

# Appendix M

## Evaluation of Alternatives Tables



**EVALUATION SUMMARY - EDWARD STREET INTERCHANGE, NORTH SIDE**

Category		Alternative N1B: Parclo A4 (R=90m)	Alternative N3A: Parclo A4 (R=55m) with connection road	Alternative N4: Diamond	Alternative N5C: Parclo A with Roundabout at Development Drive	Alternative N7A: Parclo A with Development Drive Realignment	EVALUATION SUMMARY
<b>Transportation/Constructability (40% Weight)</b>							Alternative N4 (Diamond) results in poor traffic operations including long traffic queues and delays at the north ramp terminal intersection. The alternative also has increased collision risk including possible weaving concerns between the two closed spaced intersections on the north side of the highway. This alternative is therefore least preferred. The remaining four alternatives have similar overall scoring within the Transportation and Constructability category. While Alternative N5C (roundabout) is anticipated to have the best overall traffic operations at the ramp terminal intersection and minimize risk of severe collisions, the proximity of the roundabout to the private entrances to the north will impede access to and from these properties and result in additional collision risk relative to a signalized intersection. The roundabout will also require complex construction staging and higher impacts to existing utilities. Alternative N1B has good overall operations, geometrics, intersection/access spacing, complexity of construction staging and low impacts to existing utility impacts. Overall, Alternative N1B is therefore preferred from a Transportation and Constructability category, followed closely by Alternatives N3A, N5C and N7A.
		31.52	30.56	23.68	30.88	30.88	
<b>Natural Environment (25% Weight)</b>							All Alternatives have similar impacts to Fish and Fish Habitat, Surface Water / Drainage, and Groundwater. While Alternative N1B has the lowest potential to encounter contamination, it has the greatest potential impact to vegetation, wildlife and habitat, and Species at Risk as well as to designated natural areas and wetlands. Alternatives N3A and N5C have slightly lower potential impacts to these features overall, and are therefore equally preferred from a Natural Environment perspective.
		15.25	16.25	15.88	16.25	15.50	
<b>Socio-Economic Environment (25% Weight)</b>							Alternative N7A results in one residential displacement and significant impacts to businesses along Edward Street north of Development Drive. Combined with the other impacts of this option, the alternative is least preferred from a Socio-Economic perspective. Alternative N3A has significant impacts to the Riverside Buick GMC commercial property and impacts the smaller potential development parcels in the northwest quadrant of the interchange. While Alternative N4 encroaches into the Riverside Buick GMC property, no notable impact to operations is expected and the option also has the lowest impacts to employment lands and planned land use in both the northeast and northwest quadrants. Alternative N4 is therefore preferred from a Socio-Economic perspective, followed by Alternative N1B.
		20.13	19.13	22.88	19.63	17.38	
<b>Cultural Environment (10% Weight)</b>							All alternatives have similar moderate impacts to lands with archaeology potential. Alternative S7A crosses through a portion of 1 Cultural Heritage Landscape (St. Mark's Cemetery) and is therefore least preferred, while Alternative N5C is also expected to impact the edge of this property. The remaining three alternatives are equally preferred from a Cultural Environmental perspective.
		8.0	8.0	8.0	6.0	4.0	
<b>OVERALL ASSESSMENT</b>	<b>TOTAL SCORE</b>	<b>74.9</b>	<b>73.9</b>	<b>70.4</b>	<b>72.8</b>	<b>67.8</b>	While Alternative N4 is preferred from a Socio-Economic category, the alternative results in poor traffic operations and potential weaving concerns and increased collision risk between the north ramp terminal intersection and Development Drive. Similarly, Alternative N7A scores well in the Transportation and Constructability category, but has significant impacts to the Natural, Socio-Economic and Cultural Environments due to the Development Drive realignment. This alternative is therefore least preferred.  Amongst the remaining alternatives, Alternative N5C and N3A have good overall traffic operations and are preferred in the Natural Environment category. However, the proximity of the N5C roundabout to the entrances north of Development Drive are expected to impede access to these properties, and N3A has significant impacts to the Riverside Buick GMC property and adjacent commercial developments. Alternative N1B is has good overall traffic operations and is preferred or equally preferred in the Transportation/Constructability and Cultural environment categories.  For these reasons, Alternative N1B is the preferred overall north side alternative.
	<b>RANK</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>5</b>	
	<b>RECOMMENDATION</b>	<b>TECHNICALLY PREFERRED ALTERNATIVE</b>	<b>NOT RECOMMENDED</b>	<b>NOT RECOMMENDED</b>	<b>NOT RECOMMENDED</b>	<b>NOT RECOMMENDED</b>	
<b>Legend</b>	Highest Category Weighting					Factor Not Decision Relevant	
	Most Preferred Alternative						
<b>Cost (No Weighting)</b>							
		\$8.4 M	\$8.2 M	\$6.6 M	\$7.4 M	\$8.5 M	

