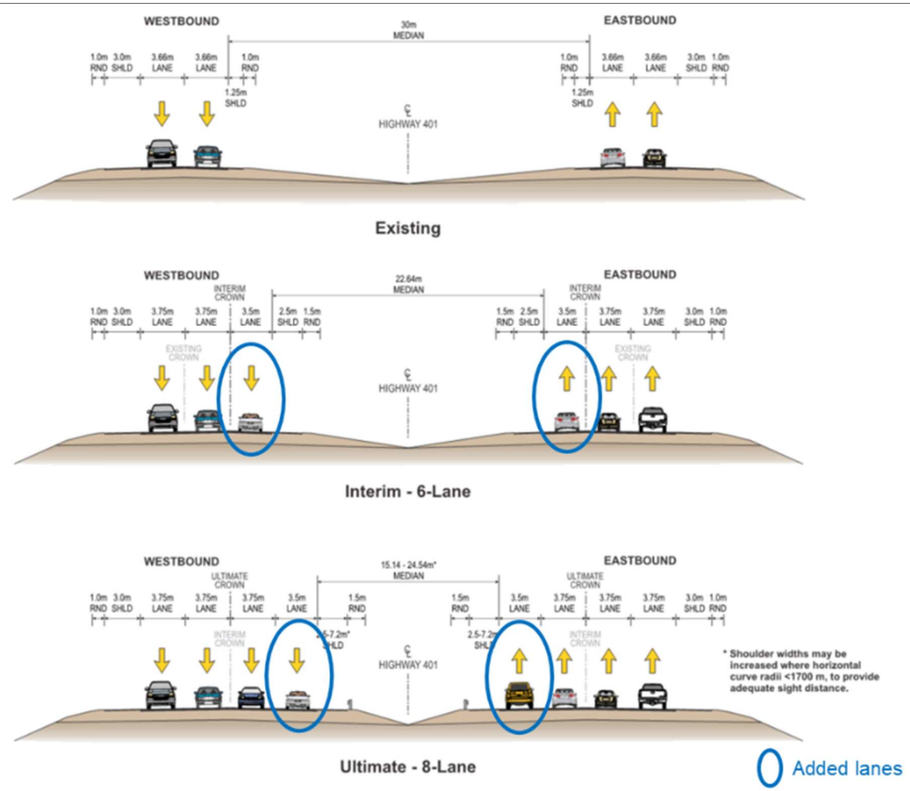
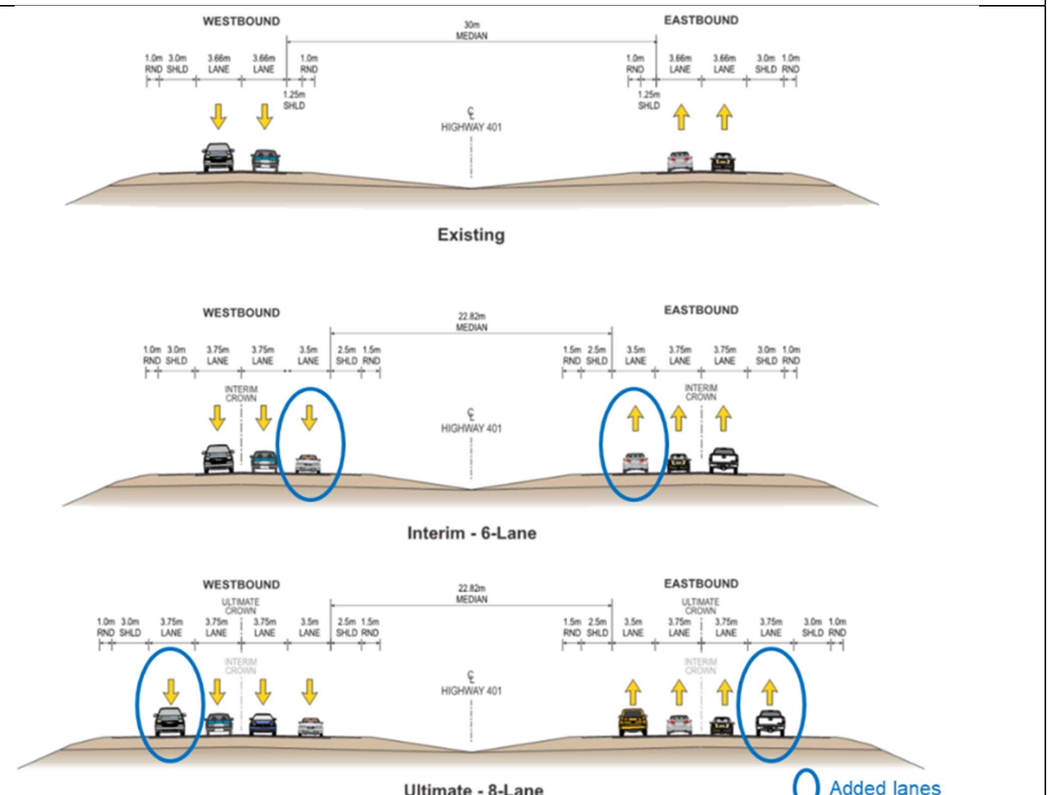
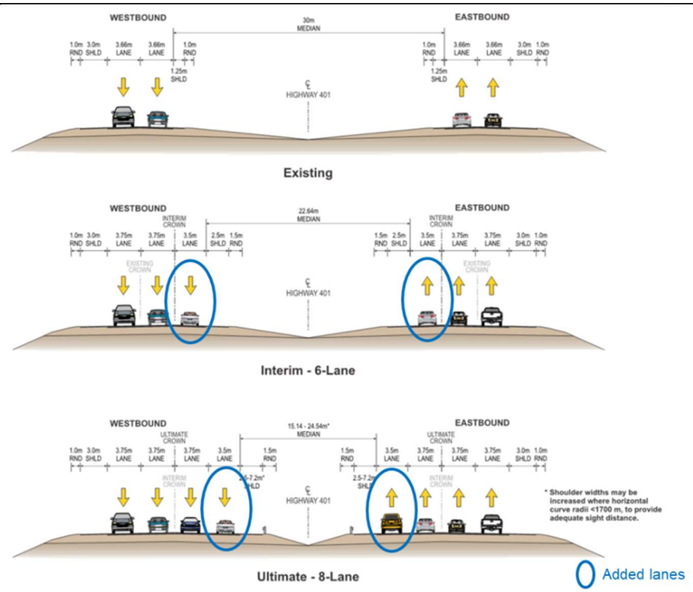
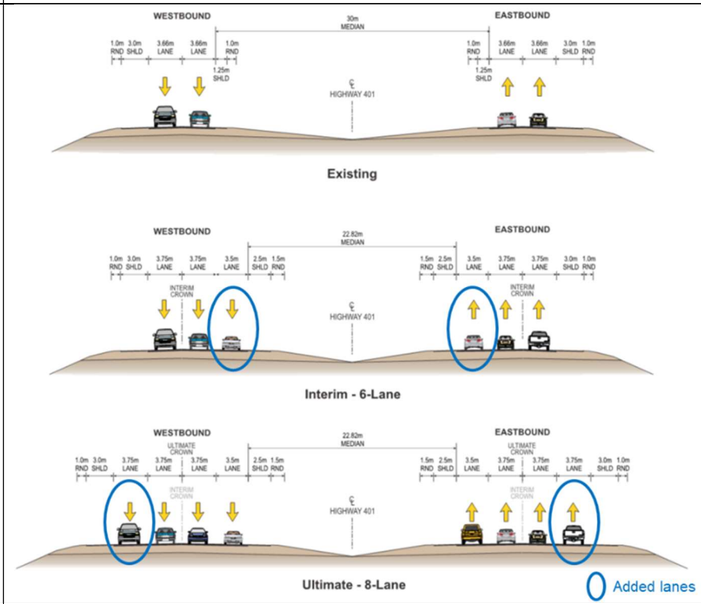
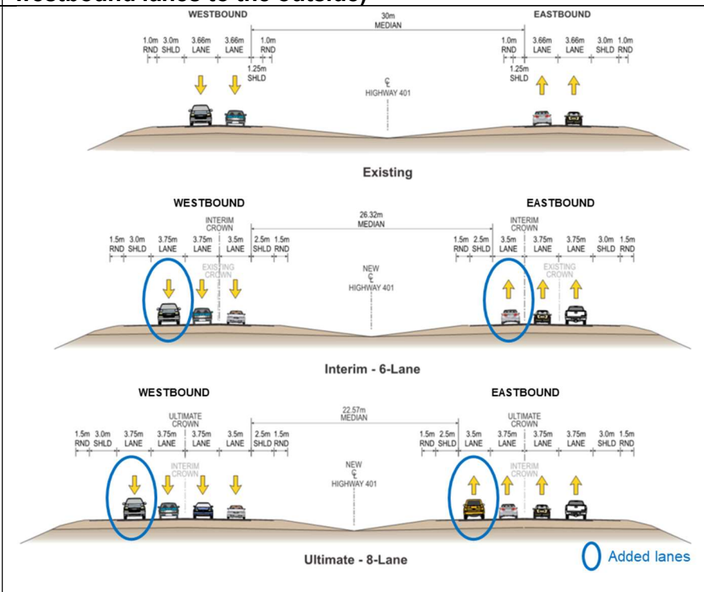
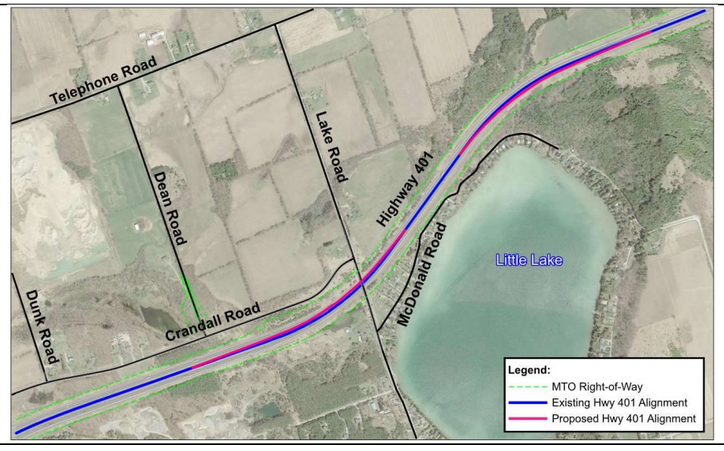
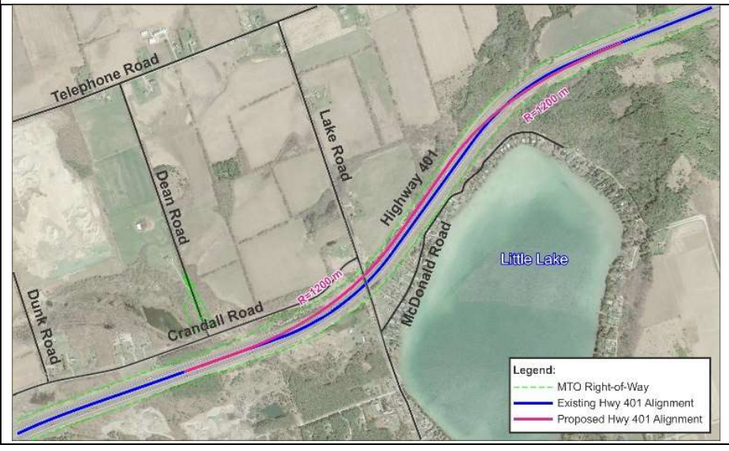
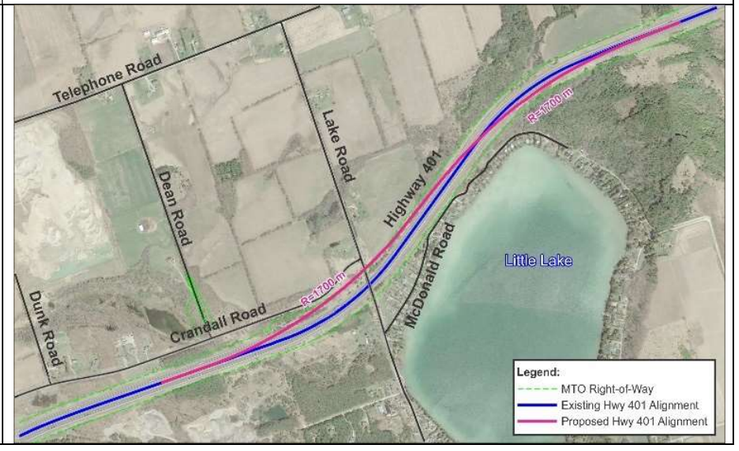
APPENDIX N

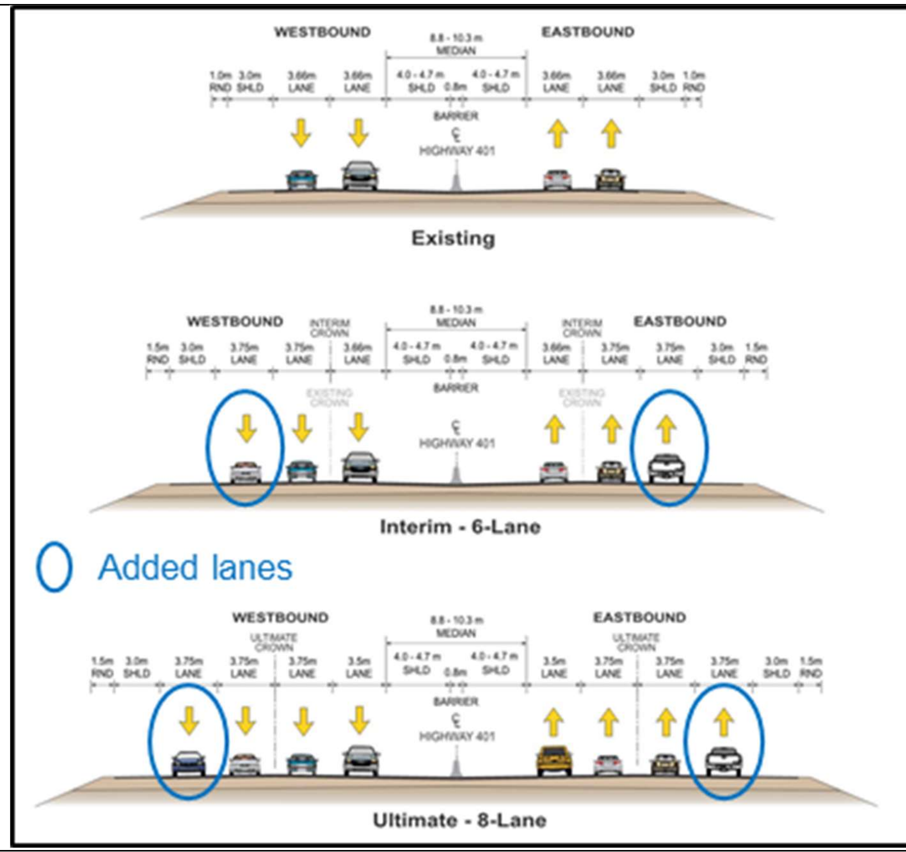
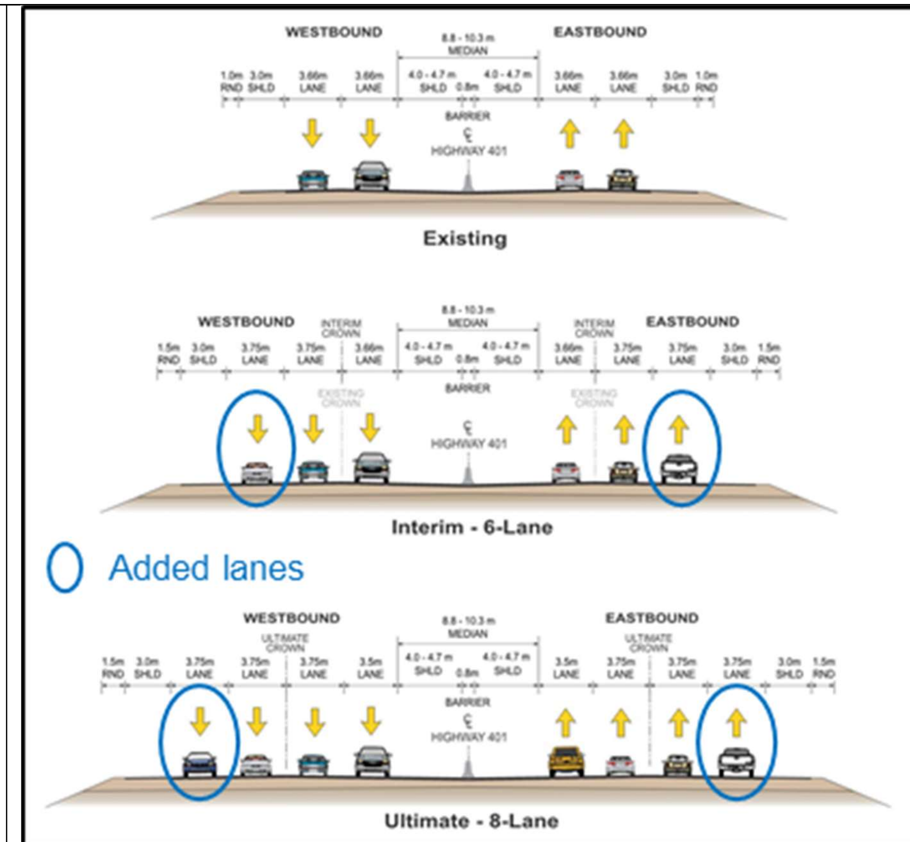
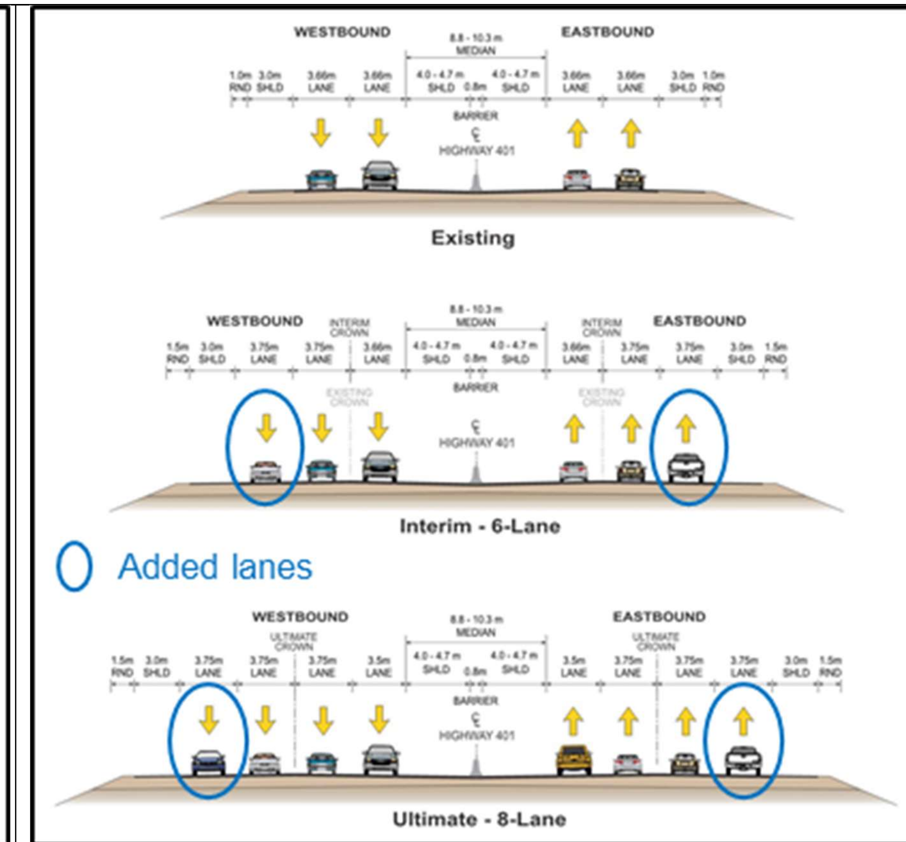
Long-List of Alternatives Evaluation Screening Table

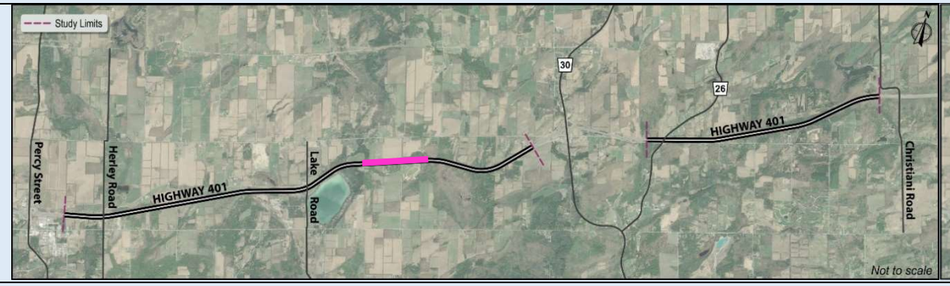
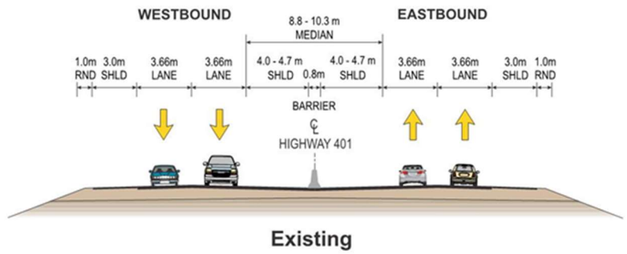
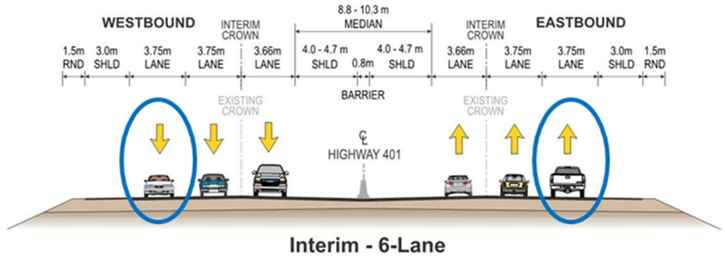
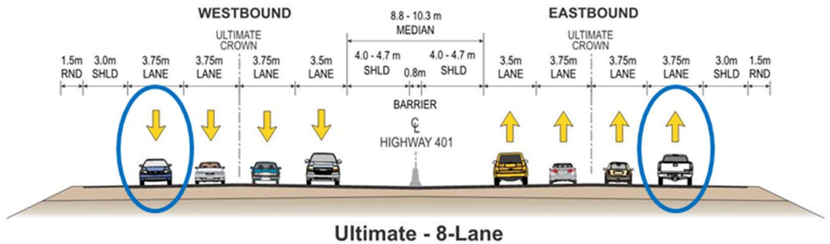
Highway 401 Colborne to Brighton – Long-List Screening

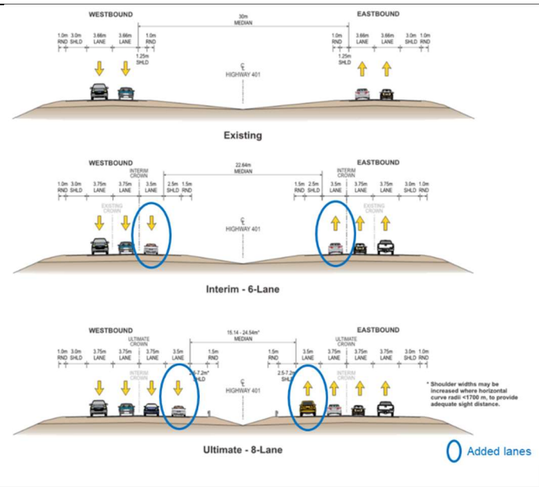
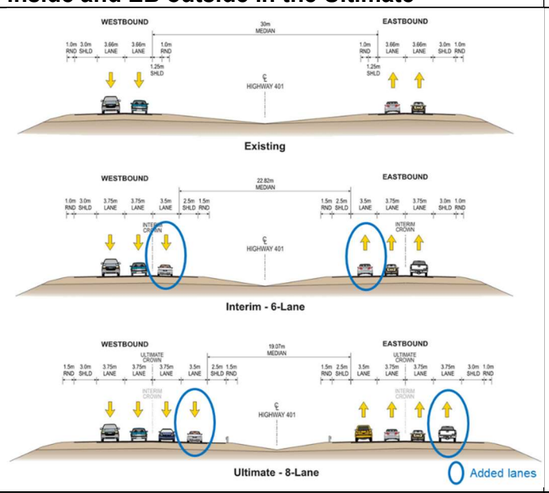
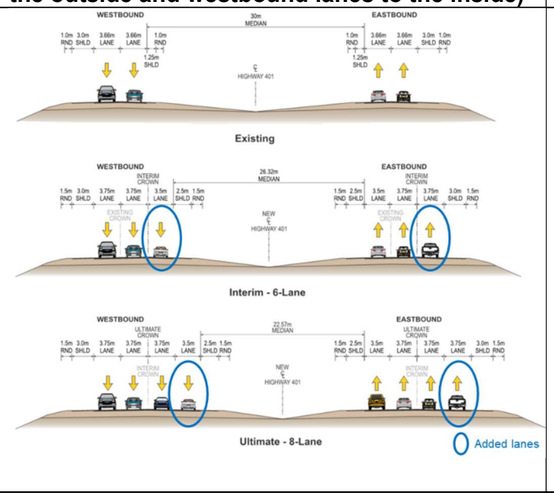
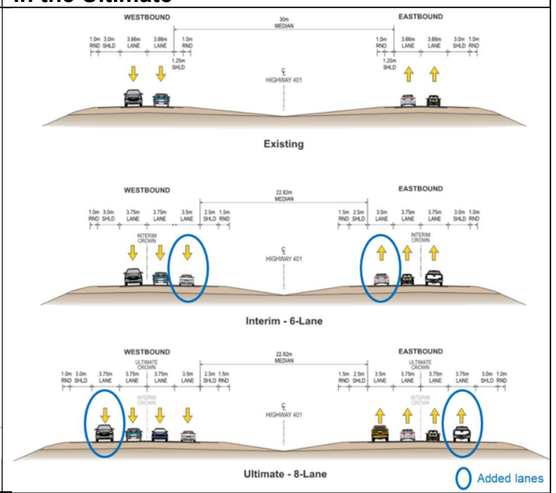
<table>
<tr><th colspan="3">Highway 401 Future Widening Alternatives</th></tr>
<tr><td>Highway Section</td><td colspan="2">Section 1</td></tr>
<tr><td>Location</td><td colspan="2"> 
</td></tr>
<tr><td>Key Features</td><td colspan="2">• Open median (over the majority of the section)
• Low erosion potential
• Two existing median turnarounds
• Tie into proposed cross-section for Cobourg to Colborne study at the west study limit</td></tr>
<tr><td>Alternative Name</td><td>Alternative 1</td><td>Alternative 2</td></tr>
