicycles can travel on the LRT system in any direction during most hours of the day, with the exception of morning and afternoon peak time periods.

BICYCLE PARKING

The provision of bicycle parking is an important component in the general encouragement of cycling. Data from Edmonton's 2006 Bicycle User Survey indicates a slightly longer average trip length where secure bicycle parking is provided and approximately a third of respondents indicated that the provision of more secure bike parking would encourage them to cycle more. Recognizing the importance of bicycle parking, Edmonton's current Zoning Bylaw includes requirements for the number, location, and design of bicycle parking stalls for new developments. The City of Edmonton has also provided on-street bike racks in areas throughout the city.

EDUCATION AND ENCOURAGEMENT

There are several notable programs in place in Edmonton aimed at educating current and potential cyclists of all types.

Bikeology, a seven year old festival, is one of a series of events geared at bringing together various types of cyclists in Edmonton each June. The festival celebrates a one-day gathering along with several bike-related events throughout Bike Month, and promotes cycling safety education, encouragement and culture. Events include bike-to-work breakfasts, bicycle related film screenings, and educational sessions on topics such as winter cycling and bicycle maintenance. Bike Monthology is facilitated by the interest groups, community-level advocates, local retailers, and the City of Edmonton.

CAN-BIKE is an educational program created by the Canadian Cycling Association with sponsorship from Transport Canada's Moving on Sustainable Transportation initiative. The program is a series of courses aimed at educating cyclists on how to operate safely and effectively on the road. In Edmonton, CAN-BIKE courses are offered each spring and summer to current and potential cyclists of all ages and abilities including children, adults, individuals with special needs, and adults who wish to become instructors themselves.

Edmonton Bicycle Commuters is a community group that provides bicycle maintenance training as well as a series of workshops on topics like safe winter cycling. Local retailers frequently support and host bicycle education and promotion events in the Edmonton region, often partnering with other community stakeholders.

MOVING FORWARD

As mentioned previously, Edmonton already has an excellent foundation for improving it's bicycle transportation. It is important to emphasize that the Bicycle Transportation Plan Update is intended to build upon, broaden, and complement existing bicycle transportation policies, facilities, and network elements in the areas of:

- End-of-trip facilities: Edmonton's Bicycle User Survey indicated that 32% of cyclists surveyed wanted more secure bicycle parking. To cater to these needs, requiring secure bike parking in new developments should be considered, as well as testing some new bike storage facilities such as bike trees, stations, and lockers
- Legislation: Coordinating regional helmet and biking-on-sidewalk legislation would reduce regional cycling confusion about these issues

- Education: Working with other organizations that have a vested interest in roadway and cycling safety to promote cycling and cycling safety is an effective use of resources
- Promotion: Cycling is a viable, green, and healthy mode of transportation and it is important that Edmontonians receive this message
- Monitoring: In order to observe if the Bicycle Transportation Plan Update is successful and to direct funds to areas that are most effective, it is important to monitor bike use through means including Household Travel Survey and Bicycle Users Survey
- Network Development: Providing a bicycle transportation network that will appeal to a broad range of users is fundamental to the Bicycle Transportation Plan Update and is discussed in more detail in the following sections.

NETWORK PHILOSOPHY AND PRINCIPLES

Providing a range of facility types appealing to a variety of skill levels creates a functional, comprehensive network for cyclists. From multi-use trails or shared lanes on quiet streets for novice cyclists and bicycle lanes on collector and arterial roads for moderately skilled cyclists, to wide curb lanes on arterials for experienced cyclists, the bicycle network, customized to the constraints and opportunities in a wide range of contexts and locations, can address the needs of a range of users.

Using a philosophy of progressive levels of skill and experience, novice cyclists will gain the skill and confidence they need from off-road or low-traffic-volume routes, and can gradually make the transition to on-road facilities. Over time, cyclists may become confident enough to ride on any road, fully integrated with vehicular traffic, including on busy roads with wide curb lanes or without designated cycling facilities.

BROADENING THE EXISTING NETWORK

The practice of implementing wide curb lanes and multi-use trails (on one side) will be continued for arterial roads that are not part of the designated bike route network. This practice has been very successful in improving the conditions and status for bicycle transportation in Edmonton, particularly for confident, experienced riders.

In addition, other bike facilities should be implemented to create a grid network appealing to a broader range of cyclists. Incorporating marked on-street bike lanes as a major element of the proposed bicycle network is an important feature. The proposed network is based on the notion that bike lanes address the desire for efficient bicycle transportation with more cyclist comfort when compared to sharing the same travel lane as motor vehicles, therefore appealing to those who are not quite ready to ride in traffic but are frustrated by factors such as indirectness and frequent stops and starts.

Since 1992, many other municipalities have adopted and expanded bicycle lanes as part of their bicycle networks. Engineering guidelines and practices have been developed and improved as the implementation of bike lanes has increased. Local research[3] analyzed the sensitivity of travel time perceptions of cyclists on different facility types, indicating that cycling in mixed traffic is more onerous than cycling in bike lanes or on bike paths.

City-Wide System and Connector System

To accommodate the wide-ranging skills of bicycle users throughout Edmonton, a two-level system is envisioned: a City-Wide system and a Connector system. City of Edmonton, Bicycle Network, Map 1 illustrates the proposed network, and the following describes the general characteristics of the system.

City-Wide System

The City-Wide system acts as the 'skeleton' of the network, providing access for movement by bicycle throughout Edmonton along direct corridors. These routes provide principal access links to and from major origins and destinations within Edmonton, as well as surrounding municipalities.

