LEGO Videos for Educating Road Users About Bicycle Infrastructure

Transportation Association of Canada SUTA & RSEA Award Submission
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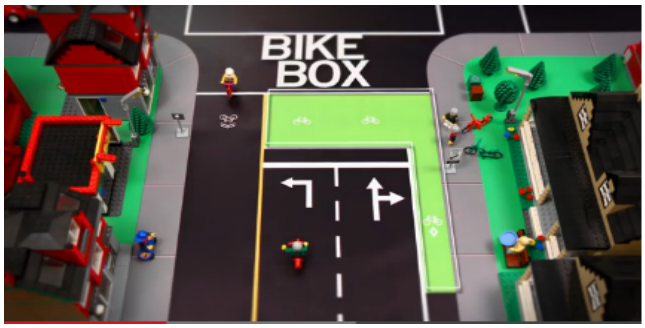

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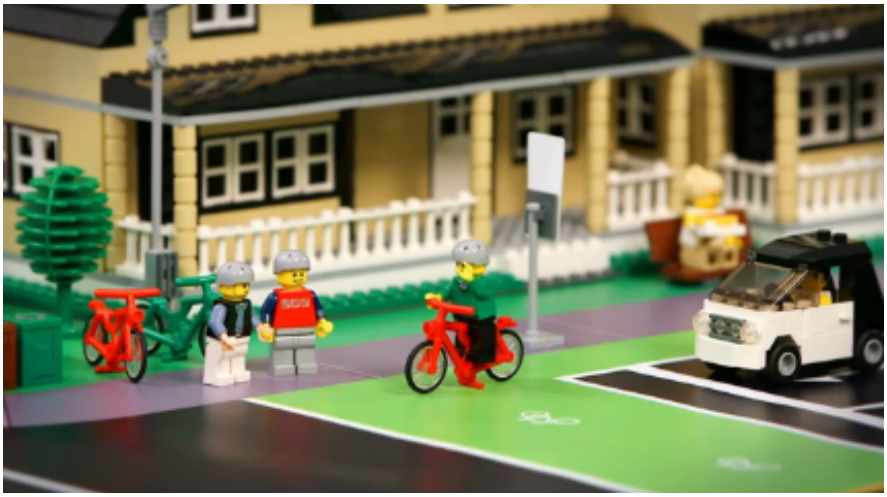


The Need for Bicycle Education to Contribute to Sustainable Transportation & Safety

The City of Edmonton is submitting this application to both the Sustainable Urban Transportation Award and the Road Safety Engineering Award because our success in increasing cycling mode share to achieve our sustainability, health, and safety goals is directly tied to our ability to improve cyclist safety and perceptions of safety. Studies have repeatedly shown building infrastructure cannot achieve these objectives in isolation; education is critical to successfully increasing sustainability and safety. The LEGO Bicycle Education Videos Initiative is an innovative way to address this need as is described in the remainder of this submission.

Background & Successes with Increasing Cycling and Safety

The City of Edmonton is creating a bike-friendly community and is achieving this by focusing on an integrated strategy of engineering, education, enforcement, encouragement, and evaluation. City Council approved three pivotal documents in 2009 that set the direction for Edmonton to become bike-friendly: The Way We Move (Transportation Master Plan), the Bicycle Transportation Plan, and the Active Transportation Policy. These plans and policies reflect Edmontonians' desires to create a walkable, bike-friendly city to support the creation of the healthy, barrier-free, age-friendly and safe city they want to live in where active modes are a preferred transportation choice[1] and more people can cycle more often.[2] The reasons that Edmontonians want to live in a bike-friendly city are varied and supported by findings from numerous studies.[3][4][5][6][7][8][9][10][11][12][13]

- **Economic**: Automobile-dependent communities tend to increase transportation costs for residents and businesses because viable and convenient options are not present. Costs of travel, vehicle maintenance, and insurance increase due to longer distances between dispersed destinations and increased travel time due to congestion. The transportation infrastructure in these cities also costs more to maintain and operate, further increasing the tax burden.
- **Social**: Providing active transportation options allows people regardless of age, income, vehicle ownership, and physical/cognitive ability to more freely and equitably move and contribute to their community. In an increasingly global environment, a city's ability to attract and retain companies and people requires the provision of travel options to support and foster the creative, livable, and vibrant places where people want to live and raise their families.
- **Environmental**: Supporting walking and cycling trips can reduce congestion and transportation-related pollution by replacing vehicle trips, particularly shorter distance trips that are conducive to and convenient by walking or cycling.
- **Health**: Increased physical activity and reduced pollution contribute to improved physical health, decreased incidence of chronic disease including obesity and cancer, and reduced health care costs. Mental health has also been shown to be improved when people live in walkable and bikeable communities.
- **Safety**: Cities that have focused on expanding their bicycle networks have achieved reductions in the number and rate of vehicle-bicycle collisions, creating safer urban environments for residents.