<tr><td>Alternative Description</td><td>Widen inside only</td><td>Widen inside in the Interim and widen outside in the Ultimate</td></tr>
<tr><td>Alternative Schematic</td><td> 
</td><td> 
</td></tr>
<tr><td>Key Advantages</td><td>• Minimizes property impacts;</td><td>• Open median (≥ 22.5 m median) is retained in the Ultimate condition (no median barrier needed);</td></tr>
</table>

	• Minimizes potential environmental impacts; • Lower cost than Alternative 2; • Minimizes cuts/fills outside of the existing highway footprint.	• The two existing emergency median turnarounds can be accommodated in the Interim and Ultimate conditions.
Key Disadvantages	• Double median barriers are required in the Ultimate condition, which are less desirable than an open median (≥ 22.5 m median); • The two existing emergency median turnarounds are precluded in the Ultimate condition.	• Larger potential property impacts; • Larger potential environmental impacts; • Higher cost than Alternative 1; • Some cuts/fills outside of the existing highway footprint.
Recommendation	**Do not carry forward**	**Carry forward**
Rationale	This alternative is **not carried forward** because it negatively impacts safety and maintenance in the ultimate condition by introducing median barriers and precluding the existing median turnarounds used by emergency services.	This alternative is the **preferred widening strategy** because the open median and existing emergency median turnarounds can be retained.