The system should be designed to a higher standard of quality and accommodate:

- Higher volumes of bicycle use
- Cyclist traffic that tends to be destination oriented (e.g. hubs such as major employers, major community facilities, educational and other public institutions, major transit nodes, significant off-road cycling corridors, etc.)
- Cyclists with a moderate to high level of experience and skill (i.e. on-road utilitarian, commuter, fitness, and touring cyclists)

3 *An Examination of Bicycle Use Sensitivities Over Time Using Stated Preference*, J.D. Hunt

The following summarizes the characteristics of the system:

- Typically located on or along higher order roads, consisting primarily of delineated bike lanes along urban cross section roads and of paved shoulders along rural cross section roads
- May include linear, high quality multi-use trail corridors
- Consists of routes regularly spaced on a grid approximately 3.2 km apart (i.e. within 1.6 km from most points within the City)
- Consists of routes that support continuous facility types, or high-quality facility type transitions with complementary signage
- Maintained for year-round use

Connector System

The Connector system constitutes a significant portion of the network and provides links within neighborhoods, as well as links integrated with the City-Wide system. The Connector system should also provide access to neighbourhood destinations, points of interest, and local recreational opportunities.

The system should be designed to accommodate:

- Moderate to high volumes of bicycle use
- Cyclist traffic that tends to be locally oriented, recognizing that the Connector system is also used to connect with the City-Wide system for commuting and utilitarian purposes
- Cyclists with low to moderate levels of experience and skill (i.e. casual/occasional commuter and recreational cyclists, and youth cyclists aged approximately 10 years and older)

Characteristics of the system include the following:

- Typically located on lower order roads consisting of a broad range of treatments suited to the context of the facility (i.e. the characteristics of the area and roadway). The range of facility type will range from shared-use lanes to multi-use trails
- Less direct or potentially more circuitous as compared to the City-Wide system, consistent with the roads that these routes are located on

- Generally offering an identified route with more positive bicycle features such as fewer frequent access crossings and/or stop controlled intersections
- Includes connections to multi-use trails
- Maintained for year-round use

Route Selection Principles

When considering candidate routes, characteristics should include the following:

- **Visible:** The network should be a visible component of the transportation system
- **Connected:** Routes should be connected to form an overall network consisting of the City-Wide and Connector systems. With input from neighbouring municipalities, the Edmonton Bicycle Network should identify and connect destinations throughout the region including St. Albert and Sherwood Park
- **Accessible:** Routes should be easily accessible from all areas across the city, considering major barriers, steep grades, and high vehicle traffic volumes and speeds. The need for new or alternative routes should be reviewed and evaluated during the planning stages for the construction or upgrading of any major roadway structure across a barrier in order to appropriately capitalize on opportunities as they arise
- **Destination Oriented:** Cycling routes should provide access to major destinations in the City
- **Integrated:** The cycling network should be integrated with other modes of transportation, particularly public transit. Bike routes should be selected to provide access to transit nodes
- **Safety Conscious/Risk Minimizing:** The system should be designed to minimize risk to all road users, including people who are not cycling
- **Accommodating:** New road rights-of-way should be designed to accommodate cyclists
- **Distributed:** The density of the City-Wide system should generally be based on a 3.2 km grid network. The Connector system should be based on a minimum spacing of 1 km to 2 km. The intention is that City-Wide network facilities should be no more than a 1.6 km bike ride from most locations within the City
- **Affordable:** Without compromising safety, design solutions to implement the network should be achievable, realistic, and cost effective

- **Attractive:** Where appropriate, cycling routes should take advantage of attractive and scenic areas and vistas
- **Responsive:** The designation and development of cycling routes should take advantage of coordinated planning opportunities when they arise. For example, linear corridors such as public utility lines, future transportation corridors, and abandoned transportation corridors should be considered for inclusion in the cycling network wherever appropriate and possible
- **Supportive:** Opportunities to provide support services and facilities such as bicycle parking and information signs should be available throughout the network

Route Selection Process

The bikeway network was developed through an interative process involving mapping and cross referencing opportunities and constraints through examination of digital aerial photography and field assessment. The analysis process included consideration of existing and planned bikeways, the Multi-Use Corridor Network, important origins and destinations, physical barriers, and input from stakeholder and public consultations.

DESCRIPTION OF THE CYCLING NETWORK

There are five principles that specifically lend themselves to the selection of geographic locations for cycling network routes: connectivity, integration, accessibility, distribution, and affordability.

Data from the 2005 Edmonton Household Travel Survey and the 2006 Edmonton Bicycle User Survey indicate that bicycle trip origins and destinations are dispersed throughout Edmonton and are not simply destined to a core area. This supports the creation of a grid network, as opposed to a radial one.

A further identified goal was to provide a link on the City-Wide network within a 1.6 km bike ride of most points within the City of Edmonton. In the core areas (e.g. downtown and Old Strathcona), a denser network is envisioned, recognizing the multiple destinations and higher propensity for bicycle use in these areas.

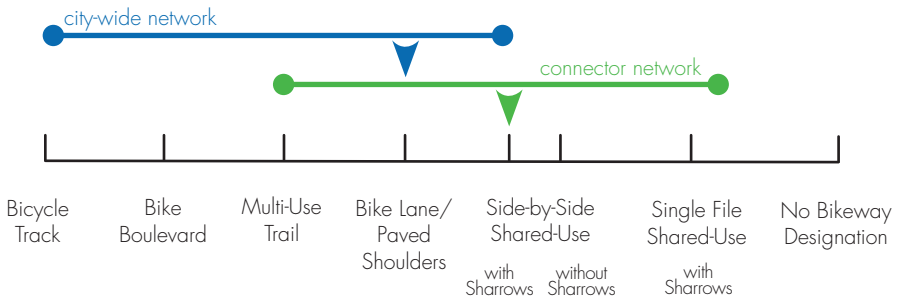
With the major goals of connectivity and affordability in mind, key cross city/ cross river routes were identified where construction of a new bridge would not be necessary. Flyovers provide better connections over freeways and major highways than interchanges, as there are fewer conflicts with merging and diverging intersection movements, and were used as proposed routes to cross these barriers.

