5. ALTERNATIVE SOLUTIONS FOR RIVERSIDE DRIVE

The Riverside Drive VIP project is being conducted as a Schedule C Municipal Class Environmental Assessment. Phase 2 of this process requires that "*alternative solutions*" be identified "*to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input*".[1] It is also important to stress that the EA process requires that alternative solutions to be considered in an EA be "*reasonable and feasible solutions".*

The following lists the the types of measures available to the City to address the Riverside Drive Transportation Problem Statement (see Section 3.5) and opportunities statement (see Section 3.6). Those solutions considered to be reasonable and feasible for the Riverside Drive context are described and assessed in this section:

1. Do Nothing
2. Roadway Capacity
3. Traffic Volume
4. Posted Speed
5. Traffic Calming
6. Traffic Management and Operations
7. Intersection Traffic Control
8. Cycling Facilities
9. Walking Facilities
10. Roadway Geometry

Alternative measures to implement each of these types of solutions are described in the following sections, and evaluated in Section 6 of this ESR to determine which specific measures should be retained for further consideration in the Phase 3 Design Concepts presented in Section 7 of this ESR.

5.1 The Do-Nothing Alternative

The Class EA process requires the inclusion of a Do-Nothing alternative as a baseline on which to compare the impacts and benefits of other alternatives. In the case of Riverside Drive, this project first established that it is not reasonable to expect that nothing will be done to improve the design, safety and streetscape problems along this Scenic Drive. Therefore, even a Do-Nothing alternative is expected to:

- Maintain the existing travel lanes along the Drive (no widenings or reductions);
- Provide for resurfacing and reconstruction of road sections in poor condition for the same purpose, use and capacity to meet minimum City and other applicable standards;
- Reconstruct curbs and sidewalks where required within the existing road right-of-way;
- Implement site or area-specific streetscape improvements within the right-of-way that are not part of another project; and
- Implement required utility modifications.

1 *Section A.2.3 Phase 2-Alternative Solutions, Municipal Class Environmental Assessment, June 2000*

According to the Municipal Class Environmental Assessment, these types of project would be considered as Schedule A works that can be implemented without an Environmental Assessment. They do not include any changes to the road function or use (i.e. no new bike lanes or sidewalks), no traffic calming and no methods of diverting traffic from Riverside Drive. These projects are considered as basic solutions for Riverside Drive, but are not considered to be a preferred solution as they do not address the problem statement dealing with traffic volume, speed and safety, and therefore do not satisfy the objective of this project to:

> *provide an improved transportation corridor that will serve the needs of the transportation system and area growth over a 20-year period.*

5.2 Roadway Capacity Alternatives

5.2.1 ALTERNATIVE #1 - RIVERSIDE DRIVE CAPACITY ENHANCEMENT

Rationale - As a Scenic Drive, the Windsor Area Long Range Transportation Study (WALTS) set a planning capacity for Riverside Drive of 400 vehicle/lane/hour, compared to 800 for a Class II Arterial such as Wyandotte Street or Tecumseh Road, and 650 for a Class I Collector such as Crawford Avenue or Drouillard Road. The 400 vehicle capacity was established by the City to reflect the special Scenic Drive and Civic Way role of Riverside Drive, compared to other major routes which are assigned higher capacities.

The Riverside Drive capacity equates to a daily two-way volume of 8,000 vehicles on two lane sections, and 16,000 on the four lane section in the downtown. As reported in Section 3.3.1 of this ESR, the comparison of daily traffic volumes recorded along Riverside Drive against this planning capacity shows that the entire length of Riverside Drive is currently capacity-deficient, even the four-lane section. Once again, the main reason for this condition is that the planning capacity of Riverside Drive has been significantly reduced to reflect its role as a Scenic Drive and Civic Way, and this responds well to input from Riverside Drive residents that traffic volumes are too high.

