Associated Engineering

GLOBAL PERSPECTIVE.
LOCAL FOCUS.

Final Report

City of Medicine Hat

Cycling Master Plan

November, 2010

CANADA'S 50 BEST MANAGED COMPANIES

Executive Summary

Cycling is gaining popularity across the country as a form of commuting. The development of proper cycling infrastructure and amenities, coupled with sound policies that view cycling as an integral part of urban renewal, can increase the number of cyclists and the numerous benefits associated with it. It is widely acknowledged that cycling is one of the best ways for people to achieve good health and fitness as it can be incorporated into daily life. The benefits of cycling extend beyond individual improvements in physical and mental health to wider public health and safety by reducing the adverse impacts associated with motor traffic and performing a role of natural surveillance.

In acknowledgement of these benefits and the public support for cycling, the City of Medicine Hat commissioned AE to develop an on and off street Cycling Master Plan (CMP) as part of a larger Roadway System Master Plan Update. The objective of the CMP is to provide the framework needed to create a complete on and off street cycling network for commuter cyclists that will make cycling in the City of Medicine Hat a safe, convenient and enjoyable transportation choice.

The CMP was developed out of a dynamic process that linked engineering standards, planning principles and input from local cyclists, residents and City staff. The following initiatives were undertaken and incorporated into the CMP:

- Stakeholder engagement and input throughout the process.
- Creation of a vision and guiding principles.
- Review of all major transportation routes and recommended routes.
- Review of related projects and best practices.
- Development of map illustrating proposed cycling network.
- Implementation plan for short, medium and long term horizons.
- Design standards for short term implementation.
- Planning level cost estimates for short and medium term implementation.

Engagement of key stakeholders, City staff and the general public occurred throughout the development of the CMP. A Bicycle Working Group (BWG) was formed to generate a vision and guiding principles for the CMP and to provide critical feedback at key stages in the process. Four BWG workshops were held with the format of presenting the progress of the CMP and engaging participants in interactive exercises. Participants at the workshops helped shape the CMP by informing the project team of their knowledge, experiences and providing feedback. Attendance at BWG workshops included representatives from:

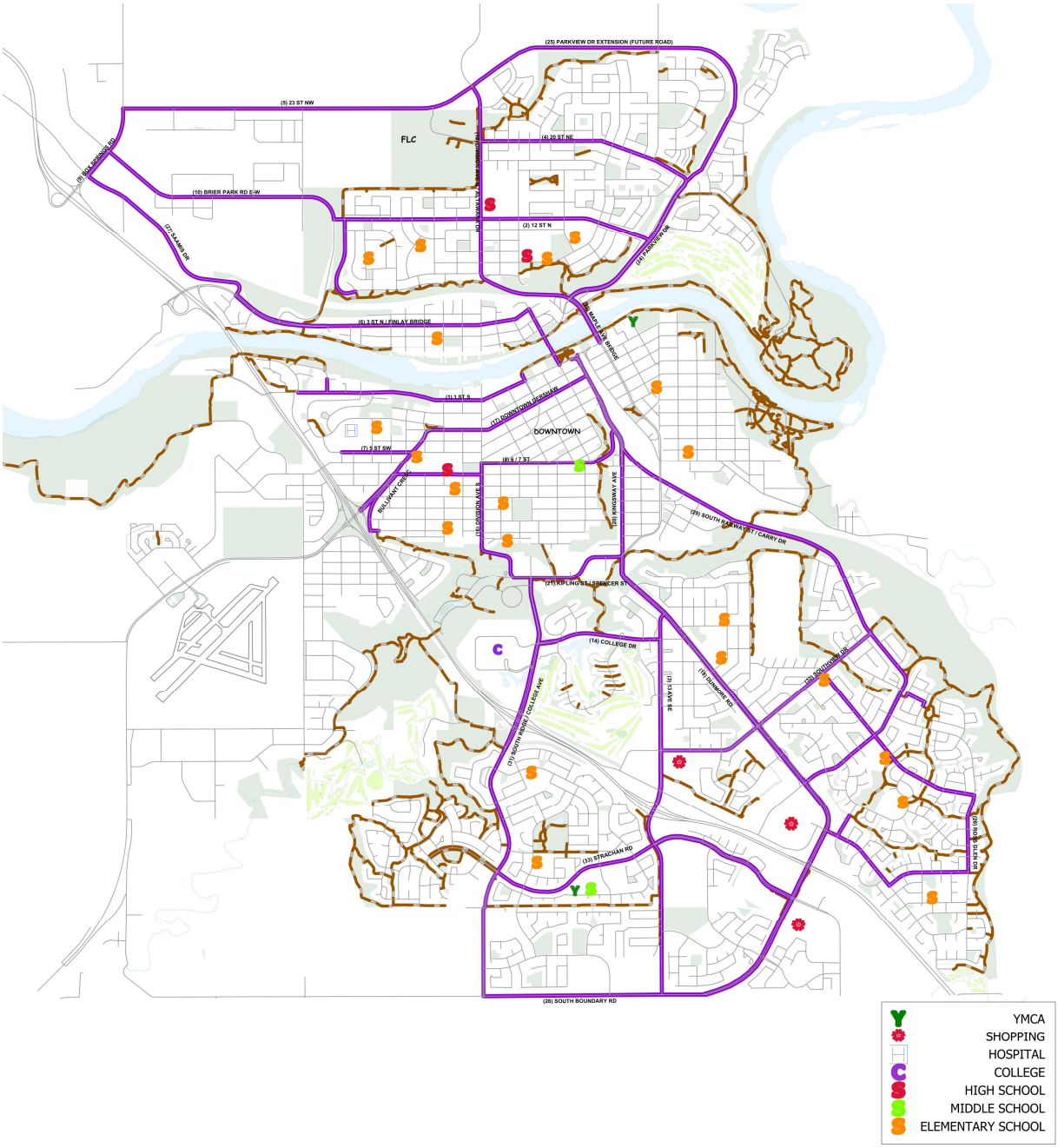
- Medicine Hat Cycling Club.
- Coalition for Active and Alternative Transportation (CAAT).
- Grasslands Naturalists.
- Medicine Hat College.

- South Eastern Alberta Safety Alliance Society.
- Urban Environmental and Recreation Advisory Board.
- City of Medicine Hat Council.
- City of Medicine Hat Police Service.
- City of Medicine Hat Municipal Works.
- City of Medicine Hat Parks and Outdoor Recreation.
- City of Medicine Hat Planning, Building and Development Staff.
- General Public.

During the development of the CMP, two public open houses were held to inform the general public of the CMP process and gather feedback. Surveys were conducted at each of the open houses to gather information on cycling habits, opinions on the cycling network and support of the overall CMP.

Using the information and feedback gathered at the BWG workshops and public open houses, the project team applied engineering standards, planning principles and best practices to refine the cycling network and develop recommendations for supportive policies and programs. The final recommended cycling network shown in **Figure E-1** received full support of the BWG.

Figure E-1
Recommended Cycling Network



Appropriate reconfiguration options, implementation horizon and cost estimates for the recommended cycling routes are provided in Table E-1 through E-5:

Table E-1
Summary of Costs for 0-2 Year Term

ROUTE NAME	SOLUTION	COST
1 ST S	WAYFINDING	$11,000
EDUCATION	BROCHURES, BILL BOARDS, WEB SITE INFORAMTION	$20,000
12 ST N	BIKE LANES	$20,000
TOTAL		**$51,000**

Table E-2
Summary of Costs for 3-4 Year Term

ROUTE NAME	SOLUTION	COST
3RD ST / FINLAY BRIDGE	SHARED LANES	$40,000
COLLEGE DR	BIKE LANES	$40,000
DIVISION AVE / ALTAWANA DR	SHARED LANE/ EX. TRAIL	$50,000
MAPLE AVE BRIDGE	EX. SIDEWALK	$5,000
TOTAL		**$135,000**

Table E-3
Summary of Costs for 5 Year Term

ROUTE NAME	SOLUTION	COST
PARKVIEW DR	TRAIL	$795,000
SOUTH BOUNDARY RD	WAYFINDING	$3,000
SOUTH RAILWAY ST / CARRY DR	MOSTLY SHARED LANES	$60,000
SOUTHVIEW DR	SHARED LANES	$90,000
DUNMORE HILL RD	TRAIL	$220,000
TOTAL		**$1,168,000**

Table E-4
Summary of Costs for 5-10 Year Term

ROUTE NAME	SOLUTION	COST
20 ST NE	MOSTLY SHARED LANES	$50,000
5 ST SW	SHARED LANES	$20,000
6 / 7 ST S	SHARED LANES	$40,000
BULLIVANT CRESC	SHARED LANES	$9,000
DIVISION AVE S	BIKE LANES	$40,000
KINGSWAY AVE	TWO-WAY LEFT-TURN LANE	$130,000
KIPLING / SPENCER ST	BIKE LANES	$20,000
STRACHAN RD	SHARED LANES	$100,000
TOTAL		**$409,000**

Table E-5
Summary of Costs for 10+ Year Term

ROUTE NAME	SOLUTION
13TH AVE	ROAD WIDENING
23RD ST NW	TRAIL
BOX SPRINGS RD	TRAIL
BRIER PARK RD	TRAIL
DOWNTOWN GERSHAW	ROAD WIDENING
DUNMORE RD	ROAD WIDENING
ROSS GLEN DR	ROAD WIDENING
SAAMIS RD	TRAIL

Recommendations to make Medicine Hat an attractive and safe place to cycle by creating a connected and efficient network of cycling routes accessible to all are located throughout the final report. The following key recommendations focus on specific tasks that the City can complete to make the CMP a success:

- Adopt **Figure E-1** as the Cycling Master Plan route plan for the City of Medicine Hat.
- Amend traffic bylaw No. 2434 to include Maple Avenue Bridge.
- Update bylaws to include typical bicycle safety codes.
- Expand Medicine Hat Municipal Servicing Standards to include on-street bikeways for future roads planned within the City, where appropriate.
- Adopt the following minimum design standards for retro-fitting cycling lanes on roads:
    - Minimum driving lane width of 3.3 m for arterial streets with buses or truck routes.
    - Minimum shared driving lane width of 4.0-4.8m.
- Include bicycle parking in Medicine Hat's land use bylaw for all new commercial developments.
- Develop an education campaign focused on teaching cyclists and motorists how to safely share the road.

- Create partnerships with other agencies and identify cycling champions within the community.
- Coordinate with existing campaigns and programs such as the Commuter Challenge Week or the HAT Smart program.
- Create a cycling network map.
- Provide cycling information on City website.
- Implement educational corridor on Dunmore Road.
- Install bicycle parking where demand is high.
- Add staff (0.5 FTE in Municipal Works) dedicated to implementation of the CMP.

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REPORT

1 Introduction

1.1 BACKGROUND

In recent years, there has been a growing trend to incorporate cycling networks into a community's larger transportation plan. This trend can be largely attributed to recognition of the positive impacts cycling has on concerns facing society; climate change, sustainable development, traffic congestion and increased levels of obesity and other negative health impacts associated with a sedentary lifestyle. A strong body of research and evidence exists that cycling has the potential to make a significant contribution to improving public health. Cycling can help reduce the risk of a range of health problems, notably heart disease and cancer, the leading preventable causes of premature death. Cycling also has the potential to improve broader aspects of community health, by increasing road safety, reducing emissions, creating opportunities for children's play and enhancing social cohesion. The City of Medicine Hat recognizes the value of cycling as a mode of transportation and has commissioned Associated Engineering (AE) to develop an on and off street Cycling Master Plan (CMP) as part of a larger Roadway System Master Plan Update.

The need for a Cycling Master Plan was identified in the City of Medicine Hat Leisure Trails and Alternative Transportation Needs Assessment and Public Consultation Report completed January, 2009. This report was initiated in response to public discussions and presentations focused on cycling opportunities in the city related to the existing leisure trails and road network. The needs assessment survey and public consultation study determined the need and public support for the development of a leisure trail master plan and an on and off street cycling master plan. The process of developing the Leisure Trail Master Plan began in July, 2009 and is complete. Members actively involved in the creation of the Leisure Trail Master Plan have participated throughout the CMP process, ensuring the two plans are complementary to one another.

Representatives from the City of Medicine Hat Police Service and the South Eastern Alberta Safety Alliance Society were also engaged throughout the process. There involvement ensured the CMP promoted safe cycling and consideration was given to public safety. Policies leading to increases in the numbers of cyclists improve the safety of people using it as mode of transportation resulting from increased awareness and safety in numbers. In addition, there may also be more broad benefits from having an increase in cyclists as they can perform a role of natural surveillance. Compared to people in vehicles, cyclists are better able to spot anti-social behaviour, deter crime or stop to provide assistance in situations where help is requested.

Encompassing the many public benefits of cycling, the objective of the CMP is to provide the framework needed to create a complete on and off street cycling network for commuter cyclists that will make cycling in the City of Medicine Hat a safe, convenient and enjoyable transportation choice.

The plan is based upon available information and local input regarding desired goals, route usage and design considerations. The following initiatives were undertaken and incorporated into the CMP:

- Stakeholder engagement and input throughout the process.
- Creation of a vision and guiding principles.
- Review of all major transportation routes and recommended routes.
- Review of related projects and best practices.
- Development of map illustrating proposed cycling network.
- Implementation plan for short, medium and long term horizons.
- Design standards for short term implementation.
- Planning level cost estimates for short and medium term implementation.

1.2 STUDY METHODOLOGY

The study methodology involved several tools using the philosophy that engineering principles coupled with input from local cyclists, residents and City staff can provide an integral plan with a high likelihood of successful implementation. Local residents and cyclists are familiar with local conditions, existing opportunities and constraints as well as related projects that the CMP can be coordinated with and/or expanded on.

A Bicycle Working Group (BWG) with local cyclists and residents was formed to work with the project team throughout the CMP process. Four BWG workshops along with two public open houses were held as an opportunity to generate and test ideas and to ensure that the refinement of the CMP was in keeping with the overall vision and principles developed with the BWG. Valuable information was provided by the BWG related to common destinations, current shortcuts, and portions of the roadway system where they felt the most or least safe, due to the proximity of motor vehicles and physical constraints.

The project team used engineering standards, planning principles and best practices throughout the process. Research was conducted on design standards, educational programs and bicycle parking. Members of the project team also familiarized themselves with the road and trail networks in the City of Medicine Hat by cycling, driving and utilizing mapping software. Potential routes identified by the BWG were evaluated to determine the feasibility of incorporating bikeways. The project team analyzed existing road configurations and the application of cycling route design standards to determine appropriate reconfiguration options.

A recommended plan indicating three implementation timeframes was developed. Routes with the greatest connectivity, safety and bike-ability are in the zero to five year timeframe. Cost estimates were prepared based on probable solutions for proposed routes.

1.3 MEDICINE HAT CONTEXT

1.3.1 Geography

Situated in the South Saskatchewan River Valley, the City of Medicine Hat is made up of a diverse and dramatic landscape. Both the Seven Persons Creek and Ross Creek empty into the South Saskatchewan River within the city limits. These bodies of water have carved extensive topographical features, including numerous cliffs, hillsides and finger coulees. Although providing breathtaking views, the landscape poses geographical constraints for cycling.

1.3.2 Infrastructure

There are two city owned bridges crossing the South Saskatchewan River. The limited number of river crossings restricts the location of cycling routes. Maple Avenue Bridge requires cyclists to dismount when using the provided sidewalks or to cross with traffic. Finlay Bridge has one dedicated sidewalk for cyclists and another for pedestrians. The Trans-Canada Highway and Canadian Pacific Railway also serve as physical constraints as they intersect through the city. The transportation infrastructure was originally designed to support the traditional transportation requirements and continues to support the personal automobile as the dominant mode of transportation. A number of roads within the city have also been designated heavy truck routes, limiting the reconfiguration options available to accommodate cycling.

Two trial cycling routes were implemented in 2008. One of the routes was on 12th Street between McCutcheon Place and 7th Avenue East and the other route was on Division Avenue between 12th Street and 19th Street. The two trial routes provided exposure and continued the discourse around cycling in the City of Medicine Hat.

1.3.3 Bicycle Bylaws and Regulations

Bicycle bylaws and regulations applied in the City of Medicine Hat are taken from the Alberta Traffic Safety Act and the City of Medicine Hat's traffic and parks bylaws as outlined below. There are currently no bylaws in the City of Medicine Hat's land use bylaw pertaining to bicycle parking requirements. Bylaws and regulations concerning cycling in Medicine Hat are provided in Appendix A.

2 Cycling Route Plan Formulation

2.1 VISION AND PRINCIPLES

The vision and supporting principles for the Medicine Hat Cycling Master Plan (CMP) were developed out of community and stakeholder input. The vision and planning principles describe the preferred character and overall direction for development of the CMP. The vision illustrates the ideal state for the CMP and the planning principles provide guidance and direction towards achieving that end result. Taken together, the vision and principles provide inspiration for the future of the CMP and highlight broad physical, economic and cultural goals.

2.1.1 Vision Statement

To make Medicine Hat an attractive and safe place to cycle by creating a connected and efficient network of cycling routes accessible to all.

2.1.2 Principles

Eight Principles support the Vision for the Cycling Master Plan. These Principles function as a guiding framework to ensure that the Vision is clearly translated into the Cycling Master Plan.

Connectivity – the CMP will establish a connected system that will provide direct access to major activity centres, employment nodes, neighbourhoods and recreational amenities.

Safety – the CMP will recognize the distinct operational and design needs of cyclist to maximize the safety of all users.

Implementable – the CMP must be supported by the community and maximize opportunities and user benefits, while addressing the life-cycle costs and ease of maintenance.

Education and Outreach – the CMP will promote the on-going education of cyclist, motorists and the public on cycling safety, rights and responsibilities.

Sustainable – the CMP will support sustainability by integrating, where appropriate, with other transportation systems to reduce construction and ongoing maintenance efforts.

Convenient – the CMP will be designed and implemented to be convenient for users by providing ease of travel, amenities, accessibility, signage, and integration with adjacent uses.

Visible – the CMP will be designed to provide awareness for all users and be a visible component of the larger transportation system.

Geographical Constraints – the CMP will recognize the needs of cyclists with the geographical constraints of Medicine Hat.

2.2 DESIGN STANDARDS

Design needs to be considered from the start of the process to definitively confirm that it is possible to accommodate cyclists safely on proposed routes. When accommodating cyclists on streets, a number of factors need to be considered. Road width, existing cross sections, traffic volume, type of motor vehicles that use the roadway, whether the route is a designated truck route and topography are just a few things to keep in mind when accommodating cyclists. Road width and cross section are the highest determining factors that will dictate whether cyclists will have a designated place along with motor vehicles.

2.2.1 Road Width

On-street bikeways can be retrofit onto existing road widths if there is sufficient width to reconfigure the lanes appropriately. The Transportation Association of Canada (TAC) has established minimum lane widths for different types of roadways. It uses a design domain that allows some flexibility to adjust in retrofit situations. The desirable lane width on major urban arterial streets with trucks and buses is 3.5 to 3.7 metres. Vancouver will allow lane widths to be reduced to 3.0 metres so that 1.5 to 2.0 metre bicycle lanes can be added to the roadway. In Ontario, many of the jurisdictions and the Ministry have accepted 3.3 metre lanes as an absolute minimum for major arterial streets. Medicine Hat is a very automobile dependent prairie community with a higher ratio of pick up trucks and rural visitors. A minimum driving lane width of 3.3 metre on arterial streets with buses or truck route is the recommended minimum width that should be allowed when retrofitting on-street bikeways.

According to the TAC Guidelines, a dedicated bike lane can be between 1.5 – 2.0 metres wide in a typical urban setting with flat topography, less than 6000 Average Annual Daily Traffic (AADT) and when heavy vehicles make up less than 10% of total traffic. When the bike lane is located adjacent to a curb, this distance is measured from the edge of curb to the centre of the paint line as long as the transition from edge of pavement to curb is done smoothly. Where bike lanes are not located adjacent to a curb, the distance is measured from centre of paint line to centre of paint line. A width of 0.5 metre should be added if the bike lane is going up a hill to accommodate for the cyclist wobbling, AADT exceeds 6000 or where heavy vehicles make up more than 10% of the total traffic.