Limiting vertical grades is important in providing a City-Wide network that is accessible to a wide range of users. Flatter routes have been prioritized over routes with steep grades.

The Connector system provides connections within neighborhoods and to the City-Wide network that less experienced users can comfortably cycle. Providing transportation routes that offer direct and practical linkages to neighbourhood destinations is also an important function of the Connector system. The form of the neighbourhood directly affects the structure of the Connector system in that area. For example, in Mill Woods the roadway network is such that the Connector system becomes quite circuitous and provides a linkage for each neighbourhood to access the City-Wide system. In more central areas, the Connector system often becomes less necessary because of the well connected grid network, which provides numerous possible routes to access the City-Wide system.

Figure 1 illustrates the range of route treatments to be considered for the City-Wide and Connector networks. The proposed typical facility for the City-Wide network is a marked bike lane that will provide a convenient and comfortable facility to cyclists. Appropriate facility types for the Connector system depend more on the context of the facility. For this reason, there will be a broad range of treatments to be considered that are dependent on the roadway system, width, speed limits, neighbourhood concerns, and parking requirements.

Figure 1: Range of Proposed Bicycle Facilities



PRIORITIES

The implementation plan for the proposed network is intended to guide decision making over the next ten years. It is based on the proposed City-Wide and Connector systems stemming from stakeholder input, cycling trends, best practices, important destinations and barriers, and planned roadwork projects in the City of Edmonton.

The approach used to establish priorities for the implementation of the various routes in the proposed network considers, in no particular order, the following parameters:

- Coordination with planned City road reconstruction projects as outlined in the 2007-2011 Transportation Program including both new development and rehabilitation of existing development
- Consideration of project team, stakeholder, and public input regarding priorities
- Areas currently under-served by functional continuous bicycle facilities
- Providing regional cycling connections between Edmonton, St. Albert, and Sherwood Park
- Implementing facilities where cycling demand is anticipated and higher cyclist volumes are expected including key corridors and/or key destinations
- Providing connections to the multi-use trail corridor system that also serve as good cycling connections by virtue of their location, length, or the continuity they add to the proposed cycling network

It is important that facilities are built in a connected manner so that meaningful sections are constructed to connect network elements or destinations. Building the cycling network in a stand-alone, piecemeal manner will not accomplish the goals of Bicycle Transportation Plan Update.

The proposed implementation plan consists of three phases:

- Phase 1 Network = Short-Term (2009 to 2013)
- Phase 2 Network = Mid-Term (2014 to 2018)
- Phase 3 Network = Major Constraints/Regional Planning

In order to produce the most cost effective, visible, near term results, all bikeways not requiring major upgrades should be considered first in the short-term. Primarily, this should include paint demarcation and the implementation of a signing strategy along these routes. Additionally, areas that are not currently served by continuous multi-use trails should be served in the early portion of Phase 1. The network elements envisioned for completion in the five-year timeframe are shown on Map 2.

Phase 2, mid-term priorities include bikeways that are associated with future growth and moderate-to-major expenditures. Bikeways serving outlying developing areas should be built as the areas build out. A new crossing at a ravine is an example of a moderate-to-major expenditure that should be realized before the end of the 10-year timeframe. The completion of the City-Wide system with the exception of the links facing major constraints and other links that may be outside the City of Edmonton's control to construct, should be completed in a 10-year time horizon. Similarly, the completion of the Connector network is seen as a reasonable goal for the end of the 10-year horizon. The network elements envisioned for completion in the 10-year timeframe are shown on Map 3.

Phase 3 includes the portion of the network where major constraints exist, elements that require significant planning and coordination with other organizations or governments or depend on other major works. Coordination and planning of these linkages with the appropriate organizations should be pursued at the earliest opportunity. The network elements requiring regional planning or other major works are shown on Map 4.

RECOMMENDATIONS

Edmonton's current and future cycling communities deserve a safe, connected, and substantive cycling network that provides a balance of utilitarian and recreational facilities. The Edmonton Bicycle Transportation Plan Update will assist the City in decision making, resource allocation, design, implementation, and maintenance of the proposed cycling network. The Bicycle Transportation Plan Update aligns with the Transportation Master Plan and its directives to design for and encourage sustainable and active transportation, and will support other ongoing transportation and land use planning initiatives in Edmonton. Many of the recommendations from the *1992 Bicycle Transportation Plan* are reiterated and complement the newer and expanded aspects of this update.

Based on the assessment of bicycle transportation needs and practices applicable in the Edmonton context, action and funding commitments to the following recommendations are necessary to support of the City's vision of more people cycling more often.

In Support of Bicycle Transportation, The City of Edmonton should:		Key Initial Priorities
A.0	Build a Functional Bicycle Transportation Network	
A.1	Work towards the creation of the bicycle transportation network outlined on Map 1	✓
A.2	Build the bicycle transportation network in an efficient, equitable, and timely manner. In this sense the network shown on Map 2 should be completed by 2013 and the network shown on Map 3 should be completed by 2018.	✓
A.3	Continue construction of wide curb lanes on all arterials.	✓
A.4	Continue construction of multi-use trails on one side of all arterials.	✓
A.5	Continue construction of Multi-Use Trail Corridor Network.	✓
A.6	Update design and construction standards with Transportation Association of Canada bicycle guidelines. (e.g. pavement markings, catch basin and grating design, handrailing heights, design of on-road and off-road bicycle facilities).	✓