Numerous studies continue to show that building bicycle infrastructure increases the number of people choosing to ride a bicycle for transportation and the number of trips that are made by bicycle.[14][15] Data collected in Edmonton also supports this conclusion. Bicycle volumes along recently installed on-street bike routes in Edmonton have average year over year increases of about 30%.[16] Studies also show there is a correlation between an increasing number of bicycle trips and a reduction in the number and rate of vehicle-bicycle collisions[17], which is also consistent with Edmonton findings.

Impact of Perceived Safety on Sustainability, Health & Safety Goals

The facilities designed and installed in Edmonton are based on approved design guidelines and best practices that have been created to provide safe on-street and off-street bicycle infrastructure. The guides used in Edmonton include the Transportation Association of Canada's Bikeway Traffic Control Guidelines for Canada, the National Association of City Transportation Officials' Urban Bikeway Design Guide, and the Manual on Uniform Traffic Control Devices (Canada). By following this guidance and applying engineering analysis and rigour, the designed and operating routes are safe from an evidence-based observed risk perspective. However, numerous studies show that perception of safety by existing and potential users is not necessarily consistent with the observed risk.[18][19] These perceptions play a critical role in a person's willingness and desire to ride a bike which significantly reduces the ability of cities to achieve their sustainability, health, and safety goals. If people do not choose to ride a bike because they are afraid, increases in cycling will not occur, the resultant environmental, social, and economic goals will not be achieved, people will not incorporate healthy activities into their daily lives, and safety for existing and new cyclists will not be improved.

In Edmonton, while resident surveys show that the constructed on-street bicycle infrastructure has increased the number of people that are cycling, particularly in neighbourhoods where infrastructure has been constructed, these same surveys indicate the significant impact that perceived safety has on the level of comfort with cycling and the willingness of Edmontonians to ride a bike. Fifty seven percent of Edmontonians state they want to bike more than they do now but 59% need to feel safer on the road to ride a bike more often and 64% indicate that traffic volumes and speeds are impacting their comfort level and willingness to ride a bike.[20][21][22][23][24]

This discrepancy between perceived safety and observed risk has been incorporated into the philosophy for planning and designing bicycle facilities. In Edmonton and other communities across North America, the design of bicycle infrastructure is being guided by the target market for cycling. This is done by ensuring the design of the infrastructure addresses the concerns and is comfortable for the majority of residents that are typically referred to as the 'Interested but Concerned.' This market is determined by completing surveys to segment the population according to two dimensions: a person's level of interest in cycling or desire to ride a bicycle, and the level of comfort that person has with riding a bike in different contexts with varying types of bicycle infrastructure.[25][26][27]

Findings from these studies have found the Interested but Concerned are people that are curious about cycling, like to ride a bicycle for recreation, may have fond memories of cycling as a child, but they are afraid to ride a bike and, therefore, do not ride regularly. They are afraid to ride with vehicles that are operating at high speeds and are nervous about riding beside vehicles and navigating through intersections. They would ride if they felt safer on the roadways which they feel could be achieved by vehicles moving slower or being less frequent, having more quiet streets with fewer vehicles, having more paths without any vehicles, and increasing separation from vehicles.[28]

In Edmonton, the Interested but Concerned have the following characteristics.[29]

- They are the majority of Edmontonians.
- They have an almost universal interest in cycling more.
- Two-thirds live within bikeable distances to their regular destinations.
- 68% currently cycle and 45% currently cycle weekly in the summer and fall, but only 29% are cycling for transportation.
- 38% have children and 76% of these households currently cycle.
- Their perceptions of safety are impacting their comfort level with cycling and their willingness to ride a bike.
    - 85% would ride a bike more if they felt safer on the road.
    - 70% feel there is so much traffic along the streets near their homes that cycling would be difficult or unpleasant.

