Canada

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Canada-United States-Ontario-Michigan Border Transportation Partnership

Practical Alternatives Evaluation Working Paper

Air Quality Impact Assessment

DRAFT May 2008

PREFACE

The Detroit River International Crossing (DRIC) Environmental Assessment Study is being conducted by a partnership of the federal, state and provincial governments in Canada and the United States in accordance with the requirements of the Canadian Environmental Assessment Act (CEAA), the Ontario Environmental Assessment Act (OEAA), and the U.S. National Environmental Policy Act (NEPA). In 2006, the Canadian and U.S. Study Teams completed an assessment of illustrative crossing, plaza and access road alternatives. This assessment is documented in two reports: *Generation and Assessment of Illustrative Alternatives Report - Draft November 2006)* (Canadian side) and *Evaluation of Illustrative Alternatives Report (December 2006)* (U.S. side). The results of this assessment led to the identification of an Area of Continued Analysis (ACA) as shown in Exhibit 1.

Within the ACA, practical alternatives were developed for the crossings, plazas and access routes alternatives. The evaluation of practical crossing, plaza and access road alternatives is based on the following seven factors:

- Changes to Air Quality;
- Protection of Community and Neighbourhood Characteristics;
- Consistency with Existing and Planned Land Use;
- Protection of Cultural Resources;
- Protection of the Natural Environment;
- Improvements to Regional Mobility;
- Cost and Constructability.

This report pertains to the *Changes to Air Quality* factor and is one of several reports used in support of the evaluation of practical alternatives and the selection of the technically and environmentally preferred alternative. This report will form a part of the environmental assessment documentation for this study.

Additional documentation pertaining to the evaluation of practical alternatives is available for viewing/downloading at the study website (www.partnershipborderstudy.com).

EXECUTIVE SUMMARY

Identifying how the Detroit River International Crossing (DRIC) study alternatives may change air quality is an important consideration in the DRIC Environmental Assessment.

Air quality effects of the Practical Alternatives have been assessed using a combination of existing air monitoring data and air dispersion modelling. Air dispersion modelling must be used to assess the impacts of future changes, such as implementation of the alternatives, and changes in fuels, vehicle technologies and traffic volumes. The predictive air quality model being used is specifically designed to assess impacts from roads and highways. The model incorporates the differences between moving vehicles, and queued vehicles that are idling, as well as differences in roads that are at-grade, below-grade, end-to-end tunneled or elevated on bridges.

Existing concentrations of gaseous pollutants in Windsor such as sulphur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOCs) (such as acrolein) and others were examined earlier in this study as part of the assessment of Illustrative Alternatives and found to be well below Ontario Ministry of the Environment (MOE) Ambient Air Quality Criteria (AAQCs). Due to the number of alternatives and combinations being assessed, two indicator pollutants were selected for this phase of the analysis. Those chosen to represent one gaseous compound and one particulate compound are nitrogen oxides (NO_x) and particulate matter less than 2.5 microns ($PM_{2.5}$). These pollutants are generally the typical air pollutant indicator compounds with respect to transportation vehicle emissions. Changes in the total predicted concentrations of these two air pollutants were examined for each alternative in relation to the future no-build alternative.

How the Analysis was Done

The analysis was completed using the following approach:

- Compile data on existing $PM_{2.5}$ and NO_x concentrations
- Determine background concentrations
- Input traffic data for future conditions, including access road, plaza and crossing alternatives
- Calculate pollutant emissions from the highway corridor for existing and future conditions
- Use air dispersion model (CAL3QHCR) with meteorological data from Windsor Airport to determine future air pollutant concentrations in the vicinity of the corridor (essentially all of west Windsor) and at sensitive receptor locations (such as schools and residences).

Data on the existing air pollutant concentrations in the Windsor area was obtained from the two MOE air monitoring stations located on College Avenue and on University Avenue. Data from the two DRIC air monitoring stations, established in 2006, were also used to refine the background concentrations.

Traffic projections were developed for the DRIC study for all main roads in the corridor for each year considered in the assessment, which were 2015, 2025 and 2035. This included the future "do nothing" cases (i.e. expected traffic volumes if no new access road/crossing is built), as well as each of the Practical Alternatives for the access road, plaza and crossing.

Emission rates from these vehicles were input into the CalTrans CAL3QHCR roadway dispersion model, which is accepted for use in Ontario by the MOE and is supported by Environment Canada. Improvements in fuels and technologies legislated to occur over the next several years and historical fleet turnover rates were considered in these emission rates. The model incorporated meteorological data from Windsor Airport, to determine predicted air pollutant concentrations at various locations in west Windsor in addition to specific sensitive receptor locations and receptors as discussed in the *Practical Alternative Work Paper - Social Impact Assessment (April 2008)*. The uncertainties and inevitable variability associated with predicting future traffic flows, weather conditions and emission rates place some limitations on the accuracy of model results; however, the results are useful and acceptable for comparing among various alternatives.

Findings

Although this phase of the study focused on $PM_{2.5}$ and NO_x specifically, additional pollutants will be examined when assessing the technically and environmentally preferred alternative.

Presently, approximately 45 percent of the total NO_x emissions in the Windsor airshed come from trucks and cars on the local road network. Emissions from the vehicles using the Huron Church Road corridor contribute approximately two percent of the total NOx emissions to the Windsor airshed. Recent and on-going improvements in emission control technologies and fuels will combine to substantially reduce the emissions from transportation sources. As of June 2006, the maximum amount of sulphur in on-road diesel fuel was reduced from 500 mg/kg to 15 mg/kg. These reductions were necessary for Canadian sulphur levels in on-road fuels to be consistent with U.S. levels, and to ensure that advanced emission control technologies on newer engines would be effective. In January 2007, additional engine standards for heavy-duty vehicles came into effect. These standards reduce NO_x and particulate matter emissions by 60 percent and 90 percent respectively over existing levels, and require the incorporation of additional emission control technologies on these newer engines to effect these reductions.

Based on these and other anticipated changes in both Canada and the U.S., preliminary estimates are that annual emissions of NO_x from road related transportation sources in Windsor will be reduced from approximately 4,000 tonnes in 2004 to 500 tonnes in 2035. These changes will occur over time as the vehicle fleet is replaced. Based on these projected decreases, cars and trucks will likely contribute less than 10 percent of the total regional NO_x emissions.

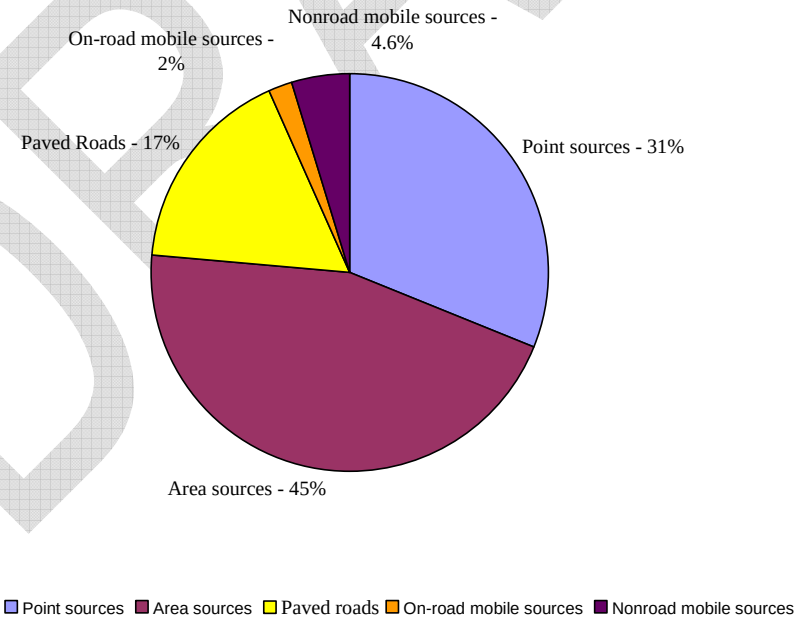
$PM_{2.5}$ emissions from road based transportation sources are comprised of two contributing fractions. The first is tailpipe emissions resulting from fuel combustion. The second, and higher fraction, is from road dust, which is generated from the re-suspension of surface material and debris, tire and brake wear, and roadway abrasion.

The figure below presents the breakdown of $PM_{2.5}$ emissions in southwestern Ontario. It is divided into:

- Point Sources (i.e. factory smoke stacks)
- Area Sources (farms, construction sites, unpaved roadways)
- Non-road Mobile Sources (rail transportation, marine transportation, construction equipment)
- Paved Roads
- On-road Mobile Sources (tailpipe emissions from cars and trucks on roads and highways).

As can be seen in the chart, cars and trucks on paved roads and highways contribute 19 percent (17 percent + 2 percent) of the total $PM_{2.5}$ emissions, and only two percent of this is from tailpipes. Improvements in fuels and vehicle engine technologies will result in further decreases in the tailpipe portion of $PM_{2.5}$ emissions from road-based transportation.

$PM_{2.5}$ Emissions for Southwest Ontario (Year 2000)



Since total road emissions of $PM_{2.5}$ are predominantly comprised of road dust, $PM_{2.5}$ emissions will increase as traffic increases in the Highway 3/Huron Church Road corridor. However, the tailpipe fraction of $PM_{2.5}$ emissions is currently a maximum of 30 percent of the total road based $PM_{2.5}$ emissions from the corridor. By 2015, this fraction will be

reduced to less than 10 percent of the total $PM_{2.5}$ emissions, because of the combined effect of cleaner fuels and provision of a freeway for international traffic. (Free flow conditions on a freeway avoid braking, idling and acceleration at traffic signals).

By 2025, the tailpipe fraction of $PM_{2.5}$ will be further reduced to four percent of the total roadway contribution from the corridor, as the vehicle fleet is fully replaced with vehicles that incorporate the new engine technologies.

Another important consideration is the role of contributions from upwind sources and transboundary (air pollution that originates outside of the local region) air flow on total $PM_{2.5}$ concentrations in Windsor. During typical conditions, these sources comprise approximately 56 percent of the total concentration of particulate matter in the Windsor area. During a smog event, this contribution increases to over 80 percent, as polluted air flows into the region from upwind sources in the U.S.

Practical Alternatives

At-grade, below-grade and end-to-end tunnel alternatives were modelled to determine impacts of:

- Changes in alignment from the existing corridor
- Changes in grade (i.e. at grade vs. below grade)
- The effects of short tunnels on local air quality
- Tunnel ventilation requirements
- Changes in service road configuration

Implementation of any of the alternatives that were assessed in this phase of the study generally result in decreased $PM_{2.5}$ and NO_x concentrations, and an improvement in air quality compared to the no-build alternative. No one alternative consistently stands out as a preferred alternative for all segments of the proposed freeway extension and the differences between the alternatives could be considered marginal.

All predicted NO_x concentrations in the vicinity of the corridor are predicted to be below relevant standards and guidelines. Or stated more simply, there were no instances of predicted increases in concentrations that would cause a change in the MOE AQI* rating in the corridor.

* - The Ontario Ministry of the Environment (MOE) publishes results annually on the air quality in different locations in Ontario as part of their Air Quality program. The Air Quality Index (AQI) is an indicator of air quality, based on hourly pollutant measurements of some or all of the six most common air pollutants: sulphur dioxide, ozone, nitrogen dioxide, total reduced sulphur compounds, carbon monoxide and fine particulate matter.

Tunnel Ventilation Options

Four different options for ventilation of the cut and cover end-to-end tunnel option were assessed. Options 1A, 1B, and 1C represented differing configurations and locations of ventilation buildings, while Option 2 included jet fans placed on the tunnel ceiling throughout the tunnel with pollutants being exhausted out through the portals instead of through ventilation buildings.

The results of the atmospheric dispersion modelling assessment indicate that of the four tunnel ventilation options studied, Option 2 (i.e. using jet fans to ventilate the tunnel through the portals instead of a vent building) results in unacceptably high concentrations of $PM_{2.5}$ and NO_x at the receptors compared to the other three ventilation options.

The results also indicate that there is little to no difference in the maximum predicted concentrations between the three ventilation building options assessed. For the purposes of comparison to at-grade and below-grade alternatives, Option 1A was used for the ventilation configuration for the end-to-end cut and cover tunnel. The two locations along the access road corridor developed in consultation with the public for the two ventilation buildings were in the vacant field in the northwest corner of the Todd Lane/Huron Church Road intersection, and the vacant field opposite St. Clair College.

At-grade vs. Below-grade vs. Cut and Cover End-to-End Tunnel

Air dispersion modelling of air quality impacts of the Practical Alternatives indicates that there are slight differences between these alternatives within 50 – 100 m (164 – 328 ft) from the right-of-way (ROW) under certain conditions. Below-grade alternatives including the Parkway result in a reduction in maximum predicted $PM_{2.5}$ and NO_x concentrations in the vicinity of the ROW, in comparison to at-grade alternatives. For example, within 50 m (164 ft) from the ROW, below-grade sections show slightly lower predicted concentrations of $PM_{2.5}$ and NO_x than at-grade sections. By 100 m (328 ft) and beyond from ROW, there is no discernible difference between at-grade and below-grade alternatives.

Within 50 m (164 ft) of the ROW, the end-to-end tunnel alternative results in lower maximum predicted concentrations of $PM_{2.5}$ compared to at-grade and below-grade alternatives under certain conditions. At 100 m (328 ft) from the ROW, there is little difference between the alternatives in terms of maximum predicted $PM_{2.5}$ concentrations. At 250 m (820 ft) from the ROW there is no difference between any of the alternatives in terms of $PM_{2.5}$ concentrations.

The end-to-end tunnel alternative results in increases in the maximum predicted 1-hour and 24-hour NO_x concentrations in the vicinity of the ROW near the tunnel portals under certain conditions, compared to at-grade and below-grade options. This reflects the effect of the tunnel entrance and exit portals, in addition to the dispersion characteristics of the exhaust stacks at the ventilation buildings.

Service Road Configurations

Air dispersion modelling of air quality impacts of the Practical Alternatives indicates that between Alternatives 1 (one-way service roads) and 2 (parallel two-way service roads), there is little difference in the predicted changes to $PM_{2.5}$ and NO_x concentrations. Maximum predicted $PM_{2.5}$ and NO_x concentrations are slightly higher with the one-way

service road options compared to the two-way service road options. However, air quality conditions are the same on average for each option.

Route Alignments between St. Clair College and Howard Avenue

Two route alignment options were studied for the area between St. Clair College and Howard Avenue. Option 1 considers a widening of the present roadway corridor more to the north (Windsor) side of Highway 3, whereas Option 2 considers a widening of the corridor more to the south (LaSalle) side of Highway 3.

The air dispersion modelling results indicate that there is little difference in the change in $PM_{2.5}$ and NO_x concentrations between Option 1 and Option 2 at receptors located within 50 m (164 ft) of the ROW between St. Clair College and Howard Avenue. Receptors within 50 m (164 ft) of the proposed ROW experience slightly lower maximum predicted NO_x and $PM_{2.5}$ concentrations with the Option 2 alignment versus the Option 1 alignment under certain conditions. This difference is primarily due to the change in the proximity of these receptors to the proposed ROW. However, on average, there is little to no difference in air quality conditions between Option 1 and Option 2 alignments.

Plaza Alternatives

Four plaza alternatives were studied (Plazas A, B, B1 & C) in this phase of the assessment. The results indicate that each of the four plaza alternatives studied results in increases in the predicted maximum $PM_{2.5}$ and NO_x concentrations in the vicinity of the plaza. These increases are experienced up to 250 m (820 ft) away from the property boundaries of each plaza under certain conditions. The effects of Plazas B, B1 and C are predominantly seen in the area to the west of Ojibway Parkway/E.C. Row Expressway interchange at non-sensitive receptors. None of the plaza options would result in a discernible difference in the maximum predicted concentrations for Sandwich Towne.

Crossing Alternatives

Three bridge crossing alternatives have been studied. The results of the atmospheric dispersion modelling indicate that each of the three crossing alternatives results in increases in the predicted $PM_{2.5}$ and NO_x concentrations within 250 m (820 ft) of the crossings and the approach roadways between each plaza and bridge under certain conditions. The area to the west of Ojibway Parkway/E.C. Row Expressway interchange will be impacted by changes in the predicted concentrations of $PM_{2.5}$ and NO_x resulting from Crossings A and B are primarily seen in the area to the west of Ojibway Parkway/E.C. Row Expressway interchange. In Sandwich Towne, there is no discernible difference in the predicted maximum $PM_{2.5}$ and NO_x concentrations from these crossing alternatives.

However, Crossing C (including the approach roadway to the crossing from the plaza sites) results in slight increases in the predicted maximum $PM_{2.5}$ and NO_x concentrations in the portion of Sandwich Towne within 250 m (820 ft) of this crossing compared to the no-build alternative. This occurs during certain worst-case meteorological conditions (light or no winds).

Next Steps

The following work will be undertaken as part of the assessment of the technically and environmentally preferred alternative.

- Model additional air pollutants and compare MOE criteria and guidelines
- Assess construction impacts
- Assess the need for mitigation measures.

Practical Alternatives Evaluation Working Paper

Air Quality Impact Assessment

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1.0 Introduction

Changes to Air Quality is one of the seven factors being used to assess the potential effects of the various transportation improvement alternatives currently being studied by the Detroit River International Crossing (DRIC) study team.

Due to the proximity to the Canada-U.S. border and the resulting high rate of traffic through the City of Windsor, vehicular emissions and their effect on existing air quality are of concern in the Windsor-Essex area. The City of Windsor also has a relatively high fraction of diesel powered transport trucks that are used to move goods into and out of Canada. Diesel exhaust is highly visible, and there is increasing evidence that there are health effects associated with it. Thus, a primary objective of the Air Quality Assessment is to have a transportation solution that not only improves transportation in the Windsor-Essex area, but also improves the overall air quality relative to existing conditions or "No Build" in the local area, if possible.

This report outlines the methodology and tools used to conduct the Air Quality Assessment and presents the results and evaluation of each of the alternatives studied. The methodology follows that outlined in the Air Quality Work Plan (*February 2006*) which was circulated to various authorities for review and comment.

The focus of this report is to determine the relative impacts of each modelled scenario when compared to the No Build and to determine if any of the alternatives offer appreciable deterioration to air quality relative to each other and to No Build The uncertainties and inevitable variability associated with predicting future traffic flows, weather conditions and emission rates place some limitations on the accuracy of model results; however, the results are useful and acceptable for comparing among various alternatives as any uncertainties will be consistent from alternative to alternative.

This report will support the choice of the Technically and Environmentally Preferred Alternative (TEPA). As per the Air Quality Work Plan (February 2006), analysis of the TEPA will include additional contaminants, refinements of the modelling parameters, if required, and other more detailed information.

This assessment identifies predicted changes in particulate and gaseous pollutant concentrations. The effects of these changes on adjacent sensitive receptors (e.g. homes and schools) are discussed in the *Practical Alternative Work Paper - Social Impact Assessment (April 2008)*.

1.1 Practical Alternatives Under Assessment

Five practical alternatives for the Access Road were presented in the public in March 2006 at the second round of DRIC Public Information Open Houses (PIOH). The alternatives are all located within the Area of Continued Analysis (ACA) as shown in Figure 1.1. Figure 1.2 summarizes the differences in road configurations of the alternatives.

Following the PIOH in December 2006, a Parkway alternative was developed for the access road based on the below-grade and tunnel alternatives (Alternatives 1B, 2B and 3) and reflecting the study goals and the community input received. With the Parkway, the

access road for international traffic would be below-grade from Howard Avenue to E.C. Row Expressway, with a number of tunnels. The Right of Way is also expanded in sections with the Parkway to provide additional buffer.

The six practical alternatives for the Access Road are as follows:

- Alternative 1A – At grade freeway with one-way local access service roads located along each side;
- Alternative 1B – Below grade freeway with one-way local access service drives located at grade along each side;
- Alternative 2A – At grade freeway with two-way local access service roads located along the approximate existing Huron Church Road / Highway 3 corridor;
- Alternative 2B – Below grade freeway with two-way local access service roads located at grade along the approximate Huron Church Road / Highway 3 corridor;
- Alternative 3 – Tunneled freeway with two-way local access service roads located at-grade along the approximate Huron Church Road / Highway 3 corridor; and
- Parkway Alternative - A below grade six-lane freeway with a series of tunnels ranging in length from 120 m to 240 m. Service roads include both two-way and one-way segments located adjacent to the freeway. The tunnel locations are shown in Figure 1.3.

In addition to these six alternatives, Alternatives 1A – 2B have two different alignment options (Option 1 & Option 2) between St. Clair College and Howard Avenue. Option 1 and Option 2 were included in the assessment. The Right of Way (ROW) for each of these alignment options is shown below in Figure 1.4.

FIGURE 1.1 - KEY PLAN OF THE AREA OF CONTINUED ANALYSIS

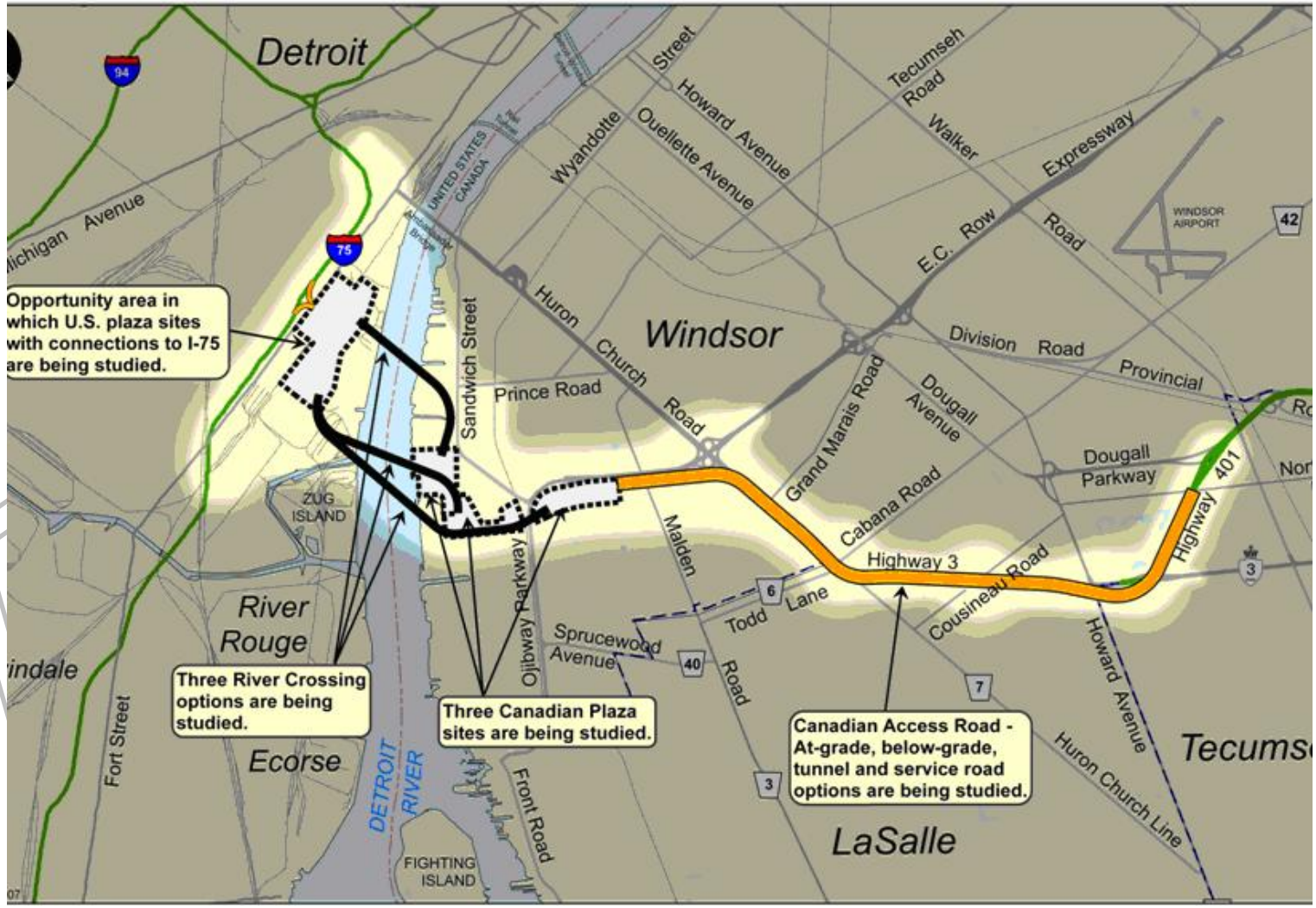


FIGURE 1.2 - SUMMARY OF ALTERNATIVE CONFIGURATIONS

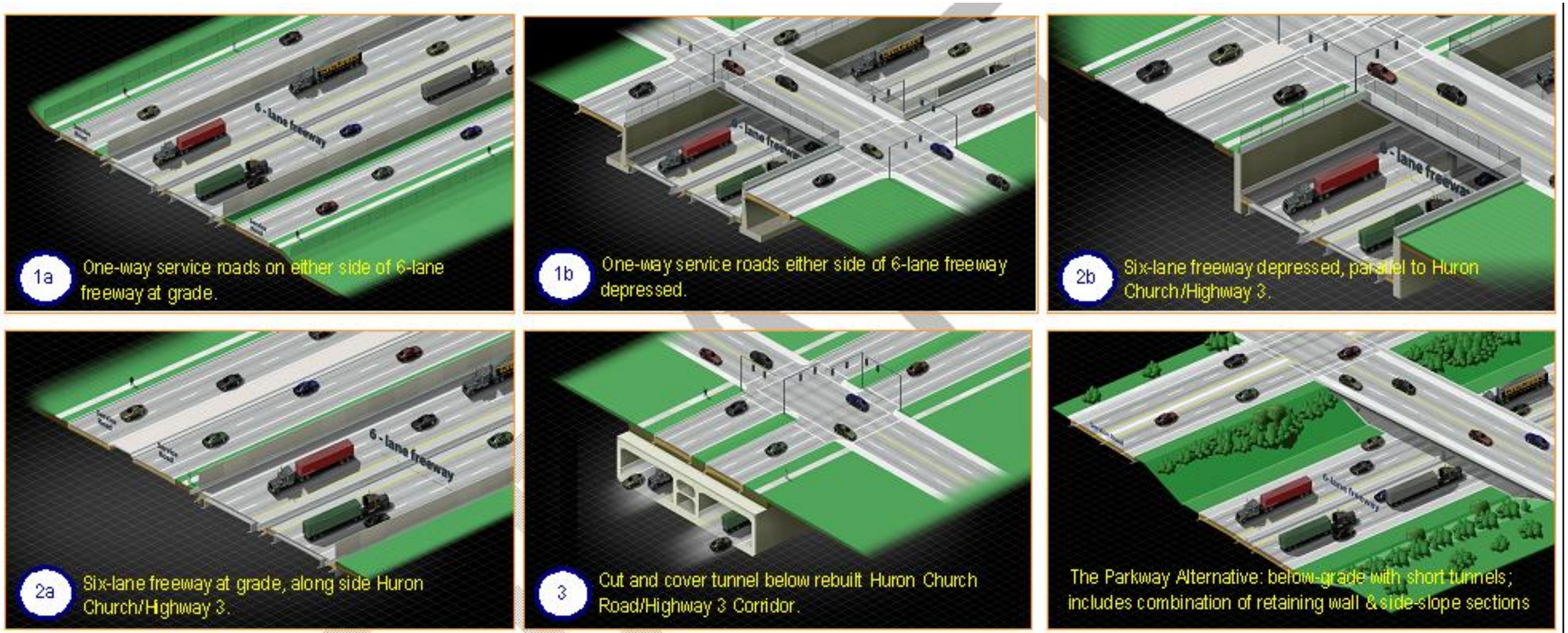
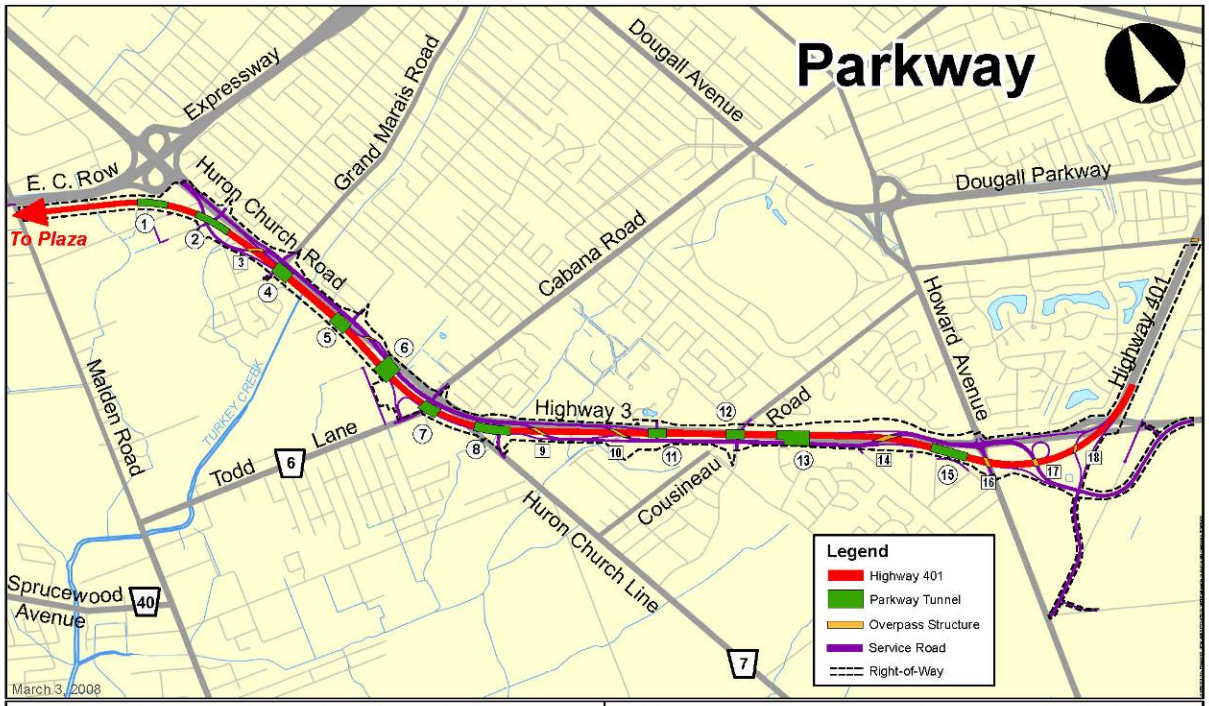


FIGURE 1.3 - PARKWAY TUNNEL CONFIGURATIONS

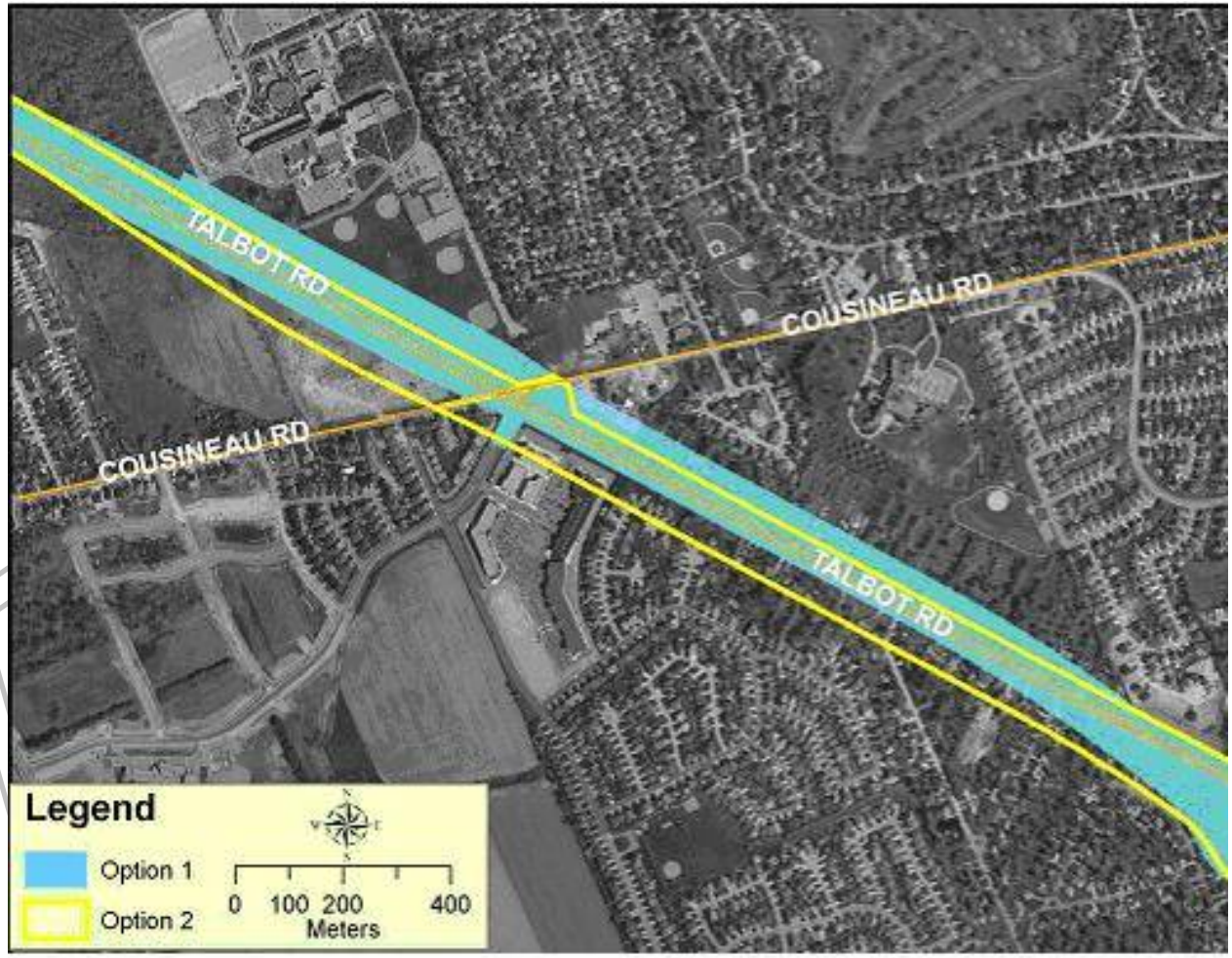


I.D.	Location of Tunnel	Tunnel Length (M)	Roof Area (Sq M)
①	Spring Garden	200	9,000
②	Ramp N-E and Labelle Street	240	10,810
④	Grand Marais Road West	120	9,550
⑤	Pulford Street	120	9,705
⑥	Reddock St	120	15,320

I.D.	Location of Tunnel	Tunnel Length (M)	Roof Area (Sq M)
⑦	Cabana Road West	120	8,300
⑧	Huron Church Line	240	14,400
⑪	St. Clair College	120	7,225
⑫	Cousineau Road	120	7,225
⑬	Hearthwood Place	220	19,250
⑮	Oliver Estates Area	240	13,200

Structures 3 9 10 14 16 17 18 are proposed as roadway overpasses

FIGURE 1.4 - RIGHT OF WAY FOR OPTION 1 AND OPTION 2 ALIGNMENTS

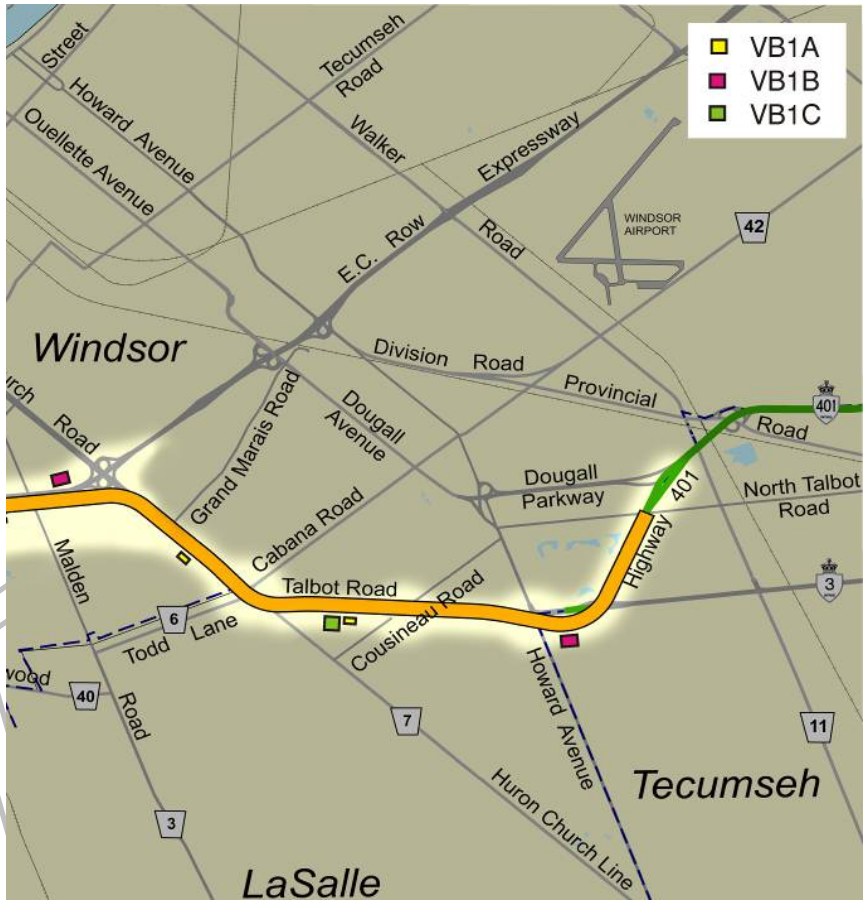


Also, four separate ventilation options were studied for Alternative 3. These are as follows:

- VB1A – use of two separate ventilation buildings to circulate and remove air from the tunnel. One vent building located approximately 1/3rd of the distance from the south tunnel entrance/exit at the present Highway 401 terminus at Highway 3; the second vent building located approximately 1/3rd of the distance from the north tunnel entrance and exit, which is half way between Malden Rd. and Huron Church Road.
- VB1B – use of two separate ventilation buildings at the main tunnel entrances/exits to circulate and remove air from the tunnel. One vent building located approximately at the present Highway 401 terminus at Highway 3; the second vent building located approximately half way between Malden Rd. and Huron Church Road.
- VB1C – use of a single ventilation building at the approximate half way point of the tunnel to circulate and remove air from the tunnel. One vent building located in the vicinity of Todd Lane/Cabana Rd.
- Jet Fans – use of multiple jet fans located in the tunnel interior to continuously circulate the tunnel air; assumes no vent buildings required.

The locations of the three vent building options are shown on Figure 1.5 below.

FIGURE 1.5 - TUNNEL VENTILATION BUILDING OPTIONS

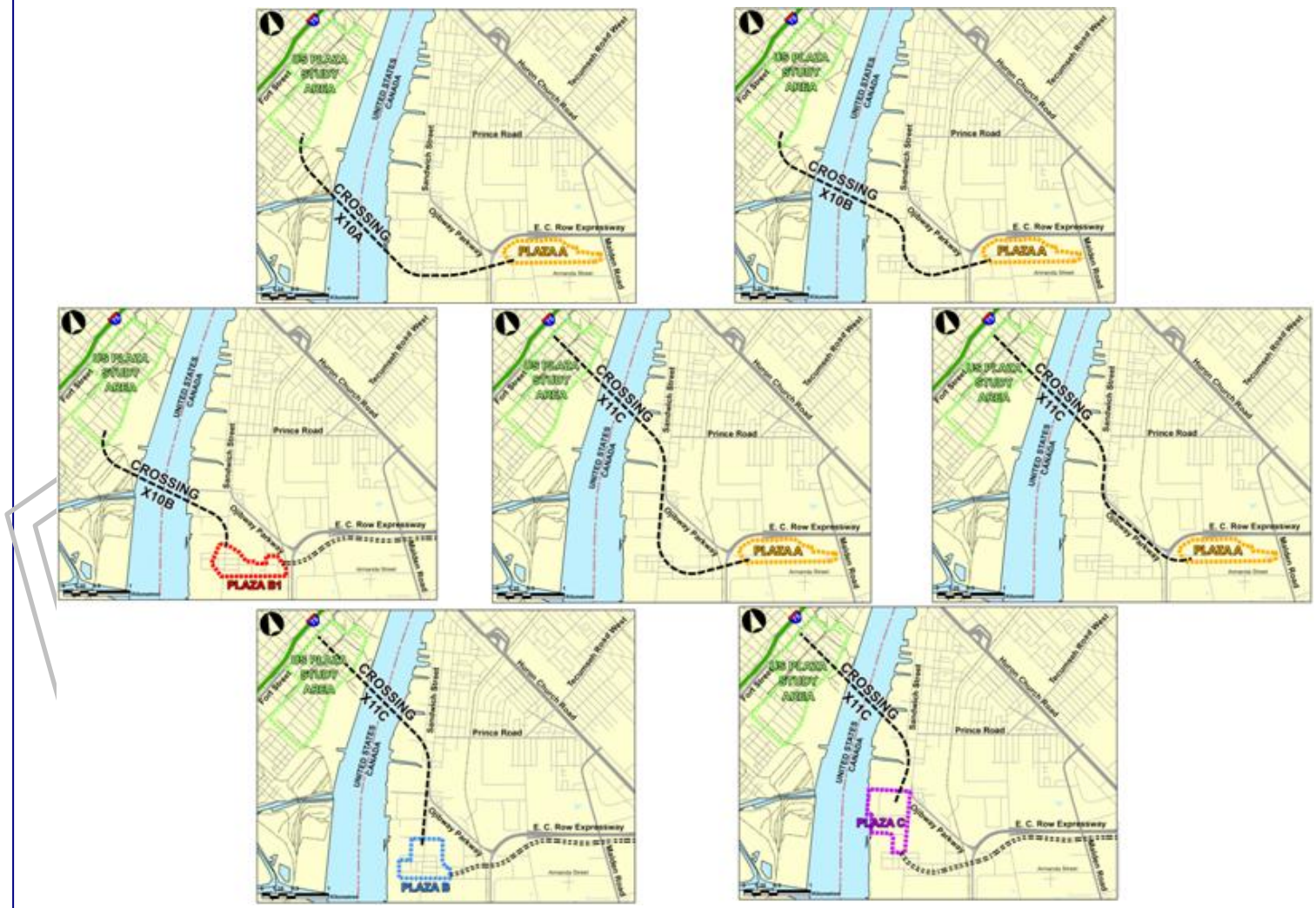


Four Plaza Alternatives and three river Crossing Alternatives were also examined, in various combinations. Each Plaza Alternative typically had several potential Crossing Alternatives, as follows:

- Plaza A
  - to Crossing A
  - to Crossing B
  - to Crossing C
- Plaza B
  - to Crossing C
- Plaza B1
  - to Crossing B
- Plaza C
  - to Crossing C

The different Canadian plaza and crossing Alternative combinations are presented in Figure 1.6 below.

FIGURE 1.6 - PRACTICAL CANADIAN PLAZA AND CROSSING ALTERNATIVE COMBINATIONS



Potential air quality effects of the six practical alternatives for the access road, four Tunnel Ventilation Alternatives and seven combinations of Plaza/Crossing Alternatives were assessed in accordance with the Air Quality Impact Assessment Work Plan developed for the DRIC Study, using a combination of existing air monitoring data in combination with air dispersion modelling. Air dispersion modelling was used to assess the impacts of future changes, such as implementation of the alternatives and, in addition, changes in fuels, vehicle technologies and traffic volumes. The model choice for most of the alternatives is CAL3QHCR with the exception of the end-to-end tunnel alternatives which used ISCST3 for the tunnels. CAL3QHCR is specifically designed to assess impacts from roads and highways. The model incorporates the differences between moving vehicles, and queued vehicles that are idling, as well as differences in roads that are "at grade", below grade and bridges.

Two indicator pollutants were selected for this phase of the analysis to represent one gaseous compound and one particulate compound. These are Particulate Matter less than 2.5 microns ($PM_{2.5}$) and Nitrogen Oxides (NO_x). Changes in the total predicted concentrations of these two air pollutants were compared for each alternative, as well as to existing conditions and a future "do nothing" condition.

1.2 Area of Investigation

Since air quality is not limited by local political boundaries, a relatively broad area was included in the Air Quality Assessment. This comprised an approximate 10 km x 10 km area in West Windsor, from just south of the present Highway 401 terminus at Highway 3, 10 km north and 10 km west to the Detroit River. This is approximately the area depicted in Figure 1.1 that was presented earlier.

Potential air quality effects from roadways decrease with increasing distance from the roadway. Therefore, the greatest effects will occur immediately adjacent to the roadway. For assessment of the potential affects on air quality of the Access Road Alternatives and Crossing Alternatives, an area located within 250 m on either side of the Right of Way (ROW) of each proposed Alternative was studied. Similar to the connecting route alternatives, the Plaza Alternatives were assessed within 250 m of the proposed facility property lines.

2.0 Existing Environmental Conditions

Assessment of the existing environmental conditions in the Windsor area is an important first step in the analysis of the various alternatives being studied. The existing conditions represent the benchmark to which future changes must be added (such as future traffic growth without implementation of any project related Alternatives). The benchmark and future changes form the baseline conditions, and are also known as the No Build Alternatives (one for each horizon year). All future changes related to the project are added to the existing conditions and evaluated against the baseline condition.

2.1 Climate and Meteorological Data

Characterization of the existing climate and meteorological conditions in the vicinity of the Huron Church Road / Highway 3 corridor is important because these are the main forces driving contaminant transport (dispersion) in the atmosphere. The direction and speed of the wind dictates the location and distance from the source that the pollutants may travel. The factors that influence the contaminant mixing in the atmosphere are described below.

The Windsor-Essex area has a middle latitude humid continental climate affected by Lake Erie and Lake St. Clair. The region is characterized by pronounced seasonal differences of weather and by a highly variable day-to-day weather pattern. Some periods in summer are essentially humid tropical (high temperatures, high humidity, afternoon thunderstorms, etc.). Some periods in winter are effectively polar (very cold, clear, dry). Precipitation occurs throughout the year.

The surface meteorological data used in the air dispersion modelling was obtained from the Windsor Airport meteorological station (2000 – 2004) which is approximately 5 – 7 km east of the Huron Church Road / Highway 3 corridor. It is well exposed and represents the general wind flow pattern in the vicinity of the corridor since the area is generally flat. The upper air measurements used are from the closest upper air station in Pontiac, Michigan, which is located approximately 30 km northwest of the DRIC study area. In order to be considered representative, the wind and temperature data should be obtained from within 100 km of the study area, and the upper air data (which is a regional parameter) should be within 300 km. The stations used for this study are well within these parameters.

2.1.1 Near-Surface Temperature

Temperature and precipitation normals for the Windsor Airport (1971-2000) are presented in Table 2.1. "Normals" is the term commonly used for values of climatic elements averaged over a fixed standard period of years (usually 30 years).

Temperature near the surface of the earth controls the buoyant component of turbulence (vertical motion). Heat from the earth's surface heats the air near the ground causing it to rise. This mechanism reaches a maximum in early afternoon and is at a minimum near sunrise. This affects the dispersion of air pollutants through the influence of "thermal mixing" as the air mass rises.

Table 2.1 indicates that the mean (averaged over 30 years) daily minimum temperature is –8.1°C in January and daily maximum temperature is 28°C in July at the Windsor Airport site. The annual mean temperature is 9.4°C.

TABLE 2.1 - WINDSOR AIRPORT CLIMATE NORMALS (1971-2000)

Temperature	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Daily Average (°C)	-4.5	-3.2	2	8.2	14.9	20	23	21.6	17	11	4.6	-1.5	9.4
Standard Deviation	2.9	2.7	2.1	1.6	2.1	1.3	1.1	1.2	1.3	1.7	1.7	2.7	0.8
Daily Maximum (°C)	-0.9	0.6	6.4	13	20.5	25	28	26.6	23	16	8.3	1.9	14
Daily Minimum (°C)	-8.1	-7	-2.4	3	9.3	15	17	16.6	12	6.2	0.9	-4.8	4.9
Precipitation													
Rainfall (mm)	29	33	55.6	81	80.7	90	82	79.7	96	64	67	47	805.2
Snowfall (cm)	35	28	20.6	4.3	0	0	0	0	0	0.7	8.3	30	126.6
Precipitation (mm)	58	57	75	85	80.8	90	82	79.7	96	65	76	75	918.3
Days with Rainfall													
>= 0.2 mm	5.7	5.6	9.4	12	11.8	11	10	10	11	11	11	7.9	115.7
Days With Snowfall													
>= 0.2 cm	13	9.1	6.7	2.3	0.03	0	0	0	0	0.3	3.8	10	45
Days with Precipitation													
>= 0.2 mm	15	12	13.9	13	11.8	11	10	10	11	11	13	15	146.7
Wind													
Days with Winds >= 52 km/hr	1.9	1.4	2.5	1.8	1.1	0.9	0.7	0.3	0.4	0.5	1.2	1.2	14
Days with Winds >= 63 km/hr	0.6	0.4	0.7	0.7	0.5	0.3	0.4	0.2	0.1	0.2	0.3	0.3	4.7

Source: Environment Canada website, http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html

The meteorological file used in the air dispersion modeling for this project requires hourly temperatures for each day in the year.

2.1.2 Precipitation

Precipitation acts as an atmospheric cleansing mechanism, as contaminants in the air are generally washed out by precipitation. More precipitation produces more washout. For this study, the role of precipitation in the removal of pollutants from the air was not considered, thereby generally providing conservatively high ground level concentrations.

As shown in Table 2.1 above, the Windsor area normally receives a total of 918.3 mm of precipitation per year, including 805.2 mm of rainfall and 126.6 cm of snowfall. The maximum mean monthly rainfall is 96.2 mm, which occurs in September.

2.1.3 Atmospheric Stability

Normally, temperature decreases with increasing height above sea level. The relationship of the actual vertical temperature to the near-surface temperature determines the atmosphere's ability to resist or enhance vertical motion. The amount of vertical motion is a measure of the stability of the atmosphere.

The atmosphere can have three general stability states - unstable, neutral and stable. The stability scale normally used for air quality simulations varies from very unstable (A) through neutral (D) to very stable (F). The stability class distribution for the Windsor Airport station for the period 2000 - 2004 is presented in Table 2.2. At this station, neutral stability conditions {D (neutral) + C (near neutral)} occur approximately 67% of the time and stable conditions (E, F) about 28% of the time. Stable conditions can produce higher concentrations of contaminants because of reduced turbulent mixing.

TABLE 2.2 - STABILITY CLASS DISTRIBUTION - WINDSOR AIRPORT (2000-2004)

Stability Class	% Frequency						Descriptor
	2000-2004	2000	2001	2002	2003	2004	
A	0.5	0.4	0.8	0.6	0.4	0.4	Unstable
B	4.2	3.6	4.6	4.4	4.4	3.9	
C	10.1	10.6	10.3	9.8	9.9	9.9	Neutral
D	57.0	56.0	56.2	57.1	57.0	58.6	
E	13.3	13.6	14.0	13.2	12.8	13.1	Stable
F	14.9	15.8	14.2	15.0	15.5	14.1	

The meteorological file used in the air dispersion modeling for this project requires hourly stability classes for each day in the year.

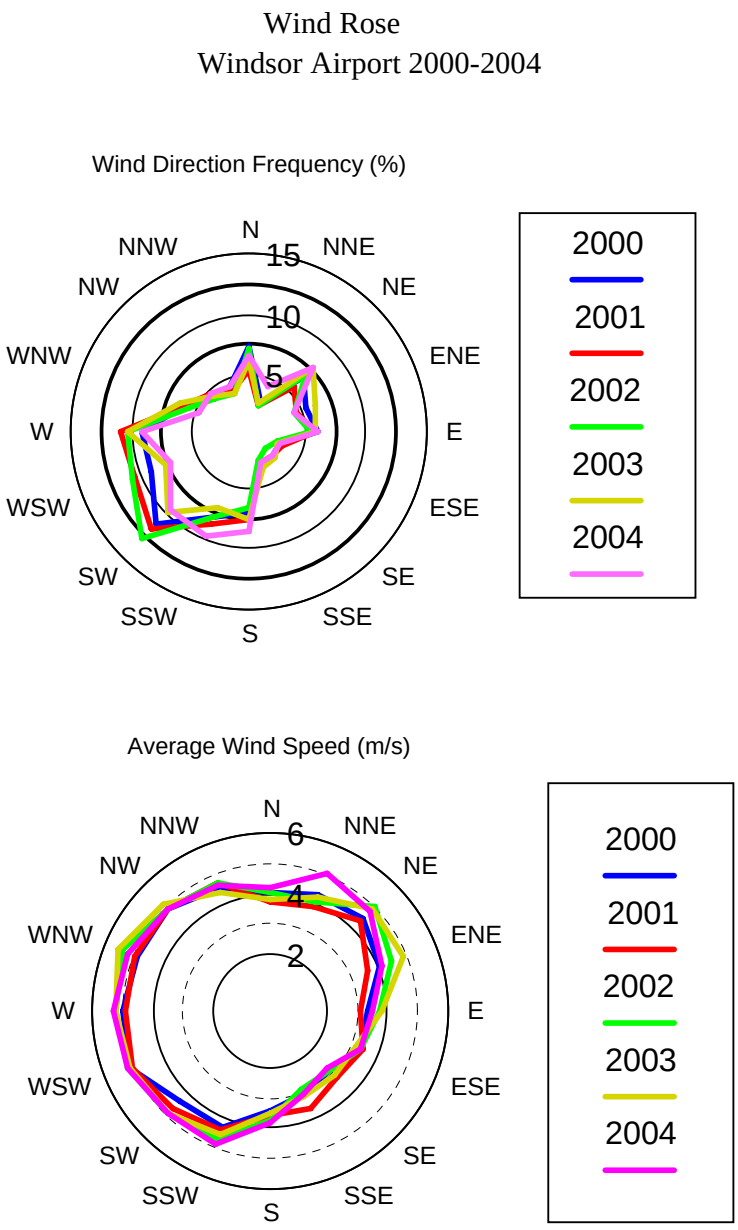
2.1.4 Wind Direction

Wind direction is reported as the direction from which the wind blows and is based on surface (10 meter) observations. In general terms, if the wind does not blow toward a receptor, there will be no impact from an upwind emission source. The wind blows in all directions with varying frequencies. Certain directions occur more frequently than others. These are known as the prevailing wind directions.

Figure 2.1 presents a wind rose for the Windsor Airport for the years 2000 - 2004. The prevailing wind is from the southwest, primarily during the summer months, with winds blowing from the west through southwest directions (i.e., from Southeast Michigan) approximately 32% of the time.

The dispersion modelling for this study uses the hourly wind directions of each day in the year.

FIGURE 2.1 - WIND ROSE - WINDSOR AIRPORT (2000 - 2004)



2.1.5 Wind Speed

Contaminant concentrations decrease with increasing wind speed as a result of atmospheric mixing. The wind speed used in the air quality modelling is based on surface observations from the Windsor Airport. Wind speed increases with height as surface friction is reduced. Variation of wind speed with height is built into the dispersion model used in this assessment. When wind speeds are high, there is good dispersion of gases

and particles, but more potential for re-suspension of surface dust. When wind speeds are near zero, the primary mechanism of pollutant transport away from a source is via diffusion, which can lead to very high pollutant concentrations near the ground. Calms were recorded 4.3% of the time at the Windsor Airport meteorological station (Figure 2.1) during 2003 compared with 3.6% for the 2000 – 2004 period.

The meteorological file used in the air dispersion modeling for this project requires hourly wind speed and directions for each day.

2.1.6 Mixing Height

Another very important parameter in the dispersion of contaminants from a source is the "mixing height". This is the vertical extent through which the plume can be mixed. With a higher mixing height, there is a larger volume of air available within which the pollutants can mix, which results in lower concentrations. With a lower mixing height, the plume may become trapped resulting in higher concentrations.

The concept of mixing height is founded on the principle that heat transferred to the atmosphere at the earth's surface results in convection, vigorous vertical mixing and the establishment of a dry-adiabatic lapse rate [Holzworth 1967]. For annual and 24-hour average concentrations, the mixing height does not have much effect on the modelled ground level concentrations [Young & Radonjic 1993]. For 1 hour average concentrations, however, mixing height is very important. The use of variable mixing heights, that are as close to the actual conditions as possible, improves the ability of the model to accurately predict downwind concentrations. For the sources that are close to the ground, the mixing heights do not play a major role.

The closest station having the upper air data necessary for this study is the Pontiac, Michigan. The mixing height data for each day in the 5-year meteorological period (2000 - 2004) was developed using the Holzworth methodology. The surface values and the mean monthly minimum (morning) and maximum (afternoon) mixing heights were then pre-processed through the U.S. EPA meteorological pre-processor (PCRAMMET) [U.S. EPA 1998] which combines surface and upper air measurements to create the hourly mixing heights which are required by the dispersion model. Missing data was filled in by interpolation. There were no significant blocks of data missing from this meteorological data set.

2.2 Assessment Criteria

Environment Canada and the Ontario Ministry of the Environment (MOE) have set air quality objectives, and air quality standards and criteria, respectively for various air pollutants.

Ontario Regulation 419/05 (O.Reg. 419/05) made under the *Ontario Environmental Protection Act* (EPA) defines maximum concentration levels for various air contaminants at a Point of Impingement (POI), arising from an industrial facility or similar operation. The POI is generally defined as the off property location where the maximum concentration resulting from a facility emission occurs. However, if there is a child care facility, health care facility, senior citizens' residence or long-term care facility or educational facility on the property in question these locations become the designated POI location.

Facility property boundaries are most often used as the POI. With the exception of the ventilation buildings assessed for Alternative 3, the emissions in this assessment are from open, public sources, and thus are not subject to MOE POI standards and criteria (ventilation buildings are assessed against POI criteria to determine the necessary property footprint).

In addition, Section 14 of the *Ontario Environmental Protection Act* (*EPA*) prohibits a facility or operation to cause an adverse effect. The definition of "adverse effect" in the *EPA* includes, but is not limited to:

1. impairment of the quality of the natural environment for any use that can be made of it; and,
2. loss of enjoyment of normal use of property.

The Ontario Ministry of the Environment (MOE) as a component of the MOE standard setting process has developed a list of the Ambient Air Quality Criteria (AAQCs). The AAQCs are effect-based levels in air, with variable averaging time (e.g., 24-hour, 1 hour and 10 minutes) appropriate for the effect that it is intended to protect against. The AAQCs, which represent desirable levels in ambient air, are used for assessing general air quality and the potential for causing an adverse effect. The Standards Development Branch of the MOE publishes a set of guideline limits in *Ontario's Ambient Air Quality Criteria* [MOE, 2008].

Federal Air Quality Objectives encompass three levels of air quality objectives: maximum desirable level (MDL), maximum acceptable level (MAL) and maximum tolerable level (MTL). The MAL is intended to provide adequate protection against effects on soil, water, vegetation, materials, visibility, personal comfort and well-being. The MAL is considered to be a realistic objective. When the MAL is exceeded, the need for control action by a regulatory agency is indicated. Table 2.3 summarizes the applicable available criteria from the MOE and Environment Canada.

TABLE 2.3 - AIR QUALITY CRITERIA FOR $PM_{2.5}$ AND NO_X

Contaminant	Averaging Time	MOE AAQC µg/m³ (ppb)	Federal AQ Objective or Maximum Acceptable Level (MAL) (µg/m³)
NO_x (as NO_2)	1 h	400 (200)	-
	24 h	200 (100)	-
	Annual	-	100[1]
$PM_{2.5}$	24 h	-	30 *

Notes
NO_x – nitrogen oxides – sum of nitrogen dioxide (NO_2) and nitric oxide (NO)
$PM_{2.5}$ includes all particulate matter with an aerodynamic diameter less than 2.5 µm – considered respirable
[1] MAL is for NO_2
- Indicates no criterion available
* comes into force in 2010

Emissions of NO_x and $PM_{2.5}$ from the vehicles traveling on the freeway and the local service roads, other local arterial roadways, local industry and transboundary pollution from the southeastern United States have the greatest potential to impact local air quality. NO_x is the sum of nitrogen dioxide (NO_2) plus nitric oxide (NO). At present, there is no provincial annual AAQC for NO_x, but there is a federal MAL for NO_2. The assessment was conservatively completed assuming that 100% of the NO_x is NO_2. Typically, NO_2 comprises approximately 60% of total NO_x. With respect to $PM_{2.5}$, the MOE does not currently have an AAQC for $PM_{2.5}$. Instead, they have adopted the Canada Wide Standard (CWS) for $PM_{2.5}$, which is a Federal air quality objective that comes into force in 2010. Unlike the POI criteria in Ontario Regulation 419, it is not a legally enforceable standard that can be applied to specific sources. However, non-attainment of the CWS may indicate that regional action is required to reduce emissions.