EVALUATION SUMMARY - EDWARD STREET INTERCHANGE, SOUTH SIDE

Category		Alternative S1: Parclo A4	Alternative S2: Parclo A2	Alternative S4: Parclo with Roundabout	EVALUATION SUMMARY
Transportation/Constructability (40% Weight)					Alternative S4 (roundabout) is anticipated to have the best overall traffic operations at the ramp terminal intersection, and the roundabout is anticipated to minimize risk of severe collisions relative to a signalized intersection. However, the close proximity of the roundabout to the intersection with Victor Road, the school entrance and residential entrances to the south is expected to increase collision risk and impede access to and from these properties, and is less desirable than a signalized intersection at this location. The roundabout will also require complex construction staging and higher impacts to existing utilities. Alternative S1 includes a directional northbound to eastbound on-ramp, rather than a northbound left-turn with Alternative S2. This additional ramp results in good overall traffic operations and the most desirable horizontal and vertical geometrics and sight distance. Alternative S1 is therefore preferred from a Transportation and Constructability perspective.
		32.2	25.8	30.8	
Natural Environment (25% Weight)					All Alternatives have similar impacts to Fish and Fish Habitat, Surface Water / Drainage, and Groundwater. The additional eastbound on-ramp in the southeast quadrant of the interchange with Alternative S1 results in slightly greater impacts to potential SAR habitat, an unevaluated wetland, and impacts to properties with potential for contamination. Alternatives S2 and S3 are therefore equally preferred from a Natural Environment perspective, followed by Alternative S1.
		14.5	17.5	17.5	
Socio-Economic Environment (25% Weight)					None of the Alternatives impact agricultural lands, and they all have similar Noise and potential Climate Change impacts and equally address municipal and provincial land use planning policies, goals and objectives. Alternative S4 is expected to have slightly reduced air quality impacts due to a reduction in idling traffic relative to a signalized intersection. However, the alternative impacts four residential properties along Edward Street in the southwest quadrant, and the roundabout is less desirable than a signalized intersection for the accommodation of Active Transportation users. Alternative S1 requires minor property acquisition from the backs of two commercial properties along Prescott Centre Drive, though no impacts to current or future business operations are expected. Alternative S2 is therefore slightly preferred from a Socio-Economic Environment perspective, followed by Alternative S1.
		23.1	24.4	21.5	
Cultural Environment (10% Weight)					Alternative S4 has potential impact to 1 possible Built Heritage resource along Edward Street, and is least preferred. Between Alternatives S1 and S2, the additional on-ramp with Alternative S1 results in slightly greater impacts to land with archaeological potential. Alternative S2 is therefore preferred from a Cultural Environmental perspective, followed closely by Alternative S1.
		9.0	9.5	7.5	
OVERALL ASSESSMENT	TOTAL SCORE	78.9	77.2	77.3	Alternative S4 (roundabout) results in the best overall traffic operations at the ramp terminal intersection, however the alternative is associated with complex construction staging, higher impacts to existing utilities and access and intersection spacing issues due to the proximity of the school and private entrances south of the roundabout. Alternative S1 includes a directional northbound to eastbound on-ramp, which results in improved traffic operations compared to both the existing condition and Alternative S2, and the most desirable horizontal and vertical geometrics and sight distance. While the larger grading footprint of this additional on-ramp makes this option slightly less preferred from the Natural, Socio-Economic and Cultural Environments relative to Alternative S2, the transportation benefits of providing the additional ramp are considered to outweigh the increased impacts. Alternative S1 (Parclo A4) is therefore the preferred overall alternative.
	RANK	1	3	2	
	RECOMMENDATION	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	NOT RECOMMENDED	
Legend					
Cost (No Weighting)					
		\$7.9 M	\$6.3 M	\$7.1 M	

