3.0 FUTURE NEEDS & ALTERNATIVE SOLUTIONS

The FUTURE NEEDS & ALTERNATIVE SOLUTIONS presented in this study section address the Windsor area's transportation system needs over the next 20 years. Existing system deficiencies were previously identified in Section 2.0. Combined with the forecasted traffic conditions and related deficiencies presented in this Section, they represent the "Need and Justification" for considering future system improvements. Identifying the various network improvement alternatives available to address these needs was conducted in response to Phase 2 of the Class EA Process For Municipal Roads. This includes the Do-Nothing approach, Transportation Demand Management (TDM) strategies and Structural alternatives to meet the area's transportation system needs to the year 2016.

3.1 FUTURE TRANSPORTATION SYSTEM NEEDS

3.1.1 MODEL CALIBRATION

The traffic forecasting model replicates traffic movement across the designated screenlines used in this Study (see Section 2.3). These screenlines are actual lines in the study area over which passing traffic can consistently be measured. Screenlines have been used to compare observed and predicted traffic volumes. The results show that the Windsor area model more than adequately replicates 1996 traffic counts.

This important conclusion was reached by calibrating the model. Calibration is the iterative process of applying the model's inputs to make the predicted results match observed actual conditions as closely as possible. The reliability of the model outputs is highly dependent on the quality of the calibration.

The Windsor area model was calibrated in four steps, with the results of each summarized as follows. The results show that the Windsor area traffic forecasting model is replicating actual traffic volumes very accurately.

Trip Generation

The household travel survey data indicated that the PM peak hour trip generation was about 0.31 person trips per person. With a study area population of 253,181 in 1996, this would yield a PM peak hour trip table that contained about 78,500 person trips, excluding through trips. The expanded survey data yielded 78,244 trips.

The first step in the calibration process was to check that the number of trips being generated using the trip generation rates and equations were comparable to the observed data. Comparisons of observed and predicted trips by travel mode were made. The data concludes that nearly all Peak Hour observed person trips by all modes were predicted by the trip generation model.

Travel Mode Split

The next step in calibration is to establish what modes of travel the study area population is using. The person-trip tables developed from survey data, and included in **Technical Appendix 9** show the following PM Peak Hour mode split characteristics:

Table 3.1 - PM Peak Hour Mode Split Characteristics

Travel Mode	Characteristic
Auto	Trips were well distributed across all of the 24 planning analysis zones in the Windsor area.
Walking	This form of transportation is primarily oriented to short distance travel internal or self-contained within each analysis zone (or neighbourhood).
Transit	The transit trip table shows a pattern of transit use to and from large employment areas, namely the Ford and Chrysler auto plant areas in East Windsor (zone 4) and the Essex plants (zone 10), the University (zone 16), downtown (zone 1) and fringe areas such as Walkerville (zone 18).
School Bus	Also primarily self-contained short trips within analysis zones.
Bicycle	The trip table identifies most trips being to and from the University area ,

Trip Distribution

The next step in calibration is to determine if the model can predict the relative attractiveness of two given zones in a manner that reflects the way Windsor area residents chose to travel. This first requires the use of trip impedance functions in the model that will determine a person's probability of making a trip. As in most smaller to medium sized urban centres such as the Windsor area, the main impedance function influencing how people travel is a combination of trip length and trip time.

The Home-Based-Work (HBW) trip is the least sensitive to this impedance since it is a "required" trip. The Home-Based-Other (HBO) and Non-Home-Based (NHB) trips tend to be more sensitive to trip length and time since many of these trips are more "optional". The resulting impedance functions for these three trip types were used as

WINDSOR VISION IN MOTION WINDSOR AREA LONG RANGE TRANSPORTATION STUDY

Figure 3.1
2016 Do-Nothing Network Level-of-Service
(Capacity Deficiencies)

Stanley Consulting

inputs to the trip distribution modules within the SYSTEM II forecasting model. The resulting PM Peak Hour trip predictions made by the model were distributed among the 14 Super Analysis Zones (SAZ) shown on Figure 2.5, and compared with actual observed trips. The overall percentage distribution of PM Peak Hour trips between the 14 SAZ, as a comparison of actual observed to predicted, is shown on Table 3.2.

Table 3.2 - Comparison of PM Peak Hour Observed and Predicted Trips

DESTINATION

Observed

SAZ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	**Total**
1	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	**4%**
2	0%	1%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**4%**
3	1%	2%	15%	4%	3%	3%	0%	1%	0%	0%	1%	0%	1%	0%	**32%**
4	0%	0%	3%	4%	1%	1%	0%	0%	0%	0%	0%	0%	1%	0%	**11%**
5	0%	0%	3%	1%	5%	3%	0%	0%	0%	0%	0%	0%	1%	0%	**14%**
6	1%	1%	4%	1%	3%	5%	1%	1%	1%	0%	0%	0%	1%	0%	**17%**
7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	**2%**
8	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	**4%**
9	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	**3%**
10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
11	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**2%**
12	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
13	1%	0%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	0%	**6%**
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
Total	**5%**	**4%**	**31%**	**11%**	**15%**	**15%**	**2%**	**5%**	**3%**	**0%**	**1%**	**0%**	**7%**	**0%**	**100%**

Predicted

SAZ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	**Total**
1	2%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**4%**
2	0%	1%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**5%**
3	1%	2%	18%	3%	3%	3%	0%	1%	0%	0%	0%	0%	1%	0%	**32%**
4	1%	0%	3%	4%	1%	1%	0%	0%	0%	0%	0%	0%	1%	0%	**12%**
5	0%	0%	3%	1%	5%	3%	0%	1%	0%	0%	0%	0%	0%	0%	**13%**
6	1%	0%	3%	1%	3%	7%	0%	1%	1%	0%	0%	0%	0%	0%	**18%**
7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**3%**
8	0%	0%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%	0%	0%	**4%**
9	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	**3%**
10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
11	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**1%**
12	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
13	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	**6%**
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
Total	**5%**	**4%**	**30%**	**12%**	**14%**	**16%**	**2%**	**5%**	**3%**	**0%**	**0%**	**0%**	**7%**	**0%**	**100%**

This shows a very close or identical percentage distribution of observed to predicted trips in each SAZ zone (note that SAZ 10 and 12 are "empty" zones used as place holders in the modeling process in case further zones were to be added).

Detailed trip table comparisons of actual and percentage trip distribution by mode are included in **Technical Appendix 9.** In absolute terms, these tables show that the HBW trips were predicted within 11% of the observed, while HBO and NHB were within 14.5 % and 8.5% respectively. This is considered to be a very good level of prediction, meaning the relative trip generation rates used in the model and the input data were good. and the model predicts how Windsor area residents currently travel.

Assignment

The final step in the calibration process compares the observed and predicted traffic volumes by screenlines. Screenlines were used as control features to compare observed and predicted traffic volumes. A screenline is a cordon, established at a major barrier to travel like a rail lines and major streets where there is a limited number of crossing locations, thereby forcing all traffic through these points.

The resulting observed-to-predicted percentage assignment of trips to screenlines is shown on Table 3.3 (the screenlines are shown on Figure 2.2). The table also includes the maximum allowable deviation at screenlines based on transportation planning standards.[1] It shows that all the Windsor area screenlines fall well within the acceptable variation range, and that the model assigns travel to screenlines well.

Table 3.3 - Screenline Calibration

	Southbound/Eastbound				Northbound/Westbound				Total				Peak Direction			
Screenline	O	P	% Diff.	MAD	O	P	% Diff.	MAD	O	P	% Diff.	MAD	O	P	% Diff.	MAD
100	2907	3160	9%	25%	2299	2377	3%	27%	5206	5537	6%	21%	2907	3160	9%	25%
200	6635	7254	9%	19%	5554	5006	-10%	20%	12189	12260	1%	15%	6635	7254	9%	19%
300	8394	8386	0%	17%	8168	7266	-11%	18%	16562	15652	-5%	14%	8394	8386	0%	17%
400	2788	2999	8%	26%	2927	2985	2%	25%	5715	5984	5%	20%	2927	2985	2%	25%
500	4542	3262	-28%	22%	4989	4888	-2%	21%	9531	8150	-14%	17%	4989	4888	-2%	21%
600	5670	4967	-12%	20%	4913	5071	3%	21%	10583	10038	-5%	16%	5670	4967	-12%	20%
700	12303	11749	-5%	15%	11181	10702	-4%	16%	23484	22451	-4%	12%	12303	11749	-5%	15%
Average			**-3%**	**21%**			**-3%**	**21%**			**-3%**	**16%**			**0%**	**20%**
Total	43239	41777	-3%	10%	40031	38295	-4%	10%	83270	80072	-4%	8%	43825	43389	-1%	10%

MAD = Maximum Allowable Deviation

[1] *Source: NCHRP Report 255, Transportation Research Board, Washington, DC.*

3.1.2 FUTURE TRAVEL DEMAND

Future travel demand is dependent upon, as a minimum, the magnitude and location of future trip generators. The model developed for the Windsor area depends on the population and employment distribution to estimate trip productions and attractions.

Demographics

Table 3.4 summarizes the total population and employment forecasts at the SAZ level based on the planning work previously summarized in Section 2.1.2. Over the planning period from 1996 to 2016, the population is expected to grow by 20%, most of which is expected surrounding the City of Windsor in suburban LaSalle (SAZ 1), Tecumseh/St. Clair Beach (SAZ 8), Maidstone (SAZ 9 and Sandwich South (SAZ 7). Employment growth is distributed throughout the City SAZ zones, as well as in LaSalle and Maidstone. The overall change in employment is in the order of 26%. (NOTE: SAZ 10 and 12 were purposely left blank, while forecasts in 11,13 and 14 are for external zones to the WALTS area):

Table 3.4 - Population and Employment Growth

	Population			Employment		
SAZ	1996	2016	Growth	1996	2016	Growth
1	20566	32400	11834	1595	5287	3692
2	15450	15195	-255	7257	11613	4356
3	75898	78565	2667	59417	64862	5445
4	28008	35507	7499	9279	12790	3511
5	48058	51542	3484	9969	14348	4379
6	30280	32418	2138	27240	30949	3709
7	6618	10500	3882	5099	8791	3692
8	16533	28005	11472	6723	7295	572
9	11770	18900	7130	1737	5420	3683
10						
11						
12						
13						
14						
	253181	303032	49851	128316	161355	33039

Origin-Destination Matrices

Translating population and employment growth into trip-making is shown in Tables 3.5, 3.6 and 3.7 by trip type and SAZ.

Table 3.5 - PM Peak Hour Auto HBW Trip Growth

	Productions			Attractions		
SAZ	1996	2016	Growth	1996	2016	Growth
1	780	2296	1516	1664	2596	932
2	170	247	77	610	621	11
3	5979	5825	-154	4621	4749	128
4	1682	2176	494	1611	2051	440
5	2690	3202	512	3509	3663	154
6	5160	5149	-11	3466	3629	163
7	834	763	-71	602	960	358
8	510	505	-5	1001	1678	677
9	768	2110	1342	908	1448	540
10	0	0	0	0	0	0
11	860	761	-99	302	292	-10
12	0	0	0	0	0	0
13	1325	1175	-150	2438	2497	59
14	26	23	-3	52	48	-4
	20784	24232	3448	20784	24232	3448

The total growth in HBW trips is about 17%, which is similar to the growth in population. SAZ 3 stands out as being the major attracter of HBW trips with about 20% of the 2016 trips destined to this area. HBW origins are primarily emanating from the SAZ 3 and SAZ 5 and 6 where new employment growth is focused.

