The The Calgary Occile Dian



The City of Calgary

Transportation Department Transportation Planning Division

October '96





THE CITY OF CALGARY

TRANSPORTATION DEPARTMENT TRANSPORTATION PLANNING DIVISION

OCTOBER 1996

PUBLISHING INFORMATION

Title:	The Calgary Cycle Plan (1996)	
Author:	The City of Calgary Transportation Department	
Status:	Adopted as amended by City Council 1996 October 7 Recommendation 4 referred to the Street Standard Design Review Committee Recommendation 36 filed	
Printing Date:	1997 February	
Additional Copies:	The City of Calgary Planning Information Centre P.O. Box 2100 Stn M Calgary, Alberta T2P 2M5 (403) 268-5333	

TABLE OF CONTENTS

1.0	SUMMARY1
1.1	CYCLE PLAN PROCESS/ORGANIZATION1
1.2	CYCLE PLAN POLICY STATEMENT1
1.3	CYCLE PLAN GOALS
	1.3.1 Existing System Evaluation, Expansion 2
	1.3.2 Engineering Goal 2
	1.3.3 Education Goal 2
	1.3.4 Enforcement Goal
	1.3.5 Encouragement Goal 2
	1.3.6 Environmental Goal
	1.3.7 Economic Goal
1.4	IMPLEMENTATION
1.5	RECOMMENDATIONS
	1.5.1 Existing Facilities Recommendations
	1.5.2 Engineering Recommendations5
	1.5.3 Education Recommendations6
	1.5.4 Enforcement Recommendations
	1.5.5 Encouragement Recommendations
	1.5.6 Economic Recommendations
	1.5.7 Environmental Recommendations
2.0	BACKGROUND9

	THE HISTORY OF BICYCLE PLANNING IN CALGARY	2.1
	CYCLE PLANNING DOCUMENTS	2.2
, March 1972 10	2.2.1 A Bicycle Path System for the City of Calgary, March 1972	

	2.2.2	Calgary Cy	cle Plan CALTS Series 46, May 1977	
	2.2.3	Calgary Cy	cle Plan CALTS 100 1984 Update	
2.3	CYCLI	NG BENEFI	TS	11
	2.3.1	Energy Effi	cient	
	2.3.2	Non-Pollut	ting	
	2.3.3	Space Effic	cient	
	2.3.4	Low Cost		
	2.3.5	Physical H	ealth	
3.0	CYCL	ING AND 1	THE CYCLIST IN CALGARY	13
3.1	EXPE	RIENCED C	/CLISTS	13
	3.1.1	Experience	ed Recreational Cyclists	
	3.1.2	Experience	ed Commuter Cyclists	
	3.1.3	Competitiv	ve/Racing Cyclists	
	3.1.4	Utilitarian	cyclists	
3.2	INEX	PERIENCED	CYCLISTS	15
4.0	EXIS	ING SYST	EM	
4.1	OVER	VIEW, TWO	D NETWORKS - ONE SYSTEM	17
4.2	ΝΕΤΜ	/ORKS		17
	4.2.1	Recreatior	nal, Multi-Use Pathways	
		4.2.1.1	Pathway Integration Versus Segregation	
		4.2.1.2	Segregating Bicycles From Motor Vehicles	
	4.2.2	Bikeways,	On-Street Bike Routes	
	4.2.3	Road Right	t-of-way Use	20
		4.2.3.1	Standard Development Agreement	
		4.2.3.2	Future Road Construction	

		4.2.3.3	Bicycle/Pedestrian Access to Bridges	21
		4.2.3.4	Existing Roads	22
	4.2.4	Bicycle lane	S	22
	4.2.5	Curb lanes		23
	4.2.6	Integrating	Bikes and Transit	23
		4.2.6.1	Bikes On Board	24
		4.2.6.2	Bikes On Buses	24
		4.2.6.3	Bike Lockers	24
4.3	FACIL	ITY RECOGN	ITION	26
4.4	FACIL	ITY/SYSTEM	PLANNING AND DEVELOPMENT	26
	4.4.1	System Plar	nning	26
	4.4.2	System Imp	rovements	26
		4.4.2.1	Pathway/Road Interface	27
		4.4.2.2	Midblock Crossings	27
	4.4.3	System Exp	ansion	27
5.0	ENGI	NEERING C	OF BICYCLE FACILITIES	29
5.1	INTRO	DUCTION .		29
5.2	BIKEV	VAY DESIGN	STANDARDS	29
	5.2.1	Lane Width	S	31
		5.2.1.1	Parking Conditions	38
	5.2.2	Gutter Wid	hs	38
	5.2.3	Catch Basin	Design	38
	5.2.4	Intersectior	Design	39
	5.2.5	Traffic Signa	ıls	42
	5.2.6	Signs		43
	5.2.7	Crosswalk .		43

	5.2.8	Grades		43
	5.2.9	Pathway Lir	ık	43
	5.2.10	Bicycle Racl	<s< td=""><td>45</td></s<>	45
5.3	MISCI	ELLANEOUS	ROADSIDE HAZARDS	46
	5.3.1	Railway Cro	ssings	46
	5.3.2	Traffic Barri	ers	48
	5.3.3	Bridges		48
	5.3.4	Road Irregu	larities	48
5.4	PATH	WAY DESIGN	I STANDARDS	49
	5.4.1	Planning an	d Design Guidelines	49
		5.4.1.1	Alignments	49
		5.4.1.2	Pathway Widths	49
		5.4.1.3	Gradients	49
		5.4.1.4	Design Speed	50
		5.4.1.5	Sight Distance	50
		5.4.1.6	Safety Clearances	51
		5.4.1.7	Signs	54
	5.4.2	Pathway Co	nstruction Guidelines	54
		5.4.2.1	Materials	54
		5.4.2.2	Drainage	34
		5.4.2.3	Root Barrier	55
		5.4.2.4	Landscaping	55
		5.4.2.5	Pavement Marking	55
		5.4.2.6	Bollards	55
	5.4.3	Pathway Ma	aintenance	56
		5.4.3.1	Surface	56
		5.4.3.2	Furnishings	59

		5.4.3.3	Signs and Pavement Marking		
		5.4.3.4	Vegetation	59	
		5.4.3.5	Control Structures	59	
	5.4.4	Proposed F	Pathway Development	59	
5.5	FINAL	DESIGN CO	ONSIDERATIONS	59	
6.0	EDUC	CATION		61	
6.1	CYCLI	ST EDUCAT	ION - ISSUES/CONCERNS	62	
6.2	EDUC	ATION OBJ	ECTIVES	62	
6.3	EXIST	ING CYCLIS	T EDUCATION PROGRAMS	62	
	6.3.1	Canadian C	Cycling Association - Can-Bike Skills Program	62	
	6.3.2	K, 1 & 2 Tra	affic Safety Program	63	
	6.3.3	Calgary Saf	ely Council	63	
	6.3.4	"Safety City	γ"	63	
	6.3.5	SPACE - Saf	fety Prevention Awareness Courtesy Enforcement Program	63	
	6.3.6	Calgary Bic	ycle Helmet Committee	64	
6.4	CHILD	DREN'S EDU	CATION	64	
6.5	ADUL	LT EDUCATION			
6.6	IMPLI	EMENTATIO)N	64	
6.7	MEDI	A AWAREN	ESS PROGRAMS	65	
	6.7.1	Television /	Ads	65	
	6.7.2	Radio Spot	S	65	
	6.7.3	Brochures		66	
		6.7.3.1	Cycling Safety Handbook	66	
		6.7.3.2	The Roads are for Sharing	66	
		6.7.3.3	Share The Trail	66	
		6.7.3.4	Get There and Get Active	66	

	6.7.4	Videos		
		6.7.4.1	Ace of Cycling by Seidler Productions Inc.	
		6.7.4.2	Basic Bicycle Education	
		6.7.4.3	Effective Cycling	
	6.7.5	Mixed Med	lia	
		6.7.5.1	Travelling Pathway Show	
6.8	MOT	ORIST EDUC	ATION - ISSUES/CONCERNS	67
6.9	PATH	WAY EDUCA	TION - ISSUES/CONCERNS	68
	6.9.1	Implementa	ation	
7.0	ENFC	DRCEMENT		71
7.1	EXIST	ING LEGISLA	ATION	71
	7.1.1	Alberta Hig	hway Traffic Act (HTA)	71
	7.1.2	City of Calg	ary Traffic By-law No. 26M96	73
	7.1.3	Calgary Par	ks By-law No . 36/76. As Amended (23M92)	73
	7.1.4	Motor Vehi	cle Administration Act (MVAA)	74
	7.1.5	Stephen Av	enue By-law 52M87	74
	7.1.6	Alberta Traf	ffic Safety Act	74
7.2	BICYC	LE REGISTR	ATION/LICENSING	75
7.3	BICYC	BICYCLE COURIERS		
7.4	ENFO	RCEMENT	OF EXISTING LAWS AND REGULATIONS	75
8.0	ENCO	DURAGEME	ENT OF BICYCLING	77
8.1	WHO	NEEDS ENC	OURAGEMENT	77
8.2	MEAN	NS OF ENCO	URAGEMENT	77
	8.2.1	Facilities an	nd Infrastructure	
	8.2.2	Education F	Programs	

	8.2.3	Education and Encouragement Information	. 78	
	8.2.4	Special Events	. 79	
	8.2.5	Bicycle User Groups [BUGS)	. 79	
8.3	ENCO	URAGEMENT ROLES	.80	
	8.3.1	The Role of Government	. 80	
	8.3.2	Interest Groups	. 81	
	8.3.3	Private Sector	. 81	
	8.3.4	Bicycle Retailers	. 82	
	8.3.5	Police Bicycle Patrols	. 82	
9.0	ECON	IOMICS	83	
9.1	FINA	ICIAL COMMITMENT	.83	
	9.1.1	Incremental Funding	. 83	
	9.1.2	Substantive Funding	. 83	
9.2	FUND	ING SOURCES	.83	
	9.2.1	Funding for Infrastructure	. 83	
	9.2.2	Funding for Retrofitting	. 84	
10.0	ENVI	RONMENT	85	
10.1	HIDDEN COST OF AUTOMOBILE USE85			
10.2	THE ROLE OF THE INDIVIDUAL85			
10.3	THE ROLE OF GOVERNMENT			
10.4	PROG	RAMS	.86	
	10.4.1 AIR Program			
	10.4.2	Transportation Demand Management (TDM)	. 86	

LIST OF FIGURES

Figure 1:	Bikeway Level-of-Service Criteria	30
Figure 2:	Divided Major Road	33
Figure 3:	Undivided Major Road	33
Figure 4:	Primary Collector	34
Figure 5:	Collector - Parking Both Sides	34
Figure 6:	Collector - Parking One Side	35
Figure 7:	Residential	35
Figure 8:	Designated Bicycle Lane	36
Figure 9:	Separate Bicycle Path	36
Figure 10:	Wide Curb lane Option	37
Figure 11:	Combined Bicycle/Parking lane Option	37
Figure 12:	Existing Standard Sewer Grate	38
Figure 13:	Bicycle Compatible Sewer Grate	39
Figure 14:	Bicycle lanes Approaching Motorist Right-Turn-Only Lanes	40
Figure 15:	Bicycle Left Turn Lane	41
Figure 16:	Bicycle Detector Loops	42
Figure 17:	Visibility Triangle	44
Figure 18:	Railway and LRT Crossings	47
Figure 19:	Minimum Stopping Sight Distance for Bicycles	51
Figure 20:	Crest Verticle Curves for Bicycles	52
Figure 21-A:	Lateral Clearance on Horizontal Curves	53
Figure 21-B:	Table of Lateral Clearance for Bicycles an Horizontal Curves	53
Figure 22:	Standard Bollard	57
Figure 23:	Alternative Control Barrier	58

APPENDICES

Appendix A:	Draft Pathway Linkage Warrant System
Appendix B:	Bicycle Sign Policy
Appendix C:	Bicycle Parking
Appendix D:	Bicycle Facility Design Summary
Appendix E:	Seattle Bicycle Traffic Enforcement Policy
Appendix F:	Pathways and Bikeways System Map

.0 SUMMARY

The Calgary Cycle Plan 1996 offers recommendations on a range of issues in response to the needs of cyclists and pedestrians in Calgary. Growing interest in the environment, physical fitness, recreation, and improved bike technology has resulted in significant growth in the popularity of cycling, prompting demand for bike programs and facilities. Adopting the recommendations below will meet this demand while, at the same time, consider safety and operational concerns. It will also achieve several of the goals of the Calgary General Municipal Plan, the Calgary Transportation Plan and other documents such as the Sustainable Suburbs Study.

1.1 CYCLE PLAN PROCESS/ORGANIZATION

The Calgary Cycle Plans of 1977 and 1984 identified and made improvements to the bikeway and pathway system, resulting in Calgary being regarded as a good city for cycling. However, pedestrians and cyclists have asked for a more comprehensive plan, as infrastructure improvements alone are insufficient. Hence, a cycle planning team was formed to review our existing system, develop engineering standards, promote bike education, encourage greater use of facilities, improve enforcement and address economic and environmental issues.

A Cycle Planning Team was formed with representatives from the Transportation Department Calgary Parks & Recreation, Engineering & Environmental Services, Planning & Building Department, Calgary Police Service, Calgary Bicycle Advisory Council, Calgary Pathway Advisory Council and the Elbow Valley Cycle Club.

The plan process was simple; develop modules to address specific aspects of the plan such as engineering or education, then combine them to produce a comprehensive plan.

1.2 CYCLE PLAN POLICY STATEMENT

That The City of Calgary recognize cycling as healthy, low cost, environmentally friendly transportation and recreation, and promote cycling through education, encouragement, good engineering design, enforcement, economic and environmental programs, policies and initiatives.

1.3 CYCLE PLAN GOALS

In order to produce a comprehensive plan, goals were written for all its components. Following are the goals of the Cycle Plan.

1.3.1 Existing System Evaluation, Expansion

Improve the continuity, clarity and safety of existing facilities and guide system development and expansion for all Calgarians.

1.3.2 Engineering Goal

Develop standards and specifications for a system of safe, efficient and visually appealing pathway and bikeway facilities for cyclist and pedestrian use.

1.3.3 Education Goal

Increase acceptance and understanding among road and pathway users, reduce the frequency and severity of bike accidents, and reduce conflicts between cyclists, pedestrians and motorists.

1.3.4 Enforcement Goal

Create a safer, more hospitable bike and pedestrian community through enforcement of laws, by-laws and regulations as they apply to all road and pathway users.

1.3.5 Encouragement Goal

Provide the facilities, information and operating environment which make cycling an attractive and exciting transportation and recreation choice.

1.3.6 Environmental Goal

Promote cycling as an environmentally friendly and responsible form of transportation and recreation.

1.3.7 Economic Goal

To develop and promote bicycle and pedestrian facilities in a cost-effective and efficient manner.

1.4 IMPLEMENTATION

Adoption and implementation of the recommendations and guidelines outlined in this report will profoundly improve the cyclist/pedestrian environment, promote non-motorized transportation, and significantly shape the future of cycling in Calgary. The City must lead in promoting and facilitating environmentally friendly, cost-effective, healthy transportation.

Effective implementation of these recommendations will require close cooperation among city departments, interest groups and the public. Items to be addressed to ensure continued growth of cycling include:

- Recognition of cycling as legitimate transportation.
- Integration of cycling into existing transportation facilities and into future land use and transportation planning.

- Continued expansion of the regional pathway system.
- Coordination of cycling initiatives and public liaison.
- Financial support of cycling and pedestrian initiatives.
- Support for education programs, information and materials.

1.5 RECOMMENDATIONS

The following is a summary of the Calgary Cycle Plan recommendations. Chapters four through 10 contain supporting data and rationale. The recommendation number and corresponding page reference are provided. It must be noted that many of the recommendations will have financial implications for the noted Departments. Individual items will be considered within the context of the budget priorities of the Corporation.

1.5.1 Existing Facilities Recommendations

The Plan's existing facilities recommendations are:

#1(page 18)

- That Calgary Parks & Recreation implement a warrant system governing the construction of pathway linkages in existing communities, based on the draft Pathway Linkage Warrant System by July 1998.
- #2 (page 20)
 - That the Transportation Department review all existing bikeways and pedestrian facilities and develop a strategy to undertake repairs, improvements and modifications as required by January 1998.

#3 (page 20)

• That by January 1998, the Transportation Department develop and adopt a level of service guideline for bikeways and determine if a two-tiered bikeway network could be developed.

#4 (page 20) Referred to the Street Standard Design Review Committee

• That by July 1998, the Engineering & Environmental Services Department negotiate to amend the existing standard development agreement to require developers to provide 2.5 metre pathways along all major or higher road classifications.

#5 (page 21)

• That all future bridge construction provide for bike and pedestrian access and crossing. Wherever possible, existing facilities should be retrofitted.

#6 (page 21)

• That a prioritized list of potential pedestrian and cycle overpass/underpass locations be developed by the Transportation Department and the Engineering & Environmental Services Department as part of the budget process, commencing in 1997. #7 (page 22)

• That by January 1999, the Transportation Department, Engineering & Environmental Services Department and Calgary Parks & Recreation review all existing major roads, freeways and expressways to determine the specific technical requirements and costs of providing pathways within transportation right-of-ways.

#8 (page 25)

- That by July 1998, Calgary Transit evaluate additional methods to accommodate cyclists on the transit system where such methods are viable and economical and not an inconvenience to other transit patrons. The evaluation should include the potential for revising the seating arrangements on existing and new LRT trains to better accommodate bikes.
- #9 (page 25)

• That all future LRT facilities integrate bike parking and be linked with bike routes.

- #10 (page 25)
 - That Calgary Transit investigate the potential to modify existing LRT facilities to better accommodate bike parking and to develop a plan for better access for pedestrians and cyclists.
- # 11 (page 25)
 - That the Calgary Transit bike locker program be expanded and a report detailing the program be forwarded to the Standing Policy Committee on Transportation, Transit and Parking in July 1998.
- #12 (page 25)
 - That a trial program be carried out to determine the feasibility of accommodating bikes on board Calgary Transit's fleet of low floor buses and a report be forwarded to the Standing Policy Committee on Transportation, Transit and Parking in July 1998 detailing the trial.
- #13 (page 25)
 - That Calgary Transit post Pathway and Bikeway Maps and directional signing on LRT platforms and stations to inform transit patrons of the location of adjacent bikeways and pathways.
- #14 (page 27)
 - That by July 1998, the Transportation Department prepare a report for the S.P.C. on Transportation, Transit and Parking detailing the formation of a Bikeway/Pathway Technical Review Committee to review all existing and future pathway/bikeway/road interfaces to ensure continuity, coordinated development and safe operation.

#15 (page 27)

- That by July 1998, the Transportation Department develop a mid-block crossing policy to address safety and operational concerns associated with mid-block crossings.
- #16 (page 28)
 - That by January 1999, the Transportation Department and Calgary Parks & Recreation develop a

long range plan for the development of pathways and bikeways. The map in Appendix F can act as the starting point. This should include planning future alignments in new developments for regional and local bike systems, determining missing links in the existing system, identifying high use bike corridors and implementing a warrant/priority system for retrofitting existing facilities and developing new ones. "In particular, the regional pathway line on 52 St. N.W. between Bowness Road and Home Road N.W. and the recreational pathway portion of the pathway line from 65 Street N.W. to the end of Bow Crescent N.W. at the C.P.R. tracks right-of-way for consultation with the local property owners and residents." It is extremely important that communities are involved, through the community planning process.

- #17 (page 28)
 - That Calgary Parks & Recreation formally adopt a pathway user counting program as part of the 1998 budget process.

1.5.2 Engineering Recommendations

The Plan's engineering recommendations are:

#18 (page 32)

- That by July 1999, the Transportation Department develop a network of routes which facilitate bike & pedestrian access and movement within the Downtown Central Business District.
- #19 (page 32)
 - That by July 2000, the Transportation Department identify and establish bike routes adjacent to major roads where conditions preclude the accommodation of cyclists.

#20 (page 32)

- That when lane marking is done on major roads, the width of inside lanes be kept to the minimum standard of 3.5 metres with all additional width being allocated to the curb lane.
- #21 (page 44)
 - That the following requirements be implemented by January 1999 on all designated on-street bikeways and other roads that are primary commuter cycle routes:
 - traffic-actuated signals that detect bikes.
 - spring street sweeping on designated bikeways.
 - -winter snow clearing on designated bikeways.
 - -wide curb lanes on multi-lane high volume streets.
 - parking restrictions where necessary.
- #22 (page 44)
 - That the Engineering & Environmental Services Department, Sewer Division, undertake a review of alternative sewer grate designs with a test program commencing in 1997.

#23 (page 45)

- That the Planning &Building Department, in cooperation with the Transportation Department continue to work toward the development of bike parking requirements for inclusion in The City of Calgary Land Use By-law 2P80.
- #24 (page 56)
 - That as resources permit, all bollards be retrofitted with 25 millimetre retro-reflective tape in the middle of the top red painted band.

1.5.3 Education Recommendations

The Plan's education recommendations are:

#25 (page 64)

- That The City of Calgary endorse and promote Can-Bike Skills Programs as the standard for bike education programs in Calgary.
- #26 (page 65)
 - That The City of Calgary assist and facilitate local organizations in developing a delivery system for Can-Bike Skills Programs.
- #27 (page 65)
 - That The City of Calgary require bike skills certification for all City employees who use bikes in the performance of their jobs.
- #28 (page 65)
 - That members of the Mountain Bike Unit (MEW) of the Calgary Police Service be requested to obtain Can-Bike certification.
- #29 (page 65)
 - That the Calgary Police Service develop a cycling awareness program as part of their outreach to Calgary schools.

#30 (page 65)

• The Transportation Department and Calgary Parks & Recreation develop and support educational and promotional programs on cycling and other non-motorized modes of transportation, in conjunction with appropriate user groups and special interest groups.

#31 (page 68)

• That The City support the inclusion of material relating to safe road sharing with bikes in Provincial Drivers licence manuals and in public and private driver education programs in the province.

#32 (page 68)

• That the Fleet Services Department, in their employee automobile driver training program, deal with how motorists can safely share the road with cyclists.

#33 (page 70)

• That public education programs dealing with pathway etiquette and natural area low impact travel techniques be developed and delivered through The City, targeted at all pathway users.

1.54 Enforcement Recommendations

The Plan's enforcement recommendations are:

- #34 (page 76)
 - That The City of Calgary work with other organizations, municipalities and the responsible Provincial Government departments to revise and update relevant legislation such as the Highway Traffic Act and Motor Vehicle Administration Act with respect to bicycles.
- #35 (page 76)
 - That The City of Calgary revise the Calgary Traffic By-law No. 26M96, the Stephen Avenue By-law No. 52M87 and the Calgary Parks By-law No. 36/76 to ensure consistency and to improve enforceability.
- #36 (page 76) Recommendation Filed
 - That by July 1999, the City of Calgary Finance Department, License Division, undertake a study to investigate the feasibility of reintroducing bike licensing in Calgary.
- #37 (page 76)
 - That the Calgary Police Commission be requested to direct the Calgary Police Service to place greater emphasis on enforcing existing laws applicable to cyclists. The Calgary Police Service should develop a bike enforcement policy.

1.5.5 Encouragement Recommendations

The Plan's encouragement recommendations are:

- #38 (page 78)
 - That the Transportation Department and Calgary Parks & Recreation continue to produce and distribute the Pathway and Bikeway Map, the Cycling Safety Handbook and other promotional materials.
- #39 (page 80)
 - That the Transportation Department develop a network of Bike User Groups (BUGs) in businesses, organizations, and major buildings throughout the city as part of a Transportation Demand Management (TDM) strategy.
- #40 (page 81)
 - That the Transportation Department, Transportation Planning Division, work towards the establishment of a bike/pedestrian coordinator position with a primary mandate to implement this plan and a secondary function to work with individuals and to provide an administrative liaison with the various special interest groups regarding cycle and pedestrian planning.

#41 (page 81)

- That The City take a leadership role in providing incentives and facilities to promote bike use among its employees.
- #42 (page 82)
 - That the Finance Department and Fleet Services Department investigate a similar system for bicycles as is currently available for automobiles regarding a use allowance and report to Council by July 1998. Consideration should be given to providing an allowance for employees using their bike for business purposes and a loan pool of bicycles available for general use.

