





Transportation Designs

Alternatives, Assessment and Evaluation

During Phase 2 of this study, alternative solutions including the "Do Nothing" alternative were assessed. The preferred alternative was a combination of Travel Demand Management measures (such as transit, walking, cycling and flexible work hours) to reduce the number of peak period trips and roadway improvements to handle the anticipated number of remaining peak period trips. As the Do Nothing alternative has already been considered and problems remain, it is not considered a reasonable option. It will not be included in the alternative designs assessment and evaluation.





Evaluation Criteria - Transportation

Criteria Group	Indicator	Evaluation Criteria
Natural .	Aquatic	o Number of watercourse crossings containing known fish habitat
Environment		Area of wetland directly impacted
	Wildlife	Number of new disruptions to wildlife corridors
		Opportunities to oppose wildlife habitat Opportunities to oppose wildlife habitat
	Vogotation	Opportunities to enhance wildlife habitat Area and type of currently potyrolland that will be offected.
	Vegetation	 Area and type of currently natural land that will be affected Area of removal of tree canopy
	Species at Risk	 Potential disruption of Species at Risk habitat
Cultural	Archaeological Resources	 Extent of disruption to areas identified as having archaeological potential
Environment	Cultural Resources	 Effect on bridges over Otonabee and Trent-Severn Waterway
	Indigenous Resources	 Effect on areas of potential Indigenous cultural significance
Physical Environment Socio-	Groundwater	Number of residential wells potentially impacted
	Potential to Encounter or Move Contaminated Soil	o Proximity to areas of known potential contamination
	Stormwater	o Increase in area of impervious surfaces
		Degree of compatibility with stormwater strategy Drovimity of now stormwater outlets to intole zone
	Compatibility with Existing	O Proximity of new stormwater outlets to intake zone Accompany of how well an elternative reflects the Official Dian. Transportation
Environment	Municipal and Institutional Planning Goals & Objectives	 Assessment of how well an alternative reflects the Official Plan, Transportation Master Plan, Zoning Plan and other approved planning documents
	Effect on Existing Residences / Communities	o Number of residential properties displaced
	Communices	Number of residential properties affected
	Planned Development	Disruption during the Construction Period
	Recreational Features	Area of property required from planned development areas
		Perceived enjoyment
	Major Infrastructure Changes	 Number of changes to major utility corridors Number of changes to existing structures
	Property Taking	A
	Capital costs	 Amount of property required Estimated Cost
	Maintenance costs	Relative Cost
	Noise	
		 Number of noise sensitive receivers with Outdoor Living Areas adjacent to (abutting) the roadway
	Air Quality	 Number of residential buildings within 100 m of the road centreline
	Traffic Performance (autos) and Road Network Function	Effect on connections to both sides of the river Dreiected corridor values to connective ratio (V/C)
		 Projected corridor volume-to-capacity ratio (V/C) Projected intersection level of service (LOS)
		 Use of existing network
		o Ability to institute short term improvements
		 Geometry characteristics
	Safety	Expected number of collisions
		Number of conflicting movements Effects on podestrian and evalist safety
	Transit	Effects on pedestrian and cyclist safety Effect on evicting routes
	- 1 311314	 Effect on existing routes Potential for impacts to transit stops
		 Potential for impacts to transit stops Potential for reduction of transit delays
		 Potential for express routes
	Active Transportation Network	 Quality of pedestrian facilities
		Quality of cyclist facilities
		Connectivity with existing network and compatibility with future network Degree of conformance with Complete Streets decign approach
Climata		
Climate Change		 Effect of the Project on Climate Change Effect of Climate Change on the Project
Climate Change		 Degree of conformance with Complete Streets design approach Effect of the Project on Climate Change



Climate Change



Human activities that **contribute to global warming** are: increasing atmospheric concentrations of greenhouse gases and global changes to land surface such as deforestation. The dominant product of fossil fuel combustion is carbon dioxide, a greenhouse gas.

The **impacts of climate change** include warming temperatures, changes in precipitation, increases in the frequency or intensity of some extreme weather events, and rising sea levels. **Transportation** is a leading source of greenhouse gas pollution, primarily through vehicle emissions.

Due to climate change, historical climate data commonly used for the design of infrastructure is no longer a reliable predictor of future risk:

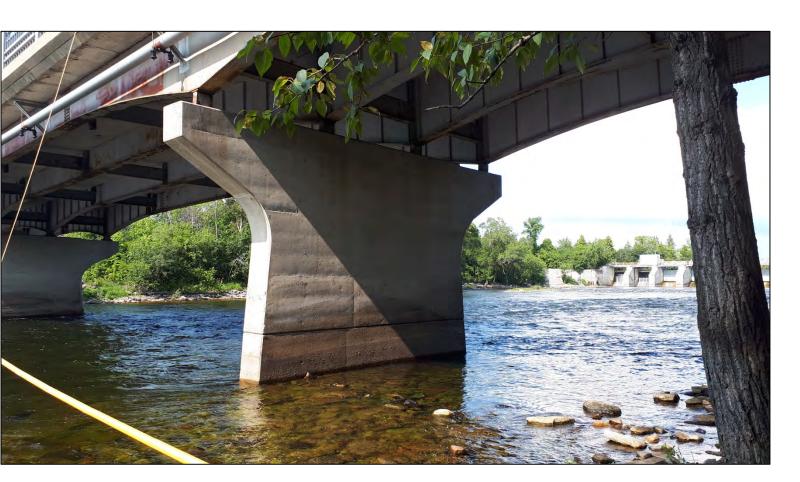
- Higher temperatures can cause pavement to soften and expand causing rutting and potholes, and placing stress on bridge joints
- Roads could become more costly to build and maintain with a shorter lifespan
- Reduced snowfall and less-frequent winter storms leading to reductions in snow and ice removal, as well as salting requirements may be a benefit
- More intense storms may result in flooding, disrupting traffic, delaying construction, and damaging culverts and embankments
- More winter precipitation may come as rain, with more frequent winter flooding if frozen ground cannot absorb precipitation.

The effect of climate change on the project and the effect of the project on climate change are considered in this EA. Traffic volumes will be similar for all alternatives. Transportation alternatives that result in a reasonable level of service that reduce stop and go conditions but that do not induce additional trips will be preferred.

Air quality modelling will be undertaken for the preferred alternative.





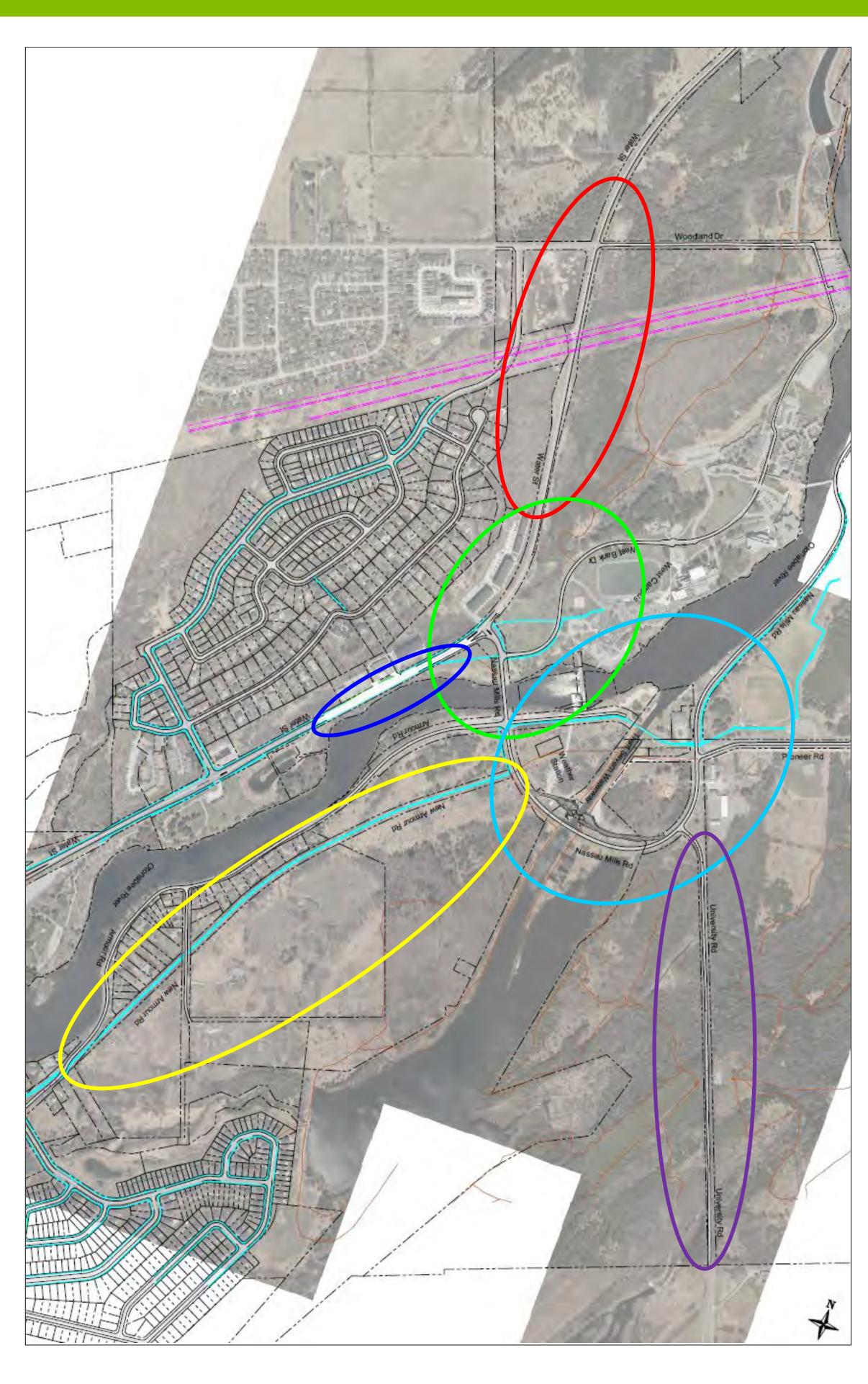






Transportation Design Concepts





The map indicates areas that were examined independently for transportation designs:

Concept 1: Amour Road Realignment Concept 2: Armour Road Connections

Concept 3: West Campus, Water Street, Nassau Mills Road,

West Bank Drive

Concept 4: East Campus, Nassau Mills Road, Armour Road,

University Road, Pioneer Road

Concept 5: Water Street and Woodland Drive

Concept 6: University Road

Concept 7: Water Street south of Nassau Mills Road

All Design Concepts presented include active transportation facilities, such as sidewalks, cycle lanes, multiuse pathways and/or other pedestrian and cyclist infrastructure suitable for the area.



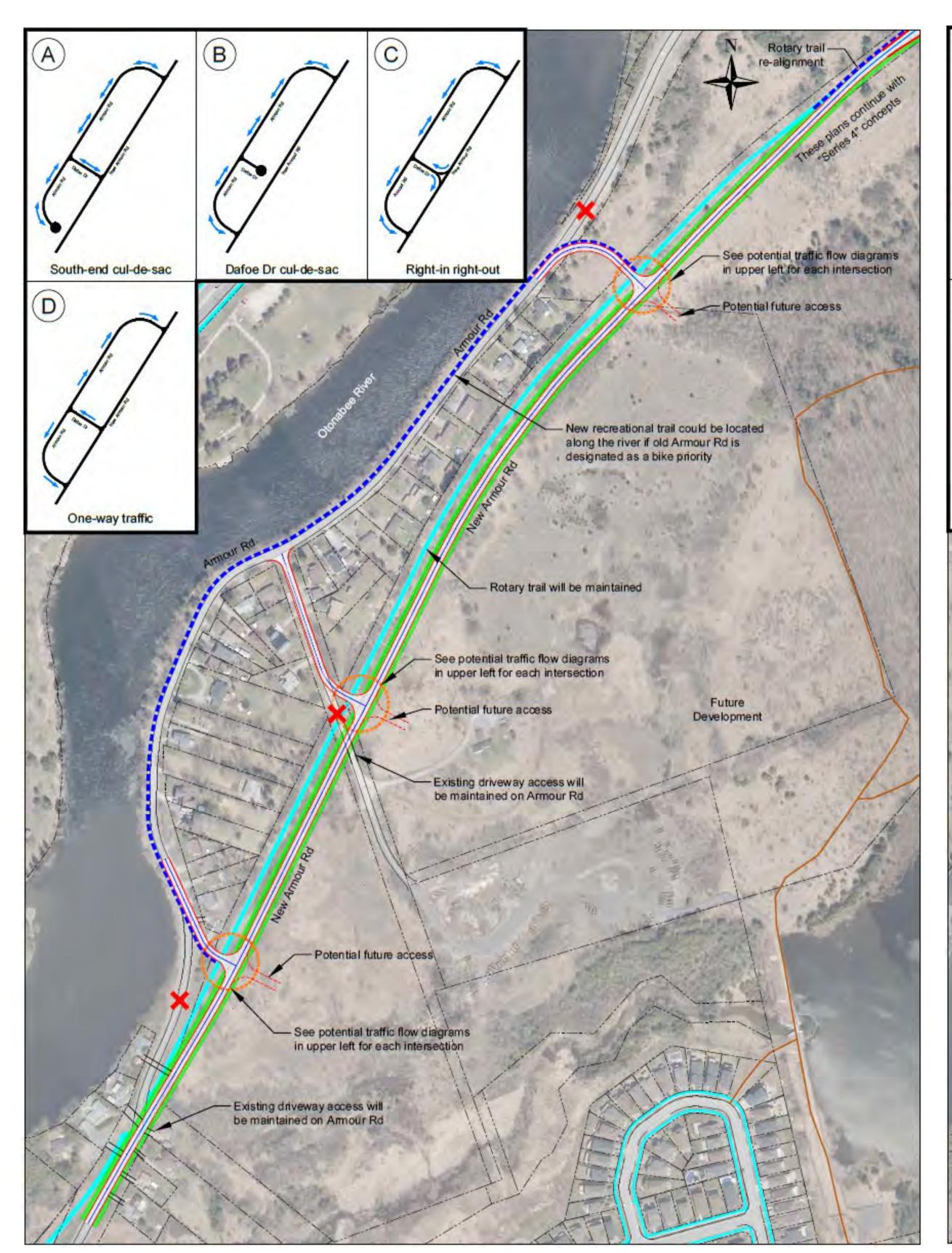


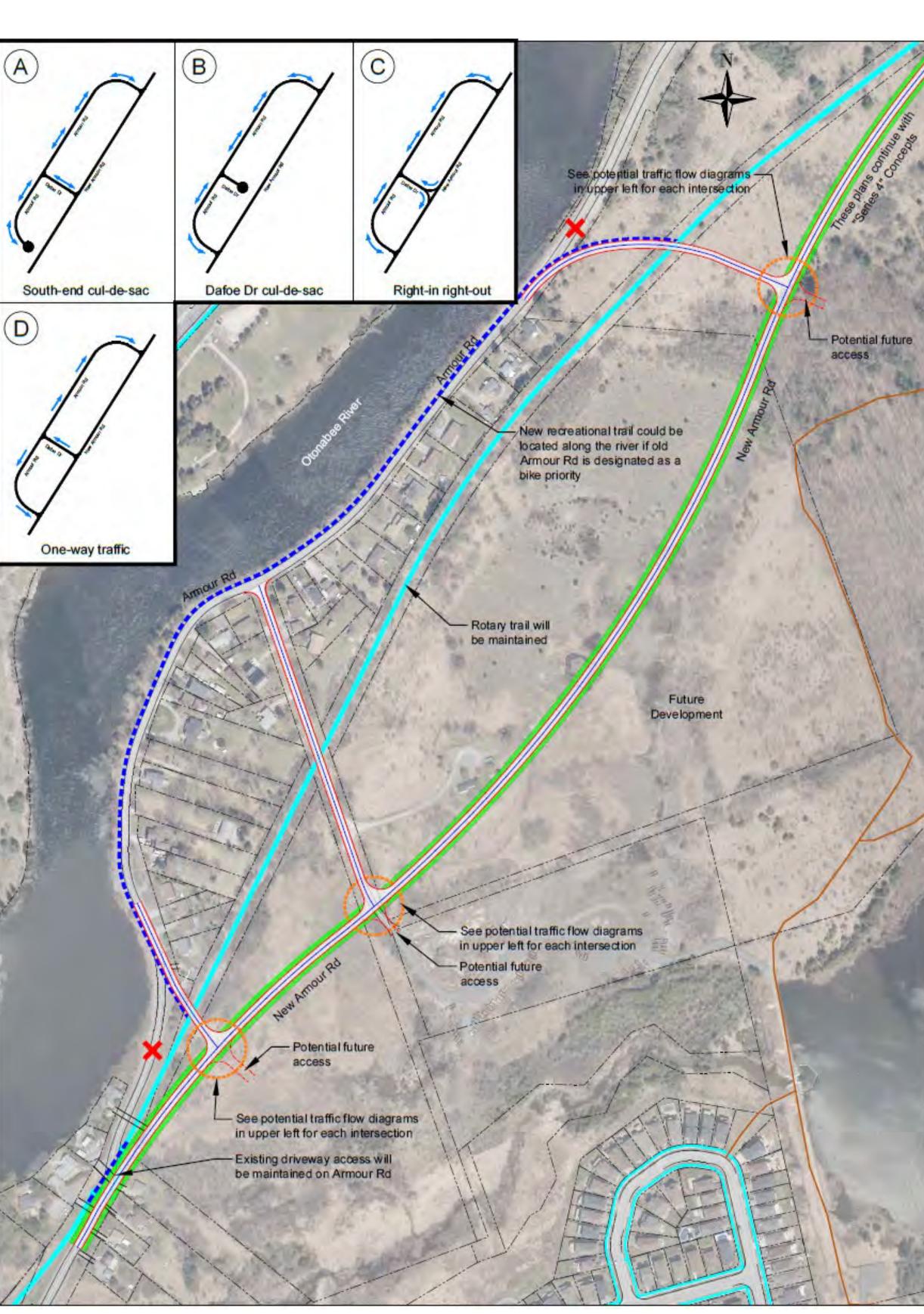






Design Concepts 1. Armour Road – Cunningham to Nassau Mills Area 2. Armour Road Connections