Highway Section	**Section 2**	
Location		
Key Features	• Open median • Low erosion potential • Large fill on south side	
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**
Alternative Description	**Widen inside only**	**Widen inside in the Interim and widen outside in the Ultimate**	**Widen to the north (widen eastbound lanes to the inside and westbound lanes to the outside)**
Alternative Schematic			
Key Advantages	• Minimizes property impacts; • Minimizes potential environmental impacts; • Lowest cost;	• Open median (≥ 22.5 m median) is retained in the Ultimate condition (no median barrier needed);	• Open median (≥ 22.5 m median) is retained in the Ultimate condition (no median barrier needed);

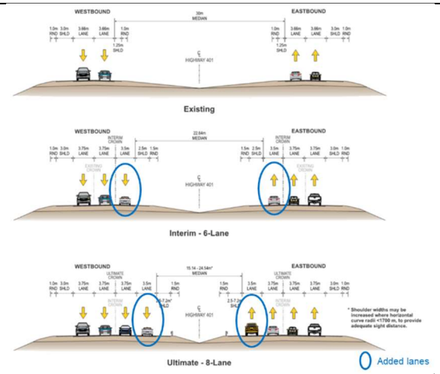
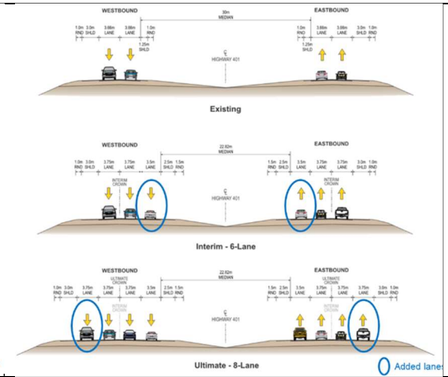
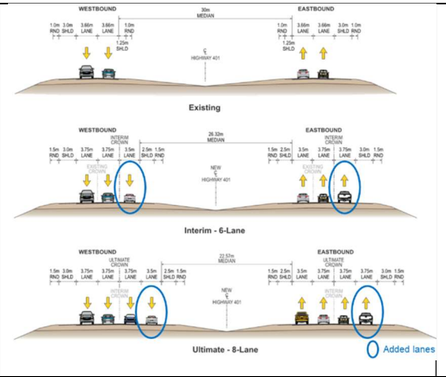
	• Minimizes large fill south of the highway.	• The existing emergency median turnaround can be accommodated in the Interim and Ultimate conditions.	• The existing emergency median turnaround can be accommodated in the Interim and Ultimate conditions; • Minimizes large fill south of the highway.
Key Disadvantages	• Double median barriers are required in the Ultimate condition, which are less desirable than an open median (≥ 22.5 m median); • One existing emergency median turnaround would have to be shifted westerly in the Ultimate condition.	• Moderate potential property impacts; • Larger potential environmental impacts; • Higher cost than Alternative 1; • Large fill required south of the highway.	• Largest potential property impacts; • Larger potential environmental impacts (including wetland impact); • Higher cost than Alternative 1.
Recommendation	**Carry forward**	**Carry forward**	**Carry forward**
Rationale	This alternative is **carried forward for further study**. While this alternative requires double median barrier, which is less desirable than an open median, it minimizes significant earth fill on the south side of the highway where there is a large depression in the terrain while minimizing property impacts and environmental impacts.	This alternative is **carried forward for further study**. While this alternative would require significant earth fill on the south side and may have potential environmental impacts, it does allow an open median to be retained and avoids the use of median barriers.	This alternative is **carried forward for further study**. This alternative maintains the open median and minimizes significant earth fill on the south side of the highway but does have greater property impacts and potential environmental impact on the north side of the highway.