The WALTS study also forecast future traffic volume in the Windsor area roadway network to 2016. It concluded that the two lane sections of Riverside Drive would remain deficient throughout the planning period if strategic enhancements are not made to key links in the roadway network, along with Transportation Demand Management initiatives to reduce growth in Single Occupant Vehicle use in the City. Roadway capacity enhancements evaluated and eventually recommended in WALTS **did not include** any proposed widening to any portion of Riverside Drive. Rather, improved east-west traffic flow in north Windsor was provided through proposed capacity improvements to portions of Wyandotte Street and Tecumseh Road, in association with traffic calming along Riverside Drive.

Impact Assessment – Widening strategic two-lane sections of Riverside Drive to four through lanes would require extensive property acquisition and/or property impacts within the required right-of-way, depending on the final cross-section provided with a minimum travel lane width of 13.2 m (4 x 3.3 m lanes) to 16.2 m (if 2 x 1.5 m bike lanes are added). Exact locations for such widenings would be determined based on; 1) availability of existing right-of-way, 2) compatible abutting property such as public parkland on the north side of the Drive or industrial lawns, and 3) the existing traffic volumes and degree of resulting capacity deficiency. Examples of candidate sections for widening to four through lanes are from Devonshire Road east to George Avenue through the Walkerville industrial area and Alexander Park area, and from Campbell Avenue to Bruce Avenue along Centennial Park in the core area.

KEY IMPACT CONSIDERATIONS – CAPACITY ENHANCEMENT:

Positive Impacts	Negative Impacts
• Increased roadway network capacity in the core area.	• Traffic volume growth and reduced level-of-service attributed to enhanced capacity; • Economic impact of property acquisition needed to achieve enhanced lane capacity; • Economic impact of capital costs to provide associated engineering features (i.e. north side embankment works); • Direct social impact on abutting low density residential property and public parkland; • Direct impact on landscaping and street trees.

Conclusion - Enhancing the vehicle capacity of Riverside Drive by widening any section from one to two through lanes per direction will increase the attractiveness of Riverside Drive to accommodate more through traffic. This is contrary to the primary purpose of Riverside Drive as a Scenic Drive, with the following operational and design characteristics according to Section 7.2.6.5. of the Windsor Official Plan:

i. Scenic Drives shall be designed to carry moderate volumes of predominantly passenger traffic adjacent to major scenic areas … at low to moderate speeds;

Other City policy documents also discourage widening Riverside Drive. For example, the Central Riverfront Implementation Plan (CRIP) states:

Riverside Drive should not be widened for additional through lanes of auto traffic.

As a result, the Capacity Enhancement Alternative is considered to be contrary to City objectives for Riverside Drive as a Scenic Drive, and the objectives of this EA specifically for Riverside Drive, and has been **screened out from further consideration** in this EA**.**

5.2.2 ALTERNATIVE #2 - RIVERSIDE DRIVE CAPACITY REDUCTION

Rationale – Proposals that could reduce the capacity of Riverside Drive through the downtown from the current four through lanes to two lanes have been made in two related planning documents:

- The Bicycle Use Master Plan (BUMP) proposes adding on-road cycling lanes to Riverside Drive between Crawford Avenue and Lincoln Road, thereby requiring removal of an existing travel lane to provide the 3 m of bike lane width (2 x 1.5m), or widening of the right-of-way onto the north side parkland to maintain four travel lanes; and

- The Central Riverfront Implementation Plan (CRIP) includes a Riverside Drive Pedestrian Promenade that would also require more space on Riverside Drive. This Promenade is not only intended as an important streetscape design opportunity that helps to unify the six km long core area waterfront, but it is also an important pedestrian safety element considering the lack of sidewalks, guide rails or fencing along the north side of Riverside Drive in the core between Goyeau Street and Glengarry Avenue, essentially in front of the Windsor Casino.

Impact Assessment - This alternative solution to reduce Riverside Drive capacity in the core to two lanes will then add 3 m of on-road curb bike lanes (2 x 1.5m) to the right-of-way, plus space remaining to incorporate the proposed Pedestrian Promenade. This should allow for a centre turn lane to be included within the Riverside Drive, that could be shared with a future trolley line linking Walkerville to the City Centre as has been proposed in the past.