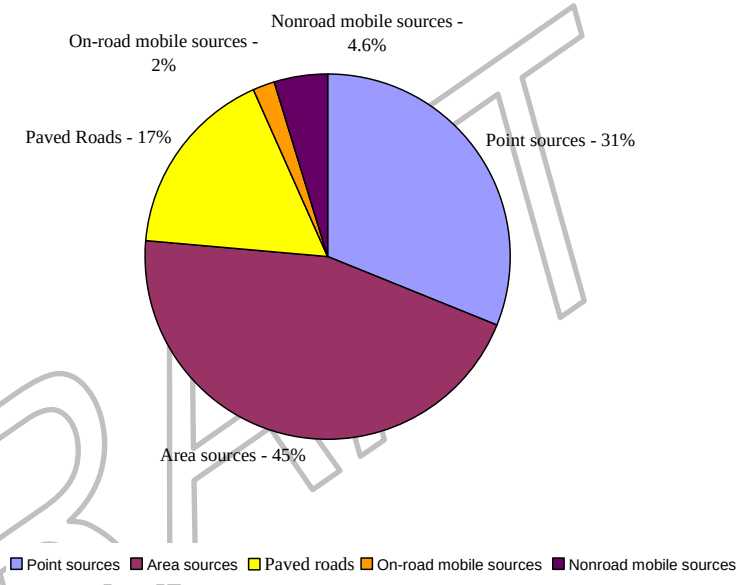
2.3 Existing Air Pollutant Concentrations

The Ontario Ministry of the Environment (MOE) measures air contaminants at various locations throughout Ontario, and reports on the state of Ontario's air quality on an annual basis. These reports are known as "Air Quality in Ontario" reports.

The existing air quality is greatly influenced by local and long range (cross-border) contaminants generated in upwind urban and industrial areas. The predominant wind directions in Windsor are from the west to southwest, which bring contaminants from the heavily industrialized areas of Detroit, nearby communities and beyond. Air quality impacts in the area are dominated by the substances that combine to produce smog or acid rain. This includes both NO_x and $PM_{2.5}$.

Figure 2.2 presents a breakdown of $PM_{2.5}$ emissions in Southwestern Ontario in 2000 (adapted from Environment Canada Great Lakes Basin Airshed Management Framework Pilot Project).

FIGURE 2.2 - $PM_{2.5}$ EMISSIONS IN SOUTHWESTERN ONTARIO (2000)



2.3.1 Ambient Monitoring Data

The MOE has historically operated a number of ambient air monitoring stations in Windsor. However, in recent years the number of fully operational stations has been reduced to two. These stations are located at:

1) 467 University Ave. (Station #060204 C);

2) College / South St. (Station #060211R);

The locations of these monitoring stations in relation to the DRIC Area of Continued Analysis are presented in Figure 2.3.

To assess the existing air pollutant concentrations in the area, monitoring data from these two stations were obtained from the MOE [MOE 2000 - 2005]. The MOE AAQCs are based on Nitrogen Dioxide (NO_2) measurements rather than total NO_x, thus the NO_2 data has been presented. Tables 2.4 and 2.5 present a summary of the measurements for NO_2 and $PM_{2.5}$ respectively.

TABLE 2.4 - FIVE YEAR SUMMARY OF MOE MONITORING RESULTS – NO_2

Station ID	Station Location	Averaging Period	Nitrogen Dioxide (µg/m³)						
			AAQC	Year					Ave
				2001	2002	2003	2004	2005	
#060211-R	College / South St.	Average	-	39	37	INS+	33	32	35
		90th Percentile	-	66	62	69	62	62	64
		1-Hour Maximum	400	130	175	182	176	133	159
		24-Hour Maximum	200	83	116	92	79	109	96
#060204-C	467 University Ave.	Average	-	36	36	INS	34	32	35
		90th Percentile	-	62	60	73	68	62	65
		1-Hour Maximum	400	163	130	150	182	124	150
		24-Hour Maximum	200	77	86	94	90	100	89

+ INS = Insufficient data available to compute a representative average

TABLE 2.5 - FIVE YEAR SUMMARY OF MOE MONITORING RESULTS – $PM_{2.5}$

Station ID	Station Location	Averaging Period	$PM_{2.5}$ (µg/m³)						
			AAQC	Year					Ave
				2001	2002	2003	2004	2005	
#060211-R	College / South St.	Average	-	-	11.8	9.6	9.5	10.5	10
		90th Percentile	-	-	26	20	21	24	23
		1-Hour Maximum	-	-	74	64	56	74	67
		24-Hour Maximum	30**	-	56	41	38	52	47
		No. of Times above Benchmark	-	-	18	7	9	9	11
#060204-C	467 University Ave.	Average	-	9.4	9.8	8.5	8.6	10.4	9
		90th Percentile	-	20	21	19	19	24	21
		1-Hour Maximum	-	72	75	64	54	72	67
		24-Hour Maximum	30**	40	56	43	39	48	45
		No. of Times above Benchmark (30 µg/m³)	-	7	10	5	8	12	8

** Canada Wide Standard, NOT AAQC

2.3.1.1 Existing Air Pollutant Concentrations in the Huron Church Rd/Hwy 3 Corridor

As part of the Environmental Assessment, the DRIC team established two ambient air monitoring stations in the study ACA, along the existing Huron Church/Talbot Rd. corridor. The stations were located at the Ontario Public Health Laboratory and to the south of St. Clair College. The location of both the DRIC monitoring stations and the MOE stations are shown in Figure 2.3.

Detailed results from the DRIC monitoring program are included separately in the Air Quality Monitoring Report.

The main purpose of the monitoring program was to collect data on the total pollutant concentrations of various pollutants that are routinely observed in the corridor. The monitoring program commenced in September 2006 and continued to October 2007.

The data are being used to:

- Establish current conditions within the corridor;
- Assist in determining background air concentrations of the pollutants being measured; and,
- Benchmark the air dispersion modelling.

In addition to $PM_{2.5}$ and NO_2 which are discussed in this assessment, additional contaminants were included in the monitoring program and will be considered in the analysis of the TEPA.

FIGURE 2.3 - MOE MONITORING STATION LOCATIONS AND DRIC MONITORING STATION LOCATIONS

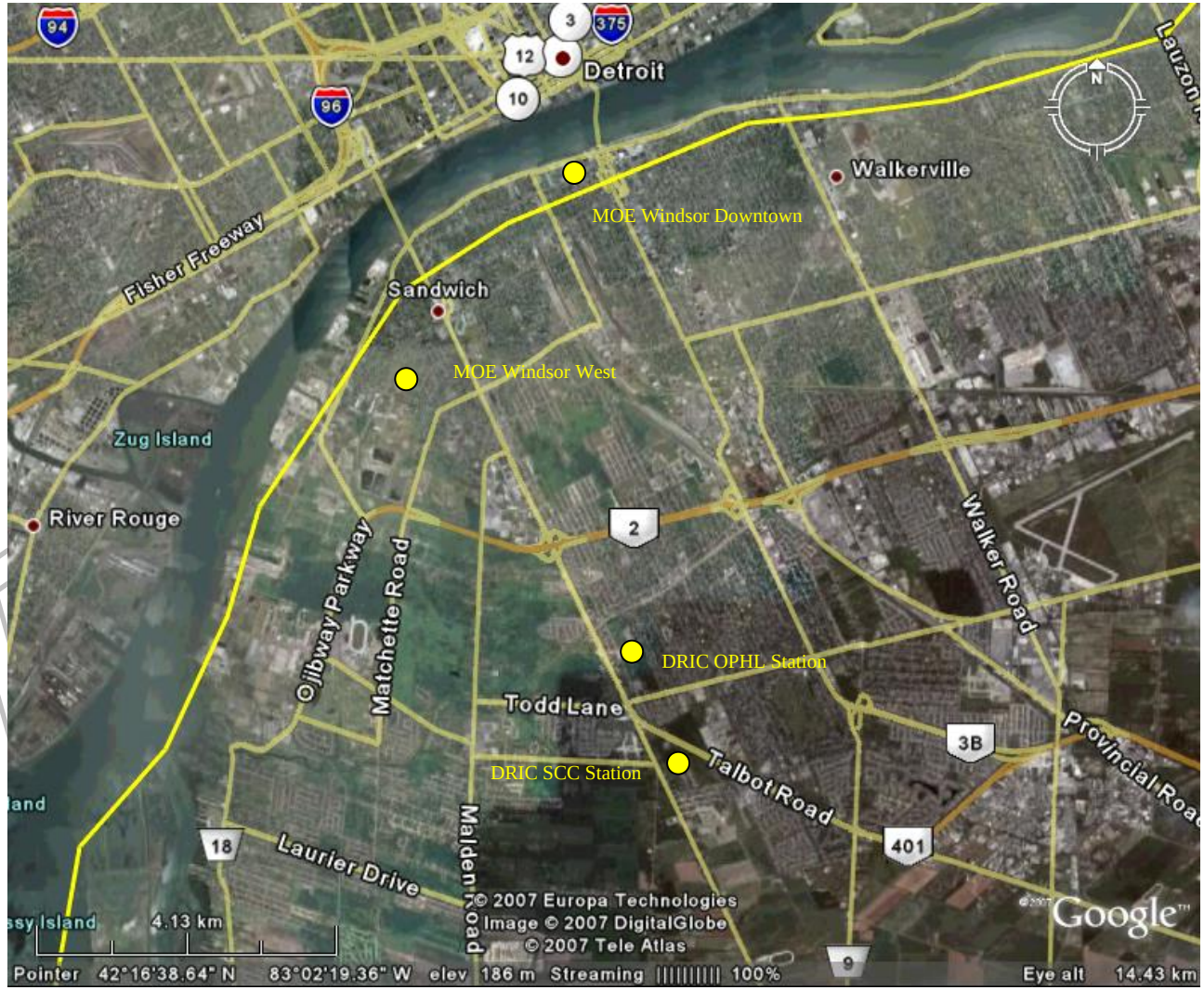


Table 2.6 presents a summary of the $PM_{2.5}$ and NO_2 measurements collected from the two DRIC stations from October 2006 to December 2006. These first quarter results were used to assist in establishing background concentrations for the modeling of the alternatives. While data are currently available for more than just the first quarter, the initial model runs were performed when only limited data was available. To keep the comparisons consistent between alternatives, the first quarter results were used for all alternatives.

Table 2.7 presents a summary of the $PM_{2.5}$ and NO_2 measurements collected from the two DRIC stations from November 2006 through October 2007. After being fully evaluated, these data will be used as part of the final analysis of the preferred alternative.

TABLE 2.6 - SUMMARY OF DRIC 1ST QUARTER MONITORING RESULTS (OCT 07 – DEC 07)

Pollutant	Averaging Time	OPHL	SCC	Average of 2 Stations
NO_2 (1-hr), µg/m^3	Max	85	85	85
	Min	0	0	0
	Average	27	21	24
	90th Percentile	47	39	43
NO_2 (24-hr), µg/m^3	Max	52	50	51
	Min	2	2	2
	Average	26	21	24
	90th Percentile	43	32	38
$PM_{2.5}$ (24-hr), µg/m^3	Max	48	46	47
	Min	8	8	8
	Average	21	20	21
	90th Percentile	32	29	31

TABLE 2.7 - SUMMARY OF DRIC MONITORING RESULTS (NOVEMBER 2006 – OCTOBER 2007)

Pollutant	Averaging Time	OPHL	SCC	Average of 2 Stations
NO_2 (1-hr), µg/m^3	Max	104	110	107
	Min	0	0	0
	Average	27	23	25
	90th Percentile	50	44	47
NO_2 (24-hr), µg/m^3	Max	68	52	60
	Min	3	3	3
	Average	27	23	25
	90th Percentile	43	36	40
$PM_{2.5}$ (24-hr), µg/m^3	Max	48	46	47
	Min	8	7	8
	Average	20	21	21
	90th Percentile	32	33	33

2.3.2 Contribution from Upwind / Background Sources

Air dispersion models provide an estimate of the air pollutant concentrations resulting from emission sources that are specifically included in the model set-up and inputs. Concentrations resulting from other, upwind (areas to the south and west of Windsor) sources are not included, but must be considered when assessing total expected air pollutant concentrations against relevant standards and guidelines. This is typically done by adding a "background component" to all model predicted results. The Ontario Ministry of the Environment (MOE) generally advocates the use of 90th percentile air pollutant concentrations obtained from ambient air monitoring stations for this purpose (i.e., background concentrations are lower 90% of the time). This approach is considered to provide a conservative estimate of background concentrations.

Data on the existing air pollutant concentrations in the Windsor area were obtained from the two MOE air monitoring stations. Given their locations in an urban setting, data from the MOE stations reflect local traffic. The MOE data therefore provide somewhat higher background concentrations of pollutants such as NO_x and $PM_{2.5}$ than might otherwise be observed at stations further from traffic but upwind (i.e. south and west) of the study area. However, for the DRIC Study, the two MOE stations were considered to be far enough away from the Huron Church/Highway 3 corridor that existing traffic conditions from this corridor would not be impacting the MOE monitors to any notable degree.

Tables 2.4 and 2.5 indicate that the average 90th percentile measured concentrations at each of the MOE stations are 23 and 21 ug/m^3 for 1-hour $PM_{2.5}$ and 64 and 65 ug/m^3 for 1-hour NO_2. The first quarter data from the two DRIC air monitoring stations were used in conjunction with the MOE monitoring data in determining the appropriate background concentrations.

As shown in Table 2.6, the average measured concentration at the DRIC stations for the first quarter of monitoring data (Oct 1 – Dec 31st, 2006) was 21 µg/m^3 for $PM_{2.5}$. This

corresponds to the 22 ug/m^3 of the 90th percentile for the MOE monitoring stations. Therefore, for the purposes of background, a rounded value of 20 µg/m^3 was chosen. This value allows for a conservative approach to determining the possible combined effects of the roadway and other contributions to $PM_{2.5}$.

For NO_2 the average value from the DRIC monitoring stations is 24 µg/m^3. The 90th percentile value for the MOE monitoring stations is 65 µg/m^3. Because of the large discrepancy between the MOE and DRIC monitoring stations and the general acceptance by the MOE for 90th percentile values, a conservative rounded value of 70 µg/m^3 was chosen for background for NO_x.

Established background levels will be re-evaluated in greater detail to reflect the full year of monitoring in the Huron Church/Highway 3 Corridor, as appropriate, in assessing the TEPA.

Table 2.8 presents the selected background concentrations used in the DRIC AQ assessment.

TABLE 2.8 - SUMMARY OF BACKGROUND CONCENTRATIONS USED IN DRIC AQ ASSESSMENT

Pollutant	Averaging Time		
	1-hour	24-hour	Annual
NO_x	70 µg/m^3	70 µg/m^3	-
$PM_{2.5}$	-	20 µg/m^3	9 µg/m^3

3.0 AIR DISPERSION MODELLING

Atmospheric dispersion modelling is an essential step in the air quality assessment process as it is the only way to evaluate the impact of future changes in air pollutant emission sources. With respect to the Detroit River International Crossing Study, these changes include implementation of a new access road, plaza and crossing, changes in fuels, vehicle technologies and traffic volumes.

Dispersion modelling is used to predict atmospheric concentrations of pollutants at specific receptors downwind of the source of pollutants over specific averaging times (i.e., annual, daily, hourly). The process involves using a computer model to mimic the way pollutants are emitted from sources, and how the atmosphere disperses them. The model takes emissions from a source, estimates how high into the atmosphere they will go, how widely they will spread and how far they will travel based on hourly meteorological data. The model then outputs the pattern of concentrations that will occur at receptors located downwind of the source for various averaging times.

In general, the maximum air pollutant concentrations (rather than average concentrations) predicted to occur over specific time periods at each receptor are typically used to assess the impact of 'worst case' meteorological conditions. For air quality impact assessment, 'worst case' conditions are usually periods with light wind speeds, when atmospheric dispersion is poor.

3.1 Assessment Methodology

A large amount of data was required to complete the Air Quality Assessment in support of the evaluation of practical alternatives. This included data on existing air pollutant concentrations in the Windsor area, existing and future traffic volumes on the Huron Church Rd./Highway 3 corridor for each connecting route Alternative and Future No-Build scenarios, meteorological conditions in the Windsor area, and geographic information such as the location co-ordinates of roadways and sensitive receptors.

The necessary data was obtained from various sources, including other DRIC team members (i.e., traffic consultant, survey/mapping consultant), Environment Canada and the Ontario Ministry of the Environment (MOE).

The analysis was completed using the following approach:

1. Characterize Existing Environmental Conditions
    a. Acquire Meteorological Data
    b. Compile data on existing $PM_{2.5}$ and NO_x concentration
    c. Determine background concentrations
2. Acquire data on current and future car and truck traffic volumes
    a. Input to model - traffic data for existing and future conditions, including access road, plaza and crossing alternatives

3. Calculate pollutant emission factors for the highway corridor for existing and future conditions
    a. Input to model - vehicle emissions for each road considered in the assessment, for both $PM_{2.5}$ and NO_x with emission factors specific to each horizon year
4. Use air dispersion modelling (primarily CAL3QHCR, with ISCST3 used for tunnel ventilation) with meteorological data from Windsor Airport to determine future air pollutant concentrations in the vicinity of the corridor (essentially all of west Windsor) and at sensitive receptor locations (such as schools).

For the analysis of practical alternatives, an air dispersion model was set up for each of the alternative connecting routes, plazas, and crossings. The selected dispersion model was the CAL3QHCR model, which is specifically designed for roads and highways, and is approved for use in Ontario by the MOE. The model calculates emissions from moving vehicles differently from those that are queued and idling at intersections and inspection plazas. The model also differentiates between at-grade, below-grade and elevated sources.

The evaluation of practical alternative 3 required the assessment of tunnel ventilation buildings and emissions from the tunnel entrance and exit portals. The CAL3QHCR model is not appropriate for these emission sources, and thus another model was required. SENES evaluated both the AERMOD and ISCST3 models for this purpose. While both models are appropriate to use in this assessment, the ISCST3 model was preferred since the same meteorological data file could be used for both ISCST3 and CAL3QHCR models. Use of the AERMOD dispersion model would have required a different meteorological data file, which potentially could have introduced some inconsistencies since the outputs from both the CAL3QHCR and AERMOD/ISCST3 models were being combined. In order to avoid this potential problem, the ISCST3 air dispersion model was selected.

For The Parkway alternative, emissions calculation methodology had to be modified to reflect the use of tunnels and to assess emissions at the portals of these tunnels. The CAL3QHCR model was used for the assessment as it was deemed to be most applicable conventional model for a preliminary assessment.

3.2 Model Inputs and Set-up

Air dispersion models typically require the following inputs: hourly meteorological data, receptor locations, source characteristics, and emission rates.

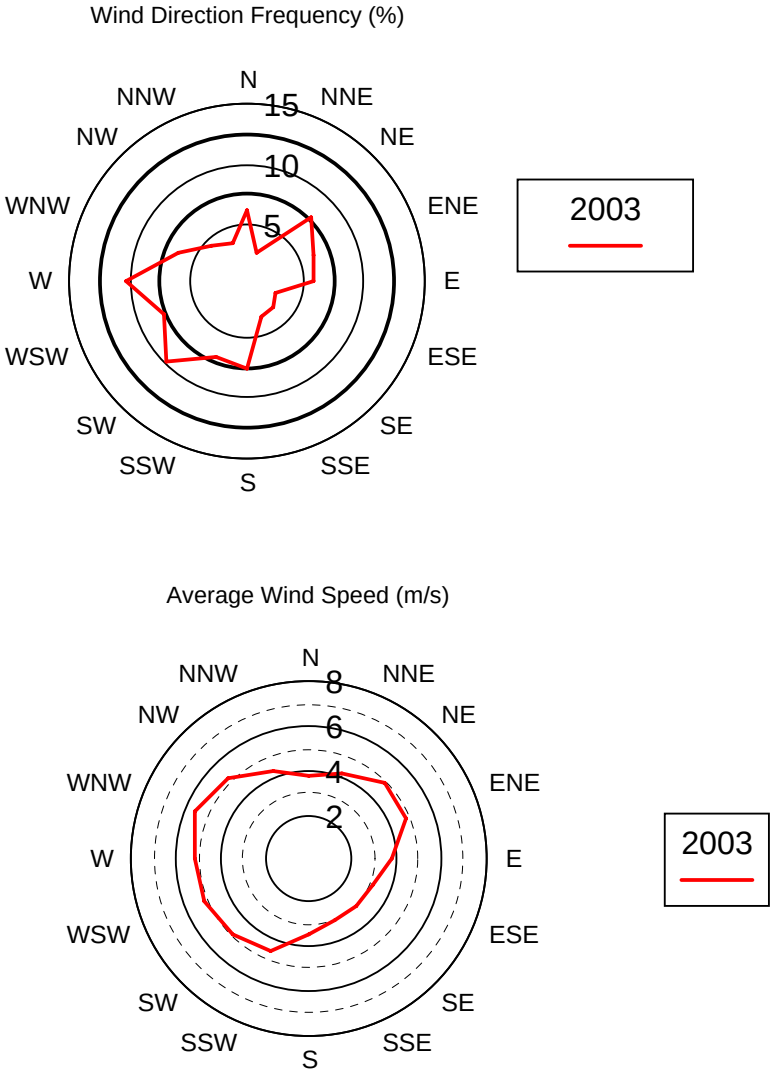
3.2.1 Meteorological Data

In order to simulate how air pollutants will disperse as they move away from a source, air dispersion models use hourly meteorological data to simulate the possible meteorological conditions that are routinely experienced in a specific area. The data typically includes mixing height, temperature, cloud cover, cloud opacity, wind speed and wind direction. These were described in detail in Section 2.1.

For the assessment of practical alternatives, one set of model runs were conducted at the sensitive receptor locations using meteorological data from 2000 through 2004. A maximum year was selected for use in all subsequent analyses. This was done by modeling a test case with the five years of meteorological data, and comparing the results.

The model results indicated that the meteorological data from 2003 generally resulted in the highest atmospheric concentrations for both contaminants evaluated (NO_x and $PM_{2.5}$). Thus, the analysis for all alternatives was completed using this single year of data. The 2003 wind rose is presented in Figure 3.1. As can be seen in the figure, the 2003 wind rose is similar to the 5-year average, except that the 2003 wind speeds are lower in the quadrants from WSW to SSW, and slightly higher in the ENE quadrant. This is consistent with the model results (i.e., slightly higher predicted concentrations) since lower wind speeds results in poorer dispersion conditions.

FIGURE 3.1 - 2003 WINDSOR WIND ROSE

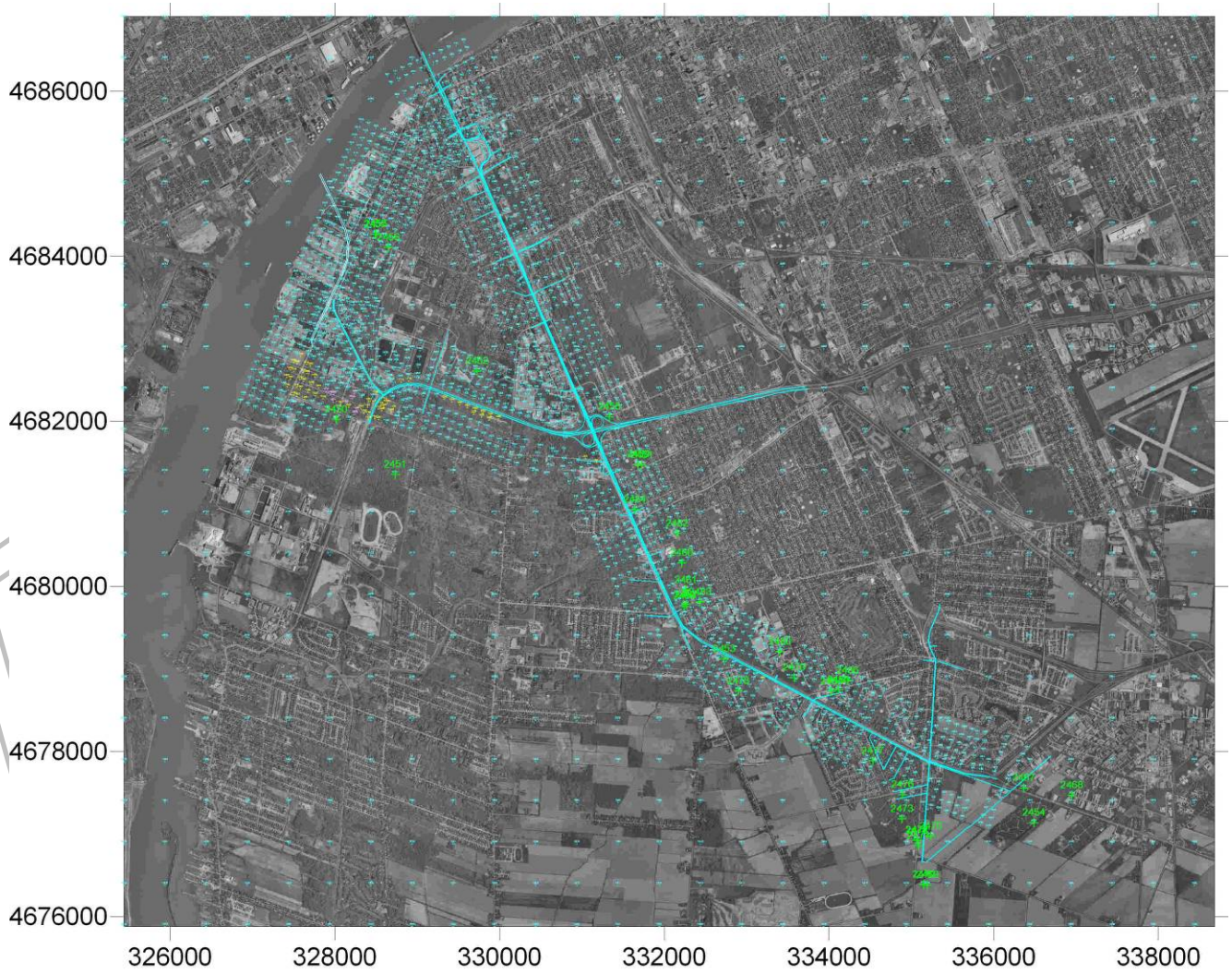


3.2.2 Receptors

A gridded network of receptors was created along the corridor at 100 m intervals that covered an area of 500 meters from the access road on each side. In order to ensure that the worst-case effects were captured in the model results, several grids with different receptor spacing were used within this area. The first two rows of receptors were placed at 50 m intervals from each side of the ROW, followed by 100 m intervals up to 500 m away. Another grid with 500 m x 500 m spacing was then overlaid to cover the rest of the modelling domain, which was essentially all of west Windsor. Any receptors that fell within the proposed ROW were removed to prevent erroneous model results, as the models do not accurately predict air pollutant concentrations at locations on a source (i.e., on the roadway). Sensitive receptors (schools, churches, parks, etc.) were also identified and included in the model runs. A total of 2484 receptors were used in each model run completed for the analysis as shown in Figure 3.2.

For a discussion on how predicted changes in pollutant concentrations will affect sensitive receptors and neighbourhoods, refer to the *Practical Alternative Work Paper - Social Impact Assessment (April 2008).*

FIGURE 3.2 - RECEPTOR GRID



3.2.3 Source Characteristics and Emissions

Each emission source included in an air dispersion model is described and input separately. Source characteristics required for input to the CAL3QHCR model include road segment identification with geographic coordinates, segment width, traffic volumes for free-flowing and idling traffic, and emission factors, which represent vehicle emissions in grams per vehicle kilometer travelled. Additional information on signal timing and intersection capacity was required for road segments where vehicles queue, such as intersections. The Universal Transverse Mercator (UTM) (geographic) coordinates of all road segments and intersections were determined from digital orthographic aerial photographs combined with AutoCAD drawings of the proposed connecting route, plaza and crossing alternatives. All elements were combined in a Geographic Information System (GIS) for data maintenance. Over 700 free-flowing roadway sources (i.e., Highway 401, sections of Huron Church Road) and almost 150 queue sources (i.e., signalized intersections where vehicles wait for a green light) were included in each model run for the assessment of the connecting route alternatives.

Details on the roadway segments considered in the assessment are included in Appendix A.

3.2.3.1 Traffic Volumes

Annual Average Daily Traffic (AADT) volumes for the roadway segments, plazas and crossings for existing conditions (2006) and the future build and no build cases for 2015, 2025 & 2035 were provided by IBI Group and URS Canada. For details on how the traffic predictions were developed, refer to the *Level 2 Traffic Operations Report (February 2008).*

A selection of traffic volumes from the main routes considered in this assessment is presented below in Table 3.1 to illustrate the relative magnitude of the volumes. The full record of traffic data used in the assessment is presented in Appendix A. These data form the basis of the emission calculations used in the dispersion modeling analysis.

TABLE 3.1 - SUMMARY OF TRAFFIC VOLUMES ON MAIN ROADS

LOCATION	SECTION	SCENARIO	24-HOUR AADT							
			2006		2015		2025		2035	
			CARS	TRUCKS	CARS	TRUCKS	CARS	TRUCKS	CARS	TRUCKS
Huron Church Rd / Talbot Road	North of ECR (Malden)	No Build	46619	10495	51466	15109	50865	19582	50178	23384
		Alternatives	0	0	58313	3352	60655	3876	63147	4592
	Grand Marais	No Build	38142	10685	40771	15164	43485	18702	44116	22369
		Alternatives	0	0	16732	245	18689	323	19884	351
	Todd/Cabbana	No Build	33454	8049	35160	11484	37285	13728	38494	16010
		Alternatives	0	0	15378	203	17269	227	18615	246
	Howard	No Build	24217	6349	24229	9039	23549	11054	23159	13246
		Alternatives	0	0	15282	21	16601	49	16979	73
Hwy 401 Mainline	Todd/Cabbana to Grand Marais	Alternatives	0	0	39481	11976	45994	16720	49632	20509

Hourly profiles for typical daily use of car and truck traffic on different roadway types (i.e., highway, major arterial, local roads) were also provided, which were used to convert the AADTs into hourly volumes. These hourly volumes of domestic and international cars and trucks on each roadway segment were used to estimate emissions of $PM_{2.5}$ and NOx from each source. Separate weekday and weekend traffic patterns were provided to SENES and used to represent actual expected traffic conditions. Idling traffic volumes and queue lengths were calculated by the CAL3QHCR air dispersion model based on the number of vehicles that approach an intersection, the signal timing and the capacity of each intersection. The vehicles approaching an intersection queue were conservatively assumed to be same as the free-flowing traffic volume.

3.2.3.2 Vehicle Emissions Estimates

Emissions from vehicles traveling on public roadways account for a significant portion of the smog producing air pollutants in North America. Although tailpipe emissions are the major source of gaseous pollutants (such as NO_x), they are not the major source of particulate emissions. In most cases, tailpipe emissions are a small fraction (<5%) of the total particulate emissions from roadways during free-flow traffic conditions. As cars and trucks travel over the surface of a roadway, there are other sources in addition to tailpipe emissions that contribute to overall particulate emissions. These other sources include road abrasion and degradation, tire & brake wear, and soil/mud/debris that are deposited on the surface. Particulate from these other (non-tailpipe) sources is collectively known as surface resuspended particulate. When vehicles queue and idle, the particulate emissions are 100% from the tailpipe, as there are no emissions from the roadway surface if the vehicles are not moving.

For tail pipe emissions, idling cars emit approximately 4 times more particulate than free-flowing cars, and idling diesel trucks emit over 25 times more particulate than free-flowing diesel trucks. However, vehicles generally spend less time idling, unless the roadways are completely congested. Because of the significant difference between particulate emissions from idling and moving vehicles, the inclusion of queuing in the analysis is an important and necessary consideration. The freeway extension is expected to divert most of the traffic currently following the existing corridor (which requires periodic idling at intersections) to a free-flowing state which would reduce tailpipe emissions from idling.

Emission factors were developed separately for vehicle exhaust and surface roadway emissions (i.e., road dust) using Environment Canada's MOBILE 6.2C model and USEPA emission factor methodologies (i.e., AP-42). Separate emission factors were developed for cars and trucks, and incorporate:

- regulatory changes in fuels and engine technologies;
- differences in Canadian and U.S. fuels and vehicles; and
- Canadian and U.S. fleet turnover rates.

Recent and on-going improvements in emission control technologies and fuels will combine to substantially reduce the emissions from transportation sources. As of June 2006, the maximum amount of sulphur in on-road diesel fuel was reduced from 500 mg/kg to 15 mg/kg. This reduction was necessary for sulphur levels in Canadian on-road fuels to be consistent with U.S. levels, and to ensure that advanced emission control technologies on newer engines would be effective. In January 2007, additional engine standards for heavy-duty vehicles came into effect in the US that will also impact the Canadian fleet. These standards reduce NO_x and particulate matter tail-pipe emissions by 60% and 90% respectively over existing levels, and require the incorporation of additional emission control technologies on these newer engines to effect these reductions.

Since the area considered in the assessment includes a number of different types of roads, the development of the emission factors considered appropriate vehicle speeds for each road type. Different emission factors were applied to each road based on the current or future assumed posted speed limits. The assessment also spans a long period of time, over which several regulated changes to fuel characteristics and vehicle engine technologies will occur. Although the effect of fuel changes on emissions starts to occur immediately following the implementation of the changes, technological changes require several years before the effects of the changes are fully observed. As such, the historical vehicle fleet turnover rates from the Detroit and Windsor areas were obtained from Air Improved Resource, Inc. and used to reflect the impacts of technological changes on vehicle emissions.

Table 3.2 presents a summary of the emission factors used in this assessment. Cars and trucks entering Canada from the U.S. were assumed to have U.S. vehicle and fuel characteristics, whereas cars and trucks exiting Canada were assumed to have Canadian vehicle and fuel characteristics. These assumptions are expected to adequately represent the fleet characteristics and emissions in the Windsor area, particularly on a daily basis, as some vehicles will both exit and enter on the same day. The complete database of emission factors, fleet turnover information and other assumptions used in the MOBILE6.2C model can be found in Appendix B. Sample calculations are presented in Appendix C.

TABLE 3.2 - SUMMARY OF EMISSION FACTORS USED IN THE ASSESSMENT

Pollutant	Speed (km/h)	Surface Emissions (g/VKT)	Tailpipe Emission Factors (g/VKT)											
			Canadian Cars			Canadian Trucks			U.S. Cars			U.S. Trucks		
			2015	2025	2035	2015	2025	2035	2015	2025	2035	2015	2025	2035
NO_x	Idle*		1.32	0.63	0.58	113.68	115.42	115.42	1.20	0.59	0.52	111.9	115.65	115.65
	25		0.44	0.20	0.18	2.35	0.46	0.34	0.40	0.19	0.16	1.9	0.50	0.34
	50		0.40	0.18	0.17	2.02	0.39	0.29	0.36	0.17	0.15	1.7	0.43	0.29
	75		0.49	0.21	0.19	2.91	0.57	0.43	0.44	0.20	0.17	2.4	0.63	0.43
	100		0.49	0.21	0.19	2.91	0.57	0.43	0.44	0.20	0.17	2.4	0.63	0.43
$PM_{2.5}$	Idle*	0	0.0086	0.0066	0.0065	1.0684	0.3140	0.1554	0.0086	0.0067	0.0065	1.1543	0.4342	0.1557
	25	1.3-2.3**	0.0021	0.0016	0.0016	0.0129	0.0062	0.0058	0.0021	0.0016	0.0016	0.0119	0.0063	0.0058
	50		0.0021	0.0016	0.0016	0.0129	0.0062	0.0058	0.0021	0.0016	0.0016	0.0119	0.0063	0.0058
	75		0.0021	0.0016	0.0016	0.0129	0.0062	0.0058	0.0021	0.0016	0.0016	0.0119	0.0063	0.0058
	100		0.0021	0.0016	0.0016	0.0129	0.0062	0.0058	0.0021	0.0016	0.0016	0.0119	0.0063	0.0058

* Idle emission rates expressed as g/hr

** $PM_{2.5}$ surface emissions based on modeled conditions and are dependent on average combined vehicle weight

In regards to traffic movements, the following additional assumptions were made:

- Vehicles on Highway 401 will be moving in a free-flowing state;
- Vehicles on service roads (and north of EC Row) will generally move in free-flow, but will queue at signalized intersections;
- Inbound vehicles at the customs plaza will queue at booths; and
- Outbound vehicles at the customs plaza will not queue.

3.2.3.3 Customs / Inspections Plazas

The traffic conditions at the customs plazas were modeled using the same queuing algorithm that was used for the intersections. Volumes of cars and trucks entering Canada from the U.S. as well those leaving Canada were provided to SENES by IBI and URS Canada for the years 2015, 2025, and 2035.

The amount of queuing at the plazas was estimated using the hourly traffic volume and the number of booths that are open during each hour, in addition to the average duration of each vehicle at a booth. The number of booths open in each hour was assumed to be a function of the traffic volume entering the plaza. Queues of cars and trucks form at car and truck booths respectively, and thus were modelled separately. Design information regarding plaza operations and vehicle timings were provided by Stantec.

With respect to plaza queuing, the following assumptions were used:

- Each truck requires 60 seconds at the primary inspection booth.
- Each car requires 45 seconds at the primary inspection booth.
- There is always queuing (idling) at the booth due to the one vehicle in the booth being inspected.
- Number of open booths assumed to be slightly less than capacity, such that some minimal queuing (2 or 3 cars or trucks) is always occurring at open booths.
- During periods where the capacity of the plaza is exceeded, longer queues form back towards the plaza entrance.

Groups of queue links were set up for each plaza car and truck lane based on an equal hourly distribution of free flow traffic through each booth that is open during a given hour. The groups extended back away from the booths to accommodate longer and longer queue lengths, as necessary. Each queue link was then manually “turned on” or “off” by calculating the number of vehicles queued at the open booths.

Based on the methodology and assumptions outlined above, and the inbound traffic volumes through the plaza provided by IBI, the maximum number of plaza booths open at any given time was 17 truck booths and 9 car booths at any of the new Customs/Inspection Plaza Alternatives.

The same methodology was applied to the Ambassador Bridge plaza for the future no-build scenarios and all of the connecting route alternatives. Using this approach, the

queue lengths at the Ambassador Bridge often extended back across the Ambassador Bridge and onto Huron Church Road for the future no-build scenarios, which is what would be expected.

3.2.3.4 Tunnel Ventilation Buildings and Portal Emissions

The tunnel ventilation buildings are not a roadway source, and thus require the use of a different model. The ISCST3 model, which is used for assessing the impact of stationary emission sources such as industrial stacks, was used to model emissions from the tunnel entrance / exit portals and ventilation buildings. The conceptual design of the tunnel is based on the premise that emissions should not escape from the portals (i.e., exhaust flow is always greater than supply flow, such that air is continually drawn into the tunnel through the ramps and portals). However, there is a "piston effect" as cars drive out of the tunnel, which will result in some emissions from these areas. A total of 5% of the emissions were assumed to escape from the tunnel at these portal locations.

Based on the tunnel configuration, there are 10 locations where emissions may exit the tunnel. These are entrance/exit portals at on and off ramps, as well as two main entrance and egress locations (one at the approximate present terminus of Highway 401 [which is combined with an entrance portal] and one immediately west of the intersection of Huron Church Rd and EC Row Expressway). The main entrance and egress locations were assumed to be comprised of two separate tunnel "tubes". The 5% of the emissions that were assumed to escape from the portals were assumed to be evenly apportioned over these 10 locations. For the "Jet Fans" option, 100% of tunnel emissions were assumed to be emitted from these openings, and the emissions were evenly apportioned over the 10 locations.

As outlined earlier, there are three options for tunnel ventilation buildings (VBIA, VBIB, VBIC). Each of these has a slightly different conceptual design and thus each option was modelled to assess whether there are any differences in the potential affects to air quality. Mitigation options were not considered in this phase of the assessment.

The basic assumptions were as follows:

- The ventilation systems collect 95% of the total emissions from the tunnel:
  - All collected emissions were discharged from the vent stacks;
  - Vent building height is 18 m;
  - Stack height is 45 m (from the ground surface).
- Options VBIA & VBIA have two ventilation buildings:
  - Emissions were apportioned equally between the two buildings.
- Option VBIC has one ventilation building.

The locations of each of the ventilation building options were presented earlier in Figure 1.3.

The ISCST3 model input files were completed and run for each of the tunnel ventilation scenarios. The hourly predicted concentrations from the vent buildings and portals were then added to the hourly predicted concentrations from the surface roadway sources (i.e.,

re-build Huron Church Road / Highway 3 corridor from the CAL3QHCR model) plus ambient background concentrations to determine the total model predicted concentrations.

3.2.3.5 The Parkway Tunnel Emissions

For the Parkway option, emissions for the tunnels were considered to be emitted from the ends of the tunnels and dispersed over a short distance (generally varying by tunnel length) from the ends of the tunnels. The tunnel structures are typical of most overpass structures and are open between opposing traffic directions such that air can flow freely between the opposing traffic thus the piston effect previously described for longer tunnels is minimized. In addition, the amount of turbulence from the tunnel egress points could be expected to impact both traffic flow directions. Both NO_x and $PM_{2.5}$ were considered to be fully emitted from the tunnels and there was no allowance for deposition of $PM_{2.5}$ within the tunnels.

The emissions at each portal were modeled using CAL3QHCR, and included both tailpipe and resuspended emissions from within the tunnels. Appendix C has more information on the emissions calculations.

3.2.4 Model combinations

The work undertaken for this project required an assessment of local impacts, as well as an assessment of end-to-end solutions. The length of the model run times (i.e., computer time) and the number of possible combinations of connecting route, plaza and crossing alternatives would require an extraordinary amount of time effort to model each possible end-to-end combination. In addition, separate model runs are required for each pollutant ($PM_{2.5}$ and NO_x).

In order to complete all of the necessary model runs, the models were run in blocks of roadway/facility type. For each pollutant, separate runs were set up for each connecting route alternative, each plaza/crossing combination, and separate connections to the plazas from Highway 401. In addition, there are two alignment alternatives (Option 1 & Option 2) for four of the connecting routes, and four tunnel ventilation options. Also, all model runs had to be completed for three horizon years (2015, 2025 & 2035).

These model runs were completed on the same receptor network, and the results were output as hourly and/or daily values for the entire year of meteorology, at each receptor. The model results for each necessary combination of blocks were then added together to provide the hourly or daily maximum concentrations. A computer program was developed using the Linux operating system to overlay the necessary files. The combinations considered in this assessment are outlined below.

Connecting Routes

- Future No-Build, Alternatives 1A (Opt 1 & 2) , 1B (Opt 1 & 2), 2A (Opt 1 & 2), 2B (Opt 1 & 2), 3 (VB1A), 3 (VB1B), 3 (VB1C), 3 (jet fans), The Parkway = 14 connecting route alternatives x 2 pollutants x 3 years = 84 model runs

Plazas & Crossings

- Alternatives PA-A, PA-B, PA-C, PB-C, PB1-B, PB1-C, PC-C = 7 combinations x 2 pollutants x 3 years = 42 model runs

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Connections to Plazas

- Alternatives 1A – PA, 1A – PB/C, 1B-PA, 1B-PB/C, 2A/2B-PA, 2A/2B-PB/C, 3-PA, 3-PB/C, The Parkway-PA, The Parkway-PB/C = 10 alternatives x 2 pollutants x 3 years = 60 model runs

It should be noted that Huron Church Road north of EC Row Expressway and the Ambassador Bridge/Plaza were included in each model run for all of the connecting route alternatives.

A model input file was prepared for each necessary run, as outlined above and run using one year of meteorological data (2003). The models were run on the Linux operating system, which offers more flexibility and memory in terms of processor use, file storage and manipulation of large data files.

Once the model runs were complete, the data was post-processed by adding the necessary data component results together (i.e., connecting route + connection to plazas + plaza/crossing) to form complete end-to-end results. The summed results were then imported into a GIS system for each combination such that the data could be interpreted in different areas along the connecting route, at various distances away from the ROW of each alternative.

4.0 OVERVIEW OF MODEL RESULTS

As discussed earlier, air dispersion models calculate air pollutant concentrations at the receptor locations specified by the user in the model inputs. For this study, two gridded networks of receptors were used along the roadway, as well as specific sensitive receptor locations (see Section 3.2.2). This chapter presents the results of the air dispersion modeling that was undertaken for each alternative.

The results from the No Build Alternative represent the predicted air quality conditions that will occur if no transportation improvements are undertaken in the corridor but assume a projected traffic growth for each of the horizon years. Thus, all results have been presented in relation to this condition, such that the expected change in air quality due to the project (i.e., air pollutant concentrations) is apparent.

It is important to note that the values presented are not indicative of typical conditions as the background levels that are added to the modeled concentrations occur only 10% of the time. In addition, the maximum conditions that are being used for comparison purposes represent the highest concentration at any receptor within the roadway segment within a modelled 1 year period and are not the average or more typical of the concentrations across all of the receptors within the roadway segment.

For each pollutant and averaging time being evaluated, the magnitude of the maximum model predicted concentrations for each alternative and year are presented as percentages of the predicted concentrations for the No Build Alternative for the respective horizon year.

Since the edges of the proposed right-of-way (ROW) limits differ for many of the access road alternatives, the results have been presented at defined distance intervals of 50 m, 100 m and 250 m from the edge of ROW for comparative purposes. In many cases, this occurred at different model receptors for different Alternatives, since a receptor that was located 50 m from the ROW for one Alternative could have been within the ROW for another Alternative.

For the purposes of this report, differences of less than +/- 10% (nominally 2 to 3 $\mu g/m^3$ for $PM_{2.5}$ and 15 to 30 $\mu g/m^3$ for NO_x) were deemed to be within model tolerances given the variability in road alignment, interpolation of results to receptor location and traffic volumes and thus were considered to represent “no appreciable” difference. Differences within an additional 10% (i.e., between 80-89% and 111-120% or 4-6 $\mu g/m^3$ for $PM_{2.5}$ and 15-30 $\mu g/m^3$ for NOx) were considered to represent “marginal” change. Any other differences were considered as “notable” or “appreciable” changes. In addition, when comparing the alternatives to each other, a 10% difference between the alternatives would be required prior to saying that one alternative shows improvements over another. For example, Alternative 1A may be at 92% of No Build, and Alternative 2B may be at 88% of No Build. Under the conventions listed above, Alternative 2B would be considered to show a marginal improvement over No Build, but Alternative 2B is only 4% lower than Alternative 1A, and therefore is not appreciably different from Alternative 1A.

By comparison, the Ministry of the Environment (MOE) publishes air quality conditions in different locations, including Windsor, in Ontario through their Air Quality Index (AQI). This information is available to the public on an hourly basis. The AQI is an indicator of air quality based on the highest pro-rated hourly pollutant measurements of common air contaminants. The range of concentration of the contaminants determines the Air Quality Index. When $PM_{2.5}$ is the driver for air quality, a change of about 6 $\mu g/m^3$ is required to move the Index from one rating to another.

At 50 m from ROW, any changes predicted by the modelling for any of the practical alternatives (i.e., at-grade, below-grade, tunnel, the Parkway) were within this six $\mu g/m^3$ range and would typically not alter the Air Quality Index.

In addition, where the concentrations (including background) were predicted to exceed Federal or Provincial standards, objectives or guidelines, the change in the number of times the concentration was predicted to exceed (i.e., number of exceedances) was also reported, relative to the No Build Alternative. These measures were used to assess the potential impacts of any predicted changes to air quality.

Achievement of the Canada Wide Standard (CWS) for $PM_{2.5}$ is based on achieving an exceedances frequency of no more than eight 24-hour periods with concentrations greater than 30 $\mu g/m^3$ in any given year over a three year period. Thus, only results with greater than eight exceedances were deemed to be in exceedance of the Standard. In addition, the eight day threshold was used to assess the significance of any changes in the number days predicted to be greater than 30 $\mu g/m^3$ in comparison to No Build (i.e., if an Alternative had 9 exceedances less (or more) than No Build, this difference was deemed to be significant, regardless of the total number of exceedance days). In addition, any exceedance of the annual criteria of 15 $\mu g/m^3$ was deemed to be significant for the purpose of this assessment.

The results are presented separately for the Access Road alternatives, Customs/Inspection Plazas and Crossings.

4.1 Access Road Segment Assessments

Tables 4.1 through 4.12 present the results of the air dispersion modelling for each of the Access Road alternatives by road segment. In order to compare microscale differences between the alternatives, the results of each Access Road Alternative will be presented and discussed in relation to specific road segments along the route, starting near the three potential river crossing locations and ending east of the present Highway 401 terminus. These road segments are as follows:

- Malden Road to Labelle Street
- Labelle Street to Pulford Street
- Pulford Street to Lennon Drain
- Lennon Drain to Cousineau Road
- Howard Avenue to Cousineau Road
- Highway 401/Highway 3 to Howard Avenue

The limits of the Access Road Alternatives assessment are between the existing Highway 401 terminus and Malden Road south of EC Row Expressway. The section from Malden Road to the river is covered under the Crossings and Plazas discussion (Section 4.2.4)

The results are presented as a percentile comparison to No Build at increasing distances/offsets at 50 m, 100 m and 250 m from the ROW.

This assessment identifies the maximum changes in concentrations at any location within the corridor segments regardless of the location of sensitive receptors. For details on the effects of the changes in concentration on sensitive receptors in specific neighbourhoods within these roadway segments, refer to the *Practical Alternative Work Paper - Social Impact Assessment (April 2008)*.

The results presented below generally follow the expected trends based on the changes in vehicle emission factors (see Appendix B) and increases in traffic volumes (see Appendix A) over time. In summary, results of the modelling indicate that:

- the concentrations for NO_x and $PM_{2.5}$ decrease as the distance from the roadway increases;
- the $PM_{2.5}$ concentrations increase with time, as traffic volumes are predicted to increase from 2015 through 2035; and
- NO_x concentrations decrease over time as the emission factors for cars and non-idling trucks are going to be significantly reduced in the future to the extent that emissions are lower than 2015, regardless of predicted traffic growth in this study. For trucks, free flow emissions are expected to decrease by approximately 75 to 80% by 2025 and by approximately 85% by 2035 (see Table 3.2), with idling emissions not expected to be appreciably different. As a result, alternatives which improve free flow are better able to leverage improvements in emission levels than the No Build option.

It should be noted that the roadway and ramp alignments are essentially identical between Highway 401 and Howard Avenue for all variations of Alternatives 1 and 2. As a result, the maximum predicted concentrations and the changes in relation to No Build are the same for these Alternatives, and thus any variations in the model predicted concentrations are likely due to slight differences in the forecasted traffic volumes for each alternative, in addition to some residual effect of emissions that occur in the previous segment.

As outlined previously, four separate tunnel ventilation options were examined. The results indicate that the location of the ventilation buildings does not have a notable affect; the locations of the entrance and exit portals have a higher impact on the results. The results of the "Jet Fans" tunnel ventilation option indicated that this option produced unacceptably high $PM_{2.5}$ and NO_x concentrations, and thus will not be discussed in detail in this report. Thus, the results will be discussed in the context of only one of the ventilation options (VB1A).

The Parkway follows similar patterns to Alternatives 1 and 2. These will be discussed in detail in the applicable sections.

4.1.1 Malden Road to Labelle Street

In this road segment the 401 veers away from Huron Church, crosses Spring Garden and follows the EC Row Expressway. The Plaza A configuration crosses Spring Garden slightly to the west of the Plaza B configuration. Both the at-grade and below-grade options are at approximately the same elevations for this section of the road with the freeway at below grade where local arterial roads cross over it, such that these arterial roads are at-grade, rather than elevated. The Alternative 3 tunnel ends near Spring Garden. The ramp configuration for Plaza A is considerably different than for Plaza B. There are two tunnels with the Parkway alternative in this location and the ROW is wider in areas relative to the other options.

NO_x

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years. In general, with isolated exceptions, all alternatives result in lower NO_x hourly and 24-hour concentrations than No Build over all horizon years as shown in Table 4.1. With the exception of Alternative 3 (VBIA), appreciable decreases in NO_x hourly concentrations are noted for all Alternatives at 50 m, with appreciable decreases extending to 100 m in 2035 for all Alternatives. Most other NO_x hourly concentrations at or beyond 100 m are not appreciably different to only marginally better than No Build.

For all alternatives and all horizon years, NO_x 24-hour concentrations show no appreciable to only marginally improvements over No Build.

While differences exist between Plaza alignments for each alternative, with few exceptions, these differences were not appreciable.

TABLE 4.1 - CHANGE IN MAXIMUM NOX CONCENTRATIONS RELATIVE TO NO-BUILD, MALDEN ROAD TO LABELLE STREET

Alternative	Distance from ROW (m)	Malden Rd to Labelle											
		2015				2025				2035			
		Plaza A Alignment		Plaza B/C Alignment		Plaza A Alignment		Plaza B/C Alignment		Plaza A Alignment		Plaza B/C Alignment	
		1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour
Alternative 1A	50	63%	82%	84%	89%	77%	87%	82%	90%	59%	85%	69%	95%
	100	73%	98%	90%	101%	83%	90%	89%	94%	69%	89%	78%	93%
	250	89%	86%	95%	93%	89%	94%	92%	95%	82%	91%	86%	94%
Alternative 1B	50	78%	88%	88%	91%	69%	87%	76%	90%	64%	85%	70%	88%
	100	82%	102%	94%	102%	79%	90%	83%	93%	75%	90%	79%	93%
	250	89%	93%	95%	93%	86%	93%	91%	95%	83%	93%	84%	94%
Alternative 2A	50	65%	83%	68%	81%	68%	87%	66%	87%	65%	85%	63%	85%
	100	82%	100%	75%	97%	83%	93%	76%	93%	78%	92%	71%	92%
	250	89%	93%	93%	92%	97%	96%	90%	95%	93%	95%	86%	94%
Alternative 2B	50	65%	83%	64%	81%	67%	87%	66%	87%	64%	85%	62%	85%
	100	82%	100%	75%	97%	78%	90%	74%	90%	75%	90%	71%	90%
	250	88%	93%	91%	92%	91%	93%	88%	94%	88%	94%	85%	94%
Alternative 3 (VBIA)	50	86%	84%	91%	87%	84%	89%	83%	90%	72%	88%	70%	89%
	100	88%	100%	92%	101%	90%	94%	87%	94%	76%	93%	73%	93%
	250	98%	92%	99%	94%	97%	96%	96%	95%	89%	95%	85%	95%
The Parkway 2015	50	71%	82%	71%	82%	69%	87%	75%	89%	65%	85%	66%	85%
	100	86%	100%	86%	101%	81%	93%	88%	95%	77%	93%	79%	93%
	250	87%	91%	89%	91%	85%	95%	94%	96%	89%	95%	89%	95%

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

$PM_{2.5}$

With the exception of the Parkway, there is largely no appreciable to isolated marginal differences between No Build and any of the alternatives for $PM_{2.5}$ 24-hour and annual maximum concentrations for all distances and all scenarios as shown in Table 4.2. The Parkway generally shows marginal to notable decreases in maximum 24-hour and annual maximum concentrations at 50 m from ROW, with differences beyond 50 m being similar to other scenarios. For each Plaza alignment the maximum concentrations for all alternatives are located in the same location and are not impacted by the Tunnel or the tunnels of the Parkway.

While differences in $PM_{2.5}$ 24-hour and annual maximum concentrations exist between Plaza alignments for each alternative, with isolated exceptions, these differences were not appreciable.

With isolated exceptions, primarily for Plaza A Alignments in 2015, all alternatives are expected to reduce the number of exceedances of the CWS $PM_{2.5}$ 24-hour standard, with exceedances generally predicted to occur only within 50 - 100 m of ROW for all alternatives (including No Build). There are no exceedances of the CWS $PM_{2.5}$ 24-hour standard by 250 m from ROW.

TABLE 4.2 - CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS RELATIVE TO NO-BUILD, MALDEN ROAD TO LABELLE STREET

Alternative	Distance from ROW (m)	Malden Rd to Labelle																	
		2015						2025						2035					
		Plaza A Alignment			Plaza B / C			Plaza A Alignment			Plaza B / C			G-H - Plaza A			G-H - Plaza B / C		
		24 Hour	Annual	> CWS	24 Hour	Annual	> CWS	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances
Alternative 1A	50	106%	93%	15	94%	100%	-3	92%	93%	-20	95%	93%	-7	88%	100%	-52	93%	94%	-31
	100	97%	92%	0	100%	92%	0	100%	100%	-1	103%	100%	3	100%	100%	-13	103%	100%	-7
	250	100%	100%	0	96%	100%	0	96%	100%	0	93%	100%	0	97%	100%	0	93%	100%	0
Alternative 1B	50	94%	93%	10	97%	100%	3	103%	100%	7	97%	100%	-2	102%	100%	-4	98%	94%	-23
	100	100%	92%	0	103%	100%	2	103%	108%	7	103%	100%	2	103%	100%	6	100%	100%	-5
	250	100%	109%	0	100%	100%	0	96%	100%	0	100%	100%	0	100%	108%	0	97%	100%	0
Alternative 2A	50	92%	92%	9.5	88%	92%	-3	87%	91%	-23	87%	92%	-26	85%	91%	-42	85%	91%	-44
	100	94%	88%	0	95%	88%	0	99%	93%	-4	101%	94%	-4	100%	91%	-17	101%	91%	-17
	250	95%	99%	0	95%	99%	0	95%	93%	0	95%	94%	0	95%	98%	0	96%	98%	0
Alternative 2B	50	92%	93%	5	96%	94%	-3	97%	93%	-20	97%	93%	-22	97%	93%	-36	97%	93%	-38
	100	89%	86%	0	90%	87%	0	93%	92%	-5	94%	92%	-6	92%	88%	-21	94%	89%	-19
	250	94%	98%	0	95%	98%	0	94%	93%	0	94%	93%	0	93%	97%	0	94%	98%	0
Alternative 3 (VBIA)	50	94%	93%	-6	94%	93%	-10	100%	93%	-12	97%	93%	-13	95%	94%	-44	100%	94%	-25
	100	100%	92%	0	103%	92%	2	103%	100%	-1	109%	100%	5	103%	93%	-16	115%	100%	-3
	250	104%	100%	0	104%	100%	0	104%	100%	0	111%	100%	1	100%	100%	0	107%	100%	2
The Parkway	50	86%	79%	2	78%	79%	-20	85%	80%	-13	77%	80%	-41	81%	75%	-47	81%	75%	-51
	100	100%	85%	0	93%	85%	0	94%	85%	-6	88%	85%	-6	88%	86%	-23	100%	86%	-19
	250	100%	91%	0	100%	91%	0	100%	83%	0	86%	83%	0	97%	92%	0	100%	92%	0

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

Roadway Section Summary

The Parkway offers notable to marginal improvement for $PM_{2.5}$ concentrations relative to No Build, primarily due to an expanded ROW which provides additional buffer space for $PM_{2.5}$ maximum concentrations. Plaza B/C alignment shows the greatest decrease in predicted exceedances of $PM_{2.5}$ 24-hour concentrations, with these reductions generally occurring within 50 - 100 m of ROW. All other alternatives show no appreciable to isolated marginal changes in $PM_{2.5}$ concentrations. NO_x concentrations are generally lower with all alternatives than for the No Build scenario, however, even the No Build scenario concentrations are lower than the applicable criteria.

4.1.2 Labelle Street to Pulford Street

This roadway section generally follows the existing Huron Church corridor. The connections to Plaza A and Plaza B differ slightly (less than 100 m difference in location) between Labelle St and Grand Marais Road West. Beyond Grand Marais there is no difference in Plaza Alignments and the Plaza alignment options will not be discussed further. The At Grade options (1A and 2A) are below grade between Labelle Street and Grand Marais and transition to at grade beyond Grand Marais. The Below Grade options (1B, 2B, and Parkway) are below grade for the entire route section. The freeway is located slightly to the west of Huron Church for Alternatives 2A, 2B, and the Parkway. Alternative 3, the tunnel option, is completely tunneled in this section. There are Parkway tunnels located at Labelle Street, Grand Marais West, and Pulford Street.