Table 3.6 summarizes the growth pattern for HBO trips. As with the HBW trips, SAZ 3 will be the major generator (30%) and attracter (8%) of the growth. SAZ 3 account for about 28% of the future HBO productions.

Table 3.7 summarizes the growth pattern for NHB trips. Unlike the home-based trips discussed above, these trips are related to employment growth. In this instance, SAZ 3 again plays the highest role in producing NHB trips.

Table 3.6 - PM Peak Hour Auto HBO Trip Growth

	Productions			Attractions		
SAZ	1996	2016	Growth	1996	2016	Growth
1	1656	2615	959	1821	2870	1049
2	1082	1083	1	1056	1052	-4
3	9025	9379	354	9812	10197	385
4	3512	4458	946	3400	4377	977
5	4660	4857	197	3960	4151	191
6	3582	3820	238	4055	4352	297
7	466	740	274	385	621	236
8	1593	2875	1282	1573	2755	1182
9	949	1526	577	751	1228	477
10	0	0	0	0	0	0
11	878	880	2	660	658	-2
12	0	0	0	0	0	0
13	1603	1605	2	1535	1579	44
14	15	15	0	13	13	0
	29021	33853	4832	29021	33853	4832

Table 3.7 - PM Peak Hour Auto NHB Trip Growth

	Productions			Attractions		
SAZ	1996	2016	Growth	1996	2016	Growth
1	483	1635	1152	490	1628	1138
2	550	674	124	508	724	216
3	4943	5550	607	4633	5138	505
4	1362	1985	623	1738	2358	620
5	956	1205	249	1517	2187	670
6	2050	2389	339	1590	1788	198
7	258	272	14	321	327	6
8	387	439	52	503	568	65
9	304	953	649	185	567	382
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	625	639	14	433	456	23
14	0	0	0	0	0	0
	11918	15741	3823	11918	15741	3823

Screenline Demands

Translating the above trip making increases into vehicles on the Windsor area's roadway network shows the areas of concern. Table 1.7 presents a summary of the growth in total demand for crossing the identified screenlines.

Table 3.8 - Growth In Screenline Demand

	Southbound/Eastbound			Northbound/Westbound			Total			Peak Direction		
Screenline	1996	2016	% Change	1996	2016	% Change	O	P	% Change	O	P	% Change
100	2907	3502	20%	2299	3147	37%	5206	6649	28%	2907	3502	20%
200	6635	7743	17%	5554	6540	18%	12189	14283	17%	6635	7743	17%
300	8394	9486	13%	8168	9137	12%	16562	18623	12%	8394	9486	13%
400	2788	2963	6%	2927	3084	5%	5715	6047	6%	2927	3084	5%
500	4542	5238	15%	4989	5651	13%	9531	10889	14%	4989	5651	13%
600	5670	7471	32%	4913	6834	39%	10583	14305	35%	5670	7471	32%
700	12303	13909	13%	11181	12786	14%	23484	26695	14%	12303	13909	13%
Average			**17%**			**20%**			**18%**			**16%**
Total	43239	50312	16%	40031	47179	18%	83270	97491	17%	43825	50846	16%

3.1.3 FUTURE ROADWAY SYSTEM DEFICIENCIES

Total screenline growth in travel demand is an indicator of where problems are anticipated to occur. However, this must be balanced with the available network capacity. For example, if a screenline volume doubled, but it was originally at 25% of the capacity, the future conditions would still only be at 50% capacity.

Based on the available capacity across the Windsor area screenlines, and the forecast increase noted in Table 3.8 above, the forecast volume/capacity (V/C) volumes for the screenlines identified range from 0.32 to 0.68 directionally. This indicates that across each of the screenlines, there is excess capacity.

However, this must be tempered with the knowledge that certain capacity may be of no value to areas where there already is congestion. There are individual links crossing screenlines that have capacity deficiencies, while the entire screenline may show that there is excess capacity. For example, Riverside Drive West east of Crawford is over capacity, but the entire CPR/Crawford Screenline is under capacity. As a result, for the Windsor area deficiency identification is best achieved at the individual link level.

Figure 3.1 illustrates the roadway sections forecasted at the year 2016 to be operating fair to poorly at LOS D, E and F (exceeding 90% of the planning capacity). This is the future Do-Nothing scenario, representing the 1996 network with all capital improvements made only up to that year. It also reflects expected study area growth patterns, related traffic growth forecasts and continuation of existing trip-making characteristics. More detailed EA work may alter or add to these deficiencies.

Figure 3.1 shows that based on the results of the modelling, there are 14 critical roadway sections expected to exceed 90% of the planning capacity for the given link (LOS F). Table 3.9 lists these and other capacity deficient links.

Table 3.9 - 2016 Capacity Deficient Roadway Sections

Street	From	To	2016 LOS
1. Dougall Avenue/Ouellette Avenue	Giles Boulevard	Norfolk Street	F
2. County Road 22 (E.C. Row)	E.C. Row Expressway	Lesperance Road	F
3. Grand Marais Road East	Walker Road	Central Avenue	F
4. Central Avenue	Grand Marais Road East	E.C. Row Expressway	F
5. Howard Avenue	Cabana Road	North Talbot Road	F
6. Malden Road	Todd Lane	Sprucewood Ave	F
7. Matchette Road	E.C. Row Expressway	Armanda Road	F
8. Forest Glade Drive	Lauzon Parkway	Lauzon Road	F
9. Riverside Drive East	Walker Road	Pillette Road	F
10. Riverside Drive West	Huron Church Road	Crawford Avenue	F
11. Seminole Street	Walker Road	Pillette Road	F
12. Tecumseh Road East	Pillette Road	Lauzon Parkway	F
13. Walker Road	Grand Marais Road East	Calderwood Avenue	F
14. Division Road	Lauzon Parkway Extension	Banwell Road	E
15. Grand Marais Road East	Central Avenue	Pillette Road	E
16. Howard Avenue	Division Road	Cabana Road	E
17. Howard Avenue	McDougall Street	E.C. Row Expressway	E
18. Howard Avenue	North Talbot Road	Highway 3	E
19. Jefferson Boulevard	Raymond Avenue	Tecumseh Road East	E
20. Malden Road	Sprucewood Ave	Reaume Road	E
21. Matchette Road	Amanda Road	Sprucewood Ave	E
22. Ojibway Parkway	E.C. Row Expressway	Sprucewood Ave	E
23. Pillette Road	Riverside Drive	S. National Railway Street	E
24. Riverside Drive East	Pilette Road	Lauzon Road	E
25. S. National Railway Street	Pillette Road	Jefferson Boulevard	E
26. Tecumseh Road East	Lauzon Parkway	Forest Glade Drive	E
27. Tecumseh Road East	Walker Road	Pillette Road	E
28. Tecumseh Road West	Huron Church Road	Campbell Avenue	E
29. Division Road	County Road 117	Banwell Road	E
30. Walker Road	Calderwood Avenue	Division Road	E
31. Walker Road	Ypres Boulevard	Grand Marais Road East	E
32. Cabana Road	Huron Church Road	Provincial Road	D
33. Division Road	Provincial Road	County Road 117	D
34. Division Road	Banwell Road	Manning Road	D
35. County Road 22	Lesperance Road	past Manning Road	D
36. Matchette Road	Sprucewood Ave	Reaume Road	D
37. Tecumseh Road East	Ouellette Avenue	Walker Road	D
38. Tecumseh Road West	Campbell Ave	Crawford Ave	D
39. Walker Road	Tecumseh Road East	Ypres Boulevard	D

These deficiencies are forecasted to **occur primarily because of the increase in population in suburban areas within the WALTS study area, especially in the County, and the increased employment primarily within the City**. Increases in WALTS traffic will also be affected by growth beyond the Study area. However, cordon survey results show this area to generate a relatively small amount of traffic into and out of the WALTS area. The overall result is expected to be increased home/work traffic growth to and from areas southwest (LaSalle), south (Sandwich South) and east (Tecumseh/St. Clair Beach) of the Windsor urban area. Deficiencies also assume continuation of existing travel characteristics within the WALTS area over the next 20 years, including a very high orientation to auto use, low use of alternative modes, a high rate of vehicle availability and low auto occupancy.

As shown on Figure 3.1, the traffic forecasts do not indicate any significant screenline or roadway link deficiencies outside of the urban/suburban part of the WALTS study area owing to its predominantly rural nature. However, link or area specific deficiencies may occur in certain suburban areas. An example here would be operational problems on Manning Road in the vicinity of County Road 22 resulting from commercial development in that area.

3.1.4 OTHER FUTURE NETWORK LIMITATIONS

The WALTS roadway network accommodates public transit, cycling and walking (sidewalks), as well as auto traffic. As with autos, how well this network serves the other modes is dependent of how and where capacity and operational deficiencies grow over the next 20 years. The traffic forecasting model assigns future trips by mode (auto, transit, cycling, walking, school bus), but the resulting non-auto trips do not respond to the volume/capacity ratios and Level-Of-Service standards used in determining future roadway capacity deficiencies. Instead, future network limitations for transit, cycling and walking are based on more qualitative assessments.

Public Transit

Public transit operates within a complex socio-economic, geographic and political environment where each condition influences the performance of the system over time. Patterns of transit use will continue to be the product of influences exerted over long periods of time. Socio-economic factors centre on population and employment trends including income levels, sources of employment and the demand for and availability of labour skills. Geographic factors, in the urban transit setting, comprise the urban form of the WALTS study area, its land-use patterns and street layout.

Political factors include municipal policies such as the Official Plan and other statements which guide and influence decision-making in the municipality, and the degree of direction and priority given to those responsible for the delivery of transit service.

At a more operational level, forecasted roadway deficiencies will create limitations for Transit Windsor, characterized mainly by congestion delays and difficulty in meeting headways on the key routes listed below:

- Dougall Route 6 between the EC Row Expressway and downtown via Dougall Avenue/Ouellette Avenue, and on Howard Avenue between Cabana Road and North Talbot Road;
- Crosstown Route 2 on Wyandotte Street East;
- Transway Route 1C along all of Tecumseh Road East;
- Walkerville Route 8 between Ypres Blvd. to south of the EC Row Expressway;
- On sections of the Central 3 and Parent 14 routes that use Grand Marais Road;
- Portions of the Ottawa 4 and Central 3 routes using Seminole Street;
- The Crosstown Route 2X on Riverside Drive east between Strabane Avenue and Walker Road, and;
- portions of Ottawa 4 and the intermittent service Route 1CX off the Expressway using Forest Glade Drive, and off the 1CX Dougall Avenue exit into downtown.

As the WALTS study area continues to grows to the southwest and east, as envisioned by planning policies, development patterns and this study, associated transit service extensions would be expected. Routes along Riverside Drive East and Tecumseh Road East into the Tecumseh/St. Clair Beach may be needed, and along Todd Lane, Malden Road, Matchette Road and/or the Ojibway Parkway to serve southwest growth. Forecasted capacity deficiencies on a number of these key routes would affect the level of transit service available to these new growth areas.

