

COUNTERPOINT
LAND DEVELOPMENT BY

DILLON
CONSULTING

2652184 ONTARIO LTD.

NOISE AND VIBRATION ASSESSMENT

1110 Tecumseh Road East Redevelopment

Zoning By-Law Amendment

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1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

Dillon Consulting Limited (Dillon) was retained by 2652184 Ontario Inc. (the Developer) to complete a noise and vibration assessment as requested by the City of Windsor for a proposed four-storey residential development located at 1110 Tecumseh Road East in Windsor, Ontario.

The noise and vibration assessment presented herein was prepared in accordance with the guidelines and requirements of the City of Windsor, the Ontario Ministry of Environment, Conservation and Parks (MECP) noise publication NPC-300 and MECP's land-use compatibility guidelines (D-series). This assessment focuses on the noise and vibration impacts from nearby transportation sources and stationary noise sources (i.e., nearby industrial operations) on the Proposed Development.

1.2 THE PROJECT AND SURROUNDING AREAS

The Proposed Development consists of a four-storey residential development located at 1110 Tecumseh Road East in Windsor, Ontario. The Proposed Development consists of approximately 36 residential units.

There are residential dwellings and light commercial/industrial facilities in the immediate vicinity of the Proposed Development parcel. The Proposed Development is located directly north of Tecumseh Road East and southeast of the Essex Terminal Railway.

The subject site and surrounding area are shown in Figure 1. The Site Plan and zoning map is shown in Appendix A.

The Proposed Development land parcels are currently vacant.

2.0 IMPACTS FROM THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

This section investigates noise impacts from nearby transportation sources and stationary sources on the Proposed Development.

2.1 TRANSPORTATION NOISE ASSESSMENT

The transportation sources with the potential to impact the Proposed Development include rail traffic from the Essex Terminal Railway and road traffic along Tecumseh Road East. Impacts from rail and road were predicted and compared against the applicable criteria in the Ontario Ministry of Environment, Conservation and Parks (MECP) noise guideline publication, *NPC 300 – Environmental Noise Guideline – Stationary and Transportation Sources – Approvals and Planning* (2013). NPC-300 outlines noise level criteria for sensitive land uses, which assist in determining requirements for façade construction, ventilation requirements, warning clauses, and potential noise barriers for the Proposed Development.

2.1.1 Noise Criteria

The applicable transportation noise criteria, as outlined in Part C of NPC-300, is presented in Table 1 through Table 5. Table 1 summarizes the indoor sound level limits based on the type of space assessed, time of day, transportation noise source, and the maximum allowable equivalent sound levels from railway sources. The indoor noise levels are based on the assumption of closed windows and doors.

Table 1: Indoor Sound Level Limits for Road and Rail

Type of Space	Time Period	Equivalent Sound Level - L_{eq}	
		Road	Rail
General offices, reception areas, retail stores, etc.	Daytime 07:00 - 23:00	50 dBA	45 dBA
Living/dining areas of residences, hospitals, nursing homes, schools, daycares, etc.	Daytime 07:00 - 23:00	45 dBA	40 dBA
Living/dining areas of residences, hospitals, nursing homes, etc. (except schools and daycares)	Night-time 23:00 - 07:00	45 dBA	40 dBA
Sleeping quarters of residences	Daytime 07:00 - 23:00	45 dBA	40 dBA
	Night-time 23:00 - 07:00	40 dBA	35 dBA
Sleeping quarters of hotels	Night-time 23:00 - 07:00	45 dBA	40 dBA

Table 2 outlines the maximum equivalent plane-of-window sound levels for road and rail where if exceeded, a detailed building component design assessment is required to ensure the indoor sound level limits (see Table 1) are achieved.

Table 2: Requirements for Building Component Assessment

Assessment Location	Time Period	Equivalent Sound Level - L_{eq}	
		Road	Rail ^[1]
Plane of window for living area or sleeping quarters	Daytime (07:00 - 23:00)	65 dBA	60 dBA
	Night-time (23:00 - 07:00)	60 dBA	55 dBA

Note: [1] Whistle noise is included for the building component and indoor noise assessment.

MECP’s NPC-300 Noise Guideline outlines façade construction requirements for proposed residential developments within 100 metres of rail tracks, shown in Table 3. These requirements apply only to the first row of dwellings.