NO_x

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years. In general, with isolated exceptions, all alternatives result in lower NO_x hourly and 24-hour concentrations than No Build over all horizon years as shown in Table 4.3. All alternatives show marginal to notable reductions in NO_x hourly concentrations at 50 – 100 m with no appreciable to marginal reductions at 100 m and beyond.

With two exceptions, for all alternatives and all horizon years, NO_x 24-hour concentrations show no appreciable to only marginally improvements over No Build.

While differences exist between Plaza alignments for each alternative, these differences were not appreciable for NO_x 24-hour concentrations. In general, for Alternatives 1A, 1B, 2A and 2B the Plaza B alignment NO_x 1 hour concentrations were marginally to notably lower than for the Plaza A alignment.

TABLE 4.3 - CHANGE IN MAXIMUM NOX CONCENTRATIONS RELATIVE TO NO-BUILD, LABELLE STREET TO PULFORD STREET

Alternative	Distance from Roadway (m)	Labelle to Pulford											
		2015				2025				2035			
		Plaza A Alignment		Plaza B/C Alignment		Plaza A Alignment		Plaza B/C Alignment		Plaza A Alignment		Plaza B/C Alignment	
		1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour
Alternative 1A	50	81%	86%	74%	89%	71%	85%	72%	89%	84%	84%	69%	91%
	100	96%	91%	81%	92%	79%	92%	76%	93%	85%	93%	69%	90%
	250	112%	99%	83%	95%	93%	96%	83%	95%	107%	99%	81%	95%
Alternative 1B	50	80%	85%	73%	85%	86%	89%	70%	86%	83%	84%	68%	81%
	100	93%	90%	70%	87%	90%	94%	69%	89%	84%	93%	64%	88%
	250	106%	96%	84%	94%	103%	99%	86%	95%	106%	99%	81%	94%
Alternative 2A	50	86%	85%	74%	85%	81%	85%	70%	86%	76%	80%	66%	81%
	100	98%	96%	70%	88%	87%	95%	70%	90%	79%	89%	64%	89%
	250	100%	95%	87%	94%	98%	96%	86%	95%	99%	96%	83%	95%
Alternative 2B	50	86%	84%	74%	84%	81%	85%	70%	85%	73%	80%	65%	81%
	100	98%	87%	70%	87%	86%	92%	70%	90%	77%	89%	64%	89%
	250	101%	95%	87%	94%	100%	96%	85%	95%	97%	95%	83%	95%
Alternative 3 (VBIA)	50	87%	90%	87%	90%	74%	87%	74%	87%	70%	83%	70%	83%
	100	88%	95%	88%	95%	75%	93%	75%	93%	68%	90%	68%	90%
	250	94%	98%	94%	98%	88%	96%	88%	96%	87%	96%	87%	96%
The Parkway	50	72%	82%	68%	82%	70%	84%	83%	89%	68%	79%	66%	79%
	100	83%	88%	80%	89%	75%	90%	89%	95%	70%	89%	70%	89%
	250	80%	93%	83%	93%	82%	94%	96%	97%	81%	94%	81%	94%

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

$PM_{2.5}$

There is generally no appreciable difference to isolated marginally differences between No Build and Alternatives 1A, 1B, and 2B for $PM_{2.5}$ 24-hour and annual maximum concentrations for all distances beyond ROW in all horizon years for either Plaza A or Plaza B alignment. The Parkway and Alternative 3, the Tunnel, show marginal to notable decreases in maximum $PM_{2.5}$ 24-hour and annual concentrations at 50 m from ROW, with differences from No Build diminishing at greater distances. Reductions for Alternative 3, the Tunnel, are attributable to emission sources being covered and vented at tunnel portals, with this effect generally limited to within 50 -100 m of the ROW.

While differences in $PM_{2.5}$ 24-hour and annual maximum concentrations exist between Plaza alignments for each alternative, with isolated exceptions, these differences were not appreciable.

Exceedances of the CWS $PM_{2.5}$ 24-hour standard are generally predicted to occur under certain conditions within 50 m of ROW for all alternatives in all horizon years, except for Alternative 3 which is not predicted to have exceedances. Plaza B alignment generally shows fewer exceedances than Plaza A alignment within 100 m of ROW. Exceedances will also be predicted for all alternatives other than Alternative 3 within 100 m by 2035. Increases in exceedances of the CWS $PM_{2.5}$ 24-hour standard are predicted for Alternatives 1A, 1B, 2A and 2B for at least one Plaza Alignment in at least one horizon year.

TABLE 4.4 - CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS RELATIVE TO NO-BUILD, LABELLE STREET TO PULFORD STREET

	Distance from ROW (m)	Labelle to Pulford																	
		2015						2025						2035					
		Plaza A Alignment			Plaza B / C			Plaza A Alignment			Plaza B / C			Plaza A Alignment			Plaza B / C		
		24 Hour	Annual	> CWS	24 Hour	Annual	> CWS	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances
Alternative 1A	50	97%	100%	6	97%	100%	-5	95%	100%	18	93%	100%	10	95%	>100%	-1	93%	94%	-4
	100	97%	100%	-3	97%	100%	-3	103%	108%	11	103%	100%	-1	103%	100%	7	103%	93%	7
	250	96%	100%	0	96%	100%	0	104%	100%	0	104%	92%	0	104%	100%	0	104%	100%	0
Alternative 1B	50	94%	100%	3	89%	93%	-5	93%	100%	-7	85%	93%	-7	95%	>100%	2	84%	88%	-22
	100	94%	100%	-3	87%	100%	-3	97%	108%	6	91%	92%	-4	94%	100%	10	89%	93%	-6
	250	104%	100%	0	92%	100%	0	108%	100%	0	100%	92%	0	107%	100%	0	96%	92%	0
Alternative 2A	50	89%	93%	-15	89%	93%	-14	85%	93%	-22	85%	93%	-25	86%	94%	-31	86%	94%	-33
	100	94%	108%	-3	97%	100%	-3	100%	108%	10	100%	100%	1	94%	107%	-10	100%	100%	1
	250	96%	100%	0	96%	100%	0	104%	92%	0	100%	100%	0	100%	100%	0	104%	100%	0
Alternative 2B	50	97%	93%	-13	97%	93%	-13	95%	93%	-19	95%	93%	-21	98%	94%	-25	98%	94%	-27
	100	94%	100%	-3	90%	100%	-3	100%	100%	7	94%	100%	-4	97%	100%	6	91%	93%	-6
	250	96%	100%	0	96%	100%	0	104%	92%	0	104%	100%	0	104%	92%	0	104%	100%	0
Alternative 3 (VBIA)	50	75%	79%	-18	78%	86%	-18	70%	80%	-40	73%	87%	-40	67%	75%	-74	70%	81%	-74
	100	81%	92%	-3	84%	92%	-3	81%	85%	-4	81%	92%	-4	77%	79%	-15	77%	86%	-15
	250	88%	91%	0	92%	91%	0	88%	83%	0	92%	92%	0	89%	92%	0	93%	92%	0
The Parkway	50	83%	79%	-18	83%	79%	-18	88%	80%	-22	75%	73%	-40	88%	75%	-51	86%	81%	-54
	100	90%	83%	-3	90%	92%	-3	94%	85%	-4	88%	85%	-4	94%	79%	-9	94%	86%	-12
	250	92%	91%	0	92%	91%	0	92%	83%	0	92%	83%	0	93%	83%	0	93%	83%	0

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

Roadway Section Summary

Alternative 3 with a Plaza A alignment offers a notable improvement in maximum $PM_{2.5}$ 24-hour concentrations relative to No Build within 50 - 100 m of the ROW, primarily due to emission sources being covered and vented at tunnel ventilation buildings which, while not reducing the overall pollutant burden, do provide for better dispersion. Plaza B alignment for the Parkway also shows notable improvements relative to No Build. All other alternatives generally show no appreciable to only marginal change in $PM_{2.5}$ 24-hour concentrations. Exceedances of the CWS $PM_{2.5}$ 24-hour standard are generally reduced or eliminated with Alternative 3 and the Parkway within 50 - 100 m of ROW for all horizon years. There are no exceedances of the CWS $PM_{2.5}$ 24-hour standard at 250 m. NO_x concentrations are lower with all alternatives than for No Build, however, even No Build concentrations are lower than the applicable criteria.

4.1.3 Pulford Street to North of Lennon Drain

This roadway section generally follows the existing Huron Church corridor and transitions to following Talbot Road where Huron Church intersects Talbot Road. The At Grade options (1A and 2A) are generally at grade with a dip below grade at Todd Lane/Cabana Road West. The Below Grade options (1B, 2B, and Parkway) are below grade for the entire route section. The freeway is located more to the west of Huron Church for Alternatives 2A, 2B, and the Parkway relative to Alternatives 1A and 1B, particularly at the Todd Lane/Cabana Road interchange. Alternative 3, the tunnel option, is completely tunneled in this section. There are four Parkway tunnels located in this section at Pulford Street, Reddock, Todd Lane/Cabana Road West, and at the Lennon Drain.

NO_x

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years. In general, with isolated exceptions at 250 m, all alternatives result in appreciably lower NO_x hourly concentrations than No Build over all horizon years. All alternatives show marginal to notable reductions in NO_x 24-hour concentrations at 50 and 100 m, with no appreciable reductions noted at 250 m.

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TABLE 4.5 - CHANGE IN MAXIMUM NOX CONCENTRATIONS RELATIVE TO NO-BUILD, PULFORD STREET TO NORTH OF LENNON DRAIN

Alternative	Distance from Roadway (m)	Pulford to North of Lennon Drain					
		2015		2025		2035	
		1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour
Alternative 1A	50	57%	82%	43%	76%	36%	70%
	100	66%	85%	54%	81%	42%	76%
	250	85%	95%	69%	94%	57%	90%
Alternative 1B	50	50%	77%	39%	75%	34%	69%
	100	61%	83%	53%	80%	41%	76%
	250	85%	95%	67%	94%	55%	90%
Alternative 2A	50	45%	75%	38%	74%	33%	69%
	100	53%	82%	50%	80%	40%	76%
	250	79%	94%	63%	92%	53%	90%
Alternative 2B	50	43%	75%	37%	75%	33%	71%
	100	52%	82%	47%	80%	41%	76%
	250	72%	93%	62%	92%	53%	90%
Alternative 3 (VBIA)	50	49%	71%	40%	73%	35%	68%
	100	64%	79%	54%	78%	43%	74%
	250	99%	93%	69%	92%	57%	90%
The Parkway	50	60%	76%	43%	74%	38%	69%
	100	74%	83%	58%	80%	45%	76%
	250	91%	93%	69%	92%	57%	90%

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

$PM_{2.5}$

Generally all alternatives show notable to marginal improvements for $PM_{2.5}$ 24-hour maximum concentrations within 50 m of ROW for all horizon years as shown in Table 4.6. Beyond 50 m, these concentrations are largely not appreciably different from No Build, except for both the Parkway and Alternative 3 which consistently show marginal to appreciable improvements at 100 m.

Both the Parkway and Alternative 3 show notable to marginal decreases in the annual $PM_{2.5}$ concentrations within 100 m of ROW. All other alternatives generally show no appreciable differences in annual $PM_{2.5}$ concentrations from ROW.

While No Build is predicted to be above the CWS $PM_{2.5}$ 24-hour standard for all horizon years, no exceedances of the CWS are predicted for all alternatives in 2015. By 2035 all alternatives other than Alternatives 2B and 3 are predicted to exceed the allowable CWS standard at 50 m from ROW; however, a substantial reduction in the number of exceedances relative to No Builds is predicted. Alternatives 2B and 3 are not predicted to have any exceedances of the CWS.

TABLE 4.6 - CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS RELATIVE TO NO-BUILD, PULFORD STREET TO NORTH OF LENNON DRAIN

Alternative	Distance from ROW (m)	Pulford North of Lennon Drain								
		2015			2025			2035		
		24 Hour	Annual	> CWS	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances
Alternative 1A	50	89%	100%	-11	85%	100%	-22	90%	100%	-21
	100	90%	100%	0	97%	100%	-5	100%	100%	-3
	250	100%	100%	0	100%	100%	0	108%	109%	0
Alternative 1B	50	86%	92%	-17	79%	93%	-33	80%	93%	-42
	100	87%	100%	0	87%	92%	-5	94%	100%	-10
	250	100%	100%	0	96%	100%	0	100%	100%	0
Alternative 2A	50	80%	92%	-17	82%	93%	-29	88%	93%	-37
	100	83%	92%	0	94%	92%	-5	100%	100%	-5
	250	96%	100%	0	104%	100%	0	104%	109%	0
Alternative 2B	50	77%	92%	-17	79%	93%	-33	76%	87%	-54
	100	83%	92%	0	90%	92%	-5	91%	92%	-10
	250	96%	100%	0	104%	100%	0	100%	100%	0
Alternative 3 (VBIA)	50	63%	77%	-17	56%	71%	-38	56%	67%	-58
	100	73%	83%	0	71%	77%	-5	72%	77%	-10
	250	92%	91%	0	88%	91%	0	85%	91%	0
The Parkway	50	83%	85%	-17	77%	79%	-38	76%	80%	-44
	100	87%	83%	0	84%	77%	-5	84%	85%	-10
	250	96%	82%	0	92%	91%	0	92%	91%	0

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

Roadway Section Summary

Alternative 3 generally offers a notable improvement in $PM_{2.5}$ 24-hour concentrations relative to No Build within 100 m of ROW, primarily due to the emissions being vented through vent buildings which allows for better dispersion. All other alternatives generally show a marginal reduction in maximum $PM_{2.5}$ 24-hour concentrations relative to No Build within 50 m from ROW and are similar to each other in overall reduction with the Parkway and Alternative 2B showing slightly greater reductions. Exceedances of the CWS $PM_{2.5}$ 24-hour standard are predicted to be reduced or eliminated for all alternatives. Both the Parkway and Alternative 3 show notable to marginal reductions of annual $PM_{2.5}$ concentrations. NO_x concentrations are lower with all alternatives than for the No Build scenario, however, even the No Build scenario concentrations are lower than the applicable criteria.

4.1.4 North of Lennon Drain to Cousineau Road

This roadway section generally follows Talbot Road. The At Grade options (1A and 2A) are at grade and transition to below grade near St. Clair College and remain below grade beyond Cousineau. The Below Grade options (1B, 2B, and Parkway) are below grade for the entire route section. The freeway is located more to the west of Talbot Road for Alternatives 2A, 2B, and the Parkway relative to Alternatives 1A and 1B. Alternative 3, the tunnel option, is completely tunneled in this section.

This section of the road involves Option 1 and Option 2 Service Road configurations. Option 1 realigns the existing Talbot Road corridor slightly to the northeast. This realignment begins approximately at St. Clair College and continues past Cousineau Road to Howard Avenue. The Option 2 alignment uses the existing Talbot Road corridor as local access service roads without any realignment and aligns the freeway to the southeast.

NO_x

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years. In general, with isolated exceptions for Option 1 in 2015, all alternatives result in appreciably lower NO_x hourly concentrations than No Build over all horizon years as shown in Table 4.7.

With isolated exceptions, all alternatives generally show no appreciable to marginal reductions over No Build in NO_x 24-hour concentrations.

While differences exist between Option 1 and 2 alignments, these differences were generally not appreciable, except for Alternatives 1A and 1B for which Option 1 had appreciably lower NO_x hourly concentrations in 2015 and 2025 and marginally lower concentrations in 2035.

TABLE 4.7 - CHANGE IN MAXIMUM NOX CONCENTRATIONS RELATIVE TO NO-BUILD, NORTH OF LENNON DRAIN TO COUSINEAU

Alternative	Distance from Roadway (m)	North of Lennon Drain to Cousineau Rd											
		2015				2025				2035			
		Option 1 Alignment		Option 2 Alignment		Option 1 Alignment		Option 2 Alignment		Option 1 Alignment		Option 2 Alignment	
		1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour
Alternative 1A	50	89%	95%	58%	92%	78%	91%	61%	91%	65%	87%	55%	86%
	100	79%	87%	55%	87%	73%	83%	59%	83%	66%	80%	54%	80%
	250	84%	98%	56%	94%	77%	94%	61%	92%	66%	91%	58%	91%
Alternative 1B	50	83%	91%	55%	88%	74%	88%	59%	88%	63%	86%	53%	86%
	100	77%	84%	53%	84%	69%	82%	57%	82%	62%	80%	53%	80%
	250	81%	96%	56%	93%	75%	92%	61%	92%	64%	91%	57%	91%
Alternative 2A	50	59%	92%	53%	88%	62%	91%	58%	88%	54%	87%	51%	85%
	100	54%	86%	52%	84%	60%	83%	56%	82%	53%	80%	52%	78%
	250	60%	95%	58%	94%	63%	94%	62%	92%	58%	92%	57%	91%
Alternative 2B	50	56%	88%	54%	88%	58%	88%	57%	86%	53%	85%	51%	85%
	100	51%	83%	53%	84%	56%	81%	54%	78%	52%	78%	52%	78%
	250	58%	94%	58%	94%	61%	92%	59%	88%	57%	91%	57%	91%
Alternative 3 (VBIA)	50	92%	110%			77%	96%			66%	93%		
	100	86%	98%			73%	88%			66%	84%		
	250	85%	95%			78%	95%			69%	92%		
The Parkway	50			76%	89%			72%	88%			64%	85%
	100			73%	84%			69%	82%			63%	78%
	250			70%	94%			72%	92%			66%	91%

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

$PM_{2.5}$

There is generally no appreciable difference between No Build and any of the alternatives for $PM_{2.5}$ 24-hour and annual maximum concentrations for all distances beyond ROW in all horizon years as shown in Table 4.8. Alternative 3, the Tunnel, generally shows a marginal reduction in concentrations within 100 m of ROW due to emission sources being covered and vented at tunnel portals.

With two isolated exceptions, there were no appreciable differences in $PM_{2.5}$ 24-hour and annual maximum concentrations between Option 1 and 2 alignments.

While the Option 2 alignment shows a greater reduction in exceedances of the CWS $PM_{2.5}$ 24-hour standard than the Option 1 alignment, exceedances of the CWS $PM_{2.5}$ 24-hour standard are still predicted, primarily within 50 -100 m of ROW for in 2025 and 2035. For Option 2, only Alternative 1A has any exceedance of the CWS $PM_{2.5}$ 24-hour standard. The frequency of exceedances is greater for at grade versus below grade alternatives.

TABLE 4.8 - CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS RELATIVE TO NO-BUILD, NORTH OF LENNON DRAIN TO COUSINEAU ROAD

Highest $PM_{2.5}$ Concentration Relative to No Build at Intervals from Right of Way ($\mu g/m^3$)																			
	Distance from ROW (m)	North of Lennon Drain to Cousineau Rd																	
		2015						2025						2035					
		Option 1 Alignment			Option 2 Alignment			Option 1 Alignment			Option 2 Alignment			Option 1 Alignment			Option 2 Alignment		
		24 Hour	Annual	> CWS	24 Hour	Annual	> CWS	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances
Alternative 1A	50	103%	100%	-1	100%	100%	-3	103%	100%	0	100%	100%	-10	105%	100%	0	103%	93%	-19
	100	111%	100%	0	104%	100%	1	107%	100%	8	107%	100%	4	113%	100%	15	109%	100%	6
	250	100%	100%	0	104%	91%	0	104%	100%	0	108%	100%	0	104%	100%	0	111%	100%	0
Alternative 1B	50	91%	100%	-5	91%	100%	-5	91%	100%	-12	91%	92%	-15	89%	107%	-27	89%	93%	-33
	100	104%	100%	0	100%	100%	0	100%	100%	0	97%	92%	1	97%	100%	2	100%	100%	0
	250	96%	100%	0	100%	91%	0	96%	100%	2	104%	100%	0	100%	100%	0	104%	100%	0
Alternative 2A	50	97%	100%	-4	88%	100%	-5	100%	100%	-7	91%	92%	-14	100%	100%	-15	89%	93%	-33
	100	104%	100%	0	96%	100%	0	103%	100%	1	97%	92%	1	103%	108%	1	94%	100%	-5
	250	100%	100%	0	96%	91%	0	104%	100%	0	100%	100%	0	107%	109%	0	100%	100%	0
Alternative 2B	50	88%	100%	-5	91%	100%	-4	86%	100%	-17	86%	92%	-17	87%	93%	-31	84%	93%	-35
	100	96%	100%	0	96%	100%	0	90%	100%	0	93%	92%	1	94%	100%	-5	91%	100%	-4
	250	96%	100%	0	100%	91%	0	96%	100%	0	100%	100%	0	100%	100%	0	100%	100%	0
Alternative 3 (VBIA)	50	84%	92%	-5				80%	85%	-17				79%	79%	-40			
	100	93%	91%	0				87%	83%	0				84%	83%	-5			
	250	92%	91%	0				88%	91%	0				89%	91%	0			
The Parkway	50				91%	92%	-5				91%	92%	-15				92%	86%	-37
	100				100%	91%	0				100%	92%	0				97%	92%	-1
	250				96%	91%	0				96%	91%	0				96%	91%	0

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

Roadway Section Summary

All alternatives generally show no appreciable change in $PM_{2.5}$ concentrations. Option 2 alignment generally shows a greater reduction in exceedances of the CWS $PM_{2.5}$ 24-hour standard than Option 1 alignment. NO_x concentrations are lower with all alternatives than for the No Build scenario, however, even the No Build scenario is lower than the applicable criteria.

4.1.5 Cousineau Road to Howard Avenue

This roadway section continues to follow Talbot Road. The At Grade options (1A and 2A) are at grade and for most of the route with transitions to below grade at Cousineau Road and Howard Avenue. The Below Grade options (1B, 2B, and Parkway) are below grade for the entire route section. The freeway is located more to the west of Talbot Road for Alternatives 2A, 2B, and the Parkway relative to Alternatives 1A and 1B. Alternative 3, the tunnel option, is completely tunneled in this section.

This section of the road involves Option 1 and Option 2 Service Road configurations. Option 1 realigns the existing Talbot Road corridor slightly to the northeast. This realignment begins approximately at St. Clair College and continues past Cousineau Road to Howard Avenue. The Option 2 alignment uses the existing Talbot Road corridor as local access service roads without any realignment and aligns the freeway to the southeast.

NO_x

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years. In general, with isolated exceptions, all alternatives result in notably to marginally lower NO_x hourly concentration and marginally to not appreciably lower 24-hour concentrations than No Build over all horizon years as shown in Table 4.9. All alternatives generally show notable reductions in NO_x hourly concentrations up to 100 m from ROW.

With one exception, for all alternatives and all horizon years, NO_x 24-hour concentrations show no appreciable to only marginally improvements over No Build.

While differences exist between Option 1 and 2 Alignments, these differences were not appreciable for NO_x 24-hour concentrations and were not appreciable to only marginally different for NO_x 1 hour concentrations, with Option 2 generally showing lower concentrations.

TABLE 4.9 - CHANGE IN MAXIMUM NOX CONCENTRATIONS RELATIVE TO NO-BUILD, COUSINEAU ROAD TO HOWARD AVENUE

Alternative	Distance from Roadway (m)	Cousineau Rd to Howard Ave											
		2015				2025				2035			
		Option 1 Alignment		Option 2 Alignment		Option 1 Alignment		Option 2 Alignment		Option 1 Alignment		Option 2 Alignment	
		1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour
Alternative 1A	**50**	75%	89%	65%	86%	63%	84%	58%	84%	58%	81%	53%	80%
	100	72%	88%	69%	88%	61%	86%	58%	85%	57%	84%	55%	83%
	250	91%	98%	78%	96%	83%	95%	76%	94%	77%	95%	73%	94%
Alternative 1B	**50**	73%	86%	63%	84%	61%	82%	56%	82%	57%	80%	52%	79%
	100	68%	87%	63%	87%	59%	85%	58%	85%	56%	83%	55%	82%
	250	91%	96%	77%	95%	81%	95%	76%	95%	75%	94%	73%	94%
Alternative 2A	**50**	73%	87%	64%	84%	65%	86%	60%	82%	59%	82%	56%	80%
	100	74%	88%	69%	87%	69%	89%	58%	85%	62%	85%	55%	83%
	250	85%	98%	85%	96%	88%	97%	78%	94%	82%	96%	75%	94%
Alternative 2B	**50**	65%	85%	63%	83%	63%	84%	58%	82%	59%	82%	54%	79%
	100	69%	88%	63%	85%	66%	86%	57%	85%	62%	85%	54%	82%
	250	85%	98%	77%	95%	86%	94%	77%	94%	83%	97%	75%	94%
Alternative 3 (VBIA)	**50**	82%	80%			64%	80%			59%	78%		
	100	90%	85%			68%	84%			64%	82%		
	250	115%	94%			93%	94%			87%	94%		
The Parkway	**50**			85%	85%			65%	84%			60%	80%
	100			84%	87%			66%	86%			61%	83%
	250			95%	95%			84%	95%			82%	95%

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

$PM_{2.5}$

There are generally no appreciable to marginal differences between No Build and all alternatives, other than Alternative 3, for $PM_{2.5}$ 24-hour and annual maximum concentrations for all distances beyond ROW in all horizon years for either Option 1 or Option 2 Alignment as shown in Table 4.10. Alternative 3, the Tunnel, shows notable reductions in $PM_{2.5}$ 24-hour concentrations up to 100 m due to emission sources being covered and vented at tunnel ventilation buildings which, while not reducing the overall pollutant burden, do provide for better dispersion. Alternative 3 also shows notable reductions in $PM_{2.5}$ annual concentrations in 2025 and 2035 at 50 m, with only marginal to no appreciable differences noted for other horizons and distances.

Exceedances of $PM_{2.5}$ 24-hour average concentrations greater than the CWS $PM_{2.5}$ 24-hour standard allowable frequency are generally predicted to occur for the No Build Scenario within 50 -100 m of ROW for all horizon years. Alternative 3 is not predicted to have any exceedances due to the design of the vent buildings. The rest of the alternatives may exceed the CWS frequency within 50 -100 m of ROW by 2035; however, the exceedances are reduced with all alternatives relative to No Build. The Option 2 alignment is predicted to have fewer exceedances than the Option 1 alignment.

TABLE 4.10 - CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS RELATIVE TO NO-BUILD, COUSINEAU ROAD TO HOWARD AVENUE

Highest $PM_{2.5}$ Concentration Relative to No Build at Intervals from Right of Way ($\mu g/m^3$)																			
		Cousineau Rd to Howard Ave																	
		2015						2025						2035					
		Option 1 Alignment			Option 2 Alignment			Option 1 Alignment			Option 2 Alignment			Option 1 Alignment			Option 2 Alignment		
	Distance from ROW (m)	24 Hour	Annual	> CWS	24 Hour	Annual	> CWS	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances
Alternative 1A	50	94%	100%	-4	94%	100%	-3	97%	100%	-5	100%	100%	-12	93%	100%	-19	93%	100%	-29
	100	100%	100%	0	104%	100%	0	103%	100%	1	103%	100%	4	100%	100%	-1	110%	108%	4
	250	100%	110%	0	100%	110%	0	104%	100%	0	104%	100%	0	117%	100%	0	117%	100%	1
Alternative 1B	50	91%	100%	-8	85%	100%	-7	92%	100%	-9	86%	100%	-18	85%	100%	-39	83%	100%	-41
	100	100%	100%	0	96%	100%	0	100%	100%	0	97%	100%	1	100%	100%	-1	100%	108%	-1
	250	100%	110%	0	100%	110%	0	100%	100%	0	100%	100%	0	113%	100%	0	113%	100%	0
Alternative 2A	50	91%	100%	-8	82%	100%	-8	92%	100%	-12	86%	100%	-18	93%	100%	-21	80%	93%	-44
	100	96%	100%	0	93%	100%	0	100%	100%	0	93%	100%	1	103%	100%	-2	97%	100%	-4
	250	96%	110%	0	96%	110%	0	100%	100%	0	100%	100%	0	113%	100%	0	113%	100%	0
Alternative 2B	50	85%	100%	-8	85%	100%	-8	89%	100%	-16	86%	100%	-17	85%	100%	-39	80%	93%	-44
	100	93%	100%	0	96%	100%	0	93%	100%	0	93%	100%	1	97%	100%	-4	97%	100%	-4
	250	96%	110%	0	100%	110%	0	100%	100%	0	100%	100%	0	113%	100%	0	113%	100%	0
Alternative 3 (VBIA)	50	67%	83%	-8				64%	77%	-20				58%	71%	-50			
	100	79%	91%	0				73%	83%	0				74%	83%	-4			
	250	88%	100%	0				85%	91%	0				92%	91%	0			
The Parkway	50				82%	92%	-8				81%	92%	-20				78%	86%	-38
	100				89%	100%	0				87%	92%	0				87%	92%	-4
	250				92%	100%	0				88%	91%	0				104%	91%	0

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

Roadway Section Summary

Alternative 3 offers a notable improvement relative to No Build for $PM_{2.5}$ 24-hour average concentrations within 100 m of ROW, primarily due to emissions being exhausted through vent buildings. All other alternatives show no appreciable to marginal changes in $PM_{2.5}$ concentrations. Option 2 alignment reduces the frequency of exceedances of the CWS $PM_{2.5}$ 24-hour standard relative to Option 1 and all alternatives show a reduction in the frequency of exceedances. NO_x concentrations are lower with all alternatives than for the No Build scenario, however, even the No Build scenario is lower than the applicable criteria.

4.1.6 Howard Avenue to Highway 401

The proposed freeway is situated approximately 200 m to the west of the Talbot Road/Highway 3 corridor for all alternatives. There are slight differences in ramp configurations for The Parkway but essentially there is no difference in predicted traffic or alignment for the alternatives. All alternatives are at grade in this section of the roadway and Alternative 3 is not tunneled in this section. As a result, the maximum predicted concentrations and the changes in relation to No Build are the same for these Alternatives, and thus any variations in the model predicted concentrations are likely due to slight differences in the forecasted traffic volumes for each alternative, in addition to some residual effect of emissions that occur in the previous segment.

NO_x

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years as shown in Table 4.11. In 2015, NO_x hourly concentration reductions are variable relative to No Build. In 2025 and 2035, NO_x hourly concentrations are notably lower than No Build out to 100 m, after which they are generally marginally lower.

For all alternatives and all horizon years, NO_x 24-hour concentrations show no appreciable to only marginally improvements over No Build.

TABLE 4.11 - CHANGE IN MAXIMUM NOX CONCENTRATIONS RELATIVE TO NO-BUILD, HOWARD AVE TO HIGHWAY 401

Alternative	Distance from Roadway (m)	Howard Ave to Highway 401					
		2015		2025		2035	
		1 Hour	24 Hour	1 Hour	24 Hour	1 Hour	24 Hour
Alternative 1A	50	84%	90%	67%	84%	64%	83%
	100	80%	98%	68%	91%	64%	90%
	250	94%	99%	83%	97%	80%	96%
Alternative 1B	50	79%	92%	66%	84%	63%	83%
	100	77%	98%	68%	91%	64%	90%
	250	92%	100%	82%	96%	80%	96%
Alternative 2A	50	80%	92%	65%	85%	66%	86%
	100	77%	98%	68%	91%	65%	90%
	250	89%	99%	82%	97%	80%	96%
Alternative 2B	50	80%	92%	64%	85%	66%	84%
	100	77%	99%	67%	91%	64%	90%
	250	90%	99%	81%	96%	79%	96%
Alternative 3 (VBIA)	50	101%	97%	75%	88%	71%	86%
	100	111%	102%	78%	95%	73%	93%
	250	122%	103%	95%	99%	89%	97%
The Parkway	50	86%	91%	68%	85%	66%	83%
	100	87%	96%	71%	93%	66%	90%
	250	97%	100%	84%	97%	81%	96%

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

$PM_{2.5}$

There is generally no appreciable difference between the alternatives and No Build in this roadway segment as shown in Table 4.12. Some $PM_{2.5}$ maximum hourly concentrations are predicted to marginally increase over No Build at 250 m from ROW; however no exceedances of the CWS $PM_{2.5}$ 24-hour standard are predicted.

TABLE 4.12 - CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS RELATIVE TO NO-BUILD, HOWARD AVE TO HIGHWAY 401

	Distance from ROW (m)	Howard Ave to Highway 401								
		2015			2025			2035		
		24 Hour	Annual	> CWS	24 Hour	Annual	> CWS	24 Hour	Annual	> CWS
Alternative 1A	50	100%	92%	0	97%	100%	0	97%	92%	-5
	100	104%	91%	0	108%	100%	0	104%	100%	0
	250	109%	100%	0	109%	100%	0	108%	100%	0
Alternative 1B	50	100%	92%	0	97%	100%	0	97%	92%	-5
	100	104%	91%	0	108%	100%	0	104%	100%	0
	250	109%	100%	0	113%	100%	0	108%	100%	0
Alternative 2A	50	100%	100%	0	97%	100%	0	100%	92%	-5
	100	100%	100%	0	108%	100%	0	104%	92%	0
	250	109%	100%	0	109%	100%	0	113%	100%	0
Alternative 2B	50	104%	100%	0	97%	100%	0	100%	92%	-5
	100	104%	100%	0	108%	100%	0	104%	92%	0
	250	114%	100%	0	109%	100%	0	113%	100%	0
Alternative 3 (VBIA)	50	104%	100%	0	100%	100%	0	100%	100%	1
	100	104%	100%	0	108%	100%	0	107%	100%	0
	250	114%	110%	0	113%	100%	0	113%	100%	0
The Parkway	50	104%	92%	0	103%	100%	3	100%	92%	2
	100	104%	100%	0	108%	100%	0	104%	92%	0
	250	109%	100%	0	109%	91%	0	100%	91%	0

Note: Values less than 100% indicate that the alternative has lower concentrations than the No Build Scenario. Cells highlighted in green indicate appreciable differences.

Roadway Section Summary

For $PM_{2.5}$ there is generally no appreciable difference between the alternatives and No Build in this area, nor is there an appreciable difference between the alternatives to each other. NO_x concentrations are lower with all alternatives than for the No Build scenario, however, even the No Build scenario is lower than the applicable criteria.

4.1.7 Overall Access Road Assessment

NO_x concentrations do not exceed any applicable standards for all horizon years, averaging periods, and distances to ROW for No Build and any of the alternatives. Generally any of the alternatives will show decreases in NO_x relative to No Build. This could be due to the alternatives having decreased idling due to the reduction of signalized intersections for international traffic. Air quality related to NO_x is expected to improve relative to No Build; however, the impacts are most notable within 100 m of ROW.

$PM_{2.5}$ concentrations generally do not show the same improvements as NO_x concentrations, primarily due to the large road dust component and increased traffic. However, in general, from 50 - 100 m from ROW there is a marginal to not appreciable reduction in concentrations relative to No Build for all alternatives other than Alternative 3 and the Parkway which can show appreciable differences in the relative maximum concentrations. The reductions shown for Alternative 3 are dependent on proper ventilation building design.

As mentioned previously in Section 4.0, none of the alternatives result in a sufficient enough change to impact the Air Quality Index.

Within 100 m of ROW, $PM_{2.5}$ exceedances are consistently predicted to be fewer relative to No Build for all alternatives and this effect is more pronounced by 2035. There are no exceedances predicted for any of the alternatives and No Build beyond 100 m of ROW.

With all alternatives showing a reduction in NO_x concentrations and $PM_{2.5}$ exceedances and with generally only marginal differences in $PM_{2.5}$ concentrations, no one alternative consistently stands out as a preferred alternative for all segments of the proposed freeway extension. Therefore all alternatives were considered to have the same impacts to air quality. It is important to consider that this assessment was performed using the maximum concentrations and the 90th percentile background (i.e., 90% of the time the background concentration would be lower) and that typical conditions would be expected to show even less variation between the alternatives.

4.2 Customs / Inspection Plaza Alternatives

As discussed previously, three separate alternatives were studied for Customs / Inspection Plaza alternatives. These are Plaza A, Plaza B / B1 and Plaza C. Tables 4.13 and 4.14 present the results of the air dispersion modelling ($PM_{2.5}$ and NO_x) for each of these Alternatives. In order to compare the location specific differences between the different alternatives, the results of each plaza alternative will be presented and discussed in relation to specific areas in the vicinity of each facility.

The plaza results show that the maximum predicted concentrations of $PM_{2.5}$ and NO_x are generally much higher than those predicted for the access road alternatives. This is due to the longer idling time near the plazas as vehicles queue in line at the booths. Although the traffic data is similar for all Plaza alternatives, the footprints of the plaza properties, alignment of the plazas and proximity of nearby roads plays an important role in the maximum predicted concentrations, which is reflected in differences in the modelling results.

TABLE 4.13 – CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS AND EXCEEDANCES RELATIVE TO NO BUILD FOR EACH PLAZA CROSSING

	Year	Distance from	Plaza A			Plaza B			Plaza B1			Plaza C		
			24 Hour	Annual	>CWS	24 Hour	Annual	>CWS	24 Hour	Annual	>CWS	24 Hour	Annual	>CWS
% Difference	2015	50	204%	200%	134	250%	145%	127	317%	200%	148	209%	136%	84
		100	167%	140%	15	173%	130%	20	165%	140%	54	177%	140%	28
		250	129%	120%	0	141%	110%	0	132%	110%	0	145%	120%	2
% Difference	2025	50	204%	200%	156	284%	155%	167	348%	220%	177	208%	145%	97
		100	159%	150%	36	209%	140%	35	239%	150%	77	200%	140%	59
		250	136%	130%	1	159%	120%	3	152%	110%	8	164%	120%	6
% Difference	2035	50	221%	209%	168	288%	164%	175	413%	240%	193	217%	155%	109
		100	191%	150%	56	218%	150%	48	250%	160%	87	214%	140%	77
		250	136%	130%	3	164%	120%	8	152%	120%	11	173%	120%	17

Note: Because the impacts are greater than 20% for all configurations, coloured highlighting has not been applied

TABLE 4.14 – CHANGE IN NO_X CONCENTRATIONS AND EXCEEDANCES RELATIVE TO NO BUILD FOR EACH PLAZA CROSSING

Year	Distance from Property	Plaza A		Plaza B		Plaza B1		Plaza C	
		1-Hour	Exceedances	1-Hour	Exceedances	1-Hour	Exceedances	1-Hour	Exceedances
2015	50	344%	8	429%	6	522%	2	123%	0
	100	194%	0	376%	2	368%	1	128%	0
	250	181%	0	199%	0	223%	0	116%	0
2025	50	805%	14	750%	18	790%	7	213%	0
	100	458%	1	623%	7	590%	1	208%	0
	250	393%	0	258%	0	310%	0	173%	0
2035	50	886%	16	774%	17	691%	6	222%	0
	100	533%	1	587%	6	655%	3	216%	0
	250	448%	0	233%	0	306%	0	176%	0

Note: Because the impacts are greater than 20% for all configurations, coloured highlighting has not been applied

4.2.1 Plaza A

The Plaza A Alternative is located adjacent to E.C. Row Expressway in the vicinity of Spring Garden Road / Armanda Street in an area with residential uses present. Plaza A provides potential access to all of the Crossing Alternatives (A, B or C) that are included in the study.

As can be seen in the Table 4.13, the maximum predicted $PM_{2.5}$ 24-hour concentrations increase appreciably to significantly out to 250 m from the Plaza A boundary, in comparison to the No Build Alternative. In addition, the number of days exceeding the CWS 24-hour standard are also predicted to increase significantly at distances up to 100 m from the plaza boundary in 2035. At distances of 250 m or more, only isolated exceedances of the CWS 24-hour standard are predicted.

The annual $PM_{2.5}$ average concentrations also increase in comparison to No Build, but are below the 15 $\mu g/m^3$ criterion by 100 m away from the plaza boundary in 2035.

Similar to the $PM_{2.5}$ results, the maximum predicted 1-hour NO_x concentrations shown in Table 4.14 also increase significantly within 250 m of the plaza boundary; however, the change in number of times that the MOE AAQC is predicted to be exceeded is not appreciable (i.e. 1 hour or less) beyond 100 m away.

Based on the results presented above, air quality is predicted to be generally impacted within approximately 100 m of the Plaza A boundary.

4.2.2 Plaza B

The Plaza B alternatives are located in an industrial area immediately north of Broadway Street, west of Ojibway Parkway, near the Detroit River.

Plazas B and B1 are only slight variants of one another, and thus will be discussed in the same section. Due to the required elevation of the Crossing Alternatives and maximum grade allowances on the approach to the crossing, Plaza B could not provide access to Crossing B. Thus, the Plaza B1 variant was created to permit access to Crossing Alternative B.

4.2.2.1 Plaza B1

Plaza B1 is located immediately to the west of Ojibway Parkway, and leads to Crossing Alternative B. The results shown in the Tables indicate a general decline in air quality in the immediate vicinity of the Plaza. In addition, the nearby concentrations are affected by traffic on the E.C. Row interchange.

Within 250 m of the property boundary, the maximum predicted $PM_{2.5}$ concentrations increase significantly in comparison to the No Build Alternative. In addition, the change in the number of days predicted to exceed the CWS 24-hour standard is significant within 250 m of the plaza boundary in 2025 and 2035. At distances of 250 m or more, the number of exceedances of the CWS 24-hour standard is appreciably reduced.

Annual average $PM_{2.5}$ concentrations are also higher compared to No Build, but are below the 15 ug/m^3 criterion beyond 50 m away from the plaza boundary in 2015 and 2025, and beyond 100 m in 2035.

Table 4.14 presents the maximum predicted 1-hour NO_x concentrations. The Table shows that the predicted concentrations are significantly greater than No Build within 250 m of the Plaza boundary; however, the maximum predicted concentrations only incrementally exceeds the MOE 1-hour NO_x criterion on an infrequent (i.e. 7 hours or less per year) out to 100 m, with no exceedances noted by 250 m.

Based on the results presented above, a general decrease in air quality is expected within approximately 250 m of the Plaza B1 boundary. However, the highest impacts will likely occur within 50 - 100 m of the boundary.

If Plaza A is not built, there will still be impacts as the freeway will be extended through this area to allow for connections to Plaza B, B1, or C. See Section 4.2.4 for more discussion.

4.2.2.2 Plaza B

Plaza B is located adjacent to Plaza B1, slightly farther to the west and closer to the Detroit River. Only Crossing Alternative C can be accessed from this Plaza Alternative.

Table 4.13 shows that the maximum predicted $PM_{2.5}$ concentrations are significantly higher than the No Build Alternative within 250 m of the Plaza B property boundary. In addition, the number of days predicted to exceed the CWS 24-hour standard increases significantly over the No Build Alternative within 100 m of the plaza boundary in 2035, with the number of exceedances significantly reduced by 250 m.

Annual average $PM_{2.5}$ concentrations are higher compared to No Build, but are below the 15 µg/m^3 criterion beyond 100 m from the Plaza B boundary in all three horizon years.

The maximum predicted 1-hour NO_x concentrations shown in Table 4.14 are also significantly higher in comparison to the No Build Alternative within 250 m of the plaza boundary. The maximum predicted concentrations exceed the MOE 1-hour NO_x criterion on occasion at distances up to 100 m from the Plaza in all years, but the change in number of exceedances is only significant at 50 m away in 2025 and 2035.

These results indicate that air quality is predicted to decrease within approximately 250 m from the Plaza B property boundary by 2035. The highest impacts will likely occur within 50 to 100 m of the boundary.

4.2.3 Plaza C

The Plaza C Alternative is located in an industrial area in the vicinity of the Brighton Beach Generating Station, on the approximate footprint of the transformer station. Plaza C provides access to Crossing Alternative C only.

Similar to the $PM_{2.5}$ results for the other Plaza alternatives, the maximum predicted $PM_{2.5}$ concentrations increase significantly over No Build at distances up to 250 m from the Plaza C boundary. Also, the change in the number of times that the CWS 24-hour standard is predicted to be exceeded (relative to No Build) is significant at distances up to

250 m away by 2035, with the number of exceedances significantly reduced by 250 m relative to the number of exceedances at 50 and 100 m.

The annual average $PM_{2.5}$ concentration only exceeds the 15 ug/m^3 criterion at 50 m from the boundary in all horizon years.

The predicted maximum 1-hour NO_x concentrations shown in Table 4.14 are also significantly higher in comparison to the No Build Alternative within 250 m of the plaza boundary; however, the MOE AAQC is not exceeded at any distance interval, in any of the horizon years.

As can be seen in the Tables, the overall magnitude of the changes in maximum NO_x and exceedances of the CWS 24-hour standard is generally less for the Plaza C Alternative than for any of the other Plaza Alternatives evaluated. This is due to the Plaza alignment and arrangement of roadways within the property. There is a larger buffer between the traveled portion of the roadways within Plaza C and the property boundary. As a result, the emissions have dispersed more by the time they reach the property boundary.

These results indicate a decrease in air quality within approximately 250 m from the Plaza C property boundary. However, the most significant affects will likely occur within 50 – 100 m away.

4.2.4 Access Road Connections to Plazas B, B1, and C

For Plazas B, B1, and C, the 401 section between Ojibway Parkway and Malden Road runs parallel and to the south of EC Row. Both the 401 extension and EC Row are in free-flow state in this section of the road. There are minor differences in traffic predicted for all alternatives and crossings in this segment and any differences in concentrations amongst the alternatives are due to these minor differences. Therefore the key comparison is between the alternatives and the No Build scenario.

NO_x concentrations in this area are well below criteria for No Build and all alternatives in all horizon years and there is no appreciable difference between No Build and alternatives at any distance from ROW. NO_x concentrations are reduced for both No Build and the alternatives by 2025 due to technology changes previously described.

$PM_{2.5}$ 24-hour concentrations for both No Build and the alternatives are predicted to be below the CWS 24-hour standard until 2035. In 2035 exceedances are predicted under certain conditions within 50-100 m for the alternatives.

4.3 Crossing Alternatives

As outlined earlier in the report, three separate bridge crossing alternatives were studied and evaluated as part of this project. These are:

- Crossing A
- Crossing B
- Crossing C

Also, there is a connecting roadway between the exit of each plaza and the entrance to the Crossings.

The air dispersion modeling results for all Crossing Alternatives are presented in Tables 4.15 through 4.16. In order to compare the location specific differences between the different alternatives, the results of each crossing alternative will be presented and discussed in relation to specific areas in the vicinity of each bridge and connecting roadway.

The results for the crossings indicate that the maximum predicted concentrations of $PM_{2.5}$ and NO_x are generally similar to those of the access road alternatives. However, for some Plaza / Crossing combinations there is some "spillover" of idle emissions from the Plaza, due to the proximity of the Plaza to the Crossing. This is the case for the Plaza B / Crossing B and Plaza C / Crossing C combinations.

TABLE 4.15 – CHANGE IN MAXIMUM $PM_{2.5}$ CONCENTRATIONS AND EXCEEDANCES RELATIVE TO NO-BUILD FOR PLAZAS AND CROSSINGS

Year	Distance from ROW (m)	Crossing A From Plaza A			Crossing B From Plaza A			Crossing B From Plaza B1			Crossing C From Plaza A			Crossing C From Plaza B			Crossing C From Plaza C		
		24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances	24 Hour	Annual	Exceedances
2015	50	204%	200%	134	204%	200%	134	317%	200%	148	192%	200%	100	250%	145%	127	200%	115%	84
	100	167%	140%	15	167%	140%	15	165%	140%	54	195%	140%	15	173%	130%	20	177%	108%	28
	250	129%	120%	0	129%	120%	0	132%	110%	0	138%	120%	0	141%	110%	1	145%	109%	2
2025	50	204%	200%	156	204%	200%	156	348%	220%	177	192%	200%	122	284%	155%	167	208%	145%	97
	100	159%	150%	36	159%	150%	36	250%	150%	77	191%	150%	36	209%	140%	35	200%	140%	59
	250	136%	130%	1	136%	130%	1	152%	110%	8	141%	130%	2	159%	120%	3	164%	120%	6
2035	50	212%	209%	168	212%	209%	168	413%	240%	193	204%	209%	134	300%	164%	175	217%	155%	109
	100	150%	127%	44	150%	127%	44	250%	160%	87	196%	150%	56	209%	150%	48	214%	140%	77
	250	135%	120%	5	135%	120%	5	152%	120%	11	164%	130%	3	164%	120%	8	173%	120%	6

Note: Because the impacts are greater than 20% for all configurations, coloured highlighting has not been applied

TABLE 4.16 – CHANGE IN MAXIMUM NO_x CONCENTRATIONS AND EXCEEDANCES RELATIVE TO NO-BUILD FOR PLAZAS AND CROSSINGS

Year	Distance from ROW (m)	Crossing A From Plaza A		Crossing B From Plaza A		Crossing B From Plaza B1		Crossing C From Plaza A		Crossing C From Plaza B		Crossing C From Plaza C	
		1-Hour	Exceedances	1-Hour	Exceedances	1-Hour	Exceedances	1-Hour	Exceedances	1-Hour	Exceedances	1-Hour	Exceedances
2015	50	344%	0	344%	0	429%	0	344%	0	429%	0	123%	0
	100	194%	0	194%	0	376%	0	194%	0	376%	0	128%	0
	250	181%	0	181%	0	199%	0	181%	0	199%	0	116%	0
2025	50	805%	0	805%	0	750%	0	805%	0	750%	0	213%	0
	100	458%	0	458%	0	623%	0	458%	0	623%	0	208%	0
	250	393%	0	393%	0	258%	0	393%	0	258%	0	173%	0
2035	50	886%	0	886%	0	774%	0	886%	0	774%	0	222%	0
	100	533%	0	533%	0	587%	0	533%	0	587%	0	216%	0
	250	448%	0	448%	0	233%	0	448%	0	233%	0	176%	0

Note: Because the impacts are greater than 20% for all configurations, coloured highlighting has not been applied

4.3.1 Crossing A

Crossing Alternative A can be accessed from Plaza A only, and is located in the vicinity of Wright and Water Streets. It has the longest span of the three Alternatives studied, at 1.1 km.

Table 4.15 shows that the maximum predicted $PM_{2.5}$ concentrations are significantly higher than the No Build Alternative within 100 m of the Crossing and marginally to significantly higher at 250 m. In addition, the number of days predicted to exceed the CWS 24-hour standard increases significantly over the No Build Alternative within 50 m of the Crossing, with the number of exceedances reduced by approximately 70 to 85% by 100 m, with no or few exceedances predicted by 250 m.

The annual average $PM_{2.5}$ concentrations are predicted to appreciably increase in the vicinity of the crossing, and will only exceed the 15 ug/m^3 criterion within 50 m in 2025 and 2035 and d1 00 m in 2025.

The changes in the maximum predicted 1-hour NO_x concentrations shown in Table 4.16 are significantly higher than No Build; however, there are no exceedances of the MOE 1-hour NO_x criterion in the vicinity of the crossing and connecting roadway.

Based on these results, a decrease in air quality is predicted to occur at distance up to 250 m away from Crossing A and the associated connecting roadway, with impacts being most apparent within the first 100 m.

4.3.2 Crossing B

Crossing Alternative B can be accessed from Plaza A or Plaza B1. Crossing B is located adjacent to the Brighton Beach Power Station and has a span of approximately 800 m.

As shown in Table 4.15, the Crossing B from both Plazas show notable increases in $PM_{2.5}$ concentrations within 100 m – 250 m of the Plaza. Exceedances are appreciably increased within 50 m of the crossing/plaza configurations. Crossings are influenced by the Plaza configurations with the highest concentrations found in close proximity to the plazas.

The changes in the maximum predicted 1-hour NO_x concentrations shown in Table 4.16 are significantly higher than No Build; however, there are no exceedances of the MOE 1-hour NO_x criterion in the vicinity of the crossing and connecting roadway.

Based on the above, air quality is predicted to decrease within 250 m of Crossing B and or the associated connecting roadway, with impacts being most apparent within the first 100 m.

4.3.3 Crossing C

Crossing Alternative C can be accessed from Plaza A, Plaza B or Plaza C. It is located near Stirling Marine Fuels, and has the shortest span of the three Crossing Alternatives, at approximately 700 m.

Table 4.15 shows that the maximum predicted $PM_{2.5}$ 24-hour concentrations are generally appreciably to significantly higher than the No Build Alternative within 250 m of all Crossing C combinations. In addition, the number of days predicted to exceed the CWS 24-hour standard increases significantly over the No Build Alternative within 50 m of the Crossing, with fewer exceedances by 100 m, with no notable (i.e., >8) increases in exceedances by 250 m.

In general, the annual average $PM_{2.5}$ concentrations are predicted to marginally to significantly increase in the vicinity of the crossing, for all Plaza combinations, but will only exceed the 15 ug/m^3 criterion within 50 m for Plaza C in all horizon years and Plazas A and B out to 100 m by 2035.

The changes in the maximum predicted 1-hour NO_x concentrations shown in Table 4.16 are significantly higher than the No Build; however, there are no exceedances of the MOE 1-hour NO_x criterion at any of the Crossing/Plaza configurations. The lowest increases in concentrations are consistently seen in the vicinity of Crossing C from Plaza C.

Based on these results, a decrease in air quality is expected within 100 m of the connecting roadway of Crossing C with either Plaza A, Plaza B, or Plaza C, with impacts being most apparent within the first 100 m.

5.0 EVALUATION OF ALTERNATIVES

The previous chapter presented the air dispersion modeling results for each Access Road, Plaza, and Crossing Alternative studied, and examined the potential changes to air quality in comparison to the No Build Option (i.e., doing nothing at all). This section of the report presents a comparative evaluation of the different options and discusses the potential benefits and effects in comparison to one another. Once again, this is completed separately for the Access Road Alternatives. The changes in air quality for the Crossings are linked to the Plaza configurations and this chapter combines the assessment of the Crossings and the Plazas together.

5.1 Access Road Alternatives

In order to evaluate the potential benefit and effects of each Access Road Alternative and compare these to one another, the maximum predicted $PM_{2.5}$ and NO_x concentrations for each segment at each distance interval were averaged along the entire route between Labelle Street and Howard Avenue. In this manner, the average change in the maximum concentrations compared to No Build could be assessed. These results are presented in Table 5.1 for both $PM_{2.5}$ and NO_x.

The key finding is that implementation of almost any of the Alternatives results in improved air quality on average in comparison to the No-Build option. Some Alternatives and alignments result in more dramatic improvements than others. In general, below grade Alternatives (1B & 2B, the Parkway) result in lower concentrations and slightly fewer exceedances of $PM_{2.5}$ criteria on average than the at-grade Alternative 1A. Differences in Alternative 2A and 2B are not appreciable, except for the number of CWS $PM_{2.5}$ 24-hour exceedances in 2035. A tunneled Alternative with a properly designed vent building (Alternative 3) results in the greatest reduction in $PM_{2.5}$ concentrations and generally comparable reductions in NO_x concentrations. As mentioned previously, the Jet Fans tunnel ventilation option typically resulted in unacceptable concentrations of $PM_{2.5}$ and NO_x, and frequently exceeded the relevant criteria by a significant amount, and thus was not considered further in this assessment.

Table 5.1 shows that all alternatives result in lower maximum concentrations and number of exceedances on average in comparison with the No Build scenario. The below grade options consistently result in slightly lower $PM_{2.5}$ and NO_x annual and 24-hr concentrations relative to Alternative 1A. Also, the reduction in number of exceedances of the $PM_{2.5}$ criterion is greater for the below grade options than for the at-grade Alternative 1A. These results are discussed in further detail in the following sections.

5.1.1 Comparison of At Grade, Below Grade, Cut & Cover Tunnel and Parkway Alternatives

This section discusses the differences between the alternatives relative to each other.

5.1.1.1 At Grade versus Below Grade Alternatives

The effect of depressing the roadway is discussed and examined in this section, through the comparison of Alternative 1A to 1B, of 2A to 2B and the Parkway (which most closely follows Alternative 2B. As can be seen in Table 5.1, comparing the relative $PM_{2.5}$ concentrations between 1A and 1B, Alternative 1A concentrations are predicted to be very close to the No Build option. Alternative 1B (below grade) results in marginally lower concentrations (relative to No Build) at 50 m from the roadway. Similarly, Alternative 1B results in a greater reduction in the number of days predicted to be greater than the CWS $PM_{2.5}$ 24-hour standard. However, this effect is limited primarily to approximately 50 m from the ROW. At 100 m from the ROW, there is no appreciable difference between Alternative 1A and 1B, and no difference between implementation of either Alternative 1A or 1B and No Build, except for the number of exceedances of the CWS $PM_{2.5}$ 24-hour standard in 2035.

A similar trend is seen in the comparison of Alternative 2A versus 2B. In comparison to No Build, the $PM_{2.5}$ concentrations at 50 m away are marginally lower over all horizon years for Alternative 2B Option 2 and generally not appreciably different for all other scenarios. There is no appreciable difference in $PM_{2.5}$ concentrations at 50 m between Alternative 2A and 2B. Also, until 2035 when Alternative 2B shows a greater reduction, there is no real difference between Alternative 2A and 2B in terms of the number of days predicted to exceed the CWS $PM_{2.5}$ 24-hour standard at 50 m away from the roadway. .

The Parkway option shows similar trends to the other Below Grade alternatives with a greater reduction in predicted exceedances of the CWS $PM_{2.5}$ 24-hour standard than either at grade alternative.

The annual average concentrations do not exceed the criterion on average for any of the alternatives examined, in any of the horizon years.

In terms of NO_x concentrations, there are no predicted exceedances of the MOE 1-hour NO_x criterion for any of Alternatives 1A, 1B, 2A, 2B, or the Parkway at any of the distance intervals studied. As mentioned previously, implementation of any of these alternatives result in notable (i.e. > 20%) decreases in the maximum predicted concentrations, relative to No Build. There are no appreciable differences between the alternatives for NO_x concentrations.

5.1.1.2 At Grade versus Tunnel Alternatives

In this section of the report, the effect of end to end tunneling of the roadway is examined in comparison to an at grade roadway. This will be done via a comparison of the results along the route between Alternative 1A and 3, as well as 2A to 3.

Comparing the results presented in Table 5.1 for Alternatives 1A and 3 show that a tunneled alternative would result in appreciable reductions in the maximum $PM_{2.5}$ concentrations at 50 m from the ROW in all horizon years examined. This is true for comparisons of Alternative 3 to both Alternative 1A and 2A. Also, in comparison to Alternative 1A and 2A there is a significant reduction (i.e., >8) in the number of days predicted to exceed the CWS $PM_{2.5}$ 24-hour standard at 50 m away for a tunneled access road in comparison to an at-grade roadway in 2025 and 2035.

The annual average concentrations do not exceed the criterion on average for any of the alternatives examined, in any of the horizon years.

With respect to the maximum predicted 1-hour NO_x concentrations, there are no predicted exceedances of the MOE 1-hour NO_x criterion for any of the at-grade or tunneled Alternatives examined. Comparing the relative magnitude of the maximum predicted concentrations between 1A and 3 shows that there is no difference at any of the distance intervals, in any of the horizon years. However, a comparison between Alternative 2A and 3 indicates that a tunneled alternative increases the maximum predicted concentrations over an at-grade access road with 2-way service roads at 50 m from the ROW. However, this difference is marginal only in the year 2015 for the 1-hour NO_x concentration. All other differences are not appreciable.

Based on these results, the effect of tunneling the roadway (either positive or negative) does not extend beyond a maximum of 100 m away in comparison to at grade Alternatives.

5.1.1.3 Below Grade (including Parkway) Alternatives versus Tunnel

This evaluation examines differences between below grade alternatives and the tunneled alternative (Alternative 3). This will be done through a comparison of Alternative 1B to 3, Alternative 2B to 3, and The Parkway to Alternative 3.

The results presented in Table 5.1 show that there are generally appreciable or close to appreciable differences (i.e. > 20%) in the relative maximum $PM_{2.5}$ concentrations between the below grade alternatives (1B, 2B and the Parkway) in comparison to the tunneled alternative (3).

When compared to both Alternatives 1B and 2B, a tunneled alternative would result in reductions in the number of days predicted to exceed the CWS $PM_{2.5}$ 24-hour standard. However, the reductions are only notable (i.e. > 8) at 50 m from the ROW in 2035 for both Alternatives in 2025.

Both the Parkway and the Tunnel alternative show similar exceedances of the CWS $PM_{2.5}$ 24-hour standard with fewer exceedances predicted for these alternatives than the other below grade alternatives.