A shared use lane, where a cyclist and a motor vehicle share one lane, ranges between 4.0 – 4.8 metres, depending on traffic volumes. Additional widths should be added again when heavy vehicles make up more than 10% of traffic or AADT exceeds 6000.

Opinions on which method to best accommodate cyclists can vary. Some believe that the dedicated bike lane provides more safety by clearly marking out a space for the cyclists. Others believe that the line between the bike lane and the motor vehicle lane can make the cyclists feel

restricted in their movements. For the purpose of this study, it was preferred to use dedicated bike lanes wherever possible and shared use lanes if dedicated bike lanes could not fit.

If there is insufficient road width to accommodate cyclists, either an off street trail that parallels the road or reconstruction and widening of the road could be completed. In cases where space exists, costs favour adding an off street trail over widening a road.

2.2.2 Cross Section

The cross section of the roadway refers to how many driving and parking lanes are in each direction and any other elements that might be on the road pavement. In all circumstances, the existing cross section should be retained as to avoid driver confusion from changing the cross section or public upset of removing driving or parking lanes. In some instances, there may be low parking demand and the removal of a parking lane could be completed without too much disturbance. When removing parking lanes however, public consultation should be completed. When removing driving lanes, a traffic analysis should be completed to ensure that the traffic flow is still satisfactory.

Accommodating cyclists on street can be a difficult task and needs to be done with careful thought and consideration. One solution rarely fits homogenously across an entire route and each route will often require multiple solutions. Typical cross sections found in Appendix B are examples of common cross sections that could be used as solutions for some sections of roadway.

2.2.3 Signs and Pavement Markings

Most jurisdictions in Canada follow TAC signage and pavement marking guidelines. Two signs commonly used for both cyclists and motorists are RB-91 and WC-47. WC-47 is a yellow warning sign that is used when there is a shared use driving / cycling lane. RB-91 is a white rectangular regulatory sign that is used when there is a reserved bicycle only lane. Both signs are placed at 200 metre intervals. The meaning of the symbols is not commonly known. As such, tabs with the words “Shared Use” and “Only” can be used for an education period. Ultimately, the goal would be to remove all written words from signs so that the signs can be identified by all residents that speak other languages.

Pavement markings are used to indicate to both cyclists and motorists where each belongs on the roadway. The pavement markings for a “bicycle only” lane include a solid lineal line on both sides of the lane, and a bicycle with a diamond symbol every 75 metres. The diamond could be supplemented with the word “only” until residents learn the meaning of the diamond. The shared use driving / cycling lanes are marked with a share the road symbol that is placed at an interval of 75 metres. Two versions of this symbol are used throughout Canada. The first version depicts a bicycle with the words “shared use”. The second symbol more recently proposed by TAC, called a “sharrow”, shows a bicycle with two arrows. There is movement toward making all signs and pavement markings wordless so that they are understood by people that do not speak English.

This should be kept in mind when deciding upon which standards to apply when accommodating cyclists.

2.2.4 Medicine Hat Design Standards

The Medicine Hat Municipal Servicing Standards contains information that includes road standards and typical cross sections. Standards should be changed to include on-street bikeways for future roads planned within the City of Medicine Hat where appropriate. The cost to accommodate cyclists with new construction is substantially less than road widening and accommodating cyclists in a retro fit situation.

2.3 EDUCATION AND OUTREACH

Insufficient cycling skills and the perception of the physical danger posed by motor vehicles can be a significant barrier for people beginning commuter cycling. The real risks of cycling are minimal and the health benefits of cycling are calculated to outweigh the risks by twenty to one. Public education campaigns can be a great way to address these safety concerns while at the same time increasing awareness of existing cycling facilities and programs. They can also provide an opportunity to promote the multiple benefits cycling has to offer, including:

- Aerobic exercise for all abilities and physical conditions as the strain on the body is less than in other endurance sports and can be carried out at different intensities.
- Reduces the chances of heart disease and increases the body's protection against various forms of diabetes and high blood pressure.
- Reduces the likelihood of arthrosis resulting from the circular movement that assists the transport of energy and other metabolic produces to the cartilages.
- Builds stamina, enabling one to carry out their day-to-day activities more effectively.
- Positive affect on emotional health, improving levels of wellbeing and self-confidence while reducing tiredness and difficulties with sleep.
- Provides a relaxing effect due to its uniform, cyclic movement which stabilizes the physical and emotional functions of the body counteracting anxiety, depression and other psychological problems while providing hormonal balance.
- Can be done as part of daily travel routines, providing the potential of becoming a habitual form of exercise that can be done throughout life.
- As an alternative to motor vehicle travel, it improves air quality, reduces noise and danger and provides greater independence for children.
- Cost effective mode of transportation.
- A complete leisure activity, it provides an opportunity to spend time with friends, meet new people and discover new places.

The combined promotion of these aspects serves to increase safety, awareness and the number of commuter cyclists in the City of Medicine Hat in a collaborative cost effective way.

Where possible the promotion of cycling should be coordinated with existing campaigns and programs such as the Commuter Challenge Week or the HAT Smart program. The process of shifting a car oriented culture to a cycling culture takes time and requires the support and persistence of several organizations to allow the public to learn that cycling is a viable transportation option. Therefore it is important to identify cycling champions within the community who can help the City promote and administer cycling programs.

Public education can be directed to a variety of audiences and it is important to reach a wide range of individuals with each campaign. The promotion of cycling and bicycle safety will be improved by providing information to drivers as well as cyclists on how to share the road. There are a number of programs and venues that can be used to deliver cycling information. The following measures are frequently administered in other communities and should be considered for implementation in the City of Medicine Hat to encourage and support cycling.

2.3.1 Public Education Programs

Cycling Network Map
A map brochure clearly illustrating the location of all cycling routes in the City of Medicine Hat can be created. The option of including locations of bicycle shops and other cycling resources can be considered as a way of helping to fund the brochure through advertising rates. Information on safe and legal bicycle practices may also be included in the brochure as a bicycle education tool for users of the map.

Bicycle Operator's Manual
A bicycle operator's manual can be an effective way of disseminating cycling information by multiple groups and at multiple venues in a compact booklet. The cycling information contained within the manual can include rules of the road, bike handling, traffic skills, benefits of cycling, bicycle security and cycling courses. British Columbia offers a manual titled Bike Sense that was produced by the Greater Victoria Cycling Coalition and was written and reviewed by professional cycling skills instructors, cycling advocacy organizations, bicycle trained police officers and provincial authorities responsible for making and interpreting traffic laws.

Website
The City's website can contain a link for cycling information. Adding cycling information to the website is a low-cost and effective way of promoting cycling to a wide audience. The information contained on the website can include the cycling network map, information on cycling programs and events, and "share the road" tips for motorists and cyclists.

Bike to Work Week
Bike to Work Week is an international campaign held annually usually in the month of May. The idea of the campaign is to encourage participants to use the bicycle as their mode of transportation to work for the week. The goal is that participants will view cycling as a reliable, healthy and affordable mode of transportation by the end of the week and continue to cycle not only to work but for all their daily activities. Although similar to the Commuter Challenge campaign that encourages

all alternative modes of transportation, the Bike to Work Week focuses on cycling alone allowing cycling programs and resources to be highlighted and coordinated during the week event.

Can-Bike Program

The Can-Bike cycling safety program provides a nationally standardized set of courses that can be taught through a variety of organizations who are interested in cycling education, safety and health. The program includes the following activities:

- Festivals.
- Courses – Smart Cycling, Cycle Right, Traffic Skills, Commuter Skills, Bike to Work Skills, Rural & First Nations.
- Sprockids – rules of road, 10 week program for students'.
- Development Training Camps.
- In-Class Training.
- 45 minutes to one hour for grade school students, some include on-bike sessions.
    - Earn a Bike and Ride – 18 hours working in bicycle shop, 20 hours safety training.
    - Effective Cycling for adult.
    - Train the trainer – for teachers, volunteers.
- Roadeos.
- Mountain biking instructor courses.

Corporate Sponsorship Program

Corporate sponsorship of education programs will achieve improved local buy-in and help defray program costs. The Bike to Work Week as an example can be promoted as an internal event by an organization. Employees can be challenged to cycle to work for prize incentives or employers can use it as a team building event engaging in friendly competition with other employers. Local employers can also be encouraged to host such programs as the Can-Bike safety program or help disseminate brochures and other information to their employees on behalf of the City.

The City may also choose to implement a matching grant program. Through such a program, applicants are expected to match the financial contributions from the City to implement cycling programs, bicycle parking and shower facilities to encourage their employees to cycle to work.

Educational Corridor

An educational campaign could have a higher degree of success if it is seen by many people of a specific audience. Educating motorists on how to drive around cyclists could be best accomplished using a designated educational corridor. The educational material could include billboards and signs. These billboards would show how to drive alongside a cyclist and how to accommodate cyclists when they are making a left hand turn. Billboards could also contain messages such as "a bicycle is a vehicle" and should direct the motorist to the City's website for more information on do's and don'ts of driving around cyclists. Signs could simply contain a message such as "share the road" with a vehicle and bicycle side by side.

2.4 BICYCLE PARKING

A critical component of a cycling master plan is sufficient supply of bicycle parking to ensure cyclists have a secure place to park their bicycles when they arrive at their destination. Bicycle parking needs to be present at both public and private facilities to properly accommodate cyclists throughout the City of Medicine Hat. The City has limited jurisdiction over the installation of bicycle parking on private property. Through awareness, encouragement and the implementation of policies and guidelines the City can positively influence the amount of bicycle parking available on private property.

Bicycle parking should be placed virtually anywhere there is a high demand for it. In some situations higher security parking, such as bike lockers, is required for long term bike parking geared to employees, students and others who will be parking for more than two hours. All the programs highlighted in this section can be used to address the need for bicycle parking.

2.4.1 Bylaws

Bicycle parking is often addressed in urban zoning or land use bylaws. Examples of bylaws containing provisions for bicycle parking are described below.

Regina
In the City of Regina's zoning bylaw there is a requirement for bicycle racks to be installed by the developer for all new commercial establishments and when significant alterations are made to an existing structure or building. Some of Regina's bylaw requirements are:

- Spaces for bicycles to be provided in safe and convenient locations, a minimum of 0.61 metres wide and 1.83 metres deep.
- If covered automobile parking is provided, all bicycle parking shall be covered.
- Depending on the type of development the number of bicycle parking spaces must equal 10%, 20% or 30% of the number of motor vehicle and parking spaces.
- The parking spaces shall be clearly marked as reserved for bicycles.

Winnipeg
Winnipeg's bylaw requires bicycle racks at the rate of one lockable bicycle space per 10 vehicle parking spaces. Bicycle parking must be located with convenient access to major building entrances.

Bicycle parking should be required in the City of Medicine Hat's land use bylaw for all new commercial developments. The bylaw could require the provision of bicycle racks at the rate of one lockable bicycle space per 10 vehicle parking spaces. All bicycle racks should be built and installed to meet acceptable standards to ensure maximum usage.

2.4.2 City Owned Bicycle Racks

Most jurisdictions have programs to provide bicycle racks at City facilities where the demand is higher, such as libraries and recreational centers. Post and ring racks such as the one shown in Figure 2-1 should be provided in the downtown and other streets where there is a high demand for on-street parking. In the longer term there is potential to further expand the amount of parking at City owned facilities.

Figure 2-1
Sample Post and Ring Racks

2.4.3 Privately Owned Bicycle Racks

Bicycle racks can also be provided at privately owned facilities where large numbers of cyclists can be expected. An incentive program which may include sponsorship or advertising opportunities could be developed to provide assistance for the provision of racks at major commercial and retail buildings. There are existing companies that provide free bicycle racks that are maintained by the company in exchange for advertising to be displayed on the racks. Before entering into such a program the aesthetic impact on the streetscape of introducing an additional type of street furniture with advertising needs to be considered. Schools and major employers can also be encouraged to provide racks.

2.4.4 Bicycle Rack Standards

Bicycle racks must be properly designed to accommodate most bicycle sizes, provide stability to the parked bicycle and minimize vandalism and theft. Common acceptable designs include the 'u' rack shown in Figure 2-2.

Figure 2-2
Sample U-Rack

Many acceptable rack styles are available. One critical requirement is that the upright racks are spaced at least 0.75 metres apart, to provide stability and safety for most bicycle sizes. The rack also must accommodate the high security, U-shaped shackle bicycle lock.

Racks should either be installed in the public right-of-way, or on private sites in conformance with front setback requirements. Whenever possible, the racks should be placed within 15 metres of building entrances. The rack placement should allow for visual monitoring by people within the building and by people entering the building. The placement of the racks should minimize conflicts

with pedestrians and vehicles. All bicycle parking provided should be located a minimum of 0.6 metres from a parallel wall, and 1.0 metres from a perpendicular wall.

On downtown streets a post and ring rack can be provided along the sidewalks. These racks must be designed to accommodate most bicycle sizes and provide a secure vandal proof locking space.

2.5 STAFFING

City staff should be dedicated to champion this initiative to continue momentum and ensure implementation. This person would have assigned responsibilities and would work to see that cycling in Medicine Hat becomes a viable commuter option. Responsibilities for this staff would include but are not be limited to:

- Planning and coordinating implementation of the on-street cycling routes.
- Overseeing bylaw changes.
- Ensuring design standards are changed.
- Adding bicycle parking to high demand attractions within the City.
- Creating a public education campaign.
- Partnering with other agencies to increase awareness and education.

2.6 MONITORING AND EVALUATION

The CMP is a document that should be reviewed and updated in approximately 5 years. This review should gauge the success of the recommended routes, public education and acceptance of cycling as a viable commuter option. A review would ensure that implementation of the routes was appropriately addressing demand while allowing refinement to capital budgeting and timing.

3 Public Consultation

3.1 INTRODUCTION

A Bicycle Working Group (BWG) with local cyclists and residents was formed to work with the project team throughout the CMP process. Invitation to join the BWG was open to cyclists, stakeholder groups and members of the general public interested in providing input into the development of the plan. Attendance at BWG workshops included representatives from:

- Medicine Hat Cycling Club.
- Coalition for Active and Alternative Transportation (CAAT).
- Grasslands Naturalists.
- Medicine Hat College.
- South Eastern Alberta Safety Alliance Society.
- Urban Environmental and Recreation Advisory Board.
- City of Medicine Hat Council.
- City of Medicine Hat Police Service.
- City of Medicine Hat Municipal Works.
- City of Medicine Hat Parks and Outdoor Recreation.
- City of Medicine Hat Planning, Building and Development Staff.
- General Public.

3.2 BWG WORKSHOP ONE

The Medicine Hat Cycling Master Plan kicked off with a BWG workshop held on March 24, 2010. The workshop had the following three objectives:

- Introduce the project, team members and BWG.
- Through interactive participation, generate a vision and basic principles to give direction for the CMP.
- Provide an introduction to bikeway design and introduce a mapping exercise to the BWG.

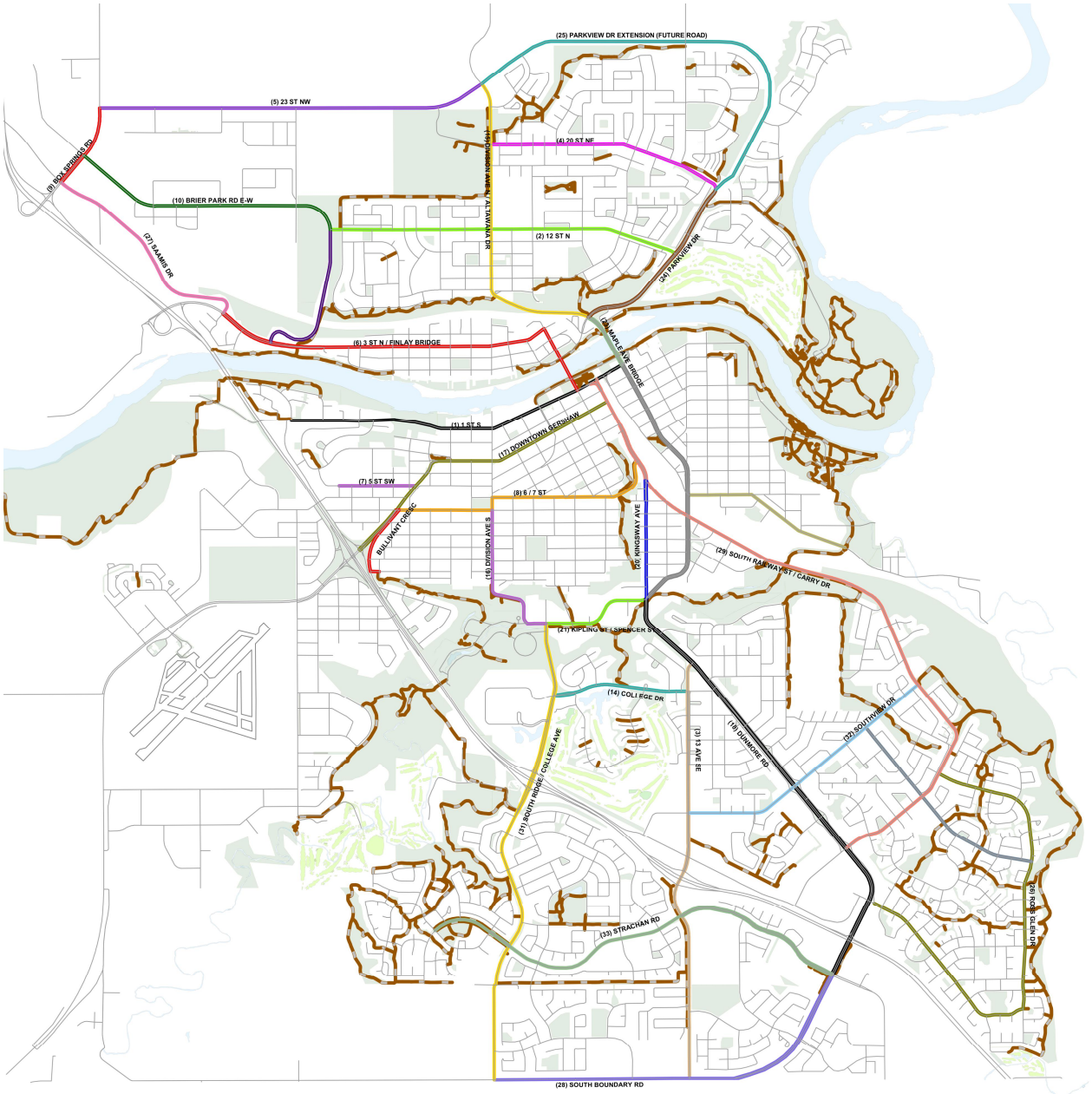
Participants at the workshop informed the project team of their knowledge, experiences and concerns related to cycling in Medicine Hat. Safety, education and connectivity were repeatedly mentioned as participants discussed their experiences and desires for the CMP. The BWG engaged in an interactive exercise to develop the vision and eight guiding principles for the CMP.

At the end of the workshop, participants were provided with a handout outlining a basic introduction to bikeway design as well as a map of the City of Medicine Hat. Using the handout and the discussions throughout the workshop as a guide, participants were asked to take the maps home and highlight their ideas for potential cycling routes.

3.3 POTENTIAL ROUTES

The potential routes for the CMP were selected and discussed at a BWG workshop. Destinations and attractions were examined together with major residential developments to determine the most attractive roads for cyclists. The project team refined the potential routes and developed the cycling network illustrated in Figure 3-1 and can be seen in a larger format in Appendix G.