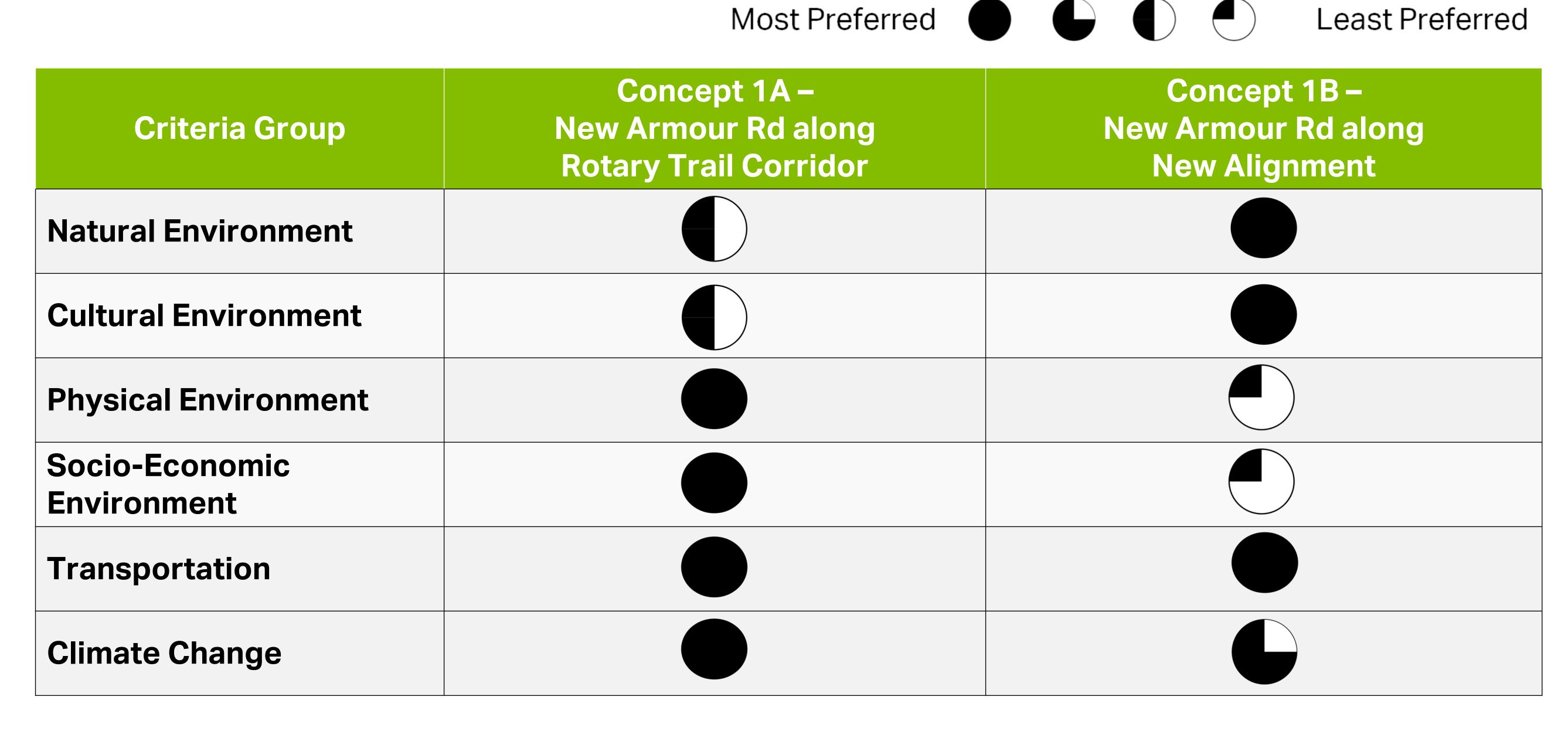


Armour Road connections are illustrated on these Concept 1A and 1B plans and example layouts are shown in the schematic traffic flow diagrams.

Concept 2 Armour Road
Connections work with
either Concept 1A or
Concept 1B and are
evaluated separately



Evaluation of Armour Road Realignment Alternatives



Concept 1A (New Armour Road along Rotary Trail Corridor) is Preferred because:

- Stormwater management is more feasible to implement independent of or together with development.
- It is closer to the existing road such that short term improvements are easier to implement.
- Less impact on future development lands
- The area of disruption to Cultural Communities (previously disturbed land), Forest Communities, area with Significant Wildlife Habitat and area with Archaeological potential can be mitigated
- Natural and cultural environments will experience greater effects with development
- Avoids area with arsenic contamination from former apple orchard lands

Evaluation of Armour Road Intersection Alternatives

Concept 2A, 2B, 2C Intersections and/or Cul-de-Sac at
North End/South End/Dafoe

Natural Environment

Cultural Environment

Physical Environment

Socio-Economic
Environment

Transportation

Concept 2D Dafoe entrance with one-way travel on existing
Armour Road to outlets at North/South

Pafoe entrance with one-way travel on existing
Armour Road to outlets at North/South

Environment

Transportation

Concept 2D Dafoe entrance with one-way travel on existing
Armour Road to outlets at North/South

Environment

Transportation

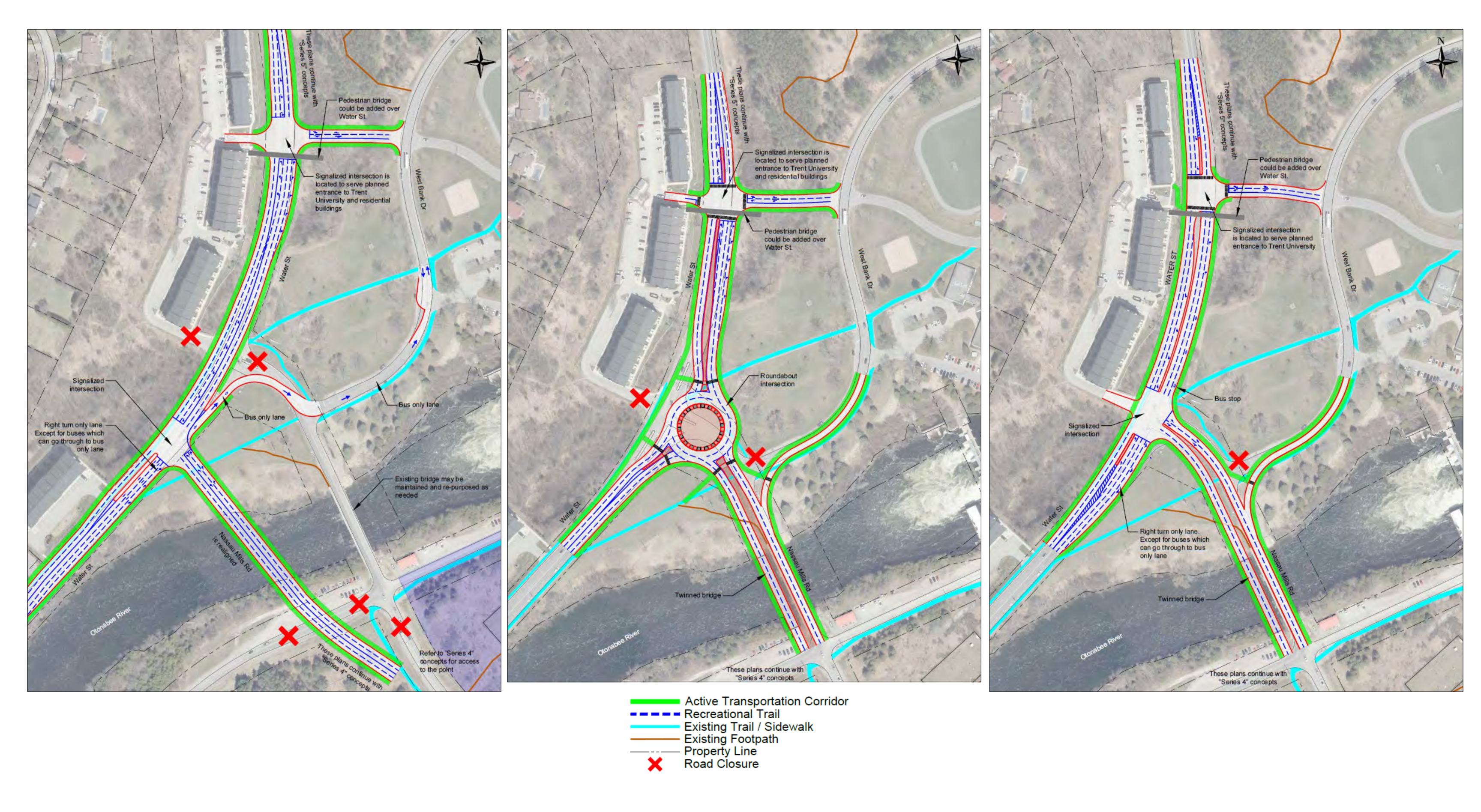
Most Preferred ()