The NO_x results are similar to what was observed when the at-grade alternatives were compared to a tunneled alternative. There are no predicted exceedances of the MOE 1-hour NO_x or 24-hour criteria for any of the below grade or tunneled alternatives. The only Below Grade Alternative that shows any marginal to notable improvement over Alternative 3 is Alternative 2B for 2015 and 2025 1-hour NO_x concentrations. The Parkway option does not appear to be appreciably different from Alternative 3.

Based on the above comparisons, the effect of tunneling the roadway (either positive or negative) is limited to within 50 - 100 m from the roadway in comparison to below grade alternatives; however, the Parkway option results in a greater reduction in the frequency of the CWS $PM_{2.5}$ 24-hour standard compared to Alternative 3.

5.1.2 Service Road Configurations

As part of the assessment, two separate configurations (Alternative 1 and Alternative 2) of freeway service roads were studied. These included one-way service roads on either side of the freeway, and two way service roads located approximately on the existing Highway 3 / Huron Church Road alignment. The differences between these configurations will be evaluated through comparisons between Alternatives 1A and 2A, as well as 1B and 2B.

The Parkway Alternative follows a similar configuration to Alternative 2B.

Comparison of the $PM_{2.5}$ concentration data between all service road configurations indicates that there are no appreciably differences between one way and two way traffic flow; however, Alternative 2B Option 1 consistently shows marginal improvements in maximum $PM_{2.5}$ concentrations across all horizon years. Also, the two-way service road alignments consistently result in reductions in the number of days predicted to be greater than the CWS $PM_{2.5}$ 24-hour standard. These differences are notable (i.e., > 8) at 50 m from the ROW in 2025 and 2035 for Alternative 2A versus Alternative 1A.

There is generally no appreciable difference in any of the alternatives for NO_x concentrations.

The results indicate that the two-way service road configurations result in similar maximum $PM_{2.5}$ concentrations and fewer days that are predicted to exceed the CWS, with reductions in frequencies limited to less than 100 m away from the ROW. Thus, differences in service road configuration can be considered to have no appreciable impact on overall air quality.

5.1.3 Route Alignments Between St. Clair College & Howard Avenue

As outlined previously, two separate route alignment options were studied in the area between St. Clair College and Howard Avenue. The first route alignment (Option 1) realigns the existing Talbot Road / Highway 3 corridor slightly to the northeast. This realignment begins at approximately at Howard Avenue and continues approximately to the entrance to St. Clair College.

The Option 2 alignment utilizes the existing Talbot Road / Highway 3 corridor as local access service roads without any realignment and aligns the freeway to the southeast.

In order to evaluate whether there are any differences between the two alignments, the Option 1 and Option 2 results will be compared to one another for each alternative. This will be done separately for the at-grade and below grade alternatives.

5.1.3.1 At Grade Alternatives

The $PM_{2.5}$ results from Alternative 1A and 2A show that the maximum predicted concentrations are similar for both Option 1 and Option 2 at 50 m away in all horizon years. The number of days predicted to exceed the CWS $PM_{2.5}$ 24-hour standard is

reduced for the Option 2 alignment at 50 m away by 2025. However, this difference is not appreciable (i.e., > 8) until 2035, and then only for Alternative 2B.

The Option 1 and 2 alignments show no appreciable differences in maximum predicted 1-hour NO_x concentrations, with the exception of a marginal reduction for Alternative 1A Option 2 at 50 m from the ROW in 2015.

Differences in route alignments for the at-grade service road configuration can be considered to have generally no appreciable impact on overall air quality.

5.1.3.2 Below Grade Alternatives

There is no appreciable differences between the Option 1 and Option 2 alignments for the below grade alternatives for either $PM_{2.5}$ concentrations, predicted CWS $PM_{2.5}$ 24-hour standard exceedance days and 1-hour NO_x concentrations.

The Below Grade alternatives do not appear to be impacted by the Option 1 and Option 2 alignments.

5.2 Evaluation of Plaza/Crossing Alternatives

The dispersion model results presented previously for each of the four plaza alternatives were used to complete a comparative evaluation of the different plaza and crossing configuration options. This evaluation is presented in Table 5.2.

The property footprints and layouts for each Plaza Alternative are slightly different, and thus the results will also differ somewhat.

The crossings are impacted by the plaza configurations and therefore the results are presented concurrently in Table 5.2.

5.2.1 $PM_{2.5}$ Concentrations

As can be seen in Table 5.2, the maximum predicted $PM_{2.5}$ concentrations at 50 m away from the property boundary increase by a factor of around 2 to over 3 versus No Build concentrations in each of the horizon years for all of the Plaza/Crossing configurations. The changes at all distance intervals from the boundary were shown earlier in Table 4.15, and are significant at 250 m for all Plaza Alternatives and all horizon years. Similarly, all of the Plaza Alternatives result in a significant increase the number of days predicted to exceed the CWS $PM_{2.5}$ 24-hour standard at 100 m away, in comparison to No Build.

The largest difference of any alternatives (i.e., highest increase) is seen in the vicinity of Plaza B1/Crossing B in 2035. Plaza B1/Crossing B also has the largest increase in number of days predicted to exceed the CWS within 100 m of the Plaza boundary. This can be attributed to the limited buffer area around the toll/inspection plaza with this option and the low levels of traffic in the vicinity that currently exists (i.e., the impacts are greatest when traffic extremes are greatest).

The lowest concentrations and lowest change in the number of days predicted to exceed the CWS $PM_{2.5}$ 24-hour standard is seen in the vicinity of the Plaza A configurations with Crossing C via Ojibway Park and Plaza C/Crossing C. These two configurations provide

greater buffer around the tolling/inspection areas than Plaza B or B1 Crossing configurations.

5.2.2 NO_X Concentrations

The plaza/crossing alternatives have a significant impact on the air quality in the immediate vicinity of the property boundaries. The maximum predicted 1-hour NO_x concentrations at 50 m away from the property boundary increase by as much as approximately a factor of 5 in 2015, 8 in 2025 and 9 in 2035, in comparison to the No Build concentrations for all plaza/crossing alternatives. The increases in concentration are significant at distances up to 250 m from the property boundary, for all alternatives, and all horizon years with the Crossing C options showing the lowest increase in concentrations.

The NO_x criterion is not exceeded at Plaza A from Crossing C via Brighton Beach or Plaza C at any of the distance intervals in any of the horizon years.

Plaza A (except for the Crossing C via Brighton Beach) and Plaza B results in the largest increases in maximum predicted concentrations and the largest increases in the number of exceedances of the NO_x criterion at distances up to 100 m from the property boundary.

The lowest concentrations and lowest change in the number of days predicted to exceed the NO_x criterion is seen in the vicinity of Plaza A from Crossing C via Brighton Beach and Plaza C. For Plaza C, this is likely due to an additional buffer between the vehicles and the property boundary, because of the facility layout.

5.3 Final Conclusions

Access Road Alternatives

All alternatives offer benefits due to the decrease in traffic idling, particularly from diesel trucks.

For the Access Road Alternatives Alternative 3 and the Parkway are slightly preferred over the other options as they have the greatest potential for reduction of exceedances of the $PM_{2.5}$ standard and $PM_{2.5}$ concentrations. However, the impacts are limited to within 50 m from ROW and beyond 50 m from ROW the differences between any of the alternatives become less notable. NO_x concentrations for all alternatives are reduced relative to No Build, however, even the No Build concentrations are below acceptable standards and less weight is given to the reduction in NO_x concentrations than the $PM_{2.5}$ exceedances.

In general, with all alternatives:

- the concentrations for NO_x and $PM_{2.5}$ decrease as the distance from the roadway increases;
- exceedances of the $PM_{2.5}$ 24-hour CWS criteria are reduced relative to No Build
- the $PM_{2.5}$ concentrations increase with time (though are still lower than No Build), as traffic volumes are predicted to increase from 2015 through 2035; and
- NO_x concentrations decrease over time as the emission factors for cars and non-idling trucks are going to be significantly reduced in the future to the extent that emissions are lower than 2015, regardless of predicted traffic growth in this study.

Plazas and Crossings

The effects of the plazas and crossings are primarily related to the plazas with the potentially larger volumes of idling traffic. The crossings are predicted to be free-flow and have a minor impact relative to the plazas. As with the access roads, the impacts are reduced at greater distances from the plazas. Plaza C has the greatest buffer zone between the area of queuing vehicles and the property line of the plaza; therefore the impacts are reduced with Plaza C. Plaza B1 queuing occurs closest to the property line of the Plaza and the negative impacts on air quality is the highest with this option.

All Plaza and Crossing Configurations are predicted to have an increased number of days of exceedances of the $PM_{2.5}$ 24-hourly concentrations and more than a doubling in $PM_{2.5}$ concentrations.

Crossing C/Plaza C is slightly preferred to the other crossing/plaza alternatives as this combination results in fewest days of CWS exceedances for particulate. Crossing B/Plaza B1 results in greatest increase in $PM_{2.5}$ exceedances. All options will result in a decreased air quality within 250 m of the plazas.

TABLE 5.1 - ACCESS ROAD EVALUATION TABLE

PRACTICAL ALTERNATIVES EVALUATION	Factor: Changes in Air Quality

Performance Measure	Criteria/Indicator	Measurement/Units	Alternative 1A Option 1	Alternative 1A Option 2	Alternative 1B Option 1	Alternative 1B Option 2	Alternative 2A Option 1	Alternative 2A Option 2	Alternative 2B Option 1	Alternative 2B Option 2	Alternative 3	The Parkway
	Change in the number of 24 hr periods where concentrations of $PM_{2.5}$ is > 30 µg/m^3 versus do nothing in 2015	Distance from Roadway, 50 m	-4	-4	-7	-7	-9	-9	-9	-8	-10	-12
		Distance from Roadway, 100 m	-1	0	-1	-1	-1	-1	-1	-1	-1	-1
		Distance from Roadway, 250 m	0	0	0	0	0	0	0	0	0	0
		Maximum concentration relative to Do Nothing (at 50 m)	96%	98%	89%	91%	89%	90%	87%	91%	73%	86%
	Change in the number of 24 hr periods where concentrations of $PM_{2.5}$ is > 30 µg/m^3 versus Do Nothing in 2025	Distance from Roadway, 50 m	-3	-7	-12	-15	-15	-17	-17	-18	-23	-28
		Distance from Roadway, 100 m	1	0	-2	-1	-1	0	-2	-1	-2	-3
		Distance from Roadway, 250 m	0	0	0	0	0	0	0	0	0	0
		Maximum concentration relative to Do Nothing (at 50 m)	94%	97%	87%	90%	90%	90%	87%	91%	68%	82%
	Change in the number of 24 hr periods where concentrations of $PM_{2.5}$ is > 30 µg/m^3 versus Do Nothing in 2035	Distance from Roadway, 50 m	-10	-16	-27	-29	-22	-30	-31	-33	-44	-43
		Distance from Roadway, 100 m	4	3	-3	-3	-1	-3	-5	-5	-7	-8
		Distance from Roadway, 250 m	0	0	0	0	0	0	0	0	0	0
		Maximum concentration relative to Do Nothing (at 50 m)	95%	97%	85%	88%	92%	90%	86%	88%	66%	86%
	Does the average annual concentration of $PM_{2.5}$ exceed 15 µg/m^3 in 2015, 2025, or 2035	Yes/No	N	N	N	N	N	N	N	N	N	N
	Does the average annual concentration of $PM_{2.5}$	Yes/No	N	N	N	N	N	N	N	N	N	N
	Summary of effect on concentration of particulate matter	Subjective assessment	The Tunnel (Alternative 3) and the Parkway are slightly preferred within the first 50 m from the Right of Way, primarily due to a greater reduction in exceedances. However, all Alternatives result in similar AQ conditions at 100 m and beyond from the right of way. The Below Grade options result in fewer exceedances and lower maximum concentrations than the At Grade alternatives within 50 m from the Right of Way. There is no notable difference between Option 1 and Option 2. Exceedances are reduced with all Alternatives relative to No Build. Changes relative to each alternative are typically limited to within 20% and therefore none of the alternatives are considered significantly different from each other.									
	Relative change in maximum concentrations, 2015	Maximum 1 - hour concentration relative to Do Nothing (at 50 m)	74%	63%	70%	60%	63%	59%	60%	59%	77%	72%
		Maximum 24 hour concentration relative to do Nothing at 50 m	88%	87%	85%	83%	85%	83%	83%	82%	88%	83%
	Relative change in maximum concentrations, 2025	Maximum 1 - hour concentration relative to Do Nothing (at 50 m)	64%	58%	61%	56%	59%	57%	57%	55%	64%	66%
		Maximum 24 hour concentration relative to do Nothing at 50 m	85%	85%	83%	83%	84%	83%	83%	82%	84%	84%
	Relative change in maximum concentrations, 2035	Maximum 1 - hour concentration relative to Do Nothing (at 50 m)	57%	53%	55%	52%	53%	52%	53%	51%	57%	57%
		Maximum 24 hour concentration relative to do Nothing at 50 m	82%	82%	79%	79%	80%	79%	80%	79%	80%	78%
	Summary of effect on concentration of gaseous pollutant	Subjective assessment	There are no exceedances of the NOx criteria for any of the alternatives and No Build in any of the horizon years. All alternatives as well as No Build are well below the NOx standards for 1 hour and 24 hour time periods. All alternatives show similar reductions relative to No Build.									
Overall Assessment			**Any impacts are generally limited to 50 m from ROW. All alternatives predict fewer exceedances relative to No Build and thus are preferred to No Build. NOx maximum concentrations are lowered significantly than No Build, however, the No Build option is also below the criteria. Differences between the alternatives are typically less than 10% even at 50 m from ROW and the difference is decreased by 100 m. There is therefore no significant differences between the alternatives.**									
			3	3	3	3	3	3	3	3	3	3

1-High Impact 2-Medium Impact 3-Low Impact 4-Neutral/No Impact 5-Low Benefit 6-Medium Benefit 7-High Benefit

1. Do Nothing defined as no transportation improvements other than those already identified/approved
2. Year 2015 reflects effects upon opening of facility
3. Provinicial guideline for acceptable maximum 24-hr
4. Year 2025 reflects effects 10 years post construction
5. Year 2035 reflects effects at 30 year planning
6. Federal objective for acceptable average annual concentration of PM2.5 is < 15µg/m3

TABLE 5.2 - PLAZA AND CROSSINGS EVALUATION TABLE

PRACTICAL ALTERNATIVES EVALUATION

Factor: Changes in Air Quality

Segment = Crossing to Malden Rd

			Plaza A				Plaza B	Plaza B1	Plaza C
Performance Measure	**Criteria/Indicator**	**Measurement/Units**	**From Crossing A**	**From Crossing B**	**From Crossing C via Ojibway Parkway**	**From Crossing C via Brighton Beach**	**From Crossing C**	**From Crossing B**	**From Crossing C**
Effect on changes in concentration of particulate matter	Change in concentration of $PM_{2.5}$ versus Do Nothing	Subjective assessment at identified receptors versus Do Nothing	In Armanda St. area, future No Build results in the lowest concentrations of all Alternatives, and Plaza A results in marginally higher PM2.5 concentrations than Plaza B due to proximity of Plaza A to Armanda St. Implementation of any Plaza Alternative results in increased concentrations over No Build. Crossing Alternatives have no impact on this area. In Sandwich, future No Build results in the lowest concentrations of all Alternatives, but there is essentially no difference between No Build and Plaza A/Plaza B/Plaza C Alternatives. Thus, Plaza alternatives have no impact in Sandwich. Crossing C results in the highest concentrations in Sandwich relative to all other Alternatives, but the increase is marginal.						
	Change in the number of 24 hr periods where in concentrations of $PM_{2.5}$ is > 30 µg/m^3 versus do nothing in 2015	Number expressed in terms of 50m from future property line	134	134	100	134	127	148	84
		100m	15	15	15	15	20	54	28
		250m	0	0	0	0	1	0	2
		Maximum concentration under Do Nothing at 50 m	204%	204%	192%	171%	250%	317%	200%
		Assessment of Results	Implementation of any of the Alternatives has a negative impact on Air Quality within 100 m of the Plaza and Crossing boundaries. Significant increases in maximum concentrations are predicted to occur within 100 m of the Plaza and Crossing boundaries versus No Build for all Plaza/Crossing combinations. Maximum concentrations are approximately two times higher than No Build within 50 m of the Plaza boundary. Maximum Plaza A concentrations and exceedances occur in the area bounded by Sandwich, EC Row, Healey, and Broadway. The differences between the Crossing alternatives for Plaza B are marginal. Maximum Plaza B and C concentrations and exceedances occur northwest of the exits of the Plazas in the industrial areas.						
	Change in the number of 24 hr periods where in concentrations of $PM_{2.5}$ is > 30 µg/m^3 versus Do Nothing in 2025	Number expressed in terms of distance intervals/offsets from roadway at 50m	156	156	122	156	167	177	97
		100m	36	36	36	35	35	77	59
		250m	1	1	2	2	3	8	6
		Maximum concentration under Do Nothing at 50 m	204%	204%	192%	184%	284%	348%	208%
		Assessment of Results	Implementation of any of the Alternatives has a negative impact on Air Quality within 100 m of the Plaza and Crossing boundaries. Significant increases in maximum concentrations are predicted to occur within 100 m of the Plaza and Crossing boundaries versus No Build for all Plaza/Crossing combinations. Maximum concentrations are approximately two times higher than No Build within 50 m of the Plaza boundary. Maximum Plaza A concentrations and exceedances occur in the area bounded by Sandwich, EC Row, Healey, and Broadway. The differences between the Crossing alternatives for Plaza B are marginal. Maximum Plaza B and C concentrations and exceedances occur northwest of the exits of the Plazas in the industrial areas.						
	Change in the number of 24 hr periods where in concentrations of $PM_{2.5}$ is > 30 µg/m^3 versus Do Nothing in 2035	Number expressed in terms of distance intervals/offsets from roadway at 50m	168	168	134	168	175	193	109
		100m	56	56	56	56	48	87	77
		250m	3	3	3	3	8	11	6
		Maximum concentration under Do Nothing at 50 m	221%	229%	204%	192%	300%	413%	217%
		Assessment of Results	Implementation of any of the Alternatives has a negative impact on Air Quality within 100 m of the Plaza and Crossing boundaries. Significant increases in maximum concentrations are predicted to occur within 100 m of the Plaza and Crossing boundaries versus No Build for all Plaza/Crossing combinations. Maximum concentrations are approximately two times higher than No Build within 50 m of the Plaza boundary. Maximum Plaza A concentrations and exceedances occur in the area bounded by Sandwich, EC Row, Healey, and Broadway. The differences between the Crossing alternatives for Plaza B are marginal. Maximum Plaza B and C concentrations and exceedances occur northwest of the exits of the Plazas in the industrial areas.						
	Does the average annual concentration of $PM_{2.5}$ exceeds 15 µg/m^3 in 2015	Yes/No 50m	Yes	Yes	Yes	Yes	Yes	Yes	No
		100m	No	No	No	No	No	No	No
		250m	No	No	No	No	No	No	No
		Assessment of Results	Average (typical) concentrations are predicted to be greater than the Reference Level at 50 m away from the Plaza Boundary for all Alternatives in 2015. Concentrations are less than the reference level at greater than 50 m from the property boundary.						
	Does the average annual concentration of $PM_{2.5}$ exceeds 15 µg/m^3 in 2025	Yes/No 50m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		100m	No	No	No	No	No	No	No
		250m	No	No	No	No	No	No	No
		Assessment of Results	Average (typical) concentrations are predicted to be greater than the Reference Level at 50 m away from the Plaza Boundary for all Alternatives in 2025. Concentrations are less than the reference level at greater than 50 m from the property boundary.						
	Does the average annual concentration of $PM_{2.5}$ exceeds 15 µg/m^3 in 2035	Yes/No 50m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		100m	No	No	No	No	Yes	Yes	No
		250m	No	No	No	No	No	No	No
		Assessment of Results	Average (typical) concentrations are predicted to be greater than the Reference Level at 50 m away from the Plaza Boundary for all Alternatives in 2035.						
	Summary of effect on concentration of particulate matter	Subjective assessment	Plaza A has more receptors in closer proximity to the Plaza boundary than other Alternatives, and the highest effects are seen within 50 - 100 m of the boundary. Crossing C may, under some circumstances, have an impact on the Sandwich area, however, model results do not predict notable differences between the Crossing and No Build scenarios.						
Effect on changes in concentration of gaseous pollutants	Change in concentration of NOx versus Do Nothing	Subjective Assessment based on changes at identified receptors versus Do Nothing	NOx concentrations in the vicinity of Armanda street are increased relative to No Build for all Plaza alternatives. Implementation of Plaza A results in higher NOx concentrations than other Plaza alternatives. Crossing Alternatives have no impact on Armanda St area. In Sandwich, future No Build results in the lowest NOx concentrations of all Alternatives. However, there is little to no difference between No Build and Plaza A/B Alternatives. Crossing A/B have little impact on NOx concentrations in Sandwich. Crossing C results in marginally higher NOx concentrations in Sandwich relative to other crossing Alternatives.						
	Change in the number of 24 hr periods where concentrations of NOx >400 µg/m^3 versus Do Nothing in 2015	Number expressed in terms of distance intervals/offsets from roadway at 50m	8	8	8	0	2	6	0
		100m	0	0	0	0	1	2	0
		250m	0	0	0	0	0	0	0
		Maximum concentration under Do Nothing at 50 m	344%	344%	344%	101%	522%	429%	123%
		Assessment of Results	Maximum predicted 1-hour NOx concentrations increase by 1 - 5X over future No Build within 50 m of the Plaza boundary for all Alternatives. There is an increase in the number of hours greater than the MOE AAQC for NOx relative to No Build at 50 m away from the Plaza boundary. Plaza A and Plaza B1 have the highest increases due to the combined effect of the Plaza and local roads. NOx concentrations are higher relative to No Build within 50 - 250 m of the roadway for all crossings. The impact of the crossings is limited to within 250 m of the bridge/roadway.						
	Change in the number of 24 hr periods where concentrations of NOx > 400 µg/m^3 versus Do Nothing in 2025	Number expressed in terms of distance intervals/offsets from roadway at 50m	14	14	14	0	7	18	0
		100m	1	1	1	0	1	7	0
		250m	0	0	0	0	0	0	0
		Maximum concentration under Do Nothing at 50 m	805%	805%	805%	131%	790%	750%	213%
		Assessment of Results	Maximum predicted 1-hour NOx concentrations increase by 1 - 8X over future No Build within 50 m of the Plaza boundary for all Alternatives. There is an increase in the number of hours greater than the MOE AAQC for NOx relative to No Build at 50 m away from the Plaza boundary. Plaza A and Plaza B1 have the highest increases due to the combined effect of the Plaza and local roads. NOx concentrations are higher relative to No Build within 50 - 250 m of the roadway for all crossings. The impact of the crossings is limited to within 250 m of the bridge/roadway.						
	Change in the number of 24 hr periods where concentrations of NOx > 400 µg/m^3 versus Do Nothing in 2035	Number expressed in terms of distance intervals/offsets from roadway at 50m	16	16	16	0	6	16	0
		100m	16	16	16	0	6	16	0
		250m	1	1	1	0	3	6	0
		Maximum concentration relative to Do Nothing at 50m	886%	886%	886%	136%	691%	774%	222%
		Assessment of Results	Maximum predicted 1-hour NOx concentrations increase by 1 - 8X over future No Build within 50 m of the Plaza boundary for all Alternatives. There is an increase in the number of hours greater than the MOE AAQC for NOx relative to No Build at 50 m away from the Plaza boundary. Plaza A and Plaza B1 have the highest increases due to the combined effect of the Plaza and local roads. NOx concentrations are higher relative to No Build within 50 - 250 m of the roadway for all crossings. The impact of the crossings is limited to within 250 m of the bridge/roadway.						
	Summary of effect on concentration of gaseous pollutant	Subjective assessment	Implementation of Plaza A or Plaza B1 Alternatives results in increases of short term NOx concentrations in close proximity (50 m) to the Plaza boundary, due to combined effect of the Plaza and nearby major roads such as EC Row and Ojibway Pkwy.						
Factor Summary:									
Factor Score:			2	2	2	2	2	2	2

1-High Impact 2-Medium Impact 3-Low Impact 4-Neutral/No Impact 5-Low Benefit 6-Medium Benefit 7-High Benefit

Notes:
1. Do Nothing defined as no transportation improvements other than those already identified/approved
2. Year 2015 reflects effects upon opening of facility
3. Provincial guideline for acceptable maximum 24-hr average PM2.5 concentration is <30µg/m3
4. Year 2025 reflects effects 10 years post construction
5. Year 2035 reflects effects at 30 year planning horizon
6. Health Canada objective for acceptable average annual concentration of PM2.5 is < 15µg/m3

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APPENDICES

Appendix A:
Roadway Segments Considered in Analysis and Traffic Data

Roadway Segments Considered in the Assessment

The dispersion modeling analysis considered a large number of existing roads and roadway segments, in addition to new, or modified roads that will be constructed through implementation of the alternatives. These are as follows:

Roads North of EC Row Expressway

Huron Church Road and all major intersecting roads along Huron Church were considered from the EC Row Expressway up to Riverside Drive. This includes the existing Ambassador Plaza, and local roads in the immediate vicinity of the Plaza. The roads that were included in the assessment are listed below:

- Riverside Dr.
- University Ave.
- Wyandotte St.
- Patricia Rd. / Union St. / Sunset Ave.
- College Ave.
- Millen St.
- Girardot St.
- Tecumseh Rd.
- Dorchester Rd.
- Prince / Totten Rd.
- Malden Rd.
- Industrial Dr.

In addition, all traffic on the Canadian side of the Ambassador Bridge and through the Ambassador Plaza was included in the assessment.

Roads South of EC Row Expressway

Huron Church Road, Talbot Road/Highway 3 and all major intersections south of EC Row Expressway along the Huron Church / Highway 3 corridor were also included in the analysis. These are as follows:

- Spring Garden Rd. / Labelle St.
- Lambton St. / Grand Marais Rd.
- Pulford St.
- Reddock Ave
- Todd Ln / Cabana Rd.
- Huron Line
- Geraedt's Rd.
- Cousineau Rd. / Sandwich Pkwy West
- Montgomery Dr.
- Surrey Dr.
- Grosvenor Rd.
- Howard Ave.
- Outer Dr.
- 6th Concession
- Roseland Dr.
- Eastbourne Ave.
- North Talbot Rd.
- Tuson Way

Roads in the Vicinity of Ojibway Parkway

The EC Row Expressway and Ojibway Parkway also formed part of the road network included in the assessment. A number of local roads in the vicinity of these major arteries were also assessed. They are as follows:

- EC Row Expressway
- Ojibway Parkway
- Malden Rd.
- Matchette Rd.
- Broadway St. (E & W)
- Chappus St.
- GN Booth Dr.
- Sandwich St.
- Prospect Ave.
- Beech St.
- Russel St.
- Armanda St.
- South St.
- Chippewa St.
- Brock St.

In order to represent each roadway in the air dispersion model, the geographic co-ordinates of the first and last point of each roadway segment (which were often comprised of several links) for each traffic flow direction had to be coded into the model input files. This was done using ArcView GIS in combination with digital orthographic aerial photography and geo-referenced AutoCAD drawings of each alternative to manually select the start and end points of each of the over 700 roadway links included in the modeling. It is important to note that the roadway links for each connecting route alternative differed, due to variations in route alignments, locations of service roads, etc. Thus, the co-ordinates for each connecting route alternative had to be coded manually for essentially all of the segments included in the models.

A map showing the network of existing roadways included in the analysis is shown in Figure A.1.

FIGURE A.1 - MODELLED ROAD NETWORK – EXISTING ROADWAYS

TABLE A- 1 HOURLY TRAFFIC PROFILES USED IN MODELING

Period Starting	Profile 1		Profile 2		Profile 3		Profile 4	
	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound
12:00 AM	47	27	22	22	8	9	29	20
01:00 AM	33	21	17	16	4	4	26	15
02:00 AM	33	19	14	15	3	3	24	14
03:00 AM	32	19	14	12	2	2	26	11
04:00 AM	41	18	18	12	2	3	34	12
05:00 AM	65	19	37	16	8	8	54	14
06:00 AM	135	28	92	29	29	21	114	24
07:00 AM	157	30	124	46	50	43	152	34
08:00 AM	175	38	149	53	81	88	139	53
09:00 AM	141	43	103	44	57	68	102	52
10:00 AM	114	48	82	46	67	68	100	56
11:00 AM	111	57	85	56	81	80	99	63
12:00 PM	112	58	87	58	81	79	100	64
01:00 PM	114	61	85	59	82	74	96	65
02:00 PM	117	69	95	68	89	84	102	74
03:00 PM	108	88	104	94	102	95	111	89
04:00 PM	100	100	100	100	100	100	100	100
05:00 PM	113	96	99	100	99	102	94	110
06:00 PM	116	82	92	75	91	96	98	98
07:00 PM	86	65	71	58	73	71	78	79
08:00 PM	94	67	63	59	61	58	74	65
09:00 PM	84	57	53	50	50	40	64	51
10:00 PM	75	48	50	42	27	29	52	44
11:00 PM	62	38	37	36	18	18	39	35
		3461		2856		2506		3151

Profile 1: Huron Church North of E.C. Row in Base Cases
Profile 2: Huron Church South of E.C. Row in Base Cases and Freeway in Alternatives 1-3
Profile 3: All other Streets in Base Cases and Alternatives 1-3
Profile 4: Huron Church North of E.C. Row and E.C. Row in Alternatives 1-3

Profiles have been standardized to modelled p.m. peak hour 4:00 to 5:00 p.m.
The modelled a.m. peak hour is between 7:00 and 8:00 a.m.

TABLE A-1 CONT'D.

Profile 1	Profile 2	Profile 3	Profile 4
0.021	0.015	0.007	0.016
0.016	0.011	0.003	0.013
0.015	0.010	0.002	0.012
0.015	0.009	0.002	0.012
0.017	0.010	0.002	0.014
0.024	0.018	0.006	0.022
0.047	0.042	0.020	0.044
0.054	0.060	0.037	0.059
0.061	0.071	0.068	0.061
0.053	0.052	0.050	0.049
0.047	0.045	0.054	0.050
0.048	0.049	0.064	0.051
0.049	0.051	0.064	0.052
0.050	0.050	0.062	0.051
0.054	0.057	0.069	0.056
0.057	0.070	0.078	0.064
0.058	0.070	0.080	0.063
0.061	0.069	0.080	0.065
0.057	0.058	0.074	0.062
0.044	0.045	0.057	0.050
0.047	0.043	0.047	0.044
0.041	0.036	0.036	0.037
0.036	0.032	0.022	0.030
0.029	0.025	0.014	0.023

TABLE A- 2 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 1A – YEAR 2015

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6903	5381	6720	5292	179	85	3	1	0	3
	University	Wyandotte	3208	3874	3015	3508	91	119	55	244	47	3
	Wyandotte	AMB Off Ramp	2263	3076	2228	2903	0	0	34	174	0	0
	AMB Off Ramp	College	17476	6223	8505	6127	234	96	6342	1	2395	0
	College St	Girardot St	25318	24056	18099	16524	543	480	6474	4536	203	2515
	Girardot St	Tecumseh Rd	24203	23788	17739	17038	629	558	5654	3842	181	2350
	Tecumseh Rd	Dorchester St	27458	27231	21099	20908	769	701	5407	3450	183	2172
	Dorchester St	Prince Rd/Totten St	27503	28501	21746	22719	677	642	4927	3158	153	1983
	Prince Rd/Totten St	Malden Rd	30089	31859	24315	25966	759	741	4841	3202	174	1950
	Malden Rd	Industrial Rd	24695	26711	19089	20887	575	581	5025	3362	7	1881
	Industrial Rd	EC Row N. Ramp Terminal	27133	28866	21649	23194	656	661	4828	3102	0	1910
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	20198	34938	15483	29452	441	749	4275	3003	0	1734
	S. of EC Row S. Ramp Terminal		24716	26836	20217	22131	557	479	3942	2688	0	1538
S Service Rd	N. of Lambton St		0	10483	n/a	9712	n/a	159	n/a	612	n/a	0
	Lambton St	Todd Ln/Cabana Rd	0	9429	n/a	9006	n/a	123	n/a	301	n/a	0
	Todd Ln/Cabana Rd	St Clair College	0	16021	n/a	15950	n/a	71	n/a	0	n/a	0
	St Clair College	Cousineau Dr	0	9288	n/a	7675	n/a	90	n/a	1433	n/a	89
	Cousineau Dr	Howard Ave	0	6287	n/a	5737	n/a	90	n/a	356	n/a	104
	E. of Howard Ave		0	12060	n/a	11822	n/a	238	n/a	0	n/a	0
N Service Rd	N. of Labelle St		25245	0	20908	n/a	472	n/a	3865	n/a	0	n/a
	Labelle St	Grand Marais Rd Ramp	24277	0	22254	n/a	307	n/a	1717	n/a	0	n/a
	Grand Marais Rd Ramp	Pulford St	12425	0	11288	n/a	153	n/a	984	n/a	0	n/a
	Pulford St	Todd Ln/Cabana Rd	12314	0	11286	n/a	163	n/a	865	n/a	0	n/a
	Todd Ln/Cabana Rd	St Clair College	6976	0	6976	n/a	0	n/a	0	n/a	0	n/a
	St Clair College	Cousineau Dr	14452	0	11656	n/a	74	n/a	2721	n/a	0	n/a
	Cousineau Dr	Howard Ave	7417	0	6689	n/a	179	n/a	548	n/a	0	n/a
	E. of Howard Ave		13630	0	13344	n/a	286	n/a	0	n/a	0	n/a
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10180	10556	9927	9984	136	134	27	14	91	422
	GN Booth Dr	Sandwich St	10116	10431	9862	9851	135	133	27	15	92	433
	Sandwich St	Prospect Ave	9479	9729	9356	9615	74	78	49	37	0	0
	N. of Prospect Ave		9416	9510	9293	9398	74	76	49	36	0	0
			0	0								
CROSSING ROADS			0	0								
Wyandotte	W of HuronChurch		5210	4912	4850	4479	0	0	359	433	0	0
	E of HuronChurch		3635	5183	2855	4105	21	142	716	937	43	0
University	W of HuronChurch		1266	1188	1266	1188	0	0	0	0	0	0
	E of HuronChurch		2136	2122	1944	1963	119	91	70	21	3	47
Riverside	W of HuronChurch		3428	3580	3428	3580	0	0	0	0	0	0
	E of HuronChurch		6712	5703	6538	5669	0	0	174	34	0	0
AMB Off Ramp	E of HuronChurch		0	10153	0	1363	0	56	0	6339	0	2395
AMB On Ramp	E of HuronChurch		6407	0	303	0	12	0	5917	0	174	0
Patricia	AMB	Wyandotte	4105	5097	541	1360	22	54	3371	3416	171	267
College St	E. of HC Road		6514	6360	6352	5557	158	125	3	536	0	142
	W. of HC Road		1861	809	1639	758	0	0	222	51	0	0
Girardot St	E. of HC Road		1127	1169	962	1169	0	0	165	0	0	0
	W. of HC Road		2346	2275	2258	2224	38	22	50	30	0	0
Tecumseh Rd	E. of HC Road		5829	6836	5496	6181	132	145	200	357	0	153
	W. of HC Road		6613	6995	6468	6877	0	0	146	118	0	0
Dorchester St	E. of HC Road		1684	1556	1438	1556	0	0	247	0	0	0
	W. of HC Road		1419	807	1371	789	23	9	24	10	0	0
Prince Rd/Totten St	E. of HC Road		2075	2907	1999	2784	0	0	76	124	0	0
	W. of HC Road		4784	5176	4709	5101	0	0	75	75	0	0
Malden Rd	E. of HC Road		1376	1126	1173	927	0	0	203	199	0	0
	W. of HC Road		7884	8413	6973	7418	371	367	390	86	151	542
Industrial Rd	E. of HC Road		3616	3425	3397	3178	56	58	156	174	7	16
	W. of HC Road		4072	3169	3912	2779	159	193	0	0	0	198
EC Row N. Ramp Termina	E. of HC Road (W-N/S Off Ramp & N-W On Ramp)		14179	2041	12487	1842	314	0	1377	199	0	0
	W. of HC Road (S-W On Ramp)		609	0	414	n/a	14	n/a	49	n/a	133	n/a
EC Row S. Ramp Termina	E. of HC Road (N-E On Ramp)		0	7407	n/a	7295	n/a	113	n/a	0	n/a	0
	W. of HC Road (S-E On Ramp & E-N/S Off Ramp)		8624	2901	7589	2479	257	83	499	338	279	0
Labelle St	E. of N. Service Rd		2073	715	1878	715	0	0	196	0	0	0
Grand Marais Rd Ramp	E. of N. Service Rd		4896	1877	4640	1680	0	0	256	197	0	0
Fazio Dr	W. of S. Service Rd		3550	2411	3421	2355	58	28	71	28	0	0
Pulford St	E. of N. Service Rd		493	1011	419	1011	0	0	74	0	0	0
Todd Ln/Cabana Rd	E. of N. Service Rd		8970	7585	8882	7537	0	0	87	49	0	0
	between N. and S. Service Rd		9971	13458	9971	12816	0	106	0	536	0	0
	between S. Service Rd and Huron Church Line		13705	14201	13430	13675	85	100	190	426	0	0
	W. of Huron Church Line		8686	8729	8682	8725	0	0	4	4	0	0
St Clair College	E. of N. Service Rd		2969	8656	2873	8387	0	0	95	268	0	0
	between N. and S. Service Rd		2255	2572	2255	2389	0	0	0	183	0	0
Cousineau Dr	E. of N. Service Rd		5380	4408	4042	3492	0	0	1338	916	0	0
	between N. and S. Service Rd		7569	6705	5520	6599	4	106	2044	0	0	0
	W. of S. Service Rd		9746	6412	8457	5507	17	114	1272	791	0	0
Howard Ave	E. of N. Service Rd		7718	8482	7588	8318	127	160	2	4	0	0
	between N. and S. Service Rd		11604	7215	11288	7067	199	147	116	1	0	0
	W. of S. Service Rd		11359	13477	11047	13167	243	277	69	32	0	0
EC Row Expressway	E. of Ojibway Pwy		13304	8173	12917	7927	311	246	17	0	58	0
	W. of Ojibway Pwy		20534	11155	16503	10907	224	248	3710	0	97	0
	E. of Huron Church Rd		34989	43027	31717	37465	673	793	2222	3542	377	1227
	At Malden Rd		23221	29489	21261	25093	402	475	1062	3032	497	889
	W. of Matchette		15619	8173	13990	7927	338	246	872	0	418	0
GN Booth Dr	W. of Ojibway Pwy		357	461	346	450	6	7	4	4	0	0
Sandwich St	W. of Ojibway Pwy		1533	1388	1360	1261	148	91	25	35	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	332	427	6	4	4	6	0	0

TABLE A-2 CONT'D.

	HIGHWAY 401 Mainline											
	S. of Hwy 3 merge/split		19972	21529	11333	10718	322	248	3131	3025	5185	7538
	N. of Howard Ave		19026	21477	10240	10473	316	255	3577	3490	4893	7259
	At Grand Marais Rd		16155	24917	8788	12349	292	305	3361	4476	3713	7787
	E. of Malden Rd		7502	13505	1749	5353	57	213	1572	2430	4123	5509
	To/From Canadian Plaza		10035	18007	0	3	2	4	4148	8568	5884	9432
			0	0								
	HIGHWAY 401 Ramps		0	0								
			0	0								
	Hwy 3 merge/split		0	0								
	401 NB Off Ramp		9970	0	8251	0	182	0	1114	0	423	0
	401 NB On Ramp		9124	0	8951	0	173	0	0	0	0	0
	401 SB Off Ramp		0	9491	0	9303	0	188	0	0	0	0
	401 SB On Ramp		0	9574	0	7278	0	186	0	1702	0	408
	At St. Clair College		0	0								
	401 NB Off Ramp		6964	0	6964	0	0	0	0	0	0	0
	401 NB On Ramp		4318	0	3605	0	20	0	693	0	0	0
	401 SB Off Ramp		0	8288	0	6876	0	77	0	1227	0	108
	401 SB On Ramp		0	5019	0	5001	0	18	0	0	0	0
	At Huron Church Rd		0	0								
	401 NB Off Ramp		8892	0	6939	0	242	0	1712	0	0	0
	401 SB On Ramp		0	11044	0	8072	0	187	0	1668	0	1117
	At Malden Rd		0	0								
	401 NB On Ramp		3176	0	2447	0	406	0	262	0	61	0
	401 SB Off Ramp		0	4140	0	2705	0	571	0	864	0	0
	Hwy 401 to EC Row Expressway		0	0								
	401 SB Off Ramp		0	13343	0	9377	0	221	0	2943	0	802
	Ojibway Pkwy IC		0	0								
	401 NB Off Ramp		4660	0	4197	0	463	0	0	0	0	0
	401 NB On Ramp		1503	0	0	0	0	0	1210	0	293	0
	401 SB Off Ramp		0	1091	0	122	0	8	0	961	0	0
	401 SB On Ramp		0	14959	0	14542	0	417	0	0	0	0
	EC Row Expressway to Hwy 401		0	0								
	401 NB On Ramp		2083	0	0	0	0	0	1309	0	774	0
			0	0								
			0	0								
Highway 401 Mainline Vol	FROM	TO	0	0								
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	19972	0	11333		322		3131		5185	
	Hwy 3/401 NB Off Ramp	Hwy 3/401 NB On Ramp	9889	0	3119		125		2475		4170	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	19026	0	10240		316		3577		4893	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	11651	0	5820		235		2491		3105	
	St. Clair/401 NB On Ramp	HC Rd/401 NB Off Ramp	16155	0	8788		292		3361		3713	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	7502	0	1749		57		1572		4123	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	10678	0	4197		463		1834		4185	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	6018	0	0		0		1834		4185	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	7521	0	0		0		3044		4477	
	EC ROW to 401 NB On Ramp	Canadian Plaza	10032	0	0		0		4148		5884	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	18007		3		4		8568		9432
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	16722		3		4		7916		8799
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	31533		16044		572		6781		8136
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	18914		5089		361		4119		9345
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	14235		3207		92		3163		7772
	HC Rd/401 SB On Ramp	St Clair/401 SB Off Ramp	0	24917		12349		305		4476		7787
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	16134		6632		205		3057		6240
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	21477		10473		255		3490		7259
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	10979		5098		121		1950		3811
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	21529		10718		248		3025		7538
			0	0								
			0	0								
Grand Marais Rd	E. of connecting ramp		4769	4265	4528	3803	0	0	241	462	0	0
	W. of connecting ramp		3659	6458	3656	5871	3	36	0	551	0	0
Broadway Street	W. of Ojibway Pkwy		330	352	329	352	0	0	1	0	0	0
			0	0								
Huron Church Line	S. of Todd Lane		9097	8914	7829	7592	197	167	843	877	227	277
Millen [1]	Felix	HC	107	257	104	251	2	4	1	3	0	0
			0	0								
Malden	Chappus	401 S. Ramp	9796	11386	8976	10514	254	259	567	612	0	0
	401 S. Ramp	401 N. Ramp	10788	7776	9899	7169	278	179	612	428	0	0
	N. of 401 N. Ramp		8014	8481	7359	7824	206	195	450	463	0	0
Matchette	Chappus	EC Row S. Ramp	8514	7907	8409	7804	0	0	105	103	0	0
	EC Row S. Ramp	EC Row N. Ramp	2621	8885	2487	8793	0	0	134	92	0	0
	EC Row N. Ramp	Carmichael	4793	3284	4678	3199	0	0	115	85	0	0

TABLE A- 3 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 1A – YEAR 2025

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6921	5488	6730	5355	188	91	3	1	0	41
	University	Wyandotte	3185	3974	2976	3574	91	123	64	236	55	41
	Wyandotte	AMB Off Ramp	2244	3139	2201	2973	0	0	43	166	0	0
	AMB Off Ramp	College	18520	6297	8368	6194	239	102	7092	1	2821	0
	College St	Girardot St	26148	24855	18434	16577	576	499	6873	4953	264	2826
	Girardot St	Tecumseh Rd	25103	24972	18123	17435	682	591	6059	4282	238	2664
	Tecumseh Rd	Dorchester St	28263	28077	21472	21113	833	733	5720	3811	238	2420
	Dorchester St	Prince Rd/Totten St	28314	29360	22182	22974	737	668	5191	3496	204	2222
	Prince Rd/Totten St	Malden Rd	30960	33126	24797	26746	824	786	5109	3544	230	2050
	Malden Rd	Industrial Rd	24658	28107	18818	21670	611	631	5220	3782	8	2024
	Industrial Rd	EC Row N. Ramp Terminal	27916	30104	22088	23972	711	692	5117	3429	0	2011
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	20480	37897	15555	31912	465	803	4460	3350	0	1832
	S. of EC Row S. Ramp Terminal		27674	28928	22465	23981	651	505	4558	2895	0	1547
S Service Rd	N. of Lambton St		0	12380	n/a	11499	n/a	174	n/a	707	n/a	0
	Lambton St	Todd Ln/Cabana Rd	0	11489	n/a	10949	n/a	133	n/a	408	n/a	0
	Todd Ln/Cabana Rd	St Clair College	0	17084	n/a	16998	n/a	86	n/a	0	n/a	0
	St Clair College	Cousineau Dr	0	9834	n/a	8086	n/a	89	n/a	1543	n/a	115
	Cousineau Dr	Howard Ave	0	6313	n/a	5739	n/a	80	n/a	376	n/a	118
	E. of Howard Ave		0	13024	n/a	12772	n/a	251	n/a	0	n/a	0
N Service Rd	N. of Labelle St		28297	0	23331	n/a	544	n/a	4421	n/a	0	n/a
	Labelle St	Grand Marais Rd Ramp	27609	0	25324	n/a	345	n/a	1940	n/a	0	n/a
	Grand Marais Rd Ramp	Pulford St	13788	0	12577	n/a	166	n/a	1045	n/a	0	n/a
	Pulford St	Todd Ln/Cabana Rd	14331	0	13152	n/a	185	n/a	994	n/a	0	n/a
	Todd Ln/Cabana Rd	St Clair College	7167	0	7167	n/a	0	n/a	0	n/a	0	n/a
	St Clair College	Cousineau Dr	14675	0	11596	n/a	79	n/a	3000	n/a	0	n/a
	Cousineau Dr	Howard Ave	7599	0	6917	n/a	199	n/a	484	n/a	0	n/a
	E. of Howard Ave		14732	0	14417	n/a	315	n/a	0	n/a	0	n/a
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10894	11126	10618	10442	137	132	27	21	112	531
	GN Booth Dr	Sandwich St	10830	10927	10553	10241	137	130	27	21	113	535
	Sandwich St	Prospect Ave	10088	10069	9968	9956	73	73	47	40	0	0
	N. of Prospect Ave		10025	9858	9906	9748	72	72	47	39	0	0
			0	0								
CROSSING ROADS			0	0								
Wyandotte	W. of Huron Church		5139	4894	4769	4457	0	0	370	437	0	0
	E. of Huron Church		3633	5254	2820	4180	19	147	743	927	51	0
University	W. of Huron Church		1376	1275	1376	1275	0	0	0	0	0	0
	E. of Huron Church		2287	2207	2053	2040	123	91	70	21	41	55
Riverside	W. of Huron Church		3579	3715	3579	3715	0	0	0	0	0	0
	E. of Huron Church		6925	5802	6759	5759	0	0	166	43	0	0
AMB Off Ramp	E. of Huron Church		0	11250	0	1286	0	54	0	7089	0	2821
AMB On Ramp	E. of Huron Church		6739	0	240	0	6	0	6270	0	223	0
Patricia	AMB	Wyandotte	4135	4980	422	1283	12	53	3486	3339	215	305
College St	E. of HC Road		6603	6529	6436	5615	164	129	3	574	0	212
	W. of HC Road		2066	963	1666	921	0	0	400	42	0	0
Girardot St	E. of HC Road		1147	1159	970	1159	0	0	177	0	0	0
	W. of HC Road		2297	2203	2218	2155	36	21	43	27	0	0
Tecumseh Rd	E. of HC Road		5789	6844	5461	6130	126	145	201	374	0	195
	W. of HC Road		6495	7114	6306	6991	0	0	189	123	0	0
Dorchester St	E. of HC Road		1717	1582	1453	1582	0	0	264	0	0	0
	W. of HC Road		1419	808	1375	790	23	9	22	9	0	0
Prince Rd/Totten St	E. of HC Road		2214	2353	2135	2253	0	0	79	101	0	0
	W. of HC Road		5516	5545	5419	5468	0	0	97	77	0	0
Malden Rd	E. of HC Road		1632	1359	1358	1086	0	0	274	273	0	0
	W. of HC Road		8212	8859	7338	7745	385	378	294	15	195	721
Industrial Rd	E. of HC Road		3925	3673	3710	3431	50	58	157	163	8	21
	W. of HC Road		4262	3467	4090	3017	173	204	0	0	0	246
EC Row N. Ramp Termina	E. of HC Road (W-N/S Off Ramp & N-W On Ramp)		15964	2066	14136	1853	358	0	1469	214	0	0
	W. of HC Road (S-W On Ramp)		584	0	378	n/a	11	n/a	44	n/a	151	n/a
EC Row S. Ramp Termina	E. of HC Road (N-E On Ramp)		0	10547	n/a	10387	n/a	160	n/a	0	n/a	0
	W. of HC Road (S-E On Ramp & E-N/S Off Ramp)		9448	3084	8157	2649	288	85	619	351	384	0
Labelle St	E. of N. Service Rd		2018	758	1819	758	0	0	199	0	0	0
Grand Marais Rd Ramp	E. of N. Service Rd		5402	2065	5154	1852	0	0	248	213	0	0
Fazio Dr	W. of S. Service Rd		3907	2924	3774	2859	62	35	71	31	0	0
Pulford St	E. of N. Service Rd		476	1099	402	1099	0	0	75	0	0	0
Todd Ln/Cabana Rd	E. of N. Service Rd		9635	7247	9555	7187	0	0	81	60	0	0
	between N. and S. Service Rd		10668	14999	10668	14245	0	119	0	635	0	0
	between S. Service Rd and Huron Church Line		16030	15949	15681	15339	91	114	259	496	0	0
	W. of Huron Church Line		8758	9145	8753	9142	0	0	5	3	0	0

TABLE A-3 CONT'D.

	HIGHWAY 401 Mainline											
	S. of Hwy 3 merge/split		24704	26965	14104	13161	414	298	3568	3385	6618	10121
	N. of Howard Ave		22602	26333	11366	11823	363	290	4199	4060	6674	10160
	At Grand Marais Rd		19526	29871	9883	13605	340	339	4031	5132	5272	10795
	E. of Malden Rd		9431	18735	1906	6731	61	239	1847	2982	5617	8783
	To/From Canadian Plaza		12704	21543	0	4	3	4	5057	9228	7644	12306
			0	0								
	HIGHWAY 401 Ramps		0	0								
			0	0								
	Hwy 3 merge/split		0	0								
	401 NB Off Ramp		11166	0	9034	0	199	0	1343	0	590	0
	401 NB On Ramp		9328	0	9156	0	172	0	0	0	0	0
	401 SB Off Ramp		0	9841	0	9643	0	198	0	0	0	0
	401 SB On Ramp		0	10600	0	7754	0	194	0	2082	0	570
	At St. Clair College		0	0								
	401 NB Off Ramp		7216	0	7216	0	0	0	0	0	0	0
	401 NB On Ramp		4457	0	3658	0	22	0	777	0	0	0
	401 SB Off Ramp		0	8772	0	7229	0	75	0	1333	0	134
	401 SB On Ramp		0	5449	0	5426	0	23	0	0	0	0
	At Huron Church Rd		0	0								
	401 NB Off Ramp		10331	0	7959	0	289	0	2082	0	0	0
	401 SB On Ramp		0	10960	0	7881	0	176	0	1748	0	1154
	At Malden Rd		0	0								
	401 NB On Ramp		3769	0	2808	0	384	0	425	0	151	0
	401 SB Off Ramp		0	4949	0	3457	0	541	0	951	0	0
	Hwy 401 to EC Row Expressway		0	0								
	401 SB Off Ramp		0	14976	0	10255	0	248	0	3455	0	1018
	Ojibway Pkwy IC		0	0								
	401 NB Off Ramp		5160	0	4714	0	446	0	0	0	0	0
	401 NB On Ramp		1688	0	0	0	0	0	1331	0	357	0
	401 SB Off Ramp		0	1142	0	202	0	18	0	922	0	0
	401 SB On Ramp		0	18909	0	18372	0	536	0	0	0	0
	EC Row Expressway to Hwy 401		0	0								
	401 NB On Ramp		2521	0	0	0	0	0	1554	0	967	0
			0	0								
			0	0								
Highway 401 Mainline Vol	FROM	TO	0	0								
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	24704	0	14104		414		3568		6618	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	13346	0	4087		170		3022		6067	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	22602	0	11366		363		4199		6674	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	14904	0	6835		283		3101		4685	
	St. Clair/401 NB On Ramp	HC Rd/401 NB Off Ramp	19526	0	9883		340		4031		5272	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	9431	0	1906		61		1847		5617	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	13200	0	4714		446		2272		5768	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	8040	0	0		0		2272		5768	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	9728	0	0		0		3603		6125	
	EC ROW to 401 NB On Ramp	Canadian Plaza	12701	0	0		0		5057		7644	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	21543		4		4		9228		12306
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	20153		4		3		8578		11568
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	39289		18221		637		8291		12140
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	24273		5859		357		4978		13079
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	18679		3616		104		3880		11078
	HC Rd/401 SB On Ramp	St Clair/401 SB Off Ramp	0	29871		13605		339		5132		10795
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	20521		7649		239		3643		8991
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	26333		11823		290		4060		10160
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	15262		6566		156		2533		6006
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	26965		13161		298		3385		10121
			0	0								
			0	0								
Grand Marais Rd	E. of connecting ramp		5257	4687	5017	4186	0	0	240	501	0	0
	W. of connecting ramp		4021	7096	4018	6458	3	40	0	597	0	0
Broadway Street	W. of Ojibway Pkwy		330	352	329	352	0	0	1	0	0	0
			0	0								
Huron Church Line	S. of Todd Lane		10984	11821	9386	9973	233	220	1039	1162	326	465
Millen [1]	Felix	HC	107	257	104	251	2	4	1	3	0	0
			0	0								
Malden	Chappus	401 S. Ramp	10514	12368	9601	11445	269	286	643	637	0	0
	401 S. Ramp	401 N. Ramp	11628	7976	10637	7375	295	185	695	416	0	0
	N.of 401 N. Ramp		8383	8854	7675	8188	212	206	496	461	0	0
Matchette	Chappus	EC Row S. Ramp	9852	9480	9736	9270	0	0	116	209	0	0
	EC Row S. Ramp	EC Row N. Ramp	2796	10345	2667	10155	0	0	129	190	0	0
	EC Row N. Ramp	Carmichael	5098	3121	4984	2984	0	0	114	137	0	0

TABLE A- 4 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 1A – YEAR 2035

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6884	5682	6681	5506	199	95	3	1	0	81
	University	Wyandotte	3071	4106	2848	3663	92	125	69	237	62	81
	Wyandotte	AMB Off Ramp	2110	3240	2062	3072	0	0	47	168	0	0
	AMB Off Ramp	College	19645	6460	7913	6352	238	107	7713	1	3781	0
	College St	Girardot St	26159	25893	18212	16345	580	514	7061	5277	306	3756
	Girardot St	Tecumseh Rd	25638	26470	18263	17708	712	614	6376	4624	287	3524
	Tecumseh Rd	Dorchester St	28751	29264	21568	21530	867	768	6028	3842	287	3124
	Dorchester St	Prince Rd/Totten St	28834	30327	22344	23275	763	691	5483	3517	244	2844
	Prince Rd/Totten St	Malden Rd	31699	34496	25100	27702	860	830	5462	3268	278	2696
	Malden Rd	Industrial Rd	25290	29911	19140	23044	648	684	5492	3421	10	2762
	Industrial Rd	EC Row N. Ramp Terminal	28563	32827	22486	25804	740	759	5337	3536	0	2728
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	21332	41573	16155	34765	488	890	4690	3428	0	2489
	S. of EC Row S. Ramp Terminal		29933	32061	24303	26445	722	568	4907	3037	0	2010
S Service Rd	N. of Lambton St		0	14423	n/a	13352	n/a	204	n/a	867	n/a	0
	Lambton St	Todd Ln/Cabana Rd	0	13362	n/a	12677	n/a	155	n/a	530	n/a	0
	Todd Ln/Cabana Rd	St Clair College	0	18371	n/a	18273	n/a	98	n/a	0	n/a	0
	St Clair College	Cousineau Dr	0	10653	n/a	8674	n/a	91	n/a	1745	n/a	143
	Cousineau Dr	Howard Ave	0	6582	n/a	5944	n/a	77	n/a	426	n/a	136
	E. of Howard Ave		0	14106	n/a	13828	n/a	278	n/a	0	n/a	0
N Service Rd	N. of Labelle St		30429	0	25012	n/a	618	n/a	4799	n/a	0	n/a
	Labelle St	Grand Marais Rd Ramp	29689	0	27023	n/a	408	n/a	2258	n/a	0	n/a
	Grand Marais Rd Ramp	Pulford St	14568	0	13112	n/a	201	n/a	1256	n/a	0	n/a
	Pulford St	Todd Ln/Cabana Rd	15197	0	13747	n/a	223	n/a	1227	n/a	0	n/a
	Todd Ln/Cabana Rd	St Clair College	7428	0	7428	n/a	0	n/a	0	n/a	0	n/a
	St Clair College	Cousineau Dr	15278	0	11970	n/a	87	n/a	3222	n/a	0	n/a
	Cousineau Dr	Howard Ave	8010	0	7331	n/a	246	n/a	434	n/a	0	n/a
	E. of Howard Ave		15472	0	15128	n/a	344	n/a	0	n/a	0	n/a
Ojibway Pwy	EC Row Expressway	GN Booth Dr	11696	11775	11387	10979	144	129	25	19	140	648
	GN Booth Dr	Sandwich St	11632	11576	11322	10778	143	127	26	19	141	652
	Sandwich St	Prospect Ave	10789	10589	10666	10473	74	72	50	44	0	0
	N. of Prospect Ave		10726	10388	10603	10274	74	71	49	43	0	0
			0	0								
CROSSING ROADS			0	0								
Wyandotte	W of HuronChurch		4985	4912	4604	4465	0	0	381	446	0	0
	E of HuronChurch		3622	5422	2776	4327	17	154	771	942	58	0
University	W of HuronChurch		1547	1310	1547	1310	0	0	0	0	0	0
	E of HuronChurch		2500	2261	2225	2085	125	92	68	22	81	62
Riverside	W of HuronChurch		3718	4039	3717	4039	0	0	0	0	0	0
	E of HuronChurch		7178	5977	7009	5930	0	0	169	47	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43	0	7710	0	3781
AMB On Ramp	E of HuronChurch		7143	0	265	0	7	0	6598	0	273	0
Patricia	AMB	Wyandotte	4288	4829	469	928	14	41	3573	3465	233	394
College St	E. of HC Road		6758	6585	6584	5577	171	131	3	582	0	296
	W. of HC Road		2275	1078	1746	1039	0	0	529	39	0	0
Girardot St	E. of HC Road		1155	1167	973	1167	0	0	182	0	0	0
	W. of HC Road		2291	2171	2213	2122	36	22	42	27	0	0
Tecumseh Rd	E. of HC Road		6209	7294	5868	6355	135	146	206	450	0	342
	W. of HC Road		6677	7354	6315	7254	0	0	362	99	0	0
Dorchester St	E. of HC Road		1740	1600	1466	1600	0	0	274	0	0	0
	W. of HC Road		1419	808	1375	790	22	9	22	9	0	0
Prince Rd/Totten St	E. of HC Road		2312	2888	2228	2764	0	0	83	124	0	0
	W. of HC Road		5054	5711	4992	5628	0	0	62	83	0	0
Malden Rd	E. of HC Road		1859	1512	1546	1009	0	0	313	503	0	0
	W. of HC Road		8621	9302	7608	7977	399	391	380	44	234	890
Industrial Rd	E. of HC Road		4361	3862	3605	3587	46	57	702	191	8	27
	W. of HC Road		4490	3603	4307	3085	183	210	0	0	0	308
EC Row N. Ramp Terminal	E. of HC Road (W-N/S Off Ramp & N-W On Ramp)		16497	2213	14587	1944	376	2	1534	267	0	0
	W. of HC Road (S-W On Ramp)		626	0	387	n/a	11	n/a	45	n/a	182	n/a
EC Row S. Ramp Terminal	E. of HC Road (N-E On Ramp)		0	12051	n/a	11821	n/a	230	n/a	0	n/a	0
	W. of HC Road (S-E On Ramp & E-N/S Off Ramp)		10022	3317	8584	2930	312	86	541	301	585	0
Labelle St	E. of N. Service Rd		2112	803	1900	803	0	0	212	0	0	0
Grand Marais Rd Ramp	E. of N. Service Rd		5912	2254	5666	2026	0	0	245	228	0	0
Fazio Dr	W. of S. Service Rd		4702	3481	4549	3403	74	39	79	39	0	0
Pulford St	E. of N. Service Rd		476	1205	401	1205	0	0	76	0	0	0
Todd Ln/Cabana Rd	E. of N. Service Rd		10835	8271	10749	8206	0	0	86	65	0	0
	between N. and S. Service Rd		11958	16763	11958	15840	0	146	0	777	0	0
	between S. Service Rd and Huron Church Line		18324	17933	17887	17167	103	140	333	626	0	0
	W. of Huron Church Line		9347	9638	9340	9633	0	0	7	5	0	0
St Clair College	E. of N. Service Rd		3387	9171	3287	8894	0	0	101	276	0	0
	between N. and S. Service Rd		2706	2961	2706	2761	0	0	0	201	0	0
Cousineau Dr	E. of N. Service Rd		5507	4380	4052	3386	0	0	1456	993	0	0
	between N. and S. Service Rd		9161	7923	6330	7763	7	160	2824	0	0	0
	W. of S. Service Rd		12108	8103	10109	7212	25	153	1974	738	0	0
Howard Ave	E. of N. Service Rd		9246	10454	9092	10245	151	202	3	6	0	0
	between N. and S. Service Rd		13631	8725	13254	8541	226	182	150	2	0	0
	W. of S. Service Rd		13518	17014	13154	16611	281	354	82	49	0	0
EC Row Expressway	E. of Ojibway Pwy		21805	9794	20974	9441	499	250	191	84	140	18
	W. of Ojibway Pwy		30777	13314	24225	13029	311	285	6091	0	150	0
	E. of Huron Church Rd		48161	57032	43009	48627	905	1071	3558	5208	688	2127
	At Malden Rd		34317	37671	30637	31372	566	596	2197	4367	917	1336
	W. of Matchette		24784	9794	21519	9441	512	250	1921	84	832	18
GN Booth Dr	W. of Ojibway Pwy		357	461	347	450	6	6	4	4	0	0
Sandwich St	W. of Ojibway Pwy		1775	1630	1594	1496	157	102	25	33	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	333	427	5	4	3	6	0	0

TABLE A-4 CONT'D.