1.5.6 Economic recommendation

The Plan's economic recommendations are:

#43 (page 84)

• That an evaluation methodology for the construction of bike and pedestrian facilities be developed and incorporated into the Transportation Improvement Priority Study (TIPS).

#44 (page 84)

• That a bike and pedestrian facilities retrofit program be established as part of the Engineering & Environmental Services Department, Streets Division, capital budget

1.5.7 Environmental recommendation

The Plan's environmental recommendation is:

#45 (page 87)

• That future Transportation Demand Management initiatives include enhancing non-motorized transportation options.

BACKGROUND

2.1 THE HISTORY OF BICYCLE PLANNING IN CALGARY

Calgary's City Council first considered legislation on bikes and public safety in 1903. A draft by-law proposed that bikes and other vehicles be lit at night and would have imposed a speed limit of eight miles per hour on both automobiles and bikes. In 1913 another by-law on bikes and public safety never got past the planning stage. By 1916, however, all bikes in use in the city, for personal use or for hire, were required to be licensed for an annual fee of 50¢.

City Council minutes reveal that over the next fifteen years, Council considered a variety of cycling issues. In 1919, the City License Department expressed concern over the failure of bikes to be equipped with tail lights. Second-hand bike dealers came under the scrutiny of Council in 1920. In 1931, the Canadian Pacific Telegraph office at 311 - 8 Avenue S.W. requested Council's permission to put up a bike stand on the sidewalk for customer parking. Council refused to grant permission on grounds that if it were allowed, everyone would want to set up bike stands, and they would become a nuisance.

In 1937 the idea of building a 'bike path" was first presented to Council. Alderman R.H. Weir wrote to Council on 24 May 1937:

There seems to be a great many more bicycles in use on our city streets and roads than ever before, and today in motoring to Bowness Park and return, I noticed a number of near accidents on account of their use on the road out to our park

At that time Bowness Park was outside the city and was a popular weekend destination for Calgarians in autos and on bikes. Weir went on to suggest that a cinder path be built on both sides of the road for the use of cyclists, and said if this were not done there would before long be a serious accident Council requested the provincial government fund such a project, since much of the mute lay outside city limits and was within provincial jurisdiction. The Minister of Public Works wrote back soon after:

The expense of construction of such a path would be out of proportion with the advantages gained, and therefore we do not feel that the expense would be justified.

Council once again gave consideration to a bike path in 1939. That winter, a local constable pointed out that there was a particularly unsafe section of road on 9 Avenue S.E. which was used by children on bikes on their way to school. He suggested that a portion of sidewalk be set aside as a bike path for the safety of these children on their way to school in winter. This proposal was considered by City Councils' legislation committee. Council was advised by the city solicitor, however, there was "no power in The City Charter authorizing any part of a public highway...to be put aside for the sole use of cyclists." His conclusion was that "however advantageous it might be for a certain number of boys attending school on bikes," he could not recommend its designation as a bike path.

In 1939, the City Clerk ordered a supply of 5,400 bike license plates.

On 15 October 1946, City Council adopted a report of their special traffic committee which directed the establishment of what seems to be Calgary's very first bike path. Council agreed to designate a four feet wide section of pavement on both sides of Centre Street, "for the use and protection of cyclists," and directed the City Engineer to carry this out in 1947. This was over a few blocks of Centre Street, extending "from and through the cut to 4 Avenue."

During the 1950's and 60's City Council was not often occupied with bike issues. This was when the automobile came into its own, and governments, including The City of Calgary, were occupied with building roads to accommodate it. Council's only consideration of bikes was whether or not to ban them from major thoroughfares.

From 1970 onward, The City undertook a more progressive planning approach and has prepared several planning documents relating to cycling which are discussed in the section 2.2.

It should also be noted that "Cycling is recognized as a component of The City's transportation system" in the Council approved Calgary Transportation Plan (1995). The Plan indicates that "Cycling will be promoted through education, provision of facilities, and enforcement of safety rules".

2.2 CYCLE PLANNING DOCUMENTS

Many documents have been produced to mate and enhance the cycling environment in Calgary. This section will highlight only a few of these.

2.2.1 A Bike Path System for the City of Calgary, March 1972.

On September 28,1970 City Council directed the Engineering Department to determine the costs of creating a system of bike routes to and from the city centre. They were also asked to examine the possibilities for creating similar routes on a community level.

The Engineering Department, other City Departments and the Bicycle Association of Calgary worked together to produce a report titled "A Bicycle Path System For The City of Calgary." This report recommended that a system of bike routes be created consisting of separated pathways and on-street bikeways. The report also recommended expanding the Traffic By-law to cover all aspects of bike use. It was recommended that studies examine the possibility of banning bikes from expressways. The report went on to recommend that "Design of all new arterial streets incorporate the requirements of the bike mute system and that pertinent parts of the system be an integral part of the street construction."

2.2.2 Calgary Cycle Plan CALTS Series 46 May 1977

On October 27,1975 City Council adopted a report which contained the following recommendation:

That the Transportation Department in conjunction with other departments initiate a re-study of the bike path system which would examine the priorities of the system and examine the possibilities of different types of construction so that costs can be reduced.

Based on this recommendation, the 1977 Calgary Cycle Plan was produced. The purpose of the plan was to document an orderly and systematic means for the implementation of a bike route system for Calgary that satisfied the needs of recreational and utilitarian cyclists.

2.2.3 Calgary Cycle Plan, CALTS 100 1984 Update

The 1984 Cycle Plan was an update of the 1977 Cycle Plan. Its purpose was to examine the performance of the cycle network that had been put in place since 1977 and to determine how well the system had met the needs of the cycling public in the city and suburbs. The report made recommendations for new pathways and facilities, priorities for implementation and other issues relating to safety and maintenance.

2.3 CYCLING BENEFITS

Cycling provides benefits far beyond those associated with transportation and recreation.

2.3.1 Energy Efficient

"Airplanes, electric cars, walking; of all the human achievements in transportation we have yet to develop a more efficient means of converting energy into motion than cycling". (The Bicycle; A Study of Efficiency, Usage & Safety, pp. 5-9. Dr. D.F. Moore, October, 1975, The National Institute For Physical Planning and Construction Research.)

2.3.2 Non-Polluting

The bike emits no exhaust or pollutants. In addition to the energy consumed and pollution created in its manufacture, the only pollution attributable to cycling is the pollution caused by producing the extra food consumed by its human engine.

2.3.3 Space Efficient

"At the present time about 40 percent of city land is taken up by roads and car parks, which have to be built, patched, marked, cleaned and sanded. (some of these are also used by utilities and used by pedestrians)." (Calgary GoPlan. Sustainability: Should it be The Ethic For Transportation Planning In The '90s?, Discussion Paper No.1-06-93). Today the average worker's office is smaller than the space used to accommodate their car. Ten to 12 bikes can be parked in a single car parking space.

2.3.4 Low Cost

Cycling is economical transportation. The cost of operating a bike is a fraction of that required to operate a motor vehicle. The average annual cost of operating a car in 1993 was \$4,975. (CAA/ Runzheimer). The cost of providing bike facilities is also a fraction of the cost associated with the provision of facilities for the private car.

Cycling is inexpensive and efficient transportation within the grasp and ability of virtually all sectors of society.

2.3.5 Physical Health

The health benefits of cycling are undeniable. Bikes offer people the opportunity to combine work trips or daily errands with exercise. The benefits of daily exercise include lower pulse rate and blood pressure. Increased cardiovascular fitness results in lower health care costs and a healthier population. Fitness Canada indicates that cycling 6 km, 3 times a week can achieve a recommended fitness level. It has been estimated that for every life year lost due to cycling related injury or death there are 20 life years gained by a healthier population (1992 Dr. Mayer Hillman).

CYCLING AND THE CYCLIST IN CALGARY

Cyclists are not a homogenous group. There is a wide diversity of cyclists in terms of skill, experience and reasons for cycling. For planning purposes it is essential to understand the difference between the various types of cyclists. The recognition and understanding of differences is essential in planning programs and designing facilities for the various groups.

3.1 EXPERIENCED CYCLISTS

Experienced cyclists can be placed into categories relating to their reason for cycling. It is also possible that one individual may belong to several of the categories listed below. For instance, a racing cyclist may also use his bike to travel to work or enjoy leisurely rides along the river with friends and family. For each of these purposes the individual will desire different cycling facilities and environments. Some of the different requirements are outlined below. In general, experienced cyclists are those individuals who cycle fairly frequently. They may belong to a cycling club. They feel comfortable operating their bike and have a basic understanding of bike operation in various circumstances and conditions. These individuals normally understand the rules that apply to bike use and operate their bike according to vehicular operating principles.

3.1.1 Experienced Recreational Cyclists

The experienced recreational cyclist chooses to use the bike for leisure, pleasure and in many eases as a form of exercise. In seeking a recreational experience these cyclists are often not concerned with the directness of a route. The preference is for a facility where they can enjoy their surroundings with minimal conflict. For some this may involve a ride down a country road, for others it may involve a trip through the river valley on a pathway and for still others it may involve a ride on a dirt trail in the woods. The common thread that ties these cyclists together is the desire to have an enjoyable, relaxing experience. This usually precludes riding on busy roads where attention must be focused on traffic. To recognize the popularity of recreational cycling one need only take a look at Calgary's regional pathway system on a sunny summer weekend. Many of these cyclists only use the road network as a means to access the pathway system.

3.1.2 Experienced Commuter Cyclists

The 1992 Commuter Cyclist Survey has shown that the requirements of the commuter cyclist tend to differ from those of the recreational cyclist Commuter cyclists are destination oriented. They prefer direct, free flowing routes. In some cases these requirements are not met by the pathway system so these cyclists often use roads. The 1992 Commuter Cyclist Survey asked respondents to indicate what measure or facility development they felt would be most effective in promoting commuter cycling; the most prevalent response was bike lanes (37.9%). When asked why they do not bike more often, the most common answer was weather (49.6%), followed by dangerous traffic (22.9%). Promoting and encouraging commuter cycling requires the development of safe, direct, free flowing

routes on which automobiles are perceived as a limited threat. Experienced commuter cyclists will mix with cars on higher speed, higher volume roads. These individuals are capable of travelling with the flow of traffic. Problems arise when there is a large speed difference between the motorists and cyclists. In these situations it is desirable to have an alternate facility or an area on the road where conflict is minimized.

Although the association most often made with commuter cycling is the work trip, other trips made by bike are important and are often overlooked. These could be called local commuter trips and would include trips to school, church, sporting facilities, errands tun by bike and trips to visit friends. The requirements for facilitating these trips are different from those needed for work trips. These trips often take place on low volume residential streets where special facilities are not required. However, in many cases major road systems must be crossed to reach a destination and adequate bike and pedestrian precincts should be provided to facilitate these movements.

There are many potential facility developments and programs for promoting commuter cycling. Some of the possible alternatives will be reviewed in this document. Each case or circumstance must be carefully studied to ensure that the most appropriate facility or program is developed.

3.1.3 Competitive/Racing Cyclists

Bike racers in Alberta are licensed with the Alberta Bicycling Association (ABA). Competitive cyclists require areas in which to race and areas in which to train. In some circumstances these two activities may share the same venue; for example training and racing takes place at the Glenmore Velodrome. Virtually all competitive cyclists are involved in training rides which will take them on roads, pathways and trails throughout the city. These cyclists prefer routes that offer wide shoulders and long uninterrupted stretches. Many popular training routes such as Calgary to Cochrane or Calgary to Bragg Creek take the cyclist out of the city and onto rural roads.

3.14 Utilitarian Cyclists

Utilitarian cyclists are those who use bikes in the course of their work or choose to bike rather than use other modes of transportation. The most obvious example is the bike courier; other examples would be the Calgary Police Service Mountain Bike Unit, some newspaper carriers and Dickie Dee ice cream cart operators. Utilitarian cyclists place limited demands on the system yet offer valuable services to society. It would be appropriate to identify other services and activities that could be done by bike and to promote utilitarian bike use. Additional community cycling systems would be of benefit to utilitarian cyclists.

3.2 INEXPERIENCED CYCLISTS

Inexperienced cyclists place different demands on the system. The largest identifiable group of novice cyclists are children. Novice cyclists, both young and old, lack the skill and confidence to share higher volume roads with motor vehicles. These individuals are often found riding on the sidewalk or on the wrong side of the street Tragically, these actions, which they think are safer, are among the leading causes of carbike collisions. (The Bicycle; A Study of Efficiency, Usage & Safely, Dr. D.F. Moore, October 1975).

Inexperienced recreational cyclists enjoy pathways. This in itself can lead to problems and conflicts on pathways. Cyclists using pathways require basic bike handling skills and knowledge of pathway regulation and etiquette in order to minimize conflicts and avoid accidents. Basic cycling education and information would greatly benefit these cyclists.

16

EXISTING SYSTEM

4.1 OVERVIEW, TWO NETWORKS - ONE SYSTEM

In the November 1988 issue of Bicycling Magazine, Calgary rated among the top 10 North American cities for cycling, partly due to the city's extensive pathways and bikeways network.

Pathways are off-street facilities which are either shared by pedestrians and cyclists or have twinned portions which segregate the two user groups. These pathways lie in Calgary's open spaces and minimize interface with automobiles while providing a facility suitable for recreational and utilitarian use.

Bikeways are signed on-street facilities designed to accommodate bikes and autos. Bikeways provide system continuity and link areas that cannot be adequately sewed by pathways.

Pathways fall under the mandate of Calgary Parks & Recreation while bikeways are the responsibility of the Transportation Department. The Calgary Pathway Advisory Council was established to provide public input regarding pathways and has worked with Calgary Parks & Recreation on many projects in the past. Efforts should be made to broaden and increase the public liaison in areas relating to bike and pedestrian facility planning, particularly as it relates to transportation. It is essential that The City administration work closely with the public and special interest groups to ensure that adequate bike and pedestrian facilities are provided for all Calgarians.

4.2 NETWORKS

4.2.1 Recreational, Multi-Use Pathways

Calgary has an extensive regional pathway network in excess of 380 kilometres, much of which parallels the city's river valleys, ravines, and other natural features. Calgary Parks & Recreation has adopted an aggressive attitude within its Policies and Priorities Plan which has allowed the pathways to expand along with new development.

At its inception, the pathway system was conceived as purely recreational in nature. However, in the past few years the importance of portions of the system to the commuting cyclist has become apparent. Calgary Parks & Recreation's 1987-1991 Policies and Priorities Plan contains the following statements:

"The City places a high priority on the development and maintenance of trails and pathways to:

- facilitate cycling as a mode of energy efficient transportation.
- benefit the urban transportation system.

The Department will:

• liaise and coordinate with the Transportation and Engineering Departments in the planning, design and development of bikeways using street and sidewalk locations as part of an integrated system with pathways."

Certain sections of the regional pathway system, such as the Bow River Pathway, provide a relatively free flow route for commuter cyclists travelling to downtown from areas adjacent to the pathway. As a rule, commuter cyclists prefer direct, unimpeded routes. The recreational nature of the pathway network is such that it can only serve a small number of commuter cyclists. The 1992 Commuter Cyclist Survey indicated that 35 percent of the average bicycle commuter trip is made on pathways. Many areas and destinations in the city cannot be effectively assessed by pathways. In these cases there is a need to accommodate cyclists within the road right-of-way.

In order to provide better neighbourhood connections, The City of Calgary is working with the development industry through the Area Structure Plan process to provide a comprehensive linear path system favouring non-motorized traffic within new communities. The pathway system links schools, joint-use sites, community centres and other local destinations. Once a community has been provided with municipal reserve and has been developed, it is difficult to retrofit or expand pathways in that community. In these situations, the Transportation Department must respond by providing additional infrastructure or space within existing road right-of-way to link trip generating facilities with residential areas.

In developed areas where it is possible to provide new pathways, a warrant system should be developed to prioritize new construction. In 1990, Calgary Parks & Recreation developed a draft Pathway Linkage Warrant System which is included as Appendix A. This warrant system should be evaluated and tested for integration into Calgary Parks & Recreation policy.

RECOMMENDATION #1

• That Calgary Parks & Recreation implement a warrant system governing the construction of pathway linkages in existing communities, based on the draft Pathway Linkage Warrant System by July 1998.

4.2.1.1 Pathways Integration Versus Segregation

The majority of Calgary's recreational pathways are open to everyone. However, in certain heavily used locations conflicts can occur. To address this concern, dedicated facilities are provided for different user types. Calgary Parks & Recreation has developed a Pathway Conflict Index to identify areas requiring separate facilities.

The development of the Pathway Conflict Index was an important step in the evolution of user conflict minimization. Previous pathway widening sometimes only dispersed the problem of user

conflict whereas pathway twinning is believed to have reduced problem on congested sections of pathway. Calgary Parks & Recreation continues to modify and improve the Pathway Conflict Index.

In specific areas where numerous attractions exist on both sides of the pathway, concerns have been raised with compliance to the segregated path concept. In these instances, Calgary Parks & Recreation may consider wider all-encompassing pathways (i.e. Eau Claire Promenade).

4.2.1.2 Segregating Bikes From Motor Vehicles

Calgary Parks & Recreation has been actively involved in improving its existing pathway network through numerous capital works projects. The 10 Street N.W. underpass on the Bow River pathway is one example of minimizing the car and bike/pedestrian interface while improving flow on a major commuter route. This expenditure shows commitment to pathway user convenience and safety. In addition, work has been done to provide grade separated crossings of major roads, railways, rivers and creeks.

4.2.2 Bikeways, On-Street Bike Routes

The City of Calgary has approximately 150 kilometres of on-street bikeways. Bikeways are generally located on streets with laver traffic volumes and are intended to identify routes best suited to bike use. Bikeways provide links with the regional pathway system, identify routes through communities and preferred routes to the downtown core and other destinations. Bikeways are also useful to users not familiar with the system as they provide a marked route connecting several destinations. A person merely needs to look at the Pathway &Bikeway Map to select a bikeway and/or pathway route.

Currently, the Transportation Department does not have a policy covering the location, level of service or maintenance of these facilities. Bikeway provision has not been governed by policy or any formal consideration. The current state of the bikeway system reflects a need for system planning and maintenance. Signing on sections of the bikeway network lacks clarity and continuity. Many bikeway signs are badly faded or in a state of disrepair.

Properly designed and maintained bikeways provide continuity for bike transportation and offer tangible benefits to cyclists. When a street is identified as a bikeway it implies that the route is suitable for use by cyclists of any age or skill level. Because of this implication, The City should take great care in identifying and maintaining these facilities.

Some item that should be considered and incorporated into designated bikeways are traffic actuated signals which detect bikes, bike-friendly sewer grates, priority spring street sweeping, winter snow clearing, wide curb lanes and sign maintenance.

Future bikeway planning should focus on creating safe and enjoyable bike transportation/recreation links. Wherever possible, direct commuter/utilitarian routes should be established to provide an

alternative to the pathway network. These routes should identify and establish bike links at both the community and city-wide level. The Transportation Department should investigate the possibility of developing a two-tiered system of bikeways. One level would be intended for the recreational rider and the other for use by commuter cyclists. Section 5.2 provides additional detail regarding a potential two-tiered system.

RECOMMENDATION #2

• That the Transportation Department review all existing bikeways and pedestrian facilities and develop a strategy to undertake repairs, improvements and modifications as required by January 1998.

RECOMMENDATION #3

• That by January 1998, the Transportation Department develop and adopt a level of service guideline for bikeways and determine if a two-tiered bikeway network could be developed.

4.2.3 Road Right-of-Way Use

In July 1995, City Council approved the Sustainable Suburbs Study, which included a policy to develop a new set of street design standards. These new standards are to meet the needs of pedestrians, cyclists and transit users while continuing to meet the needs of motorists. To provide bicycle system continuity and additional route alternatives, part of this review should include using the road right-of-way dedication required from developers as a potential location for pathways.

4.2.3.1 Standard Development Agreement.

Under the existing standard development agreement, developers are required to construct concrete sidewalks on both sides of major roadways at their cost. The agreement could be modified to require the construction of 2.5 metre paved pathways instead of concrete sidewalks. This change would involve no cost to The City and would enhance the bike/pedestrian system. This would allow for more efficient use of road right-of-way. These paths may allow for more flexible planning of recreational pathways and may eliminate the need for costly regional pathway links in certain situations.

RECOMMENDATION #4 Referred to the Street Standard Design Review Committee

• That by July 1998, the Engineering & Environmental services Department negotiate to amend the existing standard development agreement to require developers to provide 2.5 metre pathways along all major or higher road classifications.

4.2.3.2 Future Road Construction

Future transportation developments should include a review of the impact of the project on bike and pedestrian movements. This review should consider the impact of the project on local and regional pedestrian and bike movements, as well as assess the need for separate pathways within the right-of-way, wider curb lanes on the carriage way and pedestrian/bike overpasses and crossings. All future transportation projects should consider bike requirements. These requirements include, but are not limited to, pathways in the right-of-way, wider curb lanes and grade separated crossings.

The City of Calgary has demonstrated a progressive approach toward considering bike and pedestrian movements in future road improvements and expansions. Documents such as the Anderson Road Functional Study CALTS series #79 recognize and incorporate pedestrian and bike facilities.

4.2.3.3 Bike/Pedestrian Access to Bridges

Experience has shown that failure to provide bike and pedestrian access across bridges has created long-term mobility problems for these groups. The lack of pedestrian and bike facilities on or under the Crowchild Trail bridge over the Bow River complicates bike and pedestrian movement between north and south Calgary. The lack of facilities on many of the bridge structures crossing Deerfoot Trail has made movement between N.E. Calgary and the rest of the city difficult for non-motorized transportation. To remedy these problems, a policy should be adopted which ensures that all future bridges provide for bike and pedestrian access.

There are also many areas of the city that could have better access for pedestrians and cyclists if an overpass or underpass could be built. In the case of the Ivor Strong Bridge near Douglasdale, the lack of non-motorized facilities resulted in a situation where it was illegal to leave the community of Douglasdale by bike. (This situation has been resolved through the construction of a new pedestrian/ cyclist bridge over the Bow River). The City should compile a list of potential problem locations, in order of priority, and should budget for their construction.

RECOMMENDATION #5

• That all future bridge construction provide for bike and pedestrian access and crossing. Wherever possible, existing facilities should be retrofitted.

RECOMMENDATION #6

• That a prioritized list of potential pedestrian and cycle overpass/underpass locations be developed by the Transportation Department and the Engineering & Environmental Services Department as part of the budget process, commencing in 1997.

4.2.3.4 Existing Roads

The opportunity exists to provide separate pathway facilities within the existing road right-of-ways in certain areas of the city to facilitate the movement of both recreational and commuter cyclists and pedestrians. There are several advantages associated with using existing road right-of-ways for developing pathway facilities:

- Major roads and expressways have limited intersections; all intersections provide controlled or grade-separated crossings.
- The alignments are generally direct and provide unimpeded movement between intersections.
- Providing pathways within existing road right-of-ways could reduce the demands being placed on the recreational pathway system by commuter cyclists.
- These pathways would provide an alternative facility for cyclists who prefer to travel on direct road networks.
- Providing pathways within right-of-ways makes more efficient use of existing space.

RECOMMENDATION #7

That by January 1999, the Transportation Department, Engineering & Environmental Services
Department and Calgary Parks & Recreation review all existing major roads, freeways and
expressways to determine the specific technical requirements and costs of providing pathways
within transportation right-of-ways.

4.2.4 Bicycle Lanes

There are several different facility options for accommodating cyclists in the transportation network These range from complete integration where no special provisions are made, to complete segregation on separate pathway facilities. However, it is not possible to serve all origins and destinations with completely separate facilities. In some circumstances it is appropriate to integrate bike use into the existing network with no special provisions, such as on low volume residential streets. The issue of accommodating cyclists becomes more complicated on higher volume streets where complete segregation is not possible and complete integration may not be desirable. Significant controversy exists over facilities which occupy the middle ground between the extremes of complete integration and complete segregation.