Figure 3-1
Potential Route Map



3.4 BWG WORKSHOP TWO

A second BWG workshop was held on April 7, 2010 with the following three objectives:

- Present and discuss proposed vision and principles.
- Through interactive participation, determine cycling origins and destinations.
- Through interactive participation, begin developing cycling route options.

The proposed vision and principles for the CMP developed in the first BWG workshop were presented for discussion. Participants were asked if they could support the vision and principles and to vocalize any concerns they had. The BWG unanimously supported the vision and eight principles that would serve as a guide for the CMP process.

The maps produced by BWG members from the Workshop One mapping exercise were used as a guide and point of discussion to develop cycling route options. Several similarities in route selection arose between participants during the interactive exercise.

3.5 PUBLIC OPEN HOUSE ONE

A public open house was held on May 4, 2010 at the Esplanade. The boards and survey from the Open Houses are provided in Appendix B. The public open house was attended by 20 individuals and had the following objectives:

- Inform the general public of the CMP process.
- Present vision and principles.
- Present potential cycling routes.
- Gather public feedback on potential cycling routes.
- Determine public's cycling habits, likes and dislikes.

The CMP process was presented at the open house and project team members were available to further inform and answer questions of the public. Each attendee at the open house was provided with a survey to fill out. The survey asked respondents to rank the implementation of the potential cycling routes as well as indicate any of the routes they felt should not be implemented. The survey also collected information regarding attendees cycling habits, experience and comfort levels. A summary of survey responses are included in Appendix E.

3.6 PUBLIC RANKING

The potential routes were presented to the public at the first public open house to receive further input into route selection and priority. Participants at the public open house were asked to fill out a survey. The survey asked respondents to rank the implementation of potential cycling routes as well as indicate any of the routes they felt should not be implemented. The results of the survey ranking are graphically summarized in Appendix E.

3.7 BWG WORKSHOP THREE

A third BWG workshop was held the day after the public open house on May 5, 2010. The workshop had the following objectives:

- Present and discuss the survey results of the public open house.
- Present and discuss potential cycling routes.
- Begin developing design concepts and implementation strategy for potential cycling routes.

The results of the survey were compiled and presented at the BWG workshop. Overall the BWG was in agreement with the value given to routes by open house attendees in their implementation rankings. Further discussion and refinement was needed to ensure all considerations were incorporated into the order of implementation and that the cycling route network and implementation plan was in keeping with the vision and principles.

3.8 BWG WORKSHOP FOUR

A fourth and final BWG workshop was held on May 31, 2010. The workshop had the primary objective of presenting the proposed cycling network, implementation criteria and implementation timeframes to the BWG for feedback before presenting them at the second public open house. After discussion and further refinement, the BWG supported the recommended CMP that would be presented at the second public open house.

3.9 PUBLIC OPEN HOUSE TWO

A public open house was held on June 16, 2010 at the Medicine Hat Mall. The boards and survey from the Open Houses are provided in Appendix C. The mall location provided an opportunity to engage passer-bys and resulted in 26 attendees who signed in and nearly double the amount who viewed the open house boards. The public open house had the following objectives:

- Inform the general public of the CMP process.
- Present recommended cycling master plan.
- Gather public feedback on recommended cycling master plan.

The CMP process was presented at the open house along with the proposed implementation criteria and plan.

Attendees of the open house were provided with a survey to fill out. The survey asked respondents to rank the importance of implementing the CMP, ease of finding bicycle parking and indicate how supportive they were of the proposed CMP. A summary of survey responses are included in Appendix F.

4 Recommendations

4.1 RECOMMENDED PLAN

4.1.1 Cycling Network

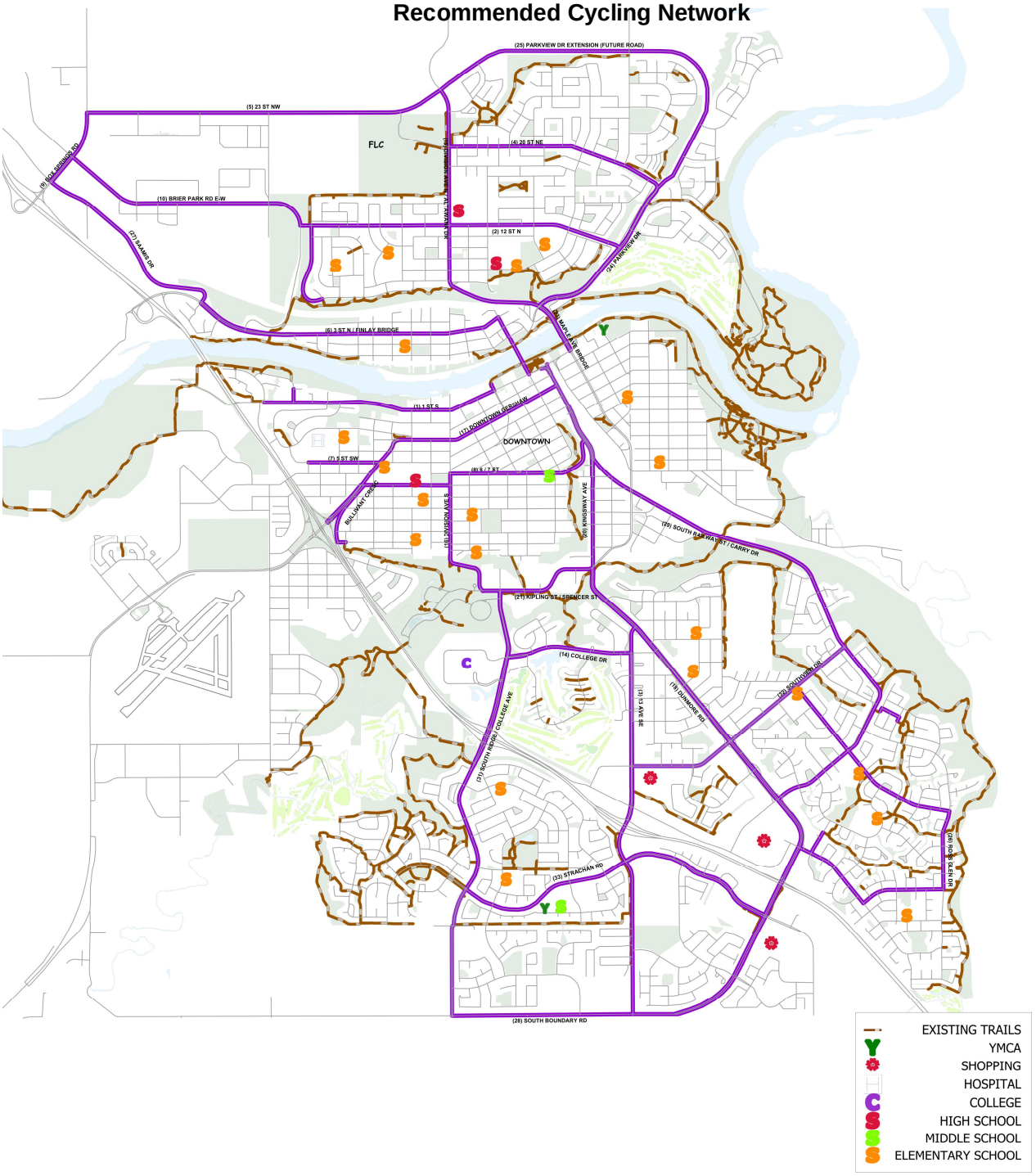
The development of a cycling network for any city can increase value in the infrastructure, encourage healthier lifestyles amongst its residents and decrease traffic congestion while increasing air quality. Studies have also demonstrated that investment in a cycling infrastructure results in a higher rate of cycling while lowering rates of cycling casualties. Streets with bike lanes have a significantly lower crash rate then either major or minor streets without any bicycle facilities.

Key elements to a successful cycling network are connectivity and determining the network's destinations and attractions. Connectivity of a network is important for cyclists as they need their trips to be made as efficiently as possible. The cycling network has been designed to offer full benefit with all aspects connected and fully integrated. The cycling network as a whole provides a complete system and as it is implemented similar design, maintenance and operating standards should be incorporated throughout. Each route must serve a purpose on its own and with the network.

After close examination of each route and determination of each route's purpose, four routes were removed. Brier Park Road N/S, Maple Avenue and Cameron Road routes were removed as they were redundant within the cycling network with other routes running parallel to them. Industrial Avenue was removed because it did not provide a connection to a specific destination or provide further connectivity within the cycling network.

Upon removal of the four routes, the final cycling network was established and received full support of the BWG. Figure 4-1 shows the recommended cycling network and can be seen in a larger format in Appendix G.

Figure 4-1
Recommended Cycling Network



4.2 IMPLEMENTATION TIMING

Based on the implementation analysis, a timeline of 0 to 5 years, 5 to 10 years or 10 plus years was assigned to each route. To determine implementation timing for bike routes a number of factors were taken into consideration. All routes were analyzed under the following criteria in conjunction with BWG and public input.

Implementation Criteria

Routes in the category 0-5 years have the following characteristics:

- Highest Connectivity
  - ✓ Routes provide the base network or "spine" that will establish a connected system
- Implementation & Safety
  - ✓ Roadways are less constrained and require minor reconfiguration (lane lines) or
  - ✓ Off street trails can easily be added
- Most Convenient
  - ✓ Provides access to key destinations such as the College, Leisure Centre and downtown core
- Education
  - ✓ Educates cyclists and motorists how to share the road
  - ✓ Promotes awareness that a bicycle is a vehicle

Routes in the category 5-10 years have the following characteristics:

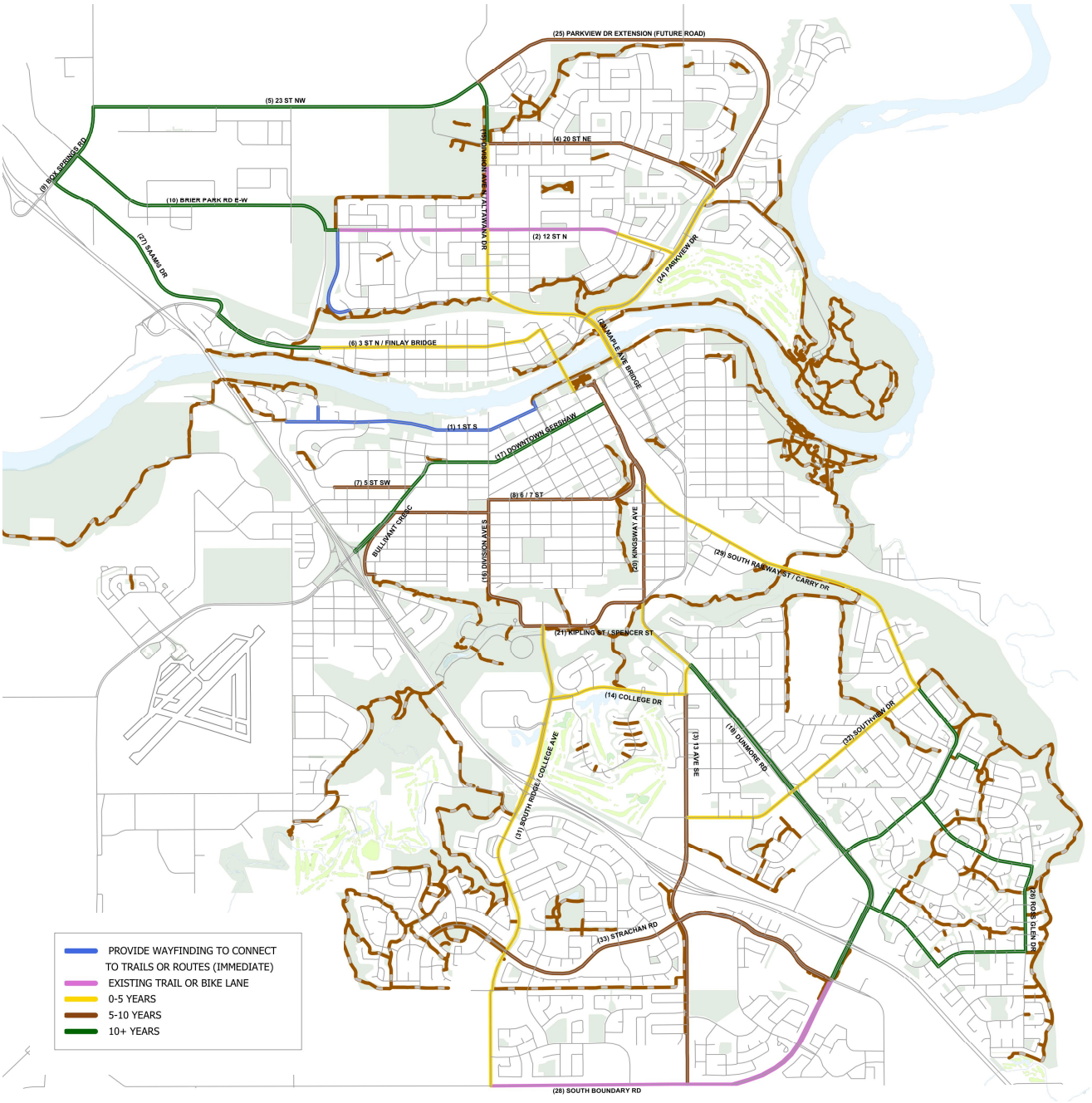
- Increases Connectivity
  - ✓ Extends "spine" system
- Implementation & Safety
  - ✓ Roadways are more constrained and require lane reconfiguration and road widening
- Convenient
  - ✓ Provides access to more destinations such as the hospital and residential areas

Routes in the category 10+ years have the following characteristics:

- Implementation & Safety
  - ✓ Roadways are very constrained and require road widening in conjunction with future upgrades

The opportunity to develop a route may present itself prior to the implementation timing it has been assigned. In the event of street reconstruction or resurfacing the implementation of a route should be considered. Figure 4-2 illustrates the implementation timing that has been assigned to each route. This figure can also be seen in a larger format in Appendix G.

Figure 4-2
Implementation Timing Map



4.3 IMPLEMENTATION COSTS

Unit costs for implementing bicycle routes were obtained by the City of Medicine Hat, suppliers and other jurisdictions with the exception of wayfinding signs that are assumed to be three times the cost of regular signs. These costs could vary in price depending on availability of product, labour and amount purchased. Unit costs used in the planning level estimate are located in Table 4-1.

Table 4-1
Unit Cost for Planning Level Estimate

ITEM	UNIT	COST
Line Painting	lineal metre	$0.85
Line Painting Removal	lineal metre	$6.00
Signs - including posts and installation	per sign	$300
Wayfinding Signs	per sign	$1,500
Painted Symbol	per symbol	$140
New Trail - excavation, topsoil, paving, paint	lineal metre	$139
Road Widening- sidewalk, sign, symbol, line painting	square metre	$650
Road Widening- sign, symbol, line painting	square metre	$420

Planning level costs were estimated for the 0-5 year term and 5-10 year term. Estimates were not completed for the 10+ year term because these routes should be implemented in combination with other capital upgrades. Estimates were also not completed for Southridge Drive / College Avenue route and Parkview Drive Extension route as these are currently being designed. Costs to implement the 0-5 year term are located in Tables 4-2, 4-3 and 4-4 and are further detailed in Appendix D. Costs to implement the 5-10 year term are located in Table 4-5 and are also detailed in Appendix D. Intended solutions for the 10+ year term are located in Table 4-6.

The cost to implement bike lanes varies greatly depending on whether road widening is needed. Roadway widening to accommodate two 1.5 m bike lanes can cost $1200 to $1800 per lineal meter, depending on whether the roadway has a sidewalk attached. This cost is in the order of 100 times more expensive than removing existing lines and repainting the lines to accommodate cyclists, which could be as little as $13.70 per meter. Typically, painted bike lanes are the most cost effective and require the least disruption as installation can be accomplished within a short timeframe. Consideration needs to be given to the most appropriate application of the bike lanes, as multiple criteria may influence which option best suits each location.

Table 4-2
Summary of Costs for 0-2 Year Term

ROUTE NAME	SOLUTION	COST
1 ST S	WAYFINDING	$11,000
EDUCATION	BROCHURES, BILL BOARDS, WEB SITE INFORAMTION	$20,000
12 ST N	BIKE LANES	$20,000
TOTAL		**$51,000**

Table 4-3
Summary of Costs for 3-4 Year Term

ROUTE NAME	SOLUTION	COST
3RD ST / FINLAY BRIDGE	SHARED LANES	$40,000
COLLEGE DR	BIKE LANES	$40,000
DIVISION AVE / ALTAWANA DR	SHARED LANE/ EX. TRAIL	$50,000
MAPLE AVE BRIDGE	EX. SIDEWALK	$5,000
TOTAL		**$135,000**

Table 4-4
Summary of Costs for 5 Year Term

ROUTE NAME	SOLUTION	COST
PARKVIEW DR	TRAIL	$795,000
SOUTH BOUNDARY RD	WAYFINDING	$3,000
SOUTH RAILWAY ST / CARRY DR	MOSTLY SHARED LANES	$60,000
SOUTHVIEW DR	SHARED LANES	$90,000
DUNMORE HILL RD	TRAIL	$220,000
TOTAL		**$1,168,000**

Table 4-5
Summary of Costs for 5-10 Year Term

ROUTE NAME	SOLUTION	COST
20 ST NE	MOSTLY SHARED LANES	$50,000
5 ST SW	SHARED LANES	$20,000
6 / 7 ST S	SHARED LANES	$40,000
BULLIVANT CRESC	SHARED LANES	$9,000
DIVISION AVE S	BIKE LANES	$40,000
KINGSWAY AVE	TWO-WAY LEFT-TURN LANE	$130,000
KIPLING / SPENCER ST	BIKE LANES	$20,000
STRACHAN RD	SHARED LANES	$100,000
TOTAL		**$409,000**

Table 4-6
Summary of Costs for 10+ Year Term

ROUTE NAME	SOLUTION
13TH AVE	ROAD WIDENING
23RD ST NW	TRAIL
BOX SPRINGS RD	TRAIL
BRIER PARK RD	TRAIL
DOWNTOWN GERSHAW	ROAD WIDENING
DUNMORE RD	ROAD WIDENING
ROSS GLEN DR	ROAD WIDENING
SAAMIS RD	TRAIL

The proposed route on 13th Avenue was originally placed into the 5-10 year term. This route was moved to the 10+ year term because it requires road widening and better fits with other routes in this time frame.

4.4 RECOMMENDATIONS

Recommendations to make Medicine Hat an attractive and safe place to cycle by creating a connected and efficient network of cycling routes accessible to all are located throughout this document. The following recommendations focus on specific tasks that the City can complete to make this CMP a success:

- Adopt Figure 4-1 as the Cycling Master Plan route plan for the City of Medicine Hat.
- Amend traffic bylaw No. 2434 to include Maple Avenue Bridge.
- Update bylaws to include typical bicycle safety codes.
- Expand Medicine Hat Municipal Servicing Standards to include on-street bikeways for future roads planned within the City, where appropriate.
- Adopt the following minimum design standards for retro-fitting cycling lanes on roads:
    - Minimum driving lane width of 3.3 m for arterial streets with buses or truck routes.
    - Minimum shared driving lane width of 4.0-4.8m.
- Include bicycle parking in Medicine Hat's land use bylaw for all new commercial developments.
- Develop an education campaign focused on teaching cyclists and motorists how to safely share the road.
- Create partnerships with other agencies and identify cycling champions within the community.
- Coordinate with existing campaigns and programs such as the Commuter Challenge Week or the HAT Smart program.
- Create a cycling network map.
- Provide cycling information on City website.
- Implement educational corridor on Dunmore Road.