HIGHWAY 401 Mainline										
	S. of Hwy 3 merge/split		27686	30966	15464	14400	474	334	3825	3724
	N. of Howard Ave		25681	30052	12463	12507	411	312	4686	4508
	At Grand Marais Rd		22404	33356	10894	14073	394	357	4549	5585
	E. of Malden Rd		11228	21750	1969	6847	67	239	2183	3534
	To/From Canadian Plaza		14834	24168	1	5	3	4	5721	9960
			0	0						
HIGHWAY 401 Ramps			0	0						
			0	0						
	Hwy 3 merge/split		0	0						
	401 NB Off Ramp		11862	0	9353	0	208	0	1518	0
	401 NB On Ramp		9728	0	9544	0	184	0	0	0
	401 SB Off Ramp		0	10383	0	10166	0	217	0	0
	401 SB On Ramp		0	11830	0	8354	0	209	0	2528
	At St. Clair College		0	0						
	401 NB Off Ramp		7753	0	7753	0	0	0	0	0
	401 NB On Ramp		4850	0	3965	0	25	0	860	0
	401 SB Off Ramp		0	8911	0	7289	0	74	0	1386
	401 SB On Ramp		0	5824	0	5797	0	27	0	0
	At Huron Church Rd		0	0						
	401 NB Off Ramp		11496	0	8930	0	342	0	2224	0
	401 SB On Ramp		0	11499	0	8128	0	187	0	1754
	At Malden Rd		0	0						
	401 NB On Ramp		4147	0	2986	0	436	0	516	0
	401 SB Off Ramp		0	5453	0	3858	0	536	0	1059
	Hwy 401 to EC Row Expressway		0	0						
	401 SB Off Ramp		0	18144	0	12115	0	304	0	4414
	Ojibway Pkwy IC		0	0						
	401 NB Off Ramp		5459	0	4956	0	503	0	0	0
	401 NB On Ramp		1807	0	0	0	0	0	1396	0
	401 SB Off Ramp		0	1297	0	295	0	28	0	974
	401 SB On Ramp		0	22906	0	22247	0	658	0	0
	EC Row Expressway to Hwy 401		0	0						
	401 NB On Ramp		3029	0	0	0	0	0	1865	0
			0	0						
			0	0						
Highway 401 Mainline Vol	FROM	TO	0	0						
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	27686	0	15464		474		3825	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	16034	0	4872		211		3465	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	25681	0	12463		411		4686	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	17359	0	7633		328		3538	
	St. Clair/401 NB On Ramp	HC Rd/401 NB Off Ramp	22404	0	10894		394		4549	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	11228	0	1969		67		2183	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	15375	0	4956		503		2698	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	9916	0	0		0		2698	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	11723	0	0		0		4095	
	EC ROW to 401 NB On Ramp	Canadian Plaza	14830	0	0		0		5721	
			0	0						
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	24168		5		4		9960
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	22602		5		3		9245
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	46534		19725		681		9840
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	29106		6163		354		5724
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	22883		3767		98		4513
	HC Rd/401 SB On Ramp	St Clair/401 SB Off Ramp	0	33356		14073		357		5585
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	23809		8128		259		4069
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	30052		12507		312		4508
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	18217		7279		176		2918
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	30966		14400		334		3724
			0	0						
			0	0						
Grand Marais Rd	E. of connecting ramp		5749	5118	5514	4580	0	0	235	537
	W. of connecting ramp		4391	7750	4388	7049	3	47	0	654
Broadway Street	W. of Ojibway Pkwy		330	352	329	352	0	0	1	0
			0	0						
Huron Church Line	S. of Todd Lane		12558	13701	10527	11295	263	251	1324	1477
Millen [1]	Felix	HC	107	257	104	251	2	4	1	3
			0	0						
Malden	Chappus	401 S. Ramp	9268	13116	8502	12153	232	312	534	652
	401 S. Ramp	401 N. Ramp	10504	8288	9648	7676	261	198	595	414
	N. of 401 N. Ramp		6946	9254	6413	8572	168	221	365	462
Matchette	Chappus	EC Row S. Ramp	10463	9981	10420	9722	0	0	44	259
	EC Row S. Ramp	EC Row N. Ramp	3015	10774	2981	10374	0	0	34	400
	EC Row N. Ramp	Carmichael	5379	3291	5343	2969	0	0	36	322

TABLE A- 5 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 1B – YEAR 2015

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6911	5457	6735	5369	173	84	3	1	0	3
	University	Wyandotte	3258	3990	3090	3626	91	118	58	242	20	3
	Wyandotte	AMB Off Ramp	2322	3177	2285	3005	0	0	37	172	0	0
	AMB Off Ramp	College	17448	6323	8617	6228	229	94	6211	1	2391	0
	College St	Girardot St	25364	24092	18255	16675	543	487	6361	4419	205	2512
	Girardot St	Tecumseh Rd	24197	23801	17763	17139	636	571	5615	3744	182	2347
	Tecumseh Rd	Dorchester St	27469	27266	21118	21024	778	716	5388	3342	186	2185
	Dorchester St	Prince Rd/Totten St	27511	28532	21714	22815	693	656	4945	3065	159	1997
	Prince Rd/Totten St	Malden Rd	30088	31791	24278	26074	777	757	4852	3020	180	1940
	Malden Rd	Industrial Rd	24739	26772	19251	21200	577	580	4904	3155	7	1837
	Industrial Rd	EC Row N. Ramp Terminal	27169	28916	21772	23501	662	652	4735	2918	0	1845
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	20228	35043	15712	30308	416	646	4099	2573	0	1516
	S. of EC Row S. Ramp Terminal		24803	26946	20499	23057	528	389	3776	2217	0	1283
S Service Rd	N. of Bethlehem Ave		0	23492	n/a	19685	n/a	343	n/a	2215	n/a	1249
	Bethlehem Ave	Lambton St	0	5220	n/a	4783	n/a	124	n/a	313	n/a	0
	Lambton St	Pulford St	0	5063	n/a	4812	n/a	29	n/a	222	n/a	0
	Pulford St	Todd Ln/Cabana Rd	0	11853	n/a	11759	n/a	94	n/a	0	n/a	0
	Todd Ln/Cabana Rd	Huron Church Line	0	12504	n/a	12007	n/a	112	n/a	385	n/a	0
	Huron Church Line	St Clair College	0	16536	n/a	16439	n/a	97	n/a	0	n/a	0
	St Clair College	Cousineau Dr	0	9334	n/a	7717	n/a	104	n/a	1359	n/a	154
	Cousineau Dr	Howard Ave	0	6282	n/a	5460	n/a	105	n/a	534	n/a	184
	E. of Howard Ave		0	12060	n/a	11823	n/a	237	n/a	0	n/a	0
N Service Rd	N. of Labelle St		25501	0	21702	n/a	443	n/a	3356	n/a	0	n/a
	Labelle St	Grand Marais Rd Ramp	25298	0	21787	n/a	235	n/a	1276	n/a	0	n/a
	Grand Marais Rd Ramp	Pulford St	5423	0	5040	n/a	8	n/a	376	n/a	0	n/a
	Pulford St	Todd Ln/Cabana Rd	5496	0	5484	n/a	12	n/a	0	n/a	0	n/a
	Todd Ln/Cabana Rd	Huron Church Line	11313	0	10740	n/a	124	n/a	449	n/a	0	n/a
	Huron Church Line	St Clair College	7229	0	7197	n/a	32	n/a	0	n/a	0	n/a
	St Clair College	Cousineau Dr	14718	0	12769	n/a	123	n/a	1825	n/a	0	n/a
	Cousineau Dr	Howard Ave	7461	0	6898	n/a	111	n/a	451	n/a	0	n/a
	E. of Howard Ave		13630	0	13346	n/a	283	n/a	0	n/a	0	n/a
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10180	10556	9926	9978	137	137	27	14	91	427
	GN Booth Dr	Sandwich St	10116	10433	9861	9845	136	135	27	15	91	438
	Sandwich St	Prospect Ave	9478	9729	9354	9613	75	78	50	37	0	0
	N. of Prospect Ave		9415	9510	9292	9397	75	77	49	36	0	0
			0	0								
	CROSSING ROADS		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5168	4869	4808	4435	0	0	359	435	0	0
	E of HuronChurch		3574	5121	2813	4048	21	135	722	937	18	0
University	W of HuronChurch		1254	1192	1254	1192	0	0	0	0	0	0
	E of HuronChurch		2138	2118	1947	1986	118	91	70	21	3	20
Riverside	W of HuronChurch		3390	3487	3390	3487	0	0	0	0	0	0
	E of HuronChurch		6770	5671	6598	5633	0	0	173	37	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43	0	7710	0	3781
AMB On Ramp	E of HuronChurch		6286	0	309	0	11	0	5792	0	174	0
Patricia	AMB	Wyandotte	4111	5195	552	1458	21	57	3367	3412	171	267
College St	E. of HC Road		6514	6361	6343	5558	168	124	3	535	0	144
	W. of HC Road		1867	806	1670	752	0	0	197	54	0	0
Girardot St	E. of HC Road		1133	1160	1017	1029	0	0	116	130	0	0
	W. of HC Road		2346	2275	2258	2216	41	25	48	33	0	0
Tecumseh Rd	E. of HC Road		5829	6836	5489	6174	139	148	201	359	0	156
	W. of HC Road		6604	6994	6420	6866	0	0	184	127	0	0
Dorchester St	E. of HC Road		1693	1533	1520	1350	0	0	173	183	0	0
	W. of HC Road		1419	807	1370	786	26	10	24	11	0	0
Prince Rd/Totten St	E. of HC Road		2075	2907	1998	2777	0	0	77	130	0	0
	W. of HC Road		4782	5176	4701	5101	0	0	81	76	0	0
Malden Rd	E. of HC Road		1377	1126	1172	923	0	0	205	203	0	0
	W. of HC Road		7891	8417	6798	7406	386	398	553	38	154	576
Industrial Rd	E. of HC Road		3619	3426	3425	3181	49	57	139	172	6	16
	W. of HC Road		4072	3166	3914	2791	158	192	0	0	0	183
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		14334	2042	13014	1881	270	0	1050	162	0	0
	W. of HC Road (N-W On Ramp)		607	0	420	n/a	14	n/a	51	n/a	122	n/a
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	7407	n/a	7341	n/a	66	n/a	0	n/a	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		8637	2904	7642	2447	263	81	451	376	280	0
Labelle St/Bethlehem Ave	E. of N. Service Rd		2903	2116	2670	1934	0	0	234	182	0	0
	between N. and S. Service Rd		1403	3202	1403	3105	0	0	0	97	0	0
	W. of S. Service Rd		1804	3255	1803	3251	0	0	2	4	0	0
Grand Marais Rd/Lambton Rd	E. of N. Service Rd		4183	3270	3919	3026	0	0	264	244	0	0
	between N. and S. Service Rd		2429	2940	2426	2777	3	24	0	140	0	0
	W. of S. Service Rd		1714	1960	1647	1912	29	17	38	32	0	0
Pulford St	E. of N. Service Rd		1465	1949	1306	1733	0	0	159	216	0	0
	between N. and S. Service Rd		1393	1234	1393	1073	0	0	0	161	0	0
	W. of S. Service Rd		1177	876	1143	855	24	7	11	14	0	0
Todd Ln/Cabana Rd	E. of N. Service Rd		8721	7177	8177	6567	0	0	544	610	0	0
	between N. and S. Service Rd		9351	8073	9351	7180	0	0	0	894	0	0
	W. of S. Service Rd		9933	9958	9920	9948	0	0	13	10	0	0
Huron Church Line	between N. and S. Service Rd		1219	5242	1178	4863	41	77	0	303	0	0
	W. of S. Service Rd		7451	6841	7017	6398	93	98	341	345	0	0
St Clair College	E. of N. Service Rd		2968	8655	2874	8398	0	0	94	257	0	0
	between N. and S. Service Rd		2255	2587	2255	2418	0	0	0	169	0	0
Cousineau Dr	E. of N. Service Rd		5396	4415	4440	3623	0	0	956	793	0	0
	between N. and S. Service Rd		7608	6705	6207	6705	0	0	1400	0	0	0
	W. of S. Service Rd		9797	6318	9797	6318	0	0	0	0	0	0
Howard Ave	E. of N. Service Rd		7718	8482	7585	8325	133	155	0	3	0	0
	between N. and S. Service Rd		11637	7215	11382	7054	211	160	44	1	0	0
	W. of S. Service Rd		11382	13477	11110	13141	250	308	21	29	0	0
EC Row Expressway	E. of Ojibway Pwy		13304	8173	12916	7790	311	383	18	0	60	0
	W. of Ojibway Pwy		20538	11155	16318	10907	214	248	3903	0	103	0
	E. of Huron Church Rd		35042	43067	31755	37865	679	775	2215	3256	393	1170
	At Malden Rd		23161	29462	20864	24508	447	539	1305	3374	545	1040
	W. of Matchette		15894	8173	15444	7790	364	383	20	0	66	0
GN Booth Dr	W. of Ojibway Pwy		357	461	346	448	7	8	4	5	0	0
Sandwich St	W. of Ojibway Pwy		1533	1388	1361	1261	148	91	24	35	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	331	426	7	4	4	7	0	0

TABLE A-5 CONTD.

	HIGHWAY 401 Mainline				NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	S. of Hwy 3 merge/split		19954	21530	11418	10688	322	249	3100	3035
	N. of Howard Ave		19664	21700	10555	10684	328	261	3688	3447
	At Grand Marais Rd		22550	30422	14236	17149	346	371	3844	4960
	E. of Malden Rd		7414	14231	1882	3207	55	88	1578	3163
	To/From Canadian Plaza		9990	17980	0	3	2	4	4203	8626
			0	0						
	HIGHWAY 401 Ramps		0	0						
			0	0						
	Hwy 3 merge/split		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp		9967	0	8295	0	179	0	1071	0
	401 NB On Ramp		9124	0	8952	0	172	0	0	0
	401 SB Off Ramp		0	9491	0	9307	0	184	0	0
	401 SB On Ramp		0	9566	0	7308	0	188	0	1668
	At St. Clair College		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp		6964	0	6937	0	27	0	0	0
	401 NB On Ramp		4069	0	3578	0	31	0	460	0
	401 SB Off Ramp		0	7812	0	6415	0	79	0	1154
	401 SB On Ramp		0	5498	0	5471	0	27	0	0
	At Pulford St		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB On Ramp		5919	0	5206	0	71	0	641	0
	401 SB Off Ramp		0	6238	0	5445	0	70	0	723
	At Huron Church Rd		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp		15039	0	12483	0	292	0	2264	0
	401 SB On Ramp		0	16563	0	13008	0	267	0	2012
	At Malden Rd		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB On Ramp		3176	0	2447	0	406	0	262	0
	401 SB Off Ramp		0	4140	0	2705	0	571	0	864
	Hwy 401 to EC Row Expressway		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 SB Off Ramp		0	13364	0	9455	0	227	0	2861
	Ojibway Pkwy IC		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp		4791	0	4329	0	461	0	0	0
	401 NB On Ramp		1496	0	0	0	0	0	1222	0
	401 SB Off Ramp		0	1092	0	126	0	10	0	956
	401 SB On Ramp		0	14959	0	14537	0	422	0	0
	EC Row Expressway to Hwy 401		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB On Ramp		2083	0	0	0	0	0	1309	0
			0	0						
			0	0						
Highway 401 Mainline Vol	FROM	TO	0	0						
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	19954	0	11418		322		3100	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	10589	0	3301		132		2615	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	19664	0	10555		328		3688	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	12307	0	6027		243		2650	
	St. Clair/401 NB On Ramp	Pulford/401 NB On Ramp	16522	0	9052		295		3309	
	Pulford/401 NB On Ramp	HC Rd/401 NB Off Ramp	22550	0	14236		346		3844	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	7414	0	1882		55		1578	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	10591	0	4329		461		1839	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	5800	0	0		0		1839	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	7296	0	0		0		3061	
	EC ROW to 401 NB On Ramp	Canadian Plaza	9987	0	0		0		4203	
			0	0						
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	17980		3		4		8626
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	16696		3		4		7971
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	31533		16044		572		6781
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	18914		5089		361		4119
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	14231		3207		88		3163
	HC Rd/401 SB On Ramp	Pulford/401 SB Off Ramp	0	30422		17149		371		4960
	Pulford/401 SB Off Ramp	St Clair/401 SB Off Ramp	0	24232		11594		304		4266
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	15850		6723		204		2874
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	21700		10684		261		3447
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	11201		5307		127		1912
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	21530		10688		249		3035
			0	0						
			0	0						
Malden	Chappus	401 S. Ramp	8966	11480	7966	10186	345	490	655	804
	401 S. Ramp	401 N. Ramp	9957	7916	8856	7008	383	341	718	567
	N. of 401 N. Ramp		7195	8613	6410	7630	276	370	510	613
Matchette	Chappus	EC Row S. Ramp	8512	7933	8363	7730	0	0	149	203
	EC Row S. Ramp	EC Row N. Ramp	2620	8916	2477	8734	0	0	144	182
	EC Row N. Ramp	Carmichael	4861	3303	4744	3150	0	0	117	153

TABLE A- 6 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 1B – YEAR 2025

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6986	5610	6800	5480	184	89	3	1	0	41
	University	Wyandotte	3233	4092	3052	3697	91	121	67	233	23	41
	Wyandotte	AMB Off Ramp	2280	3224	2234	3061	0	0	46	163	0	0
	AMB Off Ramp	College	18348	6447	8494	6347	234	100	6673	1	2947	0
	College St	Girardot St	26218	24966	18669	16795	572	497	6714	4695	263	2978
	Girardot St	Tecumseh Rd	25129	25158	18255	17710	683	597	5954	4048	237	2803
	Tecumseh Rd	Dorchester St	28309	28199	21600	21412	834	741	5636	3507	240	2539
	Dorchester St	Prince Rd/Totten St	28358	29470	22280	23208	743	678	5128	3231	207	2353
	Prince Rd/Totten St	Malden Rd	30998	33157	24902	27007	831	798	5032	3187	233	2165
	Malden Rd	Industrial Rd	24761	28255	19169	22115	608	631	4976	3389	8	2120
	Industrial Rd	EC Row N. Ramp Terminal	28022	30240	22450	24431	704	687	4868	3056	0	2066
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	20486	38090	15806	32888	438	713	4242	2742	0	1746
	S. of EC Row S. Ramp Terminal		27808	29115	22807	24956	615	428	4386	2287	0	1444
S Service Rd	N. of Bethlehem Ave		0	25122	n/a	21124	n/a	380	n/a	2245	n/a	1374
	Bethlehem Ave	Lambton St	0	5610	n/a	5139	n/a	137	n/a	333	n/a	0
	Lambton St	Pulford St	0	5642	n/a	5418	n/a	18	n/a	206	n/a	0
	Pulford St	Todd Ln/Cabana Rd	0	13546	n/a	13482	n/a	64	n/a	0	n/a	0
	Todd Ln/Cabana Rd	Huron Church Line	0	13994	n/a	13405	n/a	121	n/a	468	n/a	0
	Huron Church Line	St Clair College	0	17693	n/a	17578	n/a	115	n/a	0	n/a	0
	St Clair College	Cousineau Dr	0	9902	n/a	8111	n/a	108	n/a	1463	n/a	221
	Cousineau Dr	Howard Ave	0	6321	n/a	5422	n/a	99	n/a	568	n/a	233
	E. of Howard Ave		0	13024	n/a	12772	n/a	252	n/a	0	n/a	0
N Service Rd	N. of Labelle St		28317	0	23981	n/a	514	n/a	3821	n/a	0	n/a
	Labelle St	Grand Marais Rd Ramp	26127	0	24437	n/a	282	n/a	1408	n/a	0	n/a
	Grand Marais Rd Ramp	Pulford St	5754	0	5372	n/a	8	n/a	374	n/a	0	n/a
	Pulford St	Todd Ln/Cabana Rd	6105	0	6082	n/a	12	n/a	11	n/a	0	n/a
	Todd Ln/Cabana Rd	Huron Church Line	12049	0	11396	n/a	139	n/a	515	n/a	0	n/a
	Huron Church Line	St Clair College	7278	0	7222	n/a	56	n/a	0	n/a	0	n/a
	St Clair College	Cousineau Dr	15051	0	12962	n/a	136	n/a	1934	n/a	0	n/a
	Cousineau Dr	Howard Ave	7603	0	6978	n/a	112	n/a	513	n/a	0	n/a
	E. of Howard Ave		14732	0	14432	n/a	300	n/a	0	n/a	0	n/a
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10894	11127	10615	10438	140	134	26	21	114	534
	GN Booth Dr	Sandwich St	10830	10928	10549	10237	139	132	27	21	115	538
	Sandwich St	Prospect Ave	10088	10069	9965	9953	74	74	48	42	0	0
	N. of Prospect Ave		10025	9858	9903	9744	74	73	48	41	0	0
			0	0								
	CROSSING ROADS		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5099	4858	4729	4420	0	0	370	438	0	0
	E of HuronChurch		3562	5201	2772	4133	18	142	750	926	22	0
University	W of HuronChurch		1365	1272	1365	1272	0	0	0	0	0	0
	E of HuronChurch		2311	2214	2079	2079	121	91	70	21	41	23
Riverside	W of HuronChurch		3552	3655	3552	3655	0	0	0	0	0	0
	E of HuronChurch		6981	5782	6817	5737	0	0	164	46	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43	0	7710	0	3781
AMB On Ramp	E of HuronChurch		6558	#REF!	246	#REF!	6	#REF!	6082	#REF!	223	#REF!
Patricia	AMB	Wyandotte	4149	5049	435	1328	13	54	3485	3362	216	305
College St	E. of HC Road		6603	6526	6437	5640	163	127	3	568	0	191
	W. of HC Road		2068	956	1677	904	0	0	391	51	0	0
Girardot St	E. of HC Road		1154	1148	1032	1014	0	0	122	135	0	0
	W. of HC Road		2296	2202	2208	2148	42	25	47	30	0	0
Tecumseh Rd	E. of HC Road		5786	6844	5448	6099	137	145	201	389	0	212
	W. of HC Road		6488	7115	6271	6983	0	0	217	132	0	0
Dorchester St	E. of HC Road		1726	1557	1544	1361	0	0	182	196	0	0
	W. of HC Road		1419	808	1369	787	26	10	24	10	0	0
Prince Rd/Totten St	E. of HC Road		2213	2353	2133	2247	0	0	80	106	0	0
	W. of HC Road		5515	5545	5414	5466	0	0	101	79	0	0
Malden Rd	E. of HC Road		1631	1358	1355	1081	0	0	276	277	0	0
	W. of HC Road		8223	8875	7049	7669	401	393	570	46	203	766
Industrial Rd	E. of HC Road		3926	3674	3722	3440	48	57	148	156	8	21
	W. of HC Road		4262	3458	4094	3044	168	204	0	0	0	211
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		16245	2068	14906	1894	311	0	1028	174	0	0
	W. of HC Road (N-W On Ramp)		583	0	380	n/a	11	n/a	46	n/a	146	n/a
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	10547	n/a	10444	n/a	103	n/a	0	n/a	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		9466	3083	8237	2636	296	85	550	362	383	0
Labelle St/Bethlehem Ave	E. of N. Service Rd		3112	2338	2867	2132	0	0	246	207	0	0
	between N. and S. Service Rd		1232	3565	1232	3459	0	0	0	106	0	0
	W. of S. Service Rd		1678	4360	1676	4354	0	0	2	6	0	0
Grand Marais Rd/Lambton Rd	E. of N. Service Rd		4593	3595	4348	3339	0	0	245	256	0	0
	between N. and S. Service Rd		2664	3229	2661	3047	2	29	0	153	0	0
	W. of S. Service Rd		1876	2193	1801	2141	34	20	42	33	0	0
Pulford St	E. of N. Service Rd		1600	2135	1422	1890	0	0	178	245	0	0
	between N. and S. Service Rd		1528	1356	1528	1170	0	0	0	185	0	0
	W. of S. Service Rd		1295	956	1258	934	26	8	11	14	0	0
Todd Ln/Cabana Rd	E. of N. Service Rd		9390	7481	8855	6797	0	0	535	685	0	0
	between N. and S. Service Rd		9884	9828	9884	8599	0	0	0	1229	0	0
	W. of S. Service Rd		11875	11293	11859	11282	0	0	15	11	0	0
Huron Church Line	between N. and S. Service Rd		1392	5744	1352	5299	39	89	0	357	0	0
	W. of S. Service Rd		8272	7451	7790	6936	103	114	379	400	0	0
St Clair College	E. of N. Service Rd		3199	8915	3101	8647	0	0	98	268	0	0
	between N. and S. Service Rd		2480	2790	2480	2599	0	0	0	191	0	0
Cousineau Dr	E. of N. Service Rd		5254	4268	4303	3409	0	0	951	860	0	0
	between N. and S. Service Rd		7924	7085	6334	7082	0	3	1590	0	0	0
	W. of S. Service Rd		10685	7021	10685	7010	0	11	0	0	0	0
Howard Ave	E. of N. Service Rd		8580	9789	8436	9599	144	187	0	4	0	0
	betweem N. and S. Service Rd		12711	7994	12433	7815	221	177	57	1	0	0
	W. of S. Service Rd		12530	15356	12241	14977	262	342	27	37	0	0
EC Row Expressway	E. of Ojibway Pwy		17698	9003	16912	8373	407	400	227	160	152	69
	W. of Ojibway Pwy		25741	12305	19953	12035	255	270	5399	0	134	0
	E. of Huron Church Rd		43102	51004	38796	44381	827	929	2908	4048	571	1646
	At Malden Rd		29297	33650	25905	27562	552	614	2055	4070	785	1404
	W. of Matchette		20831	9003	19940	8373	472	400	252	160	168	69
GN Booth Dr	W. of Ojibway Pwy		357	461	346	448	7	8	4	5	0	0
Sandwich St	W. of Ojibway Pwy		1629	1518	1455	1387	151	97	24	34	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	331	426	7	5	4	6	0	0

TABLE A-6 CONTD.

HIGHWAY 401 Mainline					NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
S. of Hwy 3 merge/split			24657	26996	14332	13093	407	298	3472	3388
N. of Howard Ave			22641	27071	11602	12224	371	298	4114	4103
At Grand Marais Rd			26644	36538	16248	19562	405	419	4489	5657
E. of Malden Rd			9413	18666	2103	3616	61	92	1856	3880
To/From Canadian Plaza			12620	21442	1	5	3	4	5116	9409
			0	0						
HIGHWAY 401 Ramps			0	0						
			0	0						
Hwy 3 merge/split			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			11304	0	9165	0	198	0	1339	0
401 NB On Ramp			9462	0	9286	0	176	0	0	0
401 SB Off Ramp			0	10063	0	9875	0	189	0	0
401 SB On Ramp			0	10832	0	7935	0	200	0	2115
At St. Clair College			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			7309	0	7267	0	42	0	0	0
401 NB On Ramp			3979	0	3470	0	33	0	476	0
401 SB Off Ramp			0	7993	0	6448	0	81	0	1245
401 SB On Ramp			0	5906	0	5872	0	33	0	0
At Pulford St			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp			7507	0	6615	0	95	0	796	0
401 SB Off Ramp			0	7227	0	6381	0	77	0	768
At Huron Church Rd			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			17194	0	14226	0	346	0	2622	0
401 SB On Ramp			0	18468	0	14697	0	302	0	2027
At Malden Rd			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp			3769	0	2808	0	384	0	425	0
401 SB Off Ramp			0	4949	0	3457	0	541	0	951
Hwy 401 to EC Row Expressway			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 SB Off Ramp			0	15782	0	10963	0	274	0	3445
Ojibway Pkwy IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			5356	0	4911	0	445	0	0	0
401 NB On Ramp			1689	0	0	0	0	0	1345	0
401 SB Off Ramp			0	1133	0	155	0	14	0	964
401 SB On Ramp			0	18909	0	18366	0	542	0	0
EC Row Expressway to Hwy 401			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp			2521	0	0	0	0	0	1554	0
			0	0						
			0	0						
	FROM	TO	0	0						
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	24657	0	14332		407		3472	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	13212	0	4295		175		2911	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	22641	0	11602		371		4114	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	14884	0	6788		281		3106	
	St. Clair/401 NB On Ramp	Pulford/401 NB On Ramp	18957	0	9831		331		3739	
	Pulford/401 NB On Ramp	HC Rd/401 NB Off Ramp	26644	0	16248		405		4489	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	9413	0	2103		61		1856	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	13182	0	4911		445		2281	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	7825	0	0		0		2281	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	9515	0	0		0		3626	
	EC ROW to 401 NB On Ramp	Canadian Plaza	12617	0	0		0		5116	
			0	0						
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	21442		5		4		9409
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	20060		4		4		8745
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	39289		18221		637		8291
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	24273		5859		357		4978
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	18666		3616		92		3880
	HC Rd/401 SB On Ramp	Pulford/401 SB Off Ramp	0	36538		19562		419		5657
	Pulford/401 SB Off Ramp	St Clair/401 SB Off Ramp	0	29414		12845		340		4934
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	20763		8008		241		3539
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	27071		12224		298		4103
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	15736		6822		162		2561
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	26996		13093		298		3388
			0	0						
			0	0						
Malden	Chappus	401 S. Ramp	9084	11528	7948	10336	341	449	795	742
	401 S. Ramp	401 N. Ramp	10193	7192	8938	6456	381	279	874	457
	N. of 401 N. Ramp		6982	8058	6129	7230	261	313	593	515
Matchette	Chappus	EC Row S. Ramp	9261	9268	9114	8967	0	0	147	301
	EC Row S. Ramp	EC Row N. Ramp	2620	10207	2499	9937	0	0	121	270
	EC Row N. Ramp	Carmichael	5152	3168	5032	2977	0	0	120	192

Highway 401 Mainline Vol

TABLE A- 7 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 1B – YEAR 2035

LOCATION	SECTION		24 Hour AADT-ALT 1B									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6924	5840	6718	5664	203	94	3	1	0	81
	University	Wyandotte	3108	4254	2886	3812	92	124	68	237	62	81
	Wyandotte	AMB Off Ramp	2131	3370	2085	3201	0	0	46	169	0	0
	AMB Off Ramp	College	19543	6656	7999	6549	244	106	7545	1	3755	0
	College St	Girardot St	26227	25933	18469	16494	574	523	6880	5152	303	3764
	Girardot St	Tecumseh Rd	25638	26525	18403	17853	712	625	6238	4516	284	3530
	Tecumseh Rd	Dorchester St	28797	29299	21703	21695	867	781	5937	3720	289	3103
	Dorchester St	Prince Rd/Totten St	28875	30357	22442	23399	768	705	5418	3417	247	2837
	Prince Rd/Totten St	Malden Rd	31736	34429	25203	27845	865	847	5387	3091	281	2646
	Malden Rd	Industrial Rd	25383	29967	19460	23370	645	683	5267	3219	10	2695
	Industrial Rd	EC Row N. Ramp Terminal	28657	32868	22816	26119	734	752	5107	3366	0	2631
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	21298	41670	16270	35653	459	783	4568	3017	0	2217
	S. of EC Row S. Ramp Terminal		30005	32155	24465	27343	684	471	4856	2621	0	1717
S Service Rd	N. of Bethlehem Ave		0	27675	n/a	23078	n/a	420	n/a	2547	n/a	1629
	Bethlehem Ave	Lambton St	0	6174	n/a	5636	n/a	161	n/a	377	n/a	0
	Lambton St	Pulford St	0	6440	n/a	6187	n/a	23	n/a	230	n/a	0
	Pulford St	Todd Ln/Cabana Rd	0	15723	n/a	15648	n/a	75	n/a	0	n/a	0
	Todd Ln/Cabana Rd	Huron Church Line	0	15799	n/a	15091	n/a	134	n/a	575	n/a	0
	Huron Church Line	St Clair College	0	18794	n/a	18666	n/a	127	n/a	0	n/a	0
	St Clair College	Cousineau Dr	0	10735	n/a	8636	n/a	109	n/a	1699	n/a	292
	Cousineau Dr	Howard Ave	0	6597	n/a	5540	n/a	95	n/a	668	n/a	293
	E. of Howard Ave		0	14106	n/a	13825	n/a	281	n/a	0	n/a	0
N Service Rd	N. of Labelle St		30540	0	25730	n/a	569	n/a	4241	n/a	0	n/a
	Labelle St	Grand Marais Rd Ramp	28297	0	26402	n/a	326	n/a	1568	n/a	0	n/a
	Grand Marais Rd Ramp	Pulford St	6100	0	5700	n/a	8	n/a	391	n/a	0	n/a
	Pulford St	Todd Ln/Cabana Rd	6780	0	6766	n/a	13	n/a	0	n/a	0	n/a
	Todd Ln/Cabana Rd	Huron Church Line	12708	0	11954	n/a	151	n/a	597	n/a	0	n/a
	Huron Church Line	St Clair College	8204	0	8105	n/a	100	n/a	0	n/a	0	n/a
	St Clair College	Cousineau Dr	15671	0	13535	n/a	131	n/a	2005	n/a	0	n/a
	Cousineau Dr	Howard Ave	7984	0	7336	n/a	102	n/a	545	n/a	0	n/a
	E. of Howard Ave		15472	0	15156	n/a	316	n/a	0	n/a	0	n/a
Ojibway Pwy	EC Row Expressway	GN Booth Dr	11697	11777	11383	10973	146	131	26	19	142	654
	GN Booth Dr	Sandwich St	11632	11578	11317	10772	146	129	26	19	143	658
	Sandwich St	Prospect Ave	10788	10588	10661	10469	76	73	52	47	0	0
	N. of Prospect Ave		10725	10387	10599	10270	75	71	51	46	0	0
			0	0								
	CROSSING ROADS		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5008	4886	4627	4439	0	0	381	446	0	0
	E of HuronChurch		3648	5398	2803	4299	17	157	770	942	58	0
University	W of HuronChurch		1511	1306	1511	1306	0	0	0	0	0	0
	E of HuronChurch		2481	2273	2207	2097	124	92	68	22	81	62
Riverside	W of HuronChurch		3642	3993	3642	3993	0	0	0	0	0	0
	E of HuronChurch		7225	5957	7055	5911	0	0	170	46	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43	0	7710	0	3781
AMB On Ramp	E of HuronChurch		6917	0	222	0	6	0	6416	0	273	0
Patricia	AMB	Wyandotte	4205	4873	389	969	12	42	3571	3469	234	394
College St	E. of HC Road		6758	6581	6583	5598	172	130	4	579	0	273
	W. of HC Road		2272	1076	1730	1027	0	0	542	48	0	0
Girardot St	E. of HC Road		1162	1155	1037	1025	0	0	125	130	0	0
	W. of HC Road		2290	2168	2202	2109	42	26	47	33	0	0
Tecumseh Rd	E. of HC Road		6210	7294	5868	6315	140	146	202	468	0	366
	W. of HC Road		6679	7355	6321	7251	0	0	357	104	0	0
Dorchester St	E. of HC Road		1748	1574	1561	1382	0	0	187	191	0	0
	W. of HC Road		1419	807	1368	785	26	11	24	11	0	0
Prince Rd/Totten St	E. of HC Road		2311	2888	2228	2764	0	0	83	125	0	0
	W. of HC Road		5053	5710	4985	5626	0	0	68	85	0	0
Malden Rd	E. of HC Road		1858	1508	1545	990	0	0	313	519	0	0
	W. of HC Road		8633	9314	7378	7922	405	408	599	52	251	932
Industrial Rd	E. of HC Road		4362	3864	3613	3596	45	56	697	185	7	27
	W. of HC Road		4490	3594	4310	3115	179	210	0	0	0	269
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		16852	2214	15527	1966	327	6	998	242	0	0
	W. of HC Road (N-W On Ramp)		624	0	389	n/a	11	n/a	48	n/a	176	n/a
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	12051	n/a	11928	n/a	124	n/a	0	n/a	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		10047	3314	8650	2901	325	91	465	322	607	0
Labelle St/Bethlehem Ave	E. of N. Service Rd		3336	2617	3077	2391	0	0	259	226	0	0
	between N. and S. Service Rd		1573	3934	1573	3822	0	0	0	112	0	0
	W. of S. Service Rd		2055	3283	2053	3279	0	0	2	4	0	0
Grand Marais Rd/Lambton Rd	E. of N. Service Rd		5010	3929	4753	3657	0	0	257	272	0	0
	between N. and S. Service Rd		2907	3527	2905	3323	2	34	0	170	0	0
	W. of S. Service Rd		2056	2428	1973	2362	37	25	46	41	0	0
Pulford St	E. of N. Service Rd		1748	2330	1550	2076	0	0	199	254	0	0
	between N. and S. Service Rd		1672	1483	1672	1282	0	0	0	201	0	0
	W. of S. Service Rd		1413	1051	1372	1023	28	10	13	18	0	0
Todd Ln/Cabana Rd	E. of N. Service Rd		10586	8495	10025	7623	0	0	561	872	0	0
	between N. and S. Service Rd		10926	11224	10926	9600	0	0	0	1623	0	0
	W. of S. Service Rd		13701	12917	13683	12906	0	0	18	12	0	0
Huron Church Line	between N. and S. Service Rd		1480	6252	1426	5740	53	96	0	416	0	0
	W. of S. Service Rd		9041	7983	8500	7407	120	122	422	455	0	0
St Clair College	E. of N. Service Rd		3387	9168	3288	8903	0	0	99	265	0	0
	between N. and S. Service Rd		2706	2988	2706	2790	0	0	0	199	0	0
Cousineau Dr	E. of N. Service Rd		5516	4382	4478	3440	0	0	1038	941	0	0
	between N. and S. Service Rd		9207	7323	7335	7920	0	3	1872	0	0	0
	W. of S. Service Rd		12218	8024	12218	8015	0	8	0	0	0	0
Howard Ave	E. of N. Service Rd		9246	10454	9089	10255	157	196	0	4	0	0
	betweem N. and S. Service Rd		13678	8725	13368	8531	238	192	72	1	0	0
	W. of S. Service Rd		13546	17014	13228	16593	284	375	34	46	0	0
EC Row Expressway	E. of Ojibway Pwy		21804	9791	20977	9262	509	404	173	100	145	25
	W. of Ojibway Pwy		30784	13314	23810	13024	324	290	6487	0	163	0
	E. of Huron Church Rd		49462	56583	44205	48832	932	1039	3586	4703	738	2009
	At Malden Rd		35168	37219	30617	30207	642	678	2860	4783	1049	1550
	W. of Matchette		25630	9791	24688	9262	591	404	190	100	160	25
GN Booth Dr	W. of Ojibway Pwy		357	461	345	448	7	8	5	5	0	0
Sandwich St	W. of Ojibway Pwy		1775	1630	1598	1499	156	102	21	29	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	331	425	7	5	4	7	0	0

TABLE A-7 CONT'D.

	HIGHWAY 401 Mainline				NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	S. of Hwy 3 merge/split			27629	31034	15756	14266	470	335	3700	3704
	N. of Howard Ave			26044	30301	12902	12639	438	311	4634	4475
	At Grand Marais Rd			29920	40606	17705	20616	450	434	4996	6262
	E. of Malden Rd			11204	22878	2232	3767	66	93	2087	4513
	To/From Canadian Plaza			14748	24132	1	5	3	4	5779	10031
				0	0						
	HIGHWAY 401 Ramps			0	0						
				0	0						
	Hwy 3 merge/split			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp			11862	0	9359	0	201	0	1519	0
	401 NB On Ramp			9728	0	9541	0	186	0	0	0
	401 SB Off Ramp			0	10383	0	10185	0	198	0	0
	401 SB On Ramp			0	11814	0	8406	0	211	0	2468
	At St. Clair College			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp			7753	0	7681	0	72	0	0	0
	401 NB On Ramp			4124	0	3608	0	32	0	484	0
	401 SB Off Ramp			0	7944	0	6278	0	77	0	1309
	401 SB On Ramp			0	6223	0	6186	0	37	0	0
	At Pulford St			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB On Ramp			7737	0	6735	0	106	0	896	0
	401 SB Off Ramp			0	8464	0	7380	0	87	0	997
	At Huron Church Rd			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp			18741	0	15456	0	383	0	2902	0
	401 SB On Ramp			0	18845	0	14711	0	296	0	2235
	At Malden Rd			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB On Ramp			4147	0	2986	0	436	0	516	0
	401 SB Off Ramp			0	5453	0	3858	0	536	0	1059
	Hwy 401 to EC Row Expressway			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 SB Off Ramp			0	18179	0	12269	0	312	0	4261
	Ojibway Pkwy IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB Off Ramp			5721	0	5218	0	503	0	0	0
	401 NB On Ramp			1805	0	0	0	0	0	1413	0
	401 SB Off Ramp			0	1294	0	282	0	22	0	990
	401 SB On Ramp			0	22906	0	22242	0	664	0	0
	EC Row Expressway to Hwy 401			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
	401 NB On Ramp			3029	0	0	0	0	0	1865	0
				0	0						
		FROM	TO	0	0						
Highway 401 Mainline Vol		S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	27629	0	15756		470		3700	
		Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	16399	0	5315		235		3408	
		Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	26044	0	12902		438		4634	
		St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	17780	0	7760		332		3636	
		St. Clair/401 NB On Ramp	Pulford/401 NB On Ramp	21972	0	11030		378		4243	
		Pulford/401 NB On Ramp	HC Rd/401 NB Off Ramp	29920	0	17705		450		4996	
		HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	11204	0	2232		66		2087	
		Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	15351	0	5218		503		2603	
		Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	9630	0	0		0		2603	
		Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	11436	0	0		0		4016	
		EC ROW to 401 NB On Ramp	Canadian Plaza	14744	0	0		0		5779	
				0	0						
		Canadian Plaza	Ojibway/401 SB Off Ramp	0	24132		5		4		10031
		Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	22568		5		3		9312
		Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	46534		19725		681		9840
		401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	29106		6163		354		5724
		Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	22878		3767		93		4513
		HC Rd/401 SB On Ramp	Pulford/401 SB Off Ramp	0	40606		20616		434		6262
		Pulford/401 SB Off Ramp	St Clair/401 SB Off Ramp	0	32261		12884		346		5298
		St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	23591		8255		251		3913
		St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	30301		12639		311		4475
		Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	18464		7400		177		2904
		Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	31034		14266		335		3704
				0	0						
				0	0						
Malden		Chappus	401 S. Ramp	9447	12207	8232	10979	365	456	851	772
		401 S. Ramp	401 N. Ramp	10678	7440	9326	6705	410	275	941	460
		N. of 401 N. Ramp		7149	8393	6252	7560	274	311	622	522
Matchette		Chappus	EC Row S. Ramp	9542	10489	9486	10131	0	0	56	359
		EC Row S. Ramp	EC Row N. Ramp	2675	11452	2641	10945	0	0	34	507
		EC Row N. Ramp	Carmichael	5719	3318	5681	2975	0	0	39	343

TABLE A- 8 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 2A – YEAR 2015

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6939	5479	6763	5390	173	85	3	1	0	3
	University	Wyandotte	3286	3971	3111	3651	90	119	65	198	20	3
	Wyandotte	AMB Off Ramp	2256	3176	2211	3045	0	0	44	131	0	0
	AMB Off Ramp	College	17371	6347	8806	6251	231	96	6173	1	2162	0
	College St	Girardot St	24380	23704	17474	16649	522	486	6193	4360	192	2209
	Girardot St	Tecumseh Rd	23677	23943	17362	17487	621	567	5517	3775	176	2114
	Tecumseh Rd	Dorchester St	27103	27831	20829	21671	768	720	5325	3452	181	1987
	Dorchester St	Prince Rd/Totten St	27021	29147	21353	23522	685	653	4826	3173	156	1799
	Prince Rd/Totten St	Malden Rd	29320	32345	23703	26772	763	750	4676	3162	177	1660
	Malden Rd	Industrial Rd	24228	27223	18911	21704	573	566	4737	3352	7	1601
	Industrial Rd	EC Row N. Ramp Terminal	25922	29090	20829	23841	635	632	4457	3024	0	1593
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	19860	35172	15536	30518	425	631	3900	2716	0	1307
	EC Row S. Ramp Terminal	Highway 401 Offramp	25710	26218	23080	22647	449	380	2181	2159	0	1032
	Highway 401 Offramp	Spring Gdn Rd/Labelle St	11401	7335	10669	6674	78	97	654	564	0	0
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd Ramp	9600	7377	9076	6728	111	134	413	516	0	0
	Lambton St/Grand Marais Rd Ramp	Pulford St	8208	6730	7863	6452	136	37	209	240	0	0
	Pulford St	Todd Ln/Cabana Rd	8186	7395	8038	7308	152	50	0	37	0	0
	Todd Ln/Cabana Rd	Huron Church Line	11076	13226	10252	12558	126	153	697	461	0	54
Talbot Rd	Huron Church Line	St Clair College	6414	7682	5522	6832	8	0	884	850	0	0
	St Clair College	Cousineau Dr	9895	6404	8455	6404	10	0	1430	0	0	0
	Cousineau Dr	Howard Ave	9831	5472	9730	5472	21	0	81	0	0	0
	Howard Ave	Highway 3 split	15176	13247	14885	12943	291	278	0	25	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10181	11207	9922	10623	136	139	32	15	90	430
	GN Booth Dr	Sandwich St	10116	10994	9857	10411	136	136	32	15	91	432
	Sandwich St	Prospect Ave	9487	9723	9360	9610	75	78	52	35	0	0
	N. of Prospect Ave		9424	9512	9298	9402	74	76	52	34	0	0
			0	0								
	CROSSING ROADS		0	0								
Wyandotte	W of HuronChurch		5192	4872	4834	4441	0	0	358	431	0	0
	E of HuronChurch		3616	5077	2850	4074	21	137	726	867	18	0
University	W of HuronChurch		1267	1128	1267	1128	0	0	0	0	0	0
	E of HuronChurch		2139	2145	1950	2014	119	90	67	21	3	20
Riverside	W of HuronChurch		3368	3642	3367	3642	0	0	0	0	0	0
	E of HuronChurch		6739	5763	6608	5719	0	0	132	45	0	0
AMB Off Ramp	E of HuronChurch		3	10035	0	1643	0	60	0	6170	3	2162
AMB On Ramp	E of HuronChurch		6302	0	317	0	12	0	5799	0	174	0
Patricia	AMB	Wyandotte	4102	5173	567	1642	22	58	3342	3241	171	231
College St	E. of HC Road		6642	6443	6465	5630	175	132	3	532	0	150
	W. of HC Road		1777	805	1566	746	0	0	210	59	0	0
Girardot St	E. of HC Road		1127	1161	1060	1052	0	0	68	109	0	0
	W. of HC Road		2338	2273	2178	2149	36	29	114	91	9	4
Tecumseh Rd	E. of HC Road		5983	6760	5638	6115	134	150	211	357	0	137
	W. of HC Road		6444	6926	6296	6802	0	0	147	125	0	0
Dorchester St	E. of HC Road		1706	1536	1605	1382	0	0	102	155	0	0
	W. of HC Road		1417	807	1321	762	23	10	64	34	8	1
Prince Rd/Totten St	E. of HC Road		2112	2713	2040	2591	0	0	73	121	0	0
	W. of HC Road		4860	5238	4778	5165	0	0	82	73	0	0
Malden Rd	E. of HC Road		1376	1114	1175	931	0	0	201	183	0	0
	W. of HC Road		7502	7026	6483	6223	368	337	484	36	168	431
Industrial Rd	E. of HC Road		3634	3450	3437	3215	46	55	146	164	6	16
	W. of HC Road		3911	3157	3764	2787	147	191	0	0	0	179
EC Row N. Ramp Terminal	E-N/S Ramp		13740	0	12487	n/a	266	n/a	987	n/a	0	n/a
	N-W Ramp		0	768	n/a	731	n/a	0	n/a	37	n/a	0
	S-W Ramp		1562	0	913	n/a	28	n/a	92	n/a	528	n/a
EC Row S. Ramp Terminal	W-N/S Ramp		0	2804	n/a	2461	n/a	47	n/a	297	n/a	0
	S/N-E Ramp		0	16908	n/a	15627	n/a	296	n/a	762	n/a	224
Spring Gdn Rd	W. of HC Road		2322	3118	2320	3114	0	0	2	4	0	0
Labelle St	E. of HC Road		3606	1866	3338	1722	0	0	268	144	0	0
Lambton St/Grand Marais Rd Ramp	E. of HC Road		5266	4439	5171	4240	0	0	95	198	0	0
Pulford St	E. of HC Road		3301	1925	3090	1739	0	0	211	186	0	0
Cabana Rd	E. of HC Road		8027	6614	7381	6096	0	0	646	518	0	0
	between HC Road and Hwy 401 NB Ramps		19842	19082	19803	17449	39	127	0	1440	0	66
Todd Lane	between Hwy 401 NB and SB Ramps		12043	16536	12020	14962	24	113	0	1413	0	48
	W. of Hwy 401 SB Ramps		11370	9895	11358	9885	0	0	12	10	0	0
Huron Church Line	W. of HC Road		7444	6031	7091	5657	97	80	234	294	22	0
St Clair College	E. of Talbot Road		3144	9599	2984	9148	0	0	160	451	0	0
Cousineau Dr	E. of Talbot Road		5464	5233	5464	4248	0	0	0	985	0	0
	W. of Talbot Road		7233	6365	7233	6365	0	0	0	0	0	0
Howard Ave	E. of Talbot Rd		8134	10557	7723	10360	128	195	283	2	0	0
	betweem Talbot Road and Hwy 401 SB On-Ramp		14444	7334	13285	7183	208	150	951	0	0	0
	W. of Hwy 401 SB On-Ramp		12559	14692	12302	14210	247	290	11	192	0	0
E.C. Row Expressway	E. of Huron Church Rd		34790	44695	31509	39193	678	807	2214	3455	390	1241
	At Malden Rd		23297	29858	20975	25038	452	548	1325	3220	545	1052
	W. of Matchette		16051	8173	15597	7773	364	401	23	0	66	0

TABLE A-8 CONT'D.

HIGHWAY 401 Mainline												
S. of Hwy 3 merge/split			19958	21565	11368	10615	328	247	3123	3047	5139	7655
N. of Howard Ave			17735	23313	10196	12593	329	261	3213	3711	3997	6748
At Grand Marais Rd			22373	29083	14531	16280	371	352	3805	4866	3667	7586
E. of Malden Rd			7274	13482	1781	3389	56	260	1583	3109	3854	6724
To/From Canadian Plaza			9984	18028	0	4	2	3	4208	8509	5773	9512
			0	0								
HIGHWAY 401 Ramps			0	0								
			0	0								
Hwy 3 merge/split			0	0								
401 NB Off Ramp			11467	0	9792	0	203	0	972	0	499	0
401 NB On Ramp			9736	0	9534	0	193	0	9	0	0	0
401 SB Off Ramp			0	9952	0	9770	0	182	0	0	0	0
401 SB On Ramp			0	10350	0	7899	0	198	0	1822	0	431
Howard Ave			0	0								
401 NB Off Ramp			0	3146	0	2588	0	34	0	525	0	0
At Todd Lane/Cabana Rd			0	0								
401 NB Off Ramp			6875	0	6800	0	75	0	0	0	0	0
401 NB On Ramp			11458	0	10190	0	115	0	1153	0	0	0
401 SB Off Ramp			0	13410	0	11959	0	130	0	1245	0	77
401 SB On Ramp			0	7896	0	7872	0	25	0	0	0	0
At Huron Church Rd			0	0								
401 NB Off Ramp			15244	0	12787	0	321	0	2136	0	0	0
401 SB On Ramp			0	15712	0	12540	0	253	0	1894	0	1025
At Malden Rd			0	0								
401 NB On Ramp			3175	0	2469	0	395	0	255	0	56	0
401 SB Off Ramp			0	4144	0	2712	0	564	0	868	0	0
EC Row Expressway to Hwy 401			0	0								
401 SB Off Ramp			0	13781	0	9934	0	232	0	2770	0	845
Ojibway Pkwy IC			0	0								
401 NB Off Ramp			4701	0	4249	0	451	0	0	0	0	0
401 NB On Ramp			1495	0	0	0	0	0	1221	0	274	0
401 SB Off Ramp			0	1092	0	122	0	15	0	955	0	0
401 SB On Ramp			0	14959	0	14528	0	431	0	0	0	0
EC Row Expressway IC			0	0								
401 NB On Ramp			2178	0	0	0	0	0	1387	0	791	0
			0	0								
			0	0								
	FROM	TO	0	0								
Highway 401 Mainline Vol	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	19958	0	11368		328		3123		5139	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	7731	0	2888		129		2068		2646	
	Hwy 3/401 NB On Ramp	Todd/401 NB Off Ramp	17735	0	10196		329		3213		3997	
	Todd/401 NB Off Ramp	Todd/401 NB On Ramp	10510	0	5483		237		2332		2458	
	Todd/401 NB On Ramp	HC Rd/401 NB On Ramp	22373	0	14531		371		3805		3667	
	HC Rd/401 NB On Ramp	Malden/401 NB On Ramp	7274	0	1781		56		1583		3854	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	10449	0	4249		451		1838		3910	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	5748	0	0		0		1838		3910	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	7243	0	0		0		3059		4184	
	EC ROW to 401 NB On Ramp	Canadian Plaza	9981	0	0		0		4208		5773	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	18028		4		3		8509		9512
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	16743		4		2		7859		8877
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	31610		15975		574		6705		8355
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	18476		4689		358		4135		9294
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	13766		2827		84		3174		7681
	HC Rd/401 SB On Ramp	Todd/401 SB Off Ramp	0	29083		16280		352		4866		7586
	Todd/401 SB Off Ramp	Todd/401 SB On Ramp	0	14880		6555		175		2996		5155
	Todd/401 SB On Ramp	Howard/401 SB Off Ramp	0	23313		12593		261		3711		6748
	Howard/401 SB Off Ramp	Hwy 3/401 SB Off Ramp	0	20121		10107		226		3176		6611
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	9149		4265		91		1649		3143
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	21565		10615		247		3047		7655
			0	0								
			0	0								
			0	0								
Grand Marais Rd	E. of connecting ramp		3799	3589	3730	3436	0	0	68	153	0	0
	W. of connecting ramp		2354	2360	2283	2301	34	21	37	38	0	0
			0	0								
	FROM	TO	0	0								
Malden	Chappus	401 S. Ramp	8790	10386	7820	9202	336	442	634	742	0	0
	401 S. Ramp	401 N. Ramp	9781	6822	8710	6031	373	293	697	499	0	0
	N of 401 N. Ramp		7017	7519	6261	6651	267	322	490	546	0	0
Matchette	Chappus	EC Row S. Ramp	7691	7482	7601	7389	0	0	90	93	0	0
	EC Row S. Ramp	EC Row N. Ramp	2330	8609	2243	8524	0	0	86	85	0	0
	EC Row N. Ramp	Carmichael	4642	2938	4564	2871	0	0	79	67	0	0

TABLE A- 9 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 2A – YEAR 2025

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	7062	5644	6879	5510	180	92	3	1	0	41
	University	Wyandotte	3349	4081	3138	3726	88	124	67	191	56	41
	Wyandotte	AMB Off Ramp	2234	3201	2188	3074	0	0	45	128	0	0
	AMB Off Ramp	College	18219	6483	8649	6379	229	103	6543	1	2797	0
	College St	Girardot St	25180	25325	17875	17283	580	519	6510	4605	245	2918
	Girardot St	Tecumseh Rd	24378	25437	17721	18123	662	603	5770	3971	226	2741
	Tecumseh Rd	Dorchester St	27806	28711	21215	22028	818	751	5543	3513	230	2420
	Dorchester St	Prince Rd/Totten St	27999	30476	22001	24262	734	690	5064	3277	200	2247
	Prince Rd/Totten St	Malden Rd	30399	34133	24456	28088	820	807	4895	3216	228	2022
	Malden Rd	Industrial Rd	25181	28820	19557	22795	629	615	4986	3431	9	1979
	Industrial Rd	EC Row N. Ramp Terminal	27797	30892	22312	25206	711	686	4773	3036	0	1963
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	21217	39953	16550	34662	480	730	4187	2860	0	1700
	EC Row S. Ramp Terminal	Highway 401 Offramp	28699	30391	26613	26275	527	460	2559	2338	0	1316
	Highway 401 Offramp	Spring Gdn Rd/Labelle St	12069	8877	11292	8073	89	137	688	666	0	0
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd Ramp	10251	8762	9687	7975	134	190	431	596	0	0
	Lambton St/Grand Marais Rd Ramp	Pulford St	8577	8072	8242	7776	152	50	183	246	0	0
	Pulford St	Todd Ln/Cabana Rd	8811	8686	8646	8568	165	62	0	56	0	0
	Todd Ln/Cabana Rd	Huron Church Line	12791	14745	11835	14051	155	158	801	470	0	66
Talbot Rd	Huron Church Line	St Clair College	6864	7897	5765	7109	13	0	1087	787	0	0
	St Clair College	Cousineau Dr	10440	7016	8799	7016	12	0	1628	0	0	0
	Cousineau Dr	Howard Ave	10484	6166	10300	6162	46	3	138	0	0	0
	Howard Ave	Highway 3 split	16424	14899	16103	14544	320	315	0	41	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10894	11526	10615	10841	139	134	27	21	113	531
	GN Booth Dr	Sandwich St	10830	11322	10550	10636	139	132	27	21	114	533
	Sandwich St	Prospect Ave	10088	10109	9966	9995	74	74	48	41	0	0
	N. of Prospect Ave		10025	9899	9904	9787	73	72	48	40	0	0
			0	0								
	CROSSING ROADS		0	0								
Wyandotte	W of HuronChurch		5112	4861	4742	4425	0	0	370	436	0	0
	E of HuronChurch		3628	5148	2809	4146	18	141	749	860	51	0
University	W of HuronChurch		1358	1254	1358	1254	0	0	0	0	0	0
	E of HuronChurch		2312	2356	2083	2192	124	88	63	21	41	56
Riverside	W of HuronChurch		3548	3770	3547	3769	0	0	0	0	0	0
	E of HuronChurch		6951	5853	6822	5807	0	0	128	46	0	0
AMB Off Ramp	E of HuronChurch		41	10798	0	1407	0	54	0	6540	41	2797
AMB On Ramp	E of HuronChurch		6604	0	276	0	7	0	6098	0	223	0
Patricia	AMB	Wyandotte	4153	5101	490	1407	14	51	3456	3338	193	305
College St	E. of HC Road		6747	6609	6567	5748	178	133	3	534	0	193
	W. of HC Road		2013	899	1466	857	0	0	546	43	0	0
Girardot St	E. of HC Road		1132	1167	1065	1057	0	0	66	110	0	0
	W. of HC Road		2282	2206	2131	2092	33	27	108	83	11	4
Tecumseh Rd	E. of HC Road		5758	6765	5430	5973	128	147	200	400	0	245
	W. of HC Road		6335	6833	6273	6703	0	0	62	130	0	0
Dorchester St	E. of HC Road		1738	1562	1638	1406	0	0	101	156	0	0
	W. of HC Road		1418	807	1323	764	22	10	63	31	10	2
Prince Rd/Totten St	E. of HC Road		2259	2683	2177	2562	0	0	83	121	0	0
	W. of HC Road		5023	5427	4937	5354	0	0	87	73	0	0
Malden Rd	E. of HC Road		1681	1348	1422	1098	0	0	259	250	0	0
	W. of HC Road		7798	7050	6763	6083	368	315	461	90	206	562
Industrial Rd	E. of HC Road		3903	3861	3702	3605	47	56	146	180	8	21
	W. of HC Road		4306	3451	4136	3003	171	199	0	0	0	250
EC Row N. Ramp Terminal	E-N/S Ramp		16099	0	14751	n/a	313	n/a	1035	n/a	0	n/a
	N-W Ramp		0	889	n/a	846	n/a	0	n/a	43	n/a	0
	S-W Ramp		1642	0	882	n/a	31	n/a	91	n/a	638	n/a
EC Row S. Ramp Terminal	W-N/S Ramp		0	2910	n/a	2478	n/a	63	n/a	369	n/a	0
	S/N-E Ramp		0	19396	n/a	17986	n/a	362	n/a	704	n/a	344
Spring Gdn Rd	W. of HC Road		2322	3118	2320	3114	0	0	2	4	0	0
Labelle St	E. of HC Road		3883	2060	3589	1905	0	0	294	154	0	0
Lambton St/Grand Marais Rd Ramp	E. of HC Road		5269	4900	5182	4700	0	0	88	200	0	0
Pulford St	E. of HC Road		2975	1517	2788	1379	0	0	186	138	0	0
Cabana Rd	E. of HC Road		8534	7653	7859	7079	0	0	674	574	0	0
	between HC Road and Hwy 401 NB Ramps		21977	20565	21920	18772	56	136	0	1574	0	82
Todd Lane	between Hwy 401 NB and SB Ramps		12917	18098	12884	16383	33	123	0	1528	0	63
	W. of Hwy 401 SB Ramps		12182	10099	12168	10089	0	0	14	10	0	0
Huron Church Line	W. of HC Road		8588	7611	8180	7131	100	102	278	378	29	0
St Clair College	E. of Talbot Road		3254	9546	3141	9151	0	0	112	396	0	0
Cousineau Dr	E. of Talbot Road		5707	5513	5707	4478	0	0	0	1034	0	0
	W. of Talbot Road		8167	7000	8163	6968	4	31	0	0	0	0
Howard Ave	E. of Talbot Rd		8765	11517	8327	11296	138	218	289	2	10	0
	betweem Talbot Road and Hwy 401 SB On-Ramp		15646	8026	14389	7858	223	168	1019	1	15	0
	W. of Hwy 401 SB On-Ramp		13654	16628	13377	16078	261	331	15	219	0	0
E.C. Row Expressway	E. of Huron Church Rd		43065	50397	38745	43645	822	917	2922	4191	575	1644
	At Malden Rd		29382	32888	25989	26982	552	588	2030	4004	810	1315
	W. of Matchette		20854	9029	20264	8624	472	404	23	0	96	0

TABLE A-9 CONTD.