Highway Section	**Section 3**		
Location			
Key Features	• Closed median • Mixed low to high erosion potential		
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**
Alternative Description	**Widen outside only and widen median shoulders**	**Widen outside only and realign using two 1200 m radius curves**	**Widen outside only and realign using two 1700 m radius curves**
Alternative Plan Schematic			

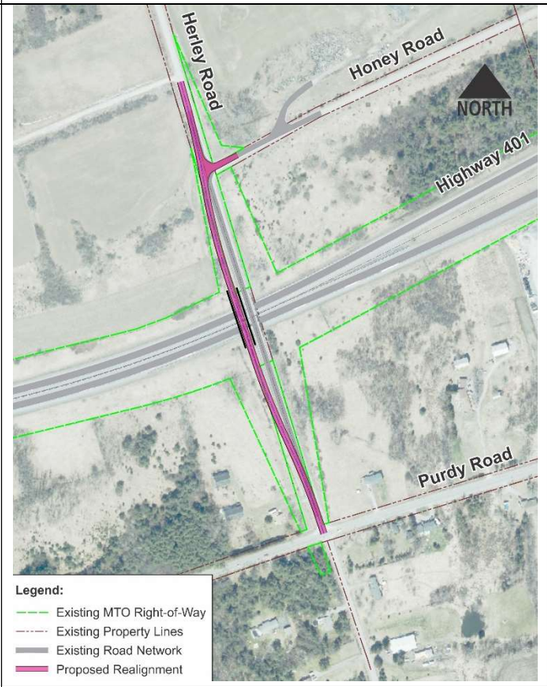
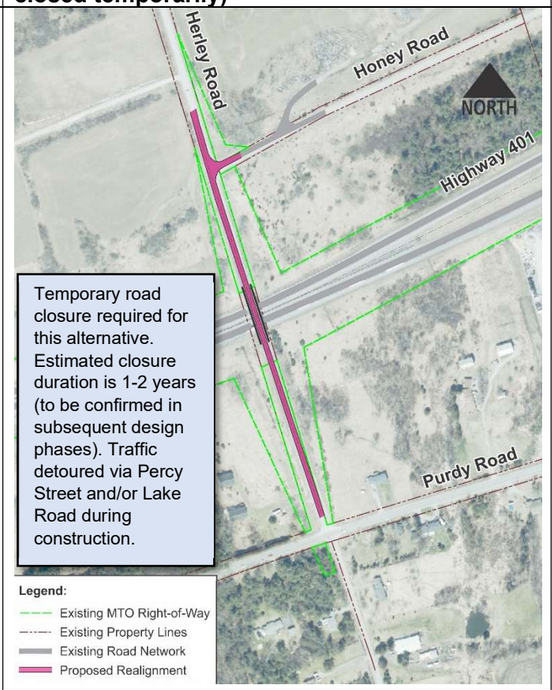
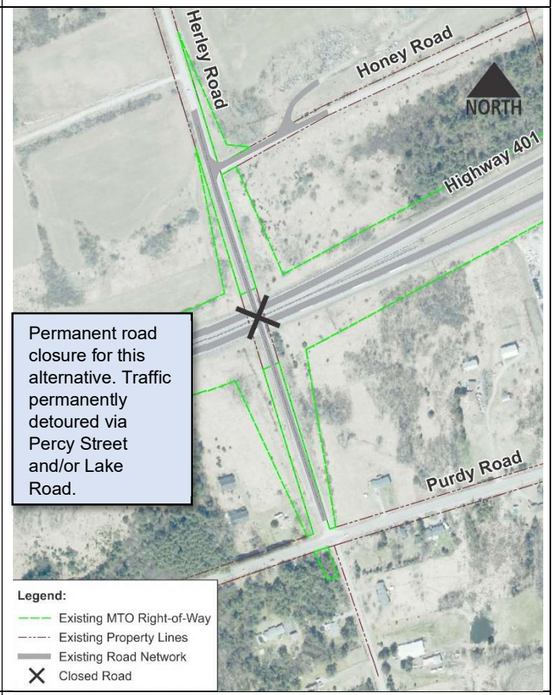
Alternative Cross-Section Schematic			
Key Advantages	• Greater potential to mitigate Crandall Road realignment and property impacts on the north side; • Minimizes potential property impacts outside of existing ROW; • Sight distance on curves improved to the design standard using widened median shoulders (up to 7.2 m wide); • Relatively low cost; • Maximizes reuse of the existing highway infrastructure; • Lower anticipated construction difficulty.	• Offset between highway and Little Lake properties greater than Alternative 1; • Sight distance on curves improved to the design standard using widened median shoulders (up to 4.7 m wide); • Improves the existing horizontal curves relative to existing, but not to the desirable standard (although curves do still meet minimum standards); • Minimizes potential impacts to existing noise berm.	• Offset between highway and Little Lake properties greater than Alternative 1; • Sight distance on curves meets design standards with standard width shoulders (3.35 m); • Improves the existing horizontal curves to the desirable standard; • Least potential impacts to existing noise berm.
Key Disadvantages	• Offset between highway and Little Lake properties smaller than Alternatives 2 and 3; • Potential impact to the existing noise berm; • Maintains the existing horizontal curves, which do not meet desirable standards, but do meet minimum standards. • While total ROW impacts are less, it has the most impact to the residential properties south of Highway 401	• Significant realignment of Crandall Road and property impacts on the north side, with greater cost or difficulty to mitigate these impacts; • Greater potential property impacts outside of existing ROW but less likely to impact residential properties south of Highway 401; • High cost; • Reuse of the existing highway infrastructure is less than Alternative 1 and more than Alternative 3; • High construction difficulty due to highway realignment, traffic staging challenges, and significant earthworks.	• Significant realignment of Crandall Road and property impacts on the north side, with greater cost or difficulty to mitigate these impacts; • Greater potential property impacts outside of existing ROW, but least potential impact to the residential properties south of Highway 401; • Highest cost; • Minimizes reuse of the existing highway infrastructure; • High construction difficulty due to highway realignment, traffic staging challenges, and significant earthworks.
Recommendation	Carry forward	Carry forward	Carry forward
Rationale	This alternative is **carried forward for further study**. This alternative minimizes potential impacts to property and road and cost and maximizes use of the existing highway; however, widened shoulders are required on the curves to provide the required sight distance.	This alternative is **carried forward for further study**. This alternative has greater cost, and staging complexity and reuses less of the existing highway than Alternative 1. While the curves are improved as compared to existing, widened shoulders are required on the curves to provide the required sight distance.	This alternative is **carried forward for further study**. This alternative has the greatest cost, and staging complexity and minimizes reuse of the existing highway; however, the existing curves are improved to the desirable standard which provides the required sight distance on the curves without widened shoulders.