Table 3: Façade Construction Requirements

Assessment Location	Equivalent Sound Level L_{eq} 24hr ^[1]	Façade Construction Requirement
Plane of window for living area or sleeping quarters	> 60 dBA	Brick veneer or acoustical equivalent
	≤ 60 dBA	No requirement

Note: [1] Whistle noise is included for façade construction requirements.

Table 4 summarizes potential noise warning clauses and ventilation requirements that should be used to warn of potential annoyance due to existing noise sources related to road and rail. Whistle noise is not included in the determination of warning clause requirements.

Table 4: Ventilation and Warning Clause Requirements for Road and Rail

Assessment Location	Time Period	Equivalent Sound Level - L_{eq} Road/Rail ^[1]	Ventilation and Warning Clause Requirements ^[2]
Plane of window for living area or sleeping quarters	Daytime (07:00 - 23:00)	≤ 55 dBA	No Requirement
		> 55 dBA and ≤ 65 dBA	Provision for the installation of central air conditioning with a Type C warning clause
		> 65 dBA	Installation of central air conditioning with a Type D warning clause
Plane of window for living area or sleeping quarters	Nighttime (23:00 - 7:00)	≤ 50 dBA	No Requirement
		> 50 dBA and ≤ 60 dBA	Provision for the installation of central air conditioning with a Type C warning clause

Assessment Location	Time Period	Equivalent Sound Level - L_{eq} Road/Rail ^[1]	Ventilation and Warning Clause Requirements ^[2]
		> 60 dBA	Installation of central air conditioning with a Type D warning clause

Note: [1] Whistle noise is not included in combined road/rail assessments for warning clause requirements.
 [2] Warning clause types and requirements are provided in Appendix C.

The applicable noise criteria for Outdoor Living Areas (OLAs) specific to surface transportation are presented in Table 5. If the 16-Hour Equivalent Sound Level (L_{eq} 16hr) at an OLA is greater than 55 dBA and less than or equal to 60 dBA, noise control measures may be applied to reduce the sound level to 55 dBA. Otherwise, prospective purchasers or tenants should be informed of potential elevated noise levels by way of warning clause Type A. For a L_{eq} 16hr of greater than 60 dBA, noise mitigation measures are required to reduce the noise levels to 55 dBA or less. Whistle noise is not included in the determination of the rail outdoor sound level.

Table 5: OLA Level Limits for Road and Rail Noise

Assessment Location	Equivalent Sound Level L_{eq} 16hr ^{[1],[2]} Road/Rail	Noise Control Measures and Warning Clause Requirements
Outdoor Living Area	≤ 55 dBA	No requirement
	> 55 dBA and ≤ 60 dBA	Installation of noise control measure OR a Type A warning clause ^[1]
	> 60 dBA	Installation of noise control measure with a Type B warning clause

Notes: [1] Daytime only (07:00 - 23:00)
 [2] Whistle noise is not included in assessment of rail noise for warning clause requirements.

2.1.2 Transportation Sources

In assessing potential transportation noise impacts on the Proposed Development, Essex Terminal Railway and Tecumseh Road East were analyzed as surface transportation sources. All traffic data used in modelling road and rail traffic is included in Appendix B.

2.1.2.1 Rail Noise Sources

The Proposed Development is located directly southeast of the Essex Terminal Railway. Freight traffic in the area was determined from the Government of Canada’s Grade Crossing Inventory. Conservatively, it was assumed that each train consists of 2 locomotives and 140 cars. The rail traffic was projected to the year 2035 based on a per annum growth rate of 2.5%. It was observed during a site visit completed by Dillon staff on May 1st, 2024, that whistle noise is used at the grade crossings in proximity to the Proposed Development. The forecasted rail traffic data is presented in Table 6.

Table 6: Future (2035) Rail Traffic Data

Train Type	Daytime Cars (07:00-23:00)	Nighttime Cars (23:00-07:00)	24hr Cars	Daytime Locomotives (07:00-23:00)	Nighttime Locomotives (23:00-07:00)	24hr Locomotives	Speed [km/h]
Freight	224	224	448	6	6	12	16

2.1.2.2 Road Noise Sources

The Proposed Development is located north of Tecumseh Road East. The Average Annual Daily Traffic (AADT) of Tecumseh Road East in 2015 was provided by the City of Windsor. A 90% and 10% split for daytime and nighttime traffic volumes, respectively, were used in the analysis. The future traffic volumes were assumed to have a 1.0% annual compound growth rate. The percentage of heavy and medium trucks was taken from the peak hour turning movement counts. The forecasted future (2035) road traffic data is presented in Table 7.