Results from the 1992 Commuter Cyclist Survey indicate that many cyclists feel the most effective way to encourage bike use is through the creation of on-street bike lanes. Bike lanes fall into the middle ground between integration and complete segregation. The idea of providing bike lanes has merit; however, it is important to evaluate the advantages and disadvantages of bike lanes and assess other alternatives. Bike lanes offer cyclists part of the road adjacent to automobile traffic, imparting an often false sense of security. There is little evidence that bike lanes are safer for cyclists. The vast majority of car bike collisions take place at intersections, and bike lanes cannot avoid intersections. In most cases bike lanes actually complicate turning movements at intersections.

The presence of a bike lane can create operational and safety concerns. In determining the desirability of creating bike lanes several factors must be considered:

- The bike lane operation when the adjacent travel lane becomes a right turn only lane.
- The mechanism for cyclists to make left hand turns from a bike lane.
- Bike lanes tend to collect the debris which is swept aside by motor vehicles.
- Bike lanes that are separate from the rest of the travel lanes by a physical barrier can complicate street sweeping and snow removal.
- The most appropriate forum to educate all road users regarding the operation of bike lanes.
- Accommodating bus stops on roads where a bike lane is present.
- The impact of the bike lane on the capacity of the road.
- Current levels of bike use may not warrant providing separate bike lanes where doing so would reduce the overall road capacity.

Many of the above problems can be overcome through design and education, but these points serve to illustrate that providing a bike lane is not simply a matter of painting a line or putting up a barrier.

4.2.5 Curb Lanes

In response to the problems created by dedicated bike lanes there has been a shift toward the idea of providing wider curb lanes. Wider curb lanes are able to accommodate a bike and motor vehicle at the same time. The wider lane is typically not marked or physically separate from the other lanes. This type of provision has several advantages over bike lanes and eliminates many of the problems associated with designated bike lanes. When cyclists are not present, motor vehicles are able to use the entire lane. The sweeping action of cars previously mentioned as a problem for bike lanes becomes a benefit as the vehicles travelling in the curb lane tend to keep the lane relatively free of debris. The absence of physical separation in wider curb lanes allow cyclists to move freely into other lanes when it is appropriate to do so; as when making left turns or when moving into a through lane when the curb lane becomes a right turn only lane. Wide curb lanes also reduce the problem of having motorists insist that bikes stay in a designated lane. Provided sufficient space is available on the existing road surface, wide curb lanes can be accommodated at little or no cost.

4.2.6 Integrating Bikes and Transit

In the absence of good bike and pedestrian access to transit stations, the only way to get people to leave their cars and use public transportation is to provide park-and-ride facilities or a feeder bus service. The cost of providing these services is considerably greater than the cost of providing facilities to promote pedestrian and bike access. The City should improve access and facilities for non-motorized transportation at major transit facilities, such as LRT stations. In a typical urban setting trips of five kilometres or less can be made as quickly by bike as by car.
4.2.6.1 Bikes On board

Following the completion of a successful trial period, City Council approved Bikes on Board as a permanent program. This program enables LRT riders to bring their bikes onto the train, with no extra charge, during non-peak periods. This program represents a significant step towards integrating bikes and transit Through the Bikes on Board program a far greater area of the city has become accessible through the combined use of the bike and LRT. Calgary Transit should consider changing the seating arrangement at the ends of selected LRT cars to better accommodate bikes and keep entrances clear. Consideration should be given to allowing cyclists to board the LRT during peak periods in the non-peak direction. The current peak hour restriction for bikes on the LRT limits this program's benefit for commuter cyclists.

4.2.6.2 Bikes On Buses

Calgary Transit conducted a trial program of providing bike racks on several bus routes. This program was discontinued due to limited use and difficulties with the operation of the rack. The major operational problem associated with the use of the bike racks has since been resolved. The existing racks should be installed on routes that service the airport during the summer months. Providing bike racks on these routes would offer a valuable service to touring cyclists who are visiting the Calgary area.

As Calgary Transit replaces existing buses with low floor buses, consideration should be given to allowing bikes dire& onto these buses, as per the Bikes On Board program. Bikes are permitted on all bus routes in: phoenix, Arizona: Dallas, Texas; Pierce County, Washington and on selected routes in many other North American municipalities. Experience has shown that these programs can be successful and that operational and maintenance problems can be overcome. Calgary Transit could conduct a trial program similar to Bikes on Board if such a service is viable.

4.2.6.3 Bike Lockers

To better serve bike-and-ride customers, secure bike parking should be provided at all LRT stations. The cost of providing surface car parking stalls at LRT stations is approximately \$3,500 per stall while the cost of providing fully enclosed bike lockers is in the order of \$500 per locker. Currently, The City of Calgary operates 11 park-and-ride lots in conjunction with the LRT system. In total these lots provide over 7,000 free surface parking stalls. The car parking is supplemented by only 10 bike lockers provided at one LRT station, Brentwood. Calgary Transit should consider increasing the number and locations of bike lockers at LRT stations to supplement existing park and ride facilities.

An evaluation of the bike locker service operating at Brentwood LRT station indicated that usage was moderate during the first year of operation. Surveys of locker users indicated a very high level of satisfaction with the service. The experience gained from the locker installation at Brentwood LRT station should be used to improve the service at future installations. In order to be successful, this service must be actively promoted. The 1992 Commuter Cyclist Survey indicated that 68 percent of respondents were unaware of the bike lockers at Brentwood LRT station.

RECOMMENDATION #8

• That by July 1998, Calgary Transit evaluate additional methods to accommodate cyclists on the transit system where such methods are viable and economical and not an inconvenience to other transit patrons. The evaluation should include the potential for revising the seating arrangements on existing and new LRT trains to better accommodate bikes.

RECOMMENDATION #9

• That all future LRT facilities integrate bike parking and be linked with bike routes.

RECOMMENDATION #10

• That Calgary Transit investigate the potential to modify existing LRT facilities to better accommodate bike parking and to develop a plan for better awes for pedestrians and cyclists.

RECOMMENDATION #11

• That the Calgary Transit bike locker program be expanded and a report detailing the program be forwarded to the Standing Policy Committee on Transportation, Transit and Parking in July 1998.

RECOMMENDATION #12

• That a trial program be carried out to determine the feasibility of accommodating bikes on board Calgary Transit's fleet of low floor buses and a report be brought to the Standing Policy Committee on Transportation, Transit and Parking in July 1998 detailing the trial.

RECOMMENDATION #13

• That Calgary Transit post Pathway and Bikeway Maps and directional signing on LRT platforms and stations to inform transit patrons of the location of adjacent bikeways and pathways.

4.3 FACILITY RECOGNITION

Currently the use of sidewalks, walkways and pathways are governed by the Highway Traffic Act, The City of Calgary Traffic By-law 26M96 and the Parks By-law 36/76. Unless specifically designated, these facilities are for pedestrian use only. However, many such undesignated facilities (local pathways, 3 metre walkways) are being regularly used by cyclists. In fact, many of these have been identified as necessary connections in the regional pathway system. It is likely that these facilities will continue to be incorporated as links in the regional pathway system. The existing Pathway and Bikeway Map adequately outlines which facilities are available to cyclists. Additional signage would also indicate this to system users.

4.4 FACILITY/SYSTEM PLANNING AND DEVELOPMENT

4.4.1 System Planning

Calgary's recreational pathway system began as informal walking paths along the Bow River. The recreational pathway system has grown and expanded over the years to the point where it is the city's most popular and well used recreational amenity. Results from the 1991 Urban Parks Survey show the high regard the citizens of Calgary have for the pathways. Calgarians also place a high level of importance on the development of alternate transportation modes, as indicated in the results of a GoPlan survey.

Recreational and commuter systems must be developed simultaneously. The distinction between commuter cycling and recreational cycling can become very blurred. Many individuals leave home in the morning for a recreational bike ride which just happens to end at their place of work. Recreational and commuter/utilitarian facilities must be developed as a system and be designed to enhance and complement one another. It is important to note that some of the direct pathways, such as the Bow River north side pathway, work very well for both recreational and commuter cycling and other more circuitous pathways, such as the Elbow River pathway, work best for recreational cycling.

4.4.2 System Improvements

The continuity and operation of the existing system should be reviewed. Emphasis should be placed on ensuring that existing facilities are working safely and efficiently. The City of Calgary needs to maintain an inventory of the existing pathways and bikeways system. The inventory could be used as a basis for enhancing the existing system. All routes should be evaluated to determine their suitability for recreation and commuting.

4.4.2.1 Pathway/Road Interface

Interface areas present unique operational, safety and design challenges which impact several departments. In these situations an inter-departmental, inter-disciplinary planning approach would help address the concerns of all departments involved and enhance the continuity of the system. A process should be established for reviewing the existing system to enhance continuity and resolve existing interface problems.

To address the concerns noted above the Transportation Department has circulated a proposal for the creation of a Bikeway/Pathway Technical Review Committee. Once all affected parties have been consulted a Board of Commissioners item will be prepared for approval.

RECOMMENDATION #14

• That by July 1998, the Transportation Department prepare a report for the S.P.C. on Transportation, Transit and Parking detailing the formation of a Bikeway/Pathway Technical Review Committee that would review all existing and future pathway/bikeway/road interfaces to ensure continuity, coordinated development and safe operation.

4.4.2.2 Mid-block Crossings

Mid-block crossings occur in locations where pathways intersect road right-of-ways between existing intersections. Mid-block crossings present certain safety and operational concerns. The Transportation Department is currently in the process of developing a mid-block crossing policy. The policy will take into consideration items such as natural features and subdivision design. It should recognize natural desire lines and accommodate all user groups equally.

The City of Calgary believes that every effort should be made to create safe bike/pedestrian facilities. The development of a mid-block crossing policy is one example of the progressive steps being taken to eliminate potential problem areas. Many of the existing pathway/bikeway and road interfaces are poorly marked and are not built to a standard design specification. Action should be taken by the City to identify problem areas, develop creative solutions and to eliminate problems at future interfaces before they occur.

RECOMMENDATION #15

• That by July 1998, the Transportation Department develop a mid-block crossing policy to address safety and operational concerns associated with mid-block crossings.

4.4.3 Expansion

As Calgary continues to grow, a long range plan to guide future pathway and bikeway development becomes essential. This plan must include a review of existing natural features and significant natural areas and potential pedestrian and bike recreation and transportation corridors. This information should include provisions for connections to park areas, LRT stations and other significant origins and destinations. This information, in map form, should clearly indicate future facility requirements. This long range plan will be a valuable tool to ensure system continuity in future developments. A draft Pathways & Bikeways System Map, located in Appendix F, could provide the starting point for the plan.

Consideration of both local and regional bike and pedestrian movements should be given greater emphasis in community plans, Growth Area Management Plans, Area Structure Plans, Outline Plans and Area Redevelopment Plans. Calgary Parks & Recreation has been very progressive in these areas with its Linear Park Policy and its work with the development industry in the creation of local and regional pathway systems. The efforts of Calgary Parks & Recreation could be enhanced by closer cooperation with the Transportation Department on use of public roadways for the development of bike and pedestrian commuter links.

Calgary Parks & Recreation in the past has undertaken a series of user counts to assist in evaluating usage patterns and prioritizing engineering, education and enforcement programs. This counting program should be formalized through the budget process.

RECOMMENDATION #16

• That by January 1999, the Transportation Department and Calgary Parks & Recreation develop a long range plan for the development of pathways and bikeways. The map in Appendix F can act as the starting point This should include planning future alignments in new developments for regional and local bike systems, determining missing links in the existing system, identifying high use bike corridors and implementing a warrant/priority system for retrofitting existing facilities and developing new ones. "In particular, the regional pathway line on 52 St. N.W. between Bowness Road and Home Road N.W. and the recreational pathway portion of the pathway line from 65 Street N.W. to the end of Bow Crescent N.W. at the C.P.R. tracks right-of way for consultation with the local property Owners and residents." It is extremely important to ensure that communities are involved, through the community planning process.

RECOMMENDATION #17

That Calgary Parks & Recreation formally adopt a pathway user counting program as part of the 1998 budget process.

ENGINEERING OF BICYCLE FACILITIES

5.1 INTRODUCTION

The provision of bike facilities requires that design standards be applied to achieve a safe and efficient system. The standards must be easily understood, consistent, clear and should consider aspects such as vehicular conflict, pedestrian/vehicle interfaces, adjacent land uses and growth requirements to name a few. The design criteria outlined in this section should provide a sensible guideline for the provision of facilities that are sensitive to the needs of cyclists as well as all other users.

5.2 BIKEWAY DESIGN STANDARDS

A bikeway is defined as a designated facility where bikes share the space with motorized vehicles. This includes existing roads without special facilities, roads with additional lane width, roads with bike lanes and roads with pavement markings for the exclusive use or preferential treatment of cyclists. To better assist in the definition of bikeways and their acceptability for commuter and recreational traffic, bikeway level of service criteria have been developed (see Figure 1). These criteria will be used to establish which factors may need to change to allow a road to be acceptable as a bikeway. The remaining sections in this bikeway chapter attempt to quantify the data used in the criteria.

As the cyclist must generate the bike's momentum it is preferable that bike routes are free flowing with limited stops. Routes with frequent stop signs will be avoided in favour of those that grant the cyclist continuous movement.

Traffic volume is a major consideration when assessing the feasibility of a bikeway along a particular street. Despite the importance of traffic volume counts, there are no clear guidelines identifying which streets are more suitable for bike travel than others. The volume of vehicles affects the "desirability" of a mute, but does not indicate its suitability for bike travel. While a low volume is desirable, factors such as lane width, number of intersections and driveways, parking conditions, directness, and continuity should be considered in the selection process. The degree of risk to cyclists is directly affected by the number of intersections, driveways and parked cars, as well as traffic volume. As stated by the Federal Highway Administration (FHWA):

> Generally, urban street and highway systems will be characterized by low volume neighbourhood streets, and high-volume collector and arterial streets and highways. High ADT's (average daily traffic volumes) are a reality for most urban cyclists making purposeful trips because the most "efficient" routes will be collector or arterial streets. For urban recreational routes, it is possible to select routes which use lower ADT streets, but greater priority will likely be given to routes with adequate lane width. Perhaps the best use of ADT in urban area route assessment is to consider it a measure of the relative magnitude

of factors which are associated with individual motor vehicles. This would include intersections and driveways (turning movements), and parking. These factors constitute risk for cyclists. This approach would treat ADT as a measure of exposure: the higher the ADT, the greater the potential risk for cyclists associated with these factors. (Federal Highway Administration, 1986; Highway Route Designation Criteria For Bicycle Routes, Washington D.C.)

Points	Traffic Volume (vph) in lane adj. to bicycle	Curb Lane Width (m)	Motor Vehicle Speed (km/h)	Driveways per km.	Percent Trucks	Traffc Control Devices per km.
1	<50	>4.5	<41	<8	<5	2
2	50 to 149	4.3 to 4.5	41 to 50	8 to 12	5 to 7	3
3	150 to 249	4.0 to 4.2	51 to 55	13 to 20	8 to 10	4
4	250 to 349	3.7 to 3.9	56 to 60	21 to 25	11 to 12	5
5	>350	<3.7	>60	>25	>12	>5

Figure 1. Bikeway Level-of-Service Criteria

Total Points	Level-of-Service
<10	А
10 to 14	В
15 to 18	С
19 to 24	D
>24	F

Level-of-Service Recommendations						
Category	L.O.S.					
Recreational Bikeways	A & B					
Commuter Bikeways	ABC&D					
Not recommended for bikeway designation	F					

5.2.1 Lane Widths

The standard lane width on major roads is 3.7 metres while the standard for primary collectors, collectors and residential roads is 3.5 metres. Parking lanes are typically 2.5 metres wide; 3.5 metres is required for a shared parking/driving lane. Figures 2 through 7 show typical cross sections for approved road standards. Wide curb lanes are preferred by cyclists in restrictive urban environments as they provide the opportunity for automobiles and bikes to proceed safely without reducing the road capacity. In many cases, other municipalities add road markings to indicate that the extra space is available for cyclists.

On major roads a lane width of 4.3 metres from the face of the curb to the centre line should be sufficient for bikes and automobiles to proceed together. Lanes wider than 4.6 metres would only encourage the operation of two automobiles in the one lane. Wider lanes on existing roads may be achieved by remarking the lanes and "borrowing" additional space from the other lanes. Figures 8 through 11 show possible revised road standards. The physical accommodation of both bikes and vehicles along curb lanes is a very important consideration in a shared use environment. A curb lane width of 4.3 metres from the face of curb provides sufficient space for cars to safely overtake bikes without crossing into the neighbouring lane. A width of 4.3 metres allocates 0.6 metres to the travelling bike, 0.15 metres from the bike to the "lip of gutter", and 0.25 metres from the area in which a vehicle would travel, leaving 3.3 metres of manoeuvring space for a car (PDOT, 1976). If the route is frequented by trucks or buses the minimum curb lane space must allow for their increased width.

Studies indicate that curb lanes 4.3 metres or wider result in bikes having no impact on the capacity of the road, and do not impede the safe operation of the road. (Highway Capacity Manual, Special Report 209, 1985, Transportation Research Board.)

The type of facility alternatives available to accommodate cyclists varies significantly with the built environment and the area of the city being considered. Some of the areas and potential facility options are discussed below.

With the exception of the Bow River corridor, Calgary's Central Business District offers very limited opportunities for providing recreational pathways. Yet, it is an area characterized by the highest concentration of pedestrians, cyclists and motorists in the existing network. In this area of the city the most practical facility alternatives are separate bike lanes and bike routes with wide curb lanes. Steps should be taken to identify several east-west and north-south routes that would serve commuter cyclists' needs and would be retrofitted to accommodate them.

There are certain roads within the city that serve as major transportation corridors but offer limited Opportunity for providing additional accommodations for bike movement Examples of such roads would be Macleod Trail, Highway 1 (16 Avenue N.W.), 17 Avenue S.W., 14 Street North. In these situations it may be possible to create adjacent free flowing bike routes along residential streets. Providing such facilities can lead to other problems. Motorists soon recognize that a bike route located a block away from a busy street offers free flow movement and may create local traffic problems on these routes. Various options exist to mitigate this problem; however, the creation of such facilities requires careful review on a site specific basis. Facility improvements at the local or community level present an opportunity to significantly improve the role of bike and pedestrian transportation. Trips to school, the shopping centre or the local community centre are all utilitarian trips easily made on foot or by bike. To promote these trips it is necessary to examine the structure of communities. Modern communities bounded by major roads make it difficult for people to leave their community on foot or by bike. There is a need to undertake studies to determine what pedestrian and bike links are required at the local level. Steps could then be taken to provide the necessary links and to promote their use. The Sustainable Suburbs Study recommends a number of measures to improve cycling opportunities in new communities including the strategic location of community facilities and a street layout that emphasis direct links to those facilities. Local networks should be tied to the regional system to provide an integrated bike/pedestrian network.

RECOMMENDATION #18

• That by July 1999, the Transportation Department develop a network of routes which facilitate bike & pedestrian access and movement within the Downtown Central Business District

RECOMMENDATION #19

• That by July 2000, the Transportation Department identify and establish bike routes adjacent to major roads where conditions preclude the accommodation of cyclists.

RECOMMENDATION #20

• That when lane marking is done on major roads, the width of inside lanes be kept to the minimum standard of 3.5 metres with all additional width being allocated to the curb lane.



Figure 2. Divided Major Road

Figure 3. Undivided Major Road



Figure 4. Primary Collector



Figure 5. Collector-Parking Both Sides





Figure 8. Designated Bicycle Lane



designated by painted line







Median or Centre Line

Figure 11. Combined Bicycle/Parking Lane Option



(Primary Collector)

5.2.1.1 Parking Conditions

When determining the suitability of a section of street for bike travel it is important to consider parking conditions. The sudden opening of a car door by the occupant is a very real danger to the cyclist. Vehicles withdrawing from or rejoining the flow of traffic may conflict with the cyclist travelling between the traffic flow and the parking lane. A lane shared by bikes and parked cars should have a minimum width of 4.0 metres. If that lane is also used for vehicle travel or if parking is restricted during certain hours of the day the lane must be 4.3 metres.

On narrow roads where lane width is restricted, consideration should be given to restricting parking if the road is part of the bikeway network. Downtown streets that have peak hour parking restrictions could provide wider parking lanes that could better accommodate cyclists and a parked car in the same lane when parking is permitted and provide a wide curb lane which can accommodate both a vehicle and a bike during the peak periods when parking is not permitted.

5.2.2 Gutter Widths

Two types of standard gutter measure 250 millimetres and 500 millimetres wide. The curb associated with the gutter can either be rolled (low profile) or standard (vertical). Collector and residential roads are designed to have a low profile rolled curb, except on the medians and in areas identified as bus zones, where standard curbs are used.

5.2.3 Catch Basin Design

Cyclists have registered a concern with the current standard, type K catch basin as shown in Figure 12. The openings in the grate run parallel to the direction of bicycle travel. Figure 13 shows an alternative design which is more conducive to bicycle traffic.

To address this concern, the Engineering and Environmental Services Department, Sewer Division should undertake a review of alternative designs. A test program should commence in 1997 with a view to adopting a new bicycle friendly sewer grate design suitable for Calgary's conditions.



Figure 12. Existing Standard Sewer Grate



5.2.4 Intersection Design

There is no doubt that bikes at intersections tend to complicate pedestrian movements and automobile turning movements. Most bike accidents occur at intersections, typically involving turning movements. Cyclists proceeding directly through an intersection often collide with automobiles turning.

When bike lanes are marked on the road, care must be taken at intersections to account for all automobile and bike movements. Figures 14 through 15 are examples of intersections with marked bike lanes.

Urban intersections frequently encounter traffic volumes that fluctuate during the peak and off-peak periods of the day. Detector loops embedded in the roadway of many city intersections, including the left turn lane, often lack the sensitivity to detect the bike. While the high level of control at these intersections may contribute to the safety of the cyclist in high volume/speed situations, they will hinder travel during off-peak periods if the cyclist cannot easily activate the signals. If a push button is situated close to the edge of the road and is conveniently a d , cyclists may use it to activate the signal.





5.2.5 Traffic Signals

Cyclists have to obey traffic signals. At intersections where bike lanes are included, bikes should be considered in the timing of traffic signals. It may be important to increase the all red time in order to allow cyclists to safely clear the intersection. Detector loops should be designed to accommodate cyclists. The detector loops are imbedded in the roadway and respond to the magnetic field induced by the metal of vehicles, and these should include bikes. The sensitivity may be adjusted to detect a bike without detecting passing vehicles. Detectors could be located in the bikeways at intersections, including left turn bays, to activate the signals for bike traffic. Figure 16 includes examples of detector loops for bikes.

A substantial number of motorist-caused bike accidents occur when motorists enter a signalized intersection before the cyclist travelling in the cross direction has cleared it. It is important therefore to take the cyclist's clearance time into consideration when evaluating an intersection. As a general rule, an additional three seconds clearance time should be used at signals located on bikeways. However, this must be balanced by considering the impact on overall traffic flow and signal coordination.



5.2.6 Signs

All signs for bikes should follow the guidelines of the Manual of Uniform Traffic Control Devices for Canada and The City of Calgary Traffic Operations Policy Manual. In general, bike signs may be regulatory, warning or informative in nature. Signs should be consistent with motor vehicle signs, even if they are posted within a park. Appendix B contains the recommended bike signing policy. Bikeway signs should be maintained and replaced as necessary. Route continuity and clarity depends on the maintenance of signs. Potential problems include signs overgrown by vegetation, vandalized signs, incorrect signs and missing signs.

5.2.7 Crosswalks

Cyclists must obey the same rules as pedestrians when using crosswalks. They must dismount and walk their bike through the crosswalk.

5.2.8 Grades

Extreme grade conditions will erode the cyclist's momentum when ascending a hill, and may create a safety problem on descent. Grade conditions should therefore be included in the assessment process. The Technical Handbook of Bikeway Design (1992) suggests that grades of three percent or less do not usually create a problem for the cyclist while streets with grades greater than six percent should be avoided in routes recommended for bike travel. The length of the climb or descent is also important when grades are being considered. If intermittent grades exceeding the recommended six percent are unavoidable they should be short so as not to discourage use of the bike route.

