



Memorandum

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Subject: DRIC W-E Parkway
Our comments on URS response letter February 6, 2009 to Dr. I. M.
Weis suggesting lengthening of several tunnel sections

I have reviewed the URS (Mr. Murray Thompson) letter to Dr. Weis of University of Windsor responding to his comments on the Draft Environmental Assessment (EA) report. Although I have not seen the initial letter from Dr. Weis, the URS letter states in part:

“Your suggestion to lengthen several of the tunnel section of the Windsor-Essex Parkway including the tunnels at Cousineau Road/Sandwich West Parkway, St. Clair College, Todd Lane/Cabana Road West, Pulford Street and Spring Garden is noted.”

The URS letter, in the 5th paragraph, then offers several reasons why, in their opinion, there are “certain physical constraints” on tunnel lengths and locations, implying that real tunnels of substantial length, such as the 1 km tunnels PB included in GreenLink Windsor, could not be constructed on the same right of way.

In my opinion, the URS statements on this issue are inaccurate. From Mr Thompson’s letter one can conclude that the reasons for selecting the length of tunnels in the W-E Parkway Alternative are as follow:

- The need for mechanical ventilation for tunnels longer than 240 m
- The impact of air entrainment between consecutive tunnels
- Ramp locations
- Roadway profile
- Geotechnical considerations

- Drainage requirements

I will address each of these issues then I will provide comments on DRIC's rationale of each of the W-E Parkway tunnels as provided in Section 8.2.2 of the Draft EA Report and in the EA Report.

The following are my comments:

- Longer tunnels are technically feasible, constructible, safe, and can be provided economically to protect neighbourhoods and connect communities. This is illustrated by the Windsor proposed GreenLink and the Modified GreenLink solutions in which tunnels over one kilometre long were provided.
- Although tunnels longer than 240 m under NFPA 502 would require mechanical ventilation such as jet fans, our analysis revealed that unventilated tunnel lengths up to 500 m long in certain circumstances are possible under normal traffic conditions. For fire-life safety aspects, faster passenger evacuation means by providing more cross-passages between the two sides of the tunnels would meet NFPA 502 fire-life safety requirements.
- Even with the provision of mechanical ventilation by jet fans, the operating and maintenance costs of the long tunnels are not necessarily higher than those for short tunnels without jet fans. This was illustrated when comparing the W-E Parkway operating and maintenance costs with those of the Modified GreenLink. The comparative evaluation revealed that the annual operating and maintenance cost of the Modified GreenLink, even with its three long tunnels having mechanical ventilation, is less by \$4.5M per year than the W-E Parkway. Furthermore, the life cycle cost of the Modified GreenLink was equal or less than that of the W-E Parkway.
- Our analysis revealed that a separation of two consecutive tunnels by only 80 meters is sufficient to control air entrainment from one tunnel into the subsequent tunnel. Therefore the proximity of one tunnel to the next is not a technical or environmental issue to limit the tunnel lengths.
- Ramp locations and lengths are not constraints for the length of tunnels. In both the GreenLink and the Modified GreenLink solutions ramp locations were maintained as were developed by the DRIC plan. Although at some locations one portal of a tunnel can be restricted due to the presence of an access/exit ramp, the other end is usually not restricted. Furthermore, ramps in and out of tunnels are feasible and constructible. Previous

examples of ramps in and out of tunnels are available. The GreenLink alternative accommodated ramps into and out of the tunnels directly.

- The roadway profile (although not provided in the EA report) should not be a constraint for the length of tunnels. The fact that the area is generally flat and the alignment is depressed, the majority of the length of the depressed highway can accommodate tunnels by decking over the depressed highway. Furthermore, the grades of the depressed highway are in the range of 2% to 3% which is well within the Highway Standards. Steeper grade can also be provided if needed. Again, both GreenLink and the Modified GreenLink accommodated longer tunnels while meeting the Ontario Highway Design Standards.
- Lengths of tunnels are not constrained by the site geotechnical conditions. We have reviewed the geotechnical report prepared by Golder Associates and have used it in our design. Although some of the soils are soft, construction of tunnels in these soils is feasible. The use of slurry walls as proposed by PB and as endorsed lately by DRIC can be used to construct the tunnels in these soft soils. Other more complicated tunnelling projects were constructed in similar soils.
- Drainage requirements will be the same for tunnels or depressed highway. The 100-year design storm can be accommodated whether the alignment is in a depressed highway or in tunnels. In either case pump stations must be provided to handle the potential volume of water. For longer tunnels, the total amount of water to be pumped would be less than that of the open depressed highway.