Table 7: Future (2035) Road Traffic Data

Roadway	2035 AADT	Medium Trucks (%)	Heavy Trucks (%)	Speed (km/h)
Tecumseh Road East	34,569	1.55	0.72	50

2.1.3 Predicted Sound Level

The noise analysis was completed using Cadna/A, a noise propagation software. The Cadna/A software includes the implementation of the Transportation Noise Model (TNM) roadway algorithms, as well as the Federal Transit Administration/Federal Railroad Administration (FTA/FRA) railway algorithms. The model is capable of incorporating various site specific features, such as elevation, berms, absorptive grounds, and barriers to accurately predict noise levels at specific receptors, pertaining to noise emissions from a particular noise source. The model accounts for reduction in sound level due to increased distance and geometrical spreading, air absorption, ground attenuation, and acoustical shielding by intervening structures and topography. The model is considered conservative as it represents atmospheric conditions that promote propagation of sound from source to receptor.

2.1.3.1 Railway Analysis

The railway noise impact assessment was conducted using the FRA algorithm using Cadna/A. The model's inputs are outlined in Section 2.1.2.

In order to confirm the modelling results of FRA protocol implemented through Cadna/A a comparative analysis was completed for rail traffic noise modelling, in which the results from FRA in Cadna/A were compared against those of STEAM implemented through STAMSON Version 5.04. This comparative analysis is discussed in Sub-section 2.1.5.

2.1.3.2 Roadway Analysis

The assessment for roadway impact noise was completed using the TNM, developed by the Federal Highway Administration (FHWA), implemented through Cadna/A. The model inputs used for the TNM algorithm are outlined in Section 2.1.2.

In order to confirm the modelling results of TNM protocol implemented through Cadna/A a comparative analysis was completed for road traffic noise modelling, in which the results from TNM in Cadna/A were compared against those of ORNAMENT implemented through STAMSON Version 5.04. This comparative analysis is discussed in Section 2.1.5.

2.1.3.3 Sensitive Receptor Locations

For the purposes of this study, the Building Evaluation feature was used in Cadna/A to assess the worst-case façade impacts throughout the Proposed Development. Based on the preliminary site plan for the Proposed Development, no Outdoor Living Areas (OLAs) have been identified that require assessment of impact due to transportation noise. Any private balconies of the Proposed Development are assumed to be less than 4m in depth, and therefore are not considered OLAs per MECP NPC-300.

2.1.3.4 Transportation Noise Impacts – Plane of Window

Table 8 summarizes the predicted building façade noise levels from rail noise sources at the sensitive receptors within the Proposed Development.

Table 8: Combined Road and Rail Noise Prediction Summary Table – Façade Impacts

Building	Equivalent Sound Level - $L_{eq}^{[1],[2]}$ [dBA]						
	Road Impacts		Railway Impacts		Combined Road and Rail ^[3]		24hr Railway Impacts ^[4]
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	
North Façade	45	39	62	65	57	60	63
East Façade	61	54	54	57	61	56	56
South Façade	66	59	56	59	66	60	57
West Façade	61	54	62	65	62	61	63

Notes: [1] L_{eq} represents maximum predicted impacts along façade.

[2] Predicted noise levels that exceed the applicable limits are presented in bold.

[3] Whistle noise is not included in combined road/rail assessments for warning clause requirements.

[4] 24hr railway impacts are only assessed at the first row of residences that are within 100 m of the railway.

The predicted transportation sound levels for combined road and rail impacts at the building façades of the Proposed Development are presented in Figure 2.

2.1.4 Transportation Noise Control Measures

2.1.4.1 Façade Construction Recommendations

Based on the predicted façade sound levels shown in Table 8, and the threshold criteria outlined in Table 2, a detailed building component design analysis is required for the Proposed Development. Additionally, based on the threshold criteria for 24-hour rail noise set in Table 3, the north and west façades of the Proposed Development is to be built to a minimum of brick veneer or masonry equivalent construction (an acoustical equivalent of STC 54). The results of an initial building component analysis are shown in Table 9. As detailed floor plans are not yet available, typical unit layouts were assumed. The predicted maximum impacts for road, locomotive, and train car noise were used to assess the required glazing for each building. The building component analysis has been provided in Appendix C.

