NEXT GENERATION ROAD CROSS
SECTIONS FOR ALL AGES & ABILITIES

City of Kelowna
WHAT IS CROSS SECTION?

A cross section is a snapshot of all road features contained within the right-of-way at a given point of the roadway.
EXISTING CROSS SECTION ISSUES

1. Excessive focus on vehicular capacity (not safety)

2. Context insensitive

3. Inadequate accommodation of pedestrians & cyclists of all ages & abilities
FOCUSED ON VEHICULAR CAPACITY

1. **Wide multiple vehicular lanes** primarily for capacity

2. **Narrow, one-side only or no sidewalk**

3. **Narrow or no bikeway**

4. **Narrow or no boulevard**

*Unbalanced Allocation of Cross Section Space*
1. Only urban & rural cross sections to represent a diverse range of contexts.

2. Identical cross section features irrespective of needs whether it is City center or sub-urban.

3. Mismatch between cross sections & user expectations creating safety & operational challenges.

Diverse Topography, Land Use & Natural Features.
PEDESTRIAN ISSUES

1. Only one type of walking facility to serve all types of pedestrians & trip purposes (no cross sections for shared-use pathways)

2. Inadequate sidewalk width (1.5 m)

3. Inconvenient & hazardous driveway let-downs

4. Lack of consideration for special pedestrian needs
CYCLING ISSUES

1. Only one type of cycling facility (bike lanes) to serve all types of cycling purposes, routes & cyclists (no cross sections for cycle tracks, shared-use pathways & ‘Sharrows’)

2. Inadequate facility widths (1.2 m & 1.5 m)

3. No segregation from vehicular traffic or parking

4. Bike lanes often used for snow storage during winter times (where there is no boulevard or parking)
CROSS SECTION APPROACH

1. Determine inputs

2. Establish cross-section components (Modules, Blocks)

3. Identify constraints, costs & impacts

4. Generate cross-section options; Review; Adjust

5. Select preferred cross section
CROSS SECTION PROCESS

6 Modules

- Module 1
  - Block 1
  - Block 2
  - Block n

- Module 2
  - Block 1
  - Block 2
  - Block n

- Module n
  - Block 1
  - Block 2
  - Block n

51 Blocks

34 Typical Cross Sections

- Cross Section 1
- Cross Section 2
- Cross Section n

71 Adjusted Cross Sections

35 Inputs

- Input 1
- Input 2
- Input n

Module n
Divides the City into 5 Context Zones based on the levels of urbanization, density & compactness.
LAND USE (INPUTS)

Context Zones further divided into 4 Land Uses to establish servicing requirements

Commercial

Residential

Industrial

Agricultural
FUNCTIONS (INPUTS)

3 Vehicular Functions

- Arterial
- Collector
- Local

2 Active Functions

- Primary
- Supporting
DESIGN USERS (INPUTS)

6 Vehicles

3 cyclists

3 Pedestrians
## INPUTS (TOTAL = 35)

<table>
<thead>
<tr>
<th>Context</th>
<th>Land Use</th>
<th>Function</th>
<th>Design Speed (6)</th>
<th>Design User (6)</th>
<th>Function (2)</th>
<th>Design Speed (3)</th>
<th>Design User (6)</th>
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# Modules & Blocks

**Modules**: Categories representing the extent of mode mix or segregation

**Blocks**: Components of cross sections based on ‘Inputs’

<table>
<thead>
<tr>
<th>No.</th>
<th>Modules</th>
<th>Examples</th>
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<td>Cycling (C)</td>
<td>Cycle Tracks</td>
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<td>Driving (D)</td>
<td>Vehicular lanes</td>
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<td>4.2</td>
<td>Cycling &amp; Driving (CD-S)</td>
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<td>Walking, Cycling &amp; Driving (WCD-S)</td>
<td>Rear Lanes</td>
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Module: Walking
Block: W3