5.2.9 Pathway Links

When pathways intersect with mads or other paths, care should be taken to safely move all users. Appropriate signing of the intersection is required to warn pedestrians, cyclists and motorists. Due care must be taken to maintain a visibility triangle as shown in Figure 17. Horizontal and vertical alignment standards should be followed to ensure adequate stopping sight distances. Allowance should also be made to accommodate a smooth transition between the facilities. This may be achieved using wheelchair ramps (curb cuts).



RECOMMENDATION #21

- That the following requirements be implemented by January 1999 on all designated on-street bikeways and other roads that are primary commuter cycle routes:
 - traffic-actuated signals that detect bikes.
 - spring street sweeping on designated bikeways.
 - winter snow clearing on designated bikeways.
 - wide curb lanes on multi-lane high volume streets.
 - parking restrictions where necessary.

RECOMMENDATION #22

• That the Engineering & Environmental Services Department, Sewer Division, undertake a review of alternative sewer grate designs with a test program commencing in 1997.

5.2.10 Bike Racks

Modem bikes vary greatly in their shape, style and accessories. A good bike rack will accommodate a wide range of bike designs and allow the user to lock the frame and a wheel to the rack and will not bend the wheel. The manner in which the bike should be locked must be easy to understand. There should be enough space around each parking stall to allow for easy access and locking. Bike parking facilities can be categorized into two classes. Class 1 facilities are lockers or controlled arm where a bike can be stored, for example, a bike locker. Class 2 facilities include any device that is specifically designed to park bikes, for example, a Ribbon Rack or U-Rack.

In order to increase the potential for cycling in Calgary, it would be appropriate to consider making bike parking mandatory for new developments. Appendix C outlines some initial bicycle parking guidelines and provides additional details concerning parking design and placement The location and layout of bike parking should not obstruct pedestrian movements or access to buildings. The design and location should be integrated into the overall site plan of a development. It should be noted that, beginning in 1992, the Transportation Department began requesting the provision of bike parking facilities in specific types of new developments at the applicant's expense and on a voluntary basis. Utilization of these facilities over time will help us develop a set of bicycle parking requirements appropriate for The City of Calgary.

RECOMMENDATION #23

• That the Planning & Building Department, in cooperation with the Transportation Department, continue to work toward the development of bike parking requirements for inclusion in The City of Calgary Land Use By-law 2P80.

5.3 MISCELLANEOUS ROADSIDE HAZARDS

The bike is a narrow, lightweight vehicle which often shares the road with trucks and motor vehicles, or a pathway with pedestrians, joggers and other cyclists. In the event of an accident, the cyclist is offered no protection by the bike. Due to the vulnerability of cyclists and pedestrians, it is important that their safety be the greatest defining factor when determining the suitability and design of a facility for bike use. As previously noted, the volume of motor vehicle traffic should not be the sole factor used to judge the level of safety of a roadway; many other components play important roles. To diminish the potential for accidents many factors must be thoroughly examined. When appropriately considered and applied, these components contribute to the cyclist's operating environment and enhance the user's safety.

5.3.1 Railway Crossings

Railway crossings should ideally be placed at right angles to avoid bike wheels being trapped in the flangeway. Where the tracks do not cross at right angles, the bikeways or paths should be widened at the approach to the tracks. This will allow the cyclist to manoeuvre the bike into a position close to perpendicular to the tracks. Where this is not possible, flangeway fillers should be used to enhance safety. It is also important that the railway tracks be flush with the bikeway or path. Examples of railway crossings with filler strips and pathway widening are shown in Figure 18.



Detail A: Rubber Crossing with Filler Strips

5.3.2 Traffic Barriers

Bikeways should be free of barriers to operate safely. Sign posts, signals and light standards should be offset from the bikeways and not interfere with the bike traffic. This is the current practice in Calgary.

5.3.3 Bridges

All bridges should be designed or retrofitted to accommodate bikes. This may be accomplished by widening the curb lane with a specially marked lane identifying the bike area. A second solution is to install curb cuts to allow shared use on a sidewalk with a minimum 2.5 metre width. The best solution is to accommodate pedestrians and cyclists in the planning and design stage of the bridge.

5.3.4 Road Irregularities

As most bikes do not have a suspension system, cyclists are keenly aware of pavement irregularities and features. Attention must be paid to pavement surface conditions when determining the suitability of a route for bike use. For roadway travel, the surface condition along the right side of the street is most important to cyclists. Pavement overlays, gutters and other pavement features may create ridges running parallel to the direction of travel and present a hazard to cyclists.

The Streets Maintenance Section, Engineering and Environmental Services Department, is responsible for repairing potholes and other irregularities on roads. The priority of repair is based on roadway classification, traffic volumes and public complaints. Bikeways should be identified through the budget process as requiring extra attention. This should include a requirement for snow clearing in winter and gravel sweeping in spring.

A priority system should be established which identifies heavily used on-street bike routes. These routes should be included in the spring street cleaning program. Early sweeping of main bike routes eliminates gravel and other debris which collect along the sides of roads during the winter and creates a safer riding environment,

As with the spring street sweeping, a priority system should be developed to identify bike routes which, if cleared of snow, could significantly extend the cycling season. Some of these routes may already be cleared, and in these cases care should be taken to ensure that the area of the road on which cyclists travel is kept dear and does not serve as the depository for snow from the rest of the road. A related issue is the propensity of plough trucks to move snow off the roads and onto adjacent pathways and sidewalks. This makes cycling and walking difficult and potentially dangerous. Greater care and priority should be given to keeping heavily used parts of the bike and pedestrian network snow free.

5.4 PATHWAY DESIGN STANDARDS

Calgary's pathways are multi-use facilities intended for the recreational use of pedestrians, cyclists and other non-motorized users. The objective of the system is to develop a network of paths linking residential areas, parks, natural areas, riverbanks and other public recreation areas. However, there is considerable growth in the number of users that are using the pathway system to commute.

Planning and design guidelines help to create a safe and enjoyable multi-use pathway incorporating the needs of pedestrians and cyclists. The needs of the cyclists are more stringent and therefore tend to dictate most of the design details. Construction guidelines ensure a functional, cost-effective facility.

5.4.1 Planning and Design Guidelines

5.4.1.1 Alignments

Regional pathways in new communities are to be coordinated and linked through Growth Area Management Plans, Area Structure Plans and Outline Plans. Local pathways should link directly or indirectly and should supplement the regional system. Continuity is maintained by minimizing the amount of on-street links in the system. Linear parks are typically designed with pathways as a feature facility. These paths may or may not form a part of the regional and local pathway system.

The development of pathways is also referenced in specific policy documents such as the River Valleys Plan and the Urban Parks Master Plan.

5.4.1.2 Pathway Widths

A local pathway is expected to carry low volumes of traffic and may be designed with a width of 2.5 metres. A regional pathway should have a minimum width of 3.5 metres. Twinning may be considered depending upon the user mix and other factors, as discussed earlier as part of the Pathway User Conflict Index. Pathways in linear parks should have a minimum width of 3.0 metres.

As cyclists travel along a pathway they frequently operate in the same area as pedestrians. This shared use must be recognized and provisions must be made to reduce the risk to all pathway users. It is recommended that a two-way, paved pathway have a minimum width of 3.0 metres. In unique circumstances a minimum of 2.4 metres may suffice. To clarify the proliferation of different pathway widths, in 1989 Calgary Parks & Recreation wrote in a report to the Park/Recreation Board that the department should work towards a standard pathway width of 3.6 metres on multi-use pathways.

5.4.1.3 Gradients

Grades on pathways should be kept to a minimum as many riders, recreational and commuters alike, will avoid paths with long, steep grades. Grades should not exceed eight percent. Grades between five percent and eight percent are acceptable for sections less than 10 metres. Grades between two percent and five percent are acceptable if they are less than 150 metres long. Unpaved paths should avoid grades exceeding three percent.

5.4.1.4 Design Speed

Design speed is defined as the maximum safe speed at which the pathway could operate under a "worst case" scenario. Bike operating speed is dictated in part by pathway surface condition, bike condition, physical condition of the cyclist and physical configuration of the pathway. Bike speed should not exceed 95 percent of the design speed. A proper design speed should safely accommodate a wide range of users and conditions. Posting a low pathway speed limit will not be effective if the design speed is high. On the other hand, using an arbitrarily low design speed may lead to accidents if users are forced by design to reduce speed in an area that could accommodate faster traffic. A minimum design speed should be 30 kilometres per hour and should be increased where grades exceed three percent.

5.4.1.5 Sight Distance

A key component of the pathway system is the ability of the users to see and react to conditions and situations on the pathway. Designing for cyclists ensures that all users have acceptable sight distances. There is insufficient data to determine stopping sight distances for users such as in-line skaters (due mainly to lack of braking information). Stopping sight distance for bicycles is described below:

Minimum S = $0.694V + \left(\frac{V^2}{255(f + (\frac{G}{100}))} \right)$

S = stopping sight

where:

distance (metres)

V = bike design speed

f = coefficient of friction = 0.25 for paved surfaces

G = grade, percent (upgrade is positive and downgrade is negative)

As an example, if we are on a pathway with a two percent upgrade and a design speed of 30 kilometres per hour the minimum stopping sight distance is 34 metres. Figure 19 may be used as a quick reference to determine approximate stopping sight distances.

To incorporate stopping sight distance into design criteria, Figure 20 shows the minimum length of vertical curve required to accommodate the required minimum stopping sight distance. It assumes the cyclist's eye height to be 137 metres above ground level and any objects at ground level.

Figure 19: Minimum Stopping Sight Distance for Bicycles

Grade %	10	15	20	25	30	35	40	45	50
12	8	13	18	_	-	_	-	_	-
10	8	13	18	24	-	-	-	-	-
8	8	13	19	25	32	-	-	-	-
6	8	13	19	25	32	40	-	-	-
4	8	13	19	26	33	41	49	-	-
2	8	4	20	26	34	42	51	61	-
0	9	14	20	27	35	44	53	63	74
-2	9	14	21	28	36	45	55	66	77
-4	9	15	21	29	38	47	58	69	81
-6	9	15	22	30	39	50	61	73	86
-8	9	16	23	32	42	53	65	78	92
-10	10	16	24	34	44	56	70	84	100
-12	10	17	26	36	48	61	76	92	110

Design Speed, (km/h)

Note: Assumed paved surface, wet conditions.

Stopping distance in metres

Due to the multi-use nature of pathways, it is important to consider stopping sight distance around horizontal curves. The minimum design curve radius is as follows:

min R = v²/(127(e+f))
where: R = minimum radius, m
V = speed, km/h
f = coefficient of lateral friction
e = superelevation, m/m

Source: Transportation Association of Canada, Urban Supplement to the Geometric Design Guide for Canadian Roads, September 1995.

As an example, with f = 0.28, e = 0.02 m/m, and a design speed of 30 km/h, the minimum curve radius is 24 metres. With this in mind, Figures 21A and 21B show the method used to determine minimum distance an obstacle needs to be away from the pathway to maintain the minimum stopping sight distance. This calculation must be used to determine required safety clearances on curves.

5.4.1.6 Safety Clearances

To ensure a clear operating environment on straight sections of pathway, no objects, including trees and shrubs, should be within 1 metre of the pathway. Overhead clearance should be a minimum of 3 metres. Further, a visibility triangle, as per Figure 17, should be maintained at all intersections. To avoid pathway damage cawed by roots it is recommended that shallow-rooted trees be placed at least 5 metres from pathways.

Figure 20. Crest Vertical Curves for Bicycles

algebraic	Design Speed km/h									
of grade, (A), %	10	15	20	25	30	35	40	45	50	
2	-	-	-	-	-	-	-	-	11	
5	-	-	-	-	15	32	51	71	100	
10	-	-	13	27	44	69	102	145	199	
15	-	10	22	40	67	104	153	-	-	
20	3	14	30	54	-	-	-	-	-	
25	6	18	37	-	-	-	-	-	-	

Minimum curve length, m

Note:

Above heavy line, stopping sight distances are greater than the curve length.Below heavy line, stopping sight distances are less than the curve length.Assumes paved surface, wet conditions.Stopping distance in metres.

The following formulas are used to determine the minimum curve length:

$$L = 2S - \frac{274}{A}$$

(when stopping sight distances are greater than curve length); or

$$L = \frac{AS^2}{274}$$

(when stopping sight distances are less than the curve length);

where:

L = minimum vertical curve length S = minimum stopping sight distance A = algebraic difference in grades, %

Note: eye height is assumed to be 1.37m with object height assumed to be zero.

Source: Transportation Association of Canada, Urban Supplement to the Geometric Design Guide for Canadian Roads, 1995.

Figure 21-A, Lateral Clearance on Horizontal Curves



Lateral clearance to obstructions on the inside of horizontal curves is based on the need to provide sufficient sight distance to an object on the intended path of the bicycle for which the rider has a need to stop. The line of sight to the object is taken to be through the comer of the visual obstruction, and the stopping distance is measured along the intended path, which is taken to be the inside edge of the inner lane.

Figure 21-A illustrates the method of measurement and gives a mathematical expression for the calculation of lateral clearance. Figure 21-B gives the lateral clearance for a range of radii from 10 to 80m and stopping sight distances from 10 to 100m. The lateral clearance values shown occur at the mid point of the curve.

Clearance (C), m										
Radius Stopping Sight Distance (S), m										
(R)m	10	20	30	40	50	60	70	80	90	100
10	1.2	4.6	9.3	-	-	-	-	-	-	-
15	0.8	3.2	6.9	11.5	-	-	-	-	-	-
20	0.6	2.4	5.4	9.2	13.7	18.6	-	-	-	-
25	0.5	2.0	4.4	7.6	11.5	15.9	20.8	-	-	-
30	0.4	1.7	3.7	6.4	9.8	13.8	18.2	22.9	27.9	-
35	0.4	1.4	3.2	5.6	8.6	12.1	16.1	20.5	25.2	30.0
40	0.3	1.2	2.8	4.9	7.6	10.7	14.4	18.4	22.8	27.4
45	0.3	1.1	2.5	4.4	6.8	9.6	12.9	16.6	20.7	25.0
50	0.2	1.0	2.2	3.9	6.1	8.7	11.8	15.2	18.9	23.0
55	0.2	0.9	2.0	3.6	5.6	8.0	10.8	13.9	17.4	21.2
60	0.2	0.8	1.9	3.3	5.1	7.3	9.9	12.8	16.1	19.7
65	0.2	0.8	1.7	3.1	4.7	6.8	9.2	11.9	15.0	18.3
70	0.2	0.7	1.6	2.8	4.4	6.3	8.2	11.1	14.0	17.1
75	0.2	0.7	1.5	2.7	4.1	5.9	8.0	10.4	13.1	16.1
80	0.2	0.6	1.4	2.5	3.9	5.6	7.5	9.8	10.8	15.1

Figure 21-B Lateral Clearance for Bicycles on Horizontal Curves

Note: No value is shown where deflection angle exceeds 180" (stopping sight distance>R).

Source: Transportation Association of Canada, Urban Supplement to the Geometric Design Guide for Canadian Roads, 1995.

Signing should be done in accordance with the Manual of Uniform Traffic Control Devices for Canada and The City of Calgary Traffic Operations Policy Manual. Interpretive signs may be designed to coordinate with the "theme" or design of the park or facility.

Signs are manufactured and installed by the Transportation Department, Traffic Operations Division, on requisition by Calgary Parks & Recreation. The installation is done according to sign locations established in the field by the Parks and Traffic Operations representatives. General guidelines are as follows:

- 1. Sign posts to be at least one metre from the pavement edge.
- 2. The bottom of the sign to be 2.1 metres from the ground.
- 3. If two signs are installed on one post, they should be side by side.
- 4. If two signs are installed one over the other, the bottom edge should be 2.1 metres above the ground. The bottom sign should be the bike sign.
- 5. The sign installation should not reduce visibility.
- 6. Signs should not be obstructed by vegetation or other obstacles.
- 7. Signs should be used sparingly in order to avoid pathway clutter.

Final sign installations are inspected and approved by Parks & Recreation staff.

5.4.2 Pathway Construction Guidelines

5.4.2.1 Materials

The subgrade should be compacted to 95 percent Standard Proctor Density (SPD). The base should consist of 20 millimetre crushed gravel, compacted to 95 percent SPD with 100 millimetres thickness for regional pathways and 50 millimetres thickness for local pathways. The surface should be a hot mix "B" asphalt 75 millimetres thick.

The change of surface material, for example the addition of stone chips on asphalt pathways, is used where one class of users is to be excluded from a particular portion of pathway. For example, the first 20 metres of pedestrian-only pathway could be treated with stone chips to warn cyclists that they are entering a wrong path. The same treatment could be used to alert users that they are approaching a section of pathway where extra caution is required.

5.4.2.2 Drainage

Pathways should be constructed so that they do not obstruct surrounding drainage patterns or allow drainage across the pathway. Culverts should be used in side slope conditions.

5.4.2.3 Root Barrier

In areas with potential weed and root problems, a root barrier system should be used.

5.4.2.4 Landscaping

All disturbed areas should be rehabilitated with screened loam, raked, rolled and an appropriate grass seed mix applied.

5.4.2.5 Pavement Marking

A program of signing and pathway pavement marking has been employed which allows for improved integration of different pathway user groups.

Pathway marking (painting) is performed by the Transportation Department, Traffic Operations Division. Guidelines include:

- A 50 millimetre solid yellow line is normally painted in the centre of the pathway. In sections
 with poor sightlines, sharp curves, bridges and underpasses and where passing in general is
 not permitted, a double line is used.
- 2. Stencil symbols are used for sections of pathway designated for use by BICYCLES ONLY or PEDESTRIANS ONLY.
- 3. A STEEP HILL symbol should be painted approximately 10 metres before the start of the descent.
- 4. STOP is written prior to dangerous crossings.
- 5. Other stencilled markings include YIELD, CYCLISTS DISMOUNT and SLOW.
- 6. Directional arrows may be used to direct users to the proper pathway(s).

5.4.2.6 Bollards

Calgary Parks & Recreation uses bollards sparingly to warn pathway users that they are approaching or leaving a regional pathway and that caution is required. Bollards are also used to prevent unwanted vehicles from entering the pathway system. If emergency access is required removable bollards are used. Typically, only one bollard is required for a pathway width of 2.5 metres.

Figure 22 shows a typical bollard. They are painted white with the top 200 millimetres painted red. To increase visibility reflective strips should be added to all bollards. Alternative designs such as the one illustrated in Figure 23 should be investigated as alternative systems that control access without restricting access for users with width or mobility problems, such as bike trailers and wheelchairs.

RECOMMENDATION #24

• That as resources permit, all bollards be retrofitted with 25 millimetre retro-reflective tape in the middle of the top red painted band.

5.4.3 Pathway Maintenance

The maintenance on pathways refers to surface, furnishings, signs, pavement markings, vegetation and control structures.

5.4.3.1 Surface

The regional pathway system and associated connections are surfaced with asphalt. The annual maintenance usually includes sweeping and removal of any debris that may have accumulated on the pathway.

Snow removal is done as required on both sides of the Bow River system between 14 Street S.W. and the Zoo (12 Street S.E.). In other areas ice control is done if the build-up warrants it. If the ice becomes uncontrollable the pathway is closed temporarily. Calgary Park & Recreation has successfully undertaken an initiative to have volunteers clear key areas of the pathway during the winter. This works well now, however, as the popularity of cycling continues to increase, consideration should be given to including snow clearing as a standard operating procedure, as per City streets.

Major maintenance repairs are carried out under the Capital Budget Life Cycle Program. This program includes the removal of bumps caused by tree roots, repairing deteriorating asphalt, base improvements on sharp curves, drainage improvements, edge/shoulder improvements and widening.

Figure 22. Standard Bollard



ELEVATION VIEW OF BOLLARD



5.4.3.2 Furnishings

Placement of site furniture, such as garbage receptacles and benches, must comply with section 5.4.1.6. Placement cannot be within one metre of the pathway. Garbage collection is done on a weekly basis. Painting and repairing of other furniture is done as required.

5.4.3.3 Signs and Pavement Marking

Signs and pavement markings will be replaced or repaired by the Transportation Department, Traffic Operations Division, on requisition by Calgary Parks & Recreation.

5.4.3.4 Vegetation

The edge zone of the pathways, approximately one metre on each side of the pathway, is cleaned and the grass cut on an annual basis. Trees smaller than 50 millimetres in diameter are removed from this zone. Branches hanging within 3.0m from the ground are removed or trimmed back. The edge zone is kept clean and increased in width at sharp curves in order to achieve optimum sight lines.

5.4.3.5 Control Structures

Although every attempt is made to keep the pathways barrier free there are cases where items such as bollards, gates and fences are required. Painting and/or replacement of these items is as required.

5.4.4 Proposed Pathway Development

On an on-going basis Calgary Parks & Recreation will evaluate items such as pathway twinning and urgent repair areas (areas raising safety concerns). They will designate and construct additional links in the pathway system and will attempt to respond to reasonable demands from the public within the context of the budget priorities of the Corporation.

5.5 FINAL DESIGN CONSIDERATIONS

Appendix D, Bicycle Facility Design Summary, has been created as a means of providing a concise reference for the design of bike facilities. It summarizes the information provided in this chapter.
EDUCATION

Safe cycling is only learned through years of training and experience. Cycling skills and knowledge of traffic regulations are an important basis for cycling proficiency but they are no more than that (Roelof Wittnink, Educational Goals for Cycling Policy in the Netherlands, Proceedings of Velo Mondial, Montreal, Sept. 1992, p. 398).

From a safety, injury reduction and courtesy perspective, the mandate of a bike education program should be to improve the skills, attitudes and knowledge not only of cyclists but also of other pathway users and motorists who share space with cyclists. In addition to the safety focus, bike education programs should endeavour to encourage the utility value of cycling for commuting and running errands. A secondary mandate for bike education should be to reduce automobile dependency and traffic congestion, and improve air quality and the general level of public health, by increasing the public's awareness of the benefits of cycling and thereby encouraging a switch from motoring to cycling.

It is clear that many cyclists would benefit by improving their proficiency and modifying their attitudes and behaviour. It is equally apparent that motorists and pedestrians need to accept some of the responsibility in making our roads and pathways safer and more accommodating to cyclists.

The delivery of bike education programs to the public by The City will likely take the form of cycling lessons through Calgary Parks & Recreation and the issuance of public service announcements intended to modify cycling behaviour or the cycling environment.

The City has an important responsibility to show leadership (or at least facilitate it) in improving the educational programs available in Calgary that deal with cycling. Although teaching cycling safety to cyclists, drivers and pedestrians may be beyond the scope of The City's involvement, The City can still have a significant effect on the quality and content of programs offered through other agencies.

Vancouver has adopted a Bicycle Education Advisory Board which receives sanction from the city. This board is empowered to approve all bike education materials and curricula proposed for delivery by, among others, the Police Department, Parks Board and School Board in Vancouver. The Board consists of volunteers from associations such as the Canadian Cycling Association, Bicycle Association of B.C., B.C. Safety Council, the Vancouver Police Department, School Board and Parks Board.

Calgary should follow this model, especially as there are few bike programs currently offered in Calgary. Such a board would ensure the responsible development of programs. One of the greatest detriments to bike education presently in Calgary is not a lack of program content or instruction; rather it is the lack of a central organizing agency to find sponsor support, publicize programs and provide a venue in which to hold them.

6.1 CYCLIST EDUCATION - ISSUES/CONCERNS

Most cyclists' injuries result from falls that do not involve motor vehicles, other bikes or pedestrians. The cyclist simply loses control of the bike. This suggests that many injury causing accidents could be averted through improving basic bike handling skills. Of the accidents reported in the 1992 City of Calgary Commuter Cyclist Survey only 26.5 percent involved a motor vehicle.

Many cyclists are unsure of the bike's status as a vehicle and are unaware of the traffic techniques that would allow them to use the roads efficiently in harmony with other vehicles.

Many cyclists do not maximize the enjoyment/use of their bikes for lack of knowledge. Knowledge that would benefit the average cyclist includes strategies for: night and foul weather riding; theft prevention; bike safety inspection; minor repairs; choosing appropriate apparel; safely carrying baggage, etc.