Table 9: Building Component Analysis Using Maximum Impacts

Building	Maximum Required Glazing (STC)	
	Living/Dining Area	Sleeping Quarters
North Façade	31	34
East Façade	25	27
South Façade	28	30
West Façade	31	34

The above mentioned STC ratings are conservatively calculated and represent the recommended minimum STC ratings for the windows. Windows should be carefully selected to ensure the entire assembly (frame and glazing) meets the specified minimum STC ratings. It is recommended that manufacturer tests and specifications be reviewed by an Acoustical Consultant upon selection. Windows which meet the structural and energy saving requirements of the OBC typically have STC29 / STC30 ratings.

Sensitive spaces located on corners of buildings, which have multiple façade exposure and potential contribution from multiple sources may require an STC increase of 3. As the design progresses, the façade and glazing requirements should be reviewed by an Acoustical Consultant, ideally at the Site Plan Approval (SPA) stage, to confirm or update the above recommended STC ratings.

2.1.4.2 Ventilation Requirements and Warning Clauses

Based on the predicted façade sound levels shown in Table 8, and the threshold criteria outlined in Table 4, residential units of the Proposed Development with a south or west facing façade will require installation of central air conditioning and a Type D warning clause. The remainder of the Proposed Development requires a provision for the installation of central air conditioning and Type C warning clause.

Additionally, it is recommended that a warning clause regarding the potential for noise and vibration impacts be applied to all sensitive locations within 300 m of the railway right-of-way.

All warning clauses should be included in agreements that are registered on Title for all Offers of Purchase and Sale, lease/rental agreements, and condominium declarations. The list of applicable warning clauses required for the Proposed Development are provided in Appendix C.

2.1.5 TNM/FTA Protocol Confirmation

In order to demonstrate appropriate implementation of Transportation Noise Model (TNM) through Cadna/A, noise modelling results obtained through the TNM protocol were compared against traffic noise modelling using MECP’s ORNAMENT implemented through STAMSON version 5.04. The Proposed Development’s south facade was used for this comparative analysis. The comparison results are presented in **Table 10**.

Table 10: TNM Protocol in Cadna/A and ORNAMENT Comparison

Assessment Location	TNM Cadna/A Result	ORNAMENT STAMSON Result
South Facade	66 dBA	66 dBA

Similarly, noise modeling results obtained through FRA protocol through Cadna/A were compared against rail modelling using MECP’s STEAM implemented through STAMSON version 5.04. The comparison results are shown in Table 11.

Table 11: FTA/FRA Protocol in Cadna/A and STEAM Comparison

Assessment Location	FTA/FRA Cadna/A Result	STEAM STAMSON Result
North Facade	62 dBA	60 dBA

The results indicate that the predicted noise impacts obtained through TNM and FRA protocols in Cadna/A are more conservative than those of ORNAMENT and STEAM and that the Cadna/A results are acceptable.

The difference in the predicted rail noise impacts are due to how each protocol accounts for noise impacts from jointed tracks compared to continuously welded tracks. The track conditions in proximity to the Proposed Development were identified as jointed tracks. Cadna/A applies a +5 dBA jointed tracks penalty to locomotive and rail car noise, whereas STAMSON applies a +3 dBA penalty to only rail car noise and for any track conditions that are not continuously welded.

The STAMSON model output is provided in Appendix D.

2.2 STATIONARY NOISE ASSESSMENT

A review of the site and surrounding area has been conducted to identify potential stationary sources (e.g., industrial / commercials) that have the potential to impact the proposed sensitive use. A site visit was completed by Dillon staff on April 10th, 2024, for the purpose of classifying facilities in proximity to the Proposed Developments, identifying potential sources of noise, and classifying the acoustic environment.

2.2.1 MECP Guideline D-6 Compatibility between Industrial Facilities

The MECP’s land-use compatibility guidelines (D-series) are intended to prevent or minimize the encroachment of sensitive land uses upon industrial/commercial land uses and vice versa, as these two types of land uses are normally incompatible, due to possible adverse effects (e.g., noise) on the sensitive land use. As per the guideline, potential noise impact from commercial / industrial establishments within the potential influence area/or recommended minimum separation distance, as outlined in D-6 (see Table 12), should be assessed.

Table 12: Guideline D-6 Potential Influence Area and Recommended Minimum Separation Distance

Industrial Classification ^[1]	Area of Influence	Recommended Minimum Separation Distance
Class I	70 m	20 m
Class II	300 m	70 m
Class III	1000 m	300 m

Note: [1] Industrial classification are outlined in Guideline D-6, and presented in Appendix E.