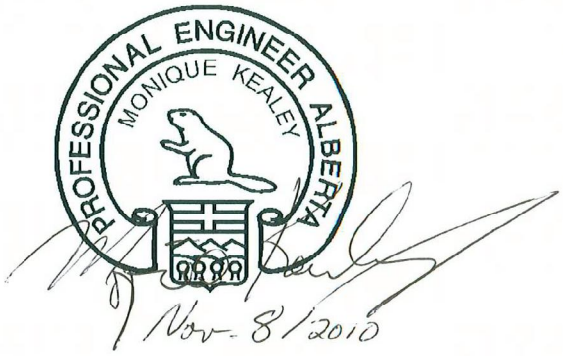
- Install bicycle parking where demand is high.
- Add staff (0.5 FTE in Municipal Works) dedicated to implementation of the CMP.

REPORT

Certification Page

REPORT
FOR
CITY OF MEDICINE HAT
CYCLING MASTER PLAN

NOVEMBER 2010



Seal

ASSOCIATED ENGINEERING
QUALITY MANAGEMENT SIGN-OFF
Signature: B Chisholm
Date: Nov. 9, 2010

PERMIT TO PRACTICE: P 3979

Prepared by Associated Engineering Alberta Ltd.

A Appendix A - Bicycle Bylaws & Regulations

Alberta Traffic Safety Act

Definition:
"Bicycle" includes any cycle propelled by human muscular power on which a person may ride regardless of the number of wheels that the cycle may have.

Cycles Rights & Duties of Operator:
Unless the context otherwise requires, a person who is operating a cycle on a highway has all the rights and is subject to all the duties of a person driving a motor vehicle.

1. A person who is operating a cycle on a highway
    a. shall keep both hands on the handlebars of the cycle, except when making a signal in accordance with this Regulation or shifting the gears of the cycle,
    b. shall keep both feet on the pedals or foot rests of the cycle other than when stopped,
    c. shall not ride other than on or astride a regular seat of the cycle, and
    d. shall not use the cycle to carry more persons at one time than the number for which the cycle is designed and equipped.

2. A person who is operating a cycle on a highway shall operate the cycle as near as practicable to the right curb or edge of the roadway unless that person is in the process of making a left turn with the cycle.

3. Notwithstanding subsection 2, a person who is operating a cycle on a one-way highway in an urban area shall ride as near as practicable to either curb or edge of the roadway unless that person is in the process of crossing from one curb or edge of the roadway to the opposite curb or edge of the roadway.

4. Notwithstanding subsection 2, a person who is operating a cycle on a highway that has shoulders
    a. in the case of a highway that has paved shoulders, shall operate the cycle on the right shoulder, and
    b. in the case of a highway that does not have paved shoulders, shall operate the cycle as far to the right of the roadway as practicable, unless that person is in the process of making a left turn.

5. A person who is riding as a passenger on a cycle
    a. shall not ride other than on a regular seat of the cycle that is designed to be used by a passenger, and
    b. shall keep both feet on the foot rests provided for the use of the passenger riding on the seat.

6. A person who is operating a cycle on a highway in the same direction in the same traffic lane, except when overtaking and passing another cycle,
    a. shall not operate the cycle adjacent to another cycle travelling in the same direction, and
    b. in the case of a cycle where more than one cycle is travelling in the near vicinity of and in the same direction as another cycle, shall operate the cycle directly in line with and to the rear or front of the other cycle.

7. At any time on a highway during the period of night time or when, due to insufficient light or unfavourable atmospheric conditions, objects are not clearly discernible on the highway at a distance of at least 150 metres ahead, a person shall not do any of the following:
    a. Have a bicycle in motion on the highway unless the lamp or lamps with which the bicycle is required to be equipped are alight.
    b. Have a cycle on the highway unless the cycle is equipped with one reflector that is located at the rear of the cycle and that is:
        i. of a type required by the Vehicle Equipment Regulation, and
        ii. affixed as required by the Vehicle Equipment Regulation so as to reflect the lights of any motor vehicle approaching from the rear.

Medicine Hat Bylaws

Traffic Bylaw

1. A person travelling upon a bicycle shall not cling to or attach himself or his conveyance to any motor vehicle upon a highway.

2. No one shall leave a two wheeled vehicle on a highway other than at the curb or edge of the roadway other than in an upright position.

3. In addition to any other penalty where a person is convicted of an offence contrary to a provision of this bylaw, the Court may order the impounding of the bicycle for a period not exceeding thirty days.

4. No person shall ride a cycle on any sidewalk except where expressly permitted to do so by this bylaw. Children's bicycles or tricycles having a wheel diameter of less than fifty centimetres are accepted from this provision.

Parks Bylaw

1. No person shall ride a bicycle within any park or recreational area or in any portion of a park or recreational area where prohibited.

2. No person shall ride a bicycle within any park or recreational area unless said bicycle is equipped with one of the warning devices referred to in Section 45 of the Highway Traffic Act.

3. Riding a bicycle in a restricted area is a $50 fine.

B Appendix B - Cross Sections

Shared Bike Lanes – 8.4 m Road

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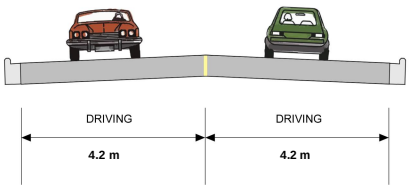

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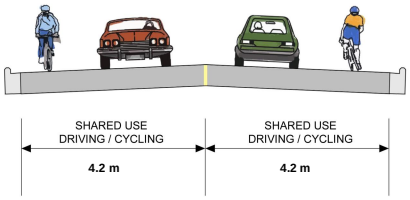

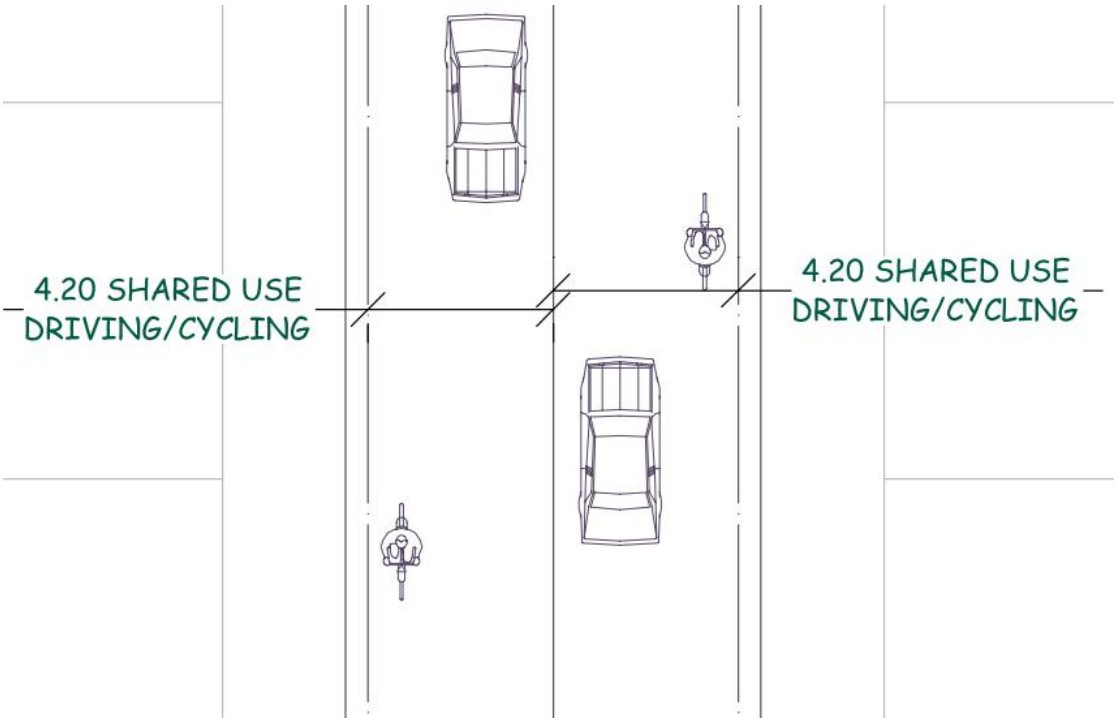

Shared Bike Lanes – 12.8m Road

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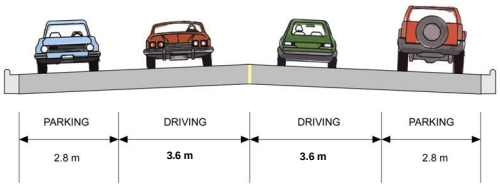

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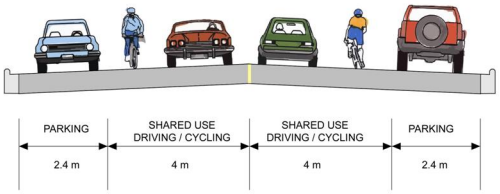

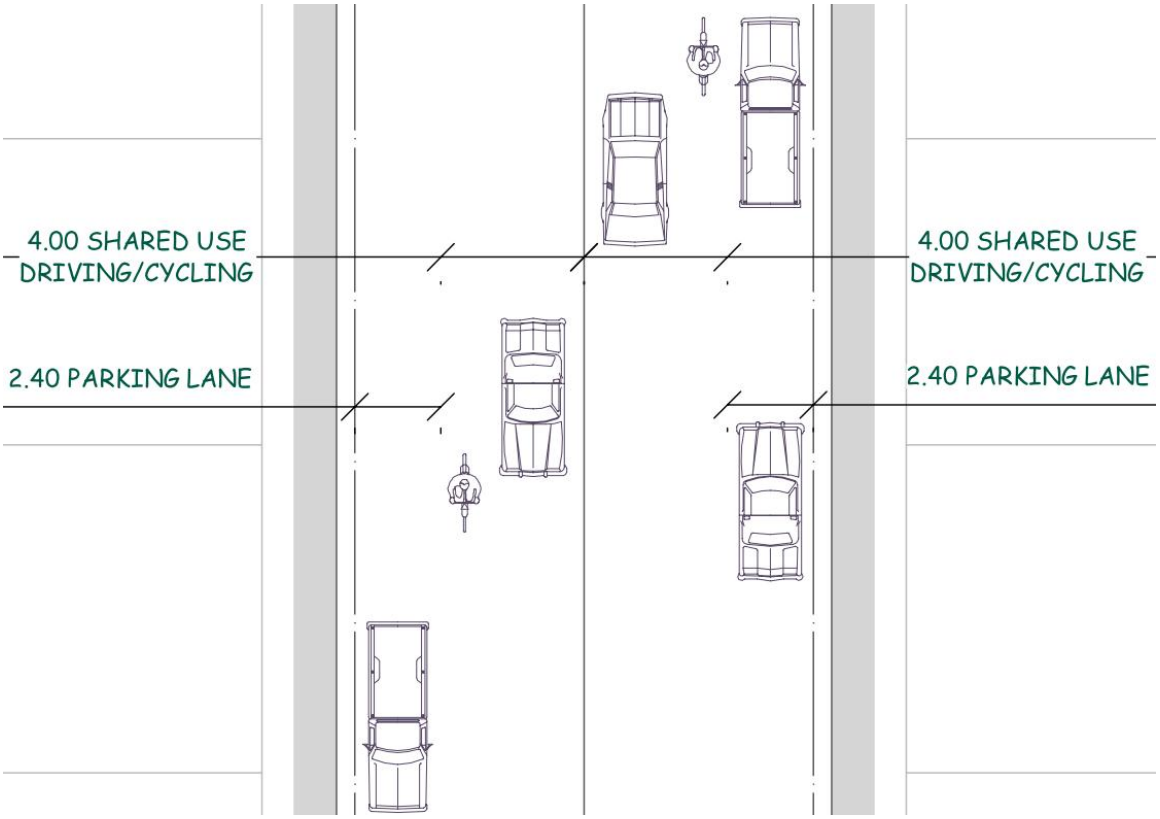

Two-Way Left Turn Lane – 14.0m Road

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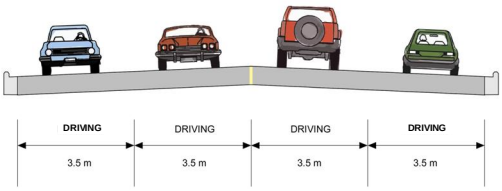

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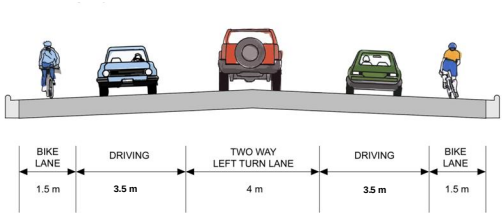

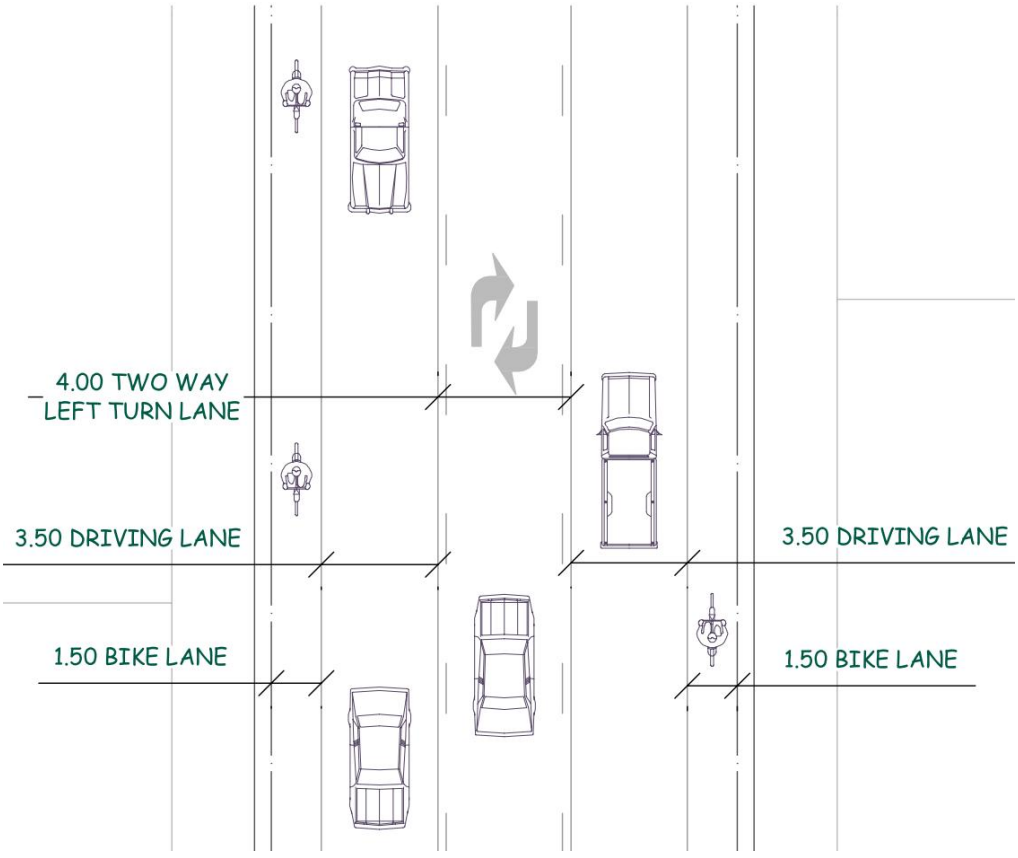

Off Street Trail On Hill – 12.3m Road

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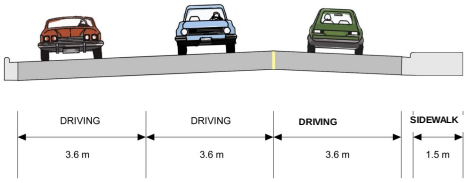

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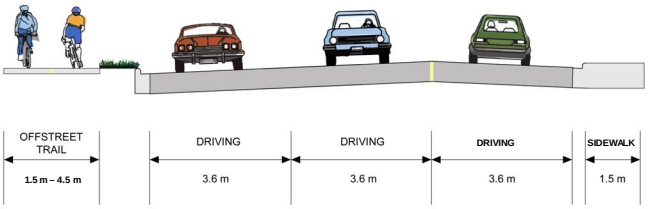

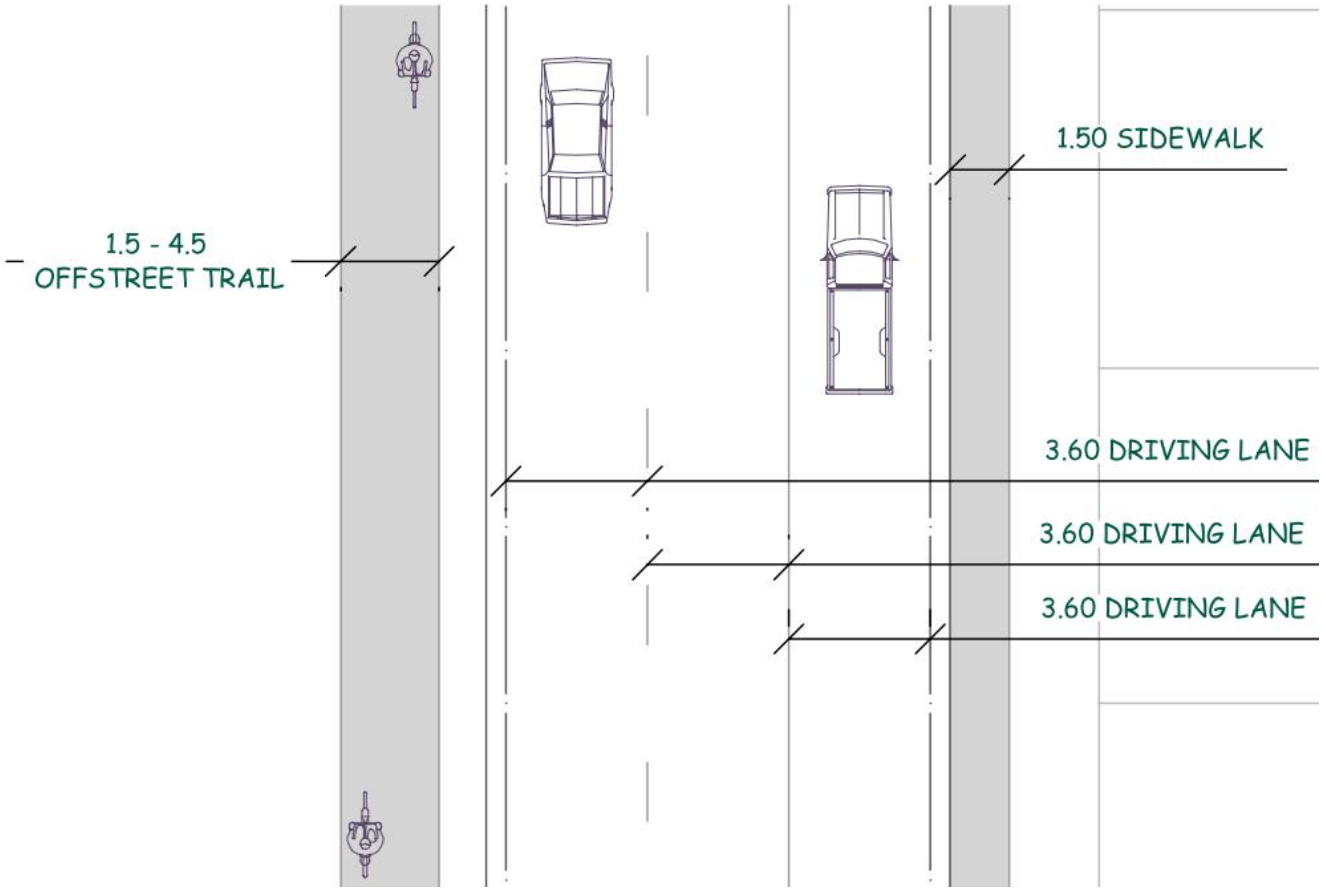

Dedicated Bike Lanes – 11.7m Road

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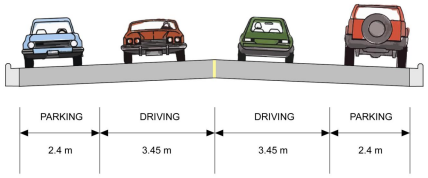