6.2 EDUCATION OBJECTIVES

Programs and information should be geared toward achieving the following objectives:

- To reduce injury causing accidents and injuries to cyclists caused by improper cycling technique.
- To enhance cyclists' bike handling and traffic skills.
- To increase cyclists' awareness of traffic law.
- To encourage recreational cyclists to make more utilitarian trips by bike.
- To maximize the utility and enjoyment that cyclists derive from their bikes.
- To enhance the safely of cyclists interacting with pedestrians, in-line skaters and motor vehicles.

6.3 EXISTING CYCLIST EDUCATION PROGRAMS

6.3.1 Canadian Cycling Association - Can-Bike Skills Program

The Can-Bike Skills Program, presently the only nationally recognized bike education program, was developed by the Canadian Cycling Association and is based on the League of American Wheelmen's Effective Cycling Program and John Forester's Effective Cycling course and book. The program has administrative guidelines that cover such areas as instructor liability insurance and periodic instructor recertification procedures. The program focuses on developing the skills and knowledge necessary to operate a bike in a wide range of traffic and weather conditions.

The Canadian Cycling Association (CCA) is the only recognized national governing body for cycling. Established in 1882, the CCA is funded by Sport Canada and Fitness Canada. Its mandate is to promote safe and efficient cycling as well as to maintain the rights and duties of cyclists. The CCA provides a number of national guidelines from which regional courses can be structured by CCA certified instructors. The program currently consists of the Kids Can-Bike Festival, Can-Bike Skills 1 and Can-Bike Skills 2.

The Kids Can-Bike Festival is a one day multi-station training program intended for children between

the ages of seven and 12. It is organized at the community level and is administered by Can-Bike instructors.

Can-Bike Skills 1(Cycling Sense) is a basic course designed for inexperienced cyclists who want to improve their cycling confidence, knowledge and ability. This course was adapted from the course 'Effective Cycling Intermediate Level' by John Forester.

Can-Bike Skills 2 is an advanced course for cyclists who want to ride more confidently and safely in traffic or who require CCA Can-Bike certification. This course is based on the Effective Cycling Program by John Forester.

6.3.2 K, 1 & 2 Traffic Safety Program

Created to teach ECS (Early Childhood Services), first and second grade students the beginning steps of traffic interaction, this interpretive video program with a teacher's guide, is the newest traffic education program on the market. The program is the first of five comprehensive traffic safety programs designed for K-12 (Kindergarten to grade 12). No instructor qualifications are required.

6.3.3 Calgary Safety Council

"Different Spokes for Different Folks"

A three level bicyclist education program created by the Calgary Safety Council targeted at children and youths ages 4-12. Instructors in this program are not required to have any bike education qualifications.

6.3.4 "Safety City"

This facility is meant to represent a small scale roadway system with signalized intersections, railway crossings, etc. It is used in conjunction with the first level of the "Different Spokes for Different Folk" program.

6.3.5 SPACE - Safety Prevention Awareness Courtesy Enforcement Program

Operated by the Metro Toronto Police Force in conjunction with the Toronto City Cycling Committee, SPACE has been an effective public awareness program to educate cyclists, motorists and pedestrians about safe behaviour on the roads (Vancouver Comprehensive Bicycle Plan, 1988, p. 78). A program such as this could be adopted by the Calgary Police Service and could be aimed at all pathway and road users.

In Oceanport, New Jersey, police have been encouraging better cycling practices among children by dispensing good behaviour citations (consisting of coupons for free treats at local enterprises) to deserving recipients. A program like this that focuses on positive reinforcement would be an effective education and encouragement tool for dealing with young cyclists.

6.3.6 Calgary Bicycle Helmet Committee

This group is a working committee of the Calgary Injury Prevention Coalition. The group was formed to promote cycling safety, education and the use of bicycle helmets.

6.4 CHILDREN'S EDUCATION

Although children's bike education programs have been available locally for some time, the effectiveness of this education (in its present form) has yet to be seen. Incorporating bike education into the school curriculum warrants investigation. However, our public education system should not be viewed as a panacea for providing bike training. The schools are overloaded with extracurricular programs. Since not all students have suitable equipment, schools might have to provide appropriate bikes, helmets, vests and other equipment. Providing bike education programs through schools would require a core of trained instructors or teachers with the necessary training.

6.5 ADULT EDUCATION

Adults often believe that the knowledge and skills required to drive a car is all that is required to operate a bike. Safe cycling is learned through years of training in "effective cycling principles" and experience in a broad range of conditions. Cycling skills and knowledge of traffic regulations are only the most basic requirements for cycling proficiency.

The immediate emphasis of bike education should be to put effective adult bike education programs in place. Skilled adult cyclists could in turn pass on their skills to children. Public role models (i.e. trained cyclists) should have a positive impact on cyclist education once they become a greater presence on the road.

RECOMMENDATION #25

• That The City of Calgary endorse and promote Can-Bike Skills Programs as the standard for bike education programs in Calgary.

6.6 IMPLEMENTATION

Historically, a great impediment to bike education programming in Calgary is not a lack of program content or instructors, but a lack of a central organizing agency to find sponsor support, publicize programs and provide a venue in which to hold them. It is essential that a suitable delivery agency be identified.

The City of Calgary can take an active role in assisting and facilitating local organizations in developing a delivery system for bike education programs. Assistance could take the form of publicity, marketing expert, printing course and promotional material, referral of public to the programs and provision of facilities for the programs.

The City can act as a role model for other agencies by integrating bike literacy into its employee training programs and requesting certification of bike competency when hiring program staff whose duties will involve the use of bikes. This would include the Calgary Police Service Mountain Bike Unit and Calgary Parks & Recreation summer leaders whose work invokes bike use.

RECOMMENDATION #26

• That The City of Calgary assist and facilitate local organizations in developing a delivery system for Can-Bike Skills Programs.

RECOMMENDATION #27

• That The City of Calgary require bike skills certification for all City employees who use bikes in the performance of their job.

RECOMMENDATION #28

• That members of the Mountain Bike Unit (MBU) of the Calgary Police Service be requested to obtain Can-Bike certification.

RECOMMENDATION #29

• That the Calgary Police Service develop a cycling awareness program as part of their outreach to Calgary schools.

RECOMMENDATION #30

• That the Transportation Department and Calgary Parks & Recreation develop and support educational and promotional programs on cycling and other non-motorized modes of transportation, in conjunction with appropriate user groups and special interest groups.

6.7 MEDIA AWARENESS PROGRAM

6.7.1 Television Ads

In 1992 The City of Calgary, Channels 2&7 and Spokes and Attire, a local bike retailer, combined efforts to produce three, thirty-second ads. These ads aired in the spring of 1992 and were well received by the public. Each ad covered a different aspect of cycling. The three subjects covered were:

- bike safety equipment
- pathway safety and etiquette
- information on cycling in traffic.

6.7.2 Radio Spots

The Fitness Canada Task Force on Cycling produced six, thirty-second public service announcements for radio dealing with various topics on cyclist safety targeted at cyclists and motorists in the urban traffic environment

6.7.3.1 Cycling Safely Handbook

The Cycling Safety Handbook is based on a similar concept created by Denys Beams of the Toronto City Cycling Committee. Calgary's version has been expanded and updated to include pathways and bike touring. Printing of the handbook was a cooperative effort of The City of Calgary, Channels 2&7 Sports at Eleven, and Spokes and Attire bicycle shop. It is distributed free by Spokes and Attire bike shop and The City. This handbook attempts to give the cycling public basic information on their rights and duties as road and pathway users and practical information about getting the most from their bike. It is not a substitute for a comprehensive bike education program.

6.7.3.2 The Roads are for Sharing

This brochure was produced by the Canadian Cycling Association (CCA) and provides safety information for cyclists and motorists. The City of Calgary has received distribution rights for this brochure from the CCA and has made the information available to the public.

6.7.3.3 Share the Trail

The Share The Trail series consists of brochures, posters, handbills and retail "hand-tags" promoting pathway and off-pavement riding safety. This is a cooperative effort between Calgary Parks & Recreation, Calgary Area Outdoor Council and Kananaskis Country.

6.7.3.4 Get There and Get Active

Produced by Calgary Parks & Recreation and the Calgary Outdoor Council, this eight panel brochure promotes the health benefits of community cycling, running and walking.

6.7.4 Videos

6.74.1 Ace of Cycling by Seidler Productions Inc.

This 29-minute video docu-dramatization is aimed to teach teenagers and adults safe cycling techniques, road sharing and role-modelling. A teacher's guide is included. Story-line: militant motorist meets snappy cyclist

6.7.4.2 Basic Bicycle Education

Cycling history along with types of bikes and cyclists are discussed in this 18-minute program. This is a well versed program for the beginning adult cyclist.

6.7.4.3 Effective Cycling

John Forester's popular bike education program Effective Cycling is now available on VHS. This 40-minute program hits all the important factors discussed in the Effective Cycling book with visuals to show you how it's done.

6.7.5 Mixed Media

6.7.5.1 Travelling Pathway Show

The Travelling Pathway Show is a seasonal program operated by Calgary Parks & Recreation. Program mobility, flexibility and visibility complement pathway usage educational messages.

6.8 MOTORIST EDUCATION - ISSUES/CONCERNS

Many drivers are confused about cyclists' status on the road As a result, motorists often reduce cyclists to the least common denominator (that of pedestrian) and cyclists often oblige by behaving as "rolling pedestrians."

Programs intended to improve drivers attitudes and reactions around cyclists should focus on achieving the following objectives:

- To reduce injury causing accidents to cyclists that result from motorist error.
- To improve the motorists' knowledge and acceptance of the legal status of bikes within the traffic mix.
- To increase motorists' awareness of safe procedures for accommodating bikes in traffic.

A determination of the content of a motorist education program must first be made. The following topics would be appropriate for a motorist education program:

<u>Bicycle as a Vehicle:</u> Under the Alberta Highway Traffic Act, a bike operator has the same rights and responsibilities as a motor vehicle operator. However, the vehicles do not have the same dynamics. The bike is narrower, usually slower, and less stable than a car or truck, requiring more manoeuvring width at slower speeds (to stay balanced) than at higher speeds. Bikes can stop quicker and accelerate from rest faster than most automobiles. Drivers must consider the inherent differences in width, speed, stability and manoeuvrability when making driving decisions.

<u>Roadway Hazards</u>: Roadway objects and debris that cause no problems to motor vehicles can be particularly hazardous to a cyclist. The motorist should be alerted to the fact that a cyclist may need to change speed or road position quickly to avoid roadway grates, puddles, loose gravel, seams or grooves in the pavement, manhole men, and debris. Cyclists may slow down and change direction to cross railway tracks. Bikes are not stable on the gravel of a soft road shoulder. Motorists should anticipate the cyclist's path by scanning the roadway for hazards. When necessary, motorists should slow down to permit the cyclist time to change lanes. Before exiting a parked car, the motorist should be sure that opening the car door will not interfere with a cyclist's passage.

The Provincial drivers license manual and driver education programs should be reviewed to insure that they address the areas outlined above. Inclusion of these topics in the Provincial drivers manual, road test and written exam would insure that all new drivers are aware of cyclists' right to the road and understand basic vehicle operation principles in the presence of cyclists. Most adults are subjected to driver training only once; incorporation of this material into driver training programs would only reach new drivers. Therefore, delivery of this information would likely have to be carried out via public awareness programs. Such programs would serve to educate drivers who have obtained a drivers license prior to changes being made to the drivers manual and education programs. Making this information available would elevate public awareness and acceptance of cycling and would reduce conflict between motorists and cyclists.

Calgary Transit drivers are already receiving bike awareness training which has been developed inhouse. This program should be assessed for potential inclusion in the driver training program for all City employees.

RECOMMENDATION #31

• That The City support the inclusion of material relating to safe road sharing with bikes in Provincial Drivers license manuals and in public and private driver education programs in the province.

RECOMMENDATION #32

• That the Fleet Services Department, in their employee automobile driver training program, deal with how motorists can safely share the road with cyclists.

6.9 PATHWAY EDUCATION - ISSUES/CONCERNS

The City's recreational pathway network has generated a great deal of pedestrian and bike traffic. Many cyclists perceive the pathways to be a safe haven away from automobile traffic. The close proximity between cyclists travelling in opposite directions (sometimes at considerable speed) on dedicated bike paths has created a level of danger possibly three times greater than that which exists on the roadway (Forester, John,

Effective Cycling, MIT Press, London 1984 p. 157). The close proximity of cyclists and pedestrians in a shared environment may increase the potential for conflict.

Social conflict between pedestrians and cyclists who do not display appropriate pathway sharing etiquette has emerged as a major pathways issue. Due to the narrow construction standard used in most of the pathway system, conflict is a natural consequence of growing user volumes. Although twinning of the pathways into two or more parallel facilities to separate cyclists from pedestrians has been used in the high traffic areas, this approach is not feasible in all high traffic locations (i.e. bridges) and not appropriate in many environments where conservation of the landscape in its natural state is a priority.

As recreational pathways are not highways, the Alberta Highway Traffic Act has no jurisdiction. A recent amendment to The City of Calgary Parks By-law was intended to establish enforceable regulations.

With the development and constant evolution of mountain bikes, Calgary's natural areas are witnessing a growing presence of bikes. Cyclists must exhibit an elevated level of environmental and social consciousness to avoid physical damage to the natural areas and conflict with pedestrians on the single track trails.

The most cost-effective approaches to reducing off-road user injuries and social conflict will be through a combination of education and enforcement.

Education materials and programs targeted at pathway use should be focused on the following objectives:

- To reduce user conflict on recreational pathways through the education of cyclists and other pathway users.
- To reduce the ecological and social impact of bikes in Calgary's natural areas through the education of offpavement cyclists.
- To increase cyclists' and other pathway users' skill levels and awareness of pathway etiquette.
- To increase cyclists' and pedestrians' awareness of low environmental impact travel techniques in Calgary's natural areas.

6.9.1 Implementation

Pathway user education must also reach the pedestrian and in-line skating populations. Therefore, a public awareness program may be the most practical approach to education of all pathway users.

Special interest groups such as the Calgary Pathway Advisory Council should work with the City to explore the possibility of developing educational materials and programs aimed at reducing pathway conflict. Brochures such as the one covering the amendments to the Calgary Parks By-law could be supplemented with information on pathway courtesy and safety tips designed to reduce conflict. Signs could also be strategically located with information regarding proper operating procedures, etiquette and safety messages.

Initiatives such as the Travelling Pathway Show combine elements of education and entertainment delivering them directly to pathway users in a convenient and non-confrontational manner.

Calgary Parks & Recreation has pioneered an environmental awareness program for youth. This program addresses the identification and measurement of soil and vegetation damage caused by various travel practices. Programs such as this should be expanded and promoted as an effective means of educating users and reducing conflicts and environmental impact.

The scope of educational programs and materials needs to be expanded to address the causes of pathway conflict and the growing presence of bikes and pedestrians on unpaved trails. While this information should be delivered through all available channels, an effective delivery is through comprehensive bike education courses. Interest groups and The City should encourage and support the incorporation of off-road cycling techniques and pathway etiquette into the Can-Bike Skills curriculum.

Recommendation #33

• That public education programs dealing with pathway etiquette and natural low impact be delivered through The City, targeted at all pathway users.

ENFORCEMENT

Enforcement is a crucial element in creating a safe and enjoyable cycling environment. Experience indicates that bike law enforcement plays a key role in augmenting bike education programs. Two steps are necessary in developing an effective enforcement program. First, people must be made aware of the laws that apply to cyclists and secondly, these laws must be enforced. It is important to stress that enforcement programs must focus not only on cyclists but must also be directed at motorists and pedestrians.

7.1 EXISTING LEGISLATION

Existing pieces of legislation that pertain to bike use are listed below. These pieces of legislation need to be reviewed and updated to reflect current trends and realities of bike use.

7.1.1 Alberta Highway Traffic Act (HTA)

With a few exceptions, the rules of the road as described in the HTA apply to the operation of a bike. According to Section 18 of the HTA, "In this part, bicycle means any cycle propelled by human power on which a person may ride, regardless of the number of wheels it has." This definition only applies to Section 45(1) of Part 2 - "Other Equipment" which refers to an adequate horn, gong or bell that should be kept in working order. It is apparent that a car horn is far different from what would be useful or reasonable on a bicycle. This Act has attempted to use one definition to satisfy all types of vehicles. The sounding device on a bicycle should be of the "ring-ring" sounding type rather than any other, gong, horn, buzzer or number of electronic sounds available for sale. The reason for this is simple. Pedestrians and other users, as defined within the Parks By-law, are the ones that cyclists will be warning of their approach. Anything other than "ring-ring" sounding devices create confusion among pedestrians and other pathway users. Part 5 of the Highway Traffic Act which deals with bicycles has no section concerning a sounding or warning device. Any reasonable device on a bicycle would not be loud enough to warn a driver of a motor vehicle. Some riders have used a whistle when riding in heavy traffic when attempting to warn motor vehicle operators. The whistle is effective and drivers hear it. However, requiring the use of one would be unrealistic.

Exception 1

Section 79(2) requires that before changing from one lane to another, or from a curb lane or a parking lane into a traffic lane, a driver:

a) shall signal his intention to do so in a manner prescribed by the regulations, and

b)shall give the signal in sufficient time to provide a reasonable warning to other persons of his intentions.

The prescribed signal is outlined in the Alberta Regulations 51/77 Section 2. The signal used for left hand lane changes is effective, the left arm extended straight out to the left. A problem arises when the prescribed signal for a right lane change is used, the left arm held out from the body, and bent at the elbow with the hand held up. As a rider attempts to shoulder check over his right shoulder to detect traffic in the direction he wishes to go, his body will be turned in such a manner that drives to his right side would not see the signal. Also, with many bikes having lower handlebars, this right turn arm signal may not be visible to any other drivers due to the position of the body. In Ontario, an "Alternative Right" hand signal is used. When changing lanes, or turning to the right, where the normal prescribed signal would not be visible, and therefore unsafe, the rider uses his right arm, extended straight out from his body, to signal his intention.

In certain situations it is appropriate to allow a cyclist to omit a signal if the act of performing the signal compromises the riders safety.

Section 120 gives a peace officer powers of arrest for specific section violations:

a) speed

b) failing to stop (119)

c) without due care and attention (123)

d)racing(124)

e)*specifies 'motor vehicle' tampering with

f) defacement of signs (139)

g) specifies pedestrian not giving name

Subsection (e) should include bikes also. No one should be allowed to tamper with a bike, for safely reasons.

Section 121 and 122 apply to seizure of a motor vehicle (121) and examination of a motor vehicle (122), not a bike. Section 121 applies when a peace officer believes any of the sections in 120 have been violated. Section 121 should include bikes. Section 122, examination is covered regarding bikes in section 150(3)(4)(5) in Part 5. (HTA)

Section 150 deals with headlamps, tail lamps, brakes, and maintaining the bike in safe repair. This section empowers peace officers to have the bike removed from the highway if it is unsafe or unfit for transportation, in their opinion, and to order that repairs be made before it is allowed back on the highway. This section should be expanded.

Section 150(1) states, a bike operated on any highway at any time during the night time hours shall be equipped with:

a) at least one headlamp but not more than two headlamps

b)at least one red tail lamp, and

c) at least one red reflector mounted on the rear

Subsection (a) should read, 'White" constant headlamp, attached to the bike, visible (at some reasonable distance) to the front

Subsection (b) should require a tail light of sufficient power that should be attached to the bike. As with the available headlamps, some are attached to the rider and are, therefore, subject to the position that the body part they are attached to is in.

7.1.2 The City of Calgary Traffic By-law No. 26M96

Section 41(5) - This section should permit bike travel on the south end of Deerfoot trail (on the paved shoulder) from Highway 22X to Anderson Road (or a location to where a cyclist could exit to a pathway or other roadway). This would allow cyclists from areas such as McKenzie access to the city. There are many more roadways that are dangerous to cyclists. These roadways should be identified and safe direct alternate routes should be identified or provided. Large easily read signs, clearly outlining the danger, and offering an alternate route could be erected at the locations, safety being the key point.

7.1.3 Calgary Parks By-law No. 36/76, As Amended (23M92)

Section #1 (a.1) The meaning of bicycle, should specify "does not include a wheelchair".

Section #1 (j.1) User should also include skateboarders and in-line skaters.

Section 25.2(3) Regarding equipment on a bicycle, the signal device should be a 'ring-ring' type of sound. Horns, gongs, buzzers and all other manner of devices available for use can be confusing for other users (as discussed in HTA).

Consideration should be given to sections requiring anyone operating a bicycle that is involved in an accident, whether injuries are sustained or not, to stop, render assistance to anyone injured and to provide their name, address, and telephone number to the other party. Contravention of the section should carry a large fine. Also, consideration should be given to sections that require anyone involved in an injury accident when operating a bike to forthwith report the accident to the Police.

Due to the difficulty associated with determining speed related offenses, the Calgary Police Service should ensure that cyclists are using due care and attention. Cyclists riding too fast for prevailing conditions, weather related or volume of users related, should be charged with cycling without due care and attention.

7.1.4 Motor Vehicle Administration Act (MVAA)

At present, there is no administrative act for bicycles. The Motor Vehicle Administration Act of Alberta which deals with such issues as licensing, reporting of accidents, and stopping when involved in an accident, does not apply to bicycles. With the number of cyclists increasing, it is apparent that an act must be created for bicycles:

- There is no requirement for a cyclist to stop when involved in an accident
- There is no requirement for a cyclist to report an accident
- There is no control for continued bad riding by an individual.

At present, the MVAA, Part 6 'Accident Reports," does not require a bicycle rider to remain at an accident scene, give any information about himself, or even report an accident.

Part 7 deals with the sale of "motor vehicles" and parts when a serial number has been defaced or removed. This section could deal with serial numbers on bicycles and may help in the fight against sky-rocketing bicycle thefts.

7.1.5 Stephen Avenue By-law No. 52M87

The definition of 'bicycle' should be updated.

The definition of 'ride' should be clearly defined to include coasting on one pedal, or simply put, cyclists will dismount and walk their bike on Stephen Avenue Mall; except, westbound from Centre Street to 2 Street S.W., between 1800 hours and 0600 hours (as per traffic control devices).

7.1.6 Alberta Traffic Safety Act

The province is currently in the process of consolidating several pieces of legislation into the new Alberta Traffic Safety Act (ATSA). ATSA, which should be completed in 1997, will replace the following Ads:

- 1. Highway Traffic Act (HTA)
- 2. Motor Vehicle Administration Act (MVAA)
- 3. Motor Transport Act (MTA)
- 4. Off Highways Vehicle Act

7.2 BICYCLE REGISTRATION/LICENSING

In 1982 a Bicycle Licensing Policy Study was conducted by The City of Calgary Corporate Systems and Operations Research Department. This study resulted in the deregulation of The City of Calgary Bicycle Licensing Bylaw.

The practicality and benefits of bike licensing warrants re-examination. Improved computer technology and the possibility of tying in with the existing dog licensing system may make bike licensing cost effective. For a bike licensing program to be effective it must offer tangible benefits to the bike owner. The program would also haw to be accompanied by an enforcement program that ensures compliance.

Some points that should be considered in determining if bike licensing should be reintroduced are:

- Revenues in excess of expenses generated through bike licensing should be used for bike education and promotion programs and facility improvements. This provision would make the concept of bike licensing far more acceptable among cyclists and would likely lead to greater compliance.
- 2) A nation wide database should be established for tracing stolen bikes.
- 3) Bicycle licensing would serve as a means of identifying cyclists who are involved in an altercation or who are consistently operating their bike in an unsafe manner.
- 4) Bike licensing may result in an increased need for enforcement in order to insure compliance with a licensing bylaw. Enforcement implications and benefits need to be carefully assessed in a review process.
- 5) It may be appropriate to institute a voluntary program first to determine public acceptance.

7.3 BICYCLE COURIERS

Bike couriers in Calgary are required to be licensed. This licensing program ensures that the couriers are covered by liability insurance and also offers a system by which police can identify repeat offenders. The current licensing program should be continued and the level of accountability among courier companies should be increased.

7.4 ENFORCEMENT OF EXISTING LAWS AND REGULATIONS

Existing laws governing bike use are in need of review and updating. This fact should not be used as an excuse for not enforcing existing regulations that are enforceable. Enforcement should be carried out as part of the regular duties of a police officer. The City of Calgary Police Service should develop a Bicycle Traffic Enforcement Policy. This policy could be modeled after the policy developed by the Seattle Police Department, the Seattle Bicycle Traffic Enforcement Policy (see Appendix E). The Seattle policy was developed to ensure that regulations and laws were applied in a consistent, equitable manner.