Least Preferred

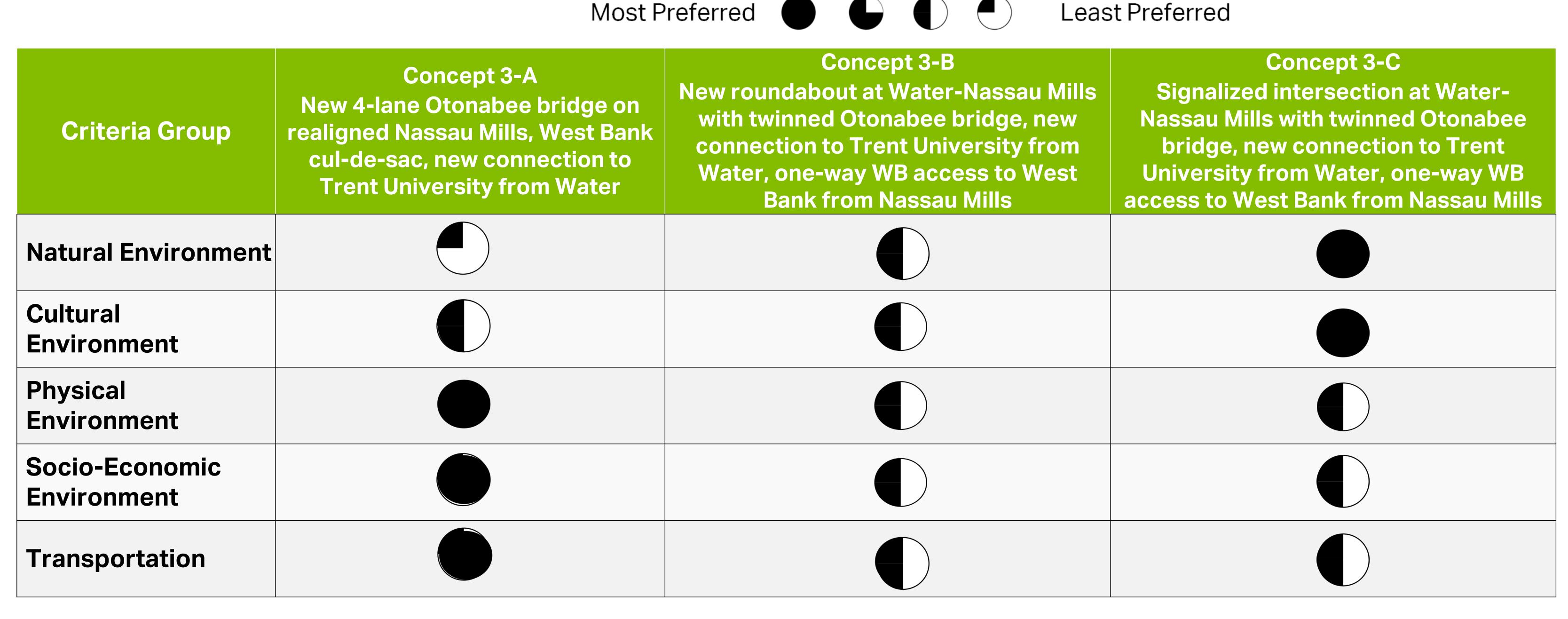
Concept 2D (Dafoe entrance with one-way travel to outlets at North/South) is Preferred because:

- One way travel on old Armour Road leaves more space for pedestrians and cyclists with an opportunity to provide a pathway along the riverfront
- Has fewer overall conflicting movements at intersections

Design Concepts 3. West Campus (Nassau Mills Rd - Water St - West Bank Dr)



Evaluation of West Campus Alternatives

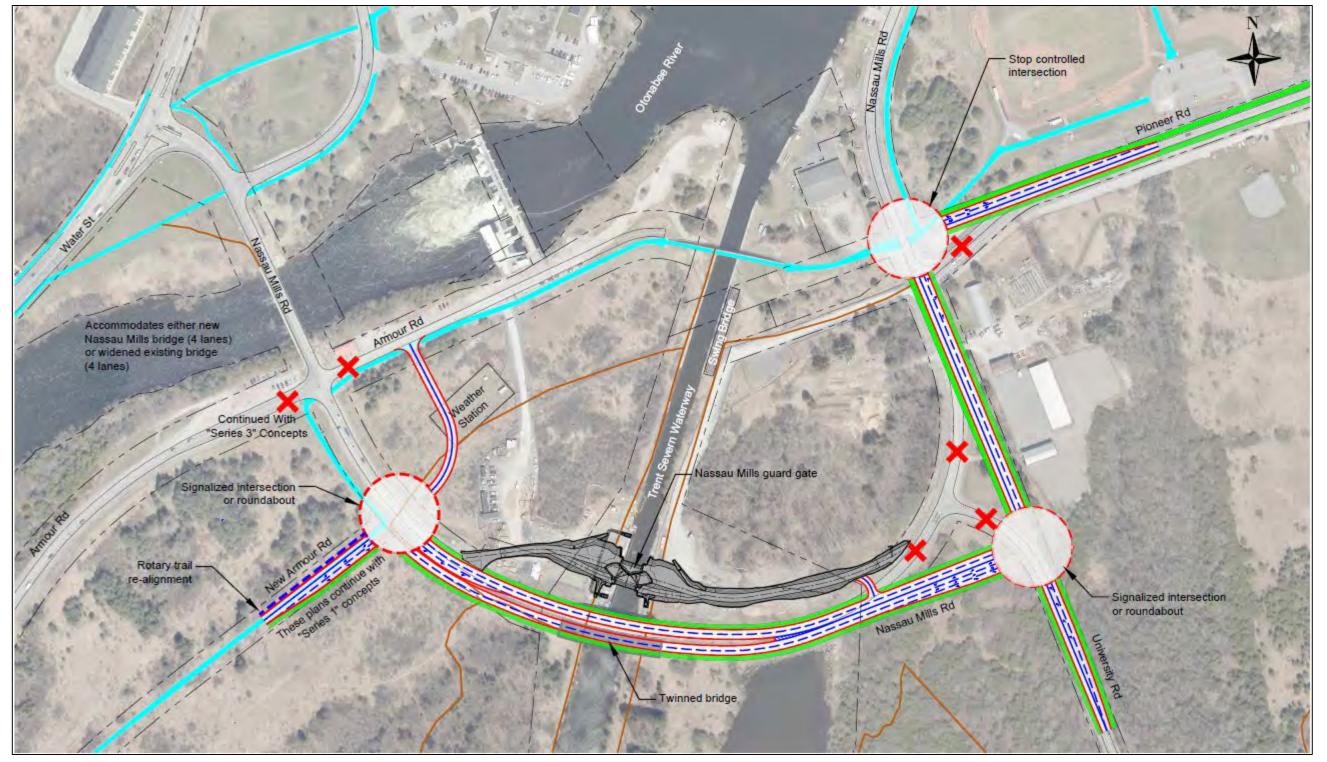


Concept 3A (New 4-lane Otonabee bridge on realigned Nassau Mills, West Bank cul-de-sac, new connection to Trent University from Water) is Preferred because:

- Better intersection separation
- Fewer conflicting movements
- o Increased road capacity and transit only access reduces transit delays
- o Good quality of facilities for pedestrians and cyclists. Better clearance to put the Rotary Trail under the Otonabee River Bridge
- Stormwater management is more feasible to implement

Design Concepts 4. East Campus (Nassau Mills Rd, Armour Rd/Pioneer Rd/University Rd

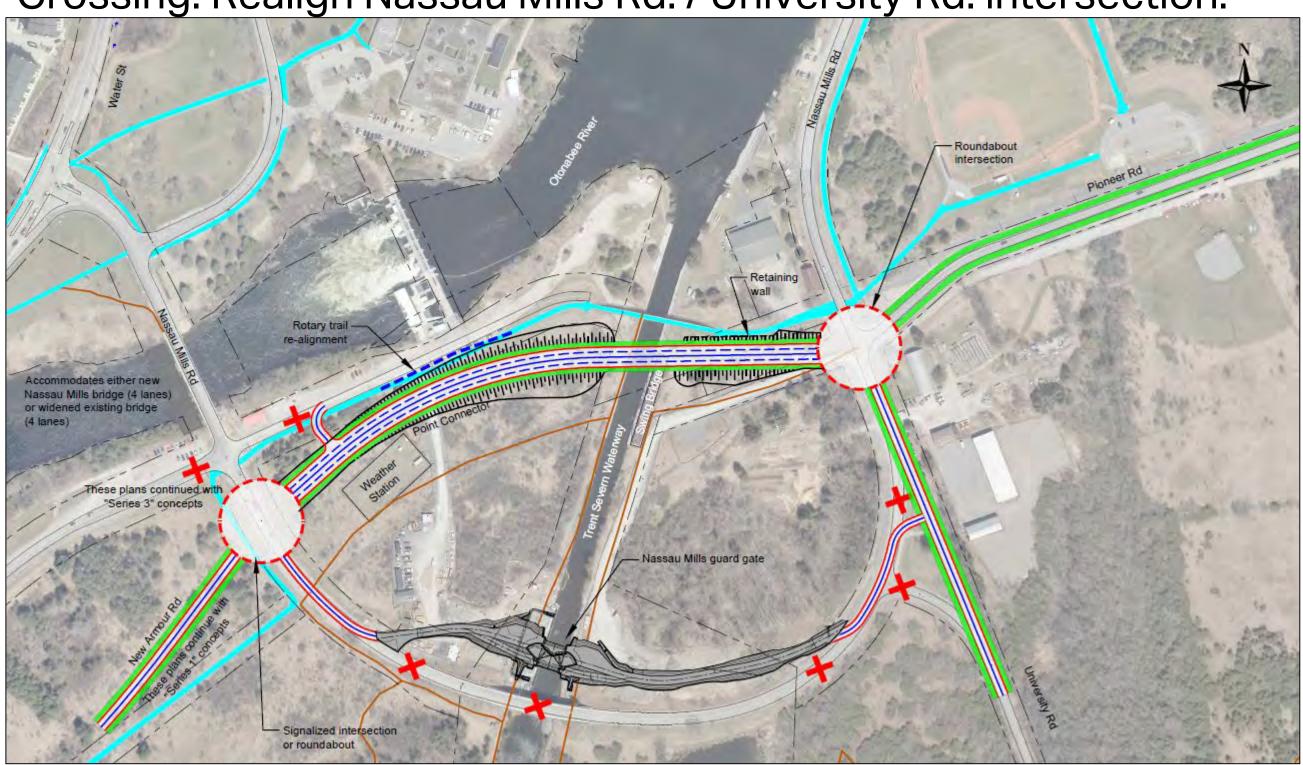
4A. Realign intersections of: Nassau Mills Rd. / University Rd. and Nassau Mills Rd. / Pioneer Rd.; Widen Nassau Mills Rd. (4 lanes)