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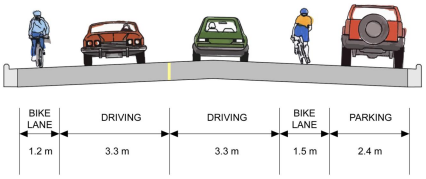

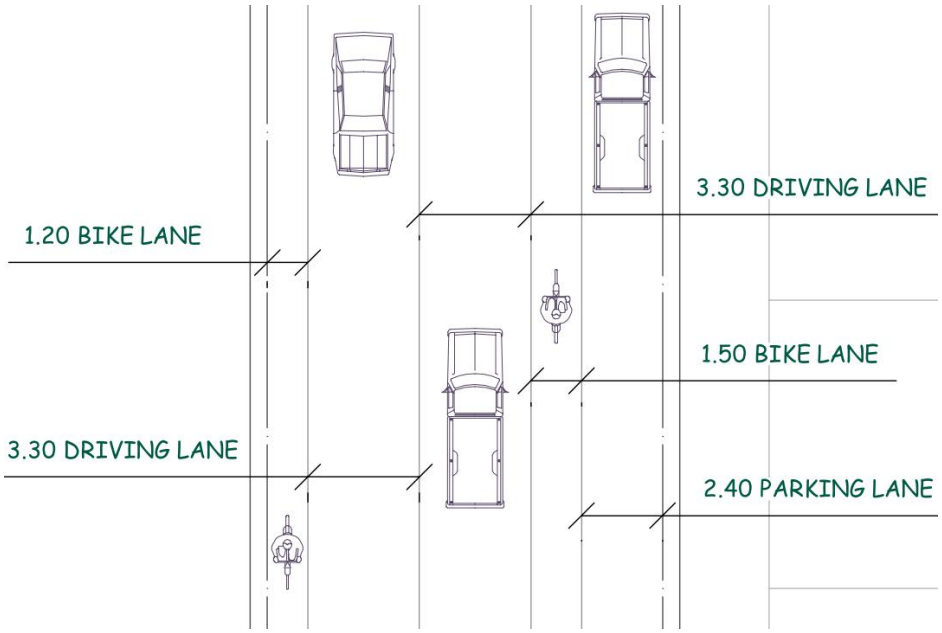

Shared Bike Lanes Divided – 16.8m Road

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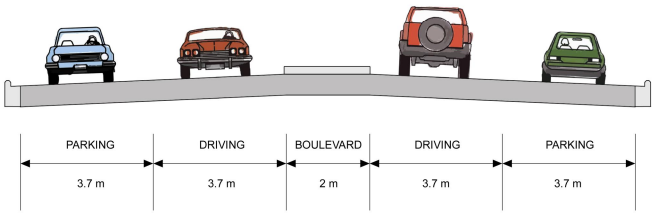

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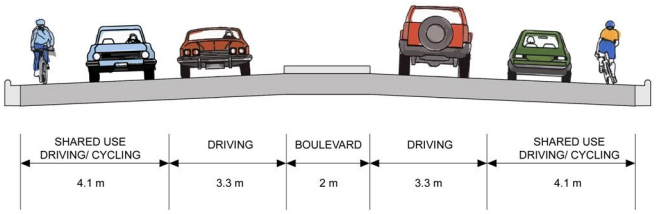
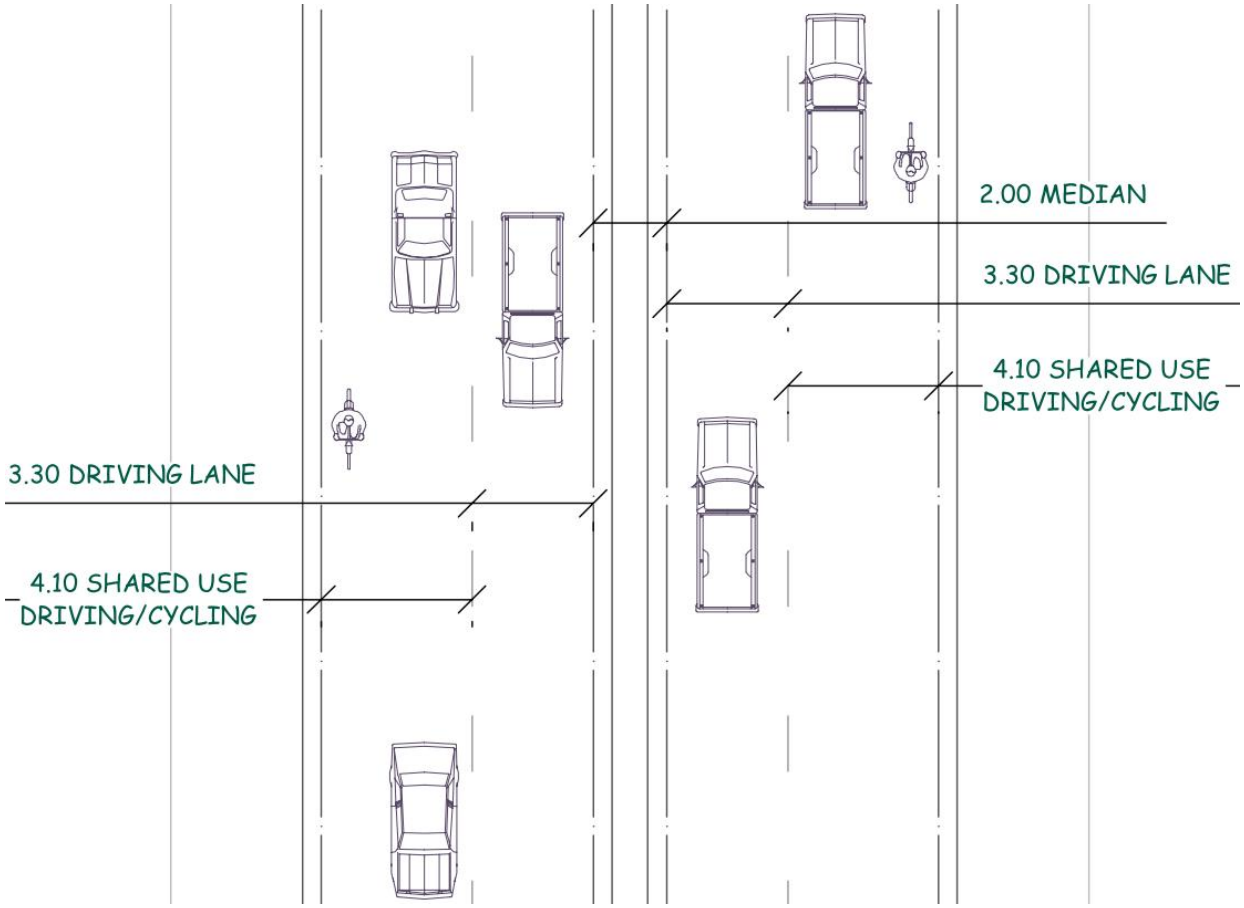




C Appendix C - Potential Routes Review

1 STREET SOUTH

Existing Lane Widths on 1 Street South

Street Name	From	To	Cross Section	Road Width (m)
1 ST S	Red Deer Dr	Harris St	2 Driving	9.6
1 ST S	Harris St	Start Park	2 Driving	11.0
1 ST S	Start Park	End Park	2 Driving	9.5
1 ST S	End Park	4th Ave	2 Driving, 1 Parking	9.5
1 ST S	4th Ave	5th Ave	2 Driving,2 Parking	12.7
1 ST S	5th Ave	6th Ave	3 Driving	12.6
1 ST S	6th Ave	Bridge	2 Driving	7.5
1 ST S	Bridge	Maple Ave	2 Driving, 1 Parking	16.4

This road frequently changes cross section and it would be possible to fit shared use lanes in some sections by using minimum standards and removing parking. This route's connectivity from the trail near the highway to downtown would make it highly desirable for cyclists, however the undesirable cross section changes make this route difficult to implement. Adding wayfinding to this route will assist cyclists if they do choose to go from the trail near the highway to downtown or vice versa.

3 STREET / FINLAY BRIDGE

Existing Lane Widths on 3 Street / Finlay Bridge

Street Name	From	To	Cross Section	Road Width (m)
3 ST N / FINLAY BRIDGE	Brier Park Rd	Gordon Pl	2 Driving	10.8
3 ST N / FINLAY BRIDGE	Gordon Pl	6 Ave NW	2 Driving, 1 Parking	10.8
3 ST N / FINLAY BRIDGE	6th Ave NW	2nd Ave NE	2 Driving, 2 Parking	13.0
3 ST N / FINLAY BRIDGE	2nd Ave NE	2nd Ave NE	2 Driving, 2 Parking	16.2
3 ST N / FINLAY BRIDGE	2nd Ave NE	Finlay Bridge	2 Driving	5.9

Although tight in some sections, a shared use roadway will fit on 3 Street NW. This road provides good connectivity for cyclists wanting to access downtown on Finlay Bridge. Currently, Finlay Bridge allows cyclists to cross the bridge on a reserved trail on the east side of the bridge. For future consideration, Finlay Bridge itself should be signed in such a way that when cyclists are using the bridge, they "own the driving lane" instead of letting motor vehicles pass them within a 3.0 m space.

5 STREET SOUTHWEST

Existing Lane Widths on 5 Street Southwest

Street Name	From	To	Cross Section	Road Width (m)
5 ST SW	all	all	2 Driving, 2 Parking	12.8

This short route could accommodate cyclists with shared use lanes if minimum standards were used, however, minor road widening would be suggested to attain desired safety standards. The route was ranked as a lower priority by the public. The low priority of the route and the suggested road widening placed the route in the 5-10 year term for implementation.

6 / 7 STREET SOUTH

Existing Lane Widths on 6 / 7 Street South

Street Name	From	To	Cross Section	Road Width (m)
6/7 ST S	Gershaw	Division Ave	2 Driving, 2 Parking	12.9
6/7 ST S	Division Ave	Division Ave	4 Driving	11.4
6/7 ST S	Division Ave	5th Ave	2 Driving, 2 Parking	10.7
6/7 ST S	5th Ave	South Railway St	2 Driving	10.7

This route would require road widening between Division Avenue and 5th Avenue East to accommodate cyclists. The use of a shared lane could be implemented on other sections of the route to accommodate cyclists. This route will increase connectivity when implemented in the 5-10 year term.

12 STREET NORTH

Existing Lane Widths on 12 Street North

Street Name	From	To	Cross Section	Road Width (m)
12 ST N	Brier Park Rd	McCutcheon Pl	3 Driving	14.7
12 ST N	McCutcheon Pl	7th Ave	2 Driving, 2 Bike Lanes, 2 Parking	14.7
12 ST N	7th Ave	Parkview Dr	3 Driving	11.2

Dedicated bike lanes are already present on this route between McCutcheon Drive and 7th Avenue. The route requires better connectivity to other on street routes and the leisure centre to make it a more successful route itself. If one driving lane was removed between 7th Avenue and Parkview Drive, the bike lanes could be continued and connected east. Wayfinding could be placed at the start and end of McCutcheon Drive to help cyclists access the off street system south of McCutcheon Drive.

13 AVENUE SOUTHEAST

Existing Lane Widths on 13 Avenue Southeast

Street Name	From	To	Cross Section	Road Width (m)
13 AVE SE	South Boundary Rd	Strachan Rd	2 Driving	7.6
13 AVE SE	Strachan Rd	Dunmore Rd	4 Driving	13.9

This route runs parallel to the Southridge Drive/ College Avenue route, both serving as major north/south connectors in the cycling network. The existing route configuration does not fully accommodate minimum design standards. As the route forms a redundancy in the connectivity of the cycling network and implementation difficulty is greater for this route it was placed into the 5-10 year term for implementation.

20 STREET NORTHEAST

Existing Lane Widths on 20 Street Northeast

Street Name	From	To	Cross Section	Road Width (m)
20 ST NE	Division Ave	11th Ave NE	2 Driving, 2 Parking	11.8
20 ST NE	11th Ave NE	Parkview Dr	3 Driving	12.9

This road, with a width of approx. 11.8 m would require the removal of parking in one direction or minor road widening to accommodate cyclists. 20 Street Northeast goes through a residential neighbourhood where parking is utilized, so removing parking would not be the appropriate solution. If the road were to be widened, a shared use lane could be adapted or if the road was further widened, reserved bicycle lanes could be introduced in the 5-10 year term.

23 STREET NORTHWEST

Existing Lane Widths on 23 Street Northwest

Street Name	From	To	Cross Section	Road Width (m)
23 ST NW	Box Springs Rd	Division Ave	2 Driving	6.6

With a width of 6.6 m in some locations, this route would require road widening to accommodate cyclists. 23 Street Northwest is planned for future road widening that includes construction of a trail on the south side of the road. The route was placed in the 10+ year term because its location along the boundary of the city doesn't make it an attractive commuter route for many cyclists and the trail will be funded as part of the road construction project. As the City of Medicine Hat grows, this route may become more desirable for cyclists and form a higher degree of connectivity.

BOX SPRINGS ROAD

Existing Lane Widths on Box Springs Road

Street Name	From	To	Cross Section	Road Width (m)
BOX SPRINGS RD	Saamis Dr	Brier Park Rd	4 Driving Divided	8.4
BOX SPRINGS RD	Brier Park Rd	23rd St NW	2 Driving	8.4

Box Springs Road was similar to the 23 Street Northwest route, offering little connectivity and requiring road widening or an off street trail to safely accommodate cyclists. The route is also scheduled to be widened in the future and includes a trail on east side of the road. This route is best suited for the 10+ year term.

BRIER PARK ROAD

Existing Lane Widths on Brier Park Road

Street Name	From	To	Cross Section	Road Width (m)
BRIER PARK RD E	Box Springs Rd	Brier Estates Crescent NW	2 Driving	5.3
BRIER PARK RD E	Brier Estates Crescent NW	10th Ave NW	3 Driving	8.1
BRIER PARK RD E	10th Ave NW	12th St N	2 Driving	8.7
BRIER PARK RD N-S	12th St N	3rd St NW	3 Driving	10.7

This route received a ranking of low priority by the public and would not be a desirable route for the average cyclist due to the high volume of heavy vehicles. A functional plan indicates that a trail is recommended south of the road. The route will not be required until the 10+ year term where the City's growth may dictate its development

BULLIVANT CRESCENT

Existing Lane Widths on Bullivant Crescent

Street Name	From	To	Cross Section	Road Width (m)
BULLIVANT CRES	All	All	2 Driving, 1 Parking	12.0

This route was added primarily for its connections to the Hospital. It will be easy to add in the 5-10 year term because of it has low traffic volume and sufficient width to accommodate cyclists.

COLLEGE DRIVE

Existing Lane Widths on College Drive

Street Name	From	To	Cross Section	Road Width (m)
COLLEGE DR	College Ave	Markwick Dr SE	2 Driving	11.7
COLLEGE DR	Markwick Dr SE	Primrose Dr SE	2 Driving	11.7
COLLEGE DR	Primrose Dr SE	Upland Dr	2 Driving, 2 Parking	11.7
COLLEGE DR	Upland Dr	13 Ave SE	3 Driving	11.6

College Drive was a highly desired route for its connections to the Medicine Hat College and ease of implementation. This route can accommodate two dedicated bike lanes easily through most of the route when parking is removed on the south side of the street. The parking lane on the south side is primarily used by park users and shouldn't inconvenience residents in the area. The scheduled bridge widening will further provide the appropriate width placing it in the 0-5 year term.

DIVISION AVENUE / ALTAWANA DRIVE

Existing Lane Widths on Division Avenue / Altawana Drive

Street Name	From	To	Cross Section	Road Width(m)
DIVISION AVE N / ALTAWANA DR	23rd St NW	19th St NE	4 Driving Divided	15.0
DIVISION AVE N / ALTAWANA DR	19th St NE	14th St NW	2 Driving, 1 Parking, 2 Bike Lanes	12.9
DIVISION AVE N / ALTAWANA DR	14th St NW	12th St NW	2 Driving, 2 Parking, 2 Bike Lanes	15.3
DIVISION AVE N / ALTAWANA DR	12th St NW	Mitchell Cres NW	3 Driving , 1 Parking	15.3
DIVISION AVE N / ALTAWANA DR	Mitchell Cres NW	8th St	4 Driving	15.3
DIVISION AVE N / ALTAWANA DR	8th St	7th St NW	3 Driving, 1 Parking	15.3
DIVISION AVE N / ALTAWANA DR	7th St NW	Parkview Dr	3 Driving	11.0

Dedicated bike lanes exist on Division Avenue between 19th Street and 12th Street and could be continued south to 7th Street. The Altawana Drive hill is currently 3 driving lanes with a sidewalk to the north and small pedestrian trail to the south. There is enough road width to narrow two lanes to 3.3 m and create a shared use lane with a width of 4.3 m for southbound cyclists. The sidewalk to the north could be reserved for cyclists to travel northbound. The leisure centre is located west of Division Avenue and is a key connection for this trail. In order to connect the route with the leisure centre, a tie-in should be made to the off-street trail west of Division Avenue.

DIVISION AVENUE SOUTH

Existing Lane Widths on Division Avenue South

Street Name	From	To	Cross Section	Road Width (m)
DIVISION AVE S	7th St	12th St SE	2 Driving, 2 Parking	11.4
DIVISION AVE S	12th St SE	Kipling St	3 Driving	11.6

This route is not a preferred route of the BWG because of the topography and the difficulty most users have climbing the hill. The route could be implemented by using the existing off street path and placing one 2.0 m bike lane for the other direction. The route is placed in the 5-10 year term as preference was indicated by the BWG for using Dunmore Road over Division Avenue as a connecting route.

DOWTOWN GERSHAW

Existing Lane Widths on Downtown Gershaw

Street Name	From	To	Cross Section	Road Width (m)
DOWNTOWN GERSHAW	Red Deer Dr	7th St	4 Driving	15.5
DOWNTOWN GERSHAW	7th St	4th St	2 Driving, 2 Parking	11.9
DOWNTOWN GERSHAW	4th St	3rd Ave SW	4 Driving	11.9
DOWNTOWN GERSHAW	3rd Ave SW	Division Ave	2 Driving, 2 Parking	12.3
DOWNTOWN GERSHAW	Division Ave	Macleod Trail	3 Driving, 1 Parking	12.1
DOWNTOWN GERSHAW	Macleod Trail	South Railway St	2 Driving, 2 Parking	13.1

Gershaw Avenue would offer good connectivity from the highway to downtown and ranked as a high priority by the public, however road widening is required to safely accommodate cyclists. This road changes cross sections numerous times making it difficult to find a simplified solution. Any road widening on this street would require significant and costly property acquisition. The route has been placed in the 10+ year term.

DUNMORE ROAD

Existing Lane Widths on Dunmore Road

Street Name	From	To	Cross Section	Road Width (m)
DUNMORE RD	all	all	4 Driving	14.2

Dunmore Road was a highly desired route by both public and BWG members. It offers excellent connectivity from residential areas to downtown and a connection to College Drive and the Medicine Hat College. Unfortunately, the high volumes of traffic and minimal space available for cyclists to ride safely make this route very difficult to implement in the short term. This road would, however, create an excellent opportunity to educate motorists on how to share the road with cyclists. Dunmore Road would be an

optimal location to become an educational corridor as discussed in the Education and Outreach section of this report. This educational corridor could be applied in the 0-5 year term with the remaining widening improvements placed in the 10+ year term when future construction along Dunmore Road is scheduled.

The hill on Dunmore Road is the favourable location to access downtown. Dunmore Road hill has an existing sidewalk along one side of the road and one trail could be constructed off street to accommodate cyclists in the opposite direction. These improvements are key to connecting cyclists from the south to downtown; therefore the suggested implementation timeline for this is 0-5 years.