Enforcement of traffic regulations should be no different for cyclists than it is for any other vehicle using the road. Failure to enforce the law as it applies to cyclists has resulted in a certain number of cyclists blatantly disregarding rules of the road. Legislation such as the law which requires a bike to be equipped with a light when operated at night should be vigorously enforced.

In 1995, two by-law enforcement officers were assigned on a seasonal basis to address pathway operational issues and enforce the Parks By-law. It is anticipated that this program will continue.

RECOMMENDATION #34

• That The City of Calgary work with other organizations, municipalities and the responsible Provincial Government departments to revise and update relevant legislation such as the Highway Traffic Act and Motor Vehicle Administration Act with respect to bicycles.

RECOMMENDATION #35

• That The City of Calgary revise the Calgary Traffic By-law No. 26M96, the Stephen Avenue By-law No. 52M87 and the Calgary Parks By-law No. 36/76 to ensure consistency and to improve enforceability.

RECOMMENDATION #36 Filed

• That by July 1999, The City of Calgary Finance Department, License Division, undertake a study to investigate the feasibility of introducing bike licensing in Calgary.

RECOMMENDATION #37

• That the Calgary Police Commission be requested to direct the Calgary Police Service to place greater emphasis on enforcing existing laws applicable to cyclists. The Calgary Police Service should develop a bike enforcement policy.

76

ENCOURAGEMENT OF BICYCLING

Bicycling is a low cost, environmentally friendly, healthy form of transportation and recreation which is readily accessible to a broad spectrum of society. Initiatives and programs which successfully incite a shift to cycling from less favourable forms of transportation and recreation benefit the environment, the individual and society.

Increased bike use results in reduced wear and tear on roads, less traffic congestion, reduction in air pollution and improved personal health for the cyclist, due to the physical exercise involved, which results in lower health care costs. Increased bike use also benefits segments of the business community (bicycle shops, tourism industry). Encouraging bike use makes good social, environmental, economic and political sense.

8.1 WHO NEEDS ENCOURAGEMENT

When it comes to promoting bike use everyone requires some form of encouragement. Government leaders and administrations must be encouraged to recognize the needs of cyclists. The general public needs to be encouraged to recognize cyclists' right to the road. Existing cyclists need to be encouraged to expand the scope of their cycling activities and to be active in promoting bike use. Accepting that there is a broad spectrum of individuals, groups and agencies who require encouragement, there is a need to identify the most effective means of delivering the encouragement message.

We must also recognize the demographics of the cycling population and target initiatives to identifiable groups under represented. For example, the 1992 Commuter Cyclist Survey indicated that 75 percent of commuter cyclists were men. There may be an opportunity to encourage more women to cycle to work.

8.2 MEANS OF ENCOURAGEMENT

There are a wide range of potential encouragement programs and initiatives. Encouragement can be as simple as an individual sharing their love of cycling with a friend or as complex as an event such as the Tour de France. There are several key factors in encouraging bike use.

8.2.1 Facilities and Infrastructure

Bike friendly roads, pathways, and end point facilities are crucial to the encouragement of bike use. Results from the 1992 Commuter Cyclist Survey indicate that the most important improvements that could be made to promote commuter cycling are bike lanes, improved pathway maintenance, pathway expansion, secure bike parking/bike racks and shower and locker facilities. Calgary is fortunate to have a fairly extensive infrastructure base. Initiatives and programs which expand or improve the cycling infrastructure can be extremely effective in encouraging greater bike use. Simple facilities such as showers and change rooms can go a long way in encouraging people to walk or cycle to work. Recommendations have been made throughout this document which are intended to improve Calgary's bike facilities and infrastructure.

8.2.2 Education Programs

The specifics of bike education programs and initiatives are covered in detail in the education section of this report. Education programs are an effective means of encouragement. Bike education programs should provide cyclists with the necessary information and skills to operate their bike with confidence in most situations. Cyclists with improved skills and knowledge are likely to extend the range and scope of their cycling activities and serve as role models for other cyclists.

Education programs and information should also be targeted at motorists. Motorists who understand and respect the cyclist's right to the road create a friendlier cycling environment, which in turn encourages bike use.

8.2.3 Education and Encouragement Information

In addition to bike education programs, the availability of safety and educational information and materials can be an effective means of encouragement.

The City of Calgary, in cooperation with various sponsors, has developed a Cycling Safety Handbook and produces the Calgary Pathway and Bikeway Map. The Cycling Safety Handbook is an excellent educational text that encourages proper bike use. The City of Calgary Pathway and Bikeway Map has proven to be an extremely popular and effective encouragement and promotional tool. The map provides route information, safety tips as well as information on various programs, regulations and agencies. The production and distribution of the map has received significant support from bike retailers and other private sector organizations.

In addition, The City has made available other brochures and material relating to cycling and use of the recreational pathway system. The information plays an important role in encouraging bike use, reducing conflict and educating various facility users. The City should continue to take an active role in developing and distributing educational and promotional materials that encourage greater bike use.

RECOMMENDATION #38

• That the Transportation Department and Calgary Parks & Recreation continue to produce and distribute the Pathway and Bikeway Map, the Cycling Safety Handbook and other promotional materials.

8.2.4 Media

Various forms of media can play an important role in encouraging and promoting bike use. Television and newspaper coverage of bike events and articles on cycling all serve to raise public awareness and interest in cycling. Public service announcements, and television and radio ads can all be effective educational and encouragement tools.

Educational/encouragement initiatives, such as the television ads which were aired on Channels 2&7 in the spring of 1992 and summer of 1994 are an effective means of conveying encouragement and safety messages. Joint sponsorship should be sought with the goal of increasing the exposure of these messages through various media channels.

8.2.5 Special Events

Events that raise the profile of cycling and generate media coverage can be very successful tools for encouraging bike use. Initiatives such as the 1992 Earth Day Commuter Demonstration and the 1993 Bike to Work Day can be an effective means of disseminating safety information and encouraging bike use. The City should continue to organize and support special events aimed at encouraging environmentally friendly transportation choices.

8.2.6 Bicycle User Groups (BUGS)

The idea of forming bicycle user groups (BUGS) originated in Toronto and has proven to be an effective way to encouraging greater bike use. BUGS are made up of cyclists employed by one company or cyclists from several companies that occupy the same building. BUGS offer a forum through which cyclists can exchange ideas and work toward the development of a bike friendly work environment. Initiatives that could be carried out by a BUG include:

- Promoting bike use among fellow employees.
- Lobbying employers or building owners to provide facilities such as secure bike parking, showers, and locker rooms.
- Providing information and workshops for fellow employees interested in cycling to work.
- Conducting bike maintenance and repair clinics.
- Organizing bike events and programs.

The presence of such groups allows cyclists to work toward bike friendly change from within their organization. Members of these groups can also serve as role models and mentors for fellow employees and provide representation as required.

RECOMMENDATION #39

• That the Transportation Department develop a network of Bike User Groups (BUGs) in businesses, organizations and major buildings throughout the city as part of a Transportation Demand Management (TDM) strategy.

8.3 ENCOURAGEMENT ROLES

Every individual, group and organization can play a role in encouraging bike use. Individuals who are unable or unwilling to use a bike can still have a significant impact on bike use through recognizing cyclists' legitimate right to the road and treating them with respect. Conversely, cyclists must gain this respect through acting in a responsible manner. Within the general scope of encouragement there are groups and organizations that play a particularly important role or would significantly benefit from encouragement.

8.3.1 The Role of Government

Throughout this document information is provided and recommendations are made. Many of the areas discussed require action and support from various levels of government. The attitude and willingness of governments to take action may be the single most important factor in encouraging bike use. Enlightened and supportive government policies and programs play a pivotal role in encouraging bike use.

All levels of government need to take reasonable steps to support and legitimize bike and pedestrian movements. Appropriate steps include, but are not limited to, facility planning and development, equitable legislation and enforcement, and supportive policies and programs.

Various examples exist of government programs geared toward encouraging the growth and development of environmentally friendly transportation alternatives. Among these are the recently adopted Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act which have been passed in the United States and the English Urban Cycle Route Network Program funded by England's Department of Transportation. These countries and their respective governments provide funding and encouragement for the development of non-motorized transportation alternatives.

8.3.2 Interest Groups

Bike organizations and interest groups play an important role in the encouragement process. These groups must take an active role in lobbying government bodies to make them aware of the concerns and needs of cyclists. These groups should also be active in expanding and educating their membership.

The City should establish and maintain an active liaison with groups and individuals representing the interests of cyclists. Individuals and active members of groups have an acute understanding of the issues and needs of cyclists and pedestrians. These groups and individuals can be a valuable source of information and insight into areas relating to the encouragement of bike use.

Among the groups currently active in Calgary are the Calgary Pathway Advisory Council (CPAC), the Calgary Bicycle Advisory Council (CBAC) and the Elbow Valley Cycle Club (EVCC).

RECOMMENDATION #40

• That the Transportation Department, Transportation Planning Division, work towards the establishment of a bike/pedestrian coordinator position with a primary mandate to implement this plan and a secondary function to work with individuals and to provide an administrative liaison with the various special interest groups regarding cycle and pedestrian planning.

8.3.3 Private Sector

Local businesses can play a significant role in encouraging bike use through the provision of secure bike parking, showers and change facilities for employees. In addition to providing these facilities, employers could follow the example of companies in areas such as California and the Netherlands and offer incentives to employees who commute using alternate forms of transportation. Employees could be offered cash-in-lieu of parking when parking is offered as a benefit. Alternatively, companies could discontinue the practice of paying for employee automobile parking.

The City has shown leadership in this area through recent improvements to bike parking facilities and the provision of shower and change facilities in the Municipal Building.

RECOMMENDATION #41

• That The City take a leadership role in providing incentives and facilities to promote bike use among its employees.

RECOMMENDATION #42

 That the Finance Department and Fleet Services Department investigate a similar system for bicycles as is currently available for automobiles regarding a use allowance and report to Council by July 1998. Consideration should be given to providing an allowance for employees using their bike for business purposes and a loan pool of bicycles available for general use.

8.3.4 Bicycle Retailers

People often look to bicycle shops not only as a source of equipment and service but also as a source of expertise and knowledge. Bicycle retailers benefit by taking an active role in promoting safe and courteous bicycle use. Retailers play an important role through supporting educational programs and distributing safety information and materials. They should be encouraged to expand their role in these activities.

8.3.5 Police Bicycle Patrols

Police bicycle patrols have been found in many parts of the world, particularly the larger cities (Amsterdam, New York), to be not only an effective and economic way of providing general policing duties, but also a factor in encouraging bike use in general. It is recommended that the Calgary Police Service continue to operate and expand the Mountain Bike Unit.

ECONOMICS

As with any project, the benefits and costs of bike facility and program development should be carefully examined. While the process for determining costs for various bike facilities or programs is usually straightforward, the resulting benefits are more difficult to determine and quantify. This presents certain problems when attempts are made to justify expenditures on bike facilities and programs.

9.1 FINANCIAL COMMITMENT

In the area of bike facility and program development, the following sections discuss financial commitment.

9.1.1 Incremental Funding

Incremental funding involves the allocation of resources in proportion to existing demand and usage. If one percent of all trips are made by bike then one percent of all transportation and recreation resources could be directed toward bike programs and developments.

Incremental funding should serve to maintain and support the existing level of bike usage. Incremental support would also involve placing the appropriate level of emphasis on bike facility requirements in areas such as land use planning and transportation facility development.

9.1.2 Substantive Funding

If it is determined that bike transportation should be promoted as a low cost, healthy and environmentally friendly form of transportation, then it may be justified to allocate resources at a level greater than is currently apportioned. The goal of substantive funding would be to induce a modal shift in favour of cycling. Surveys conducted as part of the GoPlan indicate that there is significant latent demand for cycling as a mode of transportation. Additional funding should be directed at programs and facility developments that facilitate a modal shift.

9.2 FUNDING SOURCES

Areas requiring funding can be divided into two categories, infrastructure and educational/encouragement programs. Potential revenue sources differ for these two areas.

9.2.1 Funding for Infrastructure

From a funding perspective infrastructure development takes place in two separate areas. One area comprises new developments where much of the required infrastructure is provided by developers; the other is in existing areas where the cost of retrofitting or building new facilities takes place at The City's expense, or as part of a local improvement process.

In new subdivision developments, small changes to the existing development agreements could greatly enhance the development of bike and pedestrian facilities. As previously suggested, the existing standard development agreement could be changed to require that developers provide a 2.5 metre asphalt pathway in lieu of the 1.4 metre concrete sidewalk which is currently required along major roads and expressways. Other facilities that could be provided as part of development agreements are pedestrian and bike overpasses where required to facilitate non-motorized movements.

It should be noted that developers use proximity to parks, pathways and bike facilities as selling points in new communities. Studies done on property value indicate a positive correlation between proximity to parks and bike and pedestrian facilities and property value. The closer the amenity, the higher the property value.

9.2.2 Funding for Retrofitting

As the City continues to grow, the need for bike and pedestrian connections through established areas will also continue to grow. The City may be required to retrofit existing facilities, in parks and on streets, to establish these connections. In the future, with provincial grants being drastically reduced, it may become necessary to seek sponsorship to fund retrofit projects. The possibility also exists that a bike licensing program would generate revenue. This revenue could be channelled back into bike program and facility development.

RECOMMENDATION #43

• That an evaluation methodology for the construction of bike and pedestrian facilities be developed and incorporated into the Transportation Improvement Priority Study TIPS).

RECOMMENDATION #44

• That a bike and pedestrian facilities retrofit program be established as part of the Engineering & Environmental Services Department, Streets Division, capital budget.



10.0 ENVIRONMENT

Terms such as ozone depletion, greenhouse gases and acid rain are becoming all too familiar. Although the exact causes and resulting effects of these environmental problems are uncertain, a growing number of people are beginning to express concern about these issues. Unfortunately, many individuals feel that the cause and results of these problems are beyond their control. This is not the case. Change and improvements can be made locally through the combined effort of individuals.

10.1 HIDDEN COST OF AUTOMOBILE USE

In Canada, motor vehicles emit 48 percent of the total nitrogen oxide responsible for acid rain, 14 percent of the carbon dioxide (C0_a) and about 28 percent of the chlorinated fluorocarbons (CFCs) that contribute to global warming and thinning of the ozone layer. The additional ultra-violet (UV) radiation reaching the earth is expected to impair photosynthesis, damaging crops and marine organisms. It may also produce some 300,000 additional skin cancers per year worldwide, 1.6 million new cataract cases and damage human immune systems (World Resources Institute, 1993, Environmental Almanac, p. 308). These hidden costs of automobile use are significant and must be addressed by governments and individuals.

"At the present time about 40 percent of city land is taken up by roads and car parks, which have to be built, patched, marked, cleaned, cleared of snow and sanded." (Calgary GoPlan; Sustainability, Should It Be the Ethic for Transportation Planning in the '90s? Discussion Paper No. 1-06-93)

Building and maintaining these facilities represents a significant financial burden. In addition to these costs, there are opportunity costs associated with the loss of green space and other productive uses for this land. The noise generated by motor vehicles results in the need to build sound attenuation barriers to reduce the impact of noise pollution on residences adjacent to major road systems.

10.2 THE ROLE OF THE INDIVIDUAL

Perhaps the single most effective step an individual can take toward improving the environment is to substitute walking, cycling or another form of non-motorized transportation for short automobile trips. The bike compares favourably with an automobile in travel time for trips of five kilometres or less. These same short trips are the ones for which automobiles produce the greatest pollution due to the inefficient operation of a cold engine and the "hot bath" at trips end. The term "hot bath" refers to the evaporation of fuel from a hot engine after it has been turned off. Of all available transportation options the bike is by far the most energy efficient.

Taking information from the 1992 Commuter Cyclist Survey and the 1991 Travel Survey it is possible to do a rough calculation of the fuel savings resulting from bike use in Calgary. The approximate number of individuals travelling to work by bike during the morning peak hours, at the time of the 1991 Travel Survey, was 2,165. The average length of a commuter cyclist trip according to the 1992 Commuter Cyclist Survey was 9.7 kilometres (one way), 19.4 kilometres round trip. This is a total of 42,001 kilometres being travelled by bike per day. If a fuel consumption rate of 11 litres per 100 kilometres is used, this would result in a saving of 4,620 litres per day of fuel. This assumes that those trips would have otherwise been made by single occupancy motor vehicle. While this calculation is very rough it demonstrates that the decision to travel by bike may seem insignificant but the combined effect of many people making the same decision is considerable.

10.3 THE ROLE OF GOVERNMENT

Various levels of government now recognize the need to promote alternate forms of transportation. The high cost of building and maintaining infrastructure combined with the environmental cost of automobile use are forcing governments to take action. The U.S. government has passed the Intermodal Surface Transportation Efficiency Act (ISTEA) which allocates funds to the enhancement and promotion of non-motorized transportation. The provinces of British Columbia and Ontario have developed comprehensive bike policies intended to accommodate and increase bike use. Various cities throughout North America have developed bike plans and have established positions within their administrations to deal with bike and pedestrian issues. All these actions and measures result from the realization that it is neither economically nor environmentally sustainable to continue facilitating the movement of automobiles. Transportation planners realize they must focus on moving people by the most efficient, equitable and environmentally friendly means available.

10.4 PROGRAMS

10.4.1 AIR Program

In the spring of 1990 The City of Calgary introduced the Air Improvement Resolution (AIR). This program was designed to encourage Calgarians to leave their car at home and take alternate transportation two days a month. This program met with limited success and as a result was discontinued. This program focused on detrimental effects of automobile use but failed to sell alternatives. Any program designed to incite a mode shift must provide incentives that make alternatives to the automobile attractive.

10.4.2 Transportation Demand Management (TDM)

In the past, transportation planning focused on supply side management, seeking to alleviate congestion and operational problems through building new facilities. Experience has shown that this type of approach is expensive and may actually generate increased auto use. In recent years an increased emphasis has been placed on transportation demand management (TDM). This involves programs such as car pooling, bike and pedestrian programs, transit improvements and other initiatives aimed at reducing the demands being placed on the existing road network. TDM has many benefits, including reducing wear and tear on the roads, prolonging or eliminating the need to

provide new facilities and reducing damage to the environment.

While all possible means of reducing the detrimental impacts of automobile use should be pursued, this report focuses on non-motorized options. The recommendations of the plan are intended to create an environment which is conducive to non-motorized transportation alternatives. Programs and initiatives of TDM should focus on enhancing the practicality and desirability of all alternatives to the automobile.

RECOMMENDATION #45

• That future Transportation Demand Management initiatives include enhancing non-motorized transportation options.

APPENDICES



THE CALGARY CYCLE PLAN

APPENDIX A

DRAFT PATHWAY LINKAGE

WARRANT SYSTEM



DRAFT PATHWAY LINKAGE WARRANT SYSTEM

Initially, each section of a City of Calgary pathway would be categorized into the following hierarchy: (1) Regional, (2) District, and (3) Local: <u>Regional pathways</u> would include all pathways which run along Calgary's watercourses and through major parks such as Nose Hill and Fish Creek. <u>District pathways</u> would include all pathways which tie into the regional pathway system and pass through more than one community along a continuous pathway/ bikeway network. <u>Local pathways</u> would include pathways which tie a community (local area) into the district pathway or regional pathway.

The warrant system would include the following variables:

VARIABLE/DESCRIPTION	DEFINITION	PO	ΙΝΤS
Linkage in Existing Pathway Network	Regional to Regional		5
• Importance of area to be serviced and potential	Regional to District		4
increase in overall pathway use	District to District		3
	District to Local		2
	Local to Local		1
• Existing road connection (other than major)			-2
Adjacent to existing pathway			-4
Level of Current Service:			
Proximity to or lack of existing pathway/linear	Distance	<1,000m	5
park	From	1,000 - 1,499m	4
• Ability to allow all residents ease of access to the	Regional	1,500 - 1,999m	3
regional pathway	Pathway	2,000 - 3,000m	2
		>3,000m	1
Public Response:			
Statistics from user survey report	#1 Priority (as per survey)		5
	#2 Priority		4
• Where do users feel there is a need for pathway	#3 Priority		3
links	#4 Priority		2
	#5 Priority		1

VARIABLE/DESCRIPTION

DEFINITION

Safety Concerns:	#1 Priority	10
• Changes to pathway which may improve: unsafe	#2 Priority	9
grades/curves, visibility problems, citizen	#3 Priority	8
complaints/accidents, elimination of dangerous	#4 priority	7
traffic interface	#5 Priority	6
	#6 Priority	5
• Use of user survey and conflict index	#7 Priority	4
	#8 Priority	3
	#9 Priority	2
	#10 Priority	1

Potential to Tie Into Major Node:

 Access to major pedestrian/cyclist generator 	Improved		5
• Proximity to school, Parks & Recreation facility	accessibility		4
(maximum 5 points each factor)	to		3
	no real		2
	improvement		1
• Are links informally established, i.e. existing	Number of	>160	5
beaten path	users	97-160	4
	per	49-96	3
	8 hour	25-48	2
	count	>24	1
Use of existing counts of regional pathway	Number of	>1,000	5
(average between two existing portions)	users	500-1,000	4
	per	250-499	3
	8 hour	100-249	2
	count	0 to 99	1
Estimated Cost of Project:	\$0 to \$9,999		5
	\$10,000 to \$24,999		4
	\$25,000 to \$49,999		3
	\$50,000 to \$100,000		2
	>\$100,000		1

A-2

APPENDIX B DRAFT PATHWAY LINKAGE

WARRANT SYSTEM


BICYCLE SIGN POLICY

All signs for bicycles must follow the regulations of the Manual of Uniform Traffic Control Devices for Canada and The City of Calgary Traffic Operations Policy Manual. In general, bicycle signs may be regulatory, warning or informative in nature. Signs should be consistent with motor vehicle signs, even if they are posted within a park.

Signs should be maintained and replaced as necessary. Route continuity and clarity depends on the maintenance of signs. Potential problems include signs overgrown by vegetation, vandalized signs, incorrect signs and missing signs.

Signing is an essential element in bicycle planning and, like motor vehicle oriented signing, it is designed to:

- Increase safety:
- Facilitate movement;
- Inform or remind users of regulations;
- Warn of hazards; and
- Furnish directions, clarify routes and provide general information.

Signs are manufactured and installed by the Transportation Department, Traffic Operations Division.

General guidelines are as follows:

- Sign posts to be at least 1.0 metre from the pavement edge, in the ease of pathways;
- 9 The bottom of the sign to be 2.1 metres from the ground;
- If two signs are installed on one post, they should be side by side;
- If two signs are installed one over the other, the bottom edge should be 2.1 metres above the ground. The bottom sign should be the bike sign;
- The sign installation should not reduce visibility;
- Signs should not be obstructed by vegetation or other obstacles;
- Signs should be used sparingly in order to avoid pathway clutter; and
- Final sign installations in recreation facilities, are inspected and approved by Calgary Parks & Recreation staff.

Interpretive signs may be designed to co-ordinate with the theme or design of the park or facility.

In ease of a disagreement between this policy and the Alberta Highway Traffic Act and The City of Calgary Traffic Operations Policy Manual, the latter two shall prevail.

REGULATORY SIGNS

Regulatory signs indicate an enforceable traffic regulation.

They indicate or reinforce the applicability of legal requirements that would not otherwise be apparent.

Regulatory signs shall be erected at those locations where the regulations apply and shall be readily visible.

Typical Regulatory Signs Stop Sign



background: red letter & border: white

The stop sign is used to indicate that bicycles facing the sign shall stop and shall not proceed until it is clearly safe.

A stop sign shall always be erected at the point where the bicycle is to stop, or as near thereto as possible. It may be supplemented with a stop line if located at a major intersection. In no case shall a stop sign be placed further than 15 metres from the near edge of the intersecting roadway. Where the intersection involves an acute angle, the stop sign shall be so placed to avoid confusion to drivers on the major road. If visibility of the sign is limited, an advance sign shall be used. Stop signs should not be installed indiscriminately at all unprotected crossings.

