Complete Streets: Making Canada's roads safer for all

Overview

"Complete streets" is a relatively new term that has entered into the parlance of transportation planning. Complete streets policies promote planning, engineering and transportation policies that provide a safer road network for all users, be they drivers, cyclists, pedestrians or transit users.

This issue paper examines the main aspects of complete streets—including innovative policies, success stories and benefits—and also includes advice from sustainable transportation advocates on what planners need to consider when designing complete streets.

Selected Resources

National Complete Streets Coalition (NCSC). www.completestreets.org/whoweare.html.

Thunderhead Alliance's *Guide to Complete Streets Campaigns*. www.thunderheadalliance.org/pdf/Guide%20Excerpts.pdf

A full listing of references and resources can be found at the end of this paper.

Context

The term "complete street" may be unfamiliar, but the concept is easily recognizable: complete streets are designed to be safe, convenient and comfortable for every user, regardless of transportation mode, physical ability or age.

The National Complete Streets Coalition (NCSC) defines a complete street as "a street that works for motorists, bus riders, cyclists and pedestrians, including those with disabilities." A complete street is, therefore, one that takes into account each mode of transport and uses a variety of policies, bylaws and infrastructure to make a street fully multi-modal.

America Bikes first coined the term in 2003 as part of its campaign to amend the U.S. federal transportation law. Since then, the concept has been endorsed by several leading U.S. transportation and planning organizations such as the Congress for New Urbanism, the American Public Transportation Planning Association, the American Association of Retired Persons, the American Planning Association and the Active Living by Design program (New Urban News, 2007).

By adopting complete streets policies, communities stand to gain many benefits. Viewing the road network holistically enables communities to reduce infrastructure costs by designing a transportation network that suits all users at the outset, rather than retrofitting to include pedestrian, cycling or transit amenities later. There are also safety and social benefits to be had by lowering traffic speeds, expanding mobility options, improving air quality, increasing opportunities for physical fitness, and designing more attractive communities.

By contrast, traditional transportation planning approaches don't always take cyclists, pedestrians or those with disabilities into consideration, or if they do, the infrastructure for these groups of users may be inadequate.

What does a complete street look like?

There are no hard and fast rules for what makes a street complete since complete streets will look different and serve different users depending on the needs of the community. However, the following features are often part of a successful complete street:

- Improved pedestrian infrastructure, e.g. well-designed and well-placed crosswalks, pedestrian crossing "islands," raised crosswalks, audible pedestrian signals and sidewalk "bulb outs" (widened sidewalks that effectively narrow the road).
- Sidewalk amenities for pedestrians and those waiting for public transit, such as benches, recycling bins, public art.
- Improved bicycle infrastructure and amenities, such as bicycle lanes, racks and parking areas.
- Wider shoulders.
- Synchronized traffic signals along major routes and arterial roads.
- Bus pullouts or special bus lanes.

- Safe and convenient pedestrian connections to transit stops.
- Landscaping features such as trees, planters and ground cover.
- Center medians.
- Fewer driveways.
- On-street parking and other speed reduction methods, such as traffic calming measures.

What is included in a complete street policy?

Rebecca O'Brien is the program coordinator for the Sustainable Alberta Association and offers free one-day complete streets workshops to Alberta municipalities. Ms. O'Brien says that a complete street policy begins with one overriding principle: Design streets for the most vulnerable.

"If you design a street for a 10-year old child, a person in a wheelchair or a senior with a walker," she says, "you will create streets that work for everyone."

The Thunderhead Alliance for Biking and Walking, a national coalition of state and local cycling and pedestrian advocacy organizations in the U.S., offers a complete streets policy checklist. The Alliance stresses that complete street policies should:

- Be part of a broader goal to provide a complete transportation network for all modes.
- Cover all users and all roads (regardless of the agency responsible for the road).
- Cover road reconstructions, widenings and repavings, and bridge improvement projects, as well as stand-alone retrofit projects.
- Include financing mechanisms and a formal process for approval.
- Encourage the latest and best design and performance standards.

Complete streets in action

Although no Canadian community has yet adopted a specific complete streets policy, Ms. O'Brien, says that main street revitalization projects, transit-oriented and new urbanist developments incorporate many of the same principles.

The U.S., on the other hand, has embraced the complete streets concept. More than 75 U.S. jurisdictions (States, counties, regional governments and cities) have complete streets policies (NCSC).

U.S. Examples

Oregon's Bike Bill

The State of Oregon's *Bike Bill* was adopted in 1971, making it one of the oldest complete streets policies. The bill requires bicycle and pedestrian facilities to be included on all new roads and allows up to 1% of the state's highway funds to be spent on pedestrian and bicycle infrastructure.