KINGSWAY AVENUE

Existing Lane Widths on Kingsway Avenue

Street Name	From	To	Cross Section	Road Width (m)
KINGSWAY AVE	all	all	4 Driving	14.0

Kingsway Avenue offers a vital connection to downtown and would be an optimal location for a bike route. The current cross section does not safely allow cyclists to be accommodated. There is a cross section option that could be implemented on the existing roadway to allow cyclists to share the road with motorists. With proper traffic analysis completed, Kingsway Avenue could be converted into a road that contains a two-way left-turn lane, two driving lanes and two bike lanes. The two-way left-turn lane would allow access to all adjacent businesses and could possibly improve traffic flow by creating one dedicated left-turn lane for vehicles while having one lane dedicated to thru and right turn movements. Transit busses would operate as per usual. Vehicles and cyclists would be required to stop and wait for busses or slowly pass in the two-way left-turn lane.

KIPLING STREET / SPENCER STREET

Existing Lane Widths on Kipling Street/ Spencer Street

Street Name	From	To	Cross Section	Road Width (m)
KIPLING ST / SPENCER ST	Old Cemetery Rd	Marshall Ave	2 Driving	10.5
KIPLING ST / SPENCER ST	Marshall Ave	Kingsway Ave	2 Driving, 2 Parking	12.1

This route serves much the same need that is supplied by the College Drive route. However, in 5-10 years this route may be required to make the bike network more connected. This route's wide road makes accommodating cyclists fairly simple. Two dedicated bike lanes can fit on street from College Avenue to the connection with the off-street trail to the south and east of 3rd Avenue Southeast. This existing trail connects with the proposed route of Dunmore Hill.

MAPLE AVENUE BRIDGE

Existing Lane Widths on Maple Avenue Bridge

Street Name	From	To	Cross Section	Road Width (m)
MAPLE AVE	all	all	4 Driving Divided	14.5
MAPLE AVE BRIDGE	all	all	4 Driving Divided	14.8

Maple Avenue bridge, like Finlay Bridge, offers invaluable connections to the downtown core. Unfortunately, there is very little road width to safely accommodate cyclists. The City of Medicine Hat could change their bylaw to allow cyclists on sidewalk within the vicinity of Maple Avenue Bridge except when approaching a pedestrian. This connection is vital to have a connected network and is therefore placed in the 0-5 year term.

PARKVIEW DRIVE

Existing Lane Widths on Parkview Drive

Street Name	From	To	Cross Section	Road Width (m)
PARKVIEW DR	Altawana Dr	Prairie Dr	3 Driving	10.8
PARKVIEW DR	Prairie Dr	20th St	4 Driving	15.0

Parkview Drive offers a good connection to residents in the north to the downtown core and Maple Avenue Bridge. Early implementation of the Parkview Drive route would help to complete the existing 12 Street North bike lanes. This road does not have adequate room to accommodate cyclists on the street, however, an existing sidewalk is located to the west of the road and space exists to the east for construction of a new 3.0 m trail. This location is suitable for allowing cyclists on the sidewalk on the hill because there are no driveways and the number of pedestrians is very low. Cyclists would be required to dismount when approaching a pedestrian.

PARKVIEW DRIVE EXTENSION

Existing Lane Widths on Parkview Drive Extension

Street Name	From	To	Cross Section	Road Width (m)
PARKVIEW DR EXTENSION	Start	Finish	4 Driving	14.8

The Parkview Drive extension is being planned with a paralleling trail to complete the trail system in that area. On-street bike lanes will not be required for this area for at least 5-10 years. The demand for on street bike lanes should be addressed at that time to determine if the trails are fulfilling the needs of the cyclists in that area.

ROSS GLEN DRIVE

Existing Lane Widths on Ross Glen Drive

Street Name	From	To	Cross Section	Road Width (m)
ROSS GLEN DR	Dunmore Rd	Ross Haven Ave	4 Driving	11.8
ROSS GLEN DR	Ross Haven Ave	Carry Dr	2 Driving, 2 Parking	9.8

This residential collector has a very narrow road width and cyclists could not be safely accommodated on this street without extensive road widening. Substantial property acquisition would be required to accommodate the road widening at a high cost to the City of Medicine Hat. Ross Glen Drive was removed but as a result of its connection to the trail system, was refined and reintroduced. This route best fits in the 10+ year term because it will require road widening and will finish off connections to the “spine” network in that area.

SAAMIS DRIVE

Existing Lane Widths on Saamis Drive

Street Name	From	To	Cross Section	Road Width (m)
SAAMIS DR	3rd St	condos	3 Driving	11.3
SAAMIS DR	condos	Box Springs Rd	2 Driving	9.2

Saamis Drive was ranked as a low priority route by the public, would offer little connectivity until the City increases in size and would require road widening to safely accommodate cyclists. This route is best suited for the 10+ year term.

SOUTH BOUNDARY ROAD

Existing Lane Widths on South Boundary Road

Street Name	From	To	Cross Section	Road Width (m)
SOUTH BOUNDARY RD	Start	Finish	4 Driving	8.4

This road has an existing trail that parallels the roadway and would not require on street bike lanes. Improvements to wayfinding and connectivity could be implemented once construction of the Southridge Drive / College Avenue route is completed.

SOUTH RAILWAY STREET / CARRY DRIVE

Existing Lane Widths on South Railway Street / Carry Drive

Street Name	From	To	Cross Section	Road Width (m)
SOUTH RAILWAY ST/ CARRY DR	Dunmore Rd	Cameron Rd	4 Driving	13.6
SOUTH RAILWAY ST / CARRY DR	Cameron Rd	Carr Crescent SE	2 Driving	8.5
SOUTH RAILWAY ST / CARRY DR	Carr Crescent SE	Factory St	3 Driving	11.2
SOUTH RAILWAY ST / CARRY DR	Factory St	Smelter Ave	2 Driving	11.9
SOUTH RAILWAY ST / CARRY DR	Smelter Ave	9th St	3 Driving	11.5
SOUTH RAILWAY ST / CARRY DR	9th St	Kingsway Ave	2 Driving	11.3
SOUTH RAILWAY ST / CARRY DR	Kingsway Ave	5th St	4 Driving Divided	15.4
SOUTH RAILWAY ST / CARRY DR	5th St	2nd St	3 Driving, 1 Parking	15.4

This road offers key connections between residential areas and the downtown. Sections of the route have sufficient road width to safely accommodate cyclists and space to add trails alongside the road where there is not sufficient road width. The key connection that this route will make and its ease of implementation, places the route into the 0-5 year term.

SOUTHRIDGE DR / COLLEGE AVE

Existing Lane Widths on Southridge Drive / College Avenue

Street Name	From	To	Cross Section	Road Width (m)
SOUTH RIDGE DR / COLLEGE AVE	South Boundary Rd	Vista Dr	4 Driving Divided	15.1
SOUTH RIDGE DR / COLLEGE AVE	Vista Dr	Unknown Rd	2 Driving	7.5
SOUTH RIDGE DR / COLLEGE AVE	Unknown Rd	Sage Rd	4 Driving	14.1
SOUTH RIDGE DR / COLLEGE AVE	Sage Rd	Seven Persons Dr	2 Driving, 1 Parking	15.0
SOUTH RIDGE DR / COLLEGE AVE	Seven Persons Dr	Midway Condo Block	2 Driving, 2 Parking	14.3
SOUTH RIDGE DR / COLLEGE AVE	Midway Condo Block	College Dr	4 Driving Divided	14.4
SOUTH RIDGE DR / COLLEGE AVE	College Dr	Kipling St	3 Driving	11.7

The City of Medicine Hat plans to widen this road within the next five years and with the widening will easily accommodate cyclists upon completion. It will offer a major north/south connection to residents and places cyclists closer to the downtown. This road will be the first planned major connection that cyclists have south of the highway. The route was also ranked as a very high priority by the public placing it into the 0-5 year term.

SOUTHVIEW DRIVE

Existing Lane Widths on Southview Drive

Street Name	From	To	Cross Section	Road Width (m)
SOUTHVIEW DR	13th Ave	Dunmore Rd	4 Driving	14.9
SOUTHVIEW DR	Dunmore Rd	Higdon Ave	4 Driving Divided	17.7
SOUTHVIEW DR	Higdon Ave	Carry Dr	2 Driving, 2 Parking	14.0

This road has width that could safely accommodate cyclists with a shared use lane. The route provides a connection from businesses on Dunmore Road to South Railway Street / Carry Drive route and downtown. This route was given an average ranking for priority by the public; however it completes the connection of the network with South Railway Street / Carry Drive and was put into the 0-5 year term.

STRACHAN ROAD

Existing Lane Widths on Strachan Road

Street Name	From	To	Cross Section	Road Width (m)
STRACHAN RD	Sierra Gate SW	Southridge Dr SE	4 Driving Divided	14.7
STRACHAN RD	Southridge Dr SE	13th Ave	4 Driving	14.7
STRACHAN RD	13th Ave	Dunmore Rd	4 Driving Divided	12.8

Strachan Road could safely accommodate a shared use driving lane and was given an average ranking for priority by the public. Strachan Road does not provide access to alternate key locations within the City of Medicine Hat. It was decided to place it into the 5-10 year term. This route, when implemented will increase connectivity south of the highway and will provide cyclists with a connection to the Southridge Drive / Carry Drive route.

D Appendix D - Cost Estimates

Functional Cost Estimates
Recommended Routes
0-5 Year Term

Description	Calculation	Quantity	Unit Price	Unit	Unit Total
1ST SOUTH (WAYFINDING ONLY) - 1.85 km					
Signs including posts and installation		6	$300.00	per sign	$1,800
Wayfinding Signs including posts and installation	START AND END OF PATH	2	$1,500.00	per sign	$3,000
Subtotal					$3,000
Engineering/Design					$5,000
30% Contingency					$2,400
Total					$11,000
12TH ST - 2.81 km TOTAL (0.47km NEW, 2.34 EXISTING)					
Line Painting	2 X 470 m	940	$0.85	per lineal meter	$799
Line Paint Removal	2 X 470 m	940	$6.00	per lineal meter	$5,640
Painted Symbol	(470 m / 75 m) X 2	13	$140.00	per symbol	$1,755
Signs including posts and installation	(470 m / 200 m) X 2	2	$300.00	per sign	$600
Subtotal					$8,794
Engineering/Design					$5,000
30% Contingency					$4,138
Total					$20,000
3RD ST / FINLAY BRIDGE - 2.37 km (+0.29 km OF BRIDGE)					
Painted Symbol	(2660 m / 75 m) X 2	71	$140.00	per symbol	$9,931
Signs including posts and installation	(2370 m / 200 m) X 2	28	$300.00	per sign	$8,310
Subtotal					$18,241
Engineering/Design					$10,000
30% Contingency					$8,472
Total					$40,000
COLLEGE DR - 1.26 km + 0.23 km ON 13TH AVE					
Line Painting	(1260 m X 3) +(230 m X 2)	4,240	$0.85	per lineal meter	$3,604
Painted Symbol	(1490 m / 75 m) X 2	40	$140.00	per symbol	$5,563
Signs including posts and installation	(1490 m / 200 m) X 2	15	$300.00	per sign	$4,470
Subtotal					$13,637
Engineering/Design					$10,000
30% Contingency					$7,091
Total					$40,000
DIVISION AVE / ALTAWANA DR - 1.38 km NEW(0.87 km IS SHARED, 0.51 km IS RESERVED) + 0.38 km EXISTING					
Line Painting	(870 m X 2) + (510 m X 2)	2,760	$0.85	per lineal meter	$2,346
Line Paint Removal	870 m X 2	1,740	$6.00	per lineal meter	$10,440
Painted Symbol	(1380 / 75 m) X 2	37	$140.00	per symbol	$5,152
Signs including posts and installation	(1380 m / 200 m) X 2	14	$300.00	per sign	$4,140
Subtotal					$22,078
Engineering/Design					$10,000
30% Contingency					$9,623
Total					$50,000
MAPLE AVE BRIDGE - 0.5 km					
Signs including posts and installation	(START AND END)	4	$300.00	per sign	$1,200
Painted Symbol	(START AND END)	4	$140.00	per symbol	$560
Subtotal					$1,760
Engineering/Design					$2,000
30% Contingency					$1,128
Total					$5,000
PARKVIEW DR - 1.6 km					
Pathway construction (excavation, topsoil, paving) 2.5m wide	2.5 m x 1600 m	4,000	$140.00	per square meter	$560,000
Line Painting	1 x 1600 m	1,600	$0.85	per lineal meter	$1,360
Signs including posts and installation	(1600 m / 200 m) x 2	16	$300.00	per sign	$4,800
Subtotal					$566,160
Engineering/Design					$45,000
30% Contingency					$183,348
Total					$795,000
SOUTH BOUNDARY RD - 3.28 km (WAYFINDING ONLY)					
Signs including posts and installation		6	$300.00	per sign	$1,800
Subtotal					$1,800
Engineering/Design					$0
30% Contingency					$540
Total					$3,000
SOUTH RAILWAY ST / CARRY DR - 2.97 km (ASSUME HALF OF LANES LINES WILL REQUIRE REPAINTING)					
Line Painting	2970 m / 2	1,485	$0.85	per lineal meter	$1,262
Line Paint Removal	2971 m / 2	1,485	$6.00	per lineal meter	$8,910
Painted Symbol	(2970 m / 75 m) x 2	79	$140.00	per symbol	$11,088
Signs including posts and installation	(2970 m / 200 m) x 2	30	$300.00	per sign	$8,910
Subtotal					$30,170
Engineering/Design					$15,000
30% Contingency					$13,551
Total					$60,000
SOUTHRIDGE DR / COLLEGE AVE - 3.98 km (ASSUME ALL APPROPRIATE ROAD WIDENING IS COMPLETED)					
Included in costs for Southridge Dr upgrade project.					
SOUTHVIEW DR - 2.29 km					
Line Painting	2290 m X 2	4,580	$0.85	per lineal meter	$3,893
Line Paint Removal	2290 m X 2	4,580	$6.00	per lineal meter	$27,480
Painted Symbol	(2290 m / 75 m) X 2	61	$140.00	per symbol	$8,549
Signs including posts and installation	(2290 m / 200 m) X 2	23	$300.00	per sign	$6,870
Subtotal					$46,792
Engineering/Design					$15,000
30% Contingency					$18,538
Total					$90,000
DUNMORE RD HILL - 0.69 km					
Pathway construction (excavation, topsoil, paving) - 1.5 m width	690 m x 1.5 m	1,035	$140.00	per square meter	$144,900
Signs including posts and installation	START, MIDDLE, END	6	$300.00	per sign	$1,800
Subtotal					$146,700
Engineering/Design (not including geotechnical if needed)					$20,000
30% Contingency					$50,010
Total					$220,000
Total Costs for Short Term Implementation					$1,334,000

Functional Cost Estimates
Recommended Routes
5-10 Year Term

Description	Calculation	Quantity	Unit Price	Unit	Unit Total
20 ST NE - 1.98 km TOTAL (1.6km + 0.38km)					
Line Painting	(380 m X 2) + 1600 m	2,360	$0.85	per lineal meter	$2,006
Line Paint Removal	(380 m X 2) + 1600 m	2,360	$6.00	per lineal meter	$14,160
Painted Symbol	(1980 m / 75 m) X 2	53	$140.00	per symbol	$7,392
Signs including posts and installation	(1980 m / 200 m) X 2	10	$300.00	per sign	$2,970
Subtotal					$26,528
Engineering/Design					$10,000
30% Contingency					$10,958
Total					$50,000
5 ST SW - 0.63 km					
Painted Symbol	(630 m / 75 m) X 2	17	$140.00	per symbol	$2,352
Signs including posts and installation	(630 m / 200 m) X 2	6	$300.00	per sign	$1,890
Subtotal					$4,242
Engineering/Design					$5,000
30% Contingency					$2,773
Total					$20,000
6/7 ST S - 2.31 km					
Painted Symbol	(2310 m / 75 m) X 2	62	$140.00	per symbol	$8,624
Signs including posts and installation	(2310 m / 200 m) X 2	23	$300.00	per sign	$6,930
Subtotal					$15,554
Engineering/Design					$10,000
30% Contingency					$7,666
Total					$40,000
BULLIVANT CRESC - 0.46 km					
Signs including posts and installation	START AND END	4	$300.00	per sign	$1,200
Subtotal					$1,200
Engineering/Design					$5,000
30% Contingency					$1,860
Total					$9,000
DIVISION AVE S - 1.28 km (0.69 km ON HILL)					
Line Painting	(690 m X 2) + 590 m	1,970	$0.85	per lineal meter	$1,675
Line Paint Removal	(690 m X 2) + 590 m	1,970	$6.00	per lineal meter	$11,820
Signs including posts and installation	(1280 m / 200 m) X 2	13	$300.00	per sign	$3,840
Painted Symbol	(590m /75m) X2 + (690m /75m)	25	$140.00	per symbol	$3,491
Subtotal					$20,825
Engineering/Design					$5,000
30% Contingency					$7,748
Total					$40,000
KINGSWAY AVE - 1.72 km					
Line Painting	4 x 1720 m	6,880	$0.85	per lineal meter	$5,848
Line Paint Removal	3 X 1720 m	5,160	$6.00	per lineal meter	$30,960
Signs including posts and installation	(1720 m / 200 m) x 2	17	$300.00	per sign	$5,160
Painted Symbol	(1720 m / 75 m) x 2	46	$140.00	per symbol	$6,421
Subtotal					$48,389
Engineering/Design					$50,000
30% Contingency					$29,517
Total					$130,000
KIPLING / SPENCER ST - 0.47 km					
Line Painting	470 m X 2	940	$0.85	per lineal meter	$799
Painted Symbol	(470 m / 75 m) x 2	13	$140.00	per symbol	$1,755
Signs including posts and installation	(470 m / 200 m) x 2	5	$300.00	per sign	$1,410
Subtotal					$3,964
Engineering/Design					$5,000
30% Contingency					$2,689
Total					$20,000
PARKVIEW DR EXTENSION - 3.62 km					
Included in costs for Parkview Dr upgrade project.					
STRACHAN RD - 3.05 km					
Painted Symbol	(3050 m / 75 m) x 2	81	$140.00	per symbol	$11,387
Line Painting	3050 m X 2	6,100	$0.85	per lineal meter	$5,185
Line Paint Removal	3050 m X 2	6,100	$6.00	per lineal meter	$36,600
Signs including posts and installation	(3050 m / 200 m) x 2	31	$300.00	per sign	$9,150
Subtotal					$62,322
Engineering/Design					$10,000
30% Contingency					$21,697
Total					$100,000
Total Costs for Medium Term Implementation					$409,000

E Appendix E - Public Open House One

WELCOME

TO THE MEDICINE HAT

CYCLING MASTER PLAN (CMP)

OPEN HOUSE

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

OPEN HOUSE OBJECTIVES

- Inform the general public of the CMP process
- Present potential cycling routes that have been identified
- Gather public feedback on potential cycling routes
- Determine public's cycling habits, likes and dislikes

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

CMP PROCESS

- Form a Bicycle Advisory Committee (BAC)
- Conceptualize a vision and a set of principles with the BAC
- Identify potential cycling routes with BAC
- Hold public open house to solicit feedback on the potential cycling routes
- Select preferred cycling routes and develop design concepts with BAC
- Present proposed cycling plan at a public open house
- Prepare cost estimates and implementation strategies for 0-5, 5-10 and 10+ year horizons
- Complement the proposed Parks and Outdoor Recreations' Leisure Trail Master Plan
- Plan will consider connectivity to existing pathway system

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

PROPOSED VISION & PRINCIPLES

VISION STATEMENT

To make Medicine Hat an attractive and safe place to cycle by creating a connected and efficient network of cycling routes accessible to all.

PRINCIPLES

Eight Principles support the Vision for the Cycling Master Plan (CMP). These Principles function as a guiding framework to ensure that the Vision is clearly translated into the Cycling Master Plan.

Connectivity – the CMP will establish a connected system that will provide direct access to major activity centres, employment nodes, neighbourhoods and recreational amenities.