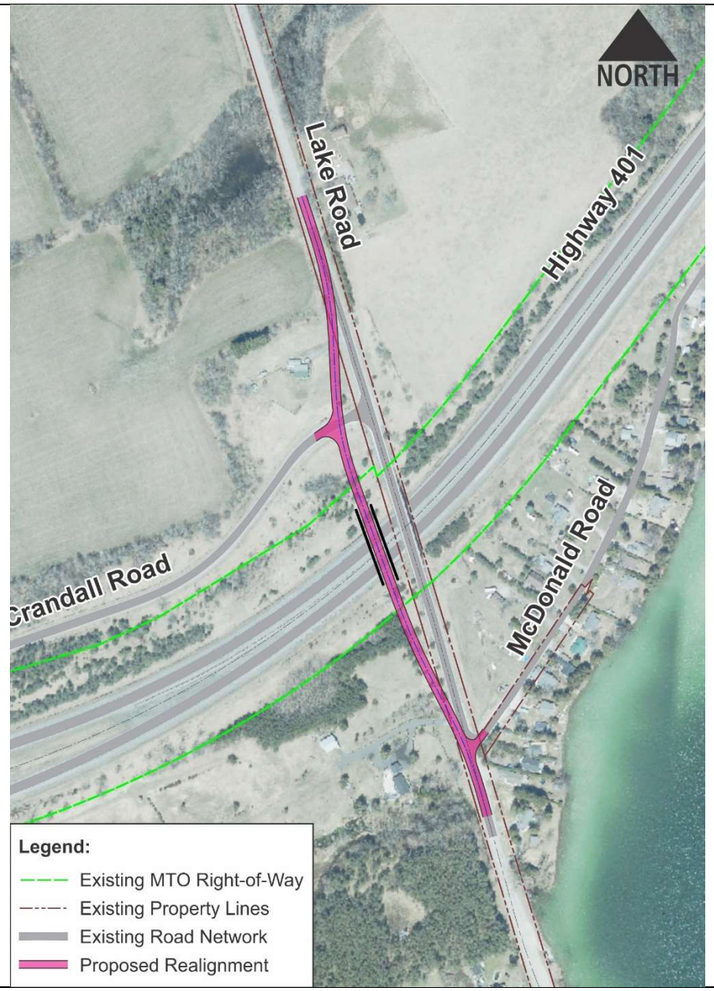
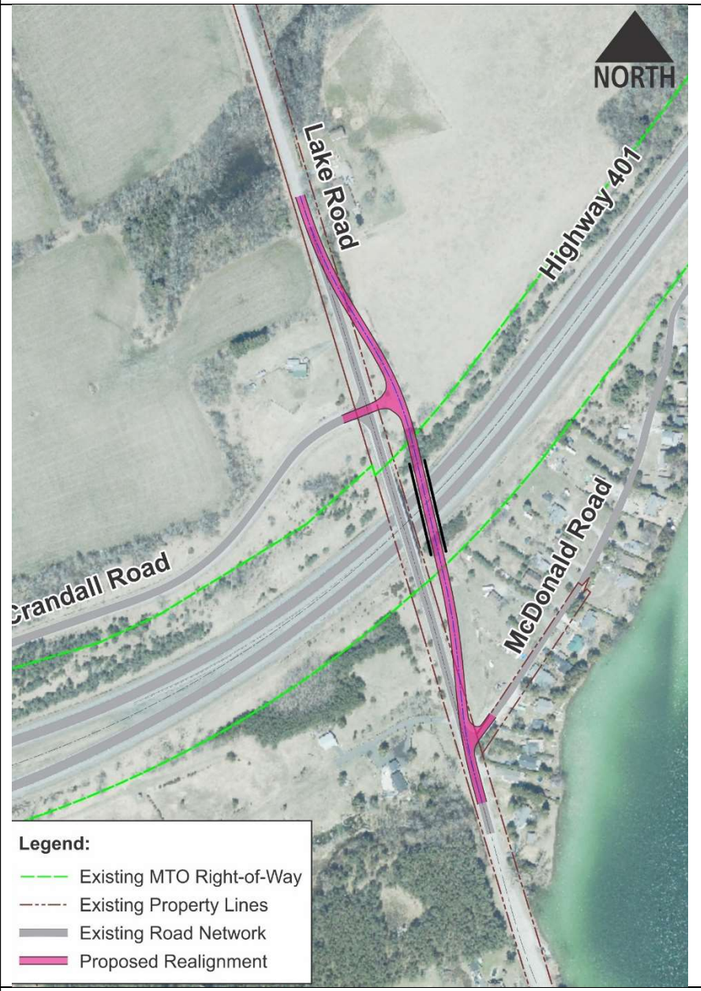
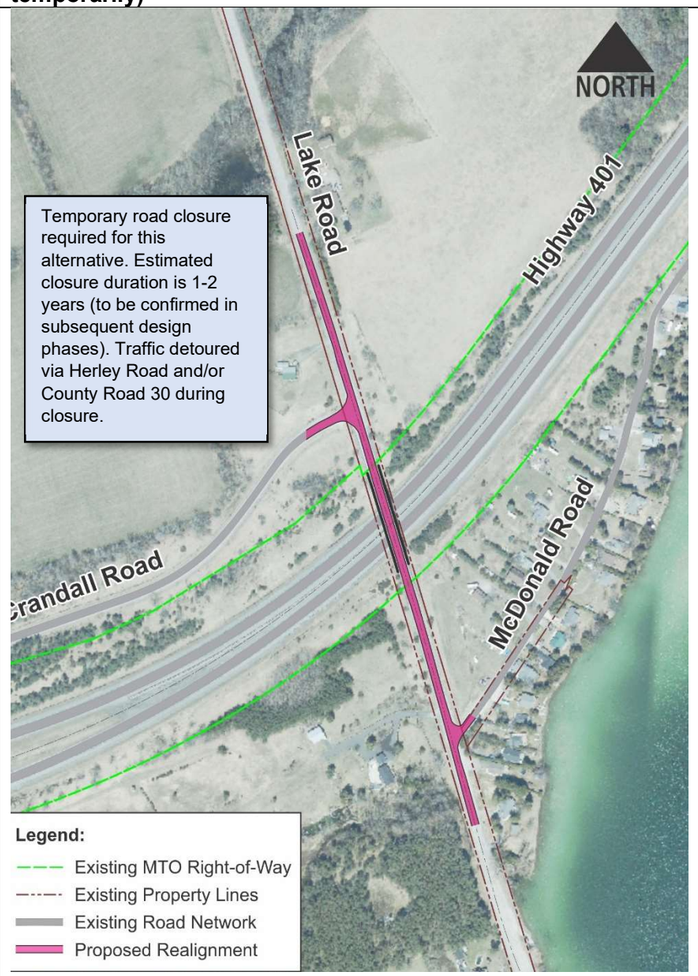
Highway Section	**Sections 4 and 6**
Location	 
Key Features	• Closed median • High erosion potential
Alternative Name	**Alternative 1**
Alternative Description	**Widen outside only and maintain existing median in Interim and Ultimate**
Alternative Schematic	 **Existing**  **Interim - 6-Lane**  **Ultimate - 8-Lane**
Key Advantages	Larger width available for construction staging.
Key Disadvantages	• Greater potential property impacts; • Greater potential impacts to the natural environment; • Higher cost than Alternative 1;

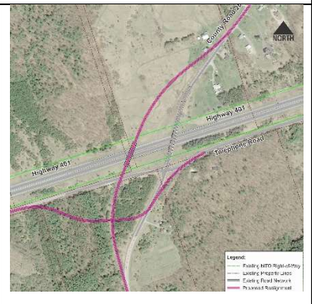
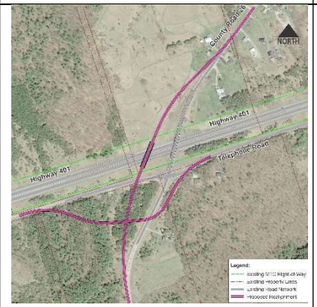
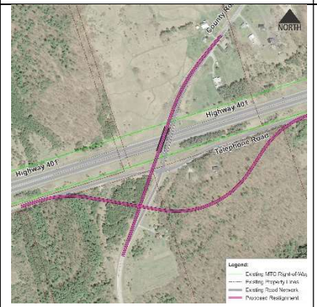
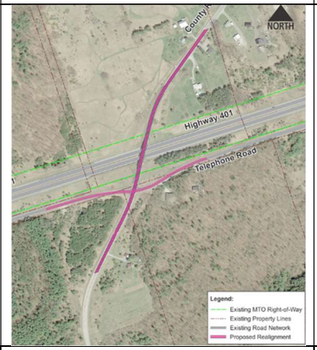
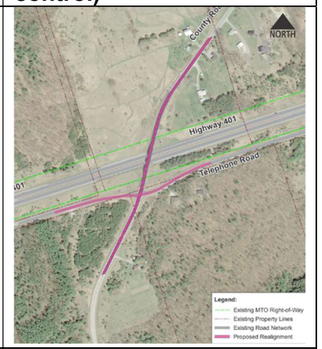
	Larger cuts/fills than Alternative 1.			
Recommendation	**Carry forward**			
Rationale	This alternative is **carried forward as the preferred alternative**. The increase in footprint (and property impacts and environmental impacts) is only marginally greater than Alternative 2, and this alternative provides more space for staging and to complete the required improvements.			