To measure the traffic operations impact of reducing Riverside Drive in the core from four travel lanes to three lanes, two three-lane cross-section scenarios were modelled between Glengarry Avenue and Walker Road with existing AM and PM peak hour volumes. The results of this analysis are included in the Specific Traffic Assessments included in **Technical Appendix Volume 1**, and conclude that the elimination of a lane would significantly increase delay for eastbound traffic at Glengarry during the PM Peak hour from 56 seconds to 373 seconds. Eastbound delay at Aylmer would increase slightly during that period. AM Peak hour operations would not be affected. This traffic impact analysis indicates that either lane reduction scenario on Riverside Drive would increase intersection delays especially for eastbound traffic during the PM peak period.

KEY IMPACT CONSIDERATIONS – CAPACITY REDUCTION:

Positive Impacts	Negative Impacts
• Increased roadway space available for alternative travel modes (i.e. bike lanes, sidewalks); • Reduce travel speeds through the core.	• Level-of-service reduction and capacity deficiencies along Riverside Drive through the core based on planning capacity vs. the projected traffic volume; and • Increased traffic volume with associated level-of-service deficiencies on Wyandotte Street with the reduction in core area Riverside Drive capacity.

Conclusion – Since reduction of Riverside Drive corridor capacity is expected to result in travel delays on the Drive, and contribute to capacity deficiencies on Wyandotte Street from traffic diverted from the Drive, capacity reduction on Riverside Drive is **screened out from further consideration** in this EA**.** The conclusion for the Roadway Capacity Alternative is to maintain the existing travel lane capacity along the entire length of Riverside Drive in this EA.

5.3 Traffic Volume Alternatives

5.3.1 ALTERNATIVE #1 - TRAFFIC DIVERSION

Rationale - In addition to being a Scenic Drive, most of Riverside Drive west of Crawford Avenue and east of Strabane Avenue is a residential street providing direct driveway access to abutting residential dwellings. The challenge here is that as a residential street, a typical traffic management practice is to discourage non-local traffic from travelling through the “neighbourhood” by actively or passively encouraging through traffic to use alternative routes in the roadway network. Conversely, as a Scenic Drive, Riverside cannot be treated purely as a residential street since the very nature of a Scenic Drive is to accommodate external traffic visiting the area. In order to minimize conflicts, and balance neighbourhood and non-local traffic, consideration should be given to ways of separating local residential and waterfront destination traffic from the commuter through traffic.

Impact Assessment – One question about actively diverting traffic from Riverside Drive to Wyandotte Street is whether Wyandotte has the capacity to accommodate this added volume while retaining an acceptable level-of-service. An analysis of this question was conducted in March 2006, as reported in the Specific Traffic Assessments included in **Technical Appendix Volume 1**, and indicates that Wyandotte Street has excess capacity to handle additional traffic diverted from Riverside Drive. In this alternative, most studied intersections will continue to operate at or near existing levels of service and vehicle delay. Changes to signal timings and/or localized on-street parking restrictions may be required at some intersections to mitigate increases in delay, particularly during the PM peak hour. However, if peak period parking (7-9 A.M. and 4-6 P.M.) were prohibited throughout the corridor, no other operational changes would be required to maintain existing levels of service or delay on Wyandotte Street.

Based on this conclusion on Wyandotte Street capacity, four (4) basic ways of diverting through traffic away from the primarily residential sections of Riverside Drive East have been identified, involving both passive and obstructive measures:

PASSIVE MEASURES

1. **Improve Alternative Route Operational Capacity** - Wyandotte Street East can accommodate more through and destination traffic with an improved level of service using Traffic Operations Management, including on-street parking restrictions during the peak A.M. and P.M. periods to add lane capacity. This approach follows WALTS study recommendations, and could be implemented without EA approval as it does not involve reconstruction or traffic calming. However, owing to the need to provide a corresponding supply of additional off-street parking, this action would require an associated parking delivery plan, as well as extensive consultation with BIAs and other stakeholders along Wyandotte Street East. As explained in Section 5.7.1 of this report, the addition of westbound left turn lanes on Riverside Drive to enhance diversion to Wyandotte is also warranted at two additional intersections (Strabane and Florence – see Section 5.6.1).