Module: Cycling
Block: C4

Module: Driving
Block: D2.0

Cross Section
**CROSS SECTION EXAMPLE**

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**Variations** | **Features** | **Adjustments** | **RoW Width, m**
--- | --- | --- | ---
CA–22 | 2LU–2SW.21CT | Urbanized (Figure 1) | 22
UC–22 | 2LU–2SW.21CT | Add 0.15 m urban Braille landscaping; Reduce boulevards to 1.7 m & property line offsets to 0.15 m | 22
SU–22 | 2LU–2SW.21CT | Reduce sidewalks to 1.5 m; Increase boulevards between sidewalks & cycle tracks to 2.15 m | 22
HS2–21 | 2LU–2SW.21CT | Fronting lots on both sides: Reduce sidewalks to 1.5 m, boulevards between sidewalks & cycle tracks to 1.65 m | 21
HS1–22 | 2LU–2SW.21CT | Fronting lots on one side: Reduce sidewalks to 1.5 m, boulevards between sidewalks & cycle tracks to 1.8 m (both sides); Increase offset from the edge of the side slope to 1.0 m (on side with no fronting lots) | 22
HS0–22 | 2LU–2SW.21CT | No fronting lots on either side: Reduce sidewalks to 1.5 m, boulevards between sidewalks & cycle tracks to 1.45 m; Increase offsets from the edge of the side slopes to 1.0 m | 22
NR–25 | 2LU–1SW.21CT | Non-urbanized (Figure 3) | 25

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**Legend**
- CA: Core Area
- 2LU: Two Lane Urban
- 1LU: One Lane Urban
- EA: Element Access
- CT: Cycle Track
- S: Sidewalk
- D: Drainage Ditch
- G: Gravel
- W: Waterway
- P: Pedestrian
- R: Right of Way
- S: Suburban
- T: Traffic Lane
- D: Drainage Ditch
- P: Pedestrian

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**Notes**
- Function: Minor arterials with cycle tracks
- Design Speed: 90 km/hr
- Provision for Cycle/ Fuß, Side Shelves, Streets & Roadside Features: Additional
- Storm Drainage: Roadway (100 YR, Rain); Drainage Ditch/ ditches (5 YR, Rain)
- Shallow Utilites: Sidewalks: Min. 1 m (Core), 0.8 m (property line), 1.5 m (some utilities)
- Shallow Utilites: Placement under Tree: Min. 1.2 m deep joint trench / conduit from the finished surface separated by road barriers
- Deep Utilities Sidewalks: Min. 1.5 m (property line, shallow utilites, tree), 3 m between water & sanitary / stone, 1.5 m between sanitary & storm

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# Cross Section Variations

<table>
<thead>
<tr>
<th>Variations</th>
<th>Features</th>
<th>Adjustments</th>
<th>RoW Width, m</th>
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<tr>
<td>CA-22</td>
<td>2L.U-2SW.2.1CT</td>
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<tr>
<td>UC-22</td>
<td>2L.U-2SW.2.1CT</td>
<td>Add 0.15 m urban Braille shorelines; Reduce boulevards to 1.7 m &amp; property line offsets to 0.15 m</td>
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<td>SU-22</td>
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<td>Reduce sidewalks to 1.5 m; Increase boulevards between sidewalks &amp; cycle tracks to 2.15 m</td>
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<td>HS2-21</td>
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<td>Fronting lots on both sides; Reduce sidewalks to 1.5 m, boulevards between sidewalks &amp; cycle tracks to 1.65 m</td>
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‘NEXT GENERATION’

• New ‘Modular’ approach profoundly different than the traditional ‘Standard’ or ‘Context Sensitive’ cross sections

• Introduction of ‘Active’ transportation functions to complement traditional ‘Auto’ functions

• Universally adaptable to suit diverse range of policy objectives, constraints & contexts
‘ALL AGES & ABILITIES’

• Inclusion of pedestrians & cyclists of all ages & abilities as design inputs

• Accommodation of safety & operational requirements of vulnerable road users

• Varying levels of mode mix (or separation) to set network connections for all types of pedestrians & cyclists