Cycling and Walking

At the WALTS network level, the major roadway corridors of Highway 401, the EC Row Expressway and Huron Church Road, plus rail lines will all continue to be major barriers to the extension of cycling and walking routes in the area. In terms of specific routes, heavy traffic volumes and congestion on roadways generally limit the usability of these routes for non-motorized transportation. However, the City's Bicycle Use Development Study wisely avoids most major thoroughfares in designating these routes. As a result, forecasted roadway deficiencies shown on Figure 3.1 are not expected to impact on bikeway and recreationway development and use, except on:

- the Grand Marais Recreationway and Grand Bikeway in the vicinity of forecasted roadway deficiencies on Grand Marais Road and Walker Road, and;
- the Forest Glade Bikeway east of Lauzon Road.

Street layouts in new subdivisions can also act as barriers to walking and cycling. Circuitous streets and dead-end cul-de-sacs make it more difficult to get around efficiently by bicycle or as a pedestrian. In contrast, the street grid network provides more direct access opportunities.

Other barriers for cyclists in Windsor can include some poorly maintained roadway surfaces, gravel shoulders that could be paved for cyclists, drainage ditches and lack of bicycle parking and storage. More generally, pedestrians and those with mobility aids can be hindered by:

- the lack of ramps along curbs in appropriate locations;
- lack of adequate sidewalks;
- barriers that are intended to restrict motor vehicle access but may also restrict those with mobility aids;
- limited number and location of crosswalks, and;
- priority at signalized intersections for motor vehicles over pedestrians crossing the street.

Another limitation to future non-motorized transportation in the WALTS area is the lack of continuous routes to the east and southwest of the Windsor recreationway and bikeway system. As the suburban area continues to expand as envisioned in this Study, the need for bikeway and recreationway extensions into the Tecumseh/St. Clair Beach area is expected from the Ganatchio Trail Recreationway, East Recreationway and Forest Glade Bikeway. To the southwest, connections with the Turkey Creek Recreationway, West Recreationway and West Bikeway may be desirable.

One final but important limitation to non-motorized transportation is the lack of route systems immediately southeast of the City. While “major utility/multi-purpose linear corridors” are planned for growing Sandwich South industrial/commercial areas east of the Airport, no bikeway or recreationway extensions have been planned to date. The abandonment of the CSX rail line from the south may create new trail opportunities in this area.

Cross-Border Transportation

The future travel demands forecasted in the WALTS area for this study are based on 1997 cross-border infrastructure and crossing characteristics gained through WALTS study surveys. Alternative transportation networks developed for this study, and described in Section 3.3 of this Report, include scenarios of future cross-border traffic increases. The extent of this cross border traffic volume increase will dictate associated impacts on the WALTS area roadway network.

Cross-border growth at the Ambassador Bridge is limited by the infrastructure and operations at the Bridge itself, and by the capacity of Huron Church Road to connect this traffic with the EC Row Expressway, Highway 3 and Highway 401. In the higher growth scenarios for cross border traffic, roadway deficiencies would be expected on Huron Church Road, along with operational deficiencies at key crossing intersections at Tecumseh Road West, the EC Row Expressway and Todd Lane/Cabana Road. Forecasted traffic volumes and impacts resulting from increased bridge traffic scenarios is further discussed in Section 3.3.2.

In terms of the Detroit/Windsor Tunnel, surveys conducted during this study confirmed that it caters largely to passenger commuter and local commercial traffic. The main limitation to future growth of this traffic will be the Tunnel plaza’s operational capacity, and the capacity of downtown streets to connect the Tunnel with the WALTS roadway system.

Other Transportation Modes

Although the WALTS study is not intended to specifically analyze the operations and future limitations of the areas rail, marine and aviation system, the following comments can be made:

Rail

- cross-border rail movements at Windsor are limited by the rail tunnel which cannot handle double-stacked domestic containers;
- the use of rail is limited by the Windsor areas capability to accommodate inter-modal containers;
- changes in transporting motor vehicles and parts by truck could significantly reduce rail transport through Windsor;
- the London-Windsor leg of the Toronto-Windsor passenger service is particularly vulnerable to low usage and resulting subsidy cuts;
- federal funding of grade separations is unlikely, leading to further problems of rail/roadway conflict and delays on major streets.

Aviation - Integrating air service with the WALTS roadway network is limited by existing and future forecasted capacity deficiencies on Walker Road and Division Road, which are the main routes linking the airport terminal and business areas with the City. The extension of Jefferson Boulevard south through the airport property to Division Road would also improve access to the City from proposed business development in the east airport development area. It would also provide an alternative to Walker Road as a north-south airport access route.

Marine - The operational capacity of marine activities along the waterfront, related either to industrial ports or recreational marinas, is in part influenced by the capacity of roadways serving these sites. At the Port of Windsor, no roadway deficiencies are forecasted on the main routes to this area, namely Russel Street, Sandwich Street, the Ojibway Parkway and the EC Row Expressway. To the east, at marine operations along Riverside Drive East, future access limitations may stem from capacity deficiencies being forecasted for Wyandotte Street East. Along with this would be associated intersection congestion problems at the main north-south roads linking to the waterfront, most notably at George Street, Pillette Road and Jefferson Boulevard.

Marine facilities should also link conveniently with pedestrian and cycling routes to provide a continuous multi-modal waterfront movement opportunity.

3.2 POTENTIAL TRANSPORTATION NETWORK SOLUTIONS

Transportation network improvements are generally provided in two distinct ways as shown on Figure 3.2. Demand-Side or **Non-Structural Improvements** involve measures and strategies that attempt to change travel behaviours to make better use of the transportation systems. Supply-Side or **Structural Improvements** such as roadway widenings or extensions increase the supply of transportation infrastructure.

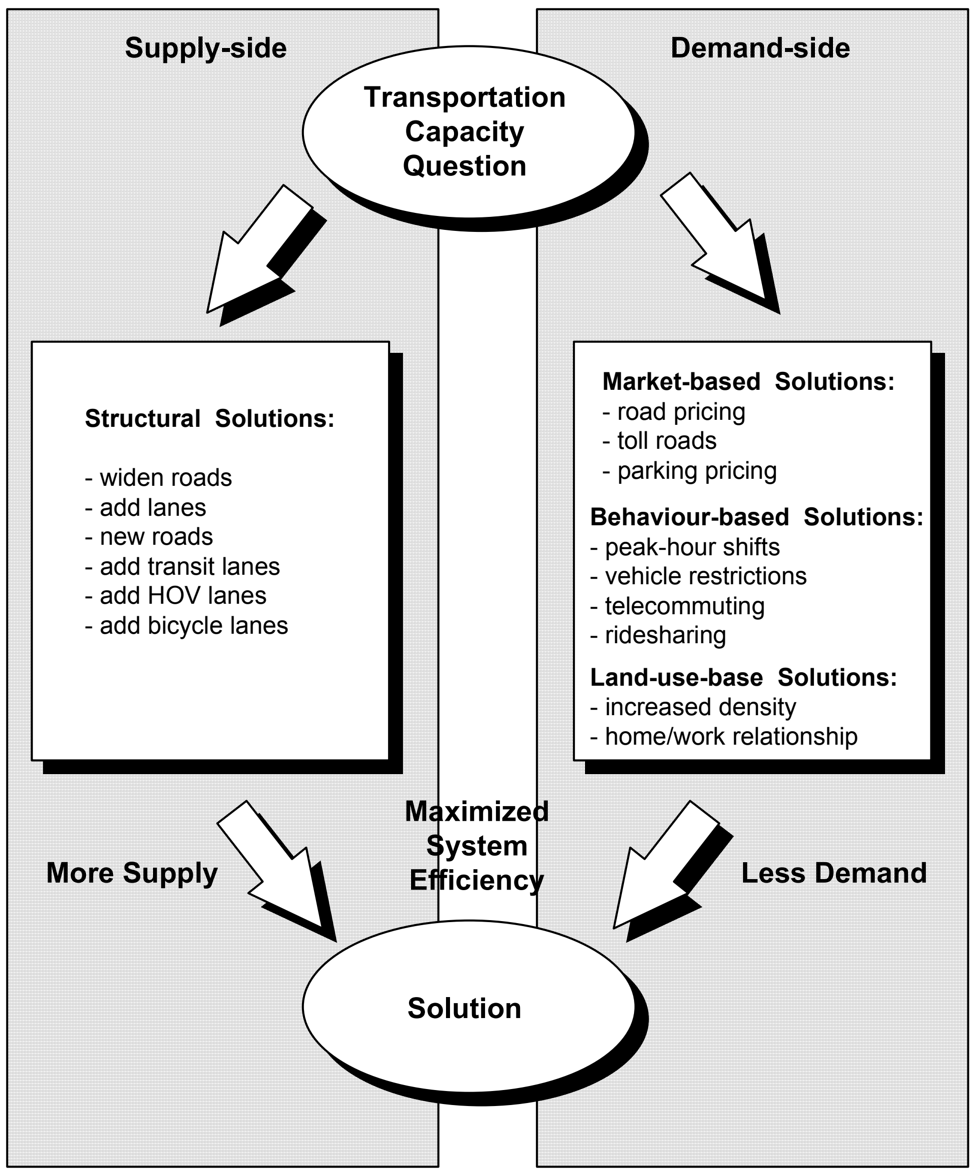


Figure 3.2: Transportation System Improvements

Alternative non-structural improvements to roadway network deficiencies, by definition, do not involve structural improvements such as roadway widenings, extensions or operational improvements. The non-structural improvements centre more on how the transportation system is used, and how travel characteristics can be altered to eliminate roadway deficiency problems. This does not mean that non-structural alternatives are cost-free. Significant investment may be required by the local government, the public and the private sector to initiate non-structural solutions dealing, for example, with improved transit service, expanded cycling and walking facilities or promotion of increased ride-sharing.

3.2.1 CONSIDERING SOLUTIONS WITHIN THE CONTEXT OF THE CLASS EA

A Transportation Master Plan, such as carried out by the WALTS study, does not focus on any one particular transportation problem or solution. According to the provinces Class EA For Municipal Roads, the scope of a Master Plan is broad. It includes an analysis of overall systems in order to recommend a network of future improvement plans and strategies to be implemented over an extended period of time.

The Class EA Process recognizes roadway capacity deficiencies as an important basis for considering the need for new road construction, widening and operational improvements. Tied to this is the associated operational capability of other modes, most notably transit and cycling. Transportation network deficiencies and limitations have been documented as part of the WALTS Planning Framework (Interim Report No. 2), and the subsequent forecasting of future needs.

In a Master Plan, alternative solutions to meet these existing and future needs are not evaluated individually. The Master Plan is based on a series of specific project and strategy recommendations, so alternative actions are evaluated as part of a larger transportation network. The individual projects within the selected network will require further assessment as part of the Class EA Process, but the Phase 1 and 2 "Need and Justification" for each project in the selected network will be satisfied by the Master Plan.

3.2.2 POTENTIAL TDM STRATEGIES

Non-structural improvement strategies collectively involve Transportation Demand Management (TDM), more recently termed Mobility Management. They focus on the single-occupant automobile because of growing social concerns about growth in automobile use, and associated costs dealing with the environment, public safety, congestion, infrastructure and economic viability. According to Environment Canada, vehicle traffic in Canada is expected to double in the next 30-35 years, with associated impacts on urban travel, pollution, accidents, land needs and public costs.[2]

Transportation agencies in the US are embracing TDM, or Mobility Management, in response to the Intermodal Surface Transportation Efficiency Act (ISTEA). This federal legislation mandates a multimodal planning process and allows for increased flexibility in the use of transportation-related funding. There is no similar federal or provincial program supporting TDM in Canada.