EVALUATION SUMMARY - BLUE CHURCH ROAD

Category		Alternative 1: Realign Blue Church Road to East	Alternative 2: Replace Structure along Existing Alignment	EVALUATION SUMMARY
Transportation/Constructability (40% Weight)				Alternative 1 has greater impacts to existing utilities along Blue Church Road. However, Alternative 1 is preferred from a Transportation and Constructability perspective based on the following: - Blue Church Road can remain open for the majority of the construction period with Alternative 1, whereas Alternative 2 requires closure of Blue Church Road for the duration of construction (up to 2 construction seasons) requiring detour to either Merwin Lane or Maitland Avenue; - The Alternative 1 replacement structure is located along a tangent alignment which is preferable to a structure along a horizontal curve, and slightly improves sight distance across the structure.
		28.8	22.4	
Natural Environment (25% Weight)				Both Alternatives have similar impacts to Fish and Fish Habitat, Surface Water / Drainage, Groundwater, Designated Natural Areas and Wetlands, and potentially contaminated areas. Alternative 1 has slightly lower impacts to potential Species at Risk (SAR) habitat, and is therefore preferred from a Natural Environment perspective.
		20.8	19.8	
Socio-Economic Environment (25% Weight)				Neither Alternative impacts any residential or commercial properties, and they have similar Air Quality and potential Climate Change impacts and equally address municipal and provincial land use planning policies, goals and objectives. While Alternative 1 results in slightly greater potential impact to noise sensitive receivers, it is preferred on the basis of limiting disruption to both agricultural operations and Active Transportation users by maintaining Blue Church Road open during the majority of construction. Alternative 1 is therefore preferred from a Socio-Economic Environment perspective.
		24.1	22.8	
Cultural Environment (10% Weight)				Neither Alternative is expected to have any notable impacts to archaeological resources, built heritage features or cultural landscapes. Alternatives 1 and 2 are therefore equally preferred from a Cultural Environment perspective.
		9.0	9.0	
OVERALL ASSESSMENT	TOTAL SCORE	82.7	73.9	Alternative 1 (Realign Blue Church Road to the East) is equally preferred or preferred in all Categories, and is therefore the preferred overall alternative.
	RANK	1	2	
	RECOMMENDATION	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	
Legend		 Highest Category Weighting → Lowest Category Weighting		
		 Most Preferred Alternative → Least Preferred Alternative		
Capital Cost				
		\$5.9 M	\$5.9 M	