In Support of Bicycle Transportation, The City of Edmonton should:		Key Initial Priorities
B.0	Coordinate Planning	
B.1	Coordinate activities of branches and sections in the Transportation Department, as well as other relevant City of Edmonton departments, to facilitate integration of cycling and other active modes into the existing and planned transportation system.	✓
B.2	Encourage continued and expanded use of the City's corporate wide geographic information system to coordinate the scheduling, planning, and execution of infrastructure projects in support of cycling and other active modes.	✓
B.3	Prioritize road rehabilitation projects to explicitly include consideration of bicycle network implementation priorities over road rehabilitation projects of a similar condition. (For example, if Road X and Road Y are in similar condition, consider scheduling Road X for rehabilitation before Road Y, since Road X accommodates a bike route.)	✓
B.4	Coordinate and promote the integration of bicycles with regional public transit properties (e.g. St. Albert Transit, Strathcona Transit).	
B.5	Investigate opportunities for cost savings and equipment coordination through joint bulk purchasing of bicycle infrastructure (e.g. bike parking racks and transit vehicle bike racks) with regional municipalities and transit properties.	
B.6	Coordinate relevant cycling legislation, such as helmet laws, with regional municipalities.	
C.0	End-of-Trip Facilities	
C.1	Amend the Edmonton *Zoning Bylaw #12800* to require bicycle end-of-trip facilities (in addition to bicycle parking) as a condition of permits for new and renovated developments, and to define design and construction standards for such facilities.	✓
C.2	Initiate, facilitate, and promote measures to implement more bicycle end-of-trip facilities in suitable locations in Edmonton and region. Specific end-of-trip facilities include short- and long-term secure bicycle parking, lockers, showers, and change rooms.	
C.3	Provide resource information and create a development checklist regarding bicycle end-of-trip facilities for developers to assess opportunities for implementation of bicycle parking and other end-of-trip facilities.	✓

In Support of Bicycle Transportation, The City of Edmonton should:		Key Initial Priorities
C.0	End-of-Trip Facilities (continued)	
C.4	Investigate the merit of offering incentives for developers/owners to provide bicycle end-of-trip facilities (e.g. financial incentives, allowance of reduced motor vehicle trip rates in traffic impact assessments, and reduced motor vehicle parking requirements). Similarly, investigate the merit of offering incentives for tenants/ non-owners to provide bicycle end-of-trip facilities.	✓
C.5	Inventory City owned buildings to determine current provision of bicycle end-of-trip facilities. Assess transportation mode split at buildings in order to prioritize implementation of bicycle end-of-trip facilities at City owned buildings.	
C.6	Retrofit existing City owned buildings with bicycle end-of-trip facilities to meet the requirements of the amended Zoning Bylaw.	
C.7	Undertake a feasibility study for a bike station or bike tree at City Hall or another major City of Edmonton facilities to improve bicycle parking at a prominent location; lead by example.	
C.8	Adopt formal standards for design of bike racks, focusing on performance based criteria (e.g. specify functionality and provide examples of appropriate design such as inverted-U or post-and-ring style racks).	✓
C.9	Continue current public bike rack program.	✓
C.10	Develop a replacement strategy for existing sub-standard 'wheel bender' bike racks on public and private property.	✓
C.11	Implement a request-a-rack program to allow Edmontonians to help direct ongoing public investment in post-and-ring bicycle racks.	✓
D.0	Bicycles and Public Transit	
D.1	Include specific material in the ETS operator training program regarding interaction between transit vehicles and bicycles. Lobby the Canadian Cycling Association to include similar material in CAN-BIKE cyclist training.	
D.2	Design new transit centres and LRT stations to accommodate movement of cyclists from the road to transit vehicles. Provide appropriate signage and wayfinding from bicycle routes to bicycle parking facilities at existing and new transit centres and LRT stations.	

	In Support of Bicycle Transportation, The City of Edmonton should:	Key Initial Priorities
D.0	Bicycles and Public Transit (continued)	
D.3	Initiate a bicycle parking monitoring program at transit centres and LRT stations to determine base case and ongoing demand for secure parking.	
D.4	Undertake a feasibility study for a bike station, bike tree, or bike lockers at transit centres and LRT stations.	✓
D.5	Identify appropriate cross river and longer distance non-local bus routes for initial expansion of the transit vehicle bike rack program, and continue to add bike racks to all routes in the longer term.	✓
D.6	Investigate and implement alternative methods of accommodating bicycles on LRT vehicles with no time of day restrictions. Examples include interior mounting/carrying systems, or the addition of a designated bicycle car.	
D.7	Allow folding bicycles on buses and LRT vehicles with no time of day restrictions.	✓
E.0	Construction Accommodation	
E.1	Ensure traffic accommodation plans for road construction, maintenance, and rehabilitation projects incorporate provisions to mitigate bicycle transportation impacts.	✓
E.2	Implement alternative bicycle transportation provisions to maintain a suitable and direct level of access. Examples include temporary signs and/or pavement markings to define a detour route; temporary hard surfaced detour trail; closure of a vehicle traffic lane to accommodate bicycle traffic; a bicycle shuttle service if no viable access alternatives can be provided.	✓
E.3	Make bicycle related construction information available through appropriate channels of communication. Example content could include wayfinding recommendations for construction zones, and construction updates regarding schedules, detours, or warnings.	✓
F.0	Signage	
F.1	Use a comprehensive signing strategy as a marketing opportunity for Edmonton's cycling network highlighting destinations, festivals, and river valley cycling.	✓
F.2	Provide pictorial and text signage in accordance with Transportation Association of Canada guidelines to serve a variety of users including children, non-English speaking, and illiterate cyclists.	