Legend

Active Transportation Corridor
Recreational Trail
Existing Trail / Sidewalk
Existing Footpath
Property Line
Road Closure

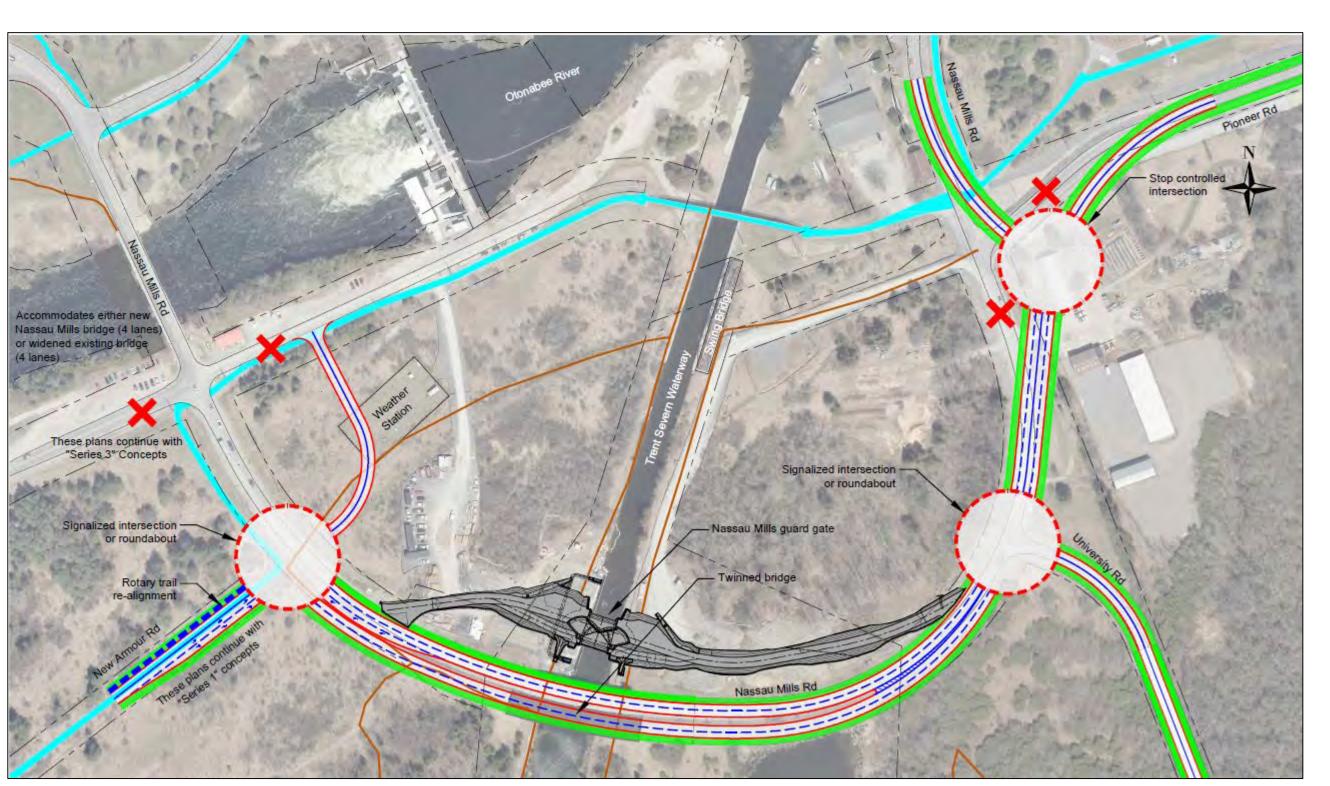
4B. Add Point Connector Rd. (4 lanes) to replace Nassau Mills Rd. Canal Crossing. Realign Nassau Mills Rd. / University Rd. intersection.



4C. Add Point Connector Rd. (4 lanes). Reconfigure Nassau Mills Rd. / University Rd.



4D. Realign Nassau Mills Rd. – Pioneer Rd. intersection. Widen Nassau Mills Rd. (4 lanes)



Evaluation of 4. East Campus Alternatives: Nassau Mills Rd – Armour Rd – Pioneer Rd – University Rd Intersections

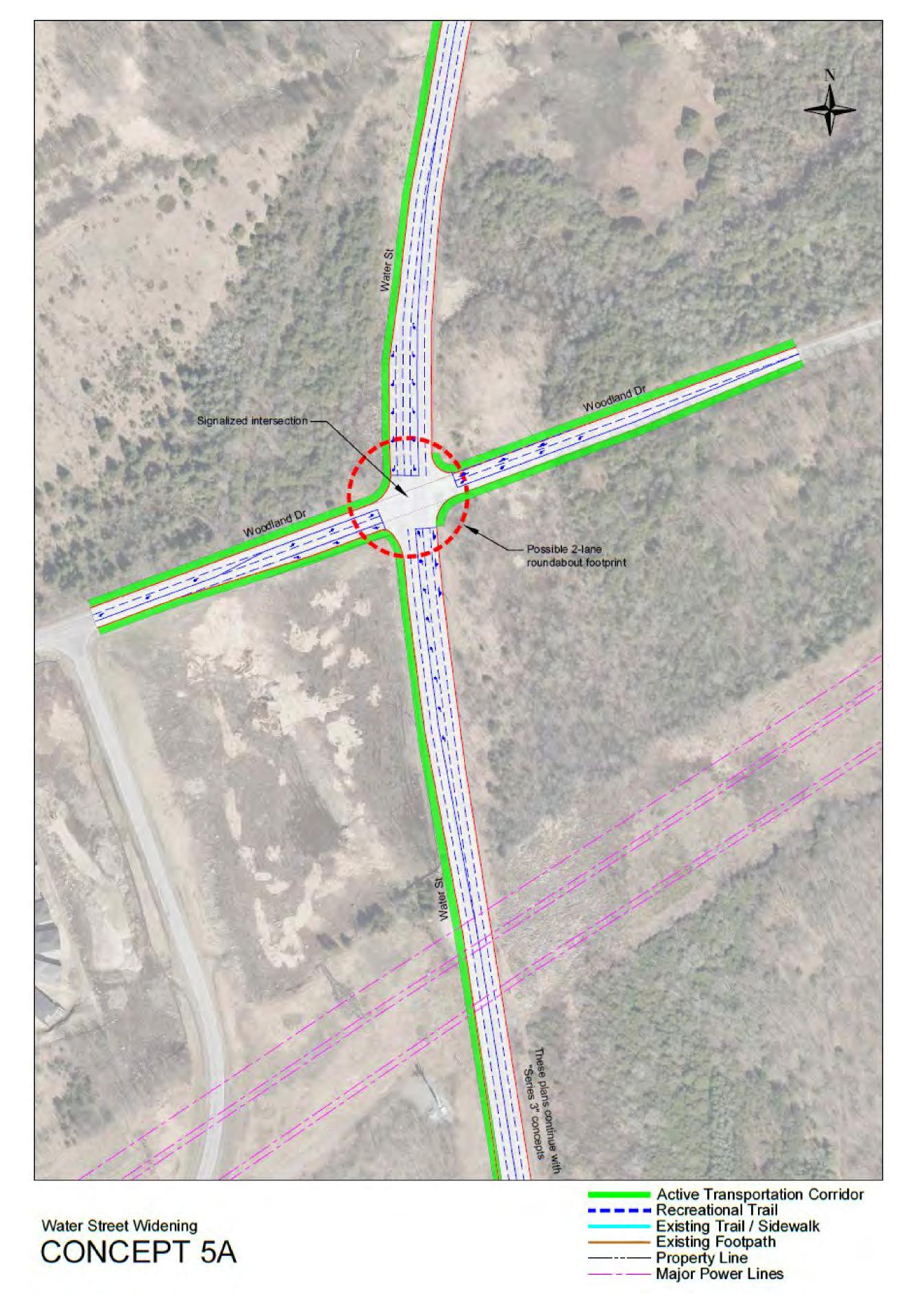
Most Preferred Least Preferred **Concept 4-A** Concept 4-C Concept 4-B **Concept 4-D** Nassau Mills widened; new Point Nassau Mills widened to new Point Nassau Mills widened; University **Criteria Group** Nassau Mills widened and **Connector; University extended** and Pioneer intersections **Connector; University realigned to** realigned to Pioneer realigned to realigned Pioneer Nassau Mills; Pioneer realigned Natural **Environment** Cultural **Environment** Physical Environment Socio-Economic **Environment Transportation**