Irrespective of this, TDM is an essential component of transportation master planning and the Environmental Assessment process. It considers ways of changing travel demand, time and mode so that more efficient use can be made of existing transportation infrastructure, and the impacts of traffic growth can be reduced. TDM strategies fall into three basic categories:

- Market-Based Strategies
- Behaviour-Based Strategies and
- Land Use-Based Strategies

Refer to **Technical Appendix 10** for a full review of the basic TDM strategies now being used within each of these categories, including an evaluation of their applicability within the Windsor area context.

The applicability of any TDM strategy in any given city context is strongly influenced by city size, travel distances/costs and existing traffic conditions. These all have a major bearing on whether and how non-structural TDM solutions are used. Some strategies respond well to large, complex transportation infrastructure where introduction of new technology has a practical role to play. In other settings, the degree of transportation congestion, and associated public concern, can result in support for controversial measures. However, in most cases, not implementing these solutions is generally influenced by:

- a lack of public concern about traffic conditions, costs and impacts;

[2] *Alternatives to the Automobile (What's Happening Now and Why), Environment Canada Workshop, 1996.*

- low political priority;
- unavailability of funds and resources;
- no proven experiences or information of effectiveness from comparable cities;
- infrastructure and travel costs to the public, and;
- private sector disinterest.

With these realities in mind, a more specific summary of non-structural TDM effectiveness, limitations and recommendations considered appropriate for the Windsor area is provided on Table 3.10. This shows that only a select number of TDM measures are expected to be potentially effective in altering travel characteristics, and this is where the emphasis should be placed over the next 20 years. Also, no one strategy alone can significantly alter travel characteristics. A package of appropriate strategies suited to Windsor area conditions is needed, in association with appropriate structural roadway improvements as discussed in the next section.

Table 3.10 - Effectiveness of TDM Measures

Strategy	Effectiveness		Costs		Implementation		Recommended
	Extent	Impact	To Users	To Society	Ease of Administration	Public Acceptability	yes/no
Market-Based							
Peak Hour Road Pricing	Broad	Great	Great	None	Moderate	Poor	No
Toll Roads	Broad	Great	Great	Great	Moderate	Poor	Potential Yes
Increase Auto Costs	Broad	Moderate	Great	Moderate	Easy	Poor	No
Increase Long-Term Parking Costs	Broad	Great	Great	None	Easy	Poor	Yes
Behaviour-Based							
Shift Peak Travel Hours	Variable	Minor	None	None	Moderate	Moderate	Yes
Telecommute	Broad	Minor	None	None	Moderate	Good	Yes
Restrict Vehicle Use	Variable	Minor	Great	None	Hard	Poor	No
Intelligent Vehicle Systems	Narrow	Minor	Great	Moderate	Hard	Moderate	No
HOV Lanes	Variable	Moderate	None	Great	Hard	Moderate	No
Transit-Priority Systems	Variable	Moderate	None	Minor	Hard	Moderate	Yes
Ride-Sharing	Narrow	Moderate	None	Minor	Hard	Good	Yes
Land-Use-Based							
Increase Residential Density at Strategic Locations	Broad	Moderate	None	Minor	Moderate	Moderate	Yes (1)
Improve Home/Work	Broad	Minor	None	Moderate	Moderate	Moderate	Yes (1)

(1) Long term potential only

3.2.3 TRANSIT SERVICE AS A TDM SOLUTION

Future WALTS area road network deficiencies will negatively affect the operating speed of Transit Windsor vehicles. A number of key transit routes use roads where deficiencies are expected. Any routes having difficulty meeting running time in peak hours would experience further vehicular traffic and congestion during peak hours, particularly at critical intersections. This will negatively impact on the efficiency of future peak hour transit operations.

The impact on off-peak operations is more difficult to estimate. However, it must be assumed that there would be some impact on these services, and that the routes traveling along the key corridors (Tecumseh, Wyandotte, Dougall/Ouellette) could require an increase in running time, or a change in route configuration with a resulting need for additional resources. Quantifying these resources and associated costs would be subject to a more detailed transit operational review, and an analysis of alternative transit routing and service delivery options.

For the purposes of the WALTS study, two modal split alternatives will be evaluated for public transit based on recent ridership trends, current performance and future issues (see Section 1.3.4):

- **Continuation -** of the existing role of public transit in the community, wherein the existing modal split level of 3% would be maintained or marginally increased to 4%. This scenario would be characterized by the maintenance of the existing level of service, walking distances and travel times.
- **Increased** - role for Transit, with a modal split target doubling to 6% by the year 2016. This target would require increased levels of policy support, transit-supportive measures and an increase in financial support in order to provide the basis for a reasonable expectation of success in achieving the 6% target.

A 6% modal split target, to be reached by the year 2016, represents a potentially realistic goal to achieve, and was chosen for consideration in this Study. Specific actions and strategies necessary to achieve this target by 2016 include:

- Evaluate opportunities to redesign the number of transit routes in order to reduce associated resource requirements;
- Improve service frequencies (increase headways) on all routes in peak hours;
- implement transit priority measures such as signal priorities, turn restrictions for automobiles and bus-only passing lanes at key intersections, and along critical

road segments in order to minimize impact on transit route running times, and/or;

- undertake structural roadway improvements to minimize the effects of increased traffic congestion on transit route running times.

Improved transit system operations can represent either an alternative to, or complement other non-structural system improvements, especially Market-Based and Behavior-Based. However, because of the currently low rate of transit use in Windsor now (3%), and the auto-convenient nature of the City, analysis in this Study shows that doubling ridership to the 6% mode split target **will not eliminate the future roadway deficiencies** being projected by the year 2016. As a result, transit-supportive strategies are recommended to complement other structural and non-structural strategies, thereby ensuring the Windsor area's transportation network will operate to the desired level-of-service over the Study timeframe.

In terms of **Market-Based strategies**, public transit ridership can be improved in 3 basic ways:

1. Pricing incentives with flexible fare options and affordable, attractive fare levels;
2. Employer-based tax or other financial incentives to encourage employees to use transit, and;
3. Marketing initiatives including programs, promotion and partnerships with local business to promote the use of public transit.

Behavior-Based strategies can also focus on the benefits of transit use. Increased transit use represents an effective alternative to automobile use, and therefore can assist in limiting the growth in auto-based trips, and the need for additional roadway space. However, attracting people to use public transit, particularly in small and medium-sized cities like Windsor where auto travel is convenient, is very difficult to achieve. This requires a high degree of commitment from all sectors of the community to provide both an attractive service which is effectively marketed to the public, and disincentives to the use of the private automobile.

Finally, transit buses are already experiencing delays, particularly in the downtown area, due to traffic congestion at a number of locations. Eliminating on-street parking during peak transit periods on key routes creates additional transit capacity. Changes either to signal phasing in the downtown area primarily, or with intersection capacity at certain locations, are also needed to improve the on-time performance of the transit system today. Therefore, in association with the above-noted non-structural improvements, a number of road network deficiencies identified for the year 2016 also need to be resolved through structural improvements that will also benefit Transit Windsor. The more prominent improvement locations are listed as follows, and will be considered in the subsequent evaluation of structural alternatives:

- Ouellette Avenue between the EC Row Expressway and the downtown for Routes 6, 1C, ICX, 1A, 3,4 and 2X;
- Wyandotte St. East between Drouillard Rd. and Prado Place for Routes 2, 2X ;
- Tecumseh Rd. East between Walker Rd. and Lauzon Rd. for Route 1C and 4, and;
- Walker Rd. between Tecumseh Rd. east and Lappan Ave. for Route 8.

3.2.4 POTENTIAL STRUCTURAL SOLUTIONS

While non-structural solutions must be considered as per the Class EA Process, they do not always have the capability of solving major transportation network problems within required timeframes. As a result, the Class EA Process also includes the evaluation of structural, or built solutions involving:

- **New Road Construction To:**

  - provide congestion relief on existing road systems;

  - shorten travel distances between two points;

  - provide access to a new location, and;

  - accommodate growth and development

- **Existing Road Widening Improvements including:**

  - widen existing driving surfaces;

  - change grade and/or cross-section;

  - provide additional traffic lanes;

  - add widened curb lanes or exclusive bicycle lanes, and;

  - add/replace operational equipment (i.e. traffic signals).

- **Divert Traffic to other Existing Roads**

  - traffic calming techniques

The selection of structural network solutions to be used in building alternative transportation networks for the WALTS area will rely upon three sources of information:

Approved Environmental Study Reports

These ESR's involve specific roadway improvement projects that have been approved and placed in the City's 5-year capital forecast, but as yet have not been constructed. There are seven (7) such projects to be considered in alternative WALTS roadway networks, as will be further described in Section 4.2 of this Interim Paper. While each project has already been selected to solve a particular congestion or operational problem, the focus of the WALTS study is to determine the cumulative magnitude of benefit these projects will have on the overall study area network over the next 20 years.

STRIPS Projects

This study can refer to the City's Strategic Roadway Improvement Priorities to identify further structural improvement opportunities. The 1997 STRIPS rankings include 56 specific link or intersection improvements needing attention in the City.

Other Potential Projects

Past studies and STRIPS analyses over the past 10 years have identified a number of other potential structural roadway improvements for the Windsor area. Most involve potential roadway widenings, usually for additional travel and/or turning lanes. Provision of additional travel lanes through on-street parking restrictions has also been considered. Others potential projects involve intersection and interchange improvements on major corridors. Those used in developing and evaluating alternative WALTS roadway networks are further described in Section 3.3.2 of this Report.

Associated transportation-related studies and proposed projects that can be considered in evaluating alternative networks include:

- Transit Windsor's new Route Planning Policies and Servicing Standards;

- continuing bikeway and trail extensions as planned by the Bicycle Use Development Study;
- implementing the City's planned on-road bicycle lanes;
- potential for further rail abandonments in the Windsor area, and new opportunities this could create for alternative rail corridor uses and crossings;
- increased cross-border traffic capacity through a number of alternative crossing enhancement proposals.

3.3 TRANSPORTATION NETWORK ALTERNATIVES

Various types of structural improvements have been identified for the Windsor area from approved ESR's, STRIPS work and other sources, as previously reported in Section 2.2. The objective of each alternative project is to solve one or more of the forecasted transportation network deficiencies in the WALTS area by the year 2016 (see Figure 3.1). A number of potential approaches were also screened-out from further consideration, resulting in a final list of four major network alternatives, some with various sub-alternatives.

3.3.1 SCREENED ALTERNATIVES

High shifts in alternative travel mode use were screened out from detailed consideration in this study for three main reasons. First, the existing high dominance of auto use in the WALTS area does not support more than a doubling of transit use over the next 20 years. It will take at least half of that time to begin shifting away from this local auto dominance. Similarly, the targeted 50% increase in cycling and walking was considered a realistic and progressive goal, as was an increase in auto occupancy from 1.4 to 1.5 people/vehicle. The second reason for this screening is that with transit and cycling rates currently very low (3% and 1% respectively), even tripling of use still leaves an auto-dominated condition. Any further increases in these alternative modes were is not supported by the WALTS area's anticipated growth patterns and existing travel characteristics. Thirdly, high alternative mode shifts, and the lifestyle changes required to achieve them, were also not chosen as part of the preferred vision for Windsor's future transportation system.

Increased residential intensification throughout the Windsor area was not viewed as having a significant impact on area-wide transportation network needs. For one reason, the City is expected to grow by only 15,500 people over the next 20 years, equating to about 6,900 new housing units. A relatively high target that would have, say 20% of these new units in intensified forms would only equate to some 1,400 units. Spread across the WALTS area, or even the suburban areas, these intensified housing projects would have little appreciable impact on traffic growth on the major roadway network. Intensification and mixed-use development forms will have a greater impact on improving mobility and traffic conditions at the local level, within specific neighbourhoods.