In Support of Bicycle Transportation, The City of Edmonton should:		Key Initial Priorities
F.0	Signage (continued)	
F.3	Provide signage that indicates distances to destinations in kilometres or time based metrics (assuming a pace of 10 km/h) to encourage potential cyclists and provide wayfinding information to current cyclists.	
F.4	Provide signage before and after any decision point/junction, after any change in continuity, and regularly on lengthy sections to provide confirmation of the route to the cyclist.	
F.5	Provide advance signing for cyclists on a roadway or trail as needed to inform the cyclist of facility types ahead including change or continuation in facility type, road surface, or grade.	
F.6	Provide signage on shared-use facilities like multi-use trail or shared sidewalks to inform users of rights and safe use.	✓
F.7	Implement detour signing for all road users in areas where temporary or ongoing maintenance or construction projects occur.	✓
F.8	Provide maps and signage at high bike traffic junctions and throughout the downtown including destination and end-of-trip facilities information.	
F.9	Provide signage directing cyclists to end-of-trip facilities where the location of the facility may not be immediately obvious.	
F.10	Provide on-street markings as part of the overall wayfinding strategy.	✓
G.0	Maintenance	
G.1	Continue snow clearing and storage policies that allow year-round access to the City-Wide and Connector bike route network.	✓
G.2	Improve maintenance practices for street cleaning that remove hazardous gravel, sand, and debris from cycling facilities after spring snowmelt and over the course of the year.	
G.3	Maintain vegetation so overhanging trees or overgrown shrubbery do not interfere with the safe and efficient use of cycling facilities.	✓
G.4	Maintain the current pothole repair program by continuing to log and respond to complaints. Maintain a sustainable funding and scheduling program to repair potholes in a timely and bike friendly manner.	✓
G.5	Implement a standard for prioritizing bike route maintenance along with other high-priority facilities.	

In Support of Bicycle Transportation, The City of Edmonton should:		Key Initial Priorities
H.0	Education and Promotion Recommendations	
H.1	Work in partnership with the Alberta Motor Association to provide relevant road sharing information and bicycle related resources on their website and in driver education programs. Support continued inclusion of road-sharing education and awareness in driver training programs and road tests.	
H.2	Initiate a 'share the road campaign' to educate the public on automobile-bicycle interaction.	
H.3	Implement an education and enforcement campaign for the use of bicycle safety devices including tail and headlamps at night and audible warning devices at all times.	
H.4	Work with school boards to integrate safe cycling education programs into school curricula. Provide information and resources regarding active transportation and safe routes to school.	
H.5	Subsidize CAN-BIKE training for City of Edmonton staff.	
H.6	Liaise with any bike sharing organizations to document all bike sharing facilities on the on the Edmonton Cycle Map..	
H.7	Initiate a Bike Ambassador Program encouraging bike advocacy, safety advocacy, and health advocacy groups to promote cycling safety.	
H.8	Continue Bike Month activities.	✓
H.9	Continue to produce and distribute free Cycle Edmonton maps.	✓
I.0	Partnering Recommendations	
I.1	Continue to work with the Trails, Paths, and Routes Advisory Committee as a conduit of information and feedback between the City and bicycle users.	✓
I.2	Partner with active living and transportation organizations to maximize support for and use of bicycle facilities.	
I.3	Work with the Edmonton Police Service in support of monitoring, education, and enforcement of relevant legislation.	✓
I.4	Work with Alberta Transportation to amend the Traffic Safety Act to require automobile users to ensure that opening their vehicle door does not impede the movement or affect the safety of other users on the roadway.	

In Support of Bicycle Transportation, The City of Edmonton should:		Key Initial Priorities
J.0	Workplace Initiatives	
J.1	Support and promote bicycle use and the integration of bicycles and transit through Transportation Demand Management (TDM) strategies, employer based commuter programs, and secondary education travel programs.	
J.2	Explore best practises for reimbursing employees who cycle between work and work related out-of-office activities (similar to mileage payment for personal vehicle use).	✓
J.3	Provide bicycles for staff to use as a mode of transportation to meetings and other out-of-office activities.	
K.0	Tourism	
K.1	Facilitate bicycle transportation and recreation information to be integrated into tourism strategies in Edmonton; coordinate guided bicycle tours of Edmonton.	✓
K.2	Utilize a comprehensive signing strategy as a marketing opportunity for Edmonton's cycling network – highlight destinations.	
K.3	Promote Edmonton as a cycling destination to tourists.	
K.4	Provide Cycle Edmonton Maps at hotels and other tourist destinations.	✓
K.5	Integrate cycling into Edmonton's reputation as the Festival City by partnering with cycling advocacy groups and providing bicycle parking at festivals.	✓
L.0	Monitoring Recommendations	
L.1	Continue to collect statistically significant bicycle travel data as a part of the regular Household Travel Survey.	
L.2	Continue the Bicycle User Survey and collect statistically significant bicycle travel data to inform cycling and planning policies for Edmonton.	
L.3	Promote increased reporting of bicycle-bicycle, bicycle-pedestrian, and bicycle-automobile collisions by cyclists and the general public (Options may include information and marketing campaigns, information on the City of Edmonton website, at schools, and at relevant events).	
L.4	Examine the potential for using more effective measures of collecting data such as deploying traffic count or detection equipment in areas with high bicycle volumes.	

FUNDING

In order to provide the services and facilities required to meet the end goal of more people cycling more often, resources will need to be allocated in support of bicycle transportation.

NETWORK COSTS

The length of bikeway associated with each phase and system is shown in Table 1.

Table 1 – Bikeway Length by Phase and System

	Length of City-Wide System Associated With Each Phase (km)	Length of Connector System Associated With Each Phase (km)	Total Length of Bikeway Associated with Each Phase (km)
Phase 1 (2009 to 2013)	125	77	202
Phase 2 (2014 to 2018)	145	90	235
Phase 3 (Major Constraints/ Regional Planning)	52	– –	52
Total	322	167	489

Base assumptions for estimating costs to implement the City-Wide system and the Connector system are:

- The majority of Phase 1 implementation will include re-striping roadways to fit bikeways on existing roadways
- The majority of Phase 2 implementation will include re-striping roadways to fit bikeways on existing roadways; however, there will be roughly twice as much new construction of bikeways as part of Phase 2 as there will be in Phase 1
- Phase 3 will consist of constructing bikeways in coordination with other construction projects

The associated cost by phase to implement the recommended cycling network is listed in Table 2.