Yield Sign



background: white border: red

The yield sign shall indicate to cyclists facing the sign that they must yield the right-of-way, stopping if necessary before entering the intersection area, to on-coming traffic on the intersecting roadway.

Pedestrian Crosswalk Sign



background: white letter & border: black

The purpose of the pedestrian crosswalk sign is to indicate a pedestrian crosswalk location. These signs are only used at locations where the pedestrian crosswalk has been painted.

Bicycle Lane Sign



background: white letter & border: black

The bicycle only sign should be used to designate an official bike lane. Signs should be located at every major intersection.

Cyclist Dismount Sign



background: white letter & border: blac

The cyclists dismount signs are used to indicate areas where cyclists are required to dismount These signs are placed where physical restrictions make cycling unsafe.

WARNING SIGNS

Warning signs indicate in advance potentially dangerous conditions to users. Such conditions require caution and may necessitate a reduction in speed.

There are five classes of warning signs outlined in The Manual on Uniform Traffic Control Devices for Canada.

Physical Conditions •	Indicate particular features or conditions of the roadway			
	which the driver will encounter ahead.			
Traffic Regulations Ahead •	Indicate that users will encounter a traffic regulation such			
	as a stop sign ahead.			
Intermittent Moving Hazards •	Indicate the possibility of some event which may require			
	mad user response such as pedestrians, slippery conditions,			
	etc.			
Temporary Conditions Signs •	Indicate construction activity or other temporary and un-			
	usual conditions which may require mad user response.			
Miscellaneous Warning Signs •	Indicate those conditions which are not otherwise provided			
	for in the other groups.			

Typical Warning Signs

Advance Pedestrian Crossing Sign



background: yellow legend & border: black

This sign may be used in advance of a pedestrian crossing where the visibility of the crossing on the approach may be somewhat restricted. The sign shall be used in conjunction with the pedestrian crosswalk sign and shall be placed between 50 and 150 metres in advance of the crossing.



Limited visibility due to conditions such as horizontal and vertical curves, parked vehicles and/or foliage should be considered in determining the need for these signs. In some cases the advance sign may be used due to poor performance of the stop or yield sign.

The placement distance of the stop or yield ahead signs should be determined by taking into consideration factors such as approach speed, visibility, grade and road/pathway condition. Signs should be located a minimum of 75 metres in advance of the intersection when practicable.



The cyclist and pedestrian crossing signs may be erected where a pathway crosses a roadway. The signs shall be erected on the right side of the roadway in advance of the actual crossing.

Bicycle - Steep Hill Sign



background: yellow letter & border: black

These signs are used to warn cyclists that they are approaching a steep hill.

Curve Warning Sign



background: yellow letter & border: black

The curve warning sign and winding pathway signs are used to warn cyclists that they are approaching sections of pathway where reduced speeds are advised. They may be used in conjunction with a speed tab (advising an appropriate maximum speed limit).

Winding Pathway Sign



background: yellow letter & border: black

INFORMATION SIGNS

Information signs provide information for users regarding facilities, directions and other general information.

Typical Information Signs

River Pathway Sign

Bicycle Route Sign



background: white letter & border: blue & green

This sign is used to inform pathway users of the name of the river pathway. May also be used to indicate the direction to follow to get to a specific river pathway.



background: white letter & symbol: black border: blue

Bicycle route signs shall indicate to bicyclists, motorists, or pedestrians, the streets, highways, and separate facilities which form part of a bicycle route system and shall provide route guidance for cyclists.

Bicycle/Pedestrian Sign



background: white letter & symbol: black border: blue

The bicycle/pedestrian signs shall indicate to bicyclists, motorists, or pedestrians, the streets, highways, and separate facilities which form part of a shared bicycle/pedestrian route system and shall provide route guidance for bicyclists and pedestrians.

Pedestrian Pathway Sign



background: white letter & symbol: black border: blue

These signs indicate that pathways are for the exclusive use of pedestrians. They also provide route guidance for pedestrians.



background: white letter & symbol: black border: blue

This sign indicates that cyclists are requested to yield the right-of-way to pedestrians.

RECREATIONAL FACILITIES

Recreational facilities are classed as either summer (bicycling, boating, boat launching, fishing, golfing, hiking trails/walking trails, horseback riding, sailing, swimming, tennis and water skiing) or winter (curling, cross-country skiing, downhill skiing, skating, snowmobiling, tobogganing).

Guidance to recreational facilities in public parks is provided by recreational park facility signs.

The recreational park facility sign shall be rectangular with the long axis vertical. The size of the sign will be determined by the identification name and the number of facilities which must be depicted on the sign. Signs shall have white letters and border and a brown background.

Parks outside the central area of Calgary in which there are at least three summer or winter recreational facilities available in the park shall qualify for signs provided that the following criteria are met:

- open to the general public;
- capacity adequate to meet normal demand;
- available for use throughout the normal summer or winter season;
- all-weather access provided for winter related facilities;
- the number of parking spaces available is adequate to meet the normal demand; and
- the facility is publicly owned or owned by a non-profit organization.

Recreational park facility signs shall be installed on the approach to any intersection formed by the route on which the recreational park abuts and any arterial road with either north-south or east-west orientation provided the intersection is within 1.5 kilometres of the facility.

Where there is no major road within 1.5 kilometres of the facility, the recreational park facility sign shall be installed on the approach to the nearest intersection formed by the road or route to the facility, and either the north-south or east-west oriented major road nearest the facility.

Also, a park name marker sign consisting of a park name marker and the appropriate directional arrow shall be installed along the route to the park.



TENNIS



WADING POOL



CANOEING



CROSS COUNTRY SKIING



SKATING



TOBOGGANING



PARKS SIGNS



PARK SIGNS

background: brown border & symbol: white



PICNIC



BICYCLE



HIKING



HORSEBACK RIDING



SWIMMING



PLAYGROUND



GOLFING



SAILBOATING



FISHING

background: brown border & symbol: white

APPENDIX C

BICYCLE PARKING



BIKE PARKING

WHY PROVIDE BICYCLE PARKING?

The growing popularity of cycling for recreational, utilitarian and commuter use has resulted in an increased demand for bicycle parking facilities. You may have noticed bicycles in hallways or locked to railings and trees in front of your building. This may be an indication that you need to provide bicycle racks or reconsider the design and location of those you presently have. Every building and business can benefit from more effective bicycle parking, whether it is for providing employees and tenants with better facilities, keeping the customers you now have, or attracting new ones.

Modern bicycles are not simply a recreational toy. They often represent a considerable investment. Protection of the cyclist's investment is therefore a key concern and must be addressed when considering bicycle parking.

If you currently have a bicycle rack on your premises but find that cyclists tend not to use it and lock their bikes to trees and other fixed objects in the area, read on. Your current rack design may not be meeting the cyclists needs.

The City of Calgary Transportation Department has developed the following guidelines to assist you in selecting the most suitable design & location for your bicycle parking facilities. The right choice can mean the difference between a bicycle rack that is constantly used and one that is forever empty.

TYPES OF BICYCLE RACKS

Modern bicycles vary greatly in their shapes, styles and mounted accessories. A good rack will accommodate a wide range of bicycle designs and allow the user to lock both the frame and a wheel to the rack. The manner in which bicycles should be locked must be obvious. The less complex the design the easier it is to use correctly. There should be enough physical space around each parking stall to allow for easy access and locking.

BICYCLE PARKING CLASSES

Bicycle parking facilities can be categorized into three classes. The following outlines the characteristics and gives examples of each class. Recommendations are given regarding the type of use for which they are suited.

Class 1 facilities are lockers or controlled access areas where a bicycle can be stored. These facilities provide protection from weather, vandalism and theft of the bicycle and its components. The design of these facilities can vary from a locker which accommodates one bicycle to a bicycle storage cage located in areas such as underground parking garages which can accommodate hundreds of bikes. Bicycle cages should have racks or other devices that allow users to lock up their bicycles with their own locks for additional security.

This type of facility is recommended for areas where an individual would be leaving their bicycle for an extended period of time. This would include people who commute to work and park their bicycle for the day. It would also be suitable for apartment complexes or other locations where long term secure storage is required. Figure C-1 gives information and specifications for a Class 1 bicycle locker system which has been developed by Calgary Transit.

General

The product used should be designed for long life and low maintenance, and should be installed to allow easy replacement and repair of units.

1 Weatherproofing

The product used should ensure contents (bicycles) stored inside are safe from the environment. The product should be totally enclosed and finished to prevent weathering and/ or deterioration.

2 Vandal Resistant

The materials used to manufacture the lockers should be vandal resistant. The material should stand up to weight applied to the roof of the locker.

3 Locking Mechanism/Hinges

The locking mechanism should allow the user to lock the door of the locker with their own lock or provide a secure locking mechanism. It is possible to equip lockers with a coin operated locking mechanism. The door hinge should run the full length of the door.

6 Anchor to Concrete.

The lockers should be anchored to a concrete slab. Minimum surface area required for a five locker arrangement is 200 centimetres x 500 centimetres.





Class 2 bicycle parking facilities include any device that is specifically designed for bicycle parking. Unfortunately, many of these racks are poorly designed and present problems for users. A well designed rack is one that supports the bicycle frame in an upright position and to which a person can lock both the frame and a wheel with a standard U-lock The manner in which these racks should be used is straightforward and invite use. Figure C-2 provides some examples of recommended Class 2 rack designs.

This type of facility may be used by individuals who commute to work However, these facilities provide a lower level of security than a bicycle locker or cage. This type of facility is best suited to short-term parking at locations such as shopping centres or restaurants. Whenever possible these racks should be placed in a location that provides protection from the elements. This may be beneath an overhanging roof in an underground garage or racks with a roof built over them.

Many Class 2 bike rack designs present real problems for users. Some of these designs are referred to as "wheel benders". These designs support the bicycle by the wheel and are known to bend rims, damage components, and do not allow users to easily lock the frame and a wheel to the rack These racks will often be avoided by cyclists or may be used in a manner for which they were not designed. Figure C-3 shows some examples of rack designs which are not recommended.



Figure C - 2. Recommended Class 2 Bicycle Rack Designs



Figure C-2. Recommended Class 2 Bicycle Rack Designs (continued)



GEAR CRUNCHER



THEFT



WHEEL BENDER

Class 3 facilities are fixed objects to which a bicycle can be secured. This type of facility would include light standards, parking meters, trees or other fixed objects.

Use of these objects or racks should only be considered for short-term use. Bicycles that are locked to trees, railings and other such objects can impede pedestrian movements, cause damage and can be unsightly.

LOCATION OF BICYCLE PARKING FACILITIES

Cyclists generally lock their bicycles in the most secure location, one they perceive as offering the best protection against theft and vandalism. Do not place bicycle racks in hidden comers or out of the way places because they will not be used.

Place bike racks in high visibility areas. To increase visibility locate the rack near building entrances, in the line of sight of windows, security offices, or near high volume pedestrian traffic.

Place bicycle racks in a secure convenient location. Cyclists will lock their bicycles to prominent objects near their destination (for example a parking meter near a building entrance) rather than leave them in secluded areas.

Bicycles may be damaged if the racks are placed right next to car parking or traffic lanes unless reasonable protection or separation is provided.

Given the choice, cyclists will place their bicycles beneath an overhang, both to protect their bicycles from the weather and for their own comfort while locking. In situations where shelter is not present, consideration should be given to constructing a roof over the racks.

Bicycle racks should be located on a hard surface such as asphalt or a concrete slab.

Consider installing your bicycle racks in increments. When satisfied there is enough demand for the existing racks consider adding more. Rather than financing an over-ambitious and under-utilized endeavour, add smaller individual units as demand warrants. Plan for growth and choose your location accordingly.

BICYCLE PARKING SPACE ALLOWANCES

In considering the location of bicycle racks, allowances should be made to provide easy access for parking and locking of the bicycle. A parked bicycle will occupy a space approximately 0.60 meters wide and 1.80 meters long. A 1.50 meter manoeuvring space should be provided behind the bicycle to allow movement of the bicycle in and out of the parking spot Figure C-4 gives information on space requirements for bicycle parking facilities.





BICYCLE PARKING FACILITY GUIDELINES

The number of bicycle parking spaces that should be provided varies greatly. A small restaurant or corner store will require less bicycle parking than a downtown office building or an apartment complex. The type of parking facilities provided may also vary between these locations.

The City of Calgary Transportation Department has developed a set of guidelines to indicate the amount of parking that should be provided for specific facilities. Bicycle parking facility guidelines are summarized in Table C-I. Currently, the Department is requesting the provision of bike parking facilities associated with specific types of new development as noted in Table 1 at the applicants expense and on a voluntary basis. Utilization of these facilities over time will help us develop a set of appropriate bicycle parking requirements.

If you have any questions regarding bicycle parking facilities please feel free to contact The City of Calgary Transportation Department at 268-1574.

Table C - 1. Bicycle Parking Facility Guidelines

Building Type/Use	Minimum Number of Bicycle Parking Stalls					
Requested						
Financial Institutions						
• free standing	2					
• within a strip mall	1					
Libraries	2					
Offices						
Central Business District	2 at each major building entrance for couriers					
Restaurants (not within industrial areas)						
casual dining	2					
Schools (Public & Separate only)						
• elementary	1 per 12 students based on operating capacity					
 junior high school 	1 per 16 students based on operating capacity					
 senior high school 	1 per 40 students based on operating capacity					
Retail Stores	2 if store is less than 2,500m ²					
	4 if store is greater than 2,500m ²					
Sport Facilities	4					

Suggested bicycle parking facility guidelines are as follows:

Dwelling Accommodations

- multi-family
- apartments

If each unit does not have its own outside entrance, then the applicant should consider bicycle racks for visitors If each unit does not have its own outside entrance, then the applicant should consider bicycle racks for visitors.

IN SUMMARY

Cyclists often invest a great deal of money in their bicycles. Their concerns regarding security and damage determine where and to what they lock their bicycles. A bicycle rack that works is one that addresses those issues.

A simple, well-designed and well-located bike rack will attract use. In contrast, a badly designed rack will be a neglected and costly ornament

APPENDIX D

BICYCLE FACILITY DESIGN SUMMARY



BICYCLE FACILITY DESIGN SUMMARY

The provision of bicycle facilities requires that design standards be applied to achieve a safe and efficient system. The standards must be easily understood, consistent, clear and should consider aspects such as vehicular conflict, pedestrian/vehicle interfaces, pedestrian/cyclist conflicts, adjacent land uses and growth requirements to name a few. The design criteria outlined in this section should provide a sensible guideline for the provision of facilities that are sensitive to the needs of cyclists as well as all other users.

BIKEWAY DESIGN STANDARDS

Lane Widths

The standard lane width on major roads is 3.7 metres while the standard for primary collectors, collectors and residential roads is 3.5 metres. Parking lanes are typically 2.5 metres wide; 3.5 metres is required for a shared parking/driving lane. A lane width of 4.3 metres from the face of the curb to the centre line should be sufficient for bicycles and automobiles to proceed together.

Gutter Widths

Two types of standard gutter measure 250 millimetres and 500 millimetres wide. The curb associated with the gutter can either be rolled (low profile) or standard (vertical). Collector and residential roads are designed to have low profile rolled curb, except on the medians and in areas identified as bus zones, where standard curbs will be used.

Catch Basin Widths

Catch basin installations should be designed so that drainage openings do not run parallel to the direction of bicycle travel.

Traffic Signals

Detector loops should be installed at all intersections on designated bikeways.

Signs

All signs for bicycles must follow the regulations of the Alberta Highway Traffic Act and The City of Calgary Traffic Operations Policy Manual. In general, bicycle signs may be regulatory, warning or informative in nature.

Grades

Grades of three percent or less are acceptable while streets with grades greater than six percent should be avoided in routes recommended for bicycle travel. The length of the climb or descent is also important when grades are being considered. If intermittent grades exceeding the recommended six percent are unavoidable they should be short so as not to discourage use of the bike route.

Railway Crossings

Railway crossings should ideally be placed at right angles to avoid the bicycle wheels being trapped in the flangeway. Where the tracks do not cross at right angles, the bikeways or paths should be widened at the approach to the tracks. This will allow the cyclist to manoeuvre the bicycle into a position close to perpendicular to the tracks. Where this is not possible, flangeway fillers should be used to enhance safely. It is also important that the railway tracks be flush with the bikeway or path.

PATHWAY DESIGN STANDARDS

Calgary's pathways are multi-use facilities intended for the recreational use of pedestrians, cyclists and other non-motorized users.

Pathway Widths

A local pathway is expected to carry low volumes of traffic and may be designed with a width of 2.5 metres. A regional pathway should have a minimum width of 3.5 metres. Twinning may be considered based upon the user mix and other factors, as previously discussed as part of the Pathway User Conflict Index. Pathways in linear parks should have a minimum width of 3.0 metres.

Gradients

Grades should not exceed eight percent maximum. Grades between five percent and eight percent are acceptable for sections less than 10 metres. Grades between two percent and five percent are acceptable if they are less than 150 metres in length. Unpaved paths should avoid grades exceeding three percent.

Design speed

A minimum design speed should be 30 kilometres per hour and should be increased in areas where grades exceed three percent.

Sight Distance

A key component of the pathway system is the ability of the users to see and react to conditions and situations on the pathway. Designing for cyclists should ensure that all users have acceptable sight distances. There is not sufficient data available to determine stopping sight distances for users such as inline skaters (due mainly to lack of braking information). Stopping sight distance is described below:

Minimum S = 0.694V +
$$\left(v^2 / \left(255 \left(f + \left(\frac{G}{100} \right) \right) \right) \right)$$

where:

S = stopping sight distance (metres)

V = bike design speed

f = coefficient of friction = 0.25 for paved surfaces

G = grade % (upgrade is positive and downgrade is negative)

As an example, if we are on a pathway with a two percent upgrade and a design speed of 30 kilometres per hour, the minimum stopping sight distance is 34 metres. Figure D-1 may be used as a quick reference to determine approximate stopping sight distances.

Design Speed, (km/h)									
Grade %	10	15	20	25	30	35	40	45	50
12	8	13	18	-	-	-	-	-	-
10	8	13	18	24	-	-	-	-	-
8	8	13	19	25	32	-	-	-	-
6	8	13	19	25	32	40	-	-	-
4	8	13	19	26	33	41	49	-	-
2	8	14	20	26	34	42	51	61	-
0	9	14	20	27	35	44	53	63	74
-2	9	14	21	28	36	45	55	66	77
-4	9	15	21	29	38	47	58	69	81
-6	9	15	22	30	39	50	61	73	86
-8	9	16	23	32	42	53	65	78	92
-10	10	16	24	34	44	56	70	84	100
-12	10	17	26	36	48	61	76	92	110

Figure D-1 : Minimum Stopping Sight Distance for Bicycles

Note: Assumes paved surface, wet conditions.

Stopping distance in metres.

To incorporate stopping sight distance into design criteria, Figure D-2 shows the minimum length of vertical curve required to accommodate the required minimum stopping sight distance. It assumes the cyclist's eye height to be 1.37 metres above ground level and any objects at ground level.

Due to the multi-use nature of pathways, it is important to consider stopping sight distance around horizontal curves. The minimum design curve radius is as follows:

 $\min R = V^2/(127(e+f))$

where: R = minimum radius, m

V = speed, km/h

f = coefficient of lateral friction

e = superelevation, m/m

Source: Transportation Association of Canada, Urban Supplement to the Geometric Design Guide for Canadian Roads, September 1995.

As an example, with f = 0.28, e = 0.02 m/m, and a design speed of 30 km/h, the minimum curve radius is 24 metres. With this in mind, Figures D-3a and D-3b show the method used to determine minimum distance an obstacle needs to be away from the pathway to maintain the minimum stopping sight distance. This calculation must be used to determine required safety clearances on curves.

Figure D-2. Crest Vertical Curves for Bicycles

algebraic	Design Speed km/h								
of grade, (A), %	10	15	20	25	30	35	40	45	50
2	-	-	-	-	-	-	-	-	11
5	-	-	-	-	15	32	51	71	100
10	-	-	13	27	44	69	102	145	199
15	-	10	22	40	67	104	153	-	-
20	3	14	30	54	-	-	-	-	-
25	6	18	37	-	-	-	-	-	-

Minimum curve length, m

Note: Above heavy line, stopping sight distances are greater than the curve length. Below heavy line, stopping sight distances are less than the curve length. Assumes paved surface, wet conditions. Stopping distance in metres.

The following formulas are used to determine the minimum curve length:

$$L = 2S - \frac{274}{A}$$

(when stopping sight distances are greater than curve length); or

$$L = \frac{AS^2}{274}$$

(when stopping sight distances are less than the curve length);

where:

L = minimum vertical curve length

S = minimum stopping sight distance

A = algebraic difference in grades, %

Note: eye height is assumed to be 1.37m with object height assumed to be zero.

Source: Transportation Association of Canada, Urban Supplement to the Geometric Design Guide for Canadian Roads, 1995.



Figure D - 3a. Lateral Clearance on Horizontal Curves

Lateral clearance to obstructions on the inside of horizontal curves is based on the need to provide sufficient sight distance to an object on the intended path of the bicycle for which the rider has a need to stop. The line of sight to the object is taken to be through the comer of the visual obstruction, and the stopping distance is measured along the intended path, which is taken to be the inside edge of the inner lane.

Figure D-3a illustrates the method of measurement and gives a mathematical expression for the calculation of lateral clearance. Figure D-3b gives the lateral clearance for a range of radii from 10 to 80 metres and stopping sight distances from 10 to 100 metres. The lateral clearance values shown occur at the midpoint of the curve.

Figure D - 3b Lateral Clearance for Bicycles on Horizontal Curves

Clearance (C), m											
Radius Stopping Sight Distance (S), m											
(R)m	10	20	30	40	50	60	70	80	90	100	
10	1.2	4.6	9.3	-	-	-	-	-	-	-	-
15	0.8	3.2	6.9	11.5	-	-	-	-	-	-	
20	0.6	2.4	5.4	9.2	13.7	18.6	-	-	-	-	
25	0.5	2.0	4.4	7.6	11.5	15.9	20.8	-	-	-	
30	0.4	1.7	3.7	6.4	9.8	13.8	18.2	22.9	27.9	-	
35	0.4	1.4	3.2	5.6	8.6	12.1	16.1	20.5	25.2	30.0	
40	0.3	1.2	2.8	4.9	7.6	10.7	14.4	18.4	22.8	27.4	
45	0.3	1.1	2.5	4.4	6.8	9.6	12.9	16.6	20.7	25.0	
50	0.2	1.0	2.2	3.9	6.1	8.7	11.8	15.2	18.9	23.0	
55	0.2	0.9	2.0	3.6	5.6	8.0	10.8	13.9	17.4	21.2	
60	0.2	0.8	1.9	3.3	5.1	7.3	9.9	12.8	16.1	19.7	
65	0.2	0.8	1.7	3.1	4.7	6.8	9.2	11.9	15.0	18.3	
70	0.2	0.7	1.6	2.8	4.4	6.3	8.2	11.1	14.0	17.1	
75	0.2	0.7	1.5	2.7	4.1	5.9	8.0	10.4	13.1	16.1	
80	0.2	0.6	1.4	2.5	3.9	5.6	7.5	9.8	10.8	15.1	

Note: No value is shown where deflection angle exceeds 180" (stopping sight distance>R).

Source: Transportation Association of Canada, Urban Supplement to the Geometric Design Guide for Canadian Roads,

Safety Clearances

To ensure a clear operating environment on straight sections of pathway, no objects, including trees and shrubs, should be within one metre of the pathway. Overhead clearance should be a minimum of three metres. Further, a visibility triangle, as per Figure D-4, should be maintained at all intersections. To avoid pathway damage caused by roots it is recommended that trees be placed at least five metre from pathways.



.Figure D - 4. Visibility Triangle

Signs

Signing should be in accordance with the Highway Traffic Act and The City of Calgary Traffic Operations Policy Manual. Interpretive signs may be designed to coordinate with the "theme" or design of the park or facility. General sign guidelines are as follows:

- 1. Sign posts to be at least one metre from the pavement edge.
- 2. The bottom of the sign to be 2.1 metres from the ground.
- 3. If two signs are installed on one post, they should be side by side.
- 4. If two signs are installed one over the other, the bottom edge should be 2.1 metres above the ground.
- 5. The bottom sign should be the bike sign.
- 6. The sign installation should not reduce visibility.
- 7. Signs should not be obstructed by vegetation or other obstacles.
- 8. Signs should be used sparingly in order to avoid pathway clutter.