The following table provides comments on DRIC's rationale on the selection of tunnel locations and lengths as shown in Section 8.2.2 of the EA report Table 8.9:

Based on the analysis in this table and the discussion above we conclude that the rationales provided by Mr Murray to Dr. Weis for the length of the tunnels are incorrect. In our professional opinion longer tunnels are feasible and would provide more benefits. They create more usable land and limit exposure to the roadway. They will limit the impact of traffic noise for users; will increase connectivity; and will enhance cohesion; and will provide more possibilities for use of the land. Longer tunnels provide a greater opportunity for ecological connections and allow for more flexibility and the creation of buffers on the tunnel decks themselves.

EA Report TABLE 8.9 – PARKWAY TUNNEL SECTION LOCATIONS, LENGTHS AND RATIONALE

Location	Length	DRIC's Rationale for tunnel location/length	PB Commentary
Spring Garden	200 m	Maintains connection between Spring Garden residential area and vacant natural area adjacent to E.C. Row Expressway.	Area is hourglass shaped adjacent to E.C. Row westbound off ramp loop. With the construction, only small area might remain natural. We believe that the shape and the size of the remaining area make it un-useful.
		Tunnel length of 200 m provides opportunities for public space and Gateway features to be incorporated in this area; this tunnel is the first tunnel along The Windsor-Essex Parkway as viewed by motorists entering Canada via the new crossing.	Gateway features would apply to any first tunnel. The public space provided is about 4 acres over roadway. Longer tunnel would provide more greenspace above the tunnel which will enhance the Gateway aspects.
		The location and length of this tunnel is constrained by the freeway profile at the west end (profile begins rising from below-grade to above-grade) and the proximity of the Labelle/Bethlehem tunnel to the south.	If the tunnel is moved westwards to merge with the adjacent tunnel, (as proposed by the Modified GreenLink) grades could reduce to less than 2% instead of 3 % and shallower excavation adjacent to the existing roadway ramps in the poor ground would result. This will improve the grade and constructibility of the facility.
Bethlehem / Labelle	240 m	Maintains existing road crossing at Labelle Street/Bethlehem Street.	Not quite true. Service road (Huron Church Road) would split making the junction larger.
		Provides improved connection between Bellewood neighbourhood / Bellewood Park / Bellewood School and Spring Garden / Bethlehem neighbourhoods / Spring Garden Forest / Windsor community trails.	The path trails are essentially footpaths added adjacent to service road and are crossing road.