Table 2 – Network Costs by Phase

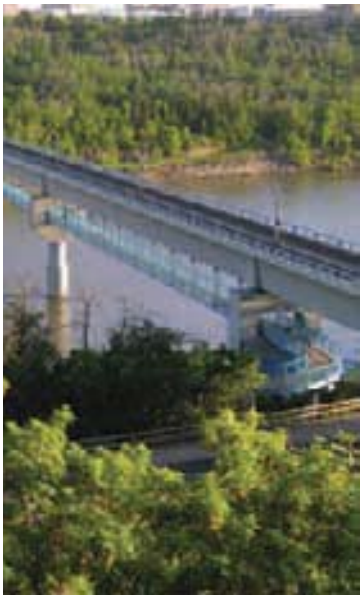
Phase	Cost
Phase 1 (2009 to 2013)	$34,300,000
Phase 2 (2014 to 2018)	$37,500,000
Phase 3 (Major Constraints/Regional Planning)	$26,200,000
Total	$98,000,000

SUPPORTIVE NETWORK INVESTMENTS

In addition to the cycling network costs summarized in the previous section, supplementary investments are also recommended to fully implement and support the recommendations of the Bicycle Transportation Plan Update.

Some supportive network elements will involve coordination, consultations, meetings, research, and planning that will require additional resources. These are:

- Coordinated planning
- Construction accommodation
- Education and promotion
- Partnering
- Workplace initiatives
- Tourism
- Enforcement



End-of-Trip Facilities

To support the expanded cycling network and encourage increased cycling travel, end-of-trip facilities are required. As included in the recommendations, the end-of-trip facility recommendations will require investments in research, revisions to existing standards, planning and inventory projects, and installation of facilities at City buildings. These tasks will require resources as well as funding to complete the research, planning, and inventory initiatives. Capital expenditures will also be required for end-of-trip facilities at City-owned buildings.

Bicycles and Public Transit

To further improve the integration of bicycles and transit in support of increasing the number of bicycle trips, investments in signage, research, planning, consultation, and bike racks on buses are required. These investments may require some additional resources.

Capital funding will be required to purchase and install the bus-mounted bicycle racks. ETS has indicated that approximately 100 of the current fleet of 906 buses are equipped with bicycle racks. It is estimated that it costs $2,500 to purchase and install each rack; to equip the 806 remaining buses carries an estimated cost of $2,015,000.

The 867 12 m (40') buses and articulated buses have brackets to mount the bike rack, whereas the 39 bus community fleet does not. A cost for manufacturing two different brackets for the two versions of community buses will need to be considered in addition to the cost of the racks.

Signage

Investments in signage along the bicycle network will be required to support the functionality of the network. Recommendations include signs for wayfinding, regulations (bicycle speed limits), and route markings. Route signs are typically spaced at five signs/km per direction (or 10 signs/km for both directions) and cost approximately $200/sign. Wayfinding and regulatory signs would be in addition to the route signs.

Based on the network phasing, approximately $400,000 would be required for route signs in Phase 1, $470,000 for Phase 2, and $100,000 for Phase 3. A total of approximately $970,000.

Maintenance

As the bicycle network increases, the cost to maintain the expanding network should incrementally increase. In addition to the costs required for route repairs, additional expenditures for snow removal on bicycle routes along local roads will be required as compared to existing practices; however, only a small percentage of the bicycle network is located on local roads.

Capital Cost Summary

A summary of the capital costs associated with the Bicycle Transportation Plan Update includes the costs associated with building the network, signing the network, and the cost of bike racks to be installed on all ETS buses.

Phase 1 (2009 to 2013) – $35,400,000

Phase 2 (2014 to 2018) –$39,000,000

Phase 3 (Major Constraints/Regional Planning) –$26,300,000

Total – $100,700,000

FUNDING SOURCES

Existing Funding

The capital budget for the Transportation Department includes approximately $1.4 million annually for multi-use trails and sidewalks.

Since the approval of the Multi-Use Trail Corridor Study in 2002, no additional annual funding has been provided to meet this new type of infrastructure. The funding previously allocated to sidewalks was re-allocated to include both sidewalks and multi-use trails. Additional funding for multi-use trails has been directed through separate capital programs, but has not been consistent on an annual basis.

The City of Edmonton had a total capital budget of $985 million in 2007 and $1.15 billion for 2008. Under current capital funding, sidewalks and bicycle infrastructure represent approximately 0.20% of the City of Edmonton capital budget and less than 1% of the Transportation Department capital budget for roads.

Proposed Funding

The network component of the plan is expected to be funded in the following way:

- Cycling facilities on new roads or within new road rights-of-way should be built by developers
- On-road facilities on existing arterial and collector roads in growth areas that are to be widened to accommodate growth should be funded partially through development charges
- On-road facilities on existing roads in established areas of the City will need to come from City tax revenues and from federal and provincial funding sources, including gas taxes
- Developers of new residential and commercial subdivisions should be encouraged or offered incentives through the planning process to construct new on- and off-road facilities that connect to the proposed network
- Cycling facilities proposed in future transit priority corridors should be funded as a part of that initiative
- On-road facilities associated with roadway improvements or rehabilitation by the City should be funded through project costs (roadways)

Opportunities for partnerships can support the scope and breadth of recommendations in the Bicycle Transportation Plan Update. However, it is important the Transportation Department's additional funding, over and above current funds for multi-use trails, be allocated to support bicycle infrastructure and programs as outlined in this strategy.

Complementary to implementing the Bicycle Transportation Plan Update is an integrated marketing strategy with an action plan to identify an appropriate source and mix of funding for completing short- and long-term, and small and large priced priorities. Branding and marketing the
cycling network is essential to its successful and safe use by Edmontonians and visitors.