Highway Section	**Section 5**			
Location				
Key Features	• Open median • High erosion potential • Large drumlins on north side • Large grade difference between eastbound and westbound alignments			
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Alternative Description	**Widen inside only**	**Widen inside in the Interim, and widen WB inside and EB outside in the Ultimate**	**Widen to the south (widen eastbound lanes to the outside and westbound lanes to the inside)**	**Widen inside in the Interim and widen outside in the Ultimate**
Alternative Schematic				
Key Advantages	• Minimizes potential property impacts; • Minimizes potential impacts to the natural environment; • Moderate cost; • Minimizes large cuts into the embankment north of the highway. Cuts are smaller than Alternative 4 and similar to Alternatives 2 and 3.	• Smaller potential property impacts (less than Alternatives 3 and 4, greater than Alternative 1); • Smaller potential impacts to the natural environment (less than Alternatives 3 and 4, greater than Alternative 1); • Minimizes large cuts into the embankment north of the highway. Cuts are smaller than Alternative 4 and similar to Alternatives 1 and 3. • Easier to tie into the County Road 30 design (completed under previous EA) than Alternative 3.	• Open median (≥ 22.5 m median) is retained in the Ultimate condition (no median barrier needed); • Minimizes large cuts into the embankment north of the highway. Cuts are smaller than Alternative 4 and similar to Alternatives 1 and 2.	• Open median (≥ 22.5 m median) is retained in the Ultimate condition (no median barrier needed); • Easiest to tie into the County Road 30 design (completed under previous EA).

Key Disadvantages	• Double median barriers required in the Ultimate condition, which are less desirable than an open median (≥ 22.5 m median); • Limited median width does not provide enough space to accommodate a ditch and slope to grade the elevation difference between the eastbound and westbound alignments. A retaining wall would be required to accommodate the ditching and grading in the median.	• Double median barriers required in the Ultimate condition, which are less desirable than an open median (≥ 22.5 m median); • Limited median width does not provide enough space to accommodate a ditch and slope to grade the elevation difference between the eastbound and westbound alignments. A retaining wall would be required to accommodate the ditching and grading in the median; • Relatively high cost due to installation and maintenance of median wall.	• Greater potential property impacts (greater than Alternatives 1 and 2); • Larger potential impacts to the natural environment, including wetland impact (greater than Alternatives 1 and 2); • Moderate cost. • Harder to tie into the County Road 30 design (completed under previous EA) than Alternatives 2 and 4.	• Greater potential property impacts (greater than Alternatives 1 and 2); • Larger potential impacts to the natural environment (greater than Alternatives 1 and 2); • Relatively high cost; • Large cuts into the embankment north of the highway greater than other alternatives.
Recommendation	**Do not carry forward**	**Do not carry forward**	**Carry forward**	**Carry forward**
Rationale	This alternative is **not carried forward** due to double barriers being required in the median which is not desirable from a safety and maintenance perspective. Additionally, a retaining wall would be required in the median because there is a large grade difference between east- and west-bound traffic and limited space in the median to grade the slope and provide a ditch which increases cost and maintenance.	This alternative is **not carried forward** due to double barriers being required in the median which is not desirable from a safety and maintenance perspective. Additionally, a retaining wall would be required in the median to be able to grade the slope which increases cost and maintenance.	This alternative is **carried forward for further study** because the open median can be retained and ditching and grading can likely be accommodated in the median without requiring a wall. The large cuts north of the highway are smaller than for Alternative 4 and similar to Alternatives 1 and 2.	This alternative is **carried forward for further study** because the open median can be retained and ditching and grading can likely be accommodated in the median without requiring a wall. The large cuts north of the highway are slightly greater than Alternative 3, however; it minimizes impacts south of Highway 401.
Highway Section	**Section 6**			
Highway Section	**Section 7**			
Location				
Key Features	• Open median • Mixed low to high erosion potential • Drumlins north of the highway • One existing median turnaround			
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Alternative Description	**Widen inside only**	**Widen one lane in, one lane out (EB and WB)**	**Asymmetrical widening to the south EB – widen 2 lanes out WB – widen 2 lanes in**	**Hybrid of Alternative 2 + 1 (widen in and out, then widen in at the east end)**	**Hybrid of Alternative 2 + 3 (widen in and out, then widen to the south at the east end)**

Alternative Schematic				Refer to schematics from Alternative 2 and Alternative 1	Refer to schematics from Alternative 2 and Alternative 3
Key Advantages	• Minimizes potential property impacts; • Minimizes potential impacts to the natural environment; • Lowest cost; • Minimizes large cuts into the embankments north of highway (near the east end).	• Open median (≥ 22.5 m width) is retained in the Ultimate condition (no median barrier needed); • Emergency median turnarounds, including the one existing turnaround, can be accommodated in the Interim and Ultimate conditions.	• Open median (≥ 22.5 m width) is retained in the Ultimate condition (no median barrier needed); • Emergency median turnarounds, including the one existing turnaround, can be accommodated in the Interim and Ultimate conditions; • Minimizes large cuts into the embankments north of the highway (near the east end).	• Emergency median turnarounds, including the one existing turnaround, can be accommodated in the Interim and Ultimate conditions; • Minimizes large cuts into the embankments north of the highway (near the east end).	• Open median (≥ 22.5 m width) is retained in the Ultimate condition (no median barrier needed); • Emergency median turnarounds, including the one existing turnaround, can be accommodated in the Interim and Ultimate conditions; • Minimizes large cuts into the embankments north of the highway (near the east end).
Key Disadvantages	• Double median barriers required in the Ultimate condition, which are less desirable than an open median (≥ 22.5 m width); • Emergency median turnarounds, including the one existing turnaround, are precluded in the Ultimate condition by the 15 m wide median.	• Large potential property impacts; • Large potential impacts to the natural environment; • High cost; • Greatest cuts into the embankments north of the highway (near the east end).	• Large potential property impacts, including impacts to residential properties south of the highway; • Large potential impacts to the natural environment; • High cost.	• Moderate potential property impacts (less than Alternative 2); • Potential impacts to the natural environment (less than Alternative 2); • For part of the section, double median barriers required for approximately 0.7 to 1.7 km (length to be confirmed) in the Ultimate condition, which are less desirable than an open median (≥ 22.5 m median); • Moderate cost.	• Moderate potential property impacts (less than Alternatives 2 and 3); • Potential impacts to the natural environment (less than Alternatives 2 and 3); • Moderate cost.
Recommendation	**Do not carry forward**	**Carry forward for further study**	**Do not carry forward**	**Carry forward for further study**	**Carry forward for further study**
Rationale	This alternative is **not carried forward** due to double barriers being required in the median which is not desirable from a safety and maintenance perspective and because it would require closure of existing emergency median turnarounds.	This alternative is **carried forward for further study** as it retains the open median and can accommodate existing emergency median turnarounds.	This alternative is **not carried forward** because it has significant property impacts including impacts to residential properties., potential impacts to the natural environment, and a high cost.	This alternative is **carried forward for further study** as it minimizes the large cuts north of the highway, emergency median turnarounds can be accommodated, and it has fewer residential property impacts than other alternatives.	This alternative is **carried forward for further study** as it minimizes the large cuts north of the highway, emergency median turnarounds can be accommodated, it maintains an open median, and it has fewer residential property impacts than other alternatives.

Crossing Road Underpasses Replacement Alternatives				
Crossing Road	**Herley/Durham Road**			
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Alternative Description	**Replace structure to the west of existing**	**Replace structure to the east of existing**	**Replace structure on existing alignment (road closed temporarily)**	**Permanently remove crossing**
Alternative Schematic				
Key Advantages	• Herley Road remains open during construction.	• Herley Road remains open during construction; • Existing Honey Road alignment can be maintained to tie into Herley Road.	• Minimizes potential property and environmental impacts; • More desirable crossing road geometry; • Existing Honey Road alignment can be maintained to tie into Herley Road; • Moderate cost (lower than Alternative 1 and 2); • Maintaining same alignment facilitates construction and staging complexity and reduces construction duration.	• Minimal potential property and environmental impacts; • Lowest cost; • Simplifies construction and staging by eliminating new bridge construction.