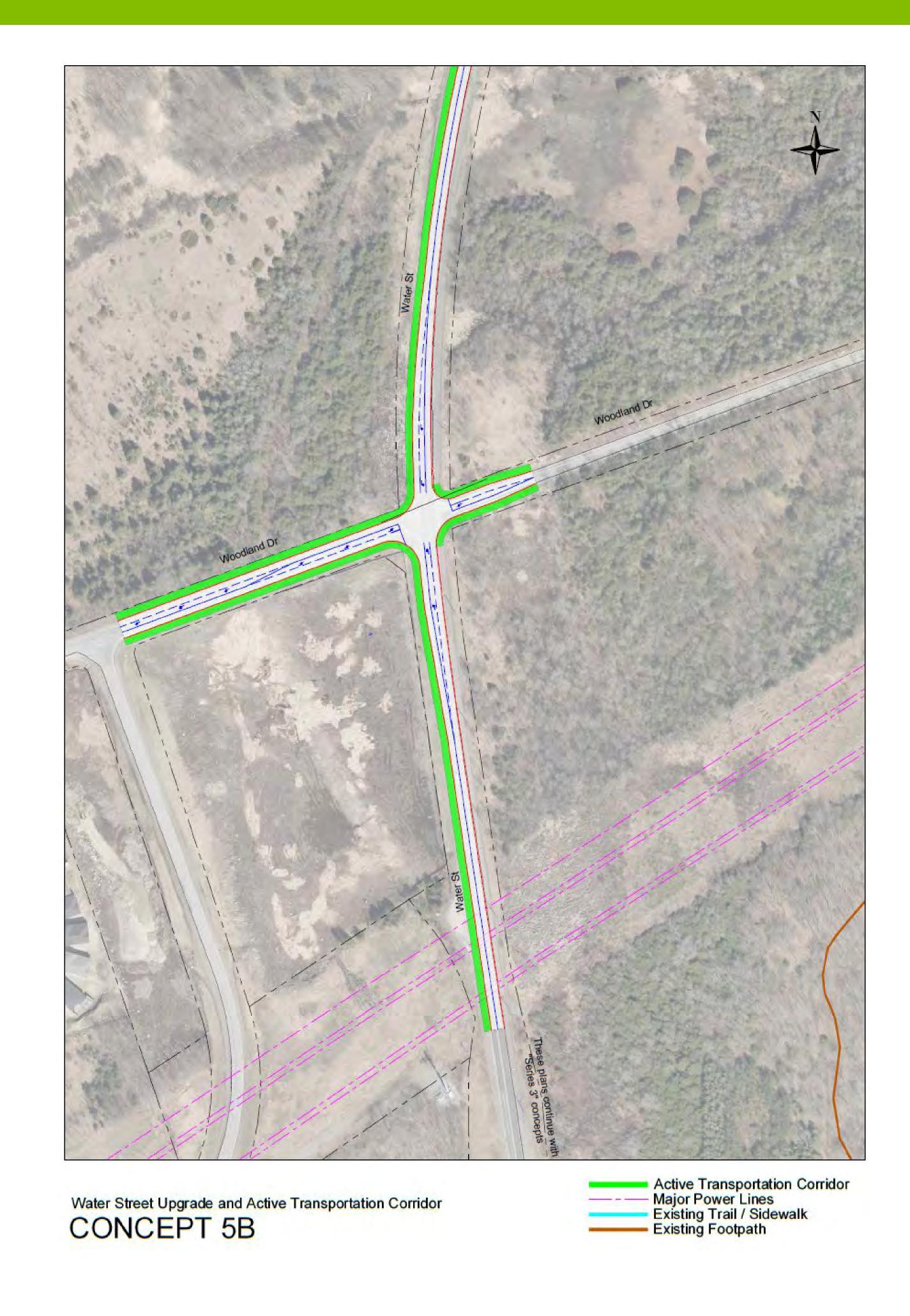
Concept 4D (Nassau Mills Dr. widened and realigned to Pioneer Rd.) is Most Preferred because:

- o least effect on wildlife habitat, vegetation, SAR species, archaeological resources, land with contamination potential and property.
- o compatible with the stormwater strategy, a complete streets design approach and interim improvements.
- o offers the best traffic operation and the fewest expected collisions.

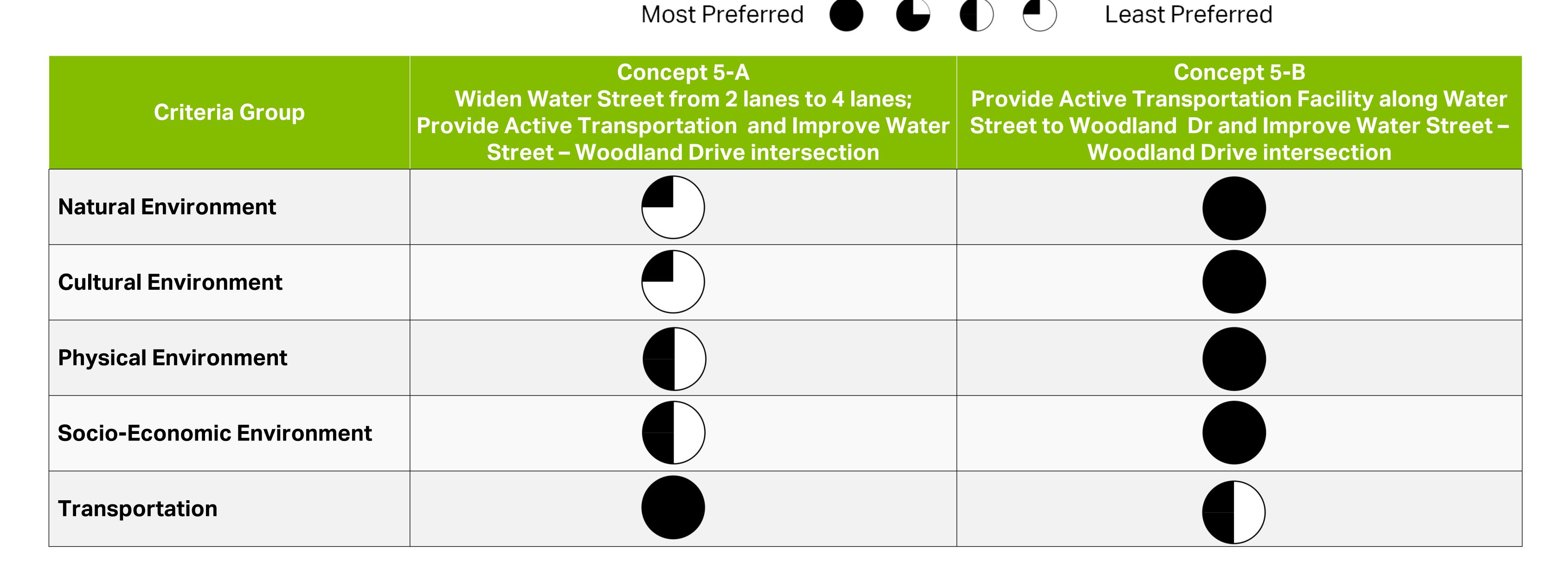
Construction of the Nassau Mills Guard Gate in 2018 must be considered in the design of the Nassau Mills Road widening.