Funding Alternatives

The following is a list of potential funding alternatives that can be considered for the Bicycle Transportation Plan Update:

- Local Improvements Program
- Neighbourhood Rehabilitation Program
- Corporate Sponsorships
- Partnerships
- Foundation/Gifts
- Grants
- Advertising Sales
- Volunteerism
- Special Fundraisers
- Tree Canada Foundation Green Streets Canada
- Evergreen Common Grounds Program
- Alberta Ecotrust Foundation Major Projects and Community Projects

Provincial Funding Sources

Funding programs available at a provincial level include but are not limited to:

- Alberta Transportation - Alberta Municipal Infrastructure Program
- Infrastructure Canada - Alberta Program
- Regional Partnership Initiative
- Alberta Lottery Fund
- Alberta Sport, Recreation Parks & Wildlife Foundation

Federal Government Grants

Funding programs available on a national scale include but are not limited to:

- Environment Canada EcoAction Community Funding Program
- Transport Canada Moving on Sustainable Transportation

CONCLUSION

The Bicycle Transportation Plan Update will build on the successes of the City of Edmonton has already realized and will move forward with a plan with an end goal of more people cycling more often. An essential element of the Bicycle Transportation Plan Update is the implementation of the proposed network that will provide a year-round functional bicycle transportation network appealing to a broad range of users with cross city routes and neighbourhood level connections. The following areas are intended to further support and encourage cycling in Edmonton:

- Coordinating planning
- End-of-trip facilities
- Bicycles and public transit
- Construction accommodation
- Signage
- Maintenance
- Education and promotion
- Partnering
- Workplace initiatives
- Tourism

Implementing the Bicycle Transportation Plan Update will make Edmonton more bike friendly will improve the quality of life for Edmontonian's.

GLOSSARY OF TERMS

Bike Boulevard – Bicycle boulevards are lower-order roadways that function as through streets for cyclists, while maintaining limited automobile access for local residents. These streets have a collection of features to control motor vehicle speed and discourage or disallow through traveling motorists. These traffic controls are strategically placed and oriented to minimize conflicts with motorists and give priority to cyclists. Some elements of traffic control found on bicycle boulevards are:

- Banning certain movements for motor-vehicles at intersections while still allowing bicycles full access
- Roundabouts that force automobiles to slow down but allow bikes to pass unimpeded
- Orienting stop signs and yield signs to control traffic approaching the bike boulevard so as not to force cyclists traveling on the bike boulevard to stop
- Narrowing lane widths

Bike Lane – Bike lanes act as a guide to motorists and cyclists alike for where cyclists should be. They delineate areas on roadways appropriate for motorists and for cyclists.

According to the Transportation Association of Canada Bicycle Pavement Marking Guidelines, bike lanes should be between 1.5 m and 2.0 m wide, marked on both sides of urban roads, and should be located adjacent to the curb or on-street parking. Paved shoulders operate very similarly to bike lanes except that they are used in a rural context.

Bicycle Lockers – Provide an enclosed, secure bicycle parking option and can keep bicycles shielded from rain and snow.

Bike Station – Offers users/members secure bicycle parking and related amenities and services. Membership to most Bike Stations includes 24-hour access to secure bicycle parking, bicycle repair equipment, snack bars and cafes, showers, lockers, change rooms, car-sharing services, discounts on retail sales, bike-sharing, and other perks.

Bicycle Track – Bicycle tracks restrict the use of the facility to bicycles and exclude use by other modes. The context in which bicycle tracks are implemented should be carefully considered. Infrequent crossings or interactions with other modes should be prioritized and parallel facilities for other active modes should be provided and clearly marked. Both the experienced and non-experienced cyclists should experience a minimum delay and a high level of safety on this type of facility.

Bike Tree – Is an innovative parking solution, which provides off-ground bicycle parking with bicycles lifted vertically to the high-level branches of a vertical trunk/pole. These systems deter theft and serve as a public attraction piece, acting as a node and landmark for bicycle travel. Some of the bike tree features include automatic security camera activation, fully visible storage, small physical footprint, aesthetically pleasing street furniture, smart card technology, and others.

Crossbikes – Are pavement markings applied adjacent to a crosswalk as a facility for cyclists to travel though without dismounting from the cycling position. They improve function and safety for cyclists and other road users by providing an identified space for bikes to travel in with no interaction with pedestrians or automobiles. These pavement markings are commonly referred to as elephant's feet, and can safely and legally accommodate bikes through signalized or unsignalized intersections. The elephant's feet markings should be 0.4 m wide dashes that run parallel to regular crosswalk treatments (solid white lines or zebra markings), placed in the safest site-specific area (one side or both) for that crosswalk. If the intersection is signalized, right turns on red should be prohibited to ensure safe crossing by bikes.

Multi-Use Trail – Multi-use trails are generally open to all types of active mode users. Concerns are often cited by experienced cyclists or commuters wishing to maintain a higher speed than other users. Multi-use trails users typically are forced to yield to traffic at roadway and access crossings. On multi-use trails in Edmonton, cyclists are required to yield to all other users. Safety concerns stem from the difference in speed, level of skill, and the range of users on the facility, and conflicts with motor-vehicles at crossings. Multi-use trails are typically two-way facilities and at least 3 m wide. When placed along roadways, multi-use trails are typically only constructed along one side of the roadway.