Key Disadvantages	• Potential property and environmental impacts; • Access impact on the southwest side; • Less desirable crossing road geometry; • Requires Honey Road realignment to tie into Herley Road; • Higher cost than Alternatives 3 and 4; • Realignment increases construction and staging complexity and construction duration.	• Potential property and environmental impacts; • Less desirable crossing road geometry; • Higher cost than Alternatives 3 and 4; • Realignment increases construction and staging complexity and construction duration.	• Herley Road closure during construction results in temporary out-of-way travel during construction.	• Out-of-way travel to cross Highway 401 due to permanent road closure; • Out-of-way travel to access Township of Cramahe water storage tank northwest of Highway 401 and Herley Road.
Recommendation	**Carry forward**	**Carry forward**	**Carry forward**	**Do not carry forward**

Rationale	This alternative is **carried forward for further study** as it allows Herley Road to remain open during construction.	This alternative is **carried forward for further study** as it allows Herley Road to remain open during construction.	This alternative is **carried forward for further study** as it minimizes property impacts, minimizes potential environmental impacts, reduces construction duration, has a better alignment and lower cost than Alternatives 1 & 2.	This alternative is **not carried forward** due to the travel impacts for emergency services, local residents, and those accessing the water storage tank.
Crossing Road	**Lake Road**			
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**	
Alternative Description	**Replace structure to the west of existing**	**Replace structure to the east of existing**	**Replace structure on existing alignment (road closed temporarily)**	
Alternative Schematic				
Key Advantages	• Lake Road remains open during construction; • Improves geometry of the McDonald Road and Lake Road intersection as compared to existing. Requires extension of McDonald Road at Lake Road to tie in.	• Lake Road remains open during construction.	• Minimizes property impacts; • Minimizes potential impacts to the natural environment; • More desirable crossing road geometry than Alternatives 1 and 2; • Higher compatibility with Highway 401 widening alternatives; • Maintains existing geometry at the Crandall Road and Lake Road intersection. No realignment anticipated to tie in.	
Key Disadvantages	• Property impacts west of Lake Road; • Potential impacts to the natural environment;	• Property impacts east of Lake Road; • Potential impacts to the natural environment;	• Lake Road closure during construction;	

	• Less desirable crossing road geometry than Alternative 3; • Worse geometry at the Crandall Road and Lake Road intersection. May require slight realignment of Crandall Road at Lake Road to tie in. • Lower compatibility with Highway 401 widening alternatives.		• Less desirable crossing road geometry than Alternative 3; • Lower compatibility with Highway 401 widening alternatives; • Worse geometry of the McDonald Road and Lake Road intersection as compared to existing. May require slight realignment of McDonald Road at Lake Road to tie in; • Requires extension of Crandall Road at Lake Road to tie in.		• Maintains existing geometry of the McDonald Road and Lake Road intersection.	
Recommendation	**Do not carry forward**		**Do not carry forward**		**Carry forward as the preferred alternative**		
Rationale	This alternative is **not carried forward** as it results in property impacts, potential natural environment impacts, a less desirable crossing road geometry, lower compatibility with Highway 401 widening alternatives, and inferior geometry at the Lake Road and Crandall Road intersection.		This alternative is **not carried forward** as it results in property impacts, potential natural environment impacts, a less desirable crossing road geometry, lower compatibility with Highway 401 widening alternatives, inferior geometry at the McDonald Road and Lake Road intersection, and required extension of Crandall Road.		This alternative is **carried forward as the preferred alternative**. It minimizes property impacts, minimizes potential environmental impacts, provides a more desirable cross road geometry, has higher compatibility with Highway 401 widening alternatives, and maintains existing geometry at the Crandall Road intersection.		
Crossing Road	**County Road 26**						
Alternative Name	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**	**Alternative 7**
Alternative Description	**Replace structure to the far west**	**Replace structure to the west (intermediate)**	**Replace structure to the west of existing (curved structure)**	**Replace structure to the west of existing (straight structure)**	**Replace structure to the east of existing (straight structure)**	**Replace structure on existing alignment (temporary road closure)**	**Replace structure on existing alignment (single-lane traffic control)**
Alternative Schematic							
Key Advantages	• County Road 26 remains open during construction; • Property impacts due to Telephone Road realignment are relatively small (less than Alternatives 3, 4, and 5); • Realignment of Telephone Road through natural area is relatively small; • Existing horizontal curves are improved.	• County Road 26 remains open during construction; • Property impacts due to Telephone Road realignment are relatively small (less than Alternatives 3, 4, and 5); • Realignment of Telephone Road through natural area is relatively small (compared to Alternative 1); • Existing horizontal curves are improved.	• County Road 26 remains open during construction; • Property impacts due to County Road 26 realignment are relatively small; • Existing horizontal curves are improved.	• County Road 26 remains open during construction; • Property impacts due to County Road 26 realignment are relatively small; • Existing horizontal curves are improved.	• County Road 26 remains open during construction; • Property impacts due to County Road 26 realignment are relatively small; • Existing horizontal curves are improved.	• Property impacts due to County Road 26 realignment are minimized; • Existing Telephone Road alignment is maintained avoiding realignment impacts, with modification and/or regarding potentially required to tie into the intersection; • Minimizes potential environmental impacts; • Lowest cost.	• County Road 26 remains open during construction with single-lane, traffic-signal controlled operations; • Property impacts due to County Road 26 realignment are minimized; • Existing Telephone Road alignment is maintained avoiding realignment impacts, with modification and/or regarding potentially required to tie into the intersection; • Minimizes potential environmental impacts; • Higher cost than Alternative 6 but

							lower than all other alternatives.
Key Disadvantages	• Property impacts due to County Road 26 realignment are significant on the northwest side; • Relatively high cost (similar to Alternatives 2 and 3).	• Property impacts due to County Road 26 realignment are large on the northwest side (less than Alternative 1); • Relatively high cost relative to other alternatives (similar to Alternatives 1 and 3).	• Property impacts due to Telephone Road realignment are relatively large (greater than Alternatives 1 and 2); • Significant realignment of Telephone Road through natural area; • Relatively high cost relative to other alternatives (similar to Alternatives 1 and 2); • Curved structure increases complexity of design and construction.	• Property impacts due to Telephone Road realignment are relatively large (greater than Alternatives 1 and 2); • Significant realignment of Telephone Road through natural area; • Moderate cost (less than Alternatives 1, 2, and 3 and greater than Alternatives 6 and 7).	• Property impacts due to Telephone Road realignment are relatively large (greater than Alternatives 1 and 2); • Significant realignment of Telephone Road through natural area; • Moderate cost (less than Alternatives 1, 2, and 3 and greater than Alternatives 6 and 7);	• County Road 26 closure during construction eliminates a key arterial road and access to local facilities; • Maintains existing horizontal curvature;	• Maintains existing horizontal curvature;
Recommendation	**Do not carry forward**	**Carry forward for further study**	**Do not carry forward**	**Do not carry forward**	**Do not carry forward**	**Carry forward for further study**	**Carry forward for further study**
Rationale	This alternative is **not carried forward** as it results in significant property impacts on the northwest side of the crossing, dand is a relatively higher cost.	This alternative is **carried forward for further study** as it allows County Road 26 to remain open during construction, has less property impacts than other alternatives, minimizes the realignment of Telephone Road, and improves the existing horizontal curves.	This alternative is **not carried forward** since the Telephone Road realignment is greater than Alternatives 1 and 2 and has greater environmental impact. It is also moderate in cost relative to other alternatives, and the curved bridge increases the complexity of the design and construction.	This alternative is **not carried forward** since the Telephone Road realignment is greater than Alternatives 1 and 2 and has greater environmental impact. It is also moderate in cost relative to the other alternatives.	This alternative is **not carried forward** since the Telephone Road realignment is greater than Alternatives 1 and 2 and has greater environmental impact. It is also moderate in cost relative to the other alternatives.	This alternative is **carried forward for further study** as it maintains the existing alignment of Telephone Road, and minimizes potential environmental impacts and property impacts.	This alternative is **carried forward for further study** as it allows County Road 26 to remain open during construction, maintains the existing alignment of Telephone Road, and minimizes potential environmental and property impacts. It is also a relatively low cost compared to the other alternatives.