The City of Edmonton is not just focusing the network planning and engineering design of bicycle infrastructure on the Interested but Concerned; the entire integrated strategy for engineering, education, enforcement, encouragement, and evaluation of the bicycle network is focused on the Interested but Concerned. Findings from focus groups and surveys in Edmonton have shown that providing additional information and explanation about what on-street bicycle infrastructure pavement markings and signs mean can significantly increase the comfort level of operating on streets with this infrastructure for both people driving a vehicle and riding a bike.[30] The findings in Edmonton are supported by a recent major study by the Organization for Economic Co-operation and Development (OECD) International Transport Forum that found policies increasing the number of cyclists should be accompanied by risk-reduction actions.[31] Another study found that education may be able to address public perception of route safety.[32]

The strategy being employed by the City of Edmonton is also unique in that education is not solely focused on cyclists. The Bicycle Education Program targets both motorists and cyclists. One reason this is so important is because the perception of safety by both groups is crucial for increasing cycling since motorists represent a large portion of the Interested but Concerned. Another reason is that motorists and cyclists have a shared responsibility for safety on city streets and both need to understand the meaning of the pavement markings and signs.

Impact of User Comprehension on Safety

The Edmonton surveys and focus groups have also helped to identify the level of comprehension that residents have with the pavement markings and signs installed to

designate on-street bicycle routes.[33] It is expected that education will be required to provide information to residents about how to navigate the roads with the new regulatory pavement markings and signs. This is of particular importance because most Edmontonians have not been exposed to learning about bicycle infrastructure through programs such as Driver Training. The research completed in Edmonton identified the pavement markings and signs that were being misunderstood and the movements being made by motorists and cyclists that were not being completed correctly. The Bicycle Education Program targeted the creation and distribution of materials based on these findings to improve comprehension and increase safety by reducing the probability of vehicle-bicycle collisions due to comprehension issues.

The specific infrastructure that Edmontonians were misunderstanding and the movements they were having difficulty making were the following:

- Shared-use lanes marked with sharrows were misunderstood to be reserved bike lanes for exclusive use by cyclists.
- Reserved bike lanes were well understood but people were unsure how cyclists were expected to make left turns from the bike lanes.
- The dashing of a reserved bike lane's longitudinal pavement lines were not consistently understood as indicating the creation of a shared space where vehicles can enter in order to move to the curb to make a right turn.[34]

By increasing the educational information provided to Edmontonians about what bicycle infrastructure pavement markings and signs mean, the City's Bicycle Education Program is consistent with findings from leading research studies regarding safe systems strategies to increase road safety for cyclists and motorists. The OECD found crash-causing conflicts can be reduced if agencies ensure that motorists and cyclists expect and understand each others' likely behaviour in critical situations, such as intersections.[35] OECD further recommends that authorities should ensure that all road users receive cycling training covering use of both roads and bicycle-specific facilities.[36] More recent versions of Alberta's Driver's Handbook have included this direction but that does not help motorists that have already received Driver Training.

The City's Bicycle Education Program is directly contributing to Canada's and Alberta's road safety visions. Transport Canada's Road Safety Vision 2010 and Road Safety Strategy 2015 include the need for public education and awareness campaigns to promote road user safety and recommends improving communications, cooperation, and collaboration among stakeholders to create safer road users and safer road infrastructure.[37][38] Alberta's Traffic Safety Plan 2015 recommends educating and marketing to young drivers and riders through the use of effective communications tools, having public awareness campaigns for vulnerable road users, coordinating with local partners to promote and implement activities related to bike safety, and introducing targeted campaigns promoting cycling rules, safety tips, and improving driver behaviour.[39]

The City of Edmonton's Bicycle Education Program has been designed based on the principles and guidance from the road safety visions/strategies for Canada and Alberta.

The Program is directly responsive to findings from local studies and surveys and is consistent with recommendations from international research and best practices. Municipalities have a responsibility to educate their residents about the rules of the road and what pavement markings and signs mean in order to ensure cyclists and motorists operate and behave in a predictable and safe way when they are navigating the roads.

Bicycle Education and LEGO Video Initiative Details & Results to Date

The Bicycle Education Program is part of the City's integrated strategy of engineering, education, enforcement, encouragement, and evaluation to transform Edmonton into a bike-friendly city. The Bicycle Education Program has initiatives for various target groups of road users from children to seniors, motorists to cyclists, and residents to visitors. The program includes disseminating and targeting Edmontonians with education and awareness information via various formats including printed materials mailed to residents and distributed via schools and bike shops, radio advertisements, online advertisements, the City of Edmonton website, social media, billboards installed along bike routes, advertisements on city buses and in local newspapers, and partnering with stakeholders such as the Alberta Motor Association, CAN-BIKE, the Edmonton Bicycle Commuters, and Edmonton school districts. See the Appendix for examples of the materials created in 2013.