2.2.2 Facilities

The land use planning guide, *D-6 Compatibility between Industrial Facilities*, was used for the classification of the surrounding industrial facilities and the compatible proximities for the proposed sensitive land use. The criteria for classification of industrial categories are presented in Appendix E.

Information on the operations of the surrounding industries was determined based on discussion with industry staff and observations during the site visit. Table 13 describes the industries that were identified with the potential to have noise impacts on the Proposed Development.

Table 13: Facilities with Proximity to Proposed Development

Facility and Address	Industrial Classification	Description of Operations	Environmental Compliance Approval
Tamimi Remedy’s RX 1190 Tecumseh Road East	Class 1	Medical clinic with rooftop air handling units.	No
Five Star Oil Change 1088 Tecumseh Road East	Class 1	Auto repair facility operating only during the daytime.	No
Heritage Tire Sales 1060 Tecumseh Road East	Class 1	Auto tire retailer and service center operating only during the daytime.	No
Essex Terminal Railway Company Siding Yard Benjamin Avenue to Lincoln Road	Class 2	Movement of way freights and storage of rail cars. Operations occur during the daytime and nighttime hours.	No

2.2.3 Stationary Noise Criteria and Area Classification

MECP Publication NPC-300 outlines applicable noise criteria for the Proposed Development associated with surrounding industrial and commercial stationary noise sources. The noise criteria are defined using area classifications (not to be confused with the D-6 industrial classifications), which are based on the receptor’s existing acoustical environment. NPC-300 classification are as follows:

- Class 1 – Urban Area;
- Class 2 – Semi-Urban / Semi – Rural;
- Class 3 – Rural Area; and
- Class 4 – Areas of Redevelopment and Infill.

Different noise guideline limits apply to each area classification, as shown below in Table 14 for steady and varying sound.

Table 14: Exclusionary Limits for Stationary Noise Sources - Steady

Assessment Location	Time Period	Exclusionary Sound Level Limit - L_{eq} 1hr [dBA]			
		Class 1	Class 2	Class 3	Class 4
Plane of window for living area or sleeping quarters	Daytime (07:00 - 19:00)	50	50	45	60
	Evening (19:00 - 23:00)	50	50	40	60
	Nighttime (23:00 - 07:00)	45	45	40	55

The noise guideline limit of impulsive noise for each area classification is shown below in Table 15.

Table 15: Exclusionary Limits for Stationary Noise Sources - Impulsive

Assessment Location	Number of Impulses in Period of One-Hour	Exclusionary Sound Level Limit - L_{eq} 1hr [dBAI]			
		Class 1 (Daytime and Evening 07:00-23:00 / Nighttime 23:00-07:00)	Class 2 (Daytime and Evening 07:00-23:00 / Nighttime 23:00-07:00)	Class 3 (Daytime and Evening 07:00-23:00 / Nighttime 23:00-07:00)	Class 4 (Daytime and Evening 07:00-23:00 / Nighttime 23:00-07:00)
Plane of window for living area or sleeping quarters	9 or more	50/45	50/45	45/40	60/55
	7 to 8	55/50	55/50	50/45	65/60
	5 to 6	60/55	60/55	55/50	70/65
	4	65/60	65/60	60/55	75/70
	3	70/65	70/65	65/60	80/75
	2	75/70	75/70	70/65	85/80
	1	80/75	80/75	75/70	90/85

During the site visit conducted on April 10th, 2024, it was observed that the acoustic environment surrounding the Proposed Development is dominated by transportation noise and general urban hum during daytime. Based on the nature of the area, the Class 1 urban sound level limits would apply.

2.2.4 Stationary Sources

The noise sources associated with the industries identified in Section 2.2.2 are outlined below in Table 16. The facilities and their corresponding location are presented in Figures 3 to 6.

Table 16: Stationary Noise Sources

Noise Source ^[1]	Associated Facility	Sound Power Level ^[1]	# of Sources	Source Type
Rooftop HVAC	Tamimi Remedy's RX	86 dBA	2	Point source, steady
Pneumatic tools	Five Star Oil Change	102 dBA	1	Point source, quasi-steady
Pneumatic tools	Heritage Tire Sales	102 dBA	2	Point source, quasi-steady
Idling Locomotive	Essex Terminal Railway Siding Yard	101 dBA	2	Point source, steady
Rail Car Shunting	Essex Terminal Railway Siding Yard	118 dBA	5	Point source, impulsive

Note: [1] the Sound Power Level of noise sources used in this assessment were based on Dillon's past experience with similar facilities.