Design Concepts 5. Water Street at Woodland





Evaluation of Water Street at Woodland Alternatives

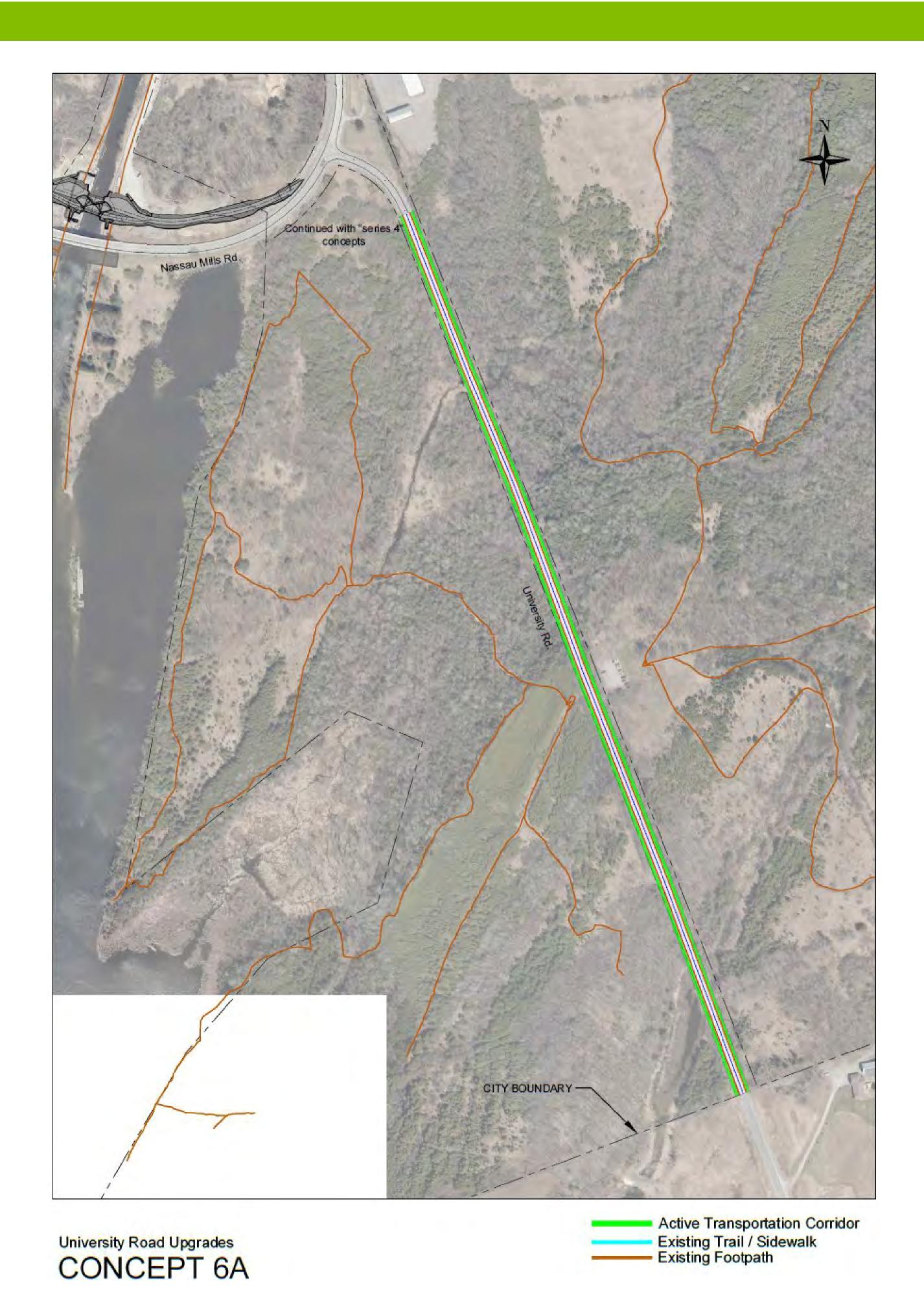


Concept 5-B is Preferred because:

- o Addresses the identified traffic operations problem to 2031 and provides a reasonable level of service at Woodland intersection.
- o Places pedestrians and cyclists on a multi-use pathway behind the curb to better separate active transportation users and vehicles
- Serves ongoing development
- o Provides speed management with the transition to west side curb and multi-use pathway instead of paved shoulder

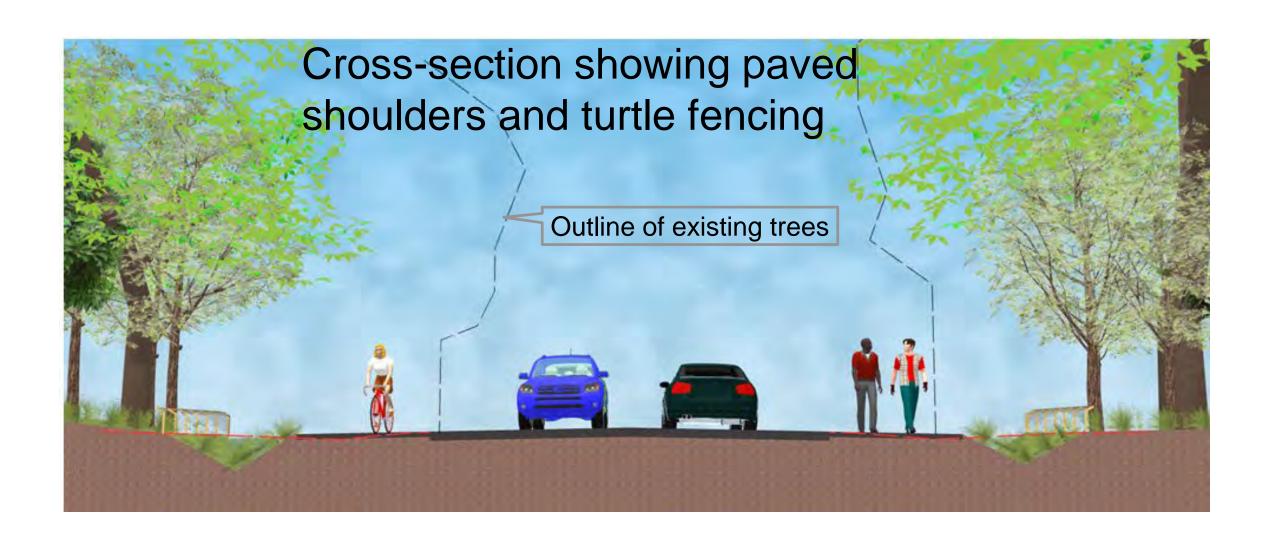
Given the expected growth in Peterborough County and the City, right-of-way for a future 4-lane road should be protected along Water Street. Should utility poles require replacement, they should be relocated to avoid conflicts with a 4-lane road.

Design Concepts 6. University Road Improvements



University Road improvements are planned to include:

- Paved shoulders to better accommodate cyclists and pedestrians including those crossing the road between footpaths. (Paved shoulders also eliminate gravel shoulders that are attractive to nesting turtles)
- Dry culverts and fencing to reduce crossings of the road by turtles and other small wildlife
- Turtle habitat improvements such as nesting areas and sunning areas

