Complete Streets

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Complete Streets
What is it & Why is it important?
“It breaks my heart when our transportation systems fails anyone in America because I know how much people depend on it...Part of how we measure a good, safe, decent place to live has to do with access to transportation.”

— Anthony Foxx, Secretary of Transportation, U.S. DOT
What are Complete Streets?

What are Complete Streets?
Benefit All Users.
34.9% of Americans are obese.
Benefits: Health

Obesity Trends* Among U.S. Adults
BRFSS, 2010
(*BMI ≥30, or ~ 30 lbs. overweight for 5’4” person)

Source: Behavioral Risk Factor Surveillance System, CDC.
Benefits: Health

States with the lowest levels of biking and walking have, on average, the highest rates of obesity, diabetes, and high blood pressure.
2.1% of federal transportation dollars go to biking and walking infrastructure, but 11% of trips and 14% of fatalities occur within those modes of travel.
Benefits: Safety

There were 32,719 traffic fatalities in the U.S. in 2013. Of these fatalities:

- 23,303 were people in cars
- 4,735 were people walking
- 743 were people on bicycles

People 65 and older account for 13 percent of the U.S. population, yet their pedestrian deaths make up 21 percent of all pedestrian deaths.
Benefits: Safety

More than 40% of pedestrian fatalities occur where there is no available crosswalk.
Benefits: Economy

"Young people do not want to work in office parks anymore... We’re seeing this big change in this country. It’s not political... it’s more generational... This is where we need to think very differently, because if you don’t, you will be left behind.”

-Mitchell Silver, Past President, APA
Benefits: Economy
Fayetteville Street, Raleigh

$15 million public investment in streetscape improvement 2006

$50 million in private investment in following 5 years

20 new business establishments

$5 million in sales tax annually
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How we do it?

Example: Six Forks Road, Raleigh, NC (Retrofit)
Complete Streets:

“It’s a process, not a product” - MMR

- Define Success
- Prioritize Modes
- Define Design Features/Limitations
- Make Tradeoffs
- Design in detail
Link and Place

**Link**
- Street as a facility for the movement of people
- Connect people from Point A to Point B

**Place**
- Street as a destination in its own right
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Design Elements
Area Context

- **Parkway Boulevard**: From Lynn Street to Loft Lane
- **Urban Boulevard**: From Loft Lane to Windel Drive
- **Parkway Boulevard**: From Windel Drive to Northbrook Drive
- **Urban Boulevard**: From Northbrook Drive to I-440 Interchange
Area Context
Walksheds & Bike/Ped Crashes
Lighting
**Traffic - Traffic - Traffic!**

**Future Year 2035 Left-Turn Performance**

<table>
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<th>No Build</th>
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<td>Laneage</td>
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<td>95th Percentile Queue (v)</td>
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<td>323</td>
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<tr>
<td>Average Queue (v)</td>
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<td>383</td>
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<tr>
<td>Left Turn Lane LOS</td>
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<tr>
<td>Approach LOS (Through Movements)</td>
<td>E</td>
<td>F</td>
<td>F</td>
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<tr>
<td>Approach Delay (Due Movements)</td>
<td>100.6</td>
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**Preliminary Six Forks Corridor Average and 95th Percentile Left-Turn Lane Queuing**

- 2035 Average Queueing Length
- 2035 95th Percentile Queueing Length
- Building Footprints
- Future Year 2035 Overall Intersection Level of Service

[Map Diagram with Points A, B, C, D, E, F marked]
How does it all work together?
Corridor Transition
Corridor Cross Section
Bicycle/Pedestrian
Intersection Treatments

Major Intersections

Minor Cross Streets
High Priority Transit Corridor
Furnishings, Public Art, Streetscape
LID & Stormwater BMPs
Example: Honore Avenue, Sarasota, FL (2013)

- Two-Lane vs. Four-Lane
- Limited ROW
- Needed better connections to school and parks
- What to do with the water?
- Save the Trees!

Context-sensitive design saves mature trees and enhances aesthetics.
The Idea Behind Stormwater

[Diagram and images of stormwater management systems and green infrastructure]
Tradeoff Benefits

- Context-sensitive design and low impact development (LID) strategies reduced floodplain impacts by 23.2 acre-feet
- Saved 1000 mature trees
- Buffered ped/bike facilities with connections to school/parks

Reduced Floodplain Compensation Area
Design in Detail
Measuring Success

- 3X the area for bikes, pedestrians and streetscape
- Consistent lanes, with only a 26% increase in asphalt roadway paving
- 10 new high quality bus shelters
- **52 high visibility crosswalks**
  - Over 4 miles of grade separated bike lanes
  - Over 4 miles of new wider sidewalks
- **Almost 8 million gallons of water quality treatment**
  - Locations for over 700 canopy and flowering trees
  - Over 3 acres of planted medians
  - Plans for 10 neighborhood gateway
- **Measurable increase in LOS for cars, bikes, pedestrian and transit**
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Nothing like a great example!