Surface Light Rail Transit (LRT) on existing or future abandoned rail lines was screened out because the Windsor area lacks the population and development densities required to support a successful LRT system. Although the CN/VIA line may be a potential alternative transportation corridor, it traverses a generally low density part of the City. However, since it does link the downtown fringe with expanding suburban development in east Windsor and the Tecumseh/St. Clair Beach area, this rail corridor should still be monitored for alternative use possibilities.

3.3.2 ALTERNATIVE TRANSPORTATION NETWORKS

The four main alternative transportation networks developed for the WALTS study respond to existing infrastructure and travel characteristics, forecasted network needs over the next 20 years and the overall WALTS transportation planning principles. Admittedly the orientation is to the major roadway system since this is where 90% of WALTS area travel occurs - autos, transit and cycling. However, as stated previously, marine and especially rail service may augment the traffic handling capacity of the main roadway system in specific areas. Most notable is marine service along the waterfront, and the use of rail for commercial goods movement into and out of the area as an alternative to trucking.

Network Alternative 1: Do Nothing

The Class EA Process requires a consideration of no change as a response to transportation network deficiencies. This establishes the "need and justification" for implementing appropriate improvements. It also shows what could happen if a Do-Nothing approach was taken to force change in local travel characteristics (i.e. freeze roadway improvements to discourage growing auto use). In Section 3.1.3 of this Paper, the results of the traffic forecasting of future roadway deficiencies reflects the Do-Nothing alternative. Corresponding impacts in terms of CO emissions, fuel consumption, accidents, V/C ratio, vehicle delays, travel time and travel length have been modeled and are shown on Figure 3.3.

This analysis, and the modeling of future capacity deficiencies, clearly shows that the existing Windsor area roadway network is not fully capable of meeting future mobility needs of Windsor area residents over the next 20 years. Expected problems area and corridors have been previously discussed in Section 3.1.3, shown on Figure 3.1 and listed on Table 3.9. Without improvements, the overall performance of the WALTS transportation system is expected to deteriorate significantly in the Do-Nothing alternative.

The overall "Need and Justification" for system improvements is evident by these findings. One strategic approach for the City and area would be to follow a Do-Nothing strategy, in hopes that, once area motorists get very frustrated with the resulting traffic problems, they will turn to alternative travel modes such as public transit, and accept more Transportation Demand Management programs like carpooling and more flexible work hours. However in reality, the most common way that motorists would resolve roadway congestion problems in the Windsor area, and most other similar-sized cities, is to find alternative travel routes. Often these routes involve shortcutting through neighbourhoods, on streets with abutting land uses not designed to accommodate higher traffic volumes. Definite signs of this are already occurring for example on Riverside Drive East or Drouillard Road.

In these areas, various "traffic calming" techniques can be introduced to mitigate traffic volume increases (to be discussed in the Transportation Master Plan). However, they will not address the original traffic problems that stem from deficiencies on the peripheral arterial roadway corridors. The Do-Nothing alternative can also have serious implications for emergency services on the roadways, and the cost-effective movements of goods and services as an important element of the Windsor area's economic health. Finally, traffic congestion results in increased travel time, accidents, human stress, energy consumption and vehicle emissions as shown on Figure 3.3. These area all negative transportation impacts from an economic, social and natural environment perspective.

Network Alternative 2: Planned Improvements

The following roadway network improvements are already planned by the City based on approved ESR's, and are in the City's five year capital forecast or have been built since 1996. Since each project is very localized in nature, it is expected they will have little benefit in solving growing deficiencies in the primary WALTS growth areas (LaSalle and the Tecumseh/St. Clair Beach area). However, it will be beneficial to show how the localized benefits of the projects provide improvements to the overall roadway network, which will in turn help in supporting their construction. These seven planned projects are listed as follows and shown on Figure 3.4:

1. McDougall Avenue Widening to 4 Lanes - Riverside Drive East to Wyandotte Street (**built in 1998**);
2. Walker Road Widening to 5 Lanes - Division Street to Highway 3 in Sandwich South (1994);

3. Tecumseh Road West - new subway structure at Wellington Avenue, and 4 lane realignment from Wellington Avenue to York Street (1994);
4. Lauzon Parkway/Road Widening to 5 Lanes from Wyandotte Street to Tranby Avenue, and 4 Lane Extension from Tranby Avenue to Tecumseh Road East;
5. Tecumseh Road East Widening to 6 lanes- Jefferson Boulevard to Banwell Road (1997);
6. Howard Avenue widening[3] to 5 lanes between the EC Row Expressway and Memorial Drive (**built**), and;
7. Dougall Avenue widening to 5 lanes[4] between Norfolk and Liberty, and between Cabana Road and Roseland Drive (**built**).

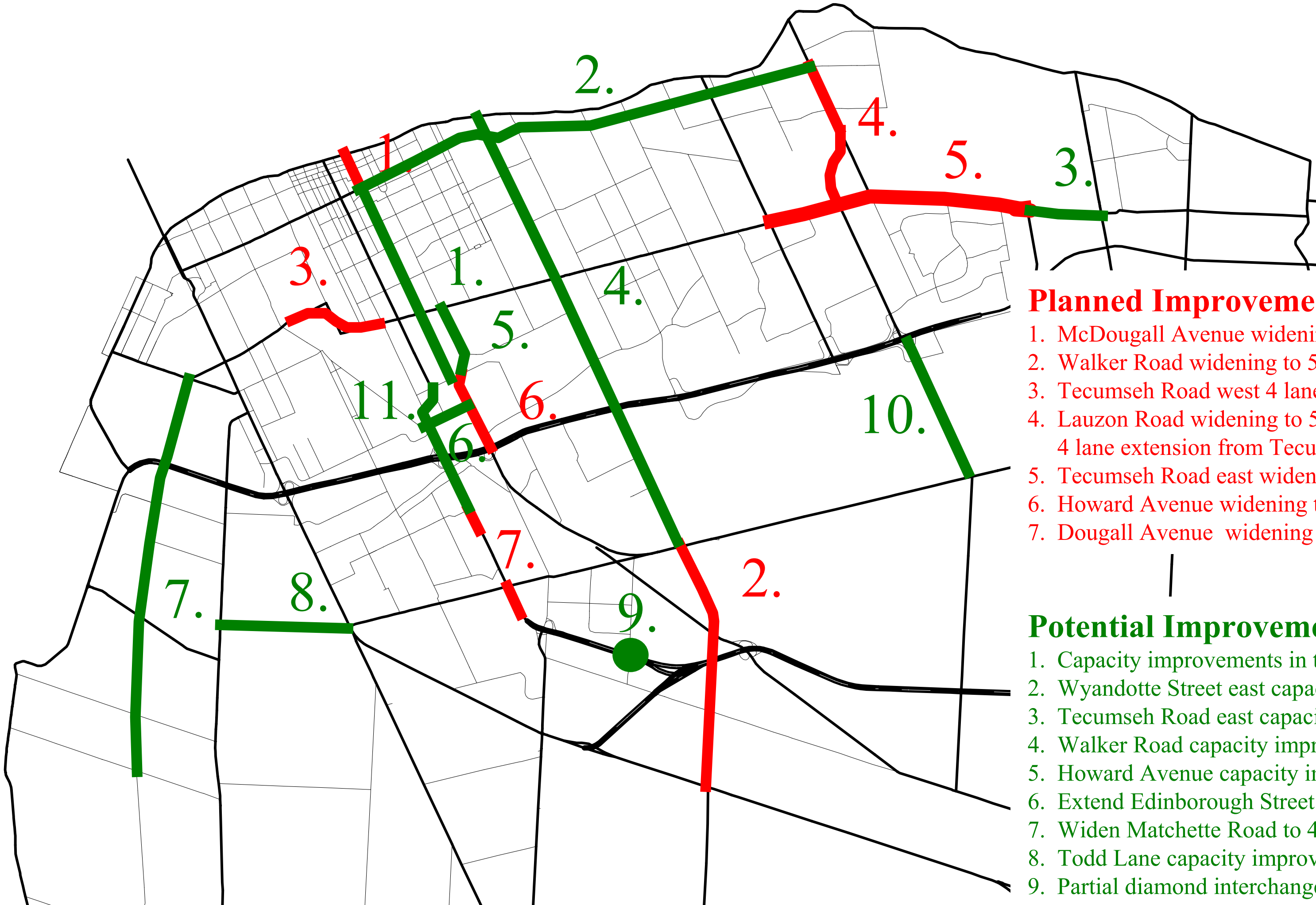
Alternative 3: Full Capacity Improvements

This alternative will be evaluated as two sub-alternatives, the first dealing with additional structural changes, and the second introducing selected TDM initiatives:

Network Alternative 3a: Planned Improvements Plus Potential Structural Improvements - is a network based on the planned improvements from Alternative 2. However, Alternative 2 is focused of solving existing problems as of 1996, and are project-specific in nature. Therefore, they are not designed to solve future network problems through to 2016. To do this, other major optional improvements considered at various times over the past 10 years (from past studies and STRIPS) are added to Alternative 2 to form Alternative 3a. The intent here is to choose the best collection of improvement projects to address the year 2016 deficiencies, especially resulting from growing suburban traffic growth and the need for improved mobility in the City. The resulting collection of **"Potential Improvements"** are listed as follows, and shown on Figure 3.5:

1. McDougall Avenue capacity improvements from Wyandotte Street to Howard Avenue through techniques such as widenings, intersection improvements (i.e. turn lanes, priority signals), on-street parking restrictions, paired one-way couplet with Windsor Avenue and/or use of reverse lanes (i.e. 2 lanes/1 lane reversed northbound and southbound);
2. Wyandotte Street East capacity improvements - Ouellette Avenue to Lauzon

[3] *Built since 1996.*
[4] *Built since 1996.*



Planned Improvements

1. McDougall Avenue widening to 4 lanes
2. Walker Road widening to 5 lanes
3. Tecumseh Road west 4 lane realignment
4. Lauzon Road widening to 5 lanes and Lauzon Pakwy. 4 lane extension from Tecumseh Rd E to Tranby Ave.
5. Tecumseh Road east widening to 6 lanes
6. Howard Avenue widening to 5 lanes
7. Dougall Avenue widening to 5 lanes

Potential Improvements

1. Capacity improvements in the McDougall corridor to 4 lanes
2. Wyandotte Street east capacity improvements
3. Tecumseh Road east capacity improvements
4. Walker Road capacity improvements
5. Howard Avenue capacity improvments
6. Extend Edinborough Street
7. Widen Matchette Road to 4 lanes
8. Todd Lane capacity improvements
9. Partial diamond interchange at 401/6th concession.
10. Upgrade/widen Lauzon Parkway
11. Operational improvements on Dougall

WINDSOR VISION IN MOTION
WINDSOR AREA LONG RANGE TRANSPORTATION STUDY

Figure 3.5
Network Alternative 3a

Stanley Consulting

Figure 3.6
2016 Alternative 3a Network Level-of-Service
(Capacity Deficiencies)

WINDSOR VISION IN MOTION
WINDSOR AREA LONG RANGE TRANSPORTATION STUDY

Stanley Consulting

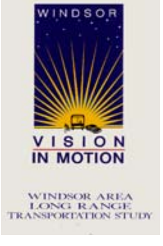


Figure 3.7
2016 Alternative 4 Network Level-of-Service
(Capacity Deficiencies)

Stanley Consulting

Road;

3. Tecumseh Road East capacity improvements - Banwell Road to Lesperance Road;
4. Walker Road capacity improvements - Riverside Drive East to Division Street;
5. Howard Avenue capacity improvements - Tecumseh Road East to Memorial Drive;
6. Extend Edinborough Street between Howard Avenue and Dougall Avenue;
7. Widen Matchette Road from Tecumseh Road West to Laurier Drive;
8. Todd Lane capacity improvements from Malden Road to Huron Church Road;
9. partial diamond interchange at Highway 401/Sixth Concession;
10. Upgrade and widen Lauzon Parkway to 4 lanes from EC Row Expressway to Division Road to provide an alternative north-south route to Walker Road, thereby reducing congestion on Walker Road - subject to Class Environmental Assessment study;
11. Operational improvements to Dougall Avenue between Eugenie and Norfolk.