The results have been impressive. In Corvallis, with a population of about 50,000, 95% of all arterial roads include bicycle lanes.

In Portland—the state's largest city with a population of more than half a million—cycling has increased by 74% since the 1990s, giving it the country's highest percentage of workers who commute by bicycle at 6% (MSNBC, July 2008). This, in turn, has given rise to a local cycling industry, with more than 125 bicycle-related businesses in 2007 (New York Times).

Portland's "bike boxes" are a new roadway engineering treatment being used to improve bike safety at intersections. They are intended to improve awareness and visibility of cyclists and to help prevent dangerous "right-hook" collisions. Photo courtesy of BikePortland.org.

In addition, since adopting its complete streets policies, Portland has seen a 12.5% reduction in transportation-related carbon dioxide emissions (NCSC).

CEOs for Cities, a national network of U.S. urban leaders, published a white paper in 2007 that showed how innovative transportation planning—including complete streets policies—saves the residents of Portland more than $2.5 billion each year. The paper divides the major savings between gas savings ($1.1 billion) and time savings ($1.5 billion).

Seattle's Complete Streets Policy

Adopted in April 2007, Seattle's *Complete Streets* ordinance set new principles for street design to include better street and sidewalk lighting, pedestrian and bicycle safety

improvements, public transit facilities accommodation, street trees and more.

Improvements are financed through the "Bridging the Gap" fund. In 2006, Seattle residents voted in favour of this $365-million property tax levy to improve the city's transportation network.

Under the ordinance, each capital project in Seattle must include a complete streets meeting with participants from all the municipal departments that have a stake in the project, most notably planning and development, public utilities and transportation.

Some of Seattle's complete streets projects have included:

- Installation of special signal loops (wires under the pavement) that cause signals to change when a motor vehicle or a bicycle is detected.
- Pedestrian-scale street lighting to illuminate sidewalks.
- "Road diets," which reduce the width of a road or the number of travel lanes.
- Installation of median islands for the safety and comfort of pedestrians crossing the streets.
- Installation of "bus bulbs," widened areas of the sidewalk where passengers board buses. These allow buses to stop in a travel lane rather than pulling over to a curb several feet away, which makes the stopping distances shorter and increases the speed of bus service.

Chicago's Safe Streets Program

In October 2006, Chicago adopted the *Safe Streets for Chicago* program to increase pedestrian and traffic safety. The plan is an extension of its complete streets policy and is a joint effort by the city's police force, transportation department and emergency management office.

The program combines traffic enforcement and improved infrastructure with new technologies, policies and design standards, and public awareness. Some of its programs include:

- A shared sidewalk program in which the city pays for half of the sidewalk and the homeowner pays for the other half.
- Streetscape improvements, developed in collaboration with the city's commercial districts. Initiatives include landscaping medians, upgraded sidewalk, curb and gutter infrastructure, and design elements such as decorative lighting, planters, trees and benches.
- Traffic calming measures including traffic circles, cul-de-sacs, speed humps and curb bump outs.

Canadian examples

As mentioned earlier, the philosophy behind complete streets is alive and well in Canadian communities and can be found in many transit-oriented and new urbanist developments.

Transit-oriented developments are compact, walkable communities created around high-quality public transit systems. New urbanist developments typically include a main centre or "town square," homes within a five- or ten-minute walk of the centre, access to high-quality public transit, traffic calming measures and streets that are designed for walking and cycling (VTPI).

Mont-Saint-Hilaire, Quebec

The town of Mont-Saint-Hilaire in Quebec is one such transit-oriented development.

Beginning in 2002, the town decided to create a residential development around a new commuter train station that linked the town to downtown Montreal. The road network includes several traffic calming measures and a network of walkways and cycling paths that lead directly to the station (Urban Transportation Showcase Program case study).

The Mont-Sainte-Hilaire train station and parking lot. A Unesco biosphere reserve is in the background. Photo courtesy of Canada Mortgage and Housing Corporation.

Since the commuter train service to Mont-Saint-Hilaire began in September 2002, ridership has increased by nearly 30,000. In addition, housing values have risen 30% to 40% since the village was developed.

Whitehorse, Yukon

In April 2005, the City of Whitehorse began implementing "Whitehorse Moves," a project to improve active transportation connections and calm traffic along major arterials and at key intersections. Some of the city's projects include:

- A traffic-separated bicycle path next to a main arterial road, which added to the city's growing trail network.
- Stairs and a bike ramp were added to an existing multi-use trail.
- A pedestrian bridge was constructed to connect to two major trail networks.