Route 9A – West Side Manhattan
Calgary Cycle Track
CS Design Guidelines
Complete Retrofit

- Elevated freeway
- Transformed into an active Complete Street Boulevard
Post Highway Collapse

At-grade interim solution
The Boulevard Concept circa 1996…
Today’s Complete Street
Calgary Cycle Track

- 1.5 year pilot project
- $5.5M capital cost
- 2 years from award of planning study to opening of the network
Presentations in one year to plan the network with stakeholders
6.5 kilometers of bike infrastructure designed and constructed to create a network in the downtown core
Three different bicycle treatments to create a network using four downtown streets

Two-way cycle track on a Two-way street

One-way cycle tracks on a Two-way street

Integration of slow moving bicycles on a pedestrian street
Edmonton Complete Streets Guidelines
Complete Street Process

Alignment with Complete Streets Principles

3.1 Define Project Goals and Scope

3.2 Identify Modal Priorities

3.3 Identify Street Type

3.4 Select Elements

3.5 Make Trade-offs

3.6 Confirm Recommended Design

Process Flowchart
# Edmonton Complete Streets Guidelines

Evidence-based design tailored to local conditions

## 4.3.6 Cycle Tracks

### Description
A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a bike lane. A cycle track is physically protected from motor vehicle traffic and adjacent areas, making it safe and comfortable for cyclists. It is designed to be part of a network of bike routes that connect to other facilities and travel modes. Cycle tracks are often included in a mix of travel modes on the same street to improve safety and comfort for all users.

### Design Considerations/Details
- **Operational Considerations**
  - **Element Description**
    - **Application Context**
      - **Cross-sections**

### Operational Considerations
- **Application Context: Land Use, Street Type, and Orientation**
  - Citywide bike routes on the Bikeway Network
  - This facility type is most likely to be installed on Arterial streets with high motor vehicle volumes and speeds.
  - On Transit Network streets consider integration with two steps. See Transit Integration with Cycle Tracks
- **Bikeway facility selection should be based on an analysis of roadway volumes and speed and other local characteristics.**

### Design Details and Dimensions
Cycle tracks generally require wider dimensions than Bike Lanes, to provide a higher level of comfort and separation, to permit bikers to pass one another. Consider the placement of utilities when designing bikeway facilities with physical separation and the access to the hydrants.

#### One-Way Cycle track through zone:
- **Standard width:** 2.0 m

#### Cycle track buffer zone:
- **Standard adjacent to parking:** 1.0 m
- **Standard adjacent to travel lane:** 0.5 m (1.0 m preferred for snow storage)

#### Two-Way Cycle Track:
- Application best on one-way streets. This is similar to a Shared-Use Path Adjacent to Roadway. See the HACTO Urban Bikeway Design Guide for details.

- **Two-way cycle tracks function best on the left side of one-way streets.**

#### Raised Median Curb Protection
- **Consider bicycle compatible curb profiles to minimize conflict with potholes and maximize rideable surface.**

### Snow Removal and Maintenance
- **Considerations**
  - City of Edmonton practices for snow removal on bike facilities are currently under review.
  - On cycle tracks the expectation is that snow will be cleared away after a storm. Snow will remain on the cycle track.

### References
- **Bikeway Traffic Control Guidelines for Canada.**
- **February 2012.**
- **Urban Bikeway Design.**
  - The Transportation Association of Canada.
  - September 2012.
- **BC Bicycle Boulevards Planning and Design Handbook.**
Addition to the 2013 Complete Streets Guidelines (by Stantec)

Outlines:
- Design Parameters for Main Streets
- Design Process
- Guidelines for Requirements for Main Street Design Elements

Definition of Design Zones

- Main Streets form an economic district that encourage lower vehicular speeds and create pedestrian oriented places while supporting transit service.
- Main Streets design does not accentuate the commonality of public space allocated to the transportation sector.
- Main Streets are differentiated through the provision of dedicated or semi-dedicated road space used to support the activity of the adjacent land and through access management and planned pedestrian movements provide the Main Streets Principles in all contexts.

2.2 MAIN STREET DESIGN ZONES

The Main Street right-of-way is divided into three design zones that provide different functions for people accessing, spending time, and travelling through Main Streets. The following defines each Main Street Design Zone.

2.2.1 Adjacent Lands
This space provides a pedestrian zone, such as the sidewalk and front footpath, extending into the street. It provides potential use for the Main Street Principles.

2.2.2 Frontage Zone
Adjacent to the building, this space is used as a support area for retail space along Edmonton’s Main Streets. This zone can include ground floor retail displays, cul-de-sacs, temporary signs, linear art, and other activities to support active use of the street by people and businesses.

2.2.3 Pedestrian Through Zone
This space provides an area for pedestrian mobility for people of all ages and abilities to access various pedestrian-oriented destinations along and around Edmonton’s Main Streets.

2.2.4 Furbishing Zone
This space provides an area for active use by pedestrians, providing access to various pedestrian-oriented destinations along and around Edmonton’s Main Streets.

2.2.5 Ancillary Zone
Located between the travel way and the pedestrian zones, this space provides the opportunity for various permanent and temporary pedestrian-oriented uses, such as sitting and socializing. The use of the rainwater space can vary between sidewalks and along an individual block. Lines can be incorporated, whether indoor or outdoor elements, such as sitting and dining areas, and landscaped pedestrian paths and sidewalks.

2.2.6 Travelled Way
This space provides a space for vehicular travel through Edmonton’s Main Streets. It is used for travel by vehicles travelling by accommodable and transit, and for the delivery of goods. In non-peak times, some of the space may be used as an area for parking and loading, and can also be closed at times to create vehicle traffic events and festivals.
Final Thoughts…

- It’s a process, not a product
- Context Defined
- Prioritize modes
- There’s always tradeoffs
- Intersection Design Exceptions
- Available Design Guidelines
- Measure your success!
Thank You!

http://www.smartgrowthamerica.org/complete-streets

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