The question to be answered here is whether this strategy of ultimate network capacity improvements will eliminate the capacity deficiencies forecasted for year 2016. This is not the case, as shown on Figure 3.6. Forecasting year 2016 traffic volumes on Alternative 3a concludes that even with this collection of structural capacity improvements, major link deficiencies are predicted in the network at LOS D, E and F. For example, when compared to the future Do-Nothing Alternative (Figure 3.1), continuing LOS F problems are seen on County 22, Tecumseh Road East and Seminole Street in the industrial plant area and on portions of Grand Marais Road East and Central Avenue.

By comparing Figure 3.1 and 3.6, other LOS D and E problems in the Do-Nothing Alternative, for example along Cabana/Division, Howard and Riverside Drive, are either reduced or at least do not escalate with the Alternative 3a improvements. New suburban deficiencies along Ojibway Parkway and Matchette Road were eliminated.

The conclusion from Figure 3.6 is that these structural improvements alone are not capable of satisfying all forecasted capacity deficiencies in the WALTS roadway network over the next 20 years. Some chronic problems will persist, but structural improvements will extend the LOS on many key routes.

<u>Network Alternative 3b: Planned Improvements Plus Selected TDM Initiatives</u> - will determine the level of improvement that can be achieved for year 2016 using only the planned projects from Network 2, plus a number of recommended TDM strategies and targets previously discussed in Section 3.2, namely.

1. Double the transit mode from 3% currently to 6% by the year 2016 (i.e. transit support). This action was chosen because it responds to Windsor's current Official Plan objectives on transportation, and because an existing implementation mechanism is available through Transit Windsor . It also reflects earlier Steering Committee discussions on a realistic future role for public transit, and challenges facing public transit as reported in Interim Reports 1 and 2.

2. Increase average automobile occupancy from 1.4 to 1.5 people/vehicle (i.e. ride-sharing);

3. Increase the pedestrian and cycling modes (combined) mode share by 50% from 11% to 16%, reflecting the more compact, mixed use communities envisioned by the Vision In Action, and therefore the attraction to use non-motorized transportation for short trips;

4. Reduce the growth in home-work trips through technological strategies, reflecting potential growth in telecommuting and closer home-work relationships. This will be done by decreasing the PM Peak Hour Home-Based Work (trips between home and work) trip growth by 10% to reflect more telecommuting. The PM Peak Hour Home-based Non-Work (for shopping, school, entertainment) trip growth will also be reduced by 10% to reflect more mixed use and compact communities.

Implementing the Network 2 planned roadway improvements in association with reduced home-work trip-making alone (Alternative 3b1) was shown to offer only marginal improvements on deteriorating Levels-of-Service, when compared to Alternatives 2 and 3a. Including these planned improvements alone with either increased transit ridership, use of other alternatives modes or average auto occupancies also showed only minor transportation system improvements over the Alternative 3a conditions shown on Figure 3.6, most notably in the areas of travel time and overall system congestion. However, in estimating traffic volume growth, Alternative 3b with each Transportation Demand Management (TDM) tactic measured independently showed no improvement over Alternative 3a. The conclusion here is that application of independent, isolated TDM initiatives in the Windsor area would not be as effective as the extensive roadway improvement approach reflected in Network Alternative 3a. This suggests a more comprehensive TDM effort would be needed.

Network Alternative 4: Balanced TDM/Structural Improvements

The goal of Alternative 4 is to describe an effective and realistic combination of structural and non-structural solutions that will further address future network capacity deficiencies. This alternative uses the results of Alternative 3a and 3b as the basis of this combined approach. For analysis and testing purposes, this network includes:

1. Structural improvements from Alternative 3a;
2. Doubling of transit mode share from 3% to the 6 % of trips target, and;
3. 10% reduction in Home Based trips resulting from closer home-work relationships, more mixed use development forms, associated increases in local short distance cycling and pedestrian activity, and potential growth in telecommuting.

Increasing transit ridership is recommended in this option, rather than increasing vehicle occupancy, because a structure of facilities and programs for transit delivery is already well established in Windsor. This does not mean that increased occupancies should not be encouraged, but the responsibility for achieving this objective rests mainly with the employee sector. Effective programs are needed to coordinate ride-sharing with the varied trip-making characteristics of WALTS residents.

Similarly, increased use of non-vehicular transportation modes should also be encouraged. However, since walking caters mainly to local mobility and short trips, and cycling currently has a very small mode share, even doubling or tripling this non-vehicular transportation is not expected to solve regional mobility problems.

The potential impact of Alternative 4 on future network deficiencies is shown on Figure 3.7. Based on the network forecasts, the addition of the selected TDM actions has the potential to either eliminate some chronic problems, for example along portions of Tecumseh Road and Riverside Drive, or more likely improve and extend LOS on other key routes such as Dougall Avenue and Division Road.

3.4 ALTERNATIVE NETWORK EVALUATION

This Study employed a seven-part evaluation process as shown below:

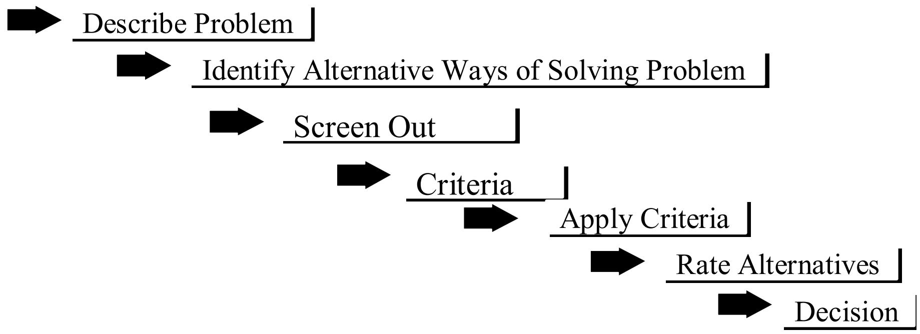


Figure 3.8 - Evaluation Process

Future transportation system needs were described in Section 1 of this Report. Alternative ways of solving these problems are found in the structural and non-structural improvement opportunities previously described in Sections 2 and 4, along with the screening out of some alternative approaches. The next steps in this process are to establish evaluation criteria, apply the criteria to the final alternatives, rate the results and make a decision on the best alternative or combination of alternatives.

This Study followed four important evaluation objectives:

1. **Compatibility -** rely on existing City and area policies and plans wherever possible in the evaluation, so that the resulting recommendations are compatible with other municipal actions.

2. **Traceability** - follow a logical, consistent evaluation process so that the rationale for the final recommendations can be traced through clear and complete documentation.

3. **Objectivity** - ensure that the evaluation process is free of any pre-conceived answers.

4. **Acceptability -** describe the evaluation process to the involved public (Transportation Task Force and attendees at Public Meetings/Workshop) so that in cases of disagreement on the resulting recommendations, they still understand how the recommendations were made. In the case of the Windsor area, the proposed evaluation process and criteria were discussed with the Transportation Task Force at

their June 11, 1998 meeting.

Table 3.11 summarizes the evaluation criteria used to assess the transportation network alternatives in this Study. They are categorized into three “environments” as per the Province’s Class EA Process, namely: Economic Environment, Socio-Cultural Environment and Natural Environment, and described in the subsequent sections:

Table 3.11 - Evaluation Criteria

CRITERIA	MEASUREMENT
1. Economic Environment:	
1.1 Total Travel Time	From the model as the effect of alternatives on travel time measured as the number of vehicle-hours during the PM Peak
1.2 Network Improvement Cost	Qualitative comparison
1.3 Downtown Accessibility	Measured by ability of a network alternative to reduce average travel time to the core.
1.4 Property Acquisition	Qualitative rating based on whether and how much acquisition may be required.
2.Socio-Cultural Environment:	
2.1 Future Auto Travel Demand	Measured by the average WALTS-wide V/C ratio in the model.
2.2 Travel Mode Choice	Qualitative rating of level of support for alternative modes based on ability to support transit, cycling and walking.
2.3 Vehicle Incident Potential	Measured as the calculated number of incidents.
2.4 Neighbourhood Traffic Impacts	Measured as the reduction in average delay on the arterial class roadways (thereby reducing residential through traffic).
2.5 Proximity Impacts	Qualitative rating based on the general type of land use in proximity to the network improvement (residential, non-residential, rural).

2.6 Noise Impacts	Measured based on percentage increase in traffic volumes.
2.7 Visual Impacts	Qualitative rating based on the existing character of areas subject to network improvements (streetscapes).
2.8 Emergency Vehicle Access	Measurement of average travel time by WALTS sector.
3. Natural Environment	
3.1 Habitat Impacts	Qualitative rating based on existing condition and available information (ESA's, etc.)
3.2 Auto Emissions	Measurement of carbon monoxide emissions from the model.
3.3 Fuel Consumption	Measured from the model as vehicle-kilometres to estimate total litres of fuel consumed.

3.4.1 ECONOMIC ENVIRONMENT

1.1 Total Travel Cost

- *Criteria* - This was a measure of the ability of an alternative network to provide sufficient capacity to reduce total travel time throughout the Windsor area.

- *Measurement* - Travel time is related to delays caused by congestion, travel speed, and the distance required to travel from place to place. The effect of alternatives on travel time will be measured by the number of vehicle-hours of travel during the PM peak hour. This is a system-wide measure produced by the transportation network model for all major roadways in the Windsor area.

1.2 Transportation Network Improvement Costs

- *Criteria* - This involves the magnitude of cost associated with construction of the transportation network improvement.

- *Measurement* - A qualitative rating (Low, Medium, High) and comparison of the improvement cost, along with the social costs of delays and accidents.

1.3 Downtown Accessibility

- *Criteria* - The current Windsor Official Plan designates the downtown as an area where employment and residential growth will be encouraged.

- *Measurement* - To support growth in the downtown, a high level of accessibility by all modes (autos, bicycles, transit and trucks) is important. Alternatives which improve access to the downtown were given greater consideration in the evaluation. This was measured by the ability of the network alternative to reduce the average weighted travel time to downtown. The average weighted travel time was calculated by the transportation planning model for the sector within which the candidate improvement was located.

1.4 Need for Property Acquisition

- *Criteria* - One important factor of the Economic Environment is whether property must be purchased to facilitate a network improvement within each of the alternatives. In some cases, public property is already available either through existing road rights-of-way or eventually through the development approval process.

- *Measurement* - Actual land acquisition costs were not used in this assessment because they are too variable and property-specific for this scope of transportation master planning. However, network improvements that would require no or less property (and therefore lower cost) acquisition were given a higher qualitative rating in the evaluation.