   Although not passice measures, other planned roadway network improvements by the City will also encourage and serve traffic diversion from Riverside Drive. These measures include the extension of Wyandotte Atreet East to Banwell Road, and McHugh Street east of Lauzon Road as documented in the East Riverside Secondary Plan and Windsor Official Plan Volume II. These diversion opportunities are further described in Section 7.4 and 7.5 of this ESR.

2. **Traffic Calming –** Using a series of appropriate features along Riverside Drive East can reduce motorist speeds as described further in Section 5.5, thereby increasing the attractiveness of Wyandotte Street as an alternative route for through traffic. If the capital cost to install such features is less than $1.5 million, Schedule B requirements of the Class EA would have to be followed including the opportunity to request a Part II Order. If more than $1.5 million, the Schedule C requirements would require the completion of Phase 1 through 5 of the Class EA process as conducted in this Riverside Drive VIP EA project.

OBSTRUCTIVE MEASURES

3. **Traffic Diverters** – These would be located at strategic intersections on Riverside Drive East to physically force the direction of traffic from Riverside Drive East onto intersecting streets where they are installed. Continuous east-west traffic flow on Riverside Drive would be obstructed at these locations, and affected traffic flows would be diverted from Riverside Drive East to nearby Wyandotte Street via short sections of major connecting streets. Diverters are typically installed at intersections to deter motor vehicles, but gaps can be included in the diversion features to accommodate cycling and pedestrians. In fact bikeway boulevards, one of the options to accomodate cycling on Riverside Drive as discussed further in Section 5.8, employees traffic diverters to make cycling through an area easy, but difficult for motorists. Examples of candidate intersections where diverters could be considered on Riverside Drive East include:

   a. *Drouillard Road which is a Class I Collector and experiencing poor LOS operations at the Riverside Drive intersection;*

   b. *Strabane Avenue;*

   c. *Pillette Road which is a Class II Arterial;*

   d. *Jefferson Blvd. which is a Class II Arterial; and*

   e. *Lauzon Road which is a Class II Arterial.*

4. **Directional or Full Traffic Closures** - Directional closures force approaching vehicles from one direction to turn onto the intersecting street as shown at right. Full closures would involve placement of a full barrier extending the entire width of Riverside Drive at strategic locations to obstruct all motor vehicle traffic from continuing along the street in the east-west direction. Gaps could be provided for cyclists and pedestrians, but the function of Riverside Drive East would change from that of a continuous east-west route, to essentially a series of local access roads for major sections of land use.

KEY IMPACT CONSIDERATIONS – REDUCE TRAFFIC VOLUME:

Positive Impacts	Negative Impacts
• Wyandotte Street has extra capacity to accommodate diverted traffic;	• Potential economic impacts on businesses from any major net reduction in Wyandotte Street parking supply;
• Wyandotte Street and McHugh Street will be extended east to increase their traffic catchment area.	• Social impact of reduced emergency response times resulting from diversions (unless passable by emergency vehicles including ambulances, fire and police);
	• Social impact of restricted residential access on portions of Riverside Drive;
	• Social Impact of restricting access to public parkland on sections of Riverside Drive;
	• Cultural impact of changing the continuous natural of Riverside Drive.

Conclusion – Owing to the need to maintain, as a Scenic Drive, public access along Riverside Drive for local resident and external traffic, to maintain the historic alignment of the road along the riverfront and to avoid shifting traffic volume problems and deficiencies to Wyandotte Street East, it is recommended that any traffic diversion solutions that involve obstructive measures be **screened out from further consideration** in this study. This also conforms to the City's new Traffic Calming Policy, and concerns raised by many Riverside Drive residents and other members of the public about access restrictions on the Drive. However, passive traffic diversion measures should be **retained for further consideration** in the design concepts.