MECP's publication, *NPC-104 – Sound Level Adjustments*, specifies sound level adjustments (penalties) to be applied to the observed sound level of a source based on its sound quality. NPC-104 specifies that a penalty of +5 dB be applied to any sound that has a pronounced audible tonal quality or cyclical variation, and that a +10 dB penalty be applied to a quasi-steady impulsive sound. "Quasi-steady" is a sequence of impulsive sounds emitted from a source having a time interval of less than 0.5 s, per MECP's *NPC-101 – Technical Definitions*. Sound level penalties are not accumulated when more than one sound quality applies. Instead, the largest of the applicable penalties shall be used.

The operation of pneumatic tools at Five Star Oil Change and Heritage Tire Sales is assumed to operate as a quasi-steady state impulsive sound. A +10 dB penalty was applied to this noise source.

2.2.5 Noise Sensitive Points of Reception

As per the MECP noise guidelines NPC-300, a Point of Reception (POR), as it applies to impact assessments of stationary sources, means any location on a noise sensitive land use where noise from a stationary source is received. Noise sensitive land uses include the following lands:

- Permanent, seasonal, or rental residences;
- Hotels, motels, and campgrounds;
- Schools, universities, libraries, and daycare centres;

- Hospitals and clinics, nursing / retirement homes; and
- Places of worship.

The planes of window of the Proposed Development were considered noise sensitive receptors. No outdoor points of reception were identified within the Proposed Development.

2.2.6 Predicted Sound Levels – Stationary

The noise analysis was completed using CADNA/A, an outdoor noise propagation model, based on ISO Standard 9613, Part 1: Calculation of the absorption of sound by the atmosphere, 1993 and Part 2: General method of calculation (ISO-9613-2:1996). The model is capable of incorporating various site specific features, such as elevation, berms, absorptive grounds, and barriers to accurately predict noise levels at specific receptors, pertaining to noise emissions from a particular source / sources. The ISO based model accounts for reduction in sound level due to increased distance and geometrical spreading, air absorption, ground attenuation, and acoustical shielding by intervening structures and topography. The model is considered conservative as it represents atmospheric conditions that promote propagation of sound from the source to the receiver.

The following assumptions were incorporated in the noise propagation modelling:

- A global ground absorption coefficient of 0.40, representing reflective grounds between sources and receptors;
- A second order reflection was incorporated in the noise model; and
- The ground within the study area is considered to be generally flat.

For the purposes of the stationary assessment, the Building Evaluation feature in Cadna/A was used to determine building facades with the worst-case noise impacts.

Impacts from the stationary noise sources were predicted through noise propagation modelling. The predicted receptor noise levels (at the Proposed Development site) were compared against the applicable criteria, as specified in NPC-300 (see Table 14).

Table 17 summarizes the predicted building façade noise levels from stationary noise sources from the surrounding industries at the Proposed Development.

Table 17: Stationary Noise Impact Summary Table – Surrounding Industries on Proposed Development

Industry	Maximum Façade Leq (1 hour) ^[1]		MECP Compliance	
	Daytime and Evening (07:00-23:00)	Nighttime (23:00-07:00)	Class 1	Class 4
Tamimi Remedy's RX	51 dBA	48 dBA	No	Yes
Five Star Oil Change	62 dBA	-	No	No
Heritage Tire Sales	58 dBA	-	No	Yes
Essex Terminal Railway Company Siding Yard – Steady	53 dBA	53 dBA	No	Yes

Industry	Maximum Façade Leq (1 hour) ^[1]		MECP Compliance	
	Daytime and Evening (07:00-23:00)	Nighttime (23:00-07:00)	Class 1	Class 4
Essex Terminal Railway Company Siding Yard – Impulsive ^[2]	63 dBAI	63 dBAI	No	Yes

Note: [1] Values in exceedance of MECP limits are shown in bold.
[2] The impulsive sound level was determined by calculating the logarithmic average of the noise impacts of 5 rail shunting impulses.

The predicted stationary noise impacts from the surrounding industries at the Proposed Development façades are shown in Figures 3 to 6.

The predicted impacts from the nearby stationary sources exceed the MECP NPC-300 Class 1 exclusionary limits at the Proposed Development. The Proposed Development is predicted to be in compliance with the Class 4 exclusionary limits, with the exception of the west façade based on the proximity to Five Star Oil Change.