Safety – the CMP will recognize the distinct operational and design needs of cyclist to maximize the safety of all users.

Implementable – the CMP must be supported by the community and maximize opportunities and user benefits, while addressing the life-cycle costs and ease of maintenance.

Education and Outreach – the CMP will promote the on-going education of cyclist, motorists and the public on cycling safety, rights and responsibilities.

Sustainable – the CMP will support sustainability by integrating, where appropriate, with other transportation systems to reduce construction and ongoing maintenance efforts.

Convenient – the CMP will be designed and implemented to be convenient for users by providing ease of travel, amenities, accessibility, signage, and integration with adjacent uses.

Visible – the CMP will be designed to provide awareness for all users and be a visible component of the larger transportation system.

Geographical Constraints – the CMP will recognize the needs of cyclists with the geographical constraints of Medicine Hat.

BICYCLE ADVISORY COMMITTEE

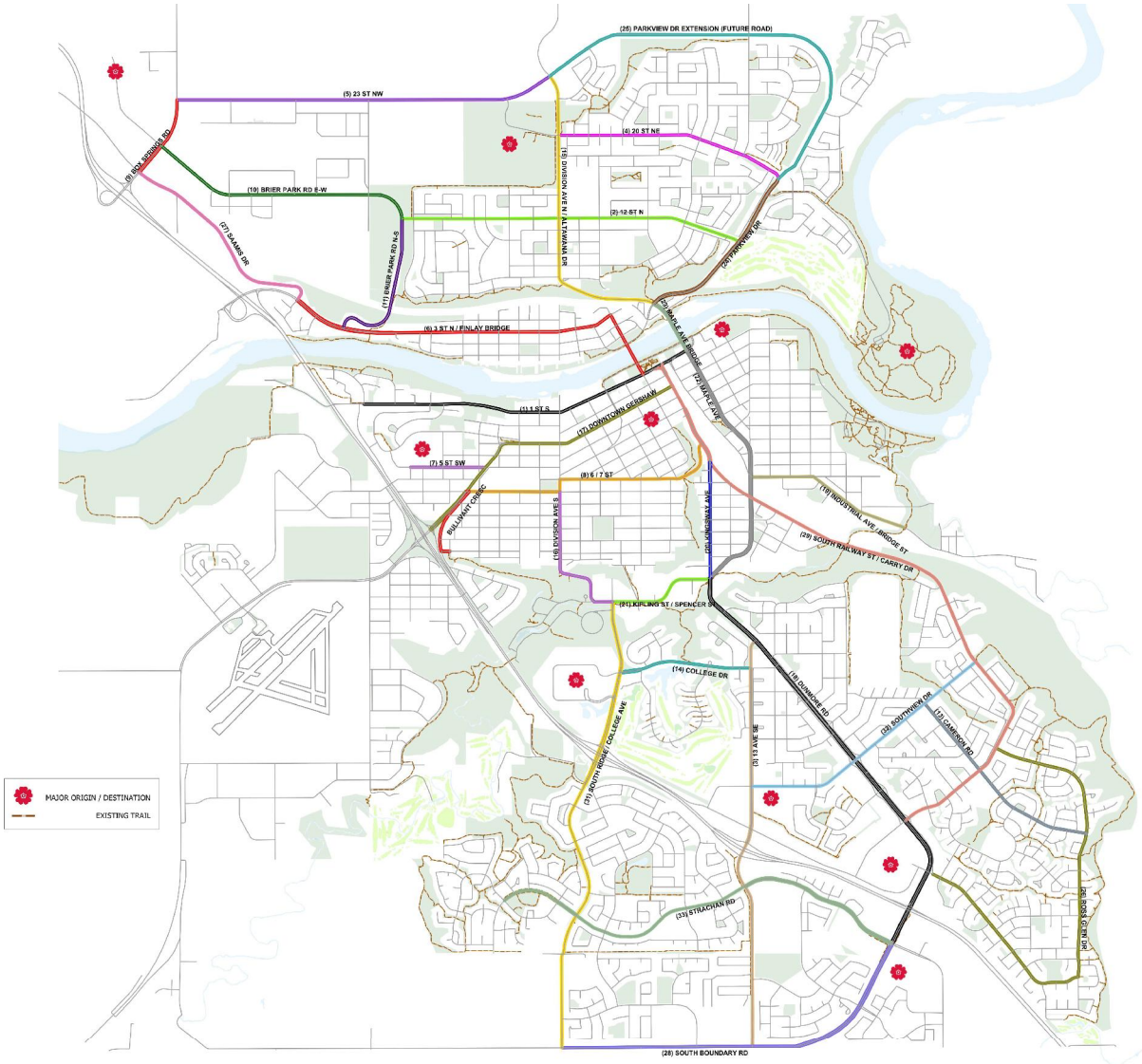
- A committee formed to assist in the development of the CMP
- Invited members of the cycling community and the general public to provide input into the development of the plan
- Consists of approximately 35 local residents, cycling advocates and city staff
- Met twice to develop the vision, principles and potential cycling routes
- Will meet again to review survey results and select preferred cycling routes

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

POTENTIAL CYCLING ROUTES



Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT CYCLING MASTER PLAN

NEXT STEPS

- Please provide feedback on survey **this evening**
- Tomorrow we will meet with BAC to review survey results and select preferred routes
- Develop design concepts for preferred cycling routes to formulate a proposed cycling master plan
- Proposed plan will be presented to public at public open house next month

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

Medicine Hat Cycling Master Plan Survey

The City of Medicine Hat and Associated Engineering need your help in determining which on street cycling routes you would like to see in our City and what the priority of the routes should be. For each route, place an "X" in the column that best matches your priority ranking from Implement First to Implement Last. For those routes you do not think should be implemented place an "X" in the Do Not Implement column. Please limit your selection to a **maximum of 10 routes per column**.

CHOOSE ONLY 10 ROUTES PER IMPLEMENTATION

	IMPLEMENT FIRST	IMPLEMENT SECOND	IMPLEMENT THIRD	IMPLEMENT LAST	DO NOT IMPLEMENT
1 ST S	○	○	○	○	○
10 AVE SW	○	○	○	○	○
12 ST N	○	○	○	○	○
13 AVE SE	○	○	○	○	○
20 ST NE	○	○	○	○	○
23 ST NW	○	○	○	○	○
3 ST N / FINLAY BRIDGE	○	○	○	○	○
DOWNTOWN GERSHAW	○	○	○	○	○
5 ST SW	○	○	○	○	○
6/7 ST S	○	○	○	○	○
BOX SPRINGS RD	○	○	○	○	○
BRIER PARK RD N-S	○	○	○	○	○
BRIER PARK RD E-W	○	○	○	○	○
CAMERON RD	○	○	○	○	○
SOUTH RAILWAY ST / CARRY DR	○	○	○	○	○
COLLEGE DR	○	○	○	○	○
DIVISION AVE N / ALTAWANA DR	○	○	○	○	○
DUNMORE RD	○	○	○	○	○
GERSHAW DR	○	○	○	○	○
INDUSTRIAL AVE / BRIDGE ST	○	○	○	○	○
KIPLING ST / SPENCER ST	○	○	○	○	○
MAPLE AVE	○	○	○	○	○
MAPLE AVE BRIDGE	○	○	○	○	○
PARKVIEW DR	○	○	○	○	○
ROSS GLEN DR	○	○	○	○	○
SAAMIS DR E	○	○	○	○	○
SAAMIS DR W	○	○	○	○	○
SOUTH BOUNDARY RD	○	○	○	○	○
SOUTH RIDGE DR / COLLEGE AVE	○	○	○	○	○
SOUTHVIEW DR	○	○	○	○	○
STRACHAN RD	○	○	○	○	○
KINGSWAY AVE	○	○	○	○	○

TURN PAGE OVER

Associated Engineering

Medicine Hat
The Gas City

Medicine Hat Cycling Master Plan Survey Cont'd

The following survey is to help educate us about your experience and needs as a cyclist. These questions are helping us go forward when determining design concepts for the CMP.

1. What type of cycling do you do?

Recreational Commuter None

2. Circle the month(s) in which you generally cycle:

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

3. Please indicate how many cycling trips you typically make (there and back is counted as one trip):

Recreational

Daily:___ Weekly:___ Monthly:___ Never

Commuting

Daily:___ Weekly:___ Monthly:___ Never

4. How experienced would you say you are with cycling in traffic on main roads, on a scale from 1 to 5:

Very experienced 1 2 3 4 5 Not experienced

5. How comfortable would you say you are with cycling in traffic on main roads, on a scale from 1 to 5:

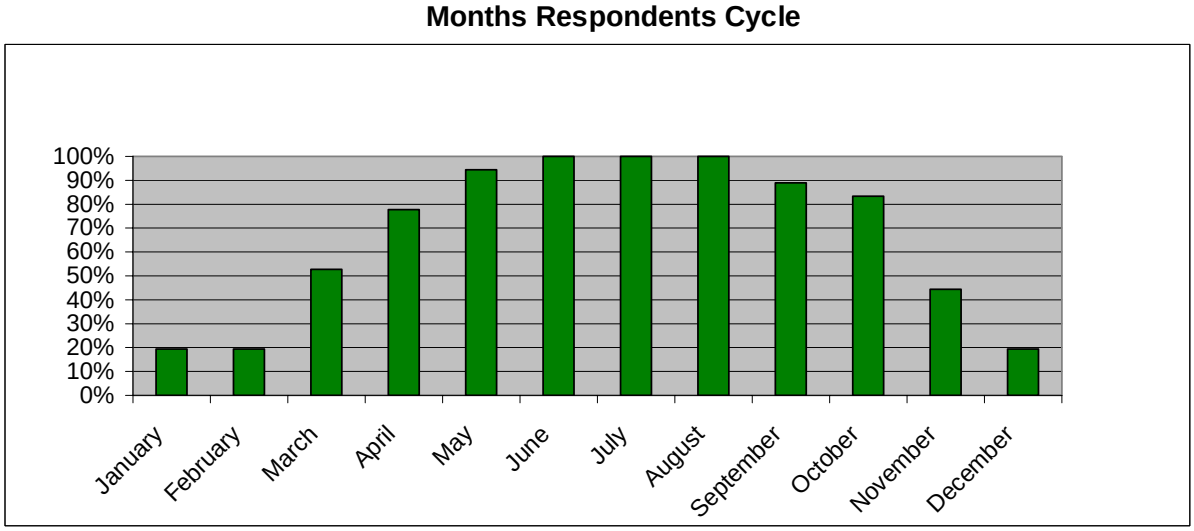
Very experienced 1 2 3 4 5 Not experienced

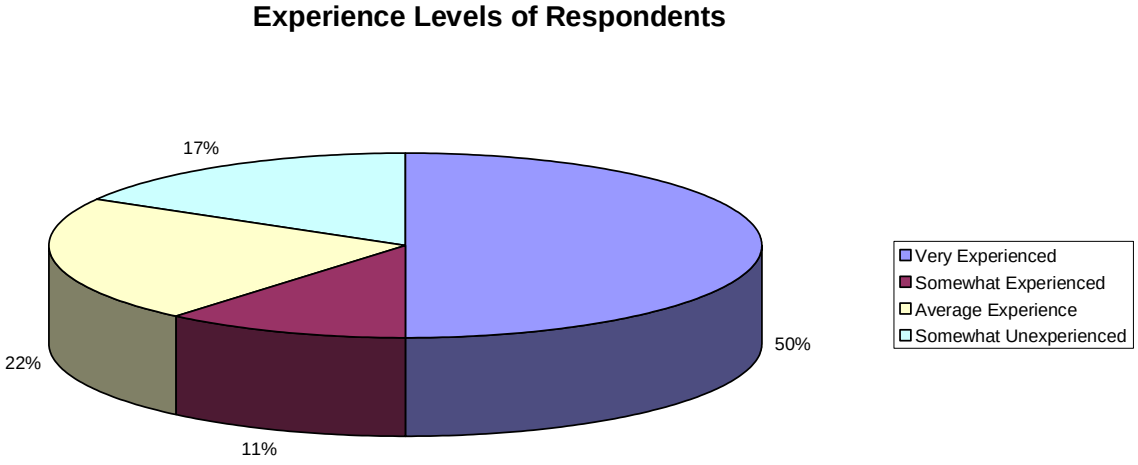
Thank you for your input

We encourage you to fill out this questionnaire and hand it to a representative or drop it off in the box provided. Your immediate response is critical to our route refinement as we will be moving forward tomorrow to select preferred routes.

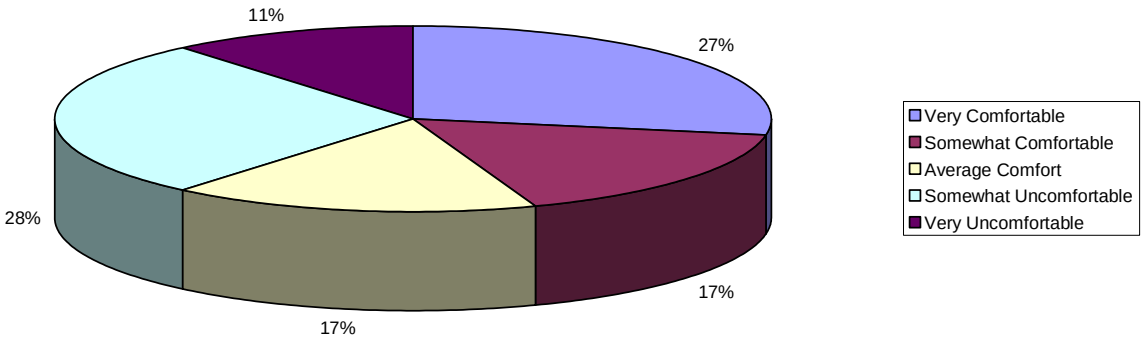
Associated Engineering

Medicine Hat The Gas City


Months Respondents Cycle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
September
October
November
December


Experience Levels of Respondents
17%
22%
11%
50%
Very Experienced
Somewhat Experienced
Average Experience
Somewhat Unexperienced

Comfort Level of Respondents Cycling on Main Roads



F Appendix F - Public Open House Two

WELCOME

TO THE MEDICINE HAT

CYCLING MASTER PLAN (CMP)

OPEN HOUSE

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

OPEN HOUSE OBJECTIVES

- Inform the general public of the CMP process
- Present recommended cycling master plan
- Gather public feedback on recommended cycling master plan

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

CMP PROCESS

- Formed a Bicycle Advisory Committee (BAC) and met four times
- Conceptualized a vision and a set of principles with the BAC
- Identified potential cycling routes with BAC
- Asked public to identify preferred routes at an open house in May
- Reviewed best practices and standards
- Reviewed ways to add cycling facilities to proposed routes
- Presented proposed cycling plan at a public open house
- Prepared implementation strategies for 0-5, 5-10 and 10+ year horizons
- Developed cycling master plan based on vision and principles, feasibility, preferences and a goal to establish a connective framework as soon as practical

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

PROPOSED VISION & PRINCIPLES

VISION STATEMENT

To make Medicine Hat an attractive and safe place to cycle by creating a connected and efficient network of cycling routes accessible to all.

PRINCIPLES

Eight Principles support the Vision for the Cycling Master Plan (CMP). These Principles function as a guiding framework to ensure that the Vision is clearly translated into the Cycling Master Plan.

Connectivity – the CMP will establish a connected system that will provide direct access to major activity centres, employment nodes, neighbourhoods and recreational amenities.

Safety – the CMP will recognize the distinct operational and design needs of cyclist to maximize the safety of all users.

Implementable – the CMP must be supported by the community and maximize opportunities and user benefits, while addressing the life-cycle costs and ease of maintenance.

Education and Outreach – the CMP will promote the on-going education of cyclist, motorists and the public on cycling safety, rights and responsibilities.

Sustainable – the CMP will support sustainability by integrating, where appropriate, with other transportation systems to reduce construction and ongoing maintenance efforts.

Convenient – the CMP will be designed and implemented to be convenient for users by providing ease of travel, amenities, accessibility, signage, and integration with adjacent uses.

Visible – the CMP will be designed to provide awareness for all users and be a visible component of the larger transportation system.

Geographical Constraints – the CMP will recognize the needs of cyclists with the geographical constraints of Medicine Hat.

BICYCLE ADVISORY COMMITTEE

- A committee formed to assist in the development of the CMP
- Invited members of the cycling community and the general public to provide input into the development of the plan
- Consists of approximately 35 local residents, cycling advocates and city staff
- Met to develop the vision, principles and potential cycling routes
- Met to review survey results and select preferred cycling routes
- Met to review and sanction recommended plan

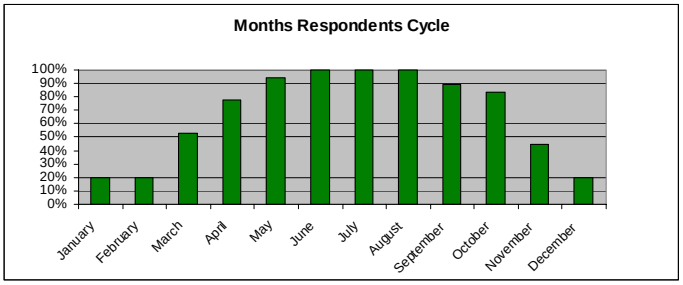
Medicine Hat
The Gas City

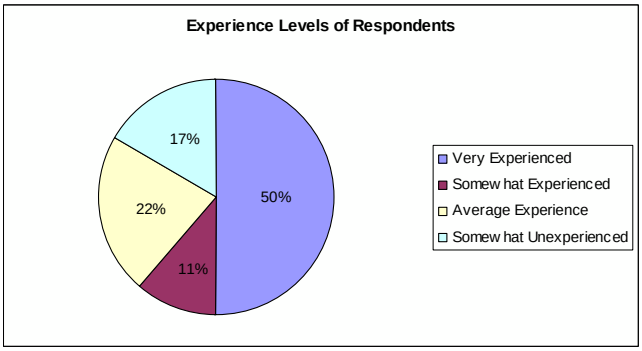
Associated Engineering

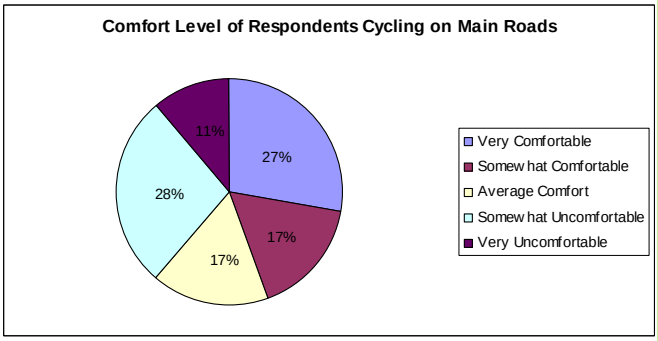
RESULTS OF OPEN HOUSE SURVEY

When surveyed at the Open House…

- 10 respondents described themselves as recreational cyclists
- 1 respondent described them self as a commuter cyclist
- 7 respondents described themselves as both recreational and commuter cyclists
  - ✓ 50% of recreational respondents cycle at least twice per week
  - ✓ 50% of commuter respondents cycle at least once per week