A tactic that was the focus of 2013 was the LEGO Educational Bicycle Videos Initiative to address findings from local surveys. The LEGO Videos Initiative were a series of stop-motion videos using LEGO to educate Edmontonians about the specific infrastructure that were being misunderstood and to help with general behaviour and awareness issues that were causing discomfort for motorists and cyclists and affecting their perceptions of safety. Based on the international studies, findings from Edmonton surveys and research, and direction from road safety visions/strategies for Canada and Alberta, there is significant support for the ability of the LEGO Videos Initiative to have positive impacts toward achieving the City's sustainability, health, and safety goals. Addressing user comprehension and perceived safety issues for motorists and cyclists is crucial to increasing the use of bicycles for transportation particularly by families and children that make up the primary group of our target market.

The LEGO Videos Initiative produced six videos in 2013 to add to a video released late in 2012. The topics of the videos are listed below with each being produced in a different style to increase public interest.

- Bike Attitude & Awareness Video: A general video about respecting other road users and being courteous when you are driving a vehicle and riding a bike.
- Riding & Driving to Safety: General operational tips and rules of the road were given in this video for cyclists and motorists.
- Dial S for Sharrow: This video explained what shared-use lanes are including the pavement markings and signs and how motorists and cyclists should use them.
- The Case of the Dashed Bike Lane: Information was provided on what a dashed bike lane is and how motorists and cyclists should operate in them.
- Coaching Corners - Left Turns for Cyclists: This video provided direction on two ways for cyclists to make left turns from bike lanes.

- Bike Box - 4 Way Intersection: This video provided instructions to motorists and cyclists on how to operate at intersections with bike boxes. It built on the video of a bike box at a 3-way intersection that was produced in late 2012.

To date there has been over 35,500 views by Edmonton residents, visitors, and others. The effectiveness of the videos and the response has been very positive including a fantastic response to the videos via social media. The City of Edmonton will continue to monitor the long term impacts of the LEGO Videos on user comprehension and safety via the Bicycle Evaluation Program and compare it to the baseline data collected in 2012 prior to the videos being released. The results of the ongoing evaluation will also be compared with findings from studies completed in other jurisdictions with respect to increases in bicycle mode share, reductions in the number and rate of vehicle-bicycle collisions, and changes in perceptions of safety.

The LEGO Videos library can be found and viewed at www.edmonton.ca/bikevideos. Information on the Education Program can be found at www.edmonton.ca/together and the Bicycle Program in general can be found at www.edmonton.ca/cycling.

Degree of Innovation & Added Value

Many municipalities have been working to build bicycle infrastructure but education programs and information to address user comprehension and perceptions of safety has typically been limited or has relied on advocacy groups or other organizations. The City of Edmonton decided to be an innovator and take the lead on education because it is fundamental to achieving our sustainability, health, and safety goals. The City developed a multi-faceted Bicycle Education Program as a result and has established a thorough Evaluation Program to monitor the results of its work to make Edmonton a bike-friendly community.

The LEGO Videos Initiative is also innovative for many reasons. First, the videos are produced using stop-motion and LEGO characters/environments. This approach was selected because it engages and appeals to the wide range of users that require more education including children and parents, motorists and cyclists, and residents and visitors. The videos are accessible and easy to understand for all ages and present important lessons in a fun, engaging, and non-judgmental way. By appealing to such a wide audience, the reach and impact of the videos is broad and deep. This results in a second innovation where the broad appeal and popularity of the videos creates a very cost effective method of reaching a vast audience.

Third, the LEGO Videos Initiative is innovative because it focuses on cyclists and motorists; both share the responsibility for safety on city streets and both need to be informed to increase comfort, reduce collisions, and increase cycling.

The varied audience was strengthened because of the partnerships that were established to deliver the project. The LEGO Videos Initiative included the input and

perspectives of various groups to confirm which videos should be produced and what instruction was required in each video. Partnering organizations included the Alberta Motor Association, CAN-BIKE, Alberta Transportation, the Edmonton Bicycle Commuters, and the Edmonton Police Service. These diverse perspectives improved the videos and ensured the communication targeted at motorists and cyclists would resonate with those groups and provide the necessary information and guidance. The partnerships created avenues for sharing the information with members of these groups which include children, adults, seniors, motorists, and cyclists. These are the exact people the Initiative was targeting and is consistent with the important groups requiring education as identified by national and provincial road safety visions and the research completed by the City of Edmonton.