2.2.7 Stationary Noise Control Measures

As shown in Table 17, the predicted sound levels exceed the Class 1 and Class 4 exclusionary sound level limits at the worst case impacted façade based on the assumed operations from Five Star Oil Change. Figure 4 shows that the Class 4 exclusionary noise limits are only exceeded on the west façade of the Proposed Development.

To achieve compliance with the NPC-300 exclusionary sound level limits, the Site Plan design can be updated to remove all sensitive uses along the west façade of the Proposed Development. This can be achieved by either implementing a blank façade (no windows), or ensure that any window located on the west façade only be dedicated to insensitive areas such as staircases, corridors, bathrooms, closets, or utility rooms that are fully partitioned from noise sensitive spaces (living and sleeping quarters). Alternatively, source-based mitigation can be investigated to control noise at Five Star Oil Change, however, based on the nature of the operations source-based mitigation may not be feasible.

By following the above Site Plan design noise control measures, sound level limits would not need to be applied to the west façade of the Proposed Development. Table 18 summarizes the predicted building façade noise levels from stationary noise sources from the surrounding industries at the Proposed Development when excluding the west façade of the Proposed Development.

Table 18: Stationary Noise Impact Summary Table – Surrounding Industries on Proposed Development Excluding West Façade

Industry	Maximum Façade Leq (1 hour) ^[1]		MECP Compliance	
	Daytime and Evening (07:00-23:00)	Nighttime (23:00-07:00)	Class 1	Class 4
Tamimi Remedy's RX	51 dBA	48 dBA	No	Yes

Industry	Maximum Façade Leq (1 hour) ^[1]		MECP Compliance	
	Daytime and Evening (07:00-23:00)	Nighttime (23:00-07:00)	Class 1	Class 4
Five Star Oil Change	55 dBA	-	No	Yes
Heritage Tire Sales	57 dBA	-	No	Yes
Essex Terminal Railway Company Siding Yard – Steady	53 dBA	53 dBA	No	Yes
Essex Terminal Railway Company Siding Yard – Impulsive ^[2]	63 dBAI	63 dBAI	No	Yes

Note: [1] Values in exceedance of MECP limits are shown in bold.

[2] The impulsive sound level was determined by calculating the logarithmic average of the noise impacts of 5 rail shunting impulses.

As shown in Table 18, the Class 1 exclusionary noise limits are exceeded at the Proposed Development. Source-based mitigation measures are likely not feasible due to the nature of siding yard operations. Similarly, acoustics barriers along the property line of the Proposed Development are not feasible due to the height of the Proposed Development. It is recommended that the Proposed Development seek a Class 4 designation approval from the land use planning authority.

As outlined in NPC-300, a Class 4 area can be applied to a proposed site under the following conditions:

- The site would otherwise be a Class 1 or Class 2 area;
- The proposed site is an area intended for the development with new noise sensitive land uses that are not yet built;
- The site is in proximity to existing, lawfully established stationary noise sources; and
- The site has formal confirmation from the land use planning authority with the Class 4 area designation.

The Proposed Development meets all the above conditions, with the exception of the confirmation from the land use planning authority. Based on the above, a Class 4 designation for the Proposed Development is reasonable. To have a Class 4 area designation, the final step is for the proponent to receive formal confirmation from the land use planning authority of the Class 4 area designation for the Proposed Development. This study should be provided to the land use planning authority in support of the application package.

With Class 4 designation approval, A Type F warning clause must be applied to all dwellings of the Proposed Development as a Class 4 area notification. Additionally, as per the Type F warning clause, all dwelling units must be supplied with a ventilation/air conditioning system which allow windows and exterior doors to remain closed.

Additionally, a Type E warning clause should be applied to all dwellings of the Proposed Development due to the proximity various industries identified in Section 2.2.2.

All warning clauses should be included in the agreements that are registered on Titles for all Offers of Purchase and Sale, lease/rental agreements, and condominium declarations. The list of applicable warning clauses required for the Proposed Development are provided in Appendix C.

2.3 RAIL VIBRATION ASSESSMENT

The Proposed Development is located approximately 24 m from the Essex Terminal Railway right-of-way. As the Proposed Development is located within the vibration influence area of 75 metres, per the Guidelines for New Development in Proximity to Railway Operations (FCM/RAC, 2013), a vibration assessment for the Proposed Development is required.