EVALUATION SUMMARY - HIGHWAY 16 INTERCHANGE

Category		Alternative 1B: Parclo A4 (R=75m) Realign Hwy 16 to East	Alternative 2A: Parclo A4 (R=90m) Realign Hwy 16 to West	Alternative 2B: Parclo A4 (R=75m) Realign Hwy 16 to West	EVALUATION SUMMARY
Transportation/Constructability (40% Weight)					All alternatives have the same desirable Parclo A4 configuration and will therefore provide similar traffic operations. Alternative 2B avoids realignment of Rooney Road, and the westbound off-ramp and channelized right-turn can generally be re-utilized which therefore simplifies construction staging. Alternative 2B also avoids the hydro pole relocations along Rooney Road that are required with the other options. Alternative 2A improves the radius of the northbound to westbound on-ramp to 90 m, although the 75 m radius provided with the other alternatives is still considered acceptable. Therefore, Alternatives 2A and 2B are considered equally preferred from a Transportation / Constructability perspective.
		29.60	31.20	31.20	
Natural Environment (25% Weight)					All Alternatives have similar impacts to Fish and Fish Habitat, Surface Water / Drainage and Groundwater. Alternative 1B has slightly lower impacts to potential Species at Risk (SAR) habitat, followed by Alternative 2B. Alternative 2B has slightly lower impacts to Designated Natural Areas and Wetlands, and by avoiding impacts to the MTO Maintenance facility north of Rooney Road also has the lowest potential to encounter contamination. Alternative 2B is therefore preferred from a Natural Environment perspective.
		14.25	14.00	15.63	
Socio-Economic Environment (25% Weight)					All Alternatives have similar Air Quality and potential Climate Change impacts, impacts to trails and active transportation networks, and equally address municipal and provincial land use planning policies, goals and objectives. While Alternative 1B (along with Alternative 2A) encroaches into the MTO maintenance yard along Rooney Road, it avoids the impacts to the residential property in the southwest quadrant associated with Alternatives 2A and 2B, also resulting in slightly lower potential for noise impacts. Alternative 1B also has lower impacts to agricultural operations in the southwest quadrant. Alternative 1B is therefore preferred from a Socio-Economic Environment perspective, followed by Alternative 2B.
		23.63	22.00	22.50	
Cultural Environment (10% Weight)					None of the alternatives are expected to have any notable impacts to archaeological resources, built heritage features or cultural landscapes. Alternatives 1B, 2A and 2B are therefore equally preferred from a Cultural Environment perspective.
		9.00	9.00	9.00	
OVERALL ASSESSMENT	TOTAL SCORE	76.48	76.20	78.33	Alternative 2B is preferred or equally preferred in the Transportation & Constructability, Natural Environment and Cultural Environment categories. While the Alternative has edge impacts to one residential property and greater agricultural impacts than Alternative 1B, the benefits of this alternative in the other categories outweigh these disadvantages. Alternative 2B (Realignment to West with 75 m loop ramp radius) is therefore the preferred overall alternative.  It is also noted that while not included as part of the weighted scoring of alternatives, Alternative 2B has the lowest overall construction cost.
	RANK	2	3	1	
	RECOMMENDATION	NOT RECOMMENDED	NOT RECOMMENDED	TECHNICALLY PREFERRED ALTERNATIVE	
Legend	Highest Category Weighting				Lowest Category Weighting
	Most Preferred Alternative				Least Preferred Alternative

EVALUATION SUMMARY - MAITLAND ROAD INTERCHANGE, SOUTH SIDE

Category		Alternative S1A: Parclo A4	Alternative S2A: Parclo A2	Alternative S3: Diamond	EVALUATION SUMMARY
Transportation/Constructability (40% Weight)					All alternatives are expected to have good overall traffic operations at the ramp terminal, similar constructability and staging challenges and similar moderate impacts to existing utilities. Alternative S3 provides improved intersection spacing between the ramp terminal and Oak Street relative to the other alternatives, however the proximity of the intersection with the Highway 401 bridge is less desirable for sight distance and requires a southbound left-turn resulting in increased collision risk. Alternative S1A provides directional movements for all maneuvers, eliminating the northbound left-turn requirement and associated reduced sight distance and increased collision risk associated with Alternative S2A. Alternative S1A is also expected to have the best overall traffic operations at the ramp terminal. Alternative S1A is therefore preferred from a Transportation and Constructability perspective.
		34.4	30.2	29.6	
Natural Environment (25% Weight)					All Alternatives have similar impacts to Groundwater and to properties with potential for contamination. Alternative S1A is least preferred as it results in slightly greater impacts to fish and fish habitat, potential SAR habitat and vegetation removal, drainage features, and impacts to designated natural areas and wetlands. Alternatives S2A avoids all ramps in the southeast quadrant, resulting in the lowest impacts to these features. Alternative S2A is therefore preferred from a Natural Environment perspective.
		15.8	20.6	17.9	
Socio-Economic Environment (25% Weight)					Alternative S3 has 3 anticipated residential displacements in the southeast quadrant and encroachment into an additional 6 residential properties, and is least preferred from a Socio-Economic perspective. Alternatives S1A and S2A avoid all residential displacements, however Alternative S1A is expected to encroach into 6 residential properties in the southeast and southwest quadrants of the interchange. Alternative S2A is therefore preferred from a Socio-Economic perspective.
		21.3	23.9	18.9	
Cultural Environment (10% Weight)					None of the alternatives are expected to impact built heritage features or cultural heritage landscapes. Alternative S1A has slightly greater impacts to lands with archaeological potential. Alternatives S2A and S3 are therefore slightly preferred over Alternative S1A from a Cultural Environmental perspective.
		8.0	8.5	8.5	
OVERALL ASSESSMENT	TOTAL SCORE	79.4	83.2	74.9	Alternative S1A is slightly preferred from a Transportation and Constructability perspective as it provides the best overall traffic operations, and includes directional movements for all maneuvers which reduces potential collision risk. However, all alternatives are expected to have good overall traffic operations at the ramp intersection. Alternative S2A is preferred from the Natural, Socio-Economic and Cultural Environments as it avoids new ramps and has lower impacts in the southeast quadrant of the interchange. Alternative S2A is therefore the preferred overall configuration.
	RANK	2	1	3	
	RECOMMENDATION	NOT RECOMMENDED	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	
Legend					
Cost (No Weighting)					
		\$7.1 M	\$6.3 M	\$5.8 M	