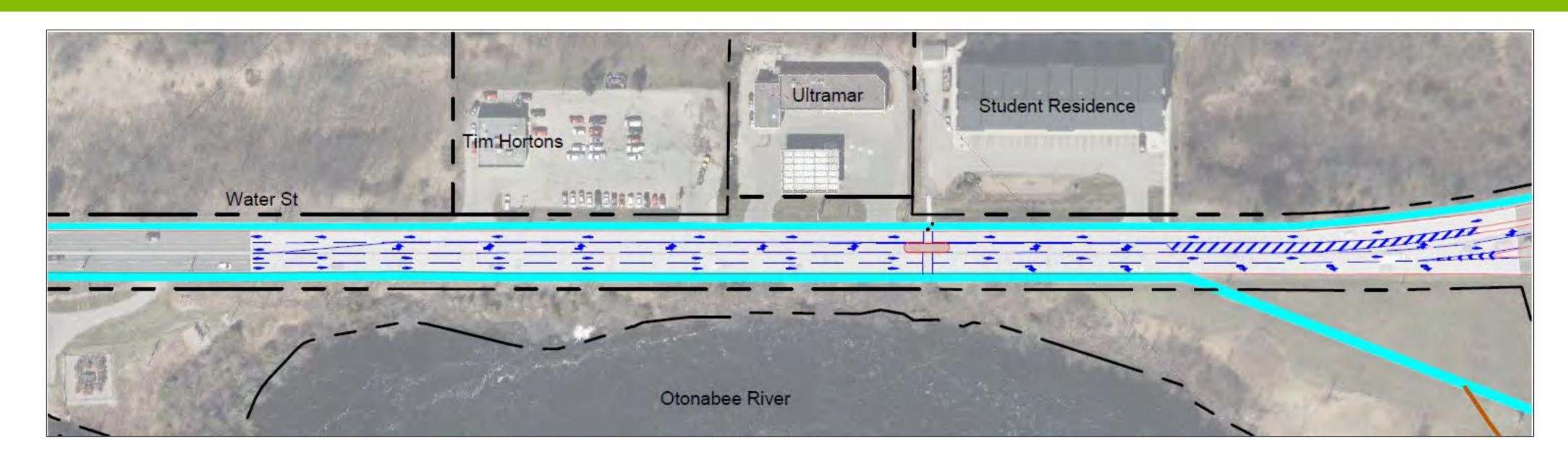




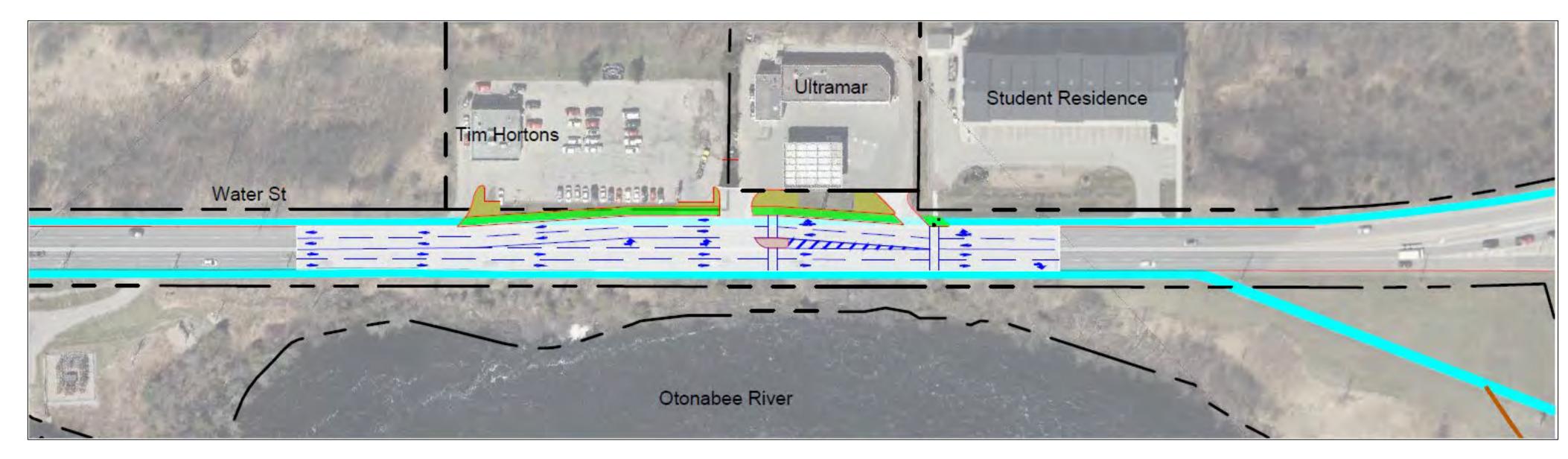




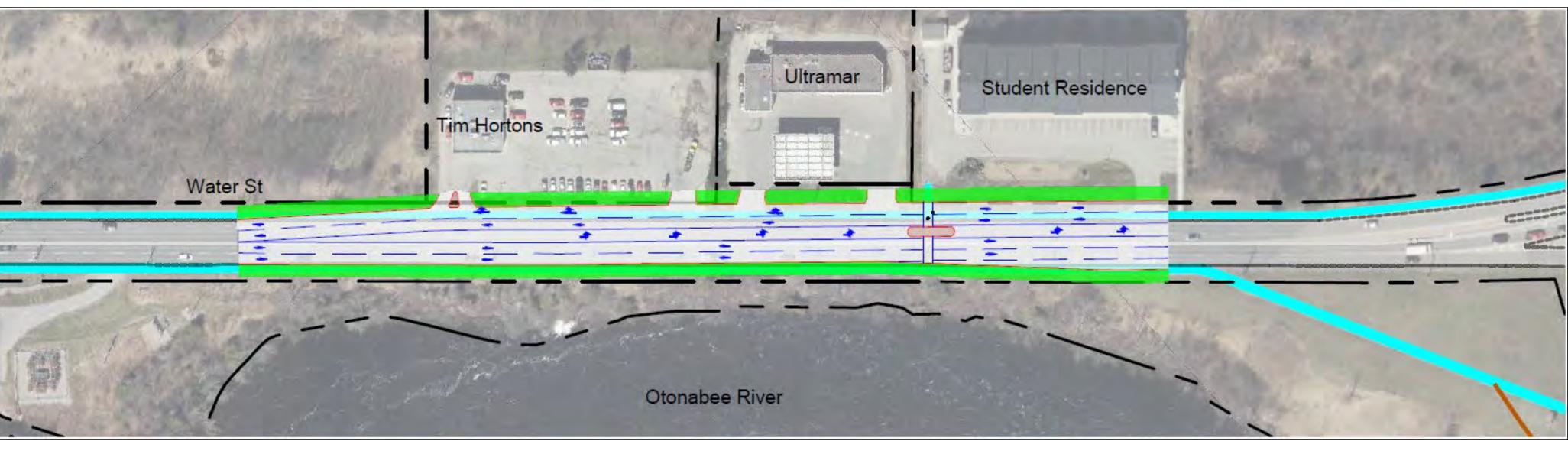
Design Concepts 7. Water Street south of Nassau Mills Road



Concept 7A: convert one southbound lane into a northbound left turn lane



Concept 7B: Consolidate the Tim Horton's and Ultramar driveways and widen locally to add a northbound left turn lane



Concept 7C: Widen to add a northbound left turn lane

Because of the Otonabee River, all widening is to the west. All concepts include a pedestrian crossing near a relocated northbound bus stop and sidewalks/pathways on both sides of Water Street

Evaluation of Water Street South of Nassau Mills Road

Concept 7-A Concept 7-B Concept 7-C **Convert one Southbound lane on Consolidate the Tim Horton's and** Widen Water Street to add a **Criteria Group** Water Street to a Northbound left Ultramar driveways and add Northbound left turn lane northbound left turn lane turn lane **Natural Environment Cultural Environment Physical Environment** Socio-Economic **Environment Transportation**

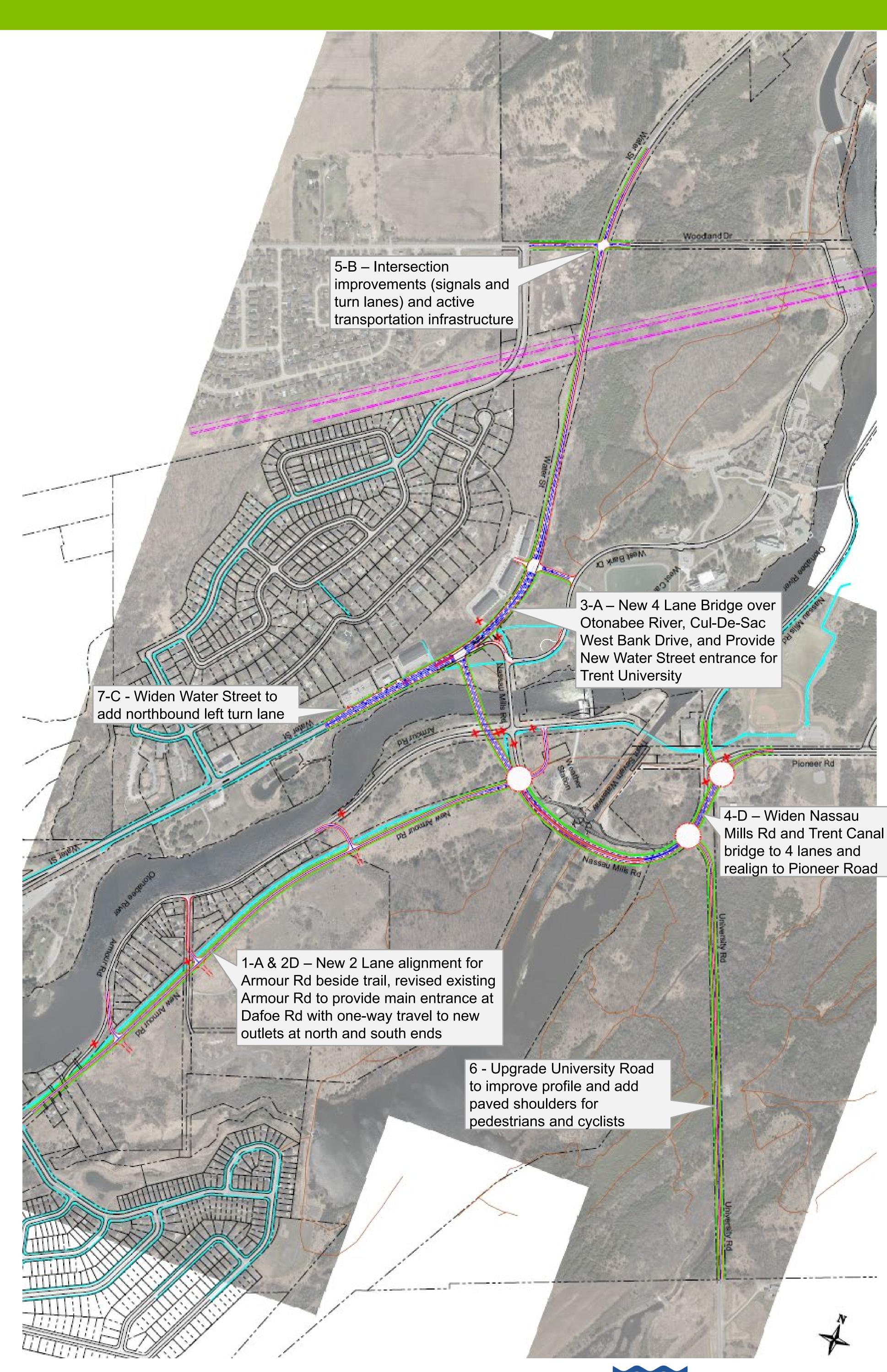
Most Preferred ()

Least Preferred

Concept 7-C is Preferred because:

- o Provides the best traffic and transit operations and a protected pedestrian crossing with median refuge
- May be combined with Concept 7-B
- o Effects are minor and can be mitigated

Preliminary Preferred Transportation Concepts



Next Steps - Transportation

- The project team will consider all comments received from this consultation and from a Public Information Centre to be held in the future. The PIC will present refined alternatives, preliminary evaluation and preliminary design alternatives.
- After receiving comments, the project team will confirm or update the Preliminary Preferred Concepts.
- Preliminary Designs will then be developed. These will:
 - Identify property requirements
 - Detail intersection designs
 - Show sidewalk, cycling and trail design options
 - Provide cost estimates and a phasing plan describing what will be built and when.
- The project team will then hold another round of consultation before preparing the Environmental Study Report for public review

Comments

How can you provide comments?

- Visit the Project website. Go to http://www.peterborough.ca/ and click on: "Doing Business", "Studies and Projects" and look under "Projects" for "North End Trent University Area Transportation and Wastewater Management Class Environmental Assessment"
- Send comments by email to: NorthEndEA@Peterborough.ca

Questions?

If you have any additional questions:

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