	HIGHWAY 401 Mainline											
	S. of Hwy 3 merge/split		24670	27043	14218	12940	422	298	3520	3423	6511	10381
	N. of Howard Ave		21980	28889	12049	14451	400	303	3864	4416	5668	9719
	At Grand Marais Rd		26683	36031	16706	19084	437	407	4489	5716	5051	10824
	E. of Malden Rd		9431	18798	2001	4411	62	284	1896	3861	5472	10242
	To/From Canadian Plaza		12619	21461	1	6	3	2	5114	9382	7501	12070
			0	0								
	HIGHWAY 401 Ramps		0	0								
			0	0								
Hwy 3 merge/split			0	0								
	401 NB Off Ramp		12564	0	10486	0	220	0	1173	0	686	0
	401 NB On Ramp		9748	0	9542	0	194	0	12	0	0	0
	401 SB Off Ramp		0	10144	0	9950	0	193	0	0	0	0
	401 SB On Ramp		0	11816	0	8453	0	207	0	2452	0	704
Howard Ave			0	0								
	401 NB Off Ramp		0	3457	0	2797	0	38	0	613	0	9
At Todd Lane/Cabana Rd			0	0								
	401 NB Off Ramp		7973	0	7883	0	90	0	0	0	0	0
	401 NB On Ramp		12703	0	11246	0	135	0	1322	0	0	0
	401 SB Off Ramp		0	14847	0	13130	0	146	0	1461	0	110
	401 SB On Ramp		0	8077	0	8041	0	36	0	0	0	0
At Huron Church Rd			0	0								
	401 NB Off Ramp		17534	0	14695	0	381	0	2458	0	0	0
	401 SB On Ramp		0	17621	0	13805	0	282	0	2112	0	1422
At Malden Rd			0	0								
	401 NB On Ramp		3749	0	2798	0	419	0	447	0	85	0
	401 SB Off Ramp		0	4953	0	3650	0	426	0	877	0	0
EC Row Expressway to Hwy 401			0	0								
	401 SB Off Ramp		0	15448	0	10506	0	265	0	3518	0	1159
Ojibway Pkwy IC			0	0								
	401 NB Off Ramp		5280	0	4799	0	481	0	0	0	0	0
	401 NB On Ramp		1689	0	0	0	0	0	1346	0	343	0
	401 SB Off Ramp		0	1431	0	1393	0	37	0	0	0	0
	401 SB On Ramp		0	17791	0	4868	0	345	0	12578	0	0
EC Row Expressway IC			0	0								
	401 NB On Ramp		2537	0	0	0	0	0	1498	0	1039	0
			0	0								
			0	0								
Highway 401 Mainline Vol	FROM	TO	0	0								
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	24670	0	14218		422		3520		6511	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	12076	0	4528		202		2766		4580	
	Hwy 3/401 NB On Ramp	Todd/401 NB Off Ramp	21980	0	12049		400		3864		5668	
	Todd/401 NB Off Ramp	Todd/401 NB On Ramp	13570	0	6532		287		2889		3861	
	Todd/401 NB On Ramp	HC Rd/401 NB On Ramp	26683	0	16706		437		4489		5051	
	HC Rd/401 NB On Ramp	Malden/401 NB On Ramp	9431	0	2001		62		1896		5472	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	13180	0	4799		481		2343		5557	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	7900	0	0		0		2343		5557	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	9589	0	0		0		3689		5900	
	EC ROW to 401 NB On Ramp	Canadian Plaza	12615	0	0		0		5114		7501	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	21461		6		2		9382		12070
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	20077		6		2		8721		11348
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	39274		17983		635		8434		12223
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	24839		5846		376		5064		13553
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	19308		3431		97		4025		11755
	HC Rd/401 SB On Ramp	Todd/401 SB Off Ramp	0	36031		19084		407		5716		10824
	Todd/401 SB Off Ramp	Todd/401 SB On Ramp	0	20218		8095		219		3842		8061
	Todd/401 SB On Ramp	Howard/401 SB Off Ramp	0	28889		14451		303		4416		9719
	Howard/401 SB Off Ramp	Hwy 3/401 SB Off Ramp	0	25374		11771		265		3798		9540
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	14014		6164		134		2297		5419
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	27043		12940		298		3423		10381
			0	0								
			0	0								
			0	0								
Grand Marais Rd	E. of connecting ramp		4299	3821	4229	3669	0	0	69	152	0	0
	W. of connecting ramp		2581	2363	2492	2306	45	22	44	35	0	0
			0	0								
	FROM	TO	0	0								
Malden	Chappus	401 S. Ramp	8678	11100	7624	9939	325	435	729	726	0	0
	401 S. Ramp	401 N. Ramp	9788	6764	8614	6053	366	266	807	445	0	0
	N. of 401 N. Ramp		6584	7630	5805	6829	246	300	533	502	0	0
Matchette	Chappus	EC Row S. Ramp	8264	9347	8169	9160	0	0	95	188	0	0
	EC Row S. Ramp	EC Row N. Ramp	2290	10334	2210	10162	0	0	80	172	0	0
	EC Row N. Ramp	Carmichael	4752	3019	4671	2900	0	0	81	119	0	0

TABLE A- 10 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 2A – YEAR 2035

LOCATION	SECTION		TOTAL		24 Hour AADT									
					Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO	NB / WB	SB / EB			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	7038	5893	7038	5893	6841	5716	194	96	3	1	0	80
	University	Wyandotte	3312	4280	3312	4280	3085	3887	88	127	77	186	62	80
	Wyandotte	AMB Off Ramp	2292	3415	2292	3415	2237	3286	0	0	55	128	0	0
	AMB Off Ramp	College	19697	6722	19697	6722	8264	6614	233	108	7649	1	3551	0
	College St	Girardot St	25791	26069	25791	26069	18116	16775	568	526	6811	5142	295	3625
	Girardot St	Tecumseh Rd	25158	27097	25158	27097	18031	18277	690	633	6165	4689	271	3498
	Tecumseh Rd	Dorchester St	28406	31078	28406	31078	21405	22845	848	812	5878	4339	275	3082
	Dorchester St	Prince Rd/Totten St	28518	32810	28518	32810	22173	25058	758	751	5347	4113	239	2888
	Prince Rd/Totten St	Malden Rd	31078	36661	31078	36661	24722	29055	851	877	5231	4139	274	2590
	Malden Rd	Industrial Rd	25673	31289	25673	31289	19807	23638	658	673	5197	4387	10	2592
	Industrial Rd	EC Row N. Ramp Terminal	27661	33495	27661	33495	22107	26382	716	751	4838	3849	0	2513
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	21241	42144	21241	42144	16462	35843	481	792	4297	3423	0	2087
	EC Row S. Ramp Terminal	Highway 401 Offramp	30263	32833	30263	32833	26863	28114	566	507	2834	2624	0	1586
	Highway 401 Offramp	Spring Gdn Rd/Labelle St	12489	9489	12489	9489	11642	8637	96	148	750	704	0	0
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd Ramp	10516	9720	10516	9720	9868	8846	142	210	506	664	0	0
	Lambton St/Grand Marais Rd Ramp	Pulford St	8947	8380	8947	8380	8470	8099	133	55	344	226	0	0
	Pulford St	Todd Ln/Cabana Rd	9368	9494	9368	9494	9190	9374	178	69	0	51	0	0
	Todd Ln/Cabana Rd	Huron Church Line	14484	17025	14484	17025	13388	16198	175	199	913	547	8	81
Talbot Rd	Huron Church Line	St Clair College	7245	8548	7245	8548	5966	7815	14	0	1266	734	0	0
	St Clair College	Cousineau Dr	10857	6843	10857	6843	9054	6843	13	0	1791	0	0	0
	Cousineau Dr	Howard Ave	10911	6141	10911	6141	10685	6137	68	4	157	0	0	0
	Howard Ave	Highway 3 split	17869	16234	17869	16234	17511	15829	358	349	0	57	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	11697	12459	11697	12459	11381	11654	146	134	27	20	143	652
	GN Booth Dr	Sandwich St	11633	12247	11633	12247	11316	11442	146	132	27	19	144	654
	Sandwich St	Prospect Ave	10780	10639	10780	10639	10653	10523	76	72	51	44	0	0
	N. of Prospect Ave		10717	10429	10717	10429	10590	10315	75	71	51	43	0	0
			0	0	0	0								
	CROSSING ROADS		0	0	0	0								
Wyandotte	W of HuronChurch		4937	4882	4937	4882	4556	4436	0	0	381	446	0	0
	E of HuronChurch		3627	5297	3627	5297	2767	4279	17	152	785	866	57	0
University	W of HuronChurch		1504	1357	1504	1357	1504	1357	0	0	0	0	0	0
	E of HuronChurch		2457	2367	2457	2367	2193	2195	127	88	57	22	80	62
Riverside	W of HuronChurch		3634	3914	3634	3914	3634	3914	0	0	0	0	0	0
	E of HuronChurch		7254	6036	7254	6036	7125	5981	0	0	129	56	0	0
AMB Off Ramp	E of HuronChurch		80	12337	80	12337	0	1096	0	44	0	7646	80	3551
AMB On Ramp	E of HuronChurch		6927	0	6927	0	214	0	5	0	6435	0	273	0
Patricia	AMB	Wyandotte	4194	4966	4194	4966	375	1095	12	42	3544	3434	263	395
College St	E. of HC Road		6798	6780	6798	6780	6613	5752	182	139	3	636	0	253
	W. of HC Road		2239	990	2239	990	1670	946	0	0	570	44	0	0
Girardot St	E. of HC Road		1153	1174	1153	1174	1071	1067	0	0	82	108	0	0
	W. of HC Road		2292	2172	2292	2172	2156	2059	33	25	88	83	14	5
Tecumseh Rd	E. of HC Road		6350	7261	6350	7261	5994	6325	138	147	218	393	0	396
	W. of HC Road		6629	7220	6629	7220	6561	7108	0	0	68	112	0	0
Dorchester St	E. of HC Road		1746	1586	1746	1586	1626	1428	0	0	119	158	0	0
	W. of HC Road		1422	806	1422	806	1332	763	22	9	55	32	13	2
Prince Rd/Totten St	E. of HC Road		2359	2668	2359	2668	2265	2560	0	0	93	109	0	0
	W. of HC Road		5173	5546	5173	5546	5081	5466	0	0	92	80	0	0
Malden Rd	E. of HC Road		1859	1541	1859	1541	1536	1195	0	0	323	347	0	0
	W. of HC Road		8088	7317	8088	7317	6860	6247	378	324	603	45	246	701
Industrial Rd	E. of HC Road		4318	4030	4318	4030	4094	3789	50	59	163	155	10	27
	W. of HC Road		4481	3597	4481	3597	4301	3096	180	222	0	0	0	279
EC Row N. Ramp Terminal	E-N/S Ramp		16787	0	16787	0	15484	n/a	339	n/a	964	n/a	0	n/a
	N-W Ramp		0	988	0	988	n/a	923	n/a	8	n/a	56	n/a	0
	S-W Ramp		1691	0	1691	0	848	n/a	28	n/a	97	n/a	719	n/a
EC Row S. Ramp Terminal	W-N/S Ramp		0	2860	0	2860	n/a	2475	n/a	72	n/a	313	n/a	0
	S/N-E Ramp		0	21212	0	21212	n/a	19144	n/a	408	n/a	1181	n/a	480
Spring Gdn Rd	W. of HC Road		2368	3118	2368	3118	2365	3114	0	0	2	4	0	0
Labelle St	E. of HC Road		4091	2140	4091	2140	3780	1987	0	0	311	153	0	0
ambton St/Grand Marais Rd Ran	E. of HC Road		5271	5542	5271	5542	5188	5305	0	0	83	238	0	0
Pulford St	E. of HC Road		3004	1495	3004	1495	2777	1362	0	0	226	132	0	0
Cabana Rd	E. of HC Road		9275	8802	9275	8802	8553	8024	0	0	723	778	0	0
Todd Lane	between HC Road and Hwy 401 NB Ramps		23942	23009	23942	23009	23872	20643	69	167	0	2098	0	101
	between Hwy 401 NB and SB Ramps		13743	19749	13743	19749	13704	17541	40	147	0	1984	0	76
	W. of Hwy 401 SB Ramps		12291	10338	12291	10338	12278	10327	0	0	14	11	0	0
Huron Church Line	W. of HC Road		10341	9022	10341	9022	9820	8436	129	117	353	464	38	5
St Clair College	E. of Talbot Road		3214	9802	3214	9802	3145	9460	0	0	70	342	0	0
Cousineau Dr	E. of Talbot Road		6502	5727	6502	5727	6502	4608	0	0	0	1120	0	0
	W. of Talbot Road		8832	7650	8832	7650	8828	7603	4	47	0	0	0	0
Howard Ave	E. of Talbot Rd		9113	12384	9113	12384	8664	12148	149	234	288	3	11	0
	between Talbot Road and Hwy 401 SB On-Ramp		17352	8434	17352	8434	15994	8255	255	178	1085	1	18	0
	W. of Hwy 401 SB On-Ramp		15378	18277	15378	18277	15057	17650	299	364	22	264	0	0
E.C. Row Expressway	E. of Huron Church Rd		48073	56669	48073	56669	42939	48782	909	1047	3516	4839	709	2001
	At Malden Rd		33768	37407	33768	37407	29372	30979	615	673	2797	4237	984	1518
	W. of Matchette		25601	9811	25601	9811	24849	9435	598	375	24	0	130	0

TABLE A-10 CONTD.

HIGHWAY 401 Mainline														
S. of Hwy 3 merge/split			27671	31056	27671	31056	15594	14171	475	334	3761	3747	7841	12804
N. of Howard Ave			24030	32962	24030	32962	12613	15452	425	329	4139	4911	6853	12270
At Grand Marais Rd			29403	40739	29403	40739	17838	20461	467	442	4916	6417	6182	13419
E. of Malden Rd			11213	22374	11213	22374	2145	4649	64	273	2124	4456	6880	12995
To/From Canadian Plaza			14746	24191	14746	24191	1	6	3	3	5775	9910	8967	14272
			0	0	0	0								
HIGHWAY 401 Ramps			0	0	0	0								
			0	0	0	0								
Hwy 3 merge/split			0	0	0	0								
401 NB Off Ramp			14074	0	14074	0	11374	0	239	0	1494	0	967	0
401 NB On Ramp			10103	0	10103	0	9879	0	207	0	17	0	0	0
401 SB Off Ramp			0	10701	0	10701	0	10497	0	204	0	0	0	0
401 SB On Ramp			0	13164	0	13164	0	9417	0	230	0	2732	0	784
Howard Ave			0	0	0	0								
401 NB Off Ramp			0	3755	0	3755	0	2996	0	40	0	709	0	10
At Todd Lane/Cabana Rd			0	0	0	0								
401 NB Off Ramp			7877	0	7877	0	7772	0	105	0	0	0	0	0
401 NB On Ramp			13317	0	13317	0	11743	0	145	0	1420	0	9	0
401 SB Off Ramp			0	16154	0	16154	0	14285	0	158	0	1590	0	120
401 SB On Ramp			0	8737	0	8737	0	8698	0	39	0	0	0	0
At Huron Church Rd			0	0	0	0								
401 NB Off Ramp			18589	0	18589	0	15534	0	405	0	2650	0	0	0
401 SB On Ramp			0	18987	0	18987	0	14852	0	303	0	2292	0	1540
At Malden Rd			0	0	0	0								
401 NB On Ramp			4144	0	4144	0	3186	0	372	0	447	0	139	0
401 SB Off Ramp			0	5460	0	5460	0	4024	0	470	0	966	0	0
EC Row Expressway to Hwy 401			0	0	0	0								
401 SB Off Ramp			0	18181	0	18181	0	12365	0	312	0	4140	0	1364
Ojibway Pkwy IC			0	0	0	0								
401 NB Off Ramp			5767	0	5767	0	5331	0	436	0	0	0	0	0
401 NB On Ramp			1807	0	1807	0	0	0	0	0	1412	0	395	0
401 SB Off Ramp			0	1291	0	1291	0	257	0	23	0	1010	0	0
401 SB On Ramp			0	22906	0	22906	0	22229	0	676	0	0	0	0
EC Row Expressway IC			0	0	0	0								
401 NB On Ramp			3026	0	3026	0	0	0	0	0	1760	0	1266	0
			0	0	0	0								
			0	0	0	0								
	FROM	TO	0	0	0	0								
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	27671	0	27671	0	15594		475		3761		7841	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	13738	0	13738	0	5060		225		2888		5566	
	Hwy 3/401 NB On Ramp	Todd/401 NB Off Ramp	24030	0	24030	0	12613		425		4139		6853	
	Todd/401 NB Off Ramp	Todd/401 NB On Ramp	15706	0	15706	0	7038		311		3270		5087	
	Todd/401 NB On Ramp	HC Rd/ 401 NB On Ramp	29403	0	29403	0	17838		467		4916		6182	
	HC Rd/401 NB On Ramp	Malden/401 NB On Ramp	11213	0	11213	0	2145		64		2124		6880	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	15357	0	15357	0	5331		436		2571		7019	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	9590	0	9590	0	0		0		2571		7019	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	11397	0	11397	0	0		0		3983		7414	
	EC ROW to 401 NB On Ramp	Canadian Plaza	14742	0	14742	0	0		0		5775		8967	
			0	0	0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	24191	0	24191		6		3		9910		14272
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	22624	0	22624		5		3		9198		13418
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	46563	0	46563		19721		683		9742		16417
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	29133	0	29133		6060		356		5788		16929
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	23011	0	23011		3417		95		4636		14862
	HC Rd/401 SB On Ramp	Todd/401 SB Off Ramp	0	40739	0	40739		20461		442		6417		13419
	Todd/401 SB Off Ramp	Todd/401 SB On Ramp	0	23531	0	23531		8634		239		4325		10333
	Todd/401 SB On Ramp	Howard/401 SB Off Ramp	0	32962	0	32962		15452		329		4911		12270
	Howard/401 SB Off Ramp	Hwy 3/401 SB Off Ramp	0	29133	0	29133		12614		288		4207		12024
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	16990	0	16990		7020		155		2646		7169
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	31056	0	31056		14171		334		3747		12804
			0	0	0	0								
			0	0	0	0								
			0	0	0	0								
Grand Marais Rd	E. of connecting ramp		4299	4417	4299	4417	4234	4229	0	0	65	187	0	0
	W. of connecting ramp		2627	1655	2627	1655	2536	1615	46	10	45	30	0	0
			0	0	0	0								
	FROM	TO	0	0	0	0								
	Chappus	401 S. Ramp	9101	11667	9101	11667	7963	10505	341	416	797	746	0	0
Malden	401 S. Ramp	401 N. Ramp	10331	6899	10331	6899	9063	6215	384	246	884	439	0	0
	N. of 401 N. Ramp		6817	7853	6817	7853	5992	7073	252	280	573	500	0	0
	Chappus	EC Row S. Ramp	9199	10065	9199	10065	9127	9882	0	0	72	183	0	0
Matchette	EC Row S. Ramp	EC Row N. Ramp	2646	10982	2646	10982	2600	10825	0	0	45	158	0	0
	EC Row N. Ramp	Carmichael	5048	3271	5048	3271	5002	3150	0	0	46	121	0	0

Highway 401 Mainline Vol

TABLE A- 11 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 2B – YEAR 2015

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6939	5479	6763	5390	173	85	3	1	0	3
	University	Wyandotte	3286	3971	3111	3651	90	119	85	198	20	3
	Wyandotte	AMB Off Ramp	2256	3176	2211	3045	0	0	44	131	0	0
	AMB Off Ramp	College	17371	6347	8806	6251	231	96	6173	1	2162	0
	College St	Girardot St	24380	23704	17474	16649	522	486	6193	4360	192	2209
	Girardot St	Tecumseh Rd	23677	23943	17362	17482	621	567	5517	5725	176	2114
	Tecumseh Rd	Dorchester St	27103	27831	20828	20671	768	720	5325	6452	181	1987
	Dorchester St	Prince Rd/Totten St	27021	29147	21353	23522	685	653	4826	3173	156	1799
	Prince Rd/Totten St	Malden Rd	29320	32345	23703	26778	763	750	4676	3162	177	1660
	Malden Rd	Industrial Rd	24228	27223	18911	21704	573	566	4737	3352	7	1601
	Industrial Rd	EC Row N. Ramp Terminal	25922	29090	20829	23841	635	632	4457	3024	0	1593
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	19860	35172	15536	30518	425	631	3900	2716	0	1307
	EC Row S. Ramp Terminal	Highway 401 Offramp	25710	26218	23080	22647	449	380	2181	2159	0	1032
	Highway 401 Offramp	Spring Gdn Rd/Labelle St	13401	7335	10689	6674	78	97	654	564	0	0
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd Ramp	9699	7377	9076	6728	111	134	413	516	0	0
	Lambton St/Grand Marais Rd Ramp	Pulford St	8208	6730	7863	6452	136	37	209	240	0	0
	Pulford St	Todd Ln/Cabana Rd	8186	7395	8033	7308	152	50	0	37	0	0
	Todd Ln/Cabana Rd	Huron Church Line	14076	13226	10252	12558	126	153	697	461	0	54
Talbot Rd	Huron Church Line	St Clair College	6414	7692	5522	6932	8	0	884	850	0	0
	St Clair College	Cousineau Dr	9895	6404	8455	6404	10	0	1430	0	0	0
	Cousineau Dr	Howard Ave	9831	5472	9730	5472	21	0	81	0	0	0
	Howard Ave	Highway 3 split	15176	13247	14885	12943	291	278	0	25	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10181	11207	9922	10623	136	139	32	15	90	430
	GN Booth Dr	Sandwich St	10116	10994	9857	10411	136	136	32	15	91	432
	Sandwich St	Prospect Ave	9487	9723	9360	9610	75	78	52	35	0	0
	N. of Prospect Ave		9424	9512	9298	9402	74	76	52	34	0	0
			0	0								
	CROSSING ROADS		0	0								
Wyandotte	W of HuronChurch		5192	4872	4834	4441	0	0	358	431	0	0
	E of HuronChurch		3616	5077	2850	4074	21	137	726	867	18	0
University	W of HuronChurch		1267	1128	1267	1128	0	0	0	0	0	0
	E of HuronChurch		2139	2145	1950	2014	119	90	67	21	3	20
Riverside	W of HuronChurch		3368	3642	3367	3642	0	0	0	0	0	0
	E of HuronChurch		6739	5763	6608	5719	0	0	132	45	0	0
AMB Off Ramp	E of HuronChurch		3	10035	0	1643	0	60	0	6170	3	2162
AMB On Ramp	E of HuronChurch		6302	0	317	0	12	0	5799	0	174	0
Patricia	AMB	Wyandotte	4102	5173	567	1642	22	58	3342	3241	171	231
College St	E. of HC Road		6642	6443	6465	5630	175	132	3	532	0	150
	W. of HC Road		1777	805	1566	746	0	0	210	59	0	0
Girardot St	E. of HC Road		1127	1161	1060	1052	0	0	68	109	0	0
	W. of HC Road		2338	2273	2178	2149	36	29	114	91	9	4
Tecumseh Rd	E. of HC Road		5983	6760	5638	6115	134	150	211	357	0	137
	W. of HC Road		6444	6926	6296	6802	0	0	147	125	0	0
Dorchester St	E. of HC Road		1706	1536	1605	1382	0	0	102	155	0	0
	W. of HC Road		1417	807	1321	762	23	10	64	34	8	1
Prince Rd/Totten St	E. of HC Road		2112	2713	2040	2591	0	0	73	121	0	0
	W. of HC Road		4860	5238	4778	5165	0	0	82	73	0	0
Malden Rd	E. of HC Road		1376	1114	1175	931	0	0	201	183	0	0
	W. of HC Road		7502	7026	6483	6223	368	337	484	36	168	431
Industrial Rd	E. of HC Road		3634	3450	3437	3215	46	55	146	164	6	16
	W. of HC Road		3911	3157	3764	2787	147	191	0	0	0	179
EC Row N. Ramp Terminal	E-N/S Ramp		13740	0	12487	n/a	266	n/a	987	n/a	0	n/a
	N-W Ramp		0	768	n/a	731	n/a	0	n/a	37	n/a	0
	S-W Ramp		1562	0	913	n/a	28	n/a	92	n/a	528	n/a
EC Row S. Ramp Terminal	W-N/S Ramp		0	2804	n/a	2461	n/a	47	n/a	297	n/a	0
	S/N-E Ramp		0	16908	n/a	15627	n/a	296	n/a	762	n/a	224
Spring Gdn Rd	W. of HC Road		2322	3118	2320	3114	0	0	2	4	0	0
Labelle St	E. of HC Road		3606	1866	3338	1722	0	0	268	144	0	0
Lambton St/Grand Marais Rd	E. of HC Road		4296	3589	4221	3436	0	0	75	153	0	0
	W. of HC Road		2354	2360	2283	2301	34	21	37	38	0	0
Pulford St	E. of HC Road		3301	1925	3090	1739	0	0	211	186	0	0
Cabana Rd	E. of HC Road		8027	6614	7381	6096	0	0	646	518	0	0
	between HC Road and Hwy 401 NB Ramps		19842	19082	19803	17449	39	127	0	1440	0	66
Todd Lane	between Hwy 401 NB and SB Ramps		12043	16536	12020	14962	24	113	0	1413	0	48
	W. of Hwy 401 SB Ramps		11370	9895	11358	9885	0	0	12	10	0	0
Huron Church Line	W. of HC Road		7444	6031	7091	5657	97	80	234	294	22	0
St Clair College	E. of Talbot Road		3144	9599	2984	9148	0	0	160	451	0	0
Cousineau Dr	E. of Talbot Road		5464	5233	5464	4248	0	0	0	985	0	0
	W. of Talbot Road		7233	6365	7233	6365	0	0	0	0	0	0
Howard Ave	E. of Talbot Rd		8134	10557	7723	10360	128	195	283	2	0	0
	betweem Talbot Road and Hwy 401 SB On-Ramp		14444	7334	13285	7183	208	150	951	0	0	0
	W. of Hwy 401 SB On-Ramp		12559	14692	12302	14210	247	290	11	192	0	0
E.C. Row Expressway	E. of Huron Church Rd		34790	44695	31509	39193	678	807	2214	3455	390	1241
	At Malden Rd		23297	29858	20975	25038	452	548	1325	3220	545	1052
	W. of Matchette		16051	8173	15597	7773	364	401	23	0	66	0

TABLE A-11 CONTD.

	HIGHWAY 401 Mainline								
	S. of Hwy 3 merge/split		19958	21565	11368	10615	328	247	3123	3047
	N. of Howard Ave		17735	23313	10196	12593	329	261	3213	3711
	At Grand Marais Rd		22373	29083	14531	16280	371	352	3805	4866
	E. of Malden Rd		7274	13482	1781	3389	56	260	1583	3109
	To/From Canadian Plaza		9984	18028	0	4	2	3	4208	8509
			0	0						
	HIGHWAY 401 Ramps		0	0						
			0	0						
Hwy 3 merge/split			0	0						
	401 NB Off Ramp		11467	0	9792	0	203	0	972	0
	401 NB On Ramp		9736	0	9534	0	193	0	9	0
	401 SB Off Ramp		0	9952	0	9770	0	182	0	0
	401 SB On Ramp		0	10350	0	7899	0	198	0	1822
Howard Ave			0	0						
	401 SB Off Ramp		0	3146	0	2588	0	34	0	525
At Todd Lane/Cabana Rd			0	0						
	401 NB Off Ramp		8875	0	6800	0	75	0	0	0
	401 NB On Ramp		11458	0	10190	0	115	0	1153	0
	401 SB Off Ramp		0	13410	0	11959	0	130	0	1245
	401 SB On Ramp		0	7896	0	7872	0	25	0	0
At Huron Church Rd			0	0						
	401 NB Off Ramp		15244	0	12787	0	321	0	2136	0
	401 SB On Ramp		0	15712	0	12540	0	253	0	1894
At Malden Rd			0	0						
	401 NB On Ramp		3175	0	2469	0	395	0	255	0
	401 SB Off Ramp		0	4144	0	2712	0	564	0	868
EC Row Expressway to Hwy 401			0	0						
	401 SB Off Ramp		0	13781	0	9934	0	232	0	2770
Ojibway Pkwy IC			0	0						
	401 NB Off Ramp		4701	0	4249	0	451	0	0	0
	401 NB On Ramp		1495	0	0	0	0	0	1221	0
	401 SB Off Ramp		0	1092	0	122	0	15	0	955
	401 SB On Ramp		0	14959	0	14528	0	431	0	0
EC Row Expressway IC			0	0						
	401 NB On Ramp		2178	0	0	0	0	0	1387	0
			0	0						
			0	0						
	FROM	TO	0	0						
Highway 401 Mainline Vol	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	19958	0	11368		328		3123	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	7731	0	2888		129		2068	
	Hwy 3/401 NB On Ramp	Todd/401 NB Off Ramp	17735	0	10196		329		3213	
	Todd/401 NB Off Ramp	Todd/401 NB On Ramp	10510	0	5483		237		2332	
	Todd/401 NB On Ramp	HC Rd/401 NB On Ramp	22373	0	14531		371		3805	
	HC Rd/401 NB On Ramp	Malden/401 NB On Ramp	7274	0	1781		56		1583	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	10449	0	4249		451		1838	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	5748	0	0		0		1838	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	7243	0	0		0		3059	
	EC ROW to 401 NB On Ramp	Canadian Plaza	9981	0	0		0		4208	
			0	0						
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	18028		4		3		8509
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	16743		4		2		7859
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	31610		15975		574		6705
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	18476		4689		358		4135
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	13766		2827		84		3174
	HC Rd/401 SB On Ramp	Todd/401 SB Off Ramp	0	29083		16280		352		4866
	Todd/401 SB Off Ramp	Todd/401 SB On Ramp	0	14880		6555		175		2996
	Todd/401 SB On Ramp	Howard/401 SB Off Ramp	0	23313		12593		261		3711
	Howard/401 SB Off Ramp	Hwy 3/401 SB Off Ramp	0	20121		10107		226		3176
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	9149		4265		91		1649
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	21565		10615		247		3047
			0	0						
	FROM	TO	0	0						
Malden	Chappus	401 S. Ramp	8439	10340	7499	9159	324	441	616	741
	401 S. Ramp	401 N. Ramp	9430	6776	8390	5988	361	291	679	497
	N. of 401 N. Ramp		6667	7473	5940	6608	254	320	472	544
Matchette	Chappus	EC Row S. Ramp	7691	7482	7601	7389	0	0	90	93
	EC Row S. Ramp	EC Row N. Ramp	2330	8626	2243	8541	0	0	86	85
	EC Row N. Ramp	Carmichael	4625	2938	4546	2871	0	0	79	67

TABLE A- 12 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 2B – YEAR 2025

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	7062	5644	6879	5510	180	92	3	1	0	41
	University	Wyandotte	3349	4081	3138	3726	88	124	67	191	56	41
	Wyandotte	AMB Off Ramp	2234	3201	2188	3074	0	0	45	128	0	0
	AMB Off Ramp	College	18219	6483	8649	6379	229	103	6543	1	2797	0
	College St	Girardot St	25180	25325	17875	17283	550	519	6510	4605	245	2918
	Girardot St	Tecumseh Rd	24378	25437	17721	18123	662	603	5770	3971	226	2741
	Tecumseh Rd	Dorchester St	27806	28711	21215	22028	818	751	5543	3513	230	2420
	Dorchester St	Prince Rd/Totten St	27999	30476	22001	24262	734	690	5064	3277	200	2247
	Prince Rd/Totten St	Malden Rd	30399	34133	24456	28088	820	807	4895	3216	228	2022
	Malden Rd	Industrial Rd	25181	28820	19557	22795	629	615	4986	3431	9	1979
	Industrial Rd	EC Row N. Ramp Terminal	27797	30892	22312	25206	711	686	4773	3036	0	1963
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	21217	39953	16550	34662	480	730	4187	2860	0	1700
	EC Row S. Ramp Terminal	Highway 401 Offramp	28699	30391	25613	26275	527	460	2559	2338	0	1316
	Highway 401 Offramp	Spring Gdn Rd/Labelle St	12069	8877	11292	8073	89	137	688	666	0	0
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd Ramp	10251	8762	9687	7975	134	190	431	596	0	0
	Lambton St/Grand Marais Rd Ramp	Pulford St	8577	8073	8242	7776	152	50	183	246	0	0
	Pulford St	Todd Ln/Cabana Rd	8811	8686	8646	8568	165	62	0	56	0	0
	Todd Ln/Cabana Rd	Huron Church Line	12791	14745	11835	14051	155	158	801	470	0	66
Talbot Rd	Huron Church Line	St Clair College	6864	7897	5765	7109	13	0	1087	787	0	0
	St Clair College	Cousineau Dr	10440	7016	8799	7016	12	0	1628	0	0	0
	Cousineau Dr	Howard Ave	10484	6166	10300	6162	46	3	138	0	0	0
	Howard Ave	Highway 3 split	16424	14899	16103	14544	320	315	0	41	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10894	11526	10615	10841	139	134	27	21	113	531
	GN Booth Dr	Sandwich St	10830	11322	10550	10636	139	132	27	21	114	533
	Sandwich St	Prospect Ave	10088	10109	9966	9995	74	74	48	41	0	0
	N. of Prospect Ave		10025	9899	9904	9787	73	72	48	40	0	0
			0	0								
	CROSSING ROADS		0	0								
Wyandotte	W of HuronChurch		5112	4861	4742	4425	0	0	370	436	0	0
	E of HuronChurch		3628	5148	2809	4146	18	141	749	860	51	0
University	W of HuronChurch		1358	1254	1358	1254	0	0	0	0	0	0
	E of HuronChurch		2312	2356	2083	2192	124	88	63	21	41	56
Riverside	W of HuronChurch		3548	3770	3547	3769	0	0	0	0	0	0
	E of HuronChurch		6951	5853	6822	5807	0	0	128	46	0	0
AMB Off Ramp	E of HuronChurch		41	10298	0	1407	0	54	0	6540	41	2797
AMB On Ramp	E of HuronChurch		6604	0	276	0	7	0	6098	0	223	0
Patricia	AMB	Wyandotte	4153	5101	490	1407	14	51	3456	3338	193	305
College St	E. of HC Road		6747	6609	6567	5748	178	133	1	534	0	193
	W. of HC Road		2013	899	1466	857	0	0	546	43	0	0
Girardot St	E. of HC Road		1132	1167	1065	1057	0	0	66	110	0	0
	W. of HC Road		2282	2206	2131	2092	33	27	108	83	11	4
Tecumseh Rd	E. of HC Road		5758	6765	5430	5973	128	147	200	400	0	245
	W. of HC Road		6335	6833	6273	6703	0	0	62	130	0	0
Dorchester St	E. of HC Road		1738	1562	1638	1406	0	0	101	156	0	0
	W. of HC Road		1418	807	1323	764	22	10	63	31	10	2
Prince Rd/Totten St	E. of HC Road		2259	2683	2177	2562	0	0	83	121	0	0
	W. of HC Road		5023	5427	4937	5354	0	0	87	73	0	0
Malden Rd	E. of HC Road		1681	1348	1422	1098	0	0	259	250	0	0
	W. of HC Road		7798	7050	6763	6083	368	315	461	90	206	562
Industrial Rd	E. of HC Road		3903	3861	3702	3605	47	56	146	180	8	21
	W. of HC Road		4306	3451	4136	3003	171	199	0	0	0	250
EC Row N. Ramp Terminal	E-N/S Ramp		16099	0	14751	n/a	313	n/a	1035	n/a	0	n/a
	N-W Ramp		0	889	n/a	846	n/a	0	n/a	43	n/a	0
	S-W Ramp		1642	0	882	n/a	31	n/a	91	n/a	638	n/a
EC Row S. Ramp Terminal	W-N/S Ramp		0	2910	n/a	2478	n/a	63	n/a	369	n/a	0
	S/N-E Ramp		0	19396	n/a	17986	n/a	362	n/a	704	n/a	344
Spring Gdn Rd	W. of HC Road		2322	3118	2320	3114	0	0	2	4	0	0
Labelle St	E. of HC Road		3883	2060	3589	1905	0	0	294	154	0	0
Lambton St/Grand Marais Rd	E. of HC Road		4299	3821	4229	3669	0	0	69	152	0	0
	W. of HC Road		2581	2363	2492	2306	45	22	44	35	0	0
Pulford St	E. of HC Road		2975	1517	2788	1379	0	0	186	138	0	0
Cabana Rd	E. of HC Road		8534	7653	7859	7079	0	0	674	574	0	0
	between HC Road and Hwy 401 NB Ramps		21977	20565	21920	18772	56	136	0	1574	0	82
Todd Lane	between Hwy 401 NB and SB Ramps		12917	18098	12884	16383	33	123	0	1528	0	63
	W. of Hwy 401 SB Ramps		12182	10099	12168	10089	0	0	14	10	0	0
Huron Church Line	W. of HC Road		8588	7611	8180	7131	100	102	278	378	29	0
St Clair College	E. of Talbot Road		3254	9546	3141	9151	0	0	112	396	0	0
Cousineau Dr	E. of Talbot Road		5707	5513	5707	4478	0	0	0	1034	0	0
	W. of Talbot Road		8167	7000	8163	6968	4	31	0	0	0	0
Howard Ave	E. of Talbot Rd		8765	11517	8327	11296	138	218	289	2	10	0
	between Talbot Road and Hwy 401 SB On-Ramp		15646	8026	14389	7858	223	168	1019	1	15	0
	W. of Hwy 401 SB On-Ramp		13654	16628	13377	16078	261	331	15	219	0	0
E.C. Row Expressway	E. of Huron Church Rd		43065	50397	38745	43645	822	917	2922	4191	575	1644
	At Malden Rd		29382	32888	25989	26982	552	588	2030	4004	810	1315
	W. of Matchette		20854	9029	20264	8624	472	404	23	0	96	0

TABLE A-12 CONTD.

	HIGHWAY 401 Mainline											
	S. of Hwy 3 merge/split		24670	27043	14218	12940	422	298	3520	3423	6511	10381
	N. of Howard Ave		21980	28889	12049	14451	400	303	3864	4416	5668	9719
	At Grand Marais Rd		26683	36031	16706	19084	437	407	4489	5716	5051	10824
	E. of Malden Rd		9431	18798	2001	4411	62	284	1896	3861	5472	10242
	To/From Canadian Plaza		12619	21461	1	6	3	2	5114	9382	7501	12070
			0	0								
	HIGHWAY 401 Ramps		0	0								
			0	0								
	Hwy 3 merge/split		0	0								
	401 NB Off Ramp		12564	0	10486	0	220	0	1173	0	686	0
	401 NB On Ramp		9748	0	9542	0	194	0	12	0	0	0
	401 SB Off Ramp		0	10144	0	9950	0	193	0	0	0	0
	401 SB On Ramp		0	11816	0	8453	0	207	0	2452	0	704
	Howard Ave		0	0								
	401 SB Off Ramp		0	3457	0	2797	0	38	0	613	0	9
	At Todd Lane/Cabana Rd		0	0								
	401 NB Off Ramp		7973	0	7883	0	90	0	0	0	0	0
	401 NB On Ramp		12703	0	11246	0	135	0	1322	0	0	0
	401 SB Off Ramp		0	13947	0	13139	0	146	0	1461	0	110
	401 SB On Ramp		0	8077	0	8041	0	36	0	0	0	0
	At Huron Church Rd		0	0								
	401 NB Off Ramp		17534	0	14695	0	381	0	2458	0	0	0
	401 SB On Ramp		0	17621	0	13805	0	282	0	2112	0	1422
	At Malden Rd		0	0								
	401 NB On Ramp		3749	0	2798	0	419	0	447	0	85	0
	401 SB Off Ramp		0	4951	0	3650	0	426	0	877	0	0
	EC Row Expressway to Hwy 401		0	0								
	401 SB Off Ramp		0	15448	0	10506	0	265	0	3518	0	1159
	Ojibway Pkwy IC		0	0								
	401 NB Off Ramp		5280	0	4799	0	481	0	0	0	0	0
	401 NB On Ramp		1620	0	0	0	0	0	1346	0	343	0
	401 SB Off Ramp		0	1431	0	1393	0	37	0	0	0	0
	401 SB On Ramp		0	17791	0	4868	0	345	0	12578	0	0
	EC Row Expressway IC		0	0								
	401 NB On Ramp		2537	0	0	0	0	0	1498	0	1039	0
			0	0								
			0	0								
	FROM	TO	0	0								
Highway 401 Mainline Vol	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	24670	0	14218		422		3520		6511	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	12076	0	4528		202		2766		4580	
	Hwy 3/401 NB On Ramp	Todd/401 NB Off Ramp	21980	0	12049		400		3864		5668	
	Todd/401 NB Off Ramp	Todd/401 NB On Ramp	13570	0	6532		287		2889		3861	
	Todd/401 NB On Ramp	HC Rd/401 NB On Ramp	26683	0	16706		437		4489		5051	
	HC Rd/401 NB On Ramp	Malden/401 NB On Ramp	9431	0	2001		62		1896		5472	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	13180	0	4799		481		2343		5557	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	7900	0	0		0		2343		5557	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	9589	0	0		0		3689		5900	
	EC ROW to 401 NB On Ramp	Canadian Plaza	12615	0	0		0		5114		7501	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	21461		6		2		9382		12070
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	20077		6		2		8721		11348
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	39274		17983		635		8434		12223
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	24839		5846		376		5064		13553
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	19308		3431		97		4025		11755
	HC Rd/401 SB On Ramp	Todd/401 SB Off Ramp	0	36031		19084		407		5716		10824
	Todd/401 SB Off Ramp	Todd/401 SB On Ramp	0	20218		8095		219		3842		8061
	Todd/401 SB On Ramp	Howard/401 SB Off Ramp	0	28889		14451		303		4416		9719
	Howard/401 SB Off Ramp	Hwy 3/401 SB Off Ramp	0	25374		11771		265		3798		9540
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	14014		6164		134		2297		5419
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	27043		12940		298		3423		10381
			0	0								
	FROM	TO	0	0								
Malden	Chappus	401 S. Ramp	8678	11091	7624	9932	325	435	729	725	0	0
	401 S. Ramp	401 N. Ramp	9788	6764	8614	6053	366	266	807	445	0	0
	N. of 401 N. Ramp		6584	7630	5805	6829	246	300	533	502	0	0
Matchette	Chappus	EC Row S. Ramp	8264	9347	8169	9160	0	0	95	188	0	0
	EC Row S. Ramp	EC Row N. Ramp	2290	10334	2210	10162	0	0	80	172	0	0
	EC Row N. Ramp	Carmichael	4752	3019	4671	2900	0	0	81	119	0	0

TABLE A- 13 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 2B – YEAR 2035

LOCATION	SECTION		24 Hour AADT						
			Total Cars and Trucks		Local Cars		Local Trucks		Internatic
	FROM	TO	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
HC Road	Riverside	University	7038	5893	6841	5716	194	96	3
	University	Wyandotte	3312	4280	3085	3887	88	127	77
	Wyandotte	AMB Off Ramp	2292	3415	2237	3286	0	0	55
	AMB Off Ramp	College	19697	6722	8264	6614	233	108	7649
	College St	Girardot St	25791	26069	18116	16775	568	526	6811
	Girardot St	Tecumseh Rd	25158	27097	18031	18277	690	633	6165
	Tecumseh Rd	Dorchester St	28406	31078	21405	22845	848	812	5878
	Dorchester St	Prince Rd/Totten St	28518	32810	22173	25058	758	751	5347
	Prince Rd/Totten St	Malden Rd	31078	36661	24722	29055	851	877	5231
	Malden Rd	Industrial Rd	25673	31289	19807	23638	658	673	5197
	Industrial Rd	EC Row N. Ramp Terminal	27661	33495	22107	26382	716	751	4838
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	21241	42144	16462	35843	481	792	4297
	EC Row S. Ramp Terminal	Highway 401 Offramp	30263	32461	26863	27824	566	503	2834
	Highway 401 Offramp	Spring Gdn Rd/Labelle St	12489	9489	11642	8637	96	148	750
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd Ramp	10516	9720	9868	8846	142	210	506
	Lambton St/Grand Marais Rd Ramp	Pulford St	8947	8380	8470	8099	133	55	344
	Pulford St	Todd Ln/Cabana Rd	9368	9494	9190	9374	178	69	0
	Todd Ln/Cabana Rd	Huron Church Line	14484	17025	13388	16198	175	199	913
Talbot Rd	Huron Church Line	St Clair College	7245	8548	5966	7815	14	0	1266
	St Clair College	Cousineau Dr	10857	6843	9054	6843	13	0	1791
	Cousineau Dr	Howard Ave	10911	6141	10685	6137	68	4	157
	Howard Ave	Highway 3 split	17869	16234	17511	15829	358	349	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	11697	12459	11381	11654	146	134	27
	GN Booth Dr	Sandwich St	11633	12247	11316	11442	146	132	27
	Sandwich St	Prospect Ave	10780	10639	10653	10523	76	72	51
	N. of Prospect Ave		10717	10429	10590	10315	75	71	51
			0	0					
	CROSSING ROADS		0	0					
Wyandotte	W of HuronChurch		4937	4882	4556	4436	0	0	381
	E of HuronChurch		3627	5297	2767	4279	17	152	785
University	W of HuronChurch		1504	1357	1504	1357	0	0	0
	E of HuronChurch		2457	2367	2193	2195	127	88	57
Riverside	W of HuronChurch		3634	3914	3634	3914	0	0	0
	E of HuronChurch		7254	6036	7125	5981	0	0	129
AMB Off Ramp	E of HuronChurch		80	12337	0	1096	0	44	0
AMB On Ramp	E of HuronChurch		6927	0	214	0	5	0	6435
Patricia	AMB	Wyandotte	4194	4966	375	1095	12	42	3544
College St	E. of HC Road		6798	6780	6613	5752	182	139	3
	W. of HC Road		2239	990	1670	946	0	0	570
Girardot St	E. of HC Road		1153	1174	1071	1067	0	0	82
	W. of HC Road		2292	2172	2156	2059	33	25	88
Tecumseh Rd	E. of HC Road		6350	7261	5994	6325	138	147	218
	W. of HC Road		6629	7220	6561	7108	0	0	68
Dorchester St	E. of HC Road		1746	1586	1626	1428	0	0	119
	W. of HC Road		1422	806	1332	763	22	9	55
Prince Rd/Totten St	E. of HC Road		2359	2668	2265	2560	0	0	93
	W. of HC Road		5173	5546	5081	5466	0	0	92
Malden Rd	E. of HC Road		1859	1541	1536	1195	0	0	323
	W. of HC Road		8088	7317	6860	6247	378	324	603
Industrial Rd	E. of HC Road		4318	4030	4094	3789	50	59	163
	W. of HC Road		4481	3597	4301	3096	180	222	0
EC Row N. Ramp Terminal	E-N/S Ramp		16787	0	15484	n/a	339	n/a	964
	N-W Ramp		0	988	n/a	923	n/a	8	n/a
	S-W Ramp		1691	0	848	n/a	28	n/a	97
EC Row S. Ramp Terminal	W-N/S Ramp		0	2860	n/a	2475	n/a	72	n/a
	S/N-E Ramp		0	21212	n/a	19144	n/a	408	n/a
Spring Gdn Rd	W. of HC Road		2368	3118	2365	3114	0	0	2
Labelle St	E. of HC Road		4091	2140	3780	1987	0	0	311
Lambton St/Grand Marais Rd	E. of HC Road		4299	4417	4234	4229	0	0	65
	W. of HC Road		2627	2362	2536	2303	46	23	45
Pulford St	E. of HC Road		3004	1495	2777	1362	0	0	226
Cabana Rd	E. of HC Road		9275	8802	8553	8024	0	0	723
	between HC Road and Hwy 401 NB Ramps		23942	23009	23872	20643	69	167	0
Todd Lane	between Hwy 401 NB and SB Ramps		13743	19749	13704	17541	40	147	0
	W. of Hwy 401 SB Ramps		12291	10338	12278	10327	0	0	14
Huron Church Line	W. of HC Road		10341	9022	9820	8436	129	117	353
St Clair College	E. of Talbot Road		3214	9802	3145	9460	0	0	70
Cousineau Dr	E. of Talbot Road		6502	5727	6502	4608	0	0	0
	W. of Talbot Road		8832	7650	8828	7603	4	47	0

TABLE A-13 CONTD.

	HIGHWAY 401 Mainline								
	S. of Hwy 3 merge/split		27671	31056	15594	14171	475	334	3761
	N. of Howard Ave		24030	32604	12613	15311	425	326	4139
	At Grand Marais Rd		29403	40387	17838	20309	467	439	4916
	E. of Malden Rd		11213	22374	2145	4649	64	273	2124
	To/From Canadian Plaza		14746	24191	1	6	3	3	5775
			0	0					
	HIGHWAY 401 Ramps		0	0					
			0	0					
Hwy 3 merge/split			0	0					
	401 NB Off Ramp		14074	0	11374	0	239	0	1494
	401 NB On Ramp		10103	0	9879	0	207	0	17
	401 SB Off Ramp		0	10701	0	10497	0	204	0
	401 SB On Ramp		0	13164	0	9417	0	230	0
Howard Ave			0	0					
	401 SB Off Ramp		0	3755	0	2996	0	40	0
At Todd Lane/Cabana Rd			0	0					
	401 NB Off Ramp		7877	0	7772	0	105	0	0
	401 NB On Ramp		13317	0	11743	0	145	0	1420
	401 SB Off Ramp		0	16154	0	14285	0	158	0
	401 SB On Ramp		0	8737	0	8698	0	39	0
At Huron Church Rd			0	0					
	401 NB Off Ramp		18589	0	15534	0	405	0	2650
	401 SB On Ramp		0	18987	0	14852	0	303	0
At Malden Rd			0	0					
	401 NB On Ramp		4144	0	3186	0	372	0	447
	401 SB Off Ramp		0	5460	0	4024	0	470	0
EC Row Expressway to Hwy 401			0	0					
	401 SB Off Ramp		0	18181	0	12365	0	312	0
Ojibway Pkwy IC			0	0					
	401 NB Off Ramp		5767	0	5331	0	436	0	0
	401 NB On Ramp		1807	0	0	0	0	0	1412
	401 SB Off Ramp		0	1291	0	257	0	23	0
	401 SB On Ramp		0	22906	0	22229	0	676	0
EC Row Expressway IC			0	0					
	401 NB On Ramp		3026	0	0	0	0	0	1760
			0	0					
			0	0					
	FROM	TO	0	0					
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	27671	0	15594		475		3761
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	13738	0	5060		225		2888
	Hwy 3/401 NB On Ramp	Todd/401 NB Off Ramp	24030	0	12613		425		4139
	Todd/401 NB Off Ramp	Todd/401 NB On Ramp	15706	0	7038		311		3270
	Todd/401 NB On Ramp	HC Rd/401 NB On Ramp	29403	0	17838		467		4916
	HC Rd/401 NB On Ramp	Malden/401 NB On Ramp	11213	0	2145		64		2124
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	15357	0	5331		436		2571
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	9590	0	0		0		2571
	Ojibway Pkway/401 NB On Ramp	EC ROW to 401 NB On Ramp	11397	0	0		0		3983
	EC ROW to 401 NB On Ramp	Canadian Plaza	14742	0	0		0		5775
			0	0					
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	24191		6		3	
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	22624		5		3	
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	46563		19721		683	
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	29133		6060		356	
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	23011		3417		95	
	HC Rd/401 SB On Ramp	Todd/401 SB Off Ramp	0	40739		20461		442	
	Todd/401 SB Off Ramp	Todd/401 SB On Ramp	0	23531		8634		239	
	Todd/401 SB On Ramp	Howard/401 SB Off Ramp	0	32962		15452		329	
	Howard/401 SB Off Ramp	Hwy 3/401 SB Off Ramp	0	29133		12614		288	
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	16990		7020		155	
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	31056		14171		334	
			0	0					
	FROM	TO	0	0					
Malden	Chappus	401 S. Ramp	9101	11717	7963	10557	341	417	797
	401 S. Ramp	401 N. Ramp	10331	6950	9063	6267	384	246	884
	N. of 401 N. Ramp		6810	7903	5986	7125	252	280	572
Matchette	Chappus	EC Row S. Ramp	9199	10065	9127	9882	0	0	72
	EC Row S. Ramp	EC Row N. Ramp	2646	10982	2600	10825	0	0	45
	EC Row N. Ramp	Carmichael	5048	3271	5002	3150	0	0	46

TABLE A- 14 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 3 – YEAR 2015

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6918	5396	6736	5308	180	84	3	1	0	3
	University	Wyandotte	3192	3920	3024	3558	91	118	58	241	20	3
	Wyandotte	AMB Off Ramp	2259	3128	2222	2957	0	0	37	171	0	0
	AMB Off Ramp	College	17523	6248	8545	6153	234	95	6352	1	2392	0
	College St	Girardot St	24195	23449	17294	16101	520	467	6189	4444	192	2437
	Girardot St	Tecumseh Rd	23064	23964	16858	17155	609	575	5424	3869	173	2365
	Tecumseh Rd	Dorchester St	26282	27186	20136	20850	750	712	5219	3451	178	2173
	Dorchester St	Prince Rd/Totten St	26623	28555	20995	22729	677	658	4796	3168	155	2001
	Prince Rd/Totten St	Malden Rd	28955	32055	23361	26152	756	763	4660	3172	177	1962
	Malden Rd	Industrial Rd	23645	26388	18327	20673	559	560	4752	3336	7	1819
	Industrial Rd	EC Row N. Ramp Terminal	25478	28982	20368	23372	624	646	4486	3098	0	1866
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	19503	36395	15128	31177	429	668	3945	2935	0	1615
	EC Row S. Ramp Terminal	Spring Gdn Rd/Labelle St	24639	28455	22018	24061	423	419	2198	2594	0	1381
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd	22690	11287	20998	10369	300	174	1392	745	0	0
	Lambton St/Grand Marais Rd	Pulford St	10760	11989	9870	11158	149	154	740	677	0	0
	Pulford St	Todd Ln/Cabana Rd	10912	12726	10093	12039	168	175	650	512	0	0
	Todd Ln/Cabana Rd	Huron Church Line	10614	11744	10200	11413	103	95	311	235	0	0
Talbot Rd	Huron Church Line	St Clair College	6839	13604	6786	13447	54	76	0	82	0	0
	St Clair College	Cousineau Dr	14243	7669	12069	6110	125	80	2049	1326	0	153
	Cousineau Dr	Howard Ave	6432	5582	5810	4825	95	93	528	488	0	176
	S. of Howard Ave		13491	12505	13212	12253	279	252	0	0	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	9914	10556	9780	9982	134	135	0	14	0	425
	GN Booth Dr	Sandwich St	9850	10366	9717	9790	133	132	0	14	0	429
	Sandwich St	Prospect Ave	9183	9681	9064	9557	72	78	46	46	0	0
	N. of Prospect Ave		9120	9480	9002	9359	72	76	46	45	0	0
			0	0								
CROSSING ROADS			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5176	4869	4817	4431	0	0	359	438	0	0
	E of HuronChurch		3579	5179	2818	4098	21	142	722	939	18	0
University	W of HuronChurch		1264	1185	1264	1185	0	0	0	0	0	0
	E of HuronChurch		2129	2108	1938	1976	118	91	70	21	3	20
Riverside	W of HuronChurch		3427	3539	3427	3539	0	0	0	0	0	0
	E of HuronChurch		6762	5658	6590	5621	0	0	171	37	0	0
AMB Off Ramp	E of HuronChurch		3	10176	0	1379	0	56	0	6349	3	2392
AMB On Ramp	E of HuronChurch		6319	0	305	0	11	0	5828	0	174	0
Patricia	AMB	Wyandotte	4109	5115	545	1376	22	55	3372	3417	171	267
College St	E. of HC Road		6585	6227	6421	5429	161	125	3	531	0	141
	W. of HC Road		1839	751	1594	709	0	0	245	43	0	0
Girardot St	E. of HC Road		1120	1156	989	996	0	0	131	160	0	0
	W. of HC Road		2346	2282	2257	2224	41	25	48	33	0	0
Tecumseh Rd	E. of HC Road		5692	6768	5357	6111	139	146	196	357	0	154
	W. of HC Road		6453	6857	6265	6733	0	0	187	124	0	0
Dorchester St	E. of HC Road		1297	844	1142	717	0	0	154	127	0	0
	W. of HC Road		1796	1457	1730	1419	32	18	34	20	0	0
Prince Rd/Totten St	E. of HC Road		2067	2624	1990	2507	0	0	77	117	0	0
	W. of HC Road		4684	4687	4607	4619	0	0	76	68	0	0
Malden Rd	E. of HC Road		1377	1093	1174	896	0	0	202	198	0	0
	W. of HC Road		7305	6667	6338	5887	362	323	455	28	150	429
Industrial Rd	E. of HC Road		3700	3485	3492	3232	52	59	149	177	7	17
	W. of HC Road		3702	3167	3570	2785	132	193	0	0	0	190
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		14514	1487	13121	1365	274	0	1120	122	0	0
	W. of HC Road (N-W On Ramp)		846	0	526	n/a	17	n/a	57	n/a	247	n/a
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	7757	n/a	7692	n/a	66	n/a	0	n/a	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		8597	2928	7615	2560	257	74	452	295	273	0
Spring Gdn Rd/Labelle St	E. of HC Road		3643	2941	3548	2853	0	0	95	88	0	0
	W. of HC Road		3659	4143	3654	4139	0	0	5	4	0	0
Lambton St/Grand Marais Rd	E. of HC Road		4381	3824	4140	3605	0	0	241	219	0	0
	W. of HC Road		2028	4081	1953	3974	36	52	39	54	0	0
Pulford St	E. of HC Road		2192	1948	1922	1665	0	0	270	284	0	0
Todd Ln/Cabana Rd	E. of HC Road		10171	8767	10075	8720	0	0	95	46	0	0
	W. of HC Road		13136	10317	13128	10310	0	0	8	7	0	0
Huron Church Line	W. of HC Road		8084	6446	7770	6118	96	81	218	247	0	0
St Clair College	E. of Talbot Road		3078	9510	2984	9189	0	0	94	321	0	0
Cousineau Dr	E. of Talbot Road		7837	5831	6000	4676	0	0	1836	1155	0	0
	W. of Talbot Road		10718	8338	10717	6675	0	39	0	1625	0	0
Howard Ave	E. of Talbot Road		7649	9487	7519	9311	127	172	2	4	0	0
	between Talbot Road and Hwy 401 SB On Ramp		10770	6885	10470	6729	189	154	111	2	0	0
	W. of Hwy 401 SB On Ramp		9648	12566	9389	12226	205	284	54	56	0	0
E.C. Row Expressway	E. of Huron Church Rd		35580	35332	32171	30978	681	652	2331	2711	398	991
	At Malden Rd		23319	29881	21005	24885	443	544	1327	3432	544	1020
	W. of Matchette		16032	8173	15668	7785	365	388	0	0	0	0

TABLE A-14 CONTD.