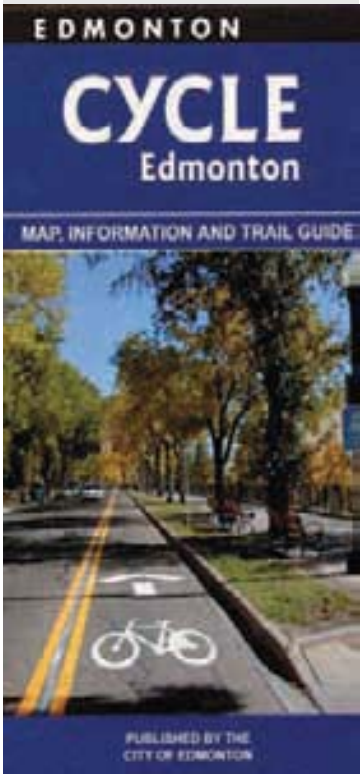
Shared-Use Lane – Side by side shared-use lanes are between 4.1 m and 4.9 m wide and are intended for shared use between cyclists and motorists. Wide curb lanes on arterial roads provide a facility in an environment where cycling may otherwise be prohibitive due to high traffic volumes and speeds. Shared-use lanes such as these offer a higher level of convenience for utilitarian cyclists and can complement a more recreational multi-use trail adjacent to an arterial roadway. The amount of delay experienced by the cyclist in the shared use lane is the same as that of the motorist, as higher order roadways have minimal delay since traffic from cross streets is typically controlled. Signing along these routes can improve awareness of the shared nature of these facilities for both cyclists and motorists. Sharrows are also used to indicate the intended cycling area of the roadway for both cyclists and motorists.

Single file shared-use lanes are less than 4.0 m and are intended for cyclists and motorists to travel in the same lane, in single file. TAC's Guidelines for the Design and Application of Bikeway Pavement Markings states that single file shared-use lanes should only be used on roadways with a speed limit of 50 km/h or less. Sharrows can be placed in the centre of the travel lane to indicate that bicycles are intended to ride in the centre of the lane because there is not adequate space for side by side operation of bicycles and motor vehicles.

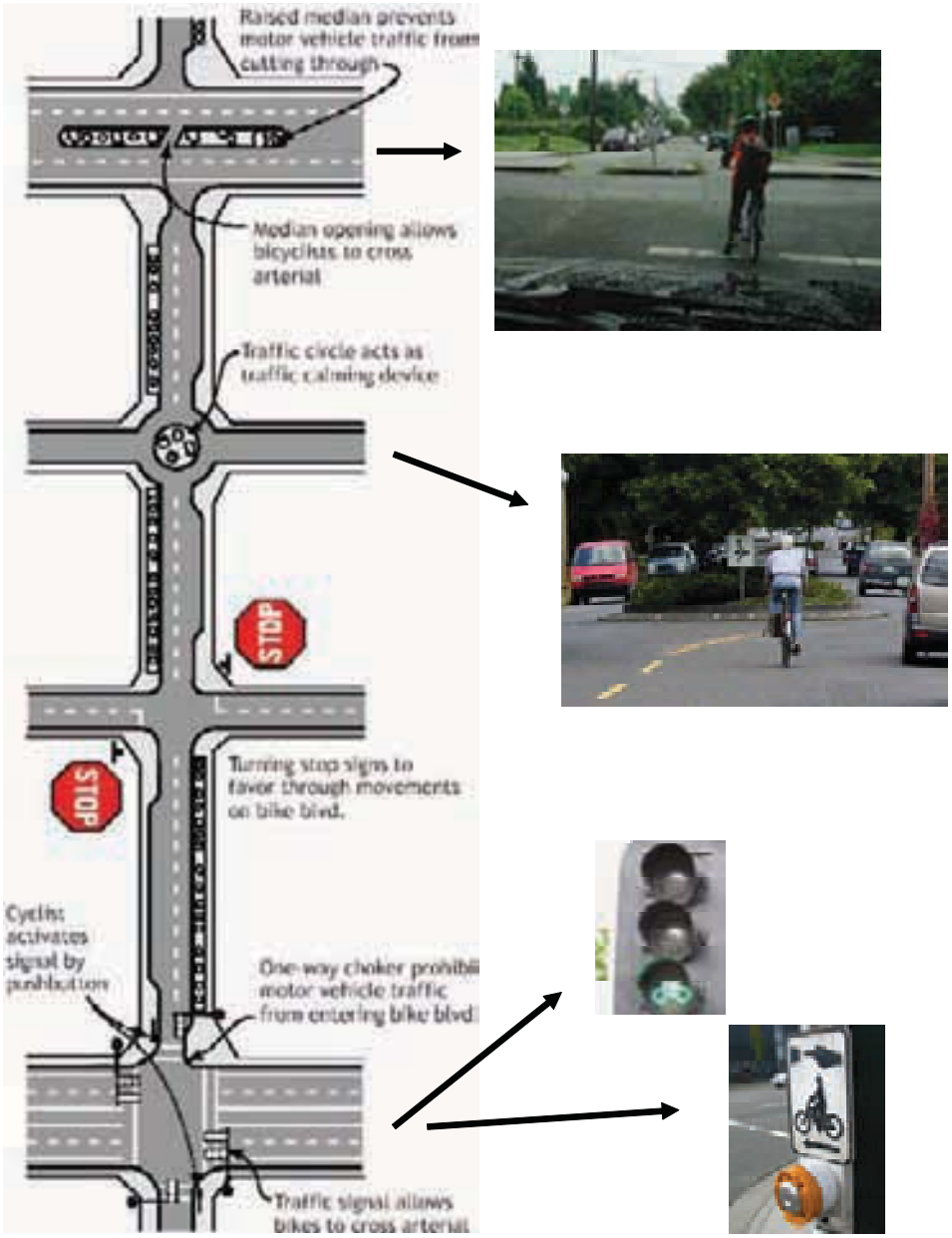
Bus/bike/taxi lanes are shared use lanes where automobile traffic is restricted but where transit vehicles, taxis, and bikes are permitted.

Sharrows – Are a new pavement marking intended to show cyclists and motorists where cyclists should be cycling with-in the lane.

Signed Routes – Are regular roadways where the route has been identified as part of a bicycle network with sign only.



Bicycle Boulevard



Bike Lane

Multi-Use Trail

Bicycle Track

Wide Shared-Use or Wide Curb Lane with Sharrow

Signed Route