Construction Materials

The subgrade should be compacted to 95 percent Standard Proctor Density. The base should consist of 20 millimetre crushed gravel, compacted to 95 percent SPD with 100 millimetres thickness for regional pathways and 50 millimetres thickness for local pathways. The surface should be a hot mix "B" asphalt 75

millimetres thick.

A change of surface material, for example the addition of stone chips on asphalt pathways, is to be used where one class of users is to be excluded from a particular portion of pathway. For example, the first 20 metres of a pedestrian-only pathway could be treated with stone chips to warn cyclists that they are entering a wrong path. The same treatment could be used to alert users that they are approaching a section of pathway where extra caution is required.

Drainage

Pathways should be constructed so that they do not obstruct surrounding drainage patterns or allow drainage across the pathway. Culverts should be used in side slope conditions.

Root Barrier

In areas with potential weed and root problems, a root barrier system (such as "Fabrene Type TE") should be used.

Pavement Marking

A program of signing and pathway pavement marking has been employed which allows for improved integration of different pathway user groups. Pathway marking (painting) guidelines are as follows:

- A 50 millimetre solid yellow line is normally painted in the centre of the pathway. In sections with poor sightlines, sharp curves, bridges and underpasses, and where passing in general is not permitted, a double line is used.
- 2. Stencil symbols are used for sections of pathway designated for use by BICYCLES ONLY or PEDESTRIANS ONLY.
- 3. A STEEP HILL symbol should be painted approximately 10 metres before the start of the descent.
- 4. STOP is written prior to dangerous crossings.
- 5. Other stencilled markings include YIELD, CYCLISTS DISMOUNT and SLOW.
- 6. Directional arrows may be used to direct users to the proper pathway(s).

Bollards

Bollards should only be used to warn pathway users that caution is required or to prevent automobiles from entering the pathway (a demonstrated problem should exist).

APPENDIX E SEATTLE BICYCLE TRAFFIC ENFORCEMENT POLICY



BICYCLE TRAFFIC ENFORCEMENT POLICY

PURPOSE

This training bulletin is designed to prescribe a uniform policy to be observed by officers when enforcing traffic laws that regulate and protect bicycle riders.

INTRODUCTION

It is the policy of the Seattle Police Department (SPD) to facilitate the use of bicycles as an alternative means of transportation and a recreational sport.

Use of bicycles for recreation, commuting and business has greatly increased in the past few years. This has resulted in an increase in the number of traffic collisions, traffic violations and cyclist/police contacts.

This bulletin is a guide for officers who encounter situations involving cyclists that require police action. Our overall goal is to increase traffic safety and to reduce the number of traffic collisions involving bicycles.

BACKGROUND

In past eras, great use was made of bicycles for business and pleasure. In the more recent past, bicycles were largely relegated to use by children. In the past decade, bicycles have once again been adopted by adults as an efficient, inexpensive mode of transportation. Business users, including the Seattle Police Department, find bicycles to be an effective means of moving rapidly through heavily congested city traffic.

In addition, the city, county and state are promoting the use of bicycles for travel to and from work. This has resulted in more bicycles mixed in with car commuters on heavily congested roads.

Adult recreational cyclists are adopting the sport in great numbers. The ever increasing popularity of such events as the Seattle-to-Portland bicycle ride indicate that the popularity of cycling will increase further.

The "traditional" bicycle user, the child riding in his own neighbourhood, continues to be present on local streets.

BICYCLE COLLISIONS

The result of increased usage of roads by cyclists is an increase in the number of collisions in which bicycles are involved. Cycling collisions occur due to driving errors made by motorists as well as by bicycle riders.

Seattle's experience in the past few years with cycling accidents shows a 600 percent increase in the number of collisions involving bicycle messengers. More than 300 bicycle accidents involving all riders are reported to the SPD each year, usually due to serious injury to the rider. We should keep in mind that the vast majority of bicycle collisions are not reported to the police.
CAUSES OF COLLISIONS

A study of recent accidents reveals that there are certain factors that commonly cause bicycle collisions. The most important factors are listed below.

Actions by automobile drivers:

- Failure to yield right-of-way to oncoming bicycles when making turns. Drivers often fail to see the cyclist.
- Failure to yield right-of-way to cyclists when emerging from a garage or driveway. Drivers pull out without looking, striking the cyclist or pulling into his path, resulting in a collision.
- Purposeful harassment of bicycle riders by motorists.
- Failure to overtake safely when passing. Drivers pass at locations with insufficient room, or fail to allow for projecting mirrors.

Actions by bicycle riders:

- Riding through red traffic signals. Cyclists travelling on roads frequently disregard signals, often riding through without slowing.
- Failing to stop for STOP signs.
- Riding against the flow of traffic on the wrong side of the street or counter to the flow of traffic on a oneway street. This results in the cyclist appearing from an unexpected direction, surprising the motorist.
- Failure to have needed lights and reflectors when riding at night.

There is a commonly held perception that cyclists represent a severe threat to pedestrians when sharing a sidewalk. Cyclists frequently overtake pedestrians without warning, frightening them. There have been only two reports of bicycle pedestrian collisions out of 155 reports of bicycle collisions in the past four years. Officers should be aware, however, of the intense feeling of pedestrians on this issue, and that many such collisions occur but are not reported.

BICYCLE COLLISION PREVENTION

The Seattle Police Department will act to control collision causing traffic violations involving bicycle riders and cars. It is the duty of every police officer to take necessary action to cite or warn violators when infractions are observed. Enforcement will be done in compliance with the policy statements below.

BICYCLE RULES AND ENFORCEMENT POLICY

In the following pages, the pertinent traffic laws are spelled out in italic text, followed by SPD policy on enforcement and application of the section. The bail amount on all violations of either the rules-of-the road or the bicycle rules is \$28. Check the "Traffic Infraction" box at the top of the citation form.

SMC CHAPTER 11.44, BICYCLE RULES

11.44.010 Where regulations apply.

These regulations applicable to bicycles shall apply whenever a bicycle is operated upon any street, alley, or way open to the public, subject to those exceptions stated in this chapter.

This section makes the bicycle rules applicable everywhere but private property. "Way open to the public" specifically includes parks, park paths, school grounds and any other place commonly used by the public.

11.44.020 Rights and duties of rider.

Every person operating a bicycle upon a roadway shall be granted all of the rights and shall be subject to all of the duties applicable to a driver of a vehicle except as to the special regulations of this chapter and except as to those provisions of this subtitle which by their nature can have no application.

This section tells the cyclist that, if you wish to ride upon the roadways, you must obey the same rules as drivers. **On roadways**, cyclists must stop at red lights, stop signs and follow all the rules of the road. They must travel with the normal flow of traffic and stay on the proper side of the road. **When operating on a roadway, the bicycle rider has the rights of a driver of a vehicle**. This means that drivers must treat the cyclist as a vehicle, granting right-of-way the same as if the bicycle were a motor vehicle.

11.44.040 Riding an roadways.

Every person operating a bicycle upon a roadway at a speed slower than the normal and reasonable flow of motor vehicle traffic thereon shall ride as near to the right side of the right through lane as is safe, except as may be appropriate while preparing to make or while making turning movements, or while overtaking and passing another bicycle or vehicle proceeding in the same direction. A person operating a bicycle upon a roadway that carries traffic in one (1) direction only and that has two (2) or more traffic lanes may ride as near to the left side of the left side of the left through lane as is safe. A person operating a bicycle upon a roadway may utilize the shoulder of the roadway or any specially designated bicycle lane if such exists.

This section is self-explanatory. If a cyclist is riding at or near the traffic speed, he is not obliged to keep out of the way. Otherwise, all of these rules must be obeyed.

11.44.060 Riding more than two (2) abreast prohibited.

Persons operating bicycles upon a roadway or sidewalk shall not ride more than two (2) abreast except on paths or parts of roadways set aside for the exclusive use of bicycles.

This section may be used if cyclists are unreasonably blocking traffic. You must observe for a sufficient time to establish that the cyclist is not overtaking and passing two slower cyclists.

While the section makes it a violation by all three of the cyclists riding side-by-side, it is SPD policy to cite only the third (or more) cyclist riding to the left. This is because it is legal for the first two to ride two-abreast, and it is the action of the third rider in riding alongside that makes it illegal.

In most cases, giving a warning and instruction is the most appropriate response to this violation.

11.44.080 Overtaking and passing on right.

The operator of a bicycle may overtake and pass a vehicle or a bicycle upon the right only under conditions pertaining such movement in safety.

Cyclists, riding along the edge of a roadway, are often tempted to pass long lines of cars stopped for signals or for other reasons. They may do this, provided they can do it safely. If you wish to cite for a violation of this rule, you should prepare detailed notes on why this movement presented a safety hazard.

This section should be cited if such passing results in a collision, as a collision is normally seen as simple proof that the movement could not be completed safely. When passing on the right, the burden is squarely upon the cyclist to avoid collisions.

11.4.100 Right-of-way in crosswalk.

A person operating a bicycle across a roadway upon and along a crosswalk shall have all the rights and duties applicable to a pedestrian under the same circumstances, but shall yield to pedestrians upon and along a crosswalk. No person operating a bicycle shall suddenly enter a crosswalk into the path of a vehicle which is so close that the driver cannot yield safely.

A cyclist may ride across a street in a crosswalk and has the same right-of-way and duties as a pedestrian. He must however, enter the crosswalk safely and slowly enough to allow drivers to yield. This section grants the right to use crosswalk to cyclists.

Cyclists using the roadway must stop for pedestrians (or bicycles, for that matter) using the crosswalk the same as any other driver. (See 11.44.040 above). If the cyclist does not stop for a pedestrian, cite under 11.40.040. Do not cite under 11.44.100.

The only offense defined by section 11.44.100 is for a cyclist crossing a street in the crosswalk who fails to yield to pedestrians using the same crosswalk, similar to if they were all on a sidewalk. You may cite if you observe a violation.

11.44.120 Riding on sidewalk or public path.

Every person operating a bicycle upon any sidewalk or public path shall operate the same in a careful and prudent manner and at a rate of speed no greater than is reasonable and proper under the conditions existing at the point of operation, taking into account the amount and character of pedestrian traffic, grade and width of sidewalk or public path, and condition of

surface, and shall obey all traffic-control devices. Every person operating a bicycle upon a sidewalk or public path shall yield the right-of-way to any pedestrian thereon, and shall give an audible signal before overtaking and passing any pedestrian.

This section is intended to control cyclist behavior on sidewalks and paths, setting the rules where bicycles and pedestrians mix.

You can cite for improper riding under this section if you can clearly establish that the riding was not careful and prudent. Keep in mind that the ordinance requires you to consider the conditions at the time. Each of the conditions noted in the ordinance should be addressed in your notes on the citation. Obviously, fast riding through a narrow, gravel covered path full of children or elderly pedestrians would justify more serious action than a rider at the same speed on a wide smooth asphalt trail populated by athletic runners and roller-skaters.

This section makes it clear that pedestrians have the right-of-way upon sidewalks and paths. A cyclist can be cited if his actions force a pedestrian to change his course or speed to avoid a collision.

The requirement to give an audible signal before passing is difficult to enforce. You must be close enough to have heard any voice, bell or horn warning given to the pedestrian. The warning must be loud enough for the pedestrian to hear. Voice signals may be used. You may ask the pedestrian if any warning was given. Record their name as a witness.

Remember that in some areas, such as Greenlake Park, special lane markings have been placed designating certain paths or parts of paths as bicycle lanes. Bicycles have the right-of-way on these. Pedestrians frequently block such lanes, often walking along three or more abreast. You should stop and warn the pedestrians in such circumstances. Normally, citations would not be appropriate.

11.55.140 Hand signals.

- A. All required hand signals shall be given in the following manner:
- 1. Left turn: left hand and arm extended horizontally beyond the side of the bicycle.
- 2. Right turn: left hand and arm extended upward beyond the side of the bicycle, or right hand and arm extended horizontally to the right side of the bicycle.
- 3. Stop or decrease speed: left hand and arm extended downward beyond the side of the bicycle.
- B. Such hand signal shall be given continuously during the last one hundred feet (100') travelled by the bicycle before initiation of a turn, unless during the last one hundred feet (100') both hands are needed to control or operate the bicycle.

Cyclists riding on a roadway are required to signal under the same circumstances as drivers. They are not required to hold the hand signals while stopped for traffic, waiting to turn. Often the cyclist's position in the traffic lane is a clear indication of plans to turn.

Please note the important exception in "B" above. **The cyclist does not have to signal if he needs both bands to maintain control.** Many bicycles are very difficult to stop unless both front and rear hand brakes are used. We would rather have the cyclist stop safely if giving such a signal results in the possibility of a crash.

The intent of the section is for the cyclist to give clear warning to motorists of his intention to turn or stop. It is also a courtesy to other drivers who can plan their moves accordingly. Encourage cyclists to comply to the extent that they can do so with safety.

11.44.160 Lamps and reflectors on bicycles

Every bicycle, when in use during the hours of darkness, shall be equipped with a lamp on the front, which shall emit a white light visible from a distance of at least five hundred (500') to the front, and with a red reflector on the rear of a type approved by the State Commission on Equipment, which shall be visible at all distances up to six hundred (600') to the rear when directly in front of lawful lower beams of head lamps on a motor vehicle. A lamp emitting a red light visible from a distance of five hundred (500') to the rear may be used in addition to the red reflector.

This section requires a headlight and a rear reflector at night. The light must be visible for 500 feet in front. This means that a person 500 feet away can see the light, not that the light illuminates an object 500 feet away. The reflector is mandatory, with the tail light being a supplement, not a replacement, for the reflector.

Failure to have required lights is a major factor in night bicycle/car collisions. Officers should stop every violator observed, giving instruction or citations as appropriate.

11.44.200 Brakes.

Every bicycle shall be equipped with a brake which will enable the operator to make the braked wheels skid on dry, level, clean pavement.

All new bicycles intended for street usage are sold with brakes. They deteriorate with use, however, and may become ineffective. Children, in particular, may neglect brake care. Officers should stop violators and warn them of the hazards. Bad brakes may be identified by the rider's attempts to stop using unconventional methods, such as dragging of the feet.

Occasionally, officers will encounter adults riding racing bicycles, without brakes, upon ways open to the public. These riders should be cited in every instance for this violation.

11.44.210 Must ride on seat.

A person operating a bicycle shall not ride other than upon or astride a permanent and regular seat attached thereto.

11.44.220 Passengers.

No person shall use a bicycle to carry more persons at one time than the number for which it is designed and equipped, except that a person eighteen years of age or older may carry a child securely attached to his person.

These sections operate together to require passengers and operator to each have a seat. Adults may carry a child in a secure carrier attached to the adult's body. Officers may stop such adults if they observe that the carrier does not appear to be a secure method of transport. "Tot trailers" designed to transport children are also permitted.

Obviously, these rules do not apply to bicycles used by stunt riders in parades upon closed routes, or to circus acts or other performers not on public ways.

11.44.240 Clinging to vehicles.

No person operating any bicycle shall attach the same or himself to any vehicle.

This section prohibits 'hitching on" to vehicles, whether by clinging to it by hand or using a rope or other tow device. If the bicycles are on roadways, one cyclist may not tow another. Always stop violators committing this offense.

11.44.260 Control.

No person operating a bicycle shall carry any package, bundle or article which prevents him from keeping at least one (1) hand upon the handlebars, nor shall he operate the bicycle at any time without keeping at least one (1) hand upon the handlebars.

This section requires one hand on the handlebars at all times. Actual loss of control is not an element of this offense. These rules do not apply to bicycles used by stunt riders in parades upon closed routes, or to circus acts or other performers not on public ways.

11.44.280 Parking.

No person shall park a bicycle upon a sidewalk or public path in such a manner as to obstruct traffic thereon; or within, against or adjacent to a bus patron shelter in a manner which restricts or eliminates tho use of such shelter by pedestrians who are waiting for public transportation: or upon a roadway except in locations designated by official traffic control devices. This section prohibits bicycle parking on roadways except where designated. This means bicycles must be parked on sidewalks in most cases. Allow bicycle parking on sidewalks unless the bicycle unreasonably blocks traffic as noted in this section.

It is SPD policy to encourage the use of substantial bicycle locks and to permit bicycles to be attached to fixed objects such as meters and posts to prevent theft. Allow such parking as long as the driver has tried to be reasonable about not blocking traffic.

Bicycles are often very valuable and are very easy to steal. Bicycle theft is an important element of our crime problems. Control of this problem requires that officers encourage cyclists to lock their bicycles when parked.

1 144.320 Responsibility.

No person shall do any act forbidden by this chapter or fail to perform any act required in the chapter. The parent of any child and the guardian of any ward shall not authorize or knowingly permit any such child or ward to violate any of the provisions of this chapter; provided, that no violation of the chapter by any child under the age of sixteen (16) years, or by a parent or guardian of such child shall constitute negligence per se in any civil action brought or defended by in behalf of such a child.

This section makes the parent responsible for the behavior of their children, as far as the parent is aware of such. This would be useful where you observe parents riding in company with children who are violating the rules with the parents knowledge, and the parent fails to take action to stop the violation. Obviously, such situations are delicate and should be handled with great tact and discretion.

The remainder of the ordinance is principally concerned with civil lawsuits.

OTHER TRAFFIC RULES AFFECTING CYCLISTS

11.53.190 Driving in a bicycle lane.

The operator of a motor vehicle shall not drive in a bicycle lane except to execute a turning manoeuvre, yielding to all persons riding bicycles thereon.

A driver may use the lane only to make a turn, and should enter it just before the turning point.

11.84.440 Television Viewers - Earphones.

A. Not applicable - Televisions seen by drivers illegal.

B. No person shall operate any motor vehicle on a public highway while wearing any headset or earphones connected to any electronic device capable of receiving a radio broadcast or playing a sound recording for the purpose of transmitting a sound to the human auditory sense and which headset or earphones muffle or exclude other sound. This rule applies to cyclists only when they operate their cycles on the streets. Note that the earphones are prohibited only if they muffle or exclude other sounds. Explain in your notes on the citation the details of how the earphones are constructed and if they fully cover the ears.

Other sections - Hazardous driving by cyclists on roadways:

11.50.380 Disobedience to traffic control devices

11.50.140 Red light

11.50.320 Stop sign

Other Sections - Hazardous driving by motorists

- 11.53.200 Overtaking a vehicle on the left
- 11.55.200 Turn signal required

11.58.005 Negligent driving

Drivers frequently pass bicycles as both approach an intersection, then the car suddenly makes a right turn into the cross street, cutting into the path of the bicycle. This is a serious violation that causes numerous collisions. The rules governing this manoeuvre are complicated. At the start, the bicycle is favoured and the car is considered to be overtaking and passing. If the driver turns before he is fully past the bicycle and into the right turn lane, cite the driver for negligent driving. However, if the car is fully past the bicycle, has moved over to the right and has signalled his turn for the required distance, he is favoured and the cyclist is burdened. This is due to the cyclist now being in the position of overtaking and passing on the right overtaking a vehicle on the right.

- 11.58.320 Emerging from alley
- 11.58.303 Emerging from entry driveway
- 11.58.050 Enter/leave vehicle on traffic side unsafely
- 11.55.080 Right-of-way, left turn

CLASSES OF BICYCLE RIDERS

It is useful to divide cyclists into classifications based upon their level of on-street activity and accident exposure. They are:

Bicycle Messengers

These riders are full time professional cyclists who operate bicycles in the course of their employment. They typically ride the downtown streets during peak traffic hours and are on the sidewalks when the pedestrian traffic is heavy. This group experiences a high number of accidents due to their constant exposure to heavy traffic. These riders routinely and habitually violate the traffic laws and bicycle rules.

Proficient Adult Riders

These riders travel long distances at relatively high speeds and may ride after dark. They have a high confidence level and are willing to ride in rush hour traffic. They usually obey the traffic laws and are aware of the hazards that they face. Proficient riders will use arterial streets and will ride on the roadway.

Novice Adult Riders

These riders travel shorter distances (less than three miles) at moderate speeds and may ride after dark. They try to avoid the busiest streets, often using the neighbourhood side streets and riding onto and off sidewalks. They will use arterial streets when traffic is moderate. They usually obey the traffic laws and have a good awareness of the hazards that they face.

Children

Children are frequently ignorant of their responsibilities when riding a bicycle. They are also frequently oblivious of the hazards that cycling presents. Police contacts with child cyclists should be aimed at correcting their behavior in a friendly, positive manner. Encourage the use of bicycle helmets. Children generally avoid traffic, lacking confidence. Most will ride on sidewalks where possible.

Children should not normally be cited for riding violations. It may be appropriate for the officer to contact the child's parents to insure correction of the problem. Teenagers present more difficult problems. They may be cited if necessary.

Enforcement Policy

Officers should stop violators when they observe violations. The decision to cite is with the officer. Officers are particularly encouraged to cite riders who endanger pedestrians or are flagrantly violating the bicycle rules.

BICYCLE COLLISIONS

Cyclist and pedestrian collisions nearly always result in injury. Seattle Police will respond to collision scenes and conduct an accident investigation in accordance with the rules set out in SPD Manual section 2.05.050.

Officers are encouraged to identify the specific rules-of-the-road violation that led to the collision. It is safe to assume that if everyone follows the rules, there will be no collision. The fact of the collision indicates that the driver or the cyclist has violated the rules. Officers should cite the party in violation.

An essential element of a bicycle accident investigation is recording the use of protective headgear by the rider.

ENCOURAGING USE OF BICYCLE HELMETS

It is SPD policy to encourage the use of bicycle helmets by all cyclists. Every contact with cyclists should include discussion of the value of helmets, even just to reinforce continued use.

Persons with questions about bicycle helmets may be referred to the Harborview Injury Prevention and Research Center, telephone # 223-3399, for more information.

Bicycle helmets have been identified as the single most important factor in reducing the severity of injuries to cyclists involved in a collision or fall. Head injuries are very common in cycling accidents and are very difficult to treat. All SPD employees who ride bicycles in the course of their work should wear an approved protective helmet.

IDENTIFICATION OF VIOLATORS

Establishing the identity of offending bicyclists is a frequent problem. Cyclists are often dressed for strenuous athletic work and are not carrying their purses or wallets. In some cases, messengers and other professional riders do not carry identification in the hopes that police will not want to take the time to properly identify them.

Riders signalled to stop by police for a traffic infraction are required to stop, to identify themselves, give their current address, and sign the notice of infraction. Officers are authorized to detain the person long enough to accomplish the above and to write out a notice of infraction. (Section 11.59.090).

The officer stopping a cyclist operating without identification must judge for himself if the offender is telling the truth. Successful tactics used in the past to help in such situations are:

- Ask the subject's companions to state the subject's name. This is best accomplished if the companion is a slight distance away.
- Ask the subject to repeat his name and address at a later time.
- Watch with great attention as the subject begins the signature. Most people sign their name effortlessly. Signing a false name requires attention and is usually done with care.
- Also, subjects will frequently give a false name and then begin to sign their true name, catching the error after it is too late. It is helpful to distract their attention with conversation while requesting the signature. If the person begins to sign and then hesitates, it is likely to be a reaction to signing the first letters of their true name.

Professional riders such as messengers present a different problem. Frequently their decision to not carry identification is a calculated plan to hinder officers who are likely to stop them for violations. Officers are encouraged to have them radio their base and have a supervisor from the company respond to identify them. An alternative is to transport the rider to the company office for such identification. This requires the permission of the rider/violater.

The main point with messengers is that consistent enforcement and follow-through on the identification problem will cause them eventually to conclude that it is more practical to carry identification.

EMPLOYEE RESPONSIBILITY

Seattle Police officers will enforce the bicycle rules in accordance with the policy set forth in this bulletin. It is particularly important that the general patrol force participate in enforcement. Of key importance is the work of the district foot patrol officer and the police bicycle patrol effort directed at controlling improper riding by messenger riders in the downtown core.

APPENDIX F

PATHWAYS & BIKEWAYS SYSTEM MAP