- Streetscape improvements were made along 4th Avenue, a major downtown road, including trees and planters, bus shelters, bike racks and signage.

The city also reduced 4th Avenue from a four-lane downtown arterial road to two lanes and added a dedicated cycling lane in 2007.

To ensure that these projects have the desired effects, the city implemented a measuring program that involves vehicle counts, surveys and trail counters. The city found that, as a result of cycling infrastructure improvements, travel time to downtown has been reduced by three to six minutes for cyclists.

In addition, use of the connected trails increased by 35% in the year following construction. The staircase that was added is also being used for training by the city's firefighters (UTSP progress update).

Saanich, B.C.

A condominium developer in Saanich, B.C., worked with the municipality to create a more transit-oriented development along Short Street. The area was already well served by a retail district and transit, with several bus stops within 100 metres of the 72-unit condominium, including an express route to downtown Victoria and the University of Victoria.

Streetscaping around the 72-unit Short Street condominium. Photo courtesy of Canada Mortgage and Housing Corporation.

Building on an existing municipal action plan to increase residential density and create a more mixed-use community, the developer:

- Reduced the number of parking spaces at the building by 21% (the municipality provided a parking variance in return for alternative transportation options). Residents also share nearby commercial parking spaces after 6 p.m.
- Provided each condominium residents with a free two-year bus pass. Forty-two people accepted the passes and averaged 18 trips per person per month, well above the region's per capita average of five trips per month.
- Purchased a car share vehicle and a membership from the Victoria Car Share Co-Op. Participating residents pay $12 per month to use the shared car.
- Provided 72 bicycle spaces in the underground parking garage.
- Worked with the municipality to widen sidewalks and add landscaping and street furniture around the building's perimeter (CMHC, 2007).

Markham, Ontario

Beginning in the late 1990s, Markham began an intensive public consultation process to introduce the concept of new urbanism to its residents. Since then, the town has developed several complementary land-use, development, parking and transportation demand management (TDM) policies and programs.

Markham uses 11 guiding principles to develop Markham Centre as a walkable community. These include creating an effective street network, transforming urban boulevards with landscaping and high-quality urban design, and developing a network of cycling and pedestrian trails and pathways.

Developers are a big part of Markham's process as they are required to include TDM supportive measures—such as bicycle racks, pedestrian access to transit, bicycle lanes and carpool parking—in their commercial and residential developments.

Benefits

By adopting complete streets policies, communities stand to gain a host of benefits.

Health & Environmental

The Public Health Agency of Canada recommends that Canadians exercise at least 30 minutes a day for optimal health benefits. However, the Agency also notes that 63% of Canadians are not active enough to achieve these benefits.

One way to promote greater physical activity is with complete streets. Complete streets provide for wider, safer and more attractive sidewalks and cycling lanes that help encourage residents to choose active modes of transportation.

Since active transportation modes produce little pollution, communities that incorporate complete street designs also stand to improve their local air quality.

For example, Go for Green estimated that if the entire Canadian population increased its current average of 8% walking or cycling to 10%, the total number of vehicle

trips would drop by about 100 million annually. The NCSC also estimated that if each driver replaced one car trip with one bike trip once a month, carbon dioxide emissions would be cut by about 3,400 tonnes per year.

Transit

Streets that are well designed for public transportation encourage people to use transit more regularly. Accessible bus stops, for example, make it easy to get to the stop, while benches, shelters, public art and plants make it more comfortable and attractive for transit users.

Transit-specific elements, such as signal priority to allow buses to move more quickly through traffic, and bus bulb outs that allow buses to stop in a traffic lane (instead of pulling over to the curb) also speed up bus service, making it a much more viable alternative to driving.

For example, Boulder, Colorado began creating its complete street network in 1990. The network now includes more than 560 kilometres of dedicated bike facilities, sidewalks, paved shoulders and a comprehensive transit network. This contributed to a 500% growth in transit trips between 1990 and 2003.

Safety

Using public transit, cycling and walking tends to be safer overall. Figures from Transport Canada show that, in 1995 alone, motor vehicle crashes killed 3,347 Canadians and injured 241,800. By contrast, between all of 1986 and 1995, 5,179 pedestrians were killed by motor vehicles and 157,703 injured.

That being said, sidewalk infrastructure plays a big role in pedestrian safety. The U.S. Federal Highway Administration reports that pedestrian crashes are twice as likely in areas without sidewalks and a study conducted by the U.S. Transportation Research Board found that installing raised medians and redesigning intersections and sidewalks cut pedestrian risk by 28%.