EVALUATION SUMMARY - MAITLAND ROAD INTERCHANGE, NORTH SIDE

Category		Alternative N1: Parclo B with Concession Road 2 Realignment	Alternative N1A: Parclo B with Concession Road 2 Extension	Alternative N2: Buttonhook with Concession Road 2 Realignment	Alternative N2A: Buttonhook with Concession Road 2 Extension	Alternative N3: Buttonhook with Connection Road	EVALUATION SUMMARY
Transportation/Constructability (40% Weight)							All alternatives improve the existing interchange geometry and facilitate replacement of the Maitland Road underpass, and result in acceptable overall traffic operations. Alternative N3 is expected to result in increased risk of wrong-way travel onto Highway 401 due to the curved alignment of the Connection Road between Maitland Road and the realigned Concession Road 2, and connection opposite the west ramp terminal intersection. Alternative N3 is therefore least preferred. The additional intersection required with the realigned Concession Road 2 east of Maitland Road with Alternatives N1 and N2 is located on a horizontal curve which may lead to sight distance concerns and increased collision risks. While the Concession Road 2 connection opposite the ramp terminal is undesirable with Alternative N1A, this option results in the best overall intersection operations. Alternative N1A is therefore preferred overall, closely followed by Alternative N2A.
		29.36	31.84	29.28	30.48	25.28	
Natural Environment (25% Weight)							The Concession Road 2 realignment in the northeast quadrant (Alternatives N1 and N2) results in additional crossings of Lemons Creek, potential impacts to a Provincially Significant Wetland, the largest area of vegetation removal as well as greater impacts to Groundwater / susceptibility to construction activities. These alternatives are therefore least preferred. The remaining 3 alternatives have similar impacts to the natural environment, although Alternative N2A has slightly lower impacts to designated natural areas and wetlands, groundwater and vegetation. Alternative N2A is therefore preferred from a Natural Environment perspective, followed by Alternatives N1A and N3.
		11.75	19.88	13.38	21.00	19.38	
Socio-Economic Environment (25% Weight)							Alternatives N1 and N1A displace the lowest number of residential properties (2) while Alternative N2 and N2A displace 4 properties and N3 displaces 5. Alternative N1A has the greatest encroachment into residential properties which are not displaced by the roadworks. The Concession Road 2 realignment has significant impacts to farming operations/agricultural lands in the northwest quadrant (with Alternative N1 and N1A) and to the Roselawn Memorial Gardens in the northeast quadrant (with Alternatives N1 and N2) which may affect current operations and future expansion opportunities. The additional grading footprint of the road realignment also results in the greatest potential to impact climate change. Alternative N2A is therefore slightly preferred from a Socio-Economic perspective, closely followed by Alternative N1A and N3.
		17.38	19.63	18.25	20.25	19.50	
Cultural Environment (10% Weight)							Alternatives N1 and N2 includes a realignment of Concession Road 2 through a portion of the Roselawn Memorial Gardens and Crematorium property which is considered a cultural heritage landscape, while the other three options avoid this property. Alternatives N2A and N3 have the lowest potential for impacts to land with archaeological potential, and are therefore equally preferred from a Cultural Environmental perspective.
		5.0	7.5	5.5	8.5	8.5	
OVERALL ASSESSMENT	TOTAL SCORE	63.49	78.84	66.41	80.23	72.66	Alternative N2A is preferred in the Natural, Socio-Economic and Cultural Environment categories, closely followed by Alternative N1A. While Alternative N1A results in the best overall traffic operations and is slightly preferred in the Transportation and Constructability category, operations with Alternative N2A are expected to be good. Considering Alternative N2A scores only slightly lower than Alternative N1A in the Transportation and Constructability category and is preferred in the other categories, Alternative N2A is the overall technically preferred north side alternative.  While not factored into the weighted evaluation, it is also noted that Alternative N2A has the lowest anticipated construction cost of the north side alternatives.
	RANK	5	2	4	1	3	
	RECOMMENDATION	NOT RECOMMENDED	NOT RECOMMENDED	NOT RECOMMENDED	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	
Legend							
Cost (No Weighting)							
		\$7.9 M	\$7.1 M	\$6.8 M	\$6.0 M	\$7.7 M	