HIGHWAY 401 Mainline											
					NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
S. of Hwy 3 merge/split			19936	21550	11487	10692	326	250	3070	3028	5053	7579
N. of Howard Ave			19359	22105	10563	10877	331	262	3614	3559	4852	7406
At Grand Marais Rd			16845	25086	9605	12163	303	322	3373	4468	3564	8132
At Malden Rd			7336	13542	1730	3444	57	260	1550	2918	3999	6920
To/From Canadian Plaza			10012	18010	0	3	2	4	4189	8563	5820	9439
			0	0								
HIGHWAY 401 Ramps			0	0								
			0	0								
Hwy 3 merge/split			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			9808	0	8206	0	178	0	1013	0	411	0
401 NB On Ramp			9225	0	9050	0	176	0	0	0	0	0
401 SB Off Ramp			0	9835	0	9642	0	193	0	0	0	0
401 SB On Ramp			0	9516	0	7303	0	188	0	1632	0	394
At St. Clair College			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			6260	0	6219	0	41	0	0	0	0	0
401 NB On Ramp			4021	0	3471	0	34	0	516	0	0	0
401 SB Off Ramp			0	6455	0	5081	0	60	0	1180	0	134
401 SB On Ramp			0	3835	0	3815	0	20	0	0	0	0
At Huron Church Rd			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			9757	0	7755	0	253	0	1749	0	0	0
401 SB On Ramp			0	11483	0	8323	0	222	0	1696	0	1242
Malden Rd IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 On Ramp			3162	0	2421	0	400	0	291	0	50	0
401 Off Ramp			0	4138	0	2737	0	558	0	844	0	0
EC Row Expressway IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 SB Off Ramp			0	13755	0	9678	0	235	0	3005	0	838
Ojibway Pkwy IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			4607	0	4151	0	457	0	0	0	0	0
401 NB On Ramp			1491	0	0	0	0	0	1209	0	281	0
401 SB Off Ramp			0	1112	0	114	0	13	0	926	0	59
401 SB On Ramp			0	14959	0	14532	0	427	0	0	0	0
EC Row Expressway IC			0	0								
401 NB On Ramp			2181	0	0	0	0	0	1400	0	781	0
			0	0								
			0	0								
	FROM	TO	0	0								
Highway 401 Mainline Vol	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	19936	0	11487		326		3070		5053	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	10106	0	3317		136		2545		4108	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	19359	0	10563		331		3614		4852	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	12756	0	6382		260		2772		3342	
	St. Clair/401 NB On Ramp	HC Rd/401 NB Off Ramp	16845	0	9605		303		3373		3564	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	7336	0	1730		57		1550		3999	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	10498	0	4151		457		1841		4049	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	5890	0	0		0		1841		4049	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	7381	0	0		0		3051		4330	
	EC ROW to 401 NB On Ramp	Canadian Plaza	10009	0	0		0		4189		5820	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	18010		3		4		8563		9439
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	16724		3		4		7912		8806
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	31565		15936		574		6769		8286
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	18546		4775		358		3881		9532
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	13841		2888		86		2960		7907
	HC Rd/401 SB On Ramp	St Clair/401 SB Off Ramp	0	25086		12163		322		4468		8132
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	18267		7825		245		3245		6951
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	22105		10877		262		3559		7406
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	11251		5302		125		1963		3861
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	21550		10692		250		3028		7579
			0	0								
	FROM	TO	0	0								
Malden	Chappus	401 S. Ramp	8168	9933	7234	8882	324	407	611	643	0	0
	401 S. Ramp	401 N. Ramp	9159	6366	8122	5685	362	262	675	419	0	0
	N. of 401 N. Ramp		6398	7063	5682	6310	252	290	464	463	0	0
Matchette	Chappus	EC Row S. Ramp	7545	6236	7421	6049	0	0	124	187	0	0
	EC Row S. Ramp	EC Row N. Ramp	2539	8038	2404	7847	0	0	135	191	0	0
	EC Row N. Ramp	Carmichael	5887	3394	5737	3232	0	0	150	163	0	0
Montgomery	Surrey	Talbot	91	179	88	171	1	2	2	3	0	2
Surrey	Montgomery	Talbot	73	222	70	210	1	3	2	8	0	1
Grosvenor	Montgomery	Talbot	127	224	122	212	2	3	4	7	0	1

TABLE A- 15 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 3 – YEAR 2025

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6961	5530	6774	5399	184	90	3	1	0	41
	University	Wyandotte	3214	4019	3000	3621	90	122	69	236	56	41
	Wyandotte	AMB Off Ramp	2224	3176	2176	3010	0	0	48	166	0	0
	AMB Off Ramp	College	18564	6353	8426	6251	234	101	7087	1	2816	0
	College St	Girardot St	24955	24843	17631	16549	546	493	6532	4968	246	2833
	Girardot St	Tecumseh Rd	24408	25958	17627	18139	664	624	5889	4413	227	2782
	Tecumseh Rd	Dorchester St	27651	29331	20974	22098	814	779	5635	3919	229	2535
	Dorchester St	Prince Rd/Totten St	28081	30873	21963	24148	736	717	5181	3654	201	2354
	Prince Rd/Totten St	Malden Rd	30049	33749	24053	27222	810	813	4961	3616	225	2098
	Malden Rd	Industrial Rd	24646	27981	19004	21544	618	608	5015	3810	9	2019
	Industrial Rd	EC Row N. Ramp Terminal	26596	30037	21211	23946	680	665	4704	3444	0	1981
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	20149	38952	15562	33206	464	721	4124	3269	0	1756
	EC Row S. Ramp Terminal	Spring Gdn Rd/Labelle St	28259	30210	25166	25543	508	455	2586	2788	0	1424
	Spring Gdn Rd/Labelle St	Lambton St/Grand Marais Rd	26134	13261	24153	12203	360	196	1622	862	0	0
	Lambton St/Grand Marais Rd	Pulford St	12557	14320	11525	13341	184	167	848	812	0	0
	Pulford St	Todd Ln/Cabana Rd	12763	15081	11793	14229	205	185	766	668	0	0
	Todd Ln/Cabana Rd	Huron Church Line	12281	14453	11786	14038	123	104	372	311	0	0
Talbot Rd	Huron Church Line	St Clair College	6530	14107	6453	13839	76	89	1	179	0	0
	St Clair College	Cousineau Dr	14778	7704	12477	6120	128	78	2173	1318	0	189
	Cousineau Dr	Howard Ave	7085	5242	6399	4536	101	80	585	430	0	196
	S. of Howard Ave		14875	13903	14581	13628	294	275	0	0	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10857	11127	10717	10440	140	133	0	21	0	533
	GN Booth Dr	Sandwich St	10758	10889	10619	10207	139	130	0	20	0	531
	Sandwich St	Prospect Ave	10039	10079	9918	9959	73	74	47	46	0	0
	N. of Prospect Ave		9978	9897	9856	9779	72	73	47	45	0	0
			0	0								
	CROSSING ROADS		0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5113	4883	4743	4443	0	0	370	439	0	0
	E of HuronChurch		3606	5258	2781	4182	18	143	754	932	51	0
University	W of HuronChurch		1375	1229	1375	1229	0	0	0	0	0	0
	E of HuronChurch		2295	2207	2063	2040	122	90	70	21	41	56
Riverside	W of HuronChurch		3595	3728	3594	3728	0	0	0	0	0	0
	E of HuronChurch		6979	5800	6812	5752	0	0	167	48	0	0
AMB Off Ramp	E of HuronChurch		41	11242	0	1287	0	54	0	7084	41	2816
AMB On Ramp	E of HuronChurch		6616	0	242	0	6	0	6145	0	223	0
Patricia	AMB	Wyandotte	4135	5001	427	1285	12	52	3480	3359	216	305
College St	E. of HC Road		6690	6390	6521	5512	166	129	4	554	0	195
	W. of HC Road		2051	935	1627	887	0	0	424	47	0	0
Girardot St	E. of HC Road		1150	1153	1011	987	0	0	139	166	0	0
	W. of HC Road		2288	2217	2199	2159	42	26	47	32	0	0
Tecumseh Rd	E. of HC Road		5683	6763	5350	6031	137	145	197	384	0	204
	W. of HC Road		6537	6961	6315	6830	0	0	222	130	0	0
Dorchester St	E. of HC Road		1296	843	1138	711	0	0	159	132	0	0
	W. of HC Road		1830	1473	1761	1434	34	19	36	20	0	0
Prince Rd/Totten St	E. of HC Road		2206	2597	2124	2482	0	0	82	115	0	0
	W. of HC Road		4726	4924	4646	4854	0	0	80	70	0	0
Malden Rd	E. of HC Road		1632	1318	1356	1050	0	0	275	268	0	0
	W. of HC Road		7621	6939	6562	6018	370	319	497	39	192	563
Industrial Rd	E. of HC Road		4029	3803	3818	3553	49	60	153	168	8	22
	W. of HC Road		4158	3449	3994	3037	163	204	0	0	0	208
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		16498	1503	15016	1374	317	1	1165	128	0	0
	W. of HC Road (N-W On Ramp)		948	0	577	n/a	17	n/a	60	n/a	294	n/a
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	10999	n/a	10896	n/a	103	n/a	0	n/a	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		9010	3132	7836	2684	273	77	558	371	343	0
Spring Gdn Rd/Labelle St	E. of HC Road		3734	3026	3622	2934	0	0	112	92	0	0
	W. of HC Road		3994	4329	3989	4325	0	0	5	5	0	0
Lambton St/Grand Marais Rd	E. of HC Road		4948	3919	4709	3704	0	0	239	215	0	0
	W. of HC Road		2077	3924	1999	3820	38	52	40	52	0	0
Pulford St	E. of HC Road		2210	1992	1931	1693	0	0	279	299	0	0
Todd Ln/Cabana Rd	E. of HC Road		10073	8513	9987	8450	0	0	86	63	0	0
	W. of HC Road		12847	10327	12838	10322	0	0	8	6	0	0
Huron Church Line	W. of HC Road		9768	8150	9382	7721	116	105	271	324	0	0
St Clair College	E. of Talbot Road		3201	9406	3107	9102	0	0	94	304	0	0
Cousineau Dr	E. of Talbot Road		8160	5416	6182	4244	0	0	1977	1172	0	0
	W. of Talbot Road		11856	8767	11856	6974	0	113	0	1681	0	0
Howard Ave	E. of Talbot Road		8186	10256	8048	10052	135	198	3	5	0	0
	betweem Talbot Road and Hwy 401 SB On Ramp		11524	7289	11210	7126	198	161	116	2	0	0
	W. of Hwy 401 SB On Ramp		10488	14834	10221	14457	214	328	53	49	0	0
E.C. Row Expressway	E. of Huron Church Rd		43452	42975	38998	37195	822	790	3058	3567	575	1422
	At Malden Rd		29307	34264	25945	28015	543	613	2046	4258	774	1379
	W. of Matchette		20751	9029	20276	8617	475	412	0	0	0	0

TABLE A-15 CONT'D.

HIGHWAY 401 Mainline												
					NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
S. of Hwy 3 merge/split			24636	26971	14411	13155	412	301	3441	3388	6373	10127
N. of Howard Ave			22414	26452	11756	11978	386	291	4032	4059	6240	10124
At Grand Marais Rd			20488	28687	10989	12714	355	341	4051	4902	5092	10731
At Malden Rd			9512	18078	1940	4241	63	275	1854	3308	5655	10254
To/From Canadian Plaza			12654	21552	1	5	3	3	5096	9206	7555	12338
			0	0								
HIGHWAY 401 Ramps			0	0								
			0	0								
Hwy 3 merge/split			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			11216	0	9160	0	201	0	1258	0	596	0
401 NB On Ramp			9408	0	9231	0	177	0	0	0	0	0
401 SB Off Ramp			0	9929	0	9747	0	182	0	0	0	0
401 SB On Ramp			0	10588	0	7792	0	196	0	2039	0	561
At St. Clair College			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			6414	0	6356	0	58	0	0	0	0	0
401 NB On Ramp			4728	0	4004	0	37	0	687	0	0	0
401 SB Off Ramp			0	6331	0	4960	0	58	0	1145	0	168
401 SB On Ramp			0	4424	0	4398	0	25	0	0	0	0
At Huron Church Rd			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			11320	0	8942	0	303	0	2075	0	0	0
401 SB On Ramp			0	10853	0	7837	0	204	0	1688	0	1124
Malden Rd IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 On Ramp			3762	0	2723	0	424	0	454	0	161	0
401 Off Ramp			0	4954	0	3551	0	517	0	887	0	0
EC Row Expressway IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 SB Off Ramp			0	16124	0	10804	0	265	0	3886	0	1169
Ojibway Pkwy IC			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp			5150	0	4663	0	487	0	0	0	0	0
401 NB On Ramp			1685	0	0	0	0	0	1330	0	355	0
401 SB Off Ramp			0	1160	0	142	0	13	0	930	0	75
401 SB On Ramp			0	18909	0	18366	0	543	0	0	0	0
EC Row Expressway IC			0	0								
401 NB On Ramp			2523	0	0	0	0	0	1569	0	954	0
			0	0								
			0	0								
	FROM	TO	0	0								
Highway 401 Mainline Vol	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	24636	0	14411		412		3441		6373	
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	12984	0	4501		190		2873		5419	
	Hwy 3/401 NB On Ramp	St. Clair/401 NB Off Ramp	22414	0	11756		386		4032		6240	
	St. Clair/401 NB Off Ramp	St. Clair/401 NB On Ramp	15629	0	7332		307		3281		4709	
	St. Clair/401 NB On Ramp	HC Rd/401 NB Off Ramp	20488	0	10989		355		4051		5092	
	HC Rd/401 NB Off Ramp	Malden/401 NB On Ramp	9512	0	1940		63		1854		5655	
	Malden/401 NB On Ramp	Ojibway/401 NB Off Ramp	13275	0	4663		487		2308		5817	
	Ojibway Pkway/401 NB Off Ramp	Ojibway Pkway/401 NB On Ramp	8125	0	0		0		2308		5817	
	Ojibway Pkway/401 NB OnRamp	EC ROW to 401 NB On Ramp	9809	0	0		0		3638		6171	
	EC ROW to 401 NB On Ramp	Canadian Plaza	12650	0	0		0		5096		7555	
			0	0								
	Canadian Plaza	Ojibway/401 SB Off Ramp	0	21552		5		3		9206		12338
	Ojibway/401 SB Off Ramp	Ojibway/401 SB On Ramp	0	20161		4		3		8557		11597
	Ojibway/401 SB On Ramp	401 to EC ROW SB Off Ramp	0	39386		18022		637		8202		12526
	401 to EC ROW SB Off Ramp	Malden/401 SB Off Ramp	0	24169		5683		368		4395		13722
	Malden/401 SB Off Ramp	HC Rd/401 SB On Ramp	0	18562		3344		95		3394		11730
	HC Rd/401 SB On Ramp	St Clair/401 SB Off Ramp	0	28687		12714		341		4902		10731
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	21968		8444		266		3737		9521
	St Clair/401 SB On Ramp	Hwy 3/401 SB Off Ramp	0	26452		11978		291		4059		10124
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	15293		6636		156		2531		5970
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	26971		13155		301		3388		10127
			0	0								
	FROM	TO	0	0								
Malden	Chappus	401 S. Ramp	8621	10764	7519	9673	340	416	762	676	0	0
	401 S. Ramp	401 N. Ramp	9729	6427	8505	5779	382	247	841	401	0	0
	N. of 401 N. Ramp		6523	7294	5713	6556	255	281	554	456	0	0
Matchette	Chappus	EC Row S. Ramp	8915	7997	8771	7728	0	0	144	269	0	0
	EC Row S. Ramp	EC Row N. Ramp	2706	9624	2577	9359	0	0	129	265	0	0
	EC Row N. Ramp	Carmichael	6299	3565	6140	3359	0	0	159	207	0	0
Montgomery	Surrey	Talbot	100	197	97	188	1	2	2	4	0	3
Surrey	Montgomery	Talbot	73	230	70	217	1	3	2	8	0	1
Grosvenor	Montgomery	Talbot	127	223	122	211	2	3	4	8	0	1

TABLE A- 16 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR ALTERNATIVE 3 – YEAR 2035

LOCATION		SECTION	24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
		FROM	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road		Riverside	6880	5780	6678	5604	199	95	3	1	0	81
		University	3053	4205	2832	3759	92	125	67	241	63	81
		Wyandotte	2107	3328	2061	3152	0	0	46	176	0	0
		AMB Off Ramp	19717	6581	7911	6474	237	106	7717	1	3852	0
		College St	25463	26103	17762	16404	558	517	6849	5320	293	3861
		Girardot St	25119	27680	17897	18482	693	654	6255	4781	275	3762
		Tecumseh Rd	28380	30495	21270	22372	851	812	5982	3977	278	3334
		Dorchester St	28794	31651	22277	24172	773	737	5498	3676	247	3066
		Prince Rd/Totten St	31206	34207	24702	27332	862	837	5362	3272	280	2766
		Malden Rd	25464	28851	19459	22099	660	642	5334	3363	11	2746
		Industrial Rd	27054	31283	21452	24453	704	695	4898	3479	0	2656
		EC Row N. Ramp Terminal	20884	41304	15992	34770	489	774	4403	3352	0	2408
		EC Row S. Ramp Terminal	29662	32024	26279	26779	547	491	2836	2906	0	1848
		Spring Gdn Rd/Labelle St	27720	13928	25464	12835	394	204	1862	889	0	0
		Lambton St/Grand Marais Rd	13439	15346	12242	14344	203	177	994	825	0	0
		Pulford St	13680	16161	12527	15281	224	193	930	687	0	0
		Todd Ln/Cabana Rd	12890	15643	12297	15199	135	111	458	333	0	0
Talbot Rd		Huron Church Line	7121	14895	7028	14513	89	110	3	272	0	0
		St Clair College	15512	8120	13092	6326	126	78	2294	1478	0	239
		Cousineau Dr	7625	5360	6884	4573	100	75	640	479	0	233
		S. of Howard Ave	15866	14939	15541	14634	324	305	0	0	0	0
Ojibway Pwy		EC Row Expressway	11827	11522	11678	10724	149	131	0	19	0	648
		GN Booth Dr	11744	11274	11595	10483	148	128	0	19	0	645
		Sandwich St	10920	10280	10793	10162	76	70	51	48	0	0
		N. of Prospect Ave	10857	10051	10731	9936	75	68	51	47	0	0
			0	0								
CROSSING ROADS			0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte		W of HuronChurch	4977	4900	4596	4453	0	0	381	447	0	0
		E of HuronChurch	3621	5433	2776	4331	17	153	770	948	58	0
University		W of HuronChurch	1513	1313	1513	1313	0	0	0	0	0	0
		E of HuronChurch	2476	2249	2206	2073	125	92	65	21	81	63
Riverside		W of HuronChurch	3708	4018	3708	4018	0	0	0	0	0	0
		E of HuronChurch	7256	5956	7079	5910	0	0	177	46	0	0
AMB Off Ramp		E of HuronChurch	81	12540	0	932	0	43	0	7713	81	3852
AMB On Ramp		E of HuronChurch	7019	0	221	0	6	0	6520	0	273	0
Patricia		AMB	4206	4833	387	930	12	41	3574	3467	233	394
College St		E. of HC Road	6834	6532	6657	5523	173	130	4	590	0	289
		W. of HC Road	2260	1021	1737	984	0	0	522	38	0	0
Girardot St		E. of HC Road	1159	1160	1017	992	0	0	142	168	0	0
		W. of HC Road	2290	2184	2202	2125	42	27	47	33	0	0
Tecumseh Rd		E. of HC Road	6150	7222	5805	6274	141	146	204	457	0	345
		W. of HC Road	6800	7321	6419	7211	0	0	381	110	0	0
Dorchester St		E. of HC Road	1296	842	1136	708	0	0	160	134	0	0
		W. of HC Road	1849	1490	1779	1449	34	20	36	21	0	0
Prince Rd/Totten St		E. of HC Road	2304	2597	2220	2485	0	0	83	112	0	0
		W. of HC Road	4856	4953	4780	4880	0	0	76	73	0	0
Malden Rd		E. of HC Road	1868	1462	1550	964	0	0	318	498	0	0
		W. of HC Road	8033	7260	6891	6225	380	323	529	14	232	699
Industrial Rd		E. of HC Road	4394	3993	3646	3711	45	59	695	195	8	29
		W. of HC Road	4432	3594	4258	3117	174	210	0	0	0	267
EC Row N. Ramp Terminal	HC Road	E-N/S Off Ramp & S-W On R	17403	1647	15875	1474	340	3	1188	171	0	0
		W. of HC Road (N-W On Ramp)	1072	0	587	n/a	15	n/a	66	n/a	403	n/a
EC Row S. Ramp Terminal		E. of HC Road (S-E On Ramp)	0	11842	n/a	11723	n/a	118	n/a	0	n/a	0
	HC Road	N-E On Ramp & W-N/S Off	9507	3316	8199	2878	294	76	479	362	535	0
Spring Gdn Rd/Labelle St		E. of HC Road	3434	3160	3170	3133	0	0	265	27	0	0
		W. of HC Road	4255	4248	4250	4243	0	0	5	4	0	0
Lambton St/Grand Marais Rd		E. of HC Road	5418	4073	5172	3873	0	0	246	200	0	0
		W. of HC Road	2126	3871	2047	3766	39	53	40	53	0	0
Pulford St		E. of HC Road	2227	2037	1943	1730	0	0	284	308	0	0
Todd Ln/Cabana Rd		E. of HC Road	10941	9229	10844	9168	0	0	97	60	0	0
		W. of HC Road	13261	10845	13248	10838	0	0	13	7	0	0
Huron Church Line		W. of HC Road	11081	9590	10658	9046	131	124	293	420	0	0
St Clair College		E. of Talbot Road	3255	9306	3164	9013	0	0	91	293	0	0
Cousineau Dr		E. of Talbot Road	8875	5604	6652	4360	0	0	2223	1244	0	0
		W. of Talbot Road	13082	9483	13081	7324	0	120	0	2039	0	0
Howard Ave		E. of Talbot Road	8905	11116	8753	10898	149	213	3	6	0	0
	eem	Talbot Road and Hwy 401 SB On R	12423	7884	12085	7704	216	178	121	2	0	0
		W. of Hwy 401 SB On Ramp	11262	16265	10974	15844	234	363	54	57	0	0
E.C. Row Expressway		E. of Huron Church Rd	50269	48093	44794	41237	944	890	3783	4209	748	1758
		At Malden Rd	35432	38618	30926	31214	645	689	2820	5162	1041	1553
		W. of Matchette	25742	9811	25148	9398	594	413	0	0	0	0

TABLE A-16 CONT'D.

HIGHWAY 401 Mainline											
				NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
S. of Hwy 3 merge/split	27604	30963	15817	14374	474	339	3691	3738	7623	12511
N. of Howard Ave	25909	30276	12948	12870	441	318	4599	4468	7921	12619
At Grand Marais Rd	23866	32298	12338	13225	410	363	4649	5383	6470	13326
At Malden Rd	11315	21421	2042	4467	69	281	2083	3857	7122	12816
To/From Canadian Plaza	14788	24160	1	5	3	4	5750	9967	9035	14184
	0	0								
HIGHWAY 401 Ramps	0	0								
	0	0								
Hwy 3 merge/split	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	12186	0	9709	0	215	0	1456	0	806	0
401 NB On Ramp	9811	0	9620	0	191	0	0	0	0	0
401 SB Off Ramp	0	10598	0	10394	0	203	0	0	0	0
401 SB On Ramp	0	11840	0	8417	0	212	0	2482	0	729
At St. Clair College	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	6745	0	6674	0	70	0	0	0	0	0
401 NB On Ramp	5077	0	4353	0	40	0	684	0	0	0
401 SB Off Ramp	0	6552	0	5025	0	58	0	1256	0	214
401 SB On Ramp	0	4893	0	4861	0	32	0	0	0	0
At Huron Church Rd	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	12988	0	10257	0	357	0	2374	0	0	0
401 SB On Ramp	0	11289	0	7916	0	209	0	1724	0	1440
Malden Rd IC	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 On Ramp	4124	0	2893	0	451	0	567	0	213	0
401 Off Ramp	0	5467	0	4002	0	511	0	954	0	0
EC Row Expressway IC	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 SB Off Ramp	0	19059	0	12479	0	320	0	4893	0	1367
Ojibway Pkwy IC	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	5454	0	4935	0	519	0	0	0	0	0
401 NB On Ramp	1802	0	0	0	0	0	1396	0	406	0
401 SB Off Ramp	0	1324	0	275	0	25	0	942	0	81
401 SB On Ramp	0	22906	0	22226	0	680	0	0	0	0
EC Row Expressway IC	0	0								
401 NB On Ramp	3019	0	0	0	0	0	1833	0	1186	0
	0	0								
	0	0								
Highway 401 Mainline Vol — FROM										
S. of Hwy 3 merge/split	27604	0	15817		474		3691		7623	
Hwy 3/ 401 NB Off Ramp	16139	0	5381		237		3349		7173	
Hwy 3/401 NB On Ramp	25909	0	12948		441		4599		7921	
St. Clair/401 NB Off Ramp	18741	0	8261		356		3865		6258	
St. Clair/401 NB On Ramp	23866	0	12338		410		4649		6470	
HC Rd/401 NB Off Ramp	11315	0	2042		69		2083		7122	
Malden/401 NB On Ramp	15439	0	4935		519		2650		7335	
Ojibway Pkway/401 NB Off Ramp	9985	0	0		0		2650		7335	
Ojibway Pkway/401 NB OnRamp	11787	0	0		0		4046		7741	
EC ROW to 401 NB On Ramp	14784	0	0		0		5750		9035	
	0	0								
Canadian Plaza	0	24160		5		4		9967		14184
Ojibway/401 SB Off Ramp	0	22596		5		4		9251		13336
Ojibway/401 SB On Ramp	0	46455		19712		706		9803		16234
401 to EC ROW SB Off Ramp	0	28226		5883		370		5089		16884
Malden/401 SB Off Ramp	0	22034		3308		92		3986		14648
HC Rd/401 SB On Ramp	0	32298		13225		363		5383		13326
St Clair/401 SB Off Ramp	0	25302		8965		288		4133		11916
St Clair/401 SB On Ramp	0	30276		12870		318		4468		12619
Hwy 3/401 SB Off Ramp	0	18224		7452		179		2868		7724
Hwy 3/401 SB On Ramp	0	30963		14374		339		3738		12511
	0	0								
FROM	0	0								
Malden — Chappus	8986	11723	7792	10551	353	442	840	730	0	0
Malden — 401 S. Ramp	10214	6953	8881	6263	400	261	933	428	0	0
Malden — N. of 401 N. Ramp	6704	7907	5840	7121	262	297	602	489	0	0
Matchette — Chappus	9695	9770	9635	9398	0	0	60	372	0	0
Matchette — EC Row S. Ramp	3096	11386	3051	10826	0	0	44	560	0	0
Matchette — EC Row N. Ramp	6874	3918	6820	3508	0	0	54	410	0	0
Montgomery — Surrey	109	206	105	196	1	2	3	5	0	4
Surrey — Montgomery	73	238	70	224	1	3	2	10	0	1
Grosvenor — Montgomery	127	223	121	211	1	3	4	8	0	2

TABLE A- 17 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR PARKWAY – YEAR 2015

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6911	5457	6735	5369	173	84	3	1	0	3
	University	Wyandotte	3258	3990	3090	3626	91	118	58	242	20	3
	Wyandotte	AMB Off Ramp	2322	3177	2285	3005	0	0	37	172	0	0
	AMB Off Ramp	College	17448	6323	8617	6228	229	94	6211	1	2391	0
	College St	Girardot St	25364	24092	18255	16675	543	487	6361	4419	205	2512
	Girardot St	Tecumseh Rd	24197	23801	17763	17139	636	571	5615	3744	182	2347
	Tecumseh Rd	Dorchester St	27469	27266	21118	21024	778	716	5388	3342	186	2185
	Dorchester St	Prince Rd/Totten St	27511	28532	21714	22815	693	656	4945	3065	159	1997
	Prince Rd/Totten St	Malden Rd	30088	31791	24278	26074	777	757	4852	3020	180	1940
	Malden Rd	Industrial Rd	24739	26772	19251	21200	577	580	4904	3155	7	1837
	Industrial Rd	E.C Row N. Ramp Terminal	27169	28916	21772	23501	662	652	4735	2918	0	1845
	EC Row N. Ramp Terminal	E.C Row S. Ramp Terminal	25821	35043	20057	30308	531	646	5233	2573	0	1516
	S. of E.C Row S. Ramp Terminal		26685	33185	22055	28396	568	479	4062	2730	0	1580
S Service Rd	N. of Bethlehem Ave		0	29261	0	24519	0	427	0	2759	0	1556
	Bethlehem Ave	Grand Marais Rd	0	5258	0	4817	0	125	0	316	0	0
N Service Rd	N. of Labelle St		27505	0	23407	0	478	0	3620	0	0	0
	Labelle St	Grand Marais Rd Ramp	25346	0	23702	0	256	0	1388	0	0	0
HC Road	Grand Marais Rd	Pulford St	7630	4265	7090	4053	11	25	529	187	0	0
	Pulford St	Todd Ln/Cabana Rd	7166	4243	7150	4210	16	34	0	0	0	0
	Todd Ln/Cabana Rd	Huron Church Line	15881	12383	15077	11891	174	111	630	381	0	0
Talbot Road	Huron Church Line	St Clair College	11107	9691	11058	9634	49	57	0	0	0	0
	St Clair College	Cousineau Dr	9229	8012	8007	6624	77	89	1145	1166	0	133
	Cousineau Dr	Howard Ave	8722	2696	8064	2343	130	45	527	229	0	79
	Howard Ave	Laurier Extension	11607	11385	11366	11161	241	224	0	0	0	0
	S. of Laurier Extension		12021	11914	11771	11680	250	234	0	0	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10180	10556	9926	9978	137	137	27	14	91	427
	GN Booth Dr	Sandwich St	10116	10433	9861	9845	136	135	27	15	91	438
	Sandwich St	Prospect Ave	9478	9729	9354	9613	75	78	50	37	0	0
	N. of Prospect Ave		9415	9510	9292	9397	75	77	49	36	0	0

	CROSSING ROADS				NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5168	4869	4808	4435	0	0	359	435	0	0
	E of HuronChurch		3574	5121	2813	4048	21	135	722	937	18	0
University	W of HuronChurch		1254	1192	1254	1192	0	0	0	0	0	0
	E of HuronChurch		2138	2118	1947	1986	118	91	70	21	3	20
Riverside	W of HuronChurch		3390	3487	3390	3487	0	0	0	0	0	0
	E of HuronChurch		6770	5671	6598	5633	0	0	173	37	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43	0	7710	0	3781
AMB On Ramp	E of HuronChurch		6286	0	309	0	11	0	5792	0	174	0
Patricia	AMB	Wyandotte	4111	5195	552	1458	21	57	3367	3412	171	267
College St	E. of HC Road		6514	6361	6343	5558	168	124	3	535	0	144
	W. of HC Road		1867	806	1670	752	0	0	197	54	0	0
Girardot St	E. of HC Road		1133	1160	1017	1029	0	0	116	130	0	0
	W. of HC Road		2346	2275	2258	2216	41	25	48	33	0	0
Tecumseh Rd	E. of HC Road		5829	6836	5489	6174	139	148	201	359	0	156
	W. of HC Road		6604	6994	6420	6866	0	0	184	127	0	0
Dorchester St	E. of HC Road		1693	1533	1520	1350	0	0	173	183	0	0
	W. of HC Road		1419	807	1370	786	26	10	24	11	0	0
Prince Rd/Totten St	E. of HC Road		2075	2907	1998	2777	0	0	77	130	0	0
	W. of HC Road		4782	5176	4701	5101	0	0	81	76	0	0
Malden Rd	E. of HC Road		1377	1126	1172	923	0	0	205	203	0	0
	W. of HC Road		7891	8417	6798	7406	386	398	553	38	154	576
Industrial Rd	E. of HC Road		3619	3426	3425	3181	49	57	139	172	6	16
	W. of HC Road		4072	3166	3914	2791	158	192	0	0	0	183
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		14334	2042	13014	1881	270	0	1050	162	0	0
	W. of HC Road (N-W On Ramp)		607	0	420	0	14	0	51	0	122	0
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	7407	0	7341	0	66	0	0	0	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		8637	2904	7642	2447	263	81	451	376	280	0
					WB	EB	WB	EB	WB	EB	WB	EB
Labelle St/Bethlehem Ave	E. of N. Service Rd		2903	2203	2670	2014	0	0	234	190	0	0
	between N. and S. Service Rd		1403	3202	1403	3105	0	0	0	97	0	0
	W. of S. Service Rd		1804	3255	1803	3251	0	0	2	4	0	0
Grand Marais Rd/Lambton Rd	E. of HC Rd		3982	3270	3730	3026	0	0	251	244	0	0
	W. of HC Rd		1714	1960	1647	1912	29	17	38	32	0	0
Pulford St	E. of HC Rd		2407	1762	2147	1567	0	0	261	195	0	0
Todd Ln/Cabana Rd	E. of HC Rd		8767	7221	8220	6607	0	0	547	613	0	0
	between HC Rd and Hwy 401 Off-ramp		7871	13883	7871	12346	0	0	0	1537	0	0
	W. of Hwy 401 Off-ramp		9953	10417	9940	10406	0	0	13	10	0	0
Huron Church Line	W. of HC Rd		7456	6841	7022	6398	93	98	341	345	0	0
St Clair College	E. of Talbot Rd		3009	9320	2914	9043	0	0	95	277	0	0
Cousineau Dr	E. of Talbot Rd		6321	5777	5201	4740	0	0	1120	1037	0	0
	W. of Talbot Rd		7099	5807	7099	5807	0	0	0	0	0	0
Howard Ave	E. of Talbot Rd		7718	8092	7585	7941	133	148	0	3	0	0
	W. of Talbot Rd		6911	8038	6746	7837	152	183	13	17	0	0
Laurier Extension	W. of Talbot Rd/Hwy 3		6658	6543	6500	6380	146	149	13	14	0	0
EC Row Expressway	E. of Huron Church Rd		35042	43067	31755	37865	679	775	2215	3256	393	1170
	W. of Malden Rd		23389	26224	21069	21815	452	480	1318	3004	550	926
	W. of Matchette		16125	21479	15668	20472	369	1007	20	0	67	0
GN Booth Dr	W. of Ojibway Pwy		357	461	346	448	7	8	4	5	0	0
Sandwich St	W. of Ojibway Pwy		1533	1388	1361	1261	148	91	24	35	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	331	426	7	4	4	7	0	0

TABLE A-17 CONTD.

HIGHWAY 401 Mainline										
			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
S. of Hwy 3 merge/split	19954	21530	11418	10688	322	249	3100	3035	5113	7557
N. of Howard Ave	14215	22874	7630	11262	237	275	2666	3633	3682	7704
At Grand Marais Rd	18476	30697	11664	17304	284	374	3149	5005	3379	8013
E. of Malden Rd	5001	11469	1269	2585	37	71	1064	2549	2630	6264
To/From Canadian Plaza	9990	17980	0	3	2	4	4203	8626	5784	9346

HIGHWAY 401 Ramps										
Hwy 3 merge/split			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp (prior to Highway 3 / Laurier split)	14237	0	11849	0	255	0	1529	0	603	0
401 NB On Ramp	8722	0	8557	0	165	0	0	0	0	0
401 SB Off Ramp	0	8660	0	8492	0	168	0	0	0	0
401 SB On Ramp	0	5656	0	4321	0	111	0	986	0	238
At Howard Ave	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp	745	0	731	0	14	0	0	0	0	0
401 SB On Ramp	0	4521	0	3454	0	89	0	788	0	190
At St. Clair College	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	4553	0	4535	0	17	0	0	0	0	0
401 SB Off Ramp (direct ramp to Hwy 3)	0	5307	0	4632	0	59	0	615	0	0
401 SB On Ramp	0	5498	0	5471	0	27	0	0	0	0
At Todd Ln / Cabana Rd			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp	7975	0	7014	0	96	0	864	0	0	0
401 SB Off Ramp (direct ramp to Todd lane)	0	7857	0	6858	0	88	0	910	0	0
At Huron Church Rd			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	13238	0	10987	0	257	0	1993	0	0	0
401 SB On Ramp	0	19424	0	15256	0	313	0	2360	0	1496
EC Row Expressway EB to Hwy 401			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp from EC ROW EB	1496	0	0	0	0	0	1222	0	274	0
Hwy 401 to EC Row Expressway WB										
401 SB Off Ramp to EC Row WB	0	1092	0	126	0	10	0	956	0	0
EC Row Expressway WB to Hwy 401			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp from EC ROW WB	2083	0	0	0	0	0	1309	0	774	0
Hwy 401 to EC Row Expressway EB / Huron Church Road			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 SB Off Ramp to EC Row EB / Huron Church Rd	0	4166	0	2948	0	71	0	892	0	256
At Malden Rd			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp	541	0	417	0	69	0	45	0	10	0
401 SB Off Ramp	0	879	0	574	0	121	0	183	0	0

Highway 401 Mainline Vol	FROM	TO										
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	19954	0	11418	0	322	0	3100	0	5113	0
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	5337	0	1664	0	67	0	1318	0	2289	0
	Hwy 3/401 NB On Ramp	Howard NB On Ramp	14215	0	7630	0	237	0	2666	0	3682	0
	Howard NB On Ramp	St. Clair/401 NB Off Ramp	14993	0	8048	0	250	0	2812	0	3883	0
	St. Clair/401 NB Off Ramp	Pulford/401 NB On Ramp	9858	0	4828	0	194	0	2123	0	2713	0
	Pulford/401 NB On Ramp	HC Rd/401 NB Off Ramp	19571	0	10722		349		3920		4580	
	HC Rd/401 NB Off Ramp	EC Row EB to 401 NB On Ramp	4502	0	2842		69		767		823	
	EC Row EB to 401 NB On Ramp	EC Row WB to 401 NB On Ramp	6982	0	0		0		2214		4768	
	EC Row WB to 401 NB On Ramp	Malden/401 NB On Ramp	9032	0	0		0		3789		5242	
	Malden/401 NB On Ramp	Canadian Plaza	9987	0	0		0		4203		5784	
	Canadian Plaza	Malden/401 SB Off Ramp	0	17980		3		4		8626		9346
	Malden/401 SB Off Ramp	01 SB to EC Row EB / HC Rd Off-ram	0	17031		3		4		8130		8894
	01 SB to EC Row EB / HC Rd Off-ram	401 SB to EC Row WB Off-ramp	0	12313		2		3		5878		6430
	401 SB to EC Row WB Off-ramp	HC Rd/401 SB On Ramp	0	10974		2		3		5239		5731
	HC Rd/401 SB On Ramp	Pulford/401 SB Off Ramp	0	30697	0	17304	0	374	0	5005	0	8013
	Pulford/401 SB Off Ramp	St Clair/401 SB Off Ramp	0	22166	0	12495	0	270	0	3614	0	5787
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	16809	0	8043	0	211	0	2960	0	5596
	St Clair/401 SB On Ramp	Howard SB On Ramp	0	22874	0	11262	0	275	0	3633	0	7704
	Howard SB On Ramp	Hwy 3/401 SB Off Ramp	0	27843	0	13822	0	322	0	3925	0	9773
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	18004	0	8530	0	204	0	3073	0	6197
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	21530	0	10688	0	249	0	3035	0	7557

Malden	Chappus	401 S. Ramp	8966	11480	7966	10186	345	490	655	804	0	0
	401 S. Ramp	401 N. Ramp	9957	7916	8856	7008	383	341	718	567	0	0
	N. of 401 N. Ramp		7195	8613	6410	7630	276	370	510	613	0	0
Matchette	Chappus	EC Row S. Ramp	8512	7933	8363	7730	0	0	149	203	0	0
	EC Row S. Ramp	EC Row N. Ramp	2620	8916	2477	8734	0	0	144	182	0	0
	EC Row N. Ramp	Carmichael	4861	3303	4744	3150	0	0	117	153	0	0

TABLE A- 18 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR PARKWAY – YEAR 2025

LOCATION	SECTION		24 Hour AAD					
			Total Cars and Trucks		Local Cars		Local Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6986	5610	6800	5480	184	89
	University	Wyandotte	3233	4092	3052	3697	91	121
	Wyandotte	AMB Off Ramp	2280	3224	2234	3061	0	0
	AMB Off Ramp	College	18348	6447	8494	6347	234	100
	College St	Girardot St	26218	24966	18669	16795	572	497
	Girardot St	Tecumseh Rd	25129	25158	18255	17710	683	597
	Tecumseh Rd	Dorchester St	28309	28199	21600	21412	834	741
	Dorchester St	Prince Rd/Totten St	28358	29470	22280	23208	743	678
	Prince Rd/Totten St	Malden Rd	30998	33157	24902	27007	831	798
	Malden Rd	Industrial Rd	24761	28255	19169	22115	608	631
	Industrial Rd	EC Row N. Ramp Terminal	28022	30240	22450	24431	704	687
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	26150	38090	20176	32888	559	713
	S. of EC Row S. Ramp Terminal		29919	35496	24538	30425	662	522
S Service Rd	N. of Bethlehem Ave		0	31059	0	26115	0	470
	Bethlehem Ave	Grand Marais Rd	0	5649	0	5175	0	138
N Service Rd	N. of Labelle St		30541	0	25865	0	555	0
	Labelle St	Grand Marais Rd Ramp	28423	0	26585	0	307	0
HC Road	Grand Marais Rd	Pulford St	8190	4743	7647	4554	11	15
	Pulford St	Todd Ln/Cabana Rd	7912	4880	7883	4857	16	23
	Todd Ln/Cabana Rd	Huron Church Line	16915	13881	15998	13297	195	120
Talbot Road	Huron Church Line	St Clair College	11982	10375	11896	10307	86	67
	St Clair College	Cousineau Dr	9448	8541	8149	6995	85	93
	Cousineau Dr	Howard Ave	8810	2709	8086	2324	130	42
	Howard Ave	Laurier Extension	12429	12257	12176	12019	253	237
	S. of Laurier Extension		12974	12826	12710	12577	264	248
Ojibway Pwy	EC Row Expressway	GN Booth Dr	10894	11127	10615	10438	140	134
	GN Booth Dr	Sandwich St	10830	10928	10549	10237	139	132
	Sandwich St	Prospect Ave	10088	10069	9965	9953	74	74
	N. of Prospect Ave		10025	9858	9903	9744	74	73
	CROSSING ROADS				NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5099	4858	4729	4420	0	0
	E of HuronChurch		3562	5201	2772	4133	18	142
University	W of HuronChurch		1365	1272	1365	1272	0	0
	E of HuronChurch		2311	2214	2079	2079	121	91
Riverside	W of HuronChurch		3552	3655	3552	3655	0	0
	E of HuronChurch		6981	5782	6817	5737	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43
AMB On Ramp	E of HuronChurch		6558	0	246	0	6	0
Patricia	AMB	Wyandotte	4149	5049	435	1328	13	54
College St	E. of HC Road		6603	6526	6437	5640	163	127
	W. of HC Road		2068	956	1677	904	0	0
Girardot St	E. of HC Road		1154	1148	1032	1014	0	0
	W. of HC Road		2296	2202	2208	2148	42	25
Tecumseh Rd	E. of HC Road		5786	6844	5448	6099	137	145
	W. of HC Road		6488	7115	6271	6983	0	0
Dorchester St	E. of HC Road		1726	1557	1544	1361	0	0
	W. of HC Road		1419	808	1369	787	26	10
Prince Rd/Totten St	E. of HC Road		2213	2353	2133	2247	0	0
	W. of HC Road		5515	5545	5414	5466	0	0
Malden Rd	E. of HC Road		1631	1358	1355	1081	0	0
	W. of HC Road		8223	8875	7049	7669	401	393
Industrial Rd	E. of HC Road		3926	3674	3722	3440	48	57
	W. of HC Road		4262	3458	4094	3044	168	204
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		16245	2068	14906	1894	311	0
	W. of HC Road (N-W On Ramp)		583	0	380	0	11	0
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	10547	0	10444	0	103
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		9466	3083	8237	2636	296	85
					WB	EB	WB	EB
Labelle St/Bethlehem Ave	E. of N. Service Rd		3112	2438	2867	2223	0	0
	between N. and S. Service Rd		1232	3565	1232	3459	0	0
	W. of S. Service Rd		1678	4360	1676	4354	0	0
Grand Marais Rd/Lambton Rd	E. of HC Rd		4372	3595	4139	3339	0	0
	W. of HC Rd		1876	2193	1801	2141	34	20
Pulford St	E. of HC Rd		2635	1928	2341	1707	0	0
Todd Ln/Cabana Rd	E. of HC Rd		9440	7526	8902	6838	0	0
	between HC Rd and Hwy 401 Off-ramp		8307	17117	8307	14977	0	0
	W. of Hwy 401 Off-ramp		11908	11817	11893	11806	0	0

TABLE A-18 CONT'D.

HIGHWAY 401 Mainline				NB / WB	SB / EB	NB / WB	SB / EB
S. of Hwy 3 merge/split	24657	27440	14332	13309	407	303
N. of Howard Ave	18139	26502	9295	11967	298	292
At Grand Marais Rd	24696	36588	15060	19589	375	420
E. of Malden Rd	7354	13403	1643	2597	48	66
To/From Canadian Plaza	12620	21442	1	5	3	4

HIGHWAY 401 Ramps							
Hwy 3 merge/split				NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp (prior to Highway 3 / Laurier split)	15464	0	12538	0	271	0
401 NB On Ramp	9051	0	8883	0	168	0
401 SB Off Ramp	0	9136	0	8965	0	171
401 SB On Ramp	0	6167	0	4518	0	114
At Howard Ave	0	0	NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp	776	0	761	0	14	0
401 SB On Ramp	0	4758	0	3485	0	88
At St. Clair College	0	0	NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	5033	0	5003	0	29	0
401 SB Off Ramp (direct ramp to Hwy 3)	0	6270	0	5537	0	67
401 SB On Ramp	0	5906	0	5872	0	33
At Todd Ln / Cabana Rd			NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp	10756	0	9479	0	137	0
401 SB Off Ramp (direct ramp to Todd lane)	0	9406	0	8305	0	100
At Huron Church Rd			NB / WB	SB / EB	NB / WB	SB / EB
401 NB Off Ramp	17108	0	14155	0	344	0
401 SB On Ramp	0	22430	0	17849	0	367
EC Row Expressway EB to Hwy 401			NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp from EC ROW EB	1689	0	0	0	0	0
Hwy 401 to EC Row Expressway WB						
401 SB Off Ramp to EC Row WB	0	1133	0	155	0	14
EC Row Expressway WB to Hwy 401			NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp from EC ROW WB	2521	0	0	0	0	0
B / Huron Church Road			NB / WB	SB / EB	NB / WB	SB / EB
401 SB Off Ramp to EC Row EB / Huron Church Rd	0	4716	0	646	0	58
At Malden Rd			NB / WB	SB / EB	NB / WB	SB / EB
401 NB On Ramp	640	0	477	0	65	0
401 SB Off Ramp	0	1059	0	739	0	116

	FROM	TO						
Highway 401 Mainline Vol	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	24657	0	14332	0	407	0
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	8978	0	2919	0	119	0
	Hwy 3/401 NB On Ramp	Howard NB On Ramp	18139	0	9295	0	298	0
	Howard NB On Ramp	St. Clair/401 NB Off Ramp	18954	0	9713	0	311	0
	St. Clair/401 NB Off Ramp	Pulford/401 NB On Ramp	13267	0	6051	0	250	0
	Pulford/401 NB On Ramp	HC Rd/401 NB Off Ramp	24696	0	15060		375	
	HC Rd/401 NB Off Ramp	EC Row EB to 401 NB On Ramp	7354	0	1643		48	
	EC Row EB to 401 NB On Ramp	EC Row WB to 401 NB On Ramp	8883	0	0		0	
	EC Row WB to 401 NB On Ramp	Malden/401 NB On Ramp	11996	0	0		0	
	Malden/401 NB On Ramp	Canadian Plaza	12617	0	0		0	
	Canadian Plaza	Malden/401 SB Off Ramp	0	21442		5		4
	Malden/401 SB Off Ramp	401 SB to EC Row EB / HC Rd Off-ramp	0	20280		4		4
	401 SB to EC Row EB / HC Rd Off-ramp	401 SB to EC Row WB Off-ramp	0	14206		3		3
	401 SB to EC Row WB Off-ramp	HC Rd/401 SB On Ramp	0	12747		3		2
	HC Rd/401 SB On Ramp	Pulford/401 SB Off Ramp	0	36588	0	19589	0	420
	Pulford/401 SB Off Ramp	St Clair/401 SB Off Ramp	0	26254	0	14056	0	301
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	19917	0	8698	0	230
	St Clair/401 SB On Ramp	Howard SB On Ramp	0	26502	0	11967	0	292
	Howard SB On Ramp	Hwy 3/401 SB Off Ramp	0	31625	0	15339	0	349
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	21212	0	9196	0	218
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	27440	0	13309	0	303

Malden	Chappus	401 S. Ramp	9084	11528	7948	10336	341	449
	401 S. Ramp	401 N. Ramp	10193	7192	8938	6456	381	279
	N. of 401 N. Ramp		6982	8058	6129	7230	261	313
Matchette	Chappus	EC Row S. Ramp	9261	9268	9114	8967	0	0
	EC Row S. Ramp	EC Row N. Ramp	2620	10207	2499	9937	0	0
	EC Row N. Ramp	Carmichael	5152	3168	5032	2977	0	0

TABLE A- 19 24-HOUR ANNUAL AVERAGE DAILY TRAFFIC (AADT) FOR PARKWAY – YEAR 2035

LOCATION	SECTION		24 Hour AADT									
			Total Cars and Trucks		Local Cars		Local Trucks		International Cars		International Trucks	
	FROM	TO			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
HC Road	Riverside	University	6924	5840	6718	5664	203	94	3	1	0	81
	University	Wyandotte	3108	4254	2886	3812	92	124	68	237	62	81
	Wyandotte	AMB Off Ramp	2131	3370	2085	3201	0	0	46	169	0	0
	AMB Off Ramp	College	19543	6656	7999	6549	244	106	7545	1	3755	0
	College St	Girardot St	26227	25933	18469	16494	574	523	6880	5152	303	3764
	Girardot St	Tecumseh Rd	25638	26525	18403	17853	712	625	6238	4516	284	3530
	Tecumseh Rd	Dorchester St	28797	29299	21703	21695	867	781	5937	3720	289	3103
	Dorchester St	Prince Rd/Totten St	28875	30357	22442	23399	768	705	5418	3417	247	2837
	Prince Rd/Totten St	Malden Rd	31736	34429	25203	27845	865	847	5387	3091	281	2646
	Malden Rd	Industrial Rd	25383	29967	19460	23370	645	683	5267	3219	10	2695
	Industrial Rd	EC Row N. Ramp Terminal	28657	32868	22816	26119	734	752	5107	3366	0	2631
	EC Row N. Ramp Terminal	EC Row S. Ramp Terminal	27189	41670	20771	35653	586	783	5832	3017	0	2217
	S. of EC Row S. Ramp Terminal		32362	39757	26387	33807	738	586	5237	3240	0	2123
S Service Rd	N. of Bethlehem Ave		0	34217	0	28534	0	519	0	3150	0	2015
	Bethlehem Ave	Grand Marais Rd	0	6218	0	5676	0	162	0	379	0	0
N Service Rd	N. of Labelle St		32939	0	27751	0	614	0	4574	0	0	0
	Labelle St	Grand Marais Rd Ramp	30782	0	28721	0	355	0	1706	0	0	0
HC Road	Grand Marais Rd	Pulford St	8774	5374	8199	5163	12	19	563	192	0	0
	Pulford St	Todd Ln/Cabana Rd	8720	5644	8703	5617	17	27	0	0	0	0
	Todd Ln/Cabana Rd	Huron Church Line	17838	15721	16787	15016	212	134	839	572	0	0
Talbot Road	Huron Church Line	St Clair College	12692	11023	12538	10948	154	75	0	0	0	0
	St Clair College	Cousineau Dr	9792	9249	8458	7440	82	94	1253	1464	0	252
	Cousineau Dr	Howard Ave	9366	2847	8606	2391	120	41	640	288	0	126
	Howard Ave	Laurier Extension	13137	13283	12869	13019	268	264	0	0	0	0
	S. of Laurier Extension		13639	13900	13361	13624	278	277	0	0	0	0
Ojibway Pwy	EC Row Expressway	GN Booth Dr	11697	11777	11383	10973	146	131	26	19	142	654
	GN Booth Dr	Sandwich St	11632	11578	11317	10772	146	129	26	19	143	658
	Sandwich St	Prospect Ave	10788	10588	10661	10469	76	73	52	47	0	0
	N. of Prospect Ave		10725	10387	10599	10270	75	71	51	46	0	0
	CROSSING ROADS				NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB
Wyandotte	W of HuronChurch		5008	4886	4627	4439	0	0	381	446	0	0
	E of HuronChurch		3648	5398	2803	4299	17	157	770	942	58	0
University	W of HuronChurch		1511	1306	1511	1306	0	0	0	0	0	0
	E of HuronChurch		2481	2273	2207	2097	124	92	68	22	81	62
Riverside	W of HuronChurch		3642	3993	3642	3993	0	0	0	0	0	0
	E of HuronChurch		7225	5957	7055	5911	0	0	170	46	0	0
AMB Off Ramp	E of HuronChurch		0	12464	0	931	0	43	0	7710	0	3781
AMB On Ramp	E of HuronChurch		6917	0	222	0	6	0	6416	0	273	0
Patricia	AMB	Wyandotte	4205	4873	389	969	12	42	3571	3469	234	394
College St	E. of HC Road		6758	6581	6583	5598	172	130	4	579	0	273
	W. of HC Road		2272	1076	1730	1027	0	0	542	48	0	0
Girardot St	E. of HC Road		1162	1155	1037	1025	0	0	125	130	0	0
	W. of HC Road		2290	2168	2202	2109	42	26	47	33	0	0
Tecumseh Rd	E. of HC Road		6210	7294	5868	6315	140	146	202	468	0	366
	W. of HC Road		6679	7355	6321	7251	0	0	357	104	0	0
Dorchester St	E. of HC Road		1748	1574	1561	1382	0	0	187	191	0	0
	W. of HC Road		1419	807	1368	785	26	11	24	11	0	0
Prince Rd/Totten St	E. of HC Road		2311	2888	2228	2764	0	0	83	125	0	0
	W. of HC Road		5053	5710	4985	5626	0	0	68	85	0	0
Malden Rd	E. of HC Road		1858	1508	1545	990	0	0	313	519	0	0
	W. of HC Road		8633	9314	7378	7922	405	408	599	52	251	932
Industrial Rd	E. of HC Road		4362	3864	3613	3596	45	56	697	185	7	27
	W. of HC Road		4490	3594	4310	3115	179	210	0	0	0	269
EC Row N. Ramp Terminal	E. of HC Road (E-N/S Off Ramp & S-W On Ramp)		16852	2214	15527	1966	327	6	998	242	0	0
	W. of HC Road (N-W On Ramp)		624	0	389	0	11	0	48	0	176	0
EC Row S. Ramp Terminal	E. of HC Road (S-E On Ramp)		0	12051	0	11928	0	124	0	0	0	0
	W. of HC Road (N-E On Ramp & W-N/S Off Ramp)		10047	3314	8650	2901	325	91	465	322	607	0
					WB	EB	WB	EB	WB	EB	WB	EB
Labelle St/Bethlehem Ave	E. of N. Service Rd		3336	2617	3077	2391	0	0	259	226	0	0
	between N. and S. Service Rd		1573	3934	1573	3822	0	0	0	112	0	0
	W. of S. Service Rd		2055	3283	2053	3279	0	0	2	4	0	0
Grand Marais Rd/Lambton Rd	E. of HC Rd		5010	3929	4753	3657	0	0	257	272	0	0
	W. of HC Rd		2056	2428	1973	2362	37	25	46	41	0	0
Pulford St	E. of HC Rd		2876	2107	2549	1878	0	0	327	230	0	0
Todd Ln/Cabana Rd	E. of HC Rd		10586	8495	10025	7623	0	0	561	872	0	0
	between HC Rd and Hwy 401 Off-ramp		9181	19292	9169	19275	0	0	12	17	0	0
	W. of Hwy 401 Off-ramp		13727	13505	13709	13492	0	0	18	12	0	0
Huron Church Line	W. of HC Rd		9041	7983	8500	7407	120	122	422	455	0	0
St Clair College	E. of Talbot Rd		3428	9882	3328	9597	0	0	100	286	0	0
Cousineau Dr	E. of Talbot Rd		6470	5725	5252	4495	0	0	1218	1230	0	0
	W. of Talbot Rd		8816	7424	8816	7416	0	8	0	0	0	0
Howard Ave	E. of Talbot Rd		9246	9953	9089	9762	157	187	0	4	0	0
	W. of Talbot Rd		8179	10157	7987	9906	172	224	20	27	0	0
Laurier Extension	W. of Talbot Rd/Hwy 3		7881	8274	7715	8091	165	183	0	0	0	0
EC Row Expressway	E. of Huron Church Rd		49128	56156	42770	45577	897	1024	3995	7217	1466	2338
	W. of Malden Rd		36660	33578	35313	31763	845	1386	272	344	229	86
	W. of Matchette		27855	25045	26963	24357	532	419	360	269	0	0
GN Booth Dr	W. of Ojibway Pwy		357	461	345	448	7	8	5	5	0	0
Sandwich St	W. of Ojibway Pwy		1775	1630	1598	1499	156	102	21	29	0	0
Prospect Ave	W. of Ojibway Pwy		342	437	331	425	7	5	4	7	0	0

TABLE A-19 CONT'D.