Any number or combination of complete streets designs will improve pedestrian and cyclist safety. Road narrowing, in particular, has been proven to slow down traffic, reduce collisions and lessen the severity when collisions occur.

Pictured at bottom left: The revitalization of St. George Street in Toronto included a road narrowing, sidewalk bulb outs and a pedestrian crossing. Photo courtesy of the City of Toronto.

For example, after implementing a road diet that reduced four lanes to two along a busy arterial road near the University of Toronto, traffic collisions decreased by 40% between 1997 and 2003 (UTSP).

Vulnerable populations

Children, the elderly and the disabled are particularly vulnerable when it comes to poor street design.

By providing sidewalks on both sides of the road, crosswalks, and cycling paths or lanes, complete streets policies can make walking much safer for children. Parents are also more willing to allow their children to walk or cycle to school if the route is safe (UTSP). Complete streets policies—because they encourage all stakeholders to play a role in designing the road network—can also dovetail with existing children's transportation initiatives, such as the Active and Safe Routes to School program.

Seniors are also vulnerable to poor transportation planning and design. Statistics Canada recently reported that of the 1,746 pedestrians who died in accidents involving cars between 2000 and 2004, more than one-third (636) were 65 years or older. The average annual death rate among seniors from this cause is significantly higher than the rate for any other age group.

One simple way to make walking safer for seniors is to extend the time of pedestrian crosswalk signals. Some signals do not allow enough time for seniors to safely cross the street before the traffic light changes. In addition, by including audible pedestrian signals or signals that count down the number of seconds pedestrians have to cross, streets are made safer not only for seniors, but for all users.

The disabled—whether physically, visually or hearing impaired—are another group at risk from poor transportation planning. For wheelchair users, winter is an especially challenging time. Some cities, such as Ottawa, are now designing sidewalks with a flat top design that slopes slightly downward at the edges. This helps restrict melting snow to the sides rather than over the entire sidewalk.

Pictured at bottom right of previous page: Old designs (left) leave sidewalks covered in ice when snow melts then refreezes. The new sloped sidewalk design allows melted snow to pool off the sidewalk. Photos courtesy of Ottawa councillor Clive Doucet.

Financial

There is a common misconception that complete streets cost more to build than incomplete streets. In fact, complete streets often cost the same or less than those that are traditionally planned.

Complete streets help to reduce municipal infrastructure costs, increase sales for local businesses, increase land and property values and reduce individual transportation costs.

Municipalities

Complete street policies reduce the amount of money that municipalities spend on road infrastructure because all elements of the road are considered—and constructed—at the same time. Major retrofitting of an existing road to incorporate pedestrian, cycling or transit amenities is often more expensive than including them in the first place.

In addition, when areas become safer and more attractive, land and property values often increase, which can in turn increase municipal tax revenues.

Transportation Alternatives, a non-profit transportation advocacy organization in the United States, summarized the economic outcomes of complete streets in an August 2008 report:

- An 85% reduction in traffic translates into a 5% increase in property values after one year, and 30% after 13 years.
- Homes on streets with no through traffic command up to a 9% price premium.
- Quiet streets command a price premium of between 8% and 10% over noisy streets.

Businesses

Complete streets can be a boon to local retailers by increasing foot traffic and making the business area safer and more attractive.

Beyond the benefits to property values, the Transportation Research report also found that safe, convenient and attractive pedestrian amenities boosts pedestrian traffic by up to 40%, which can in turn boost retail sales along commercial streets by between 10% and 25%.

When Valencia Street in San Francisco's Mission District narrowed its traffic lanes to slow down cars and accommodate other users, for example, nearly 40% of merchants reported increased sales while 60% reported that more area residents were shopping locally (NCSC).

A redesign of Barrack's Row in Washington, D.C., made the sidewalks more attractive, improved the street lighting and slowed down traffic. Once the redesign was completed in 2006, the area attracted 44 new businesses (200 new jobs), tripling the street's economic activity.

By contrast, incomplete streets can hinder economic growth and result in lost business, lower productivity and higher employee turnover. In a report on employment centres outside of Pittsburgh, for example, 30% of employers said that a lack of adequate public transportation was the number one barrier to hiring and retaining qualified workers (NCSC).

Individual transportation costs

According to Statistics Canada, in 2006 Canadians spent about 14% of their income on transportation.

Since complete streets encourage safer and more convenient transportation options for all users, they can encourage drivers to make the choice *not* to drive and use public transit, walk or cycle instead, thus lowering a driver's overall transportation costs.

Efficient use of the transportation network

"Build it and they will come" is an oft-used phrase in the sustainable transportation community to argue against road widenings. More lanes, advocates argue, means more cars.