5.3.2 ALTERNATIVE #2 - TRANSPORTATION DEMAND MANAGEMENT (TDM)

Rationale - One solution to the problem of growing traffic volumes on Riverside Drive is to achieve an overall reduction in the amount of single occupant motorized vehicles (SOV) using the Drive. This would involve Transportation Demand Management (TDM) measures designed to shift a reasonable amount of SOV trips to other travel modes, most notably transit, cycling and walking, and to increase the average vehicle occupancy along the road through various types of ride-sharing programs.

Impact Assessment - The role of TDM in the Windsor area transportation system has already been established by the WALTS plan, with the following TDM measures recommended for Windsor:

- Transit supportive measures to double transit ridership between 1996 and 2016 from 3% of all daily trips in the City to 6%. This will be implemented primarily by Transit Windsor through implementation of their new Transit Ridership Growth Plan and Long term Master Plan, and by the City through their administration of more transit-supportive urban growth, density, land use and urban design policies and guidelines;
- Trip-reduction measures including telecommuting and shorter work trips that will reduce the amount of home-based trip making by 10% between 1996 and 2016;
- Intensification and mixed use development policies that also result in reduce home-based trip making;
- Design pedestrian, cycling and transit-supportive subdivisions;

- Manage the supply and cost of municipally-owned long term parking; and
- Support flexible work hours to shift peak travel times.

KEY IMPACT CONSIDERATIONS - TDM:

Positive Impacts	Negative Impacts
• Reduction in growth of auto trip-making and related decreases in roadway deficiencies; • Ability to maximize existing roadway network capacity.	• Length of time for measures to take effect to improve Riverside Drive traffic conditions; • Economic impact of increased investment in transit and cycling systems.

Conclusion - Since these TDM measures are already part of overall city transportation planning in Windsor, they need not apply specifically to Riverside Drive within this Class EA. As a result, it is recommended that the City continue to support, encourage and incorporate appropriate TDM measures as a type of associated transportation solution for Riverside Drive separate from this EA.

5.4 Posted Speed Alternatives

The maximum speed on Riverside Drive is currently posted at 50 km/h, while Section 3.3.3 of this ESR reports that the 85th percentile speed calculated from a 2005 speed survey results ranges from 8 to 15 km/h over the posted speed limit. One alternative to reduce travel speeds is through the self-enforcing impacts of appropriate traffic calming on Riverside Drive discussed next in Section 5.5. Another method noted by some members of the public is to reduce the posted speed on Riverside Drive to 40 km/h.

5.4.1 ALTERNATIVE #1 – REDUCE POSTED SPEED LIMIT

Based on industry practice, 50 km/hr is a reasonable speed limit for Riverside Drive, assuming it is effectively enforced. A 40 km/hr limit is more applicable to local residential streets. A 40 km/hr zone along all of Riverside Drive would increase driver frustration, while adding zones of 40 km/hr speed limits would tend to confuse motorists. These concerns are supported by the Windsor Police Service and their opinion that there would be no advantage to a speed limit reduction. Furthermore, traffic conditions during the day dictate travel speed, making it difficult to speed. At night when volumes are naturally lower, a posted 40 km/hr speed would affect drivers will to alternatively travel at 50 km/hr while not penalizing speeders.[2]

5.5 Traffic Calming Alternatives

Rationale - According to the City of Windsor's new Traffic Calming Policy approved in the fall of 2005, traffic calming is defined as:

"the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users".

Although the Traffic Calming Policy does not include guidelines to install traffic calming measures on a Scenic Drive such as Riverside Drive, the potential for traffic calming on Riverside Drive East specifically between Walker Road and Jefferson Blvd. is addressed in Section 4.6 of WALTS.

2 *Meeting held with Inspector Cliff Lovell, Windsor Police Services, June 23, 2005*

Furthermore, the City's new Traffic Calming Policy states that traffic calming is intended to alleviate safety issues relating to high traffic volumes and high traffic speeds on roads that are not designed nor intended to handle such traffic issues. This intension is especially appropriate in addressing the Transportation Problem Statement on Riverside Drive, and input provided by the public in this Class EA.

Description – Although Scenic Drives are not included for traffic calming in the new policy, traffic and land use conditions along the two lane sections of Riverside Drive from Rosedale Avenue to the east City border would qualify for these sections of Riverside Drive for "Level 3 Calming", including horizontal deflections and signage.