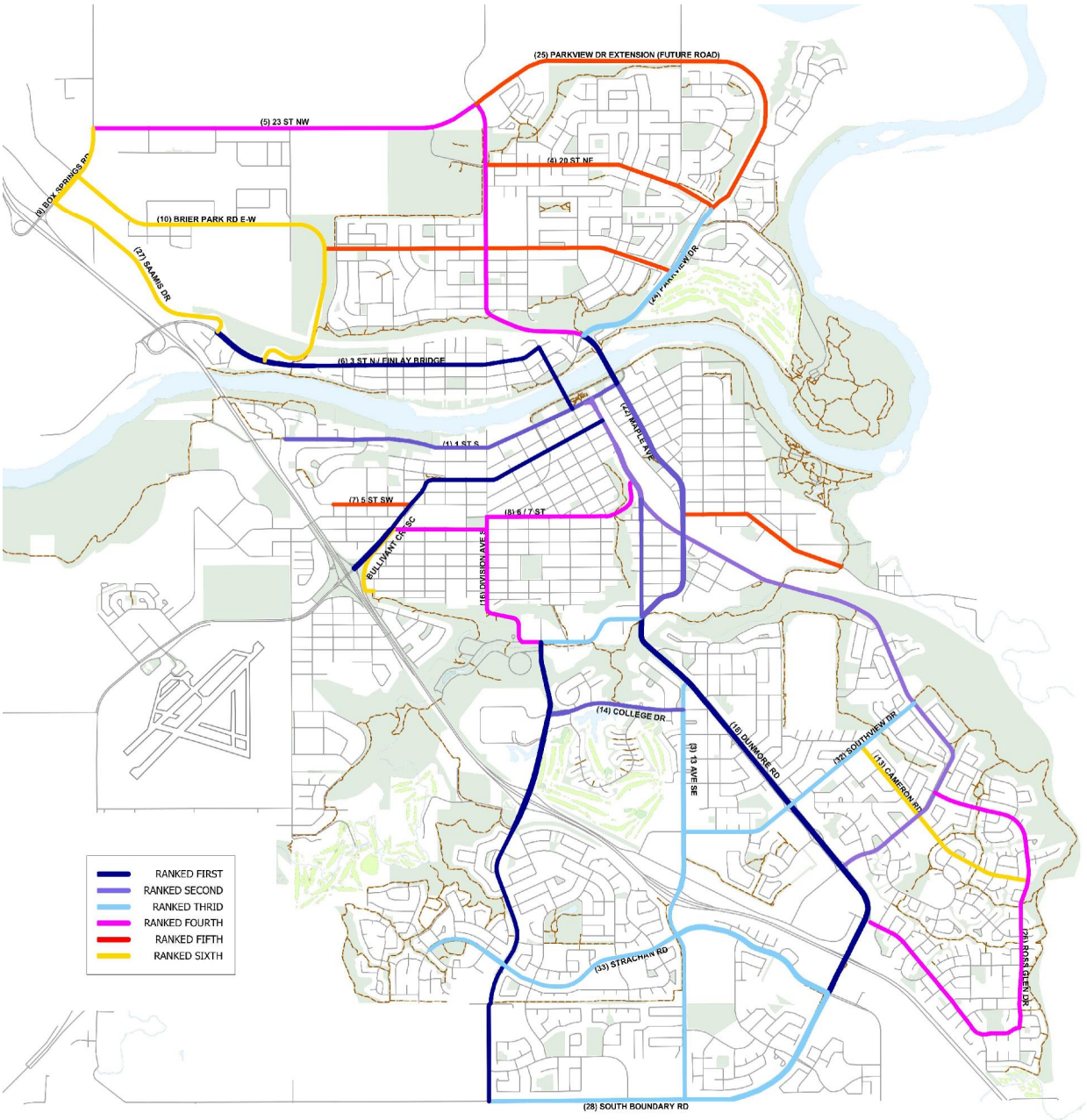


Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

FIRST OPEN HOUSE RESPONDENT PREFERENCES



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The Gas City

Associated Engineering

MEDICINE HAT CYCLING MASTER PLAN

TIMELINES FOR IMPLEMENTATION

- 0-5 Years
  - ✓ Highest Connectivity
    - ✓ Routes provide the base network or “spine” that will establish a connected system
  - ✓ Implementation & Safety
    - ✓ Roadways are less constrained and require minor reconfiguration (lane lines) or
    - ✓ Off street pathways can easily be added
  - ✓ Most Convenient
    - ✓ Provides access to key destinations such as the College, Leisure Centre and downtown core
  - ✓ Education
    - ✓ Educates cyclists and motorists how to share the road
    - ✓ Promotes awareness that a bicycle is a vehicle

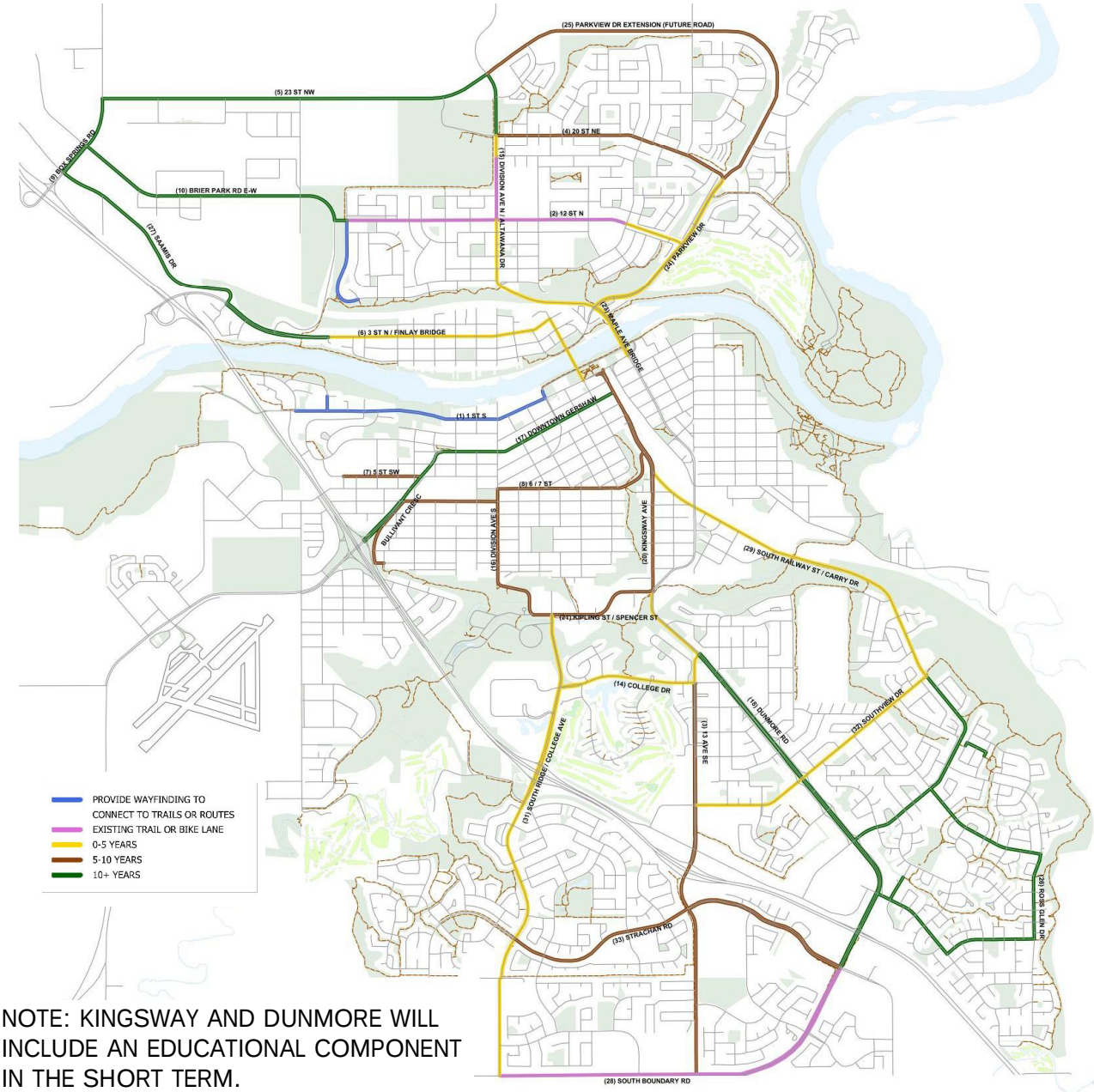
- 5-10 years
  - ✓ Increases Connectivity
    - ✓ Extends “spine” system
  - ✓ Implementation & Safety
    - ✓ Roadways are more constrained and require lane reconfiguration and road widening
  - ✓ Convenient
    - ✓ Provides access to more destinations such as the hospital and residential areas

- 10+ years
  - ✓ Implementation & Safety
    - ✓ Roadways are very constrained and require road widening in conjunction with future upgrades

Medicine Hat
The Gas City

Associated Engineering

RECOMMENDED ROUTES AND IMPLEMENTATION PLAN



NOTE: KINGSWAY AND DUNMORE WILL INCLUDE AN EDUCATIONAL COMPONENT IN THE SHORT TERM.

Medicine Hat
The Gas City

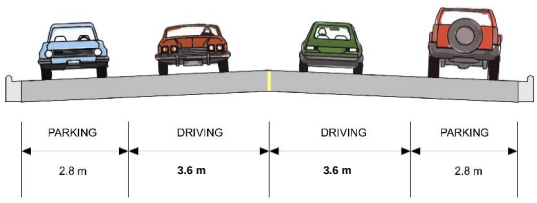
Associated Engineering

MEDICINE HAT CYCLING MASTER PLAN

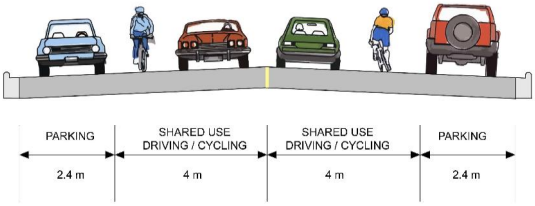
POSSIBLE SOLUTIONS FOR SHORT TERM IMPLEMENTATION

SHARED BIKE LANES
12.8 m ROAD

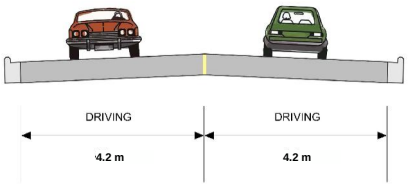
BEFORE

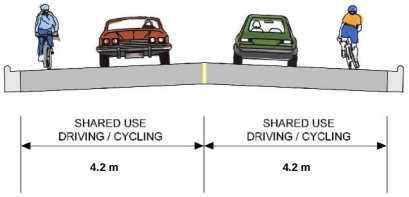


AFTER



SHARED BIKE LANES
8.4 m ROAD





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The Gas City

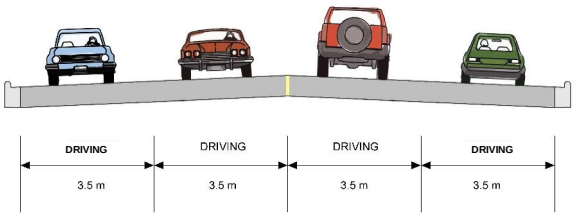
Associated Engineering

MEDICINE HAT CYCLING MASTER PLAN

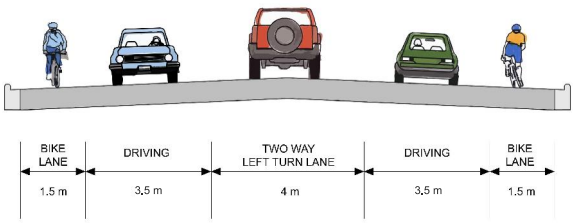
POSSIBLE SOLUTIONS FOR SHORT TERM IMPLEMENTATION

TWO-WAY LEFT TURN LANE
14.0 m ROAD

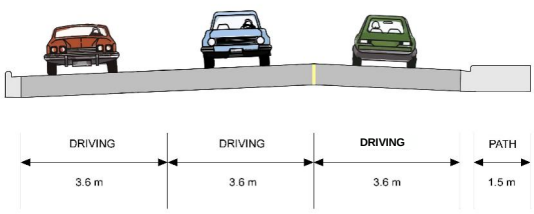
BEFORE

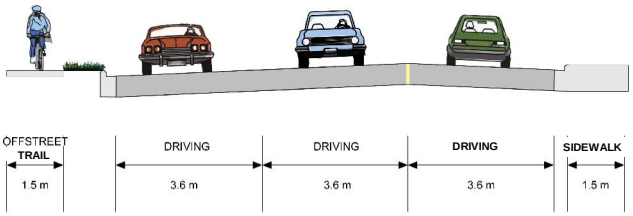


AFTER

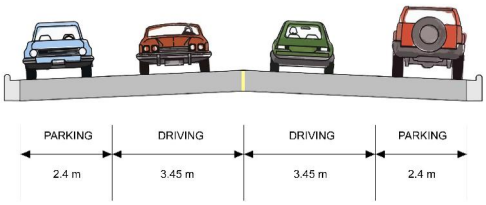


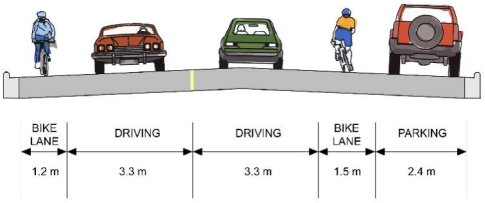
OFF STREET TRAIL ON HILL
12.3 m ROAD





DEDICATED BIKE LANES
11.7 m ROAD





Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT CYCLING MASTER PLAN

NEXT STEPS

- Review results of public open house
- Prepare detailed implementation plan and include cost estimates
- Present to council for approval in September, 2010

Medicine Hat
The Gas City

Associated Engineering

MEDICINE HAT
CYCLING MASTER PLAN

Medicine Hat Cycling Master Plan Survey

The City of Medicine Hat along with Associated Engineering would like to thank you for attending this open house. We are in the process of gathering public feedback on the recommended Cycling Master Plan. Your response will help us finalize the recommended plans.

1. How important is the implementation of the Cycling Master Plan?

- ☐ Very Important
- ☐ Somewhat Important
- ☐ Neutral
- ☐ Somewhat Unimportant
- ☐ Very Unimportant

2. The following questions are in regards to the proposed bike route locations.

a) What do you like about the proposed bike route locations?

b) What would you change about the proposed bike route locations?

3. The following questions are in regards to the proposed implementation plan.

a) What do you like about the proposed implementation plan?

a) What would you change about the proposed implementation plan?

TURN PAGE OVER

4. **When cycling to a destination, how easy is it to find bicycle parking?**
   - ☐ Very Easy
   - ☐ Easy
   - ☐ Average
   - ☐ Difficult
   - ☐ Very Difficult
   - ☐ I don't have a need for bicycle parking

5. **How supportive are you of the implementation plan?**
   - ☐ Very Supportive
   - ☐ Somewhat Supportive
   - ☐ Neutral
   - ☐ Somewhat Unsupportive
   - ☐ Very Unsupportive

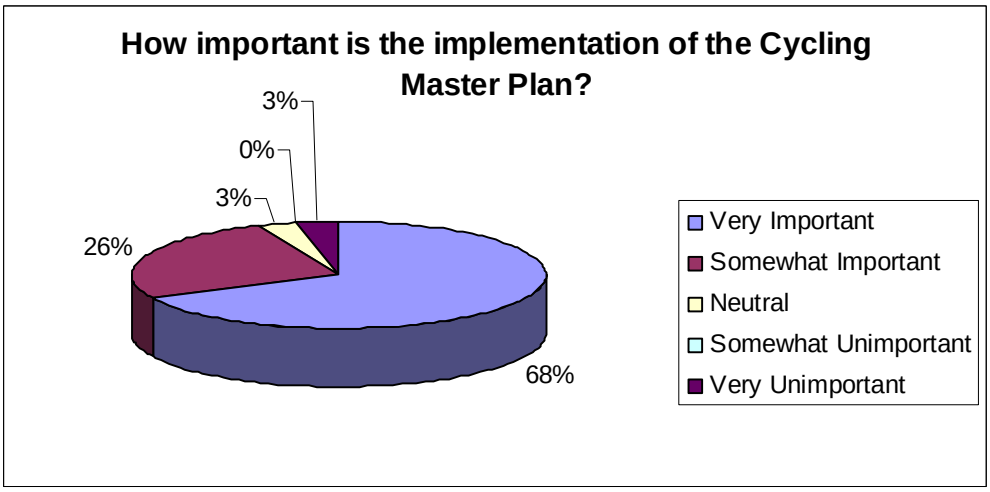
6. **Do you have any other comments / concerns related to the recommended Cycling Master Plan?**

Thank you for your input

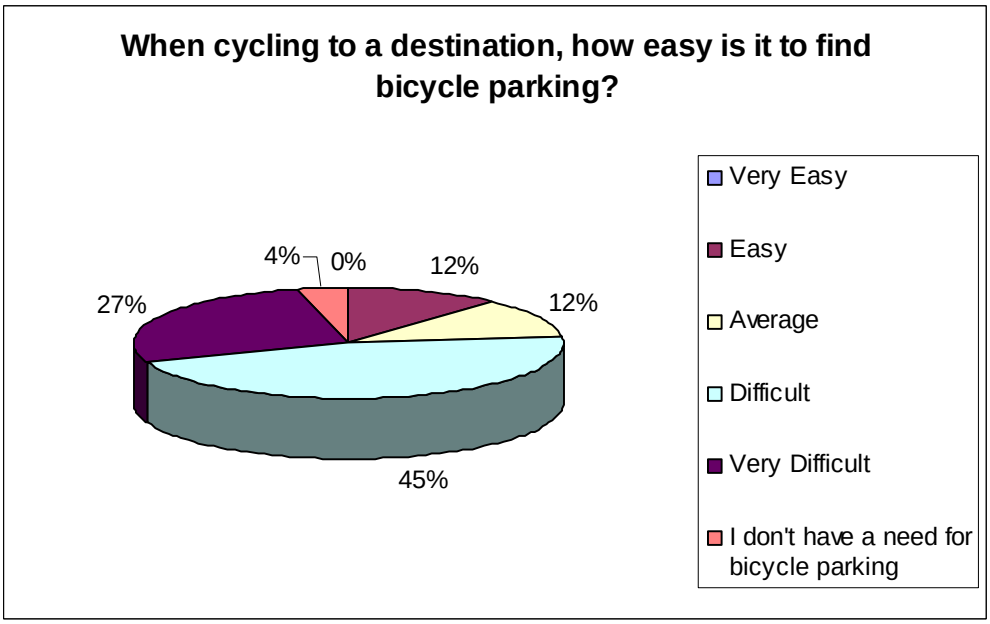
Associated Engineering

Medicine Hat The Gas City

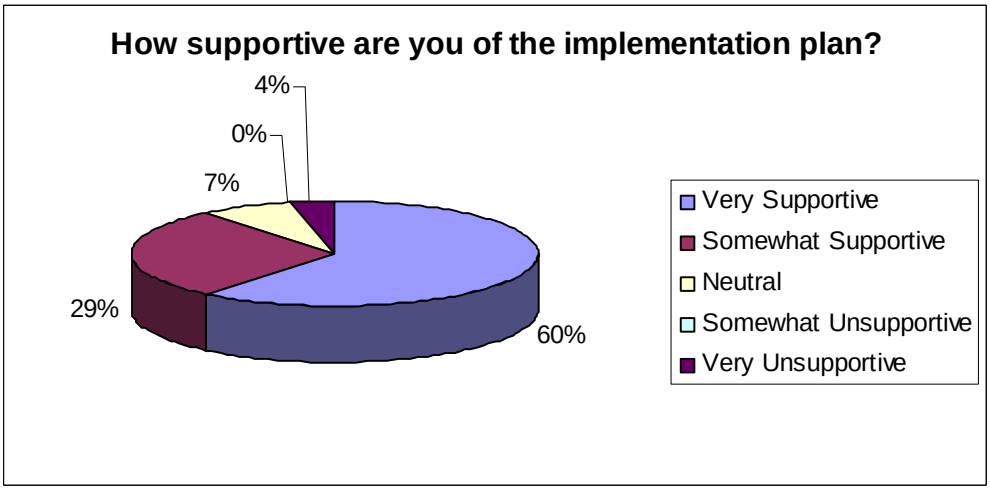
Importance of Cycling Master Plan Survey Summary



Bicycle Parking Survey Summary



Implementation Plan Support Survey Summary



G Appendix G - Full Size Drawings