In addition to paid advertising and social media, the City also used a number of different events and approaches to share the videos with the community. These included the Belmont Elementary School “Helmet Fest” bike safety event, a media launch with a City Councillor, street events at farmers markets and festivals, and as part of the Edmonton stage of the Tour of Alberta professional bicycle race.

Transferability to Other Canadian Communities and Organizations

The final element to discuss is how the LEGO Videos Initiative can be used by other Canadian communities and organizations. The Initiative has already shown the broad transferability the videos can have across Canada, North America, and even South America. The videos were created to educate about bicycle infrastructure that is designed based on guidelines used across Canada. In addition, most communities in Canada have similar legislation concerning the rules of the road for motorists and cyclists which were the basis of the operational instructions included in the videos. Finally, the LEGO Videos Initiative is an action that directly contributes to achieving national and provincial road safety visions and provides a valuable education resource for municipalities across the country that are expanding their bicycle networks.

Due to these characteristics and the fact they were developed with local, provincial, and national partners, the LEGO videos have already been widely shared. The videos have been shared and linked via television and print media news outlets, websites, blogs, professional organization newsletters such as the Institute of Transportation Engineers and the National Center for Bicycling and Walking, magazines, Twitter, Facebook, LinkedIn, YouTube, and Tumblr. Local and regional governments across Canada, the United States, and even Lima, Peru (where the videos were translated to Spanish) have used the videos. Cyclists and motorist groups have linked to the videos and numerous individuals have shared the videos using social media. From emails and direct correspondence with various groups and an online search, the LEGO Videos have been mentioned, shared, or used by almost 40 groups, from coast to coast in Canada and in many other cities, demonstrating its successful transferability in Canada and further abroad.

Appendix

City of Edmonton Bicycle Education Materials

The following illustrate examples of the materials produced and distributed as part of the City of Edmonton's Bicycle Education Program. These are in addition to the LEGO Videos Initiative that can be found at www.edmonton.ca/bikevideos. Information on the City of Edmonton's Bicycle Program can be found here www.edmonton.ca/cycling and the Education Program can be found at www.edmonton.ca/together.

Bike Route Installation Fact Sheets sent to residents, schools, and businesses prior to construction

THE WAY WE MOVE

TRANSFORMING | EDMONTON

BRINGING OUR CITY VISION TO LIFE

June 2013

EDMONTON'S BIKE NETWORK IS GROWING!

2013 ON-STREET BIKE LANE INSTALLATION NOTICE

EDMONTON IS A BIKE-FRIENDLY CITY

This year the City of Edmonton will install 20 km of on-street bike routes throughout the city, adding to the existing 86 km built since 2010. It's part of a plan to create an integrated bicycle network consisting of close to 500 km of on-street cycling facilities within the next 10 to 20 years. Providing cycling infrastructures fulfills the vision of the Transportation Master Plan, *The Way We Move*, as it will provide more sustainable transportation options for Edmontonians.

MORE BIKE ROUTES ENCOURAGE MORE CYCLING

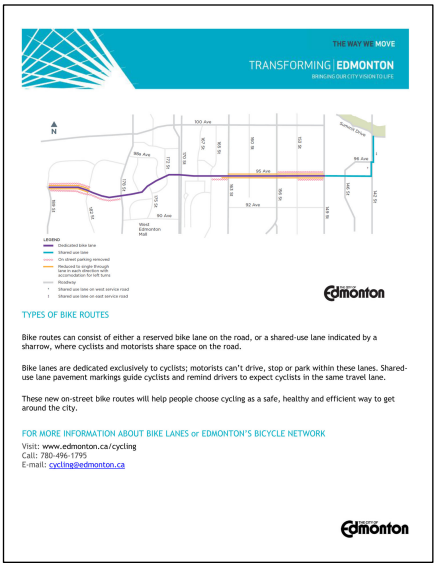
Bike infrastructure encourages cyclists to take to the streets, with 14% of Edmontonians already reporting more bike usage because of the bike lanes that have been installed in their neighborhoods and to nearby destination points. In Edmonton, 68% of households with children currently cycle together and two-thirds of families want to bike more than they do now. Cycling is a great way for families to get fit together and begin a life-long love of healthy living.

NEW BIKE ROUTES FOR EDMONTON'S WESTEND

Depending on the weather this summer, new bike routes are scheduled to be installed in your neighbourhood sometime between July and the start of the 2013/2014 school season. The new routes will join ones built last year and will allow cyclist to travel from beyond West Edmonton Mall to the River Valley and MacKinnon Ravine.