But the same phrase can also be used to promote complete streets. Communities that provide the proper infrastructure find that pedestrian and cycling traffic increases, transit use grows and traffic congestion is reduced, all of which increases the efficiency of the entire transportation network.

Social

Studies have shown that communities designed to enhance walking offer more opportunities for residents to socialize, be involved in their communities and "self-police" their neighbourhoods.

A study conducted in a mixed-use neighbourhood in Galway, Ireland, for example, found that people who lived in the most walkable neighbourhoods felt more connected to their community and more likely to know their neighbours. They were also more likely to trust and have faith in people, more likely to contact elected officials to express concerns, had a higher level of political participation, and were more likely to walk to work (Leyden, 2003).

For a more in-depth discussion of the social benefits, see the UTSP issue paper *The Social Implications of Sustainable and Active Transportation*.

Considerations for designing complete streets

For complete streets to be effective, the NCSC recommends that certain implementation measures be considered. Their top four measures include:

1. Rewrite and/or refocus policies and procedures to serve all modes.
2. Rewrite and/or adapt design guidelines.
3. Train and develop staff skills in serving all modes.
4. Collect data on all users and modes for performance improvements.

In the December 2007 issue of *New Urban News*, Michael Ronkin, a transportation consultant in Salem, Oregon, recommends that municipalities be flexible with design guidelines as rigid standards or dimensions can impede creativity.

He also notes that major road projects are not where the greatest gains are to be made. Greater progress can be achieved through routine work done by regular maintenance and operations staff members because existing streets, crosswalks, signals and other elements undergo continual maintenance and repair. Pedestrian advocates, urban planners or other stakeholders can seize on these opportunities. Each time a traffic signal is worked on, for example, a pedestrian countdown signal could be installed.

Jeffrey Tumlin of Nelson/Nygaard, a transportation consulting firm based in San Francisco, says that for pedestrians, cyclists, and transit users to have access to the transportation system equal to that of motorists, each mode of transportation must be measured. If the only thing that is measured is the level of service for cars, he says, then the car will continue be the focus of road planning.

Fort Collins, Colorado, for example, uses a Multimodal Transportation Level of Service Manual. The manual rates various kinds of environments—pedestrian districts, activity centres, transit corridors, and areas near schools—on five factors: directness, continuity, street crossings, visual interest and amenities, and security. This helps ensure that statements in favour of complete streets are translated into improved conditions on the ground.

Ms. O'Brien of the Sustainable Alberta Association has found that a community's rate of growth can be a challenge.

"In Alberta, there is a lot of pressure to expand residential areas and build new subdivisions," she says. "Many of the planners and engineers I speak with are cognizant of the need to build more walkable communities but the problem they run into is a lack of connectivity between the community and the province. The municipality may want to develop better pedestrian and cycling connections, but these are often cut off by highway systems."

There is, therefore, a need for provincial and federal cooperation in designing complete streets. A good example of federal support comes from our neighbours to the south. In March 2008, the Complete Streets Act was introduced into the U.S. congress. If passed, the Act would require all states and metropolitan planning organizations to establish complete streets policies and apply them to federally funded projects (Library of Congress).

Among the resources included in the references section at the end of this paper, the following provide more detailed information about complete streets:

1. Complete streets policies and guides, a chart of U.S. city ordinances. www.completestreets.org/documents/CompleteStreetsPolicyChart.pdf.
2. Thunderhead Alliance's *Guide to Complete Streets Campaigns*, www.thunderheadalliance.org/pdf/Guide%20Excerpts.pdf.
3. Information on Sustainable Alberta's complete streets, www.calgarycommute.ca/complete_streets.html.

Stakeholders

Many different stakeholders must be involved to make our roads safer and more convenient for all users. The lead stakeholder is typically the local level of government, its planners, engineers and transit officials. Other groups, however, are also important in order to design complete streets that work for each user and each mode.

These groups include:

- School boards
- Local cycling, walking and transit users groups
- Health care organizations
- Seniors' groups
- Organizations that work with the disabled (including the visually and hearing impaired)
- Local businesses and developers, including business improvement associations and chambers of commerce
- Area employers
- Provincial and federal governments, specifically ministries of transportation, health and environment.

Conclusion

Complete streets blend the best practices of many different movements—new urbanist and transit-oriented developments, and walkable communities—and also helps meet the goals of smart growth and sustainability.

The philosophy behind the concept is holistic in nature. All stakeholders in the road network must be involved in order to create a transportation system that works for everyone. This not only leads to greater cooperation among many different users and stakeholders, it helps create more mobility options, provides safer and more livable communities and reduces municipal, business and personal costs.

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