EVALUATION SUMMARY - MERWIN LANE

Category		Alternative 1: Realign Merwin Lane to West	Alternative 2: Realign Merwin Lane to East	Alternative 3: Replace Structure along Existing Alignment	EVALUATION SUMMARY
Transportation/Constructability (40% Weight)					Alternative 2 is preferred from a Transportation and Constructability perspective based on the following: - Merwin Lane can remain open for the majority of the construction period with both Alternatives 1 and 2, whereas Alternative 3 requires closure of Merwin Lane for the duration of construction (up to 2 construction seasons) requiring detour through the Town of Prescott to Edward Street; - Alternative 2 requires the lowest grade raise of Merwin Lane for the new replacement structure due to the lower profile of Highway 401 to the east; - Alternative 2 avoids impacts to the hydro corridor along the west side of Merwin Lane that is impacted by Alternatives 1 and 3.
		27.2	33.6	24.0	
Natural Environment (25% Weight)					All Alternatives have similar impacts to Fish and Fish Habitat, Surface Water / Drainage, Groundwater, and potentially contaminated areas. Alternative 1 has the lowest impacts to Designated Natural Areas and Wetlands, but slightly greater impacts to confirmed Species at Risk (SAR) habitat. Alternative 2 has the greatest impacts to the significant woodland in the northeast quadrant, but lower overall impacts to confirmed or potential SAR habitat. Alternatives 1 and 2 are therefore considered equally preferred from a Natural Environment perspective, followed closely by Alternative 3.
		19.3	19.1	18.5	
Socio-Economic Environment (25% Weight)					None of the Alternatives impact any residential or commercial properties, and they have similar Noise, Air Quality and potential Climate Change impacts and equally address municipal and provincial land use planning policies, goals and objectives. Alternative 3 is least preferred as it requires closure of Merwin Lane during construction which will disrupt farm equipment movement and Active Transportation users. Alternative 1 minimizes impacts to agricultural lands, and is therefore slightly preferred from a Socio-Economic Environment perspective, followed by Alternative 2.
		23.6	22.5	21.3	
Cultural Environment (10% Weight)					None of the alternatives are expected to have any notable impacts to archaeological resources, built heritage features or cultural landscapes. Alternatives 1, 2 and 3 are therefore equally preferred from a Cultural Environment perspective.
		9.0	9.0	9.0	
OVERALL ASSESSMENT	TOTAL SCORE	79.1	84.2	72.8	Alternative 3 is least or equally preferred in all Categories and is the least preferred alternative overall. Alternative 2 is slightly less preferred than Alternative 1 on the basis of the Socio-Economic Environment categories. However, Alternative 2 is preferred in the Transportation category as it avoids impacts to the hydro corridor along the west side of Merwin Lane which is impacted by the other alternatives, and requires the lowest grade raise of Merwin Lane over Highway 401. Alternative 2 (Realignment of Merwin Lane to the East) is therefore the preferred overall alternative.
	RANK	2	1	3	
	RECOMMENDATION	NOT RECOMMENDED	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	
Legend	Highest Category Weighting				Lowest Category Weighting
	Most Preferred Alternative				Least Preferred Alternative
Cost					
		\$5.8 M	\$5.8 M	\$5.8 M	