Location	Length	DRIC's Rationale for tunnel location/length	PB Commentary
		<p>Tunnel length of 240 m provides opportunities for public space and gateway features to be incorporated in this area; this tunnel is situated at junction of The Parkway and Huron Church Road and is viewed by motorists entering Canada via the new crossing or the Ambassador Bridge.</p>	<p>Tunnel length crisscrossed by roads making the public space above it virtually un-useable.. Again longer tunnel would provide better opportunity for the Gateway and the use of the covered are for public and green spce.</p> <p>Must provide for Marentette Mangin Drain crossing which were not addressed by this scheme. .</p>
Grand Marais Road/Lambton Road	120 m	<p>Maintains existing road crossing at Grand Marais/Lambton. Provides improved connection between Bellewood neighbourhood / Bellewood Park / Bellewood School and Huron Estates neighbourhood and Spring Garden Forest. Tunnel also provides improved connection for existing West Windsor Recreationway trail; presently trail passes under Huron Church Road at Grand Marais Drain; in times of high water flows in the drain, this trail is closed. With The Parkway, this trail will need to be relocated due to changes to Grand Marais Drain structure. Trail will be relocated to allow crossing of The Parkway and service road either via Grand Marais tunnel or Pulford Avenue tunnel.</p> <p>Tunnel length constrained by road profile at south end (freeway is not as deep at Grand Marais drain crossing as other locations) and location of exit ramp to service road as well as service road structure at north end.</p>	<p>The pedestrian trail at this location is interrupted by the Roadway or the street. Unless a pedestrian underpass is provided in an extra cell beneath the roadway at the drain location, the north south trail will be severed (detour to Pulford).</p> <p>New east west trail is provided behind sound wall on south side (link to Pulford). This trail is un-useable.</p> <p>The end of this tunnel is 120 m from the drain, some 6 m below the surface. The present bridge is slightly elevated. Even if one could lower the road by 2 m, the intersection will need to be raised several metres (not suitable for the northbound on-ramp) and the south end of the tunnel would be raised even more. The south end of the tunnel seems too close to the drain.</p> <p>The tunnel does not appear to be limited at the north end since the service road could be on the tunnel instead of on structure. Therefore longer</p>



Location	Length	DRIC's Rationale for tunnel location/length	PB Commentary
			tunnel is possible
Pulford Street	120 m	Provides improved connection between residential area on east side of Huron Church Road / South Windsor Recreation Complex and Huron Estates neighbourhood / Spring Garden Forest.	Gratiot Street is now severed without any connections to existing properties and the future development shown on the plan has no access.
		Tunnel length constrained by road profile at north end (freeway is not as deep at Grand Marais drain crossing as other locations) and location of entrance ramp from service road at south end.	Although the north end is restrained by profile (but note however how much further from the drain this end of the tunnel is than the Lambton Road tunnel end). The ramp at south end does not limit tunnel length. The tunnel can be made longer.
		Tunnel also provides improved connection for existing West Windsor Recreationway trail; presently, trail passes under Huron Church Road at Grand Marais Drain; in times of high water flows in the drain, this trail is closed. With The Parkway, this trail will need to be relocated due to changes to Grand Marais Drain structure. Trail will be realigned to allow crossing of The Parkway and service road either via Grand Marais tunnel or Pulford Avenue tunnel.	Similar to our comments for Lambton Road
Reddock Street	120 m	Provides improved wildlife linkage and new community connection between Oakwood Bush / Oakwood School/Windsor community trails and Spring Garden Forest.	Street access to Lansing Street and Reddock Street (many houses) will be severed. No improved connection. South side is essentially farmland without access across it except at the severed streets.

		Both the freeway and service road pass through this tunnel leaving a road-free connection at the surface.	Problem for Lansing Street and Reddock Street (many houses).
		Tunnel length constrained by service road profile at north and south ends (service road profile rises from 7 m below grade to at-grade at intersections on both sides of tunnel).	Although it is true for the service road the mainline highway could continue in tunnel. Longer tunnel is possible. Stream crossing to be incorporated.
Todd Lane / Cabana Road	120 m	Maintains existing road crossing at Todd Lane / Cabana Road. Provides improved connection between Villa Borghese neighbourhood / Oakwood Bush / Oakwood School and Todd Lane neighbourhood and Spring Garden Forest.	Improved connection (other than parallel footpaths) is not seen. Again the tunnel can be made longer.
		Tunnel length constrained by service road profile at north end and proximity of tunnel to the south.	North/west end is not constrained. PB has proposed a tunnel extending further eastwards.
Huron Church Line	240 m	Maintains an existing road connection for Huron Church Line and the service road.	The proposed modified connection is much slower movement off the service road.
		Provides improved wildlife linkage and improved community connection between Lennon Drain / St. Clair College environmentally sensitive area and Cahill Drain candidate natural heritage site lands/LaSalle Woods / LaSalle community trails.	If the tunnel were extended further east, this might be true. Improved linkage at the present location is marginal at best through strips much narrower than today on the north side. Note that south side is part of farm land today, with woods around the church that is acquired. Lennon Drain crossing to be incorporated and perhaps part of Cahill Drain too.