A bike route will be installed on 95 Avenue from 189 Street to 142 Street then up the 142 Street service roads to Summit Drive.

Edmonton



THE WAY WE MOVE

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N

100 Ave

Mills Ave

95 Ave

92 Ave

90 Ave

West Edmonton Mall

LEGEND

Dedicated bike lane

Shared use lane

On-street parking removed

Reduced to single through lane to provide bike accommodation for left turns

Roadway

Shared use lane on west service road

Shared use lane on east service road

Edmonton

TYPES OF BIKE ROUTES

Bike routes can consist of either a reserved bike lane on the road, or a shared-use lane indicated by a sharrow, where cyclists and motorists share space on the road.

Bike lanes are dedicated exclusively to cyclists; motorists can't drive, stop or park within these lanes. Shared-use lane pavement markings guide cyclists and remind drivers to expect cyclists in the same travel lane.

These new on-street bike routes will help people choose cycling as a safe, healthy and efficient way to get around the city.

FOR MORE INFORMATION ABOUT BIKE LANES or EDMONTON'S BICYCLE NETWORK

Visit: www.edmonton.ca/cycling
Call: 780-496-1795
E-mail: cycling@edmonton.ca

Edmonton

Bike Route Installation Billboards set along bike routes prior to construction to illustrate how the road will look following installation

THE WAY WE MOVE

OUR BIKE NETWORK IS GROWING!

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95 AVENUE BIKE LANE CONSTRUCTION AND ROAD RECONFIGURATION - EASTBOUND

FOR INFORMATION: edmonton.ca/bikerouteprojects

Edmonton

THE WAY WE MOVE

OUR BIKE NETWORK IS GROWING!

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BRINGING OUR CITY VISION TO LIFE

95 AVENUE BIKE LANE CONSTRUCTION AND ROAD RECONFIGURATION - WESTBOUND

FOR INFORMATION: edmonton.ca/bikerouteprojects

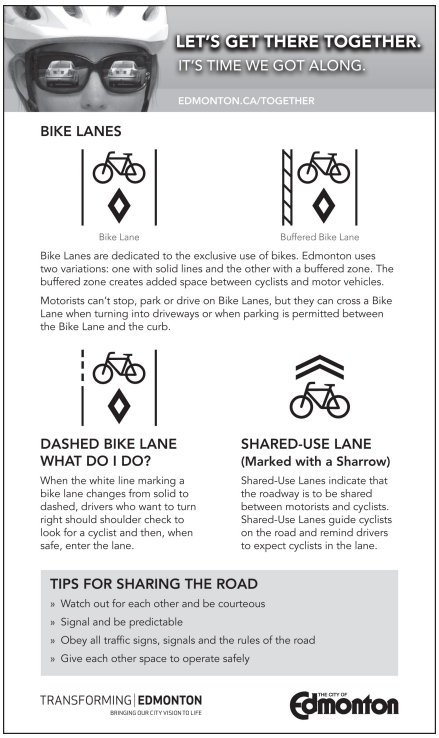
Edmonton

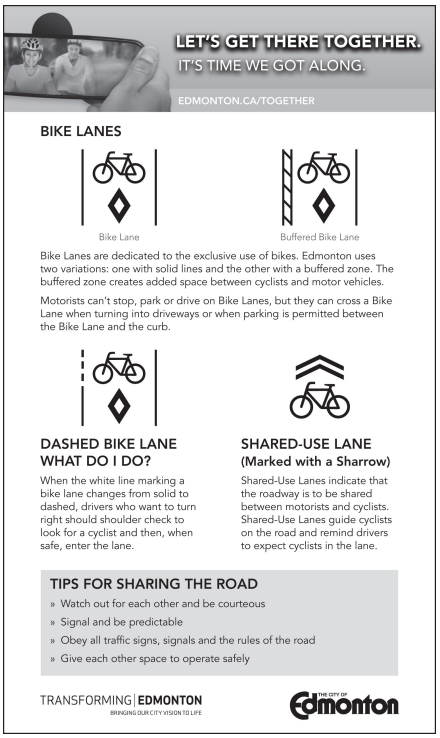
Bike Route Education Flyers sent to residents, schools, and businesses post construction

On-street Education Signs installed along bike routes post construction

Online Advertising and Social Media

Print Advertising placed in newspapers





Transit Advertising and used as banners at public events

Website Information

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