HIGHWAY 401 Mainline									
			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
S. of Hwy 3 merge/split	28867	32317	16565	14965	699	801	3761	3747	7841
N. of Howard Ave	21434	29449	10293	11792	149	690	4139	4840	6853
At Grand Marais Rd	27665	40606	16371	20616	416	434	4619	6262	6259
E. of Malden Rd	8751	15479	1743	2549	52	63	1630	3053	5326
To/From Canadian Plaza	14748	24132	1	5	3	4	5779	10031	8965

HIGHWAY 401 Ramps									
Hwy 3 merge/split			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB Off Ramp (prior to Highway 3 / Laurier split)	16787	0	13245		284		2150		1107
401 NB On Ramp	9298	0	9120		178		0		0
401 SB Off Ramp	0	9309		9131		178		0	
401 SB On Ramp	0	6996		4978		125		1462	
At Howard Ave	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB On Ramp	795	0	780		15		0		0
401 SB On Ramp	0	5488		3905		98		1146	
At St. Clair College	0	0	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB Off Ramp	5297	0	5247		49		0		0
401 SB Off Ramp (direct ramp to Hwy 3)	0	7431		6480		76		875	
401 SB On Ramp	0	6223		6186		37		0	
At Todd Ln / Cabana Rd			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB On Ramp	10643	0	9265		146		1232		0
401 SB Off Ramp (direct ramp to Todd lane)	0	9590		8362		98		1130	
At Huron Church Rd			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB Off Ramp	18688	0	15412		382		2894		0
401 SB On Ramp	0	24870		19414		391		2949	
EC Row Expressway EB to Hwy 401			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB On Ramp from EC ROW EB	1805	0	0		0		1413		392
Hwy 401 to EC Row Expressway WB			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 SB Off Ramp to EC Row WB	0	1479	0	0		0		1140	
EC Row Expressway WB to Hwy 401			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB On Ramp from EC ROW WB	3029	0	0		0		1865		1164
Hwy 401 to EC Row Expressway EB / Huron Church Road			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 SB Off Ramp to EC Row EB / Huron Church Rd	0	5890	0	0	0	0	0	4541	0
At Malden Rd			NB / WB	SB / EB	NB / WB	SB / EB	NB / WB	SB / EB	NB / WB
401 NB On Ramp	591	0	0		0		463		128
401 SB Off Ramp	0	1232	0	0		0		950	

Highway 401 Mainline Vol	FROM	TO									
	S. of Hwy 3 merge/split	Hwy 3/ 401 NB Off Ramp	28867	0	16461		491		3865		8049
	Hwy 3/ 401 NB Off Ramp	Hwy 3/401 NB On Ramp	12071	0	3912		173		2508		5478
	Hwy 3/401 NB On Ramp	Howard NB On Ramp	21434	0	10618		360		3814		6642
	Howard NB On Ramp	St. Clair/401 NB Off Ramp	22229	0	11398		375		3814		6642
	St. Clair/401 NB Off Ramp	Pulford/401 NB On Ramp	15990	0	8027		275		3088		4600
	Pulford/401 NB On Ramp	HC Rd/401 NB Off Ramp	27665	0	16371		416		4619		6259
	HC Rd/401 NB Off Ramp	EC Row EB to 401 NB On Ramp	8751	0	1743		52		1630		5326
	C Row EB to 401 NB On Ran	EC Row WB to 401 NB On Ramp	10640	0	0		0		3737		6903
	C Row WB to 401 NB On Ran	Malden/401 NB On Ramp	14608	0	0		0		5131		9478
	Malden/401 NB On Ramp	Canadian Plaza	14744	0	0		0		5779		8965
	Canadian Plaza	Malden/401 SB Off Ramp	0	24132		5		4		10031	
	Malden/401 SB Off Ramp	401 SB to EC Row EB / HC Rd Off-ramp	0	22846		5		3		9426	
	B to EC Row EB / HC Rd Off	401 SB to EC Row WB Off-ramp	0	16214		3		2		6690	
	01 SB to EC Row WB Off-ran	HC Rd/401 SB On Ramp	0	14549		3		2		6003	
	HC Rd/401 SB On Ramp	Pulford/401 SB Off Ramp	0	40606		20616		434		6262	
	Pulford/401 SB Off Ramp	St Clair/401 SB Off Ramp	0	29962		15212		320		4621	
	St Clair/401 SB Off Ramp	St Clair/401 SB On Ramp	0	22443		8963		240		3686	
	St Clair/401 SB On Ramp	Howard SB On Ramp	0	29449		12283		303		4349	
	Howard SB On Ramp	Hwy 3/401 SB Off Ramp	0	33686		16236		381		4216	
	Hwy 3/401 SB Off Ramp	Hwy 3/401 SB On Ramp	0	23741		9881		237		2963	
	Hwy 3/401 SB On Ramp	S. of Hwy 3 merge/split	0	32317		14855		349		3857	

Malden	Chappus	401 S. Ramp	9447	12207	8232	10979	365	456	851	772	0
	401 S. Ramp	401 N. Ramp	10678	7440	9326	6705	410	275	941	460	0
	N. of 401 N. Ramp		7149	8393	6252	7560	274	311	622	522	0
Matchette	Chappus	EC Row S. Ramp	9542	10489	9486	10131	0	0	56	359	0
	EC Row S. Ramp	EC Row N. Ramp	2675	11452	2641	10945	0	0	34	507	0
	EC Row N. Ramp	Carmichael	5719	3318	5681	2975	0	0	39	343	0

Appendix B:
MOBILE 6.2 Modelling Results

MEMORANDUM

To: Ms. Abby Salb, SENES

From: Tom Darlington

Date: December 8, 2005

Subject: Emission Rates for Windsor/Detroit Crossing Project

This memo details the models, inputs, and procedures used to estimate on-road mobile source emission rates for various vehicle types for the Windsor/Detroit Crossing project.

This memo focuses on the emission rates from all vehicle types except idle emissions from heavy-duty diesel vehicles. The idle emissions from heavy-duty diesel vehicles are described in a separate AIR memo. [1]

This memo is divided into the following sections:

- Background
- Models
- Seasons and ambient temperatures
- Vehicle speeds
- Fuel inputs
- Results

Background

Detroit and Windsor are studying the possibility of adding a second Detroit River facility to augment the current Ambassador Bridge and tunnel. Such a crossing would change emissions of vehicles on both sides of the crossing. For example, heavy-duty diesel trucks may experience reduced idle times if the crossing were added. Light duty vehicles may also experience reduced idle times and somewhat higher average speeds in the vicinity of the crossings. At the same time, cross-border traffic could increase, as the time it takes to cross the border is reduced.

A key part of the study is to estimate the impact of a new crossing on traffic flow on both sides, and the resultant impact on vehicle emissions. To estimate these emission impacts requires detailed information about emission rates at idle, and at various speeds, for all the different vehicle types, and also detailed projections of traffic flow, and the projected impact of the crossing on traffic flow in the vicinity of the crossing.

The purpose of this memo is to describe the methods used to estimate emissions on both the U.S. and Canadian side of the crossing. SENES contracted with AIR to estimate vehicle emissions for all of the various vehicle types, for both sides of the crossing. AIR assisted EPA in the development of the MOBILE6 model, and also developed the MOBILE6.2C model for Environment Canada. These models estimate emissions for a number of different vehicle types. The emissions are estimated in units of g/mi for vehicles not at idle, and in units of g/hr for vehicles at idle.

Models Used

AIR used EPA's MOBILE6.2 model for the Detroit side, and used Environment Canada's M6C25PPM model for Windsor. The M6C25PPM model is a Canadian version of the MOBILE6 model that incorporates fuel changes and many other changes that are specific to the Canadian fleet. Both models estimate all of the pollutants needed in this evaluation, however, AIR utilized more up-to-date procedures for estimating emissions from idling heavy-duty diesel trucks.

The following pollutants were estimated:

- VOC
- CO
- NO_x
- SO_2
- $PM_{2.5}$
- CO_2
- Methane
- 1,3 butadiene
- Acrolein
- Formaldehyde
- Acetaldehyde
- Benzene

The above pollutants were estimated for a base year, 2004, and two projection years, 2013 and 2023.

Seasons and Ambient Temperatures

Emissions are estimated for the fours seasons. Average minimum and maximum temperatures for these seasons were determined for both locations using 30 years of data from the National Weather Service for the US, and from Environment Canada for Canada. The ambient temperatures for the two locations are shown in Table B.1 below.

Table B.1 - Average Minimum and Average Maximum Temperatures (F)				
Season	Detroit		Windsor	
Winter	22.8	35.6	19.7	32.4
Spring	38.8	57.7	37.3	55.4
Summer	67.1	88.9	60.4	79.9
Autumn	43.4	60.9	46.7	60.2

Vehicle Speeds

Vehicle speed inputs were obtained from SENES. Emissions were estimated for the following speeds: Idle (2.5 mph), 15.5, 31.1, 46.6, and 62.1 mph. The same speeds were used for both sides of the border.

Fuel Inputs

Both models used default gasoline and diesel fuel sulfur levels for Canada and the U.S. Detailed gasoline inputs are also needed to compute toxics emission rates. Ontario fuel property data was obtained from Natural Resources Canada. [2] Data for Detroit was obtained from The Alliance of Automobile Manufacturers. [3] Fuel characteristics are shown in Table B.2.

Table B.2 - Non-Sulphur Gasoline Characteristics

City	Season	RVP (psi)	E200 (%)	E300 (%)	Arom. (%)	Olef. (%)	Benzene (%)	% with ETOH	ETOH Concen.
Detroit	Winter	14.4	53.8	82.7	26.8	6.9	1.7	25%	9.75%
	Spring	11.0	47.7	81.2	29.4	8.5	1.6	25%	9.75%
	Summer	7.6	41.6	79.6	32.0	10.0	1.5	25%	9.75%
	Fall	11.0	47.7	81.2	29.4	8.5	1.6	25%	9.75%
Windsor	Winter	14.6	53.9	84.4	25.1	9.0	0.73	100%	1.92%
	Spring	12.1	50.9	83.4	26.9	9.3	0.73	100%	1.92%
	Summer	9.7	47.9	82.4	28.8	9.7	0.73	100%	1.92%
	Fall	12.1	50.9	83.4	26.9	9.3	0.73	100%	1.92%

Gasoline and diesel sulphur levels that are contained in both models for 2003, 2013, and 2023 are shown in Table B.3.

Table B.3 - Sulphur Levels

Fuel	Year	Sulphur Level (ppm) - Windsor	Sulphur Level (ppm) – Detroit
Gasoline	2004	52	170-180 ppm ,depending on season
	2013	25	30
	2023	25	30
Diesel	2004	320	365
	2013	15	11
	2023	15	11

Technologies and Emission Standards

Both models used in this analysis include the effects of all currently adopted regulatory programs for light duty vehicles and light duty trucks, as follows:

Light Duty Vehicles

- National LEV program starting in 2001
- Onboard vapor recovery requirements for all gasoline cars, trucks, and SUVs
- Onboard diagnostic requirements for all vehicles
- Tier 2 exhaust emission standards
- Tier 2 evaporative emission standards

Technologies which are being used to meet the Tier 2 exhaust emission standards are closer air/fuel ratio control, increased previous metal loadings on catalysts, closer-coupled catalysts, reduced cold-start emissions, and dual oxygen sensors. Technologies being used to meet the Tier 2 evaporative standards are larger and redesigned charcoal canisters, very low permeation hoses and fuel tanks, and other technologies designed to reduced vapor generation from the fuel tanks and lines during engine operation.

Heavy-Duty Vehicles

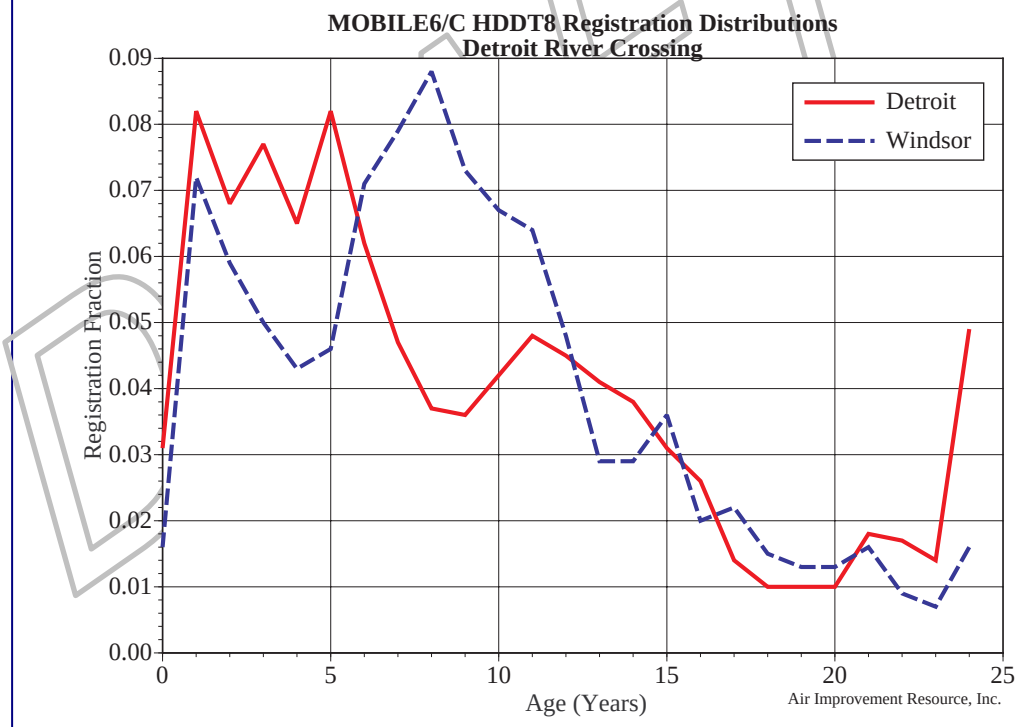
- 2004 HC+NO_x standards
- 2007-2010 HC, NOx and PM standards
- 2010 NOx standards

The 2007-2010 heavy-duty standards assume the use of catalyzed PM traps to meet the 0.01 g/bhp-hr PM standard, and either engine controls like aggressive EGR, or after treatment (or both) needed to obtain a 50% NO_x reduction. The 2010 heavy-duty NO_x standards are a 90% reduction from 2006 NO_x, and currently it is thought that this can only be met with after treatment and aggressive EGR. Currently the after treatment choices to meet the 2010 NO_x standard of 0.2 g/bhp-hr is either selective catalytic reduction (SCR), or a NO_x adsorber.

EPA is planning to propose a mobile source toxics rule to apply to future light duty gasoline vehicles and trucks. That rule will probably reduce toxics from motor vehicles further, but the rule is not reflected in these emission rates because it has not been either proposed or adopted.

Heavy-Duty Fleet Turnover Comparison

The figure below shows a comparison of registration fractions versus age for both Detroit and Windsor. The Detroit fleet appears to be somewhat newer with the highest registration fractions in the 1-5 year old age group, but there also is a significantly higher fraction in the 25+ year old category for Detroit. Windsor appears to have a somewhat older fleet on average, in that the highest registrations fractions are for vehicles that are 6-9 years of age.



Results

All results are shown in spreadsheet format in two different files, “Detroit.xls”, and “Windsor.xls”.

REFERENCES

"Idle Emission Rates for Diesel Trucks", Memo from Tom Darlington at AIR to Dan Hrebenyk at SENES, November 9, 2005.

Natural Resources Canada

Alliance of Automobile Manufacturers Fuel Survey for Detroit for 2003.

M E M O R A N D U M

Dan Hrebenyk, SENES

Tom Darlington

November 9, 2005

Idle Emission Rates for Diesel Trucks

This memo develops heavy duty diesel emission idle and "creep" emission rates for use in Vancouver.

Method

We are unsure of the duty cycle of heavy-duty trucks which are waiting in line at them loading terminal. Therefore, we have developed two sets of emissions rates – one is an idle emission rate, if the duty cycle is almost all idle, and the second estimate is based on a "creep" cycle, which was developed by the California Air Resources Board and West Virginia University.

The idle emission rates we recommend using in Vancouver come from a recent ARB staff report on requirements to reduce idling emissions from new and in-use trucks. The report lists idle emissions by model year for heavy-duty diesel trucks that are weighted by the fraction of time spent at low idle and high idle. The emission rates are also weighted by summer and winter fractions.

We obtained the separate winter and summer idle emission emission rates, at both low and high idle. For Vancouver, we have developed separate summer and winter emission rates, but we have used the ARB low and high idle fractions in each season. Idle emission rates were developed for three years: 2003, 2011, and 2020. Idle emission rates were developed for NOx, PM10, VOC, CO, and CO2.

The emission rates based on the creep cycle have been developed from raw data obtained from the Coordinating Research Council's E55/57 testing program (the idle emission rates also ultimately come from this testing program). The creep cycle is a very low average speed cycle, where speed is varied between 0 and 8 mph and 0 and 3 mph, with an idle period in between.

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ARB's Idle Emission Rates

In the recent idle emissions staff report, ARB lists the idle emissions for heavy-duty diesel trucks in g/hr. [1] These emission rates are shown in Table B.1.

Table B.1 - HDDT Idle Emissions (grams/hour)

Calendar Year	Model Year	NO_x	ROG	PM	CO_2
2010	Pre-1991	39.8	20.2	5.3	6228
	1991-2006	115.3	9.4	1.9	6228
	2007+	115.3	8.3	0.16	6228
2020	Pre-1991	39.8	20.1	5.2	6228
	1991-2006	115.3	8.9	1.8	6228
	2007+	115.3	8.3	0.16	6228

The above emission factors were developed by the ARB from recent tests conducted by West Virginia University as a part of the Coordinating Research Councils' E55/E57 testing program. [2] The above numbers include typical accessory loads for both summer and winter (summer is weighted 7/12 and winter is weighted 5/12), and also include both low and high idle operation. The low/high idle weighting factors are 61% low idle, 39% high idle.

The PM emission rates are much lower for 2007 and later trucks, due to fact that 2007 and later trucks are subject to much lower PM standards (0.01 g/bhp-hr). While the NOx standards are also lower in 2007 and 2010 (1.2 g/bhp-hr and 0.2 g/bhp-hr, respectively), ARB does not expect this technology to reduce idle NOx emissions, because idle temperatures are much lower than when the engine is under load, and the expected NOx emission control technology is expected to be less efficient at lower temperatures than at high temperatures. [1]

Idle Emissions for Vancouver

Since the climate is much different in Vancouver than in California, we recommend the use of separate winter and summer emission rates in Vancouver. The emission rates still need to utilize the ARB fractions of high and low idle operation.

We obtained the separate summer and winter high and low idle emission rates and high idle correction factors from the ARB, and these are shown in Attachments 1 and 2. We then weighted the low idle baseline with the summer high idle and winter high idle emission rates. The results are shown in Tables B.2 and B.3.

Table B.2 - Summer Vancouver Idle Emission Rates (g/hr) for HDDTs					
Model Year	PM	NOx	CO	HC	CO2
2007+	0.13	119.0	33.7	7.8	6594
2004-2006	1.35	119.0	33.7	7.8	6594
1998-2003	1.35	119.0	33.7	7.8	6594
1994-1997	1.80	119.0	37.4	9.7	6594
1991-1993	2.38	119.0	41.6	12.0	6594
1990	3.17	119.0	46.2	14.9	6594
1987-1989	3.17	41.1	46.2	14.9	6594
1984-1986	4.21	41.1	51.2	18.5	6594
1980-1983	5.60	41.1	56.9	22.9	6594
1977-1979	7.42	41.1	63.2	28.4	6594
1975-1976	9.08	41.1	68.1	33.0	6594
Pre-1975	10.68	41.1	72.3	37.4	6594

Table B.3 - Winter Vancouver Idle Emission Rates (g/hr) for HDDTs					
Model Year	PM	NOx	CO	HC	CO2
2007+	0.19	110.2	63.9	9.0	5714
2004-2006	1.95	110.2	63.9	9.0	5714
1998-2003	1.95	110.2	63.9	9.0	5714
1994-1997	2.59	110.2	70.9	11.1	5714
1991-1993	3.44	110.2	78.8	13.8	5714
1990	4.58	110.2	87.5	17.1	5714
1987-1989	4.58	38.0	87.5	17.1	5714
1984-1986	6.07	38.0	97.2	21.2	5714
1980-1983	8.08	38.0	107.9	26.3	5714
1977-1979	10.72	38.0	119.8	32.5	5714
1975-1976	13.11	38.0	129.1	37.9	5714
Pre-1975	15.42	38.0	137.1	42.8	5714

As shown in Table B.2 and B.3, the winter PM, CO, and HC emission rates are higher than the summer emission rates, and the NO_x and CO_2 emission rates are lower.

Heavy-duty truck registration distributions were obtained for British Columbia from modeling we have done for Environment Canada. The registration distributions are shown in Attachment 3. These registration distributions were used with the idle emission rates in Table B.2 and B.3 to develop fleet idle emission rates for three years: 2003, 2011, and 2020. The final fleet idle emission rates for summer and winter for 2003, 2011 and 2020 are shown in Table B.4.

Table B.4 - HDDT Fleet Idle Emission Rates (g/hr) for HDDTs

Year	Season	PM	NOx	CO	HC	CO_2
2003	Summer	2.26	110	39.4	11.3	6594
	Winter	3.26	102	74.7	12.9	5714
2011	Summer	1.26	111	36.1	9.2	6594
	Winter	1.82	110	68.5	10.5	5714
2020	Summer	0.52	119	34.0	8.0	6594
	Winter	0.75	110	64.5	9.2	5714

"Creep" Emission Rates

The CRC testing referenced earlier also included a "Creep" cycle. This cycle was 0.13 miles long, with an average speed of 1.6 mph. The driving cycle is shown in Attachment 4. The cycle is intended to develop emissions for situations in which trucks wait in lines for long periods of time with idle and very slow speed operation, like at borders and toll collections, etc. Trucks were tested with normal accessory loads (compressor fan and alternator, but not a/c or heater).

AIR estimated average creep emissions in g/mi for pre-1991 and 1991 and later trucks, as shown in Table B.5. These were estimated in both g/mi (first two columns), and in g/hr (second two columns).

Table B.5 - "Creep" Emission Rates

	g/mi		g/hr	
Pollutant	Pre-1991	1991+	Pre-1991	1991+
NO_x	38.6	71.7	62.7	116.1
HC	15.5	9.2	25.1	14.9
PM	7.2	3.5	11.7	5.7
CO	30.9	20.2	50.0	32.7

For NO_x, the g/hr emission rates in Table 5 are similar to the NO_x and CO emission rates in Table B.4. However the creep cycle HC and PM rates appear to be higher than the rates in Table B.4. This is due to the acceleration periods from idle in this cycle (see Attachment 4). Starting in model year 2007, however, PM emission rates must be reduced by 90%. Therefore, we propose the use of a 0.57 g/hr emission rate for 2007 and later heavy-duty

trucks. While NO_x emissions may also be reduced because of lower NO_x standards, for this analysis we will assume they remain the same as 1991+ creep emission rates. We also propose the use of a 12% reduction in VOC emissions, similar to the ARB in Table B.1 (13.1 g/hr).

Using estimates of HDDV VMT fractions in Attachment 3, the 2003, 2011 and 2020 fleet "creep" emissions are shown in Table B.6.

Table B.6 - HDDT Fleet Idle Emission Rates (g/hr) for HDDTs

Year	PM	NO_x	CO	HC
2003	6.94	105	36	17
2011	5.04	116	36	16
2020	2.19	116	33	14

The HC and PM emission rates in Table B.6 are somewhat higher than those in Table B.5. These may be the most realistic emission rates to use for Vancouver, if the duty cycle includes idle punctuated by slow movement.

SO_2 Emission Rates

SO_2 emission rates can be estimated from the very low speed fuel consumption estimates from the creep cycle data (fuel consumption is not available from the idle emission tests). Idle SO_2 emission rates in g/hr can be estimated with the following expression:

SO_2 (g/hr) = (cycle miles/mpg) *4.44 L/gal *850 g/L * Sulphur ppm * (64/32)/(hr * 10^6)

Where:

Cycle miles = 0.13 miles

Mpg = average of 2.32 mpg

850 = typical density of diesel fuel

sulphur ppm = 365 ppm in 2003, 15 ppm in other years

64/32 = molecular weight ratio of SO2 to S

hr = cycle time in hours, or 0.08 hrs

Using the above expression, the SO2 emission rates in g/hr are shown in

Table B.7 below.

Table B.7 - SO_2 Emission Rates (g/hr)		
Year	Sulphur in Diesel fuel (ppm)	SO_2 Emission Rate (g/hr)
2003	365	1.93
2011	15	0.08
2020	15	0.08

EPA Guidance on PM and NO_x

Finally, we note EPA's 2002 guidance recommends a NOx emission rate of 135 g/hr, and a PM emission rates that vary by model year from 3.68 g/hr for 2006 and earlier vehicles down to 0.33 g/hr for 2029 vehicles. [3] EPA does not provide CO, HC, or SO_2 emission rates. EPA developed these emission rates from a variety of sources including the CRC data, but the guidance does not explain how EPA arrived at these emission rates.

Uncertainties

The major uncertainty with the above emission rates is ARB's assumption that the NO_x idle emission rates will not be lower in with lower NO_x standards in the 2007 and later model years. The ARB is proposing to adopt controls that would either (1) require new engines to shut-off after a period of time, or (2) emit at below 30 g/hr. If these controls are adopted by the ARB, they could also be adopted by the EPA. If they are adopted by the EPA, it is likely that Environment Canada will implement a memorandum of understanding to require the controls in Canada as well. But even if none of this happens, it is likely that the 2007-2010 NOx emission reduction strategies will have some effect at reducing idle emissions from 2007 and later trucks. Thus, the idle NOx emission rates for 2020 in Table B.4 are probably quite high.

Another uncertainty is whether the idle emission rates properly represent the duty cycle at the terminal. The creep emission rates indicate that the NO_x emissions are probably appropriate, but if the duty cycle is more like the creep cycle than the idle cycle, then PM and HC emission rate will be somewhat higher.

REFERENCES

"Staff Report: Initial Statement of reasons, Notice of Public Hearing to Consider Requirements to Reduce Idling Emissions from New and In-Use Trucks, Beginning in 2008", September 1, 2005, California EPA, Air Resources Board.

"Heavy-Duty Vehicle Chassis Dynamometer Testing for Emission Inventory", CRC Project No. E-55/59, http:crcao.com

"Guidance for Quantifying and Using Long Duration Truck Idling Emission Reductions in State Implementation Plans and Transportation Conformity", EPA420-B-04-001, January 2004.

Attachment 1
Low Idle and High Idle Emission Rates

LOW IDLE	PM	NOx	CO	HC	CO2
BASELINE					
2007+	0.09	83.73	18.40	6.12	4366
2004-2006	0.85	83.73	18.40	6.12	4366
1998-2003	0.85	83.73	18.40	6.12	4366
1994-1997	1.13	83.73	20.44	7.59	4366
1991-1993	1.50	83.73	22.70	9.39	4366
1990	2.00	83.73	25.21	11.65	4366
1987-1989	2.00	28.91	25.21	11.65	4366
1984-1986	2.65	28.91	28.00	14.42	4366
1980-1983	3.53	28.91	31.10	17.89	4366
1977-1979	4.68	28.91	34.53	22.14	4366
1975-1976	5.72	28.91	37.21	25.79	4366
Pre-1975	6.73	28.91	39.51	29.15	4366

High Idle Summer	PM	NOx	CO	HC	CO2
2007+	0.213	174	57.6	10.5	10081
2004-2006	2.131	174	57.6	10.5	10081
1998-2003	2.131	174	57.6	10.5	10081
1994-1997	2.837	174	64.0	13.1	10081
1991-1993	3.761	174	71.0	16.2	10081
1990	5.007	174	78.9	20.1	10081
1987-1989	5.007	60	78.9	20.1	10081
1984-1986	6.639	60	87.6	24.8	10081
1980-1983	8.838	60	97.3	30.8	10081
1977-1979	11.719	60	108.1	38.1	10081
1975-1976	14.336	60	116.5	44.4	10081
Pre-1975	16.863	60	123.6	50.2	10081

High Idle Winter	PM	NOx	CO	HC	CO2
2007+	0.367	151.5	135.0	13.5	7823
2004-2006	3.666	151.5	135.0	13.5	7823
1998-2003	3.666	151.5	135.0	13.5	7823
1994-1997	4.880	151.5	149.9	16.7	7823
1991-1993	6.471	151.5	166.5	20.7	7823
1990	8.613	151.5	184.9	25.6	7823
1987-1989	8.613	52.3	184.9	25.6	7823
1984-1986	11.421	52.3	205.3	31.7	7823
1980-1983	15.203	52.3	228.1	39.4	7823
1977-1979	20.159	52.3	253.2	48.7	7823
1975-1976	24.661	52.3	272.9	56.7	7823
Pre-1975	29.008	52.3	289.7	64.1	7823

Attachment 2
Idle Correction Factors

High Idle Correction Factors

		PM	NOx	CO	HC	CO2
Summer CF	CF1	2.51	2.08	3.13	1.72	2.31
Winter CF	CF2	4.31	1.81	7.33	2.20	1.79

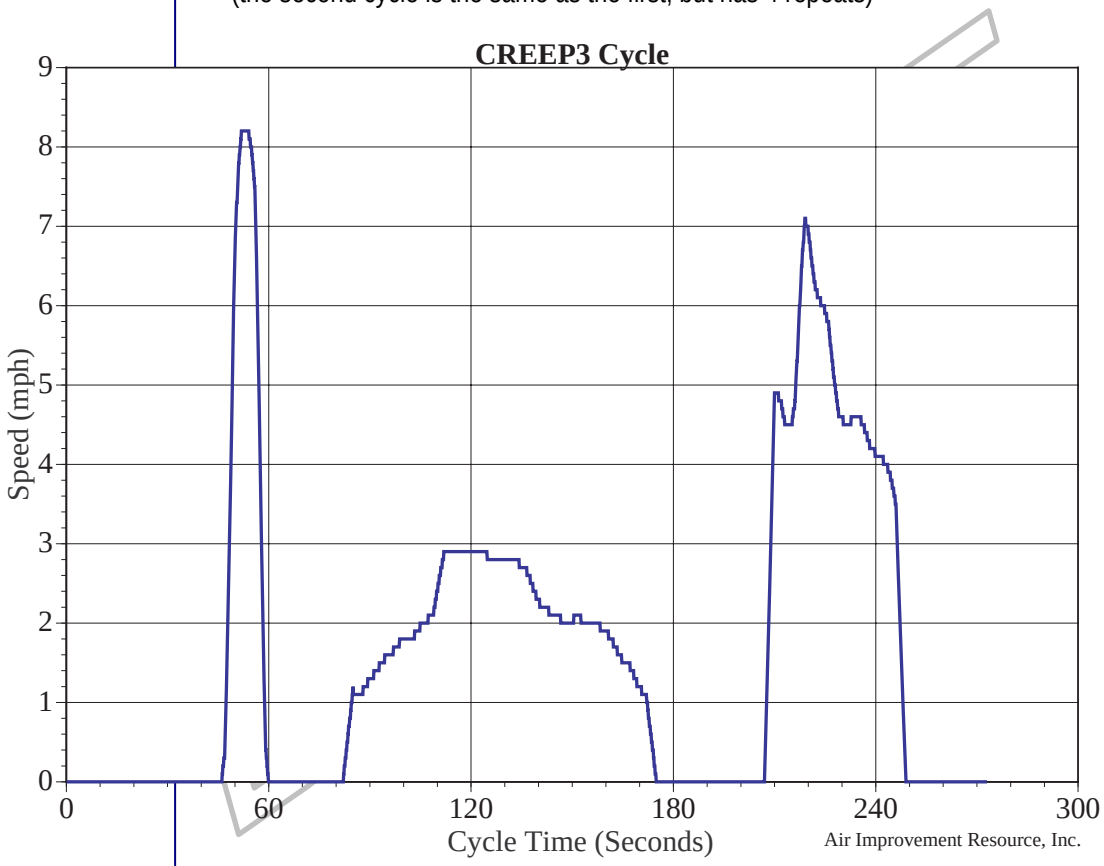
Attachment 3

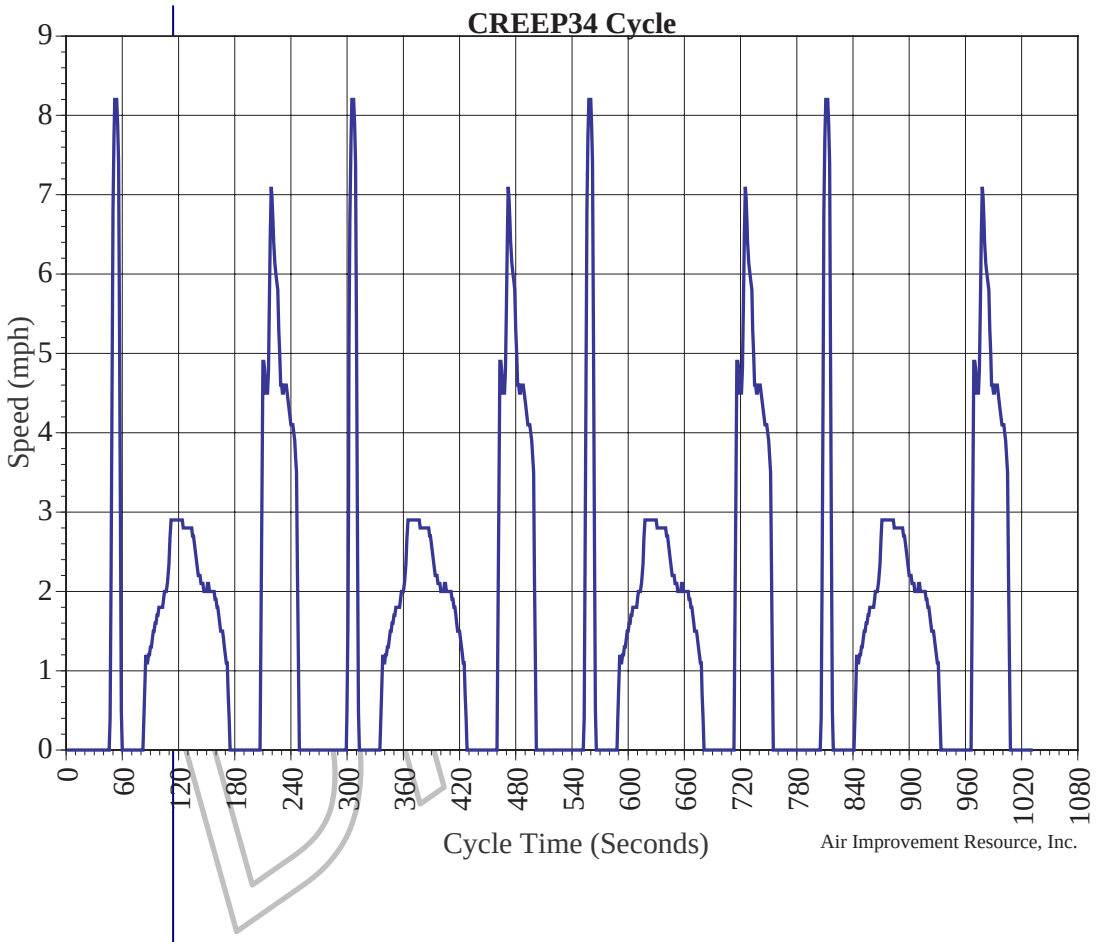
British Columbia HDDT Registration Distributions

Age	Calendar Year 2000 (used for 2003)	Calendar Year 2010 (used for 2011)	Calendar Year 2020 (used for 2020)
1	0.079	0.0816	0.0835
2	0.086	0.0733	0.075
3	0.086	0.0685	0.0701
4	0.065	0.0641	0.0655
5	0.055	0.0599	0.0612
6	0.074	0.052	0.0515
7	0.066	0.0486	0.0482
8	0.044	0.0455	0.045
9	0.040	0.0426	0.0422
10	0.039	0.0397	0.0394
11	0.062	0.0372	0.0368
12	0.050	0.0348	0.0344
13	0.047	0.0325	0.0322
14	0.034	0.0305	0.0301
15	0.029	0.0284	0.0281
16	0.022	0.0267	0.0263
17	0.013	0.0249	0.0245
18	0.004	0.0233	0.023
19	0.008	0.0218	0.0215
20	0.018	0.0204	0.0201
21	0.017	0.0191	0.0188
22	0.013	0.0179	0.0176
23	0.007	0.0166	0.0164
24	0.009	0.0156	0.0154
25	0.034	0.0745	0.0734

* Only the 1997-2020 year data were used in this analysis for 2003, 2011, and 2020.

Attachment 4
CREEP Cycle Used in CRC E55/E57
(the second cycle is the same as the first, but has 4 repeats)




CREEP34 Cycle
Speed (mph)
0
1
2
3
4
5
6
7
8
9
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
Cycle Time (Seconds)
Air Improvement Resource, Inc.

Appendix C:
Sample Calculations

SAMPLE CALCULATIONS

$PM_{2.5}$ EMISSIONS

Emissions of particulate (TSP, PM_{10}, and $PM_{2.5}$) from vehicle travel on roadways results both from tailpipe emissions and recirculation of road dust.

1. Tailpipe Emissions

Tailpipe emissions from vehicle travel were calculated by applying a fleet averaged emission factor from the Mobile 6C Emissions model for each horizon year. For the public roads, traffic data on AADT levels was supplied by IBI Group. The emission factors output from Mobile 6C have been included below in the following tables. As indicates in the tables, the emission factors are dependent upon vehicle type, country of origin (of vehicle), vehicle speed and analysis year. The $PM_{2.5}$ and NO_x emission factors have been highlighted, as they are the two contaminants that have been assessed at this point in time. All contaminants will be included in the final analysis.

As both cars and trucks travel on the same roadways, an average fleet tailpipe emission factor must be calculated.

(a) $VKT_{Total} = VKT_{CDN\_car} + VKT_{CDN\_truck} + VKT_{US\_car} + VKT_{US\_Truck}$

(b) Fleet Average $EF_{(g/VKT)} =$

$$EF_{CDN\_car} * \frac{VKT_{CDN\_car}}{VKT_{Total}} + EF_{CDN\_truck} \frac{VKT_{CDN\_truck}}{VKT_{car}} + EF_{US\_car} \frac{VKT_{US\_car}}{VKT_{Total}} + EF_{US\_truck} \frac{VKT_{US\_truck}}{VKT_{Total}}$$

Table 1a - 2015 Canadian Car Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0161	0.0161	0.0086	1.32	0.0108	29.3	1398.5	2.70	0.0532	0.0084	0.0196	0.0058	0.0014
25	0.0040	0.0040	0.0021	0.44	0.0047	6.4	347.6	0.38	0.0108	0.0020	0.0047	0.0012	0.0003
50	0.0040	0.0040	0.0021	0.40	0.0047	5.9	347.6	0.28	0.0087	0.0014	0.0033	0.0010	0.0002
75	0.0040	0.0040	0.0021	0.49	0.0047	6.6	347.6	0.27	0.0085	0.0013	0.0031	0.0009	0.0002
100	0.0040	0.0040	0.0021	0.49	0.0047	6.6	347.6	0.27	0.0085	0.0013	0.0031	0.0009	0.0002

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 1b - 2015 CanadianTruck Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	1.1015	1.1015	1.07	113.68	0.08	52.50	6228	1.02	0.0113	0.0309	0.0838	0.0065	0.0050
25	0.0191	0.0191	0.01	2.35	0.007	0.96	960	0.33	0.0036	0.0099	0.0268	0.0021	0.0016
50	0.0191	0.0191	0.01	2.02	0.007	0.49	960	0.19	0.0020	0.0056	0.0152	0.0012	0.0009
75	0.0191	0.0191	0.01	2.91	0.007	0.51	960	0.16	0.0018	0.0048	0.0131	0.0010	0.0008
100	0.0191	0.0191	0.01	2.91	0.007	0.51	960	0.16	0.0018	0.0048	0.0131	0.0010	0.0008

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 1c - 2015 American Car Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0158	0.0158	0.0086	1.20	0.0123	25.0	1405	2.34	0.0577	0.0080	0.0174	0.0050	0.0012
25	0.0039	0.0039	0.0021	0.40	0.0055	5.5	349	0.33	0.0118	0.0019	0.0043	0.0011	0.0003
50	0.0039	0.0039	0.0021	0.36	0.0056	5.1	349	0.25	0.0096	0.0013	0.0029	0.0008	0.0002
75	0.0039	0.0039	0.0021	0.44	0.0056	5.7	349	0.24	0.0094	0.0013	0.0028	0.0008	0.0002
100	0.0039	0.0039	0.0021	0.44	0.0056	5.7	349	0.24	0.0094	0.0013	0.0028	0.0008	0.0002

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 1d - 2015 American Truck Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	1.1901	1.1901	1.1543	111.9	0.0800	53.60	6228	1.00	0.0111	0.0303	0.0822	0.0064	0.0049
25	0.0181	0.0181	0.0119	1.9	0.0066	0.83	960	0.32	0.0035	0.0097	0.0263	0.0021	0.0016
50	0.0181	0.0181	0.0119	1.7	0.0066	0.43	960	0.18	0.0020	0.0055	0.0149	0.0012	0.0009
75	0.0181	0.0181	0.0119	2.4	0.0066	0.44	960	0.16	0.0017	0.0047	0.0128	0.0010	0.0008
100	0.0181	0.0181	0.0119	2.4	0.0066	0.44	960	0.16	0.0017	0.0047	0.0128	0.0010	0.0008

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 2a - 2025 Canadian Car Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0141	0.0141	0.0066	0.63	0.0108	26.56	1411	2.26	0.0433	0.0069	0.0159	0.0048	0.0011
25	0.0035	0.0035	0.0016	0.20	0.0048	5.77	351	0.31	0.0087	0.0016	0.0038	0.0010	0.0003
50	0.0035	0.0035	0.0016	0.18	0.0048	5.34	351	0.23	0.0071	0.0012	0.0027	0.0008	0.0002
75	0.0035	0.0035	0.0016	0.21	0.0048	6.00	351	0.21	0.0070	0.0011	0.0025	0.0008	0.0002
100	0.0035	0.0035	0.0016	0.21	0.0048	6.00	351	0.21	0.0070	0.0011	0.0025	0.0008	0.0002

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 2b - 2025 Canadian Truck Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0476	0.0476	0.3140	115.42	0.0800	51.30	6228	0.8575	0.0094	0.0259	0.0702	0.0055	0.0042
25	0.0118	0.0118	0.0062	0.46	0.0071	0.31	960	0.2740	0.0030	0.0083	0.0225	0.0018	0.0013
50	0.0118	0.0118	0.0062	0.39	0.0071	0.16	960	0.1553	0.0017	0.0047	0.0128	0.0010	0.0008
75	0.0118	0.0118	0.0062	0.57	0.0071	0.16	960	0.1336	0.0015	0.0040	0.0110	0.0009	0.0007
100	0.0118	0.0118	0.0062	0.57	0.0071	0.16	960	0.1336	0.0015	0.0040	0.0110	0.0009	0.0007

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 2c - 2025 American Car Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0141	0.0141	0.0067	0.59	0.0123	22.0	1417	1.88	0.0454	0.0064	0.0141	0.0040	0.0010
25	0.0035	0.0035	0.0016	0.19	0.0056	4.8	352	0.26	0.0092	0.0015	0.0035	0.0009	0.0002
50	0.0035	0.0035	0.0016	0.17	0.0057	4.5	352	0.19	0.0076	0.0011	0.0024	0.0007	0.0002
75	0.0035	0.0035	0.0016	0.20	0.0057	5.0	352	0.18	0.0075	0.0010	0.0022	0.0007	0.0002
100	0.0035	0.0035	0.0016	0.20	0.0057	5.0	352	0.18	0.0075	0.0010	0.0022	0.0007	0.0002

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 2d - 2025 American Truck Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0483	0.0483	0.4342	115.65	0.0800	51.50	6228	0.86	0.0095	0.0261	0.0708	0.0055	0.0042
25	0.0120	0.0120	0.0063	0.50	0.0066	0.32	960	0.28	0.0030	0.0083	0.0226	0.0018	0.0014
50	0.0120	0.0120	0.0063	0.43	0.0066	0.16	960	0.16	0.0017	0.0047	0.0128	0.0010	0.0008
75	0.0120	0.0120	0.0063	0.63	0.0066	0.17	960	0.13	0.0015	0.0041	0.0111	0.0009	0.0007
100	0.0120	0.0120	0.0063	0.63	0.0066	0.17	960	0.13	0.0015	0.0041	0.0111	0.0009	0.0007

Bn = Benzene, Ac =Acetaldehyde, Fm = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 3a - 2035 Canadian Car Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0139	0.0139	0.0065	0.58	0.0108	26.4	1411	2.24	0.0425	0.0068	0.0156	0.0047	0.0011
25	0.0034	0.0034	0.0016	0.18	0.0048	5.7	351	0.30	0.0086	0.0016	0.0038	0.0010	0.0003
50	0.0034	0.0034	0.0016	0.17	0.0048	5.3	351	0.22	0.0070	0.0011	0.0026	0.0008	0.0002
75	0.0034	0.0034	0.0016	0.19	0.0048	6.0	351	0.21	0.0069	0.0011	0.0025	0.0007	0.0002
100	0.0034	0.0034	0.0016	0.19	0.0048	6.0	351	0.21	0.0069	0.0011	0.0025	0.0007	0.0002

n = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 3b - 2035 Canadian Truck Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0458	0.0458	0.1554	115.42	0.0800	51.30	6228	0.85	0.0093	0.0255	0.0693	0.0054	0.0041
25	0.0114	0.0114	0.0058	0.34	0.0071	0.26	960	0.27	0.0030	0.0082	0.0222	0.0017	0.0013
50	0.0114	0.0114	0.0058	0.29	0.0071	0.13	960	0.15	0.0017	0.0046	0.0126	0.0010	0.0008
75	0.0114	0.0114	0.0058	0.43	0.0071	0.14	960	0.13	0.0015	0.0040	0.0108	0.0008	0.0006
100	0.0114	0.0114	0.0058	0.43	0.0071	0.14	960	0.13	0.0015	0.0040	0.0108	0.0008	0.0006

n = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 3c - 2035 American Car Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0139	0.0139	0.0065	0.52	0.0123	21.8	1417	1.85	0.0443	0.0062	0.0136	0.0039	0.0009
25	0.0034	0.0034	0.0016	0.16	0.0056	4.8	352	0.25	0.0090	0.0015	0.0034	0.0008	0.0002
50	0.0034	0.0034	0.0016	0.15	0.0057	4.4	352	0.19	0.0074	0.0011	0.0023	0.0006	0.0002
75	0.0034	0.0034	0.0016	0.17	0.0057	4.9	352	0.18	0.0073	0.0010	0.0022	0.0006	0.0001
100	0.0034	0.0034	0.0016	0.17	0.0057	4.9	352	0.18	0.0073	0.0010	0.0022	0.0006	0.0001

n = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

Table 3d - 2035 American Truck Tailpipe Emissions (g/VKT)

Speed (km/h)	PM	PM_{10}	$PM_{2.5}$	NOx	SOx	CO	CO_2	VOC	Bn	Ac	Fm	Bu	Acr
Idle	0.0458	0.0458	0.1557	115.65	0.0800	51.50	6228	0.85	0.0093	0.0255	0.0693	0.0054	0.0041
25	0.0114	0.0114	0.0058	0.34	0.0066	0.26	960	0.27	0.0030	0.0082	0.0222	0.0017	0.0013
50	0.0114	0.0114	0.0058	0.29	0.0066	0.13	960	0.15	0.0017	0.0046	0.0126	0.0010	0.0008
75	0.0114	0.0114	0.0058	0.43	0.0066	0.14	960	0.13	0.0015	0.0040	0.0108	0.0008	0.0006
100	0.0114	0.0114	0.0058	0.43	0.0066	0.14	960	0.13	0.0015	0.0040	0.0108	0.0008	0.0006

n = Formaldehyde, Bu = 1,3 Butadiene, Acr = Acrolein

2. Road Dust Emissions

Emissions of road dust (TSP, PM_{10}, and $PM_{2.5}$) resulting from vehicular travel on paved roads were estimated using the empirical expression (*Equation 1*) and parameters (*Tables 13.2.1-1 and 13.2.1-2*) provided in *Section 13.2.1: Paved Roads* of the U.S. EPA AP-42 document.

$$EF_{(g/VKT)} = k * \left(\frac{sL}{2}\right)^{0.65} * \left(\frac{W}{3}\right)^{1.5} - C$$

where,

EF = particle emission factor (having units matching the units of k)
k = particle size multiplier (see Table 1)
sL = road surface silt content (g/m^2) (see Table 5)
W = average weight (tons) of the vehicles traveling the road
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (see Table 1)
VKT = vehicle kilometers travelled

Table 4 – Paved Road Parameters

Constant	TSP	PM_{10}	$PM_{2.5}$
k (g/VKT)	24	4.6	0.66
C (g/VKT)	0.1317	0.1317	0.1005

Table 5 – Silt Loading Default Values

Constant	Average Travel (No. of Vehicles)		
	<500	5,000-10,000	>10000
sL	0.6	0.06	0.03

Silt Loading

Silt loading factors for high numbers of vehicles can result in a decrease in contribution from road dust on a road way to negligible quantities. As a conservative measure, SENES chose the silt loading factor of 0.6 to allow for quantities of road dust from traffic conditions.

Estimating the W

(a) To calculate W, the car and truck contributions to the total VKT must first be determined.

$$VKT_{Total} = VKT_{car} + VKT_{truck}$$

(b) the weight of each type of vehicle must be determined

Average weight of car=3.5 tons

Average weight of truck =20 tons

(c) the average weight (tons) of the vehicles traveling the road can be determined:

$$W = W_{car} * \frac{VKT_{car}}{VKT_{Total}} + W_{truck} \frac{VKT_{truck}}{VKT_{car}}$$

3. Total $PM_{2.5}$ Emissions

$$Total\_PM_{2.5}ER_{(g/s)} = \left[TailpipeEF_{(g/VKT)} + RoadDustEF_{(g/VKT)}\right] x VKT_{Total(kg/hr)} x \frac{1hr}{3600s}$$

NO_x EMISSIONS

Emissions of NO_x from vehicle travel on roadways results solely from tailpipe emissions. The NO_x tailpipe emissions were estimated in the same manner as the $PM_{2.5}$ tailpipe emissions, and using the emission factors included above in Tables 1a through 3c.

(a) $VKT_{Total} = VKT_{CDN\_car} + VKT_{CDN\_truck} + VKT_{US\_car} + VKT_{US\_Truck}$

(b) Fleet Average $EF_{(g/VKT)}$ =

$$EF_{CDN\_car} * \frac{VKT_{CDN\_car}}{VKT_{Total}} + EF_{CDN\_truck} \frac{VKT_{CDN\_truck}}{VKT_{car}} + EF_{US\_car} \frac{VKT_{US\_car}}{VKT_{Total}} + EF_{US\_truck} \frac{VKT_{US\_truck}}{VKT_{Total}}$$

(c) $$NOxTailpipeER_{(g/s)} = \left[TailpipeEF_{(g/VKT)}\right] x VKT_{Total(kg/hr)} x \frac{1hr}{3600s}$$

QUEUING AT THE CUSTOMS/INSPECTION PLAZAS

Key assumptions:

- Inbound vehicles at customs plaza will queue at inspection booths.
- Outbound vehicles at customs plaza will not queue.
- Queuing traffic volume is same as free-flowing traffic volume.
- There is always queuing (idling) at the booth due to the one vehicle in the booth being inspected.
- Inspection times for cars and trucks are 45 seconds and 60 seconds, respectively.

Customs Plaza Queuing Algorithm:

Groups of queue links were set up for each plaza based on an equal distribution of free flow traffic through each booth that is open during a given hour. Then each queue link was manually "turned on" or "off" by calculating the number of vehicles queued. This modeling approach represents the actual situation because not all groups of queue links actually experience queuing for a given hour.

The amount of queuing at each booth was calculated manually for each group of queue links and for each hour using the hourly free flow traffic volume and the number of booths that are open during each hour, which varies by demand.

1. For each hour, the number of booths that are open is calculated using the hourly free flow traffic volume and the inspection time for each vehicle.
2. The number of vehicles passing through each booth is then back calculated.
3. The calculated number from Step 2 is then compared with the capacity of each booth, i.e., 80 for cars and 60 for trucks. If the number is less than its capacity, then no queuing in this hour; if greater than its capacity, then queuing will occur and the difference is the number of vehicles queued at the booth during that hour.
4. Based on the results obtained from Step 3, the queue links are either "turned on" (with queuing) or "off" (no queuing).
5. If there is queuing, and the queue length per booth exceeds 4 trucks or 6 cars, an additional booth is opened, if possible.
6. If there are no more booths to open, the queue length extends far enough back to accommodate the number of vehicles waiting at the plaza. The locations depend on the physical configuration of each plaza; if the number of vehicles queued determined from Step 3 exceeds the physical length of the queue link, then the next corresponding group of queue links will be "turned on", and so on.

For example, for an hour with 1004 truck traffic, the number of booths that are needed is 1004 / 60 = 17. Then the number of trucks passing through each booth is back calculated: 1004 / 17 = 59. Since this number is less than the capacity of each booth (60 trucks per hour), there will be no queuing at each booth except for the one truck that is in the booth and being inspected.

For an hour with 443 truck traffic, the number of booths that are needed is 443 / 60 = 7. Similarly, the back-calculated number of trucks passing through each booth is 443 / 7 = 63.3. Theoretically, there will be 3.3 trucks queuing at each booth, in addition to the one truck that is in the booth and being inspected. If the group of queue links right next to the booths are set up such that only 2 trucks can wait in line, then 7 of the next group of queue links will be "turned on" and on each link, there will be 1.3 trucks queuing.

Summary of CAL3QHCR Model Inputs:

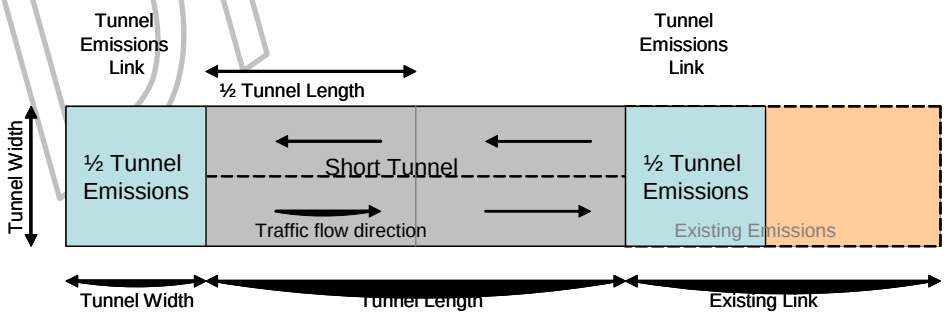
	Cars	Trucks
Number of queuing lanes	1	1
Light cycle time	45 seconds	60 seconds
Yellow time	0 seconds	0 seconds
Red duration time	40 seconds	55 seconds
Saturated flow volume (veh/hr/lane)	1200	1200
Signal type	2	2
Arrival rate	1	1
Maximum number of booths at each plaza	20	19

TUNNEL OFFSET

For the Parkway option emissions for the tunnels were considered to be emitted from the ends of the tunnels and dispersed over a short distance from the end of the tunnel. The tunnel structures are open between opposing traffic directions such that air can flow freely between the opposing traffic thus the piston effect previously described for longer tunnels is minimized. In addition, the amount of turbulence from the tunnel egress points could be expected to impact both traffic flow directions.

To simulate these egress points, the tunnel emissions from each half of the tunnel were allocated to tunnel emissions links (TEL) as in the figure below. Any emissions from the tunnel are assumed to be evenly distributed across both traffic directions. To facilitate modeling using other models, if required, the length of the tunnel emissions link was assumed to be equivalent to the width of the tunnel (this allows for volume source configurations in other models). The tunnel emissions links were overlaid with the flow of existing traffic such that within the length of the tunnel emissions link, two emission values were input into the model: the tunnel emissions and the existing roadway emissions.

Figure C.1 – Schematic for emissions calculations from Tunnels



Vehicle emissions are directly proportional to the vehicle kilometers traveled (VKT), the number of vehicles per hour and an emission factor. Therefore, traveling a distance of 100 m in a vehicle will result in twice the emissions of traveling 50 m in the same vehicle. Or, two identical cars traveling 100 m will result in twice the emissions as one car traveling 100 m. Because this is a directly proportional ratio, it is possible to adjust the emission factor, the VKT, and/or the number of vehicles to calculate equivalent emissions in the TEL.

Because the TEL length is established by the width of the tunnel and the emission factor is calculated through the use of a macro in the approach used by SENES (and is considered constant between the tunnel and the TEL), artificially adjusting the number of vehicles in the TEL was the simplest way of ensuring equivalent emissions from the tunnel. Without this adjustment, the TEL would underestimate emissions by the ratio of half of the tunnel length to the TEL length (i.e., a tunnel of 180 m with a TEL length of 30 m would result in the TEL underpredicting emissions by a factor of 6 (180 m/30 m /2).

One other consideration with this methodology is that each traffic direction may have a different flow within the same tunnel. For example, north bound traffic may have 500 vehicles per hour and south bound traffic may have 1500 vehicles per hour. When the TEL links are established within the SENES input files the traffic data is automatically entered to be consistent with the link section. To calculate an average emission from the tunnel, an average of the two directions must be considered.

The methodology used to adjust the vehicles in the TEL is as follows:

1. Calculate the ratio of half of the tunnel lengths to the TEL lengths.
2. Adjust each of the traffic directions traffic data by this ratio.
3. Calculate an average adjusted traffic volume for the link.
4. Calculate the ratio of average adjusted traffic volume to the existing volume for each direction.
5. Apply this ratio to the existing traffic volume for each direction.
6. Use these traffic direction specific ratios to determine hourly traffic data.

The following sample calculations illustrate the concept.

Given:

Howard Tunnel Length: 114 m

Howard Tunnel Width (equivalent to TEL length): 40 m

Northbound total annual average daily traffic: 14,215 vehicles

Southbound total annual average daily traffic: 27,843 vehicles

Step 1 – Calculate ratio for TEL

$$= \frac{\text{Howard Tunnel Length} / 2}{\text{Howard Tunnel Width}} = \frac{114 / 2}{40} = 1.4$$

Step 2 – Adjust traffic by ratio in each direction

= NB traffic * 1.4 = 14,215 * 1.4 = 20,307 vehicles

= SB traffic * 1.4 = 27,843 * 1.4 = 39,775 vehicles

Step 3 – Calculate average adjusted traffic volume

= (NB adjusted traffic + SB adjusted traffic)/2 = (20,307+39,775)/2 = 30,041 vehicles

Step 4 – calculate the final adjustment ratio for each traffic direction

= average adjusted traffic volume / existing volume

= 30,041/14,215 = 2.1 for NB traffic

= 30,041/27,843 = 1.1 for SB traffic

Step 5 – Apply ratio to original traffic data to come up with equivalent traffic data

This is performed within Input Maker

Step 6 – Determine revised hourly traffic data

This is performed within Input Maker