According to the Policy, no types of vertical deflections are considered as appropriate traffic calming devises for Collector Roads. Also, traffic diversion cannot involve the installation of any obstructions (i.e. diverters, closures) on Collector Roads. Since Scenic Drives are not included in the policy, these and other types of traffic calming measures should be considered as alternatives in this ESR.

It is also noted that different traffic calming measures have different benefits and disbenefits, as reported in the Canadian Guide to Neighbourhood Traffic Calming. Rather than considering the effectiveness of individual traffic calming measures, the Guide advises that the cumulative effects of the measures in combination be considered. Therefore, this EA will evaluate traffic calming effectiveness on Riverside Drive based on a complete calming program rather than the effectiveness of individual measures.

5.5.1 ALTERNATIVE #1 - VERTICAL DEFLECTIONS

The use of subtle vertical deflections should be considered for appropriate locations on Riverside Drive. The use of the following types of vertical deflections would be extremely beneficial in demarcating and improving the safety performance of pedestrian crossings of the street, enhancing streetscape designs and reducing traffic speeds, all without the physical impacts and emergency response delays associated with more severe vertical deflection measures, most notably speed humps which are not considered for any section of Riverside Drive:

1. **Raised Crosswalks** – are marked pedestrian crossings of a street at an intersection or mid-block location, constructed at a slightly higher elevation up to 80 mm or 3 inches than the abutting street surface. They are 2.5 metres wide extending across the street, with 2 m ramps on either side to the street surface.

   Speed reduction impacts of raised crosswalks is considered substantial based on their slight vertical deflection of passing vehicles, and enhanced visibility with pavement markings, coloured pavement and notice signage.[3]
   Raised crosswalks are typically not installed on emergency access routes unless supported by the local emergency services, so support would be required for any possible application on Riverside Drive.

3 *Canadian Guide to Neighbourhood Traffic Calming, ITE/TAC, December 1998*

2. **Raised Intersections** – are intersection areas, including the crosswalks, constructed at a higher elevation than the abutting street. They offer a similar vertical deflection as raised crosswalks, but across the entire raised flat intersection surface. This larger footprint makes raised intersections more appropriate for emergency vehicles since the tactile impact on a vehicle is not as noticeable as across a narrow raised crosswalk. The speed reduction potential of raised intersections is considered minor owing mainly to this more subtle vertical deflection, although the treatment has streetscape design and enhanced visibility advantages.

3. **Textured Crosswalks** – are not raised, but use surface materials to improve the crosswalk visibility and tactile identification. Textures may be created using concrete pavers, stamped concrete or exposed aggregate concrete. Unlike raised crosswalks and intersections, the textured crosswalk is not elevated above the abutting street surface so has little impact on traffic speed, but the enhanced visibility makes the drivers more aware of the crossings.

Vertical deflection measures can also include **speed humps**, speed tables and other associated “hump” designs. Owing to their increased tactile impacts, the needs of emergency response services along Riverside Drive and that the Windsor Traffic Calming Policy limits their use to local streets only, they have been screened out from consideration on Riverside Drive. **Rumble Strips** were also screened out from consideration owing to noise impacts on residential streets, and because they are intended more as a warning devise than for speed reduction.

5.5.2 ALTERNATIVE #2 - HORIZONTAL DEFLECTIONS

Horizontal deflections change the width, alignment and/or side friction of the travel lanes on the street to reduce vehicle speeds and encourage through traffic to use alternative routes. The Windsor Traffic Calming Policy allows for their use in Level 2 and 3 calming programs. Some measures involve the traffic diversion alternatives discussed previously in Section 5.4.1 of this ESR. Others involve major deflection or narrowing measures such as **chicanes, curb extensions and on street parking** that offer minor traffic reduction potential, and typically require more curb-to-curb width than most of the Riverside Drive right-of-way can provide without property acquisition, especially on Riverside Drive East east of Strabane. Most of these treatments are not suited to the traffic speed and volume characteristics of Riverside Drive, as compared to local residential streets.