3.4.2 SOCIO-CULTURAL ENVIRONMENT

2.1 Future Auto Travel Demand

- *Criteria* - Most Windsor area residents currently prefer the comfort and convenience of the private automobile for travel. Transportation network alternatives that limit travel choice by restricting automobile use, or make automobile travel less convenient during peak hours of the day, were perceived to have a negative social impact on the lifestyles of many Windsor area residents.

- *Measurement* - Improvements which would provide roadway capacity to support travel by car were given greater consideration based on this criterion. This criterion was measured by the average area wide volume to capacity ratio (V/C) for all roadways using the transportation planning model.

2.2 Travel Mode Choice

- *Criteria* - The provision of new bicycle, pedestrian and marine facilities, and improved transit service, would increase the choice and use of non-auto transportation modes in the Windsor area. Opportunities for improved travel by alternative modes were therefore considered to be an important criterion upon which to base transportation decisions.

- *Measurement* - This criterion was measured through a subjective or qualitative assessment. Where new routes are developed to shorten cycling and walking distances, these modes will become more attractive transportation alternatives. Since transit relies on a roadway network which is largely shared with other traffic, solutions which provide improved auto travel times will also improve transit service and reliability.

2.3 Vehicle Incident Potential

- *Criteria* - An important objective of a transportation system is traffic safety. Improvements which increase safety were given greater consideration in the evaluation process.

- *Measurement* - Traffic accidents are related to the number of vehicle hours traveled and the total distance traveled. As traffic congestion increases, safety decreases resulting in a negative social impact on the community. This criteria was measured by the calculated number of accidents for each alternative based on the transportation planning model. The measure used was the number of accidents estimated for the sector within which the network improvement is located.

2.4 Neighbourhood Traffic Impacts

- *Criteria* - The effect of through-traffic in residential areas is a common social issue. Riverside Drive East is an example in the Windsor area.

- *Measurement* - Improvements which are able to reduce through traffic in residential areas were given greater consideration in the evaluation process. Through-traffic in residential neighbourhoods is generally caused by inadequate capacity and the resulting congestion levels on the adjacent arterial network. As congestion and delay increases on this arterial network, an increased social impact in residential areas can be expected. This objective was measured based on a reduction in average delay on the arterial roadway network. The average delay was calculated by the transportation network model for the sector in the study area in which the network improvement is located.

2.5 Land Use Impacts

- *Criteria* - New roadways or roadway widenings require additional land for construction. In some situations, the distance separation between traffic activity and existing land uses is reduced considerably, which can result in increased vibration, dust, litter, as well as a less comfortable property and pedestrian environment.

Measurement - In making this qualitative assessment, consideration was given to the type of land uses affected by the alternative project(s) - residential, commercial, rural.

2.6 Residential Noise Impacts

- *Criteria* - Traffic noise levels increase as traffic volume increases. In residential areas adjacent to arterial streets, this is a sensitive issue. Those improvements which reduced the increase in arterial traffic in close proximity to residential areas were scored higher in the evaluation.

- *Measurement* - A doubling of traffic can create a 3 dBA increase in noise levels. The percentage increase in traffic volumes on an improved roadway over that of the "Do-Nothing" alternative was used to measure the relative noise impact of each improvement. Where the improvement involves more than one roadway, the sum of the average increases was used.

2.7 Visual Impacts

- *Criteria* - Some transportation improvements can change the visual , or aesthetic character of an area significantly, and therefore the way people perceive this character. They can also have a negative visual impacts on existing adjacent land uses. Some of these impacts can be mitigated at the design level, but this cannot be anticipated at the Master Planning level of detail.

- *Measurement* - Perceived impacts generally come from the removal of significant vegetation, historical, or cultural features. If adjacent residential properties are subjected to a new, or expanded non-residential view, this could also be considered a high impact. Alternatively some streetscapes are already formed by intensive built character, and improvement in these areas would score low from a visual impact perspective.

2.8 Emergency Vehicle Access

- *Criteria* - Traffic congestion will reduce the transportation network's ability to respond quickly in providing emergency services such as fire, police, and ambulance services. Longer response times are a negative social cost to the community.

- *Measurement* - Transportation network improvements which would increase overall travel speed would therefore improve emergency response times, and reduce the related social impact. The transportation planning model was able to provide estimates of the average travel time by sector of the study area. This was used to estimate the magnitude of this impact.

3.4.3 NATURAL ENVIRONMENT

3.1 Habitat Impacts and Enhancements

- *Criteria* - The construction of new transportation facilities can disturb areas of significant wildlife, vegetation and/or watercourse habitat, and in some cases can result in an enhancement or improvement of such areas.

- *Measurement* - Qualitative assessments of potentially impacted habitats were made based on existing information available from existing studies on whether significant natural environments would be disturbed.

3.2 Air Quality

- *Criteria* - Vehicle emissions contain hydrocarbons, carbon monoxide, nitric oxide, ozone and other volatile organic compounds, all of which have a proven negative impact on air quality. Vehicle emissions are a function of vehicle-kilometres and vehicle-hours of travel, as calculated by the traffic forecasting model.

- *Measurement* - Area wide quantitative estimates and comparison of carbon monoxide (CO) emissions from the traffic forecasting model were used. The relative vehicle emissions such as hydrocarbons (HC) and nitrous oxides (No_x) were considered indirectly through the use of CO estimates.

3.3 Energy Consumption

- *Criteria* - Fossil fuels are a non-renewable resource which should be conserved.

- *Measurement* - Area wide quantitative estimates and comparison of carbon monoxide fuel consumption were used to measure this criterion. The traffic forecasting model was used to estimate total litres of fuel consumed.

3.4.4 RESULTS OF NETWORK EVALUATIONS

Results of both the qualitative and the more analytical, measurable evaluations are summarized on Table 3.12 based on the three types of environments considered. The bottom table shows the relative scores generated by each alternative, with 100 being the lowest impact score **or** best result, and 0 being the highest impact score **or** worst result. **Technical Appendix 11** includes the raw data results and relative results used in generating the summary scores.

The scores in Table 3.12 were developed from two sources. The first were the "raw" results of measurable criteria generated from the SYSTEM II forecasting model as shown at the top of Table 3.12, for example future auto travel demand. The second involves subjective assessments of qualitative criteria such as travel mode choice, using a comparative High (15), Medium (50) and Low (80) impact scoring system. Table 3.13 summarizes the basic conclusions used in making these subjective assessments. Included in these assessments were input from various public sources and WALTS study venues on what would be considered positive versus negative impacts of transportation on the Windsor area. These assessments also included the informed judgment of the assessment team.

In summary, of the four network alternatives discussed in Section 4, the evaluation process concludes that **Network 4: Balanced TDM/Structural Improvements** is the best overall transportation network solution for the Windsor area to follow, when all criteria are considered together without any weighting and ranking of the criteria. Weights and ranks were not used to highlight the relative importance of one criteria against another since the evaluation process assumes all criteria are equally important. Network Alternative 4 involves the following roadway system improvements elements, which have been shown to also benefit transit service and cycling capabilities in the future:

Network Alternative 4: Balanced TDM/Structural Improvements

1. Establish goals, with supporting policies and programs, to increase the mode share of transit use from 3% to 6% of trips in the Transit Windsor service area by the year 2016, and to reduce home-based trips by 10% during this period as a result of land use planning initiatives;

2. Complete the City's five remaining planned roadway improvement projects in the five year capital forecast, with their associated localized benefits to the network;

3. Initiate selected operational and capacity improvements on strategic roadway sections to provide for Class I and II Arterial and Collector operational capability. These improvements focus mainly on five types of initiatives to be applied where appropriate based on further functional analyses:

   - Physical roadway widening;
   - Introduction of intersection capacity improvements such as left turning, and where warranted, right turn lanes along with other geometric intersection and signal improvements;
   - Restrict on-street parking either totally, or during peak hours to provide increased lane capacity;
   - Increase the "people-moving" capacity of a roadway by increasing auto occupancies and transit ridership along key routes, and;
   - Provide for "demand diversion" techniques, such as traffic calming measures, to redirect congestion problems to higher capacity routes.

Network Alternative 4 also offers advantages and weaknesses that represent trade-offs required in selecting the best overall planning approach. These trade-offs are summarized on Table 3.14:

Table 3.14 - Network Evaluation Summary

NETWORK	RANK	ADVANTAGES	DISADVANTAGES
4 - Balanced TDM/Structural	1	Scores the best in important functional criteria, namely Travel Cost, Downtown Accessibility, ability to satisfy Future Auto Travel Demand, System Safety and avoidance of Neighbourhood Impacts. Also offers the lowest increase in traffic volumes owing to better system utilization. This also equates to the lowest emission and energy consumption levels.	This is the highest cost alternative with capital expenditures plus transit enhancement programs. There will be need for property acquisition, and limited proximity impacts mainly on non-residential property
3b4 - Planned	2	Reduced needs for transportation infrastructure	Relatively high capital cost needs, moderate improvement to

Improvements Plus Reduced Home-Work Trips		expansion with associated reduction in proximity impacts. and acquisition needs Increased mode choice especially for shorter distance walking and cycling. Good system safety.	downtown accessibility and system-wide congestion . Continued delays on major arterials. Increased traffic volumes and related noise.
3B2 - Planned Improvements Plus Increased Auto Occupancy	2 tie	Reduced capital cost needs, property acquisition and proximity impacts. Good levels of reduced emissions and fuel consumption. Restricted impacts on natural areas.	Minor improvement to downtown accessibility. moderate increase in traffic volumes and associated noise.
3b3 - Planned Improvements Plus Increased Walking/Cycling	4	Very good travel mode choice to walking and cycling, system safety and travel time savings.	Moderate need for property acquisition for expanded systems. Results in high increase in traffic volumes and associated noise. Moderate levels of auto emissions.
3b1 - Planned Improvements Plus Transit	5	Low property acquisition from more system efficiency. High improvement to travel mode choice. Minimum system expansion equates to minimum community impacts and natural impacts.	Moderate capital needs for transit system operations. Fair system-wide travel time savings and downtown accessibility. Medium levels of system wide congestion, emissions and fuel consumption.
2 - Planned Improvements	6	Minor property acquisition needs, proximity impacts and habitat impacts. Moderate capital costs.	Poor travel time savings, system-wide congestion, travel mode choice, safety, travel speeds and emission levels. High fuel consumption, increases in traffic volume, associated noise and neighbourhood impacts. Low travel speeds.
3a - Planned Improvements Plus Potential Structural Improvements	7	Relatively low growth in traffic volumes provided by increased system capacity.	Moderate to poor performance in all other criteria, especially with very high capital costs, property acquisition needs, emission levels and fuel consumption., Very poor system-wide safety
1 - Do Nothing	8	Low capital cost, property acquisition needs, proximity, community and natural impacts.	Very poor results in all other criteria. High traffic growth levels.

3.4.5 RECOMMENDED TRANSPORTATION NETWORK

Based on the results of the evaluation process, of the four main network alternatives evaluated in this Study, the one concluded to be the recommended network for the Windsor area over the next 20 years is **Network 4: Balanced TDM/Structural Improvements.** The results of both the measurable and subjective evaluations suggest that this planning approach represents:

the best combination of structural improvements and practical, attainable TDM initiatives to effectively manage traffic growth and multi-modal accessibility within the Windsor area over the next 20 years - a single emphasis either on structural improvements or TDM initiatives will be insufficient in managing this growth.