St. Clair College Entrance	120 m	<p>Maintains an existing road connection for the main entrance to the college and the service road.</p> <p>Provides improved wildlife linkage and improved community connection between St. Clair College environmentally sensitive area/athletic fields and Cahill Drain candidate natural heritage site lands/Windsor Crossing commercial area/LaSalle community trails.</p>	<p>The future connection provides much less linkage than exists today. Longer tunnel provide better connection.</p>
		<p>No residential neighbourhood in this immediate area, but as the main entrance to the college, this area is expected to have a relatively high volume of pedestrian and cyclist traffic. A length of 120 m was considered adequate for meeting the connectivity requirements at this location.</p>	<p>Outlet for Cahill and Wolfe Drains needed. This may be appropriate location.</p> <p>Tunnel could be longer.</p>
Cousineau Road / Sandwich West Parkway	170 m	<p>Maintains existing road crossing at Cousineau Rd/Sandwich West Parkway.</p> <p>Provides improved community connection between St. Clair College and athletic fields / Our Lady of Mt. Carmel School / Kendleton Court and Villa Paradiso neighbourhoods and Heritage Estates neighbourhood / Windsor Crossing commercial area / LaSalle community trails.</p>	<p>The improved connection is the footpaths along each side of the road between Cousineau and St Clair. This is not different than what exists today. No other improvements seen.</p>

		Initially, tunnel extended further west of road crossing; during refinement, tunnel section was shortened by 50 m to enable extension to length of Hearthwood Place tunnel section; length of tunnel sections in this area is constrained by service road profile at east end (service road profile rises from 7 m below grade to at-grade at intersection at Cousineau/Sandwich West Pkwy).	<p>This appears to be a cost-balancing issue to maintain a certain length only of tunnel.</p> <p>Regarding east end of tunnel limitation, see earlier comment about the distance between two consecutive tunnels. The next tunnel need not be located where shown were it not for service road.</p> <p>Service tunnel comment relates only to next tunnel.</p>
		Given the extent of buffer area at west end of tunnel section, a length of 120 m was considered adequate for meeting the connectivity requirements at this location.	Tunnel is 170 m long and could be longer.
Hearthwood Place	165 m	Provides improved wildlife linkage and new community connection between Villa Paradiso and Kendleton Court neighbourhoods / Matthew Rodzik Park / new green space north of corridor and Heritage Estates neighbourhood / Windsor Crossing commercial area/LaSalle community trails.	There is nowhere for wildlife to link; area is created from demolished properties and provided with longitudinal footpaths. Path on south side trapped behind noise walls and existing properties.
		Both the freeway and service road pass through this tunnel leaving a road-free connection at the surface.	The paths are to nowhere with links at ends.

		Initially, tunnel for freeway and service road were the same length. The length of tunnel section is constrained by service road profile at west end (service road profile rises from 7 m below grade to at-grade at intersection at Cousineau / Sandwich West Pkwy). East limit of tunnel constrained by proximity of at-grade intersection at Montgomery Dr. and entrance ramp to freeway. During refinement, freeway section of tunnel extended westerly by 55 m to reduce aesthetic impacts to adjacent residences.	Freeway extension not shown on plans and is shown to match service road. Longer tunnel on the mainline Highway is possible.
Howard Avenue	120 m	Maintains existing road crossing at Howard Avenue.	Tunnel now west of a bridge at Howard Avenue
		Provides improved community connection between Shadetree neighbourhood / Matthew Rodzik Park / new green space north of corridor and Oliver Estates neighbourhood / LaSalle community trails.	The trail across this green area shortens the distance between Oliver estates and Howard Avenue to the north, but all these connections must go via Howard Avenue. No improved community connection, it is shorter than today.
		Tunnel length of 120 m provides opportunities for public space and Gateway features to be incorporated in this area; this is the first tunnel along the Parkway as viewed by motorists entering Windsor/LaSalle via Highway 401 or Highway 3.	tunnel is about 240 m long and could be longer. Gateway feature can be improved with a longer tunnel.

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