However, in recommending Network Alternative 4 as the best long term strategy, two important conditions must be included:

Condition 1 - Even with the structural network improvements included in Alternative 4, severe, chronic LOS problems are still forecasted on Seminole Street and portions of Tecumseh Road East, Grand Marais Road East, Central Avenue and County Road 22. Consideration must be given to operational and capacity improvement potential on these links.

Condition 2 - If the TDM targets established as part of Alternative 4 are not achieved over the next 20 years, the City and County will be required to consider further structural roadway capacity improvements to address growing deficiencies (see Alternative 3a).

The final step in the evaluation process will be to determine what potential impact the three associated cross-border traffic growth options will have on this preferred network.

3.4.6 IMPACT OF INCREASED CROSS-BORDER TRAFFIC

A sensitivity test was conducted on recommended Network Alternative 4 to estimate the impacts of increased cross-border traffic, thereby adding an important variation to this WALTS network. Once a balanced network was been achieved in Alternative 4, it was subjected to three (3) “what if” changes in cross-border traffic at Windsor/Detroit, reflecting MTO projections and very general assumptions involving international cross-border traffic growth. These changes included:

Local Growth - a 20% growth in "Local" traffic , both passenger and commercial, entering the WALTS area reflecting expected population growth between 1996 and 2016;

Double Truck Growth - is the Local Growth plus a 100% (doubling) increase in cross-border "Through Commercial" traffic based on MTO predictions in their SW Ontario Transportation Perspective, and;

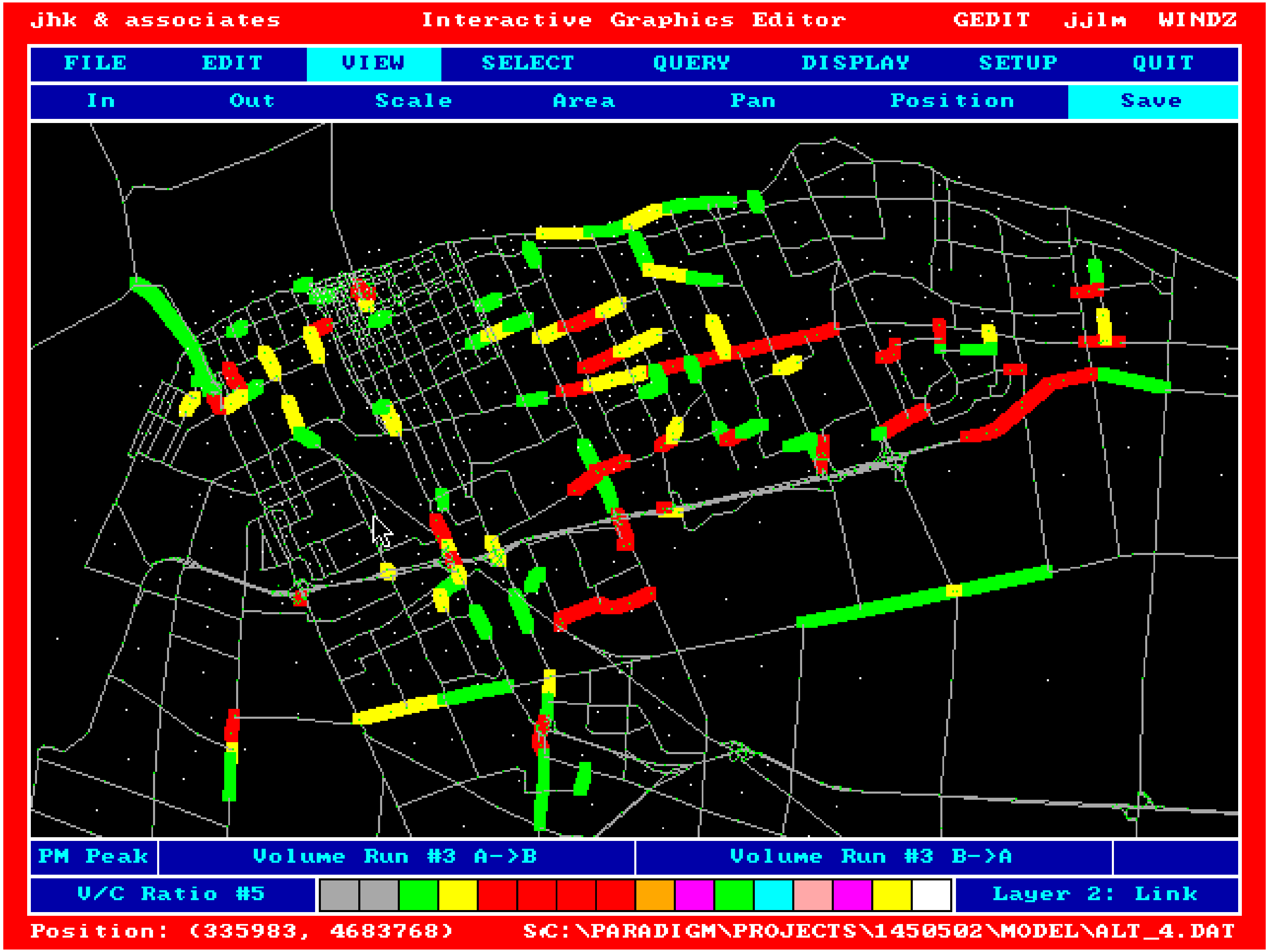
Triple Truck Growth - is the Local Growth plus a 200% (tripling) arbitrary increase in cross-border "Through Commercial" traffic based on MTO's predictions, plus traffic growth influences attributed to a potential North American highway trade corridor policy involving Windsor/Detroit (i.e "NAFTA Superhighway"). Future traffic projections show the impacts of this traffic growth on the network, and especially the Huron Church Road corridor. Structural solutions would then be required to improve the existing corridor capacity, or the full or partial diversion of cross-border traffic onto new facilities (i.e. new bridge crossing and corridor to Highway 401 or the E.C. Row Expressway).

Using the City's SYSTEM II traffic forecasting model, the impact of this cross-border traffic in terms of network performance changes is shown on Figure 3.9. These results highlight the significant decreases in performance measures with a doubling or tripling of traffic volumes.

More specifically, a 20% increase in local traffic with a 100% increase in commercial crossings results in congestion at LOS E on the Ambassador Bridge and the plaza area. As shown on Figure 3.10.a, severe LOS E and F congestion would also be expected on Huron Church Road to and including the College Avenue area. Further LOS D congestion would occur in the Totten Street/Prince Road area along Huron Church Road, and in the EC Row interchange area.

If the cross-border commercial traffic triples, described as the 200% or Tripling of cross-border traffic, the Bridge and plaza area would reach severe congestion at LOS F, and most of Huron Church Road would operate at LOS D, as also shown on Figure 3.10.b.

As a comparison, MTO conducted their SW Ontario Gateway Study in early 1998, and concluded that cross-border traffic at Windsor and Sarnia is expected to grow by



WINDSOR
VISION IN MOTION
WINDSOR AREA LONG RANGE TRANSPORTATION STUDY

Figure 3.10
Alternative 4 Plus Double Trucks

Stanley
Consulting

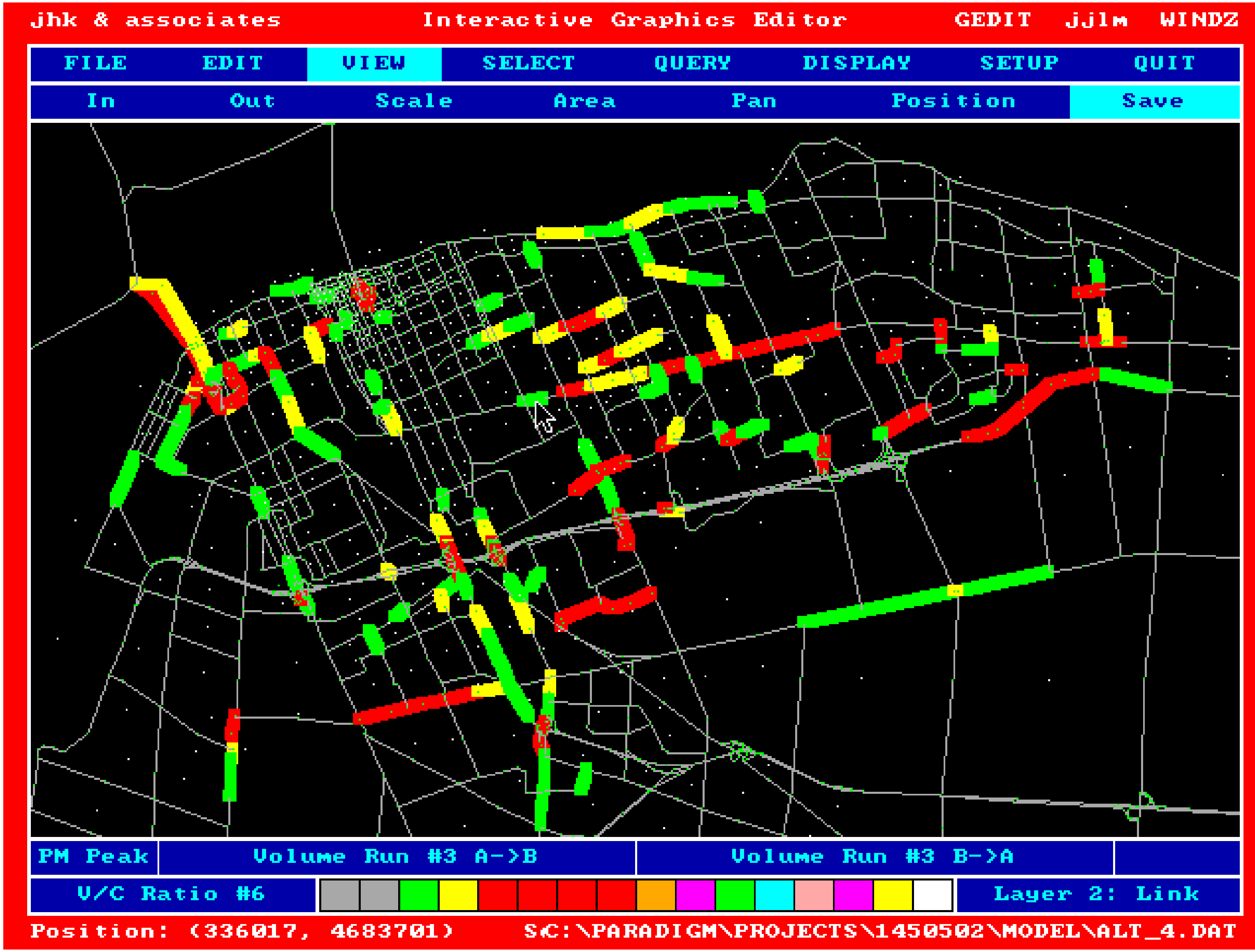


Figure 3.10
Alternative 4 Plus Triple Trucks

five percent/year for commercial vehicles, and about two percent/year for other traffic. At the Ambassador Bridge, this equates to a growth in truck traffic of from 2.2 million crossings in 1995 to 5.1 million by 2021. Passenger traffic would grow from 7.5 million to 11.4 million during the same period. Based on these projections, MTO has forecast that the Ambassador Bridge will reach capacity by 2014. Furthermore, Huron Church Road from the Bridge to Cabana Road, which operates at LOS A to C today, would decrease to LOS D/E by the year 2011, and LOS E/F by 2021.