2.3.1 Rail Vibration Criteria

There are no MECP guidelines with respect to railway vibration and proposed sensitive land-uses. Applicable guidelines for vibration impact due to railway operations are those published in the *Guidelines for New Development in Proximity to Railway Operations* (FCM/RAC, 2013).

Overall vibration levels from railway activities are recommended not to exceed 0.14 mm/s RMS (root mean square) between 4 Hz and 200 Hz on and above the first floor of all dwellings. This criterion is based on the human perception of ground-borne vibration, published in the International Standard ISO 2631-2. Vibration levels from railway operations meeting this criterion will generally not be perceptible by the occupants.

2.3.2 Rail Vibration Measurements

Throughout late July and early August 2024, Dillon staff visited the site of the Proposed Development to measure rail vibration levels from train movements. Measurements were conducted 24 m from the railway right-of-way (ROW) using the Instantel Minimate® Plus seismograph. The vibration measurement location is shown in Figure 7.

The instrument is capable of measuring vibrations between 4 and 200 Hz within ± 3 VdB. A trigger level of 0.112 mm/s PPV (peak particle velocity) was used during the monitoring. Monitoring was conducted for six freight train passbys. The results of the measurements are shown below in Table 19.

Table 19: Summary of Rail Vibration Measurements

Date	Time of Passby	Train Type	Number of Locomotives	Number of Cars	Max RMS at 33 m (mm/s)
July 29th, 2024	08:24	Freight	1	1	0.059
July 30th, 2024	08:11	Freight	1	1	0.055
July 31st, 2024	08:08	Freight	1	1	0.059
August 1st, 2024	9:55	Freight	1	6	0.058

Date	Time of Passby	Train Type	Number of Locomotives	Number of Cars	Max RMS at 33 m (mm/s)
August 2nd, 2024	09:08	Freight	1	7	0.057
August 2nd, 2024	09:17	Freight	1	12	0.078

2.3.3 Rail Vibration Impacts

The maximum measured vertical ground-borne vibration level was below the 0.14 mm/s RMS FCM/RAC criterion. As such, no vibration mitigation measures are deemed necessary to meet the applicable criterion.

It is recommended that a railway warning clause regarding the potential for noise and vibration impacts be applied to all residential locations within 300 metres of their right-of-way. All warning clauses should be included in agreements that are registered on Title for all Offers of Purchase and Sale, lease/rental agreements, and condominium declarations. The list of applicable warning clause requirements for the Proposed Development are provided in Appendix C.

3.0 CONCLUSIONS

Dillon Consulting Limited (Dillon) was retained by 2652184 Ontario Inc. to complete a Noise and Vibration Assessment as requested by the City of Windsor for the proposed residential development located at 1110 Tecumseh Road East. This study has been completed in support of Zoning By- Amendment application.

The noise and vibration assessment focuses on the noise impacts from nearby transportation sources and stationary sources (i.e., nearby industrial operations) on the Proposed Development and vibration impacts from the nearby railway on the Proposed Development.

The conclusions of each assessment have been provided below. It is recommended that this assessment be updated by a qualified acoustic practitioner once floor plans and elevation plans for the Proposed Development are available.

3.1 TRANSPORTATION NOISE ASSESSMENT

As outlined in Section 2.1.4, the results of the transportation noise assessment confirm that the noise impacts on the Proposed Development can be sufficiently controlled by:

- Upgraded glazing;
- Brick veneer or acoustical equivalent (STC 54) façade construction;
- Installation of central air conditioning and Type D warning clause for residential units with south and west façades; and
- Provision for the installation of central air conditioning with a Type C warning clause for residential units with north and east façades.

It should be noted that transportation noise impacts were assessed on the west façade of the Proposed Development. Based on the noise control measures detailed in Section 2.2.7, a potential solution to control stationary noise impacts would be to remove windows and/or sensitive uses along the west façade of the Proposed Development. With this stationary noise control measure in place, upgraded glazing and the Type D warning clause would not need to be applied to the west façade of the Proposed Development.

3.2 STATIONARY NOISE ASSESSMENT

The noise impacts from surrounding commercial and industrial properties on the development were assessed through modelling of stationary sources in Cadna/A using ISO:9613 standards. Based on the acoustic analysis, the stationary noise impacts on the Proposed Development can be sufficiently controlled by:

- Dedicating the west façade of the Proposed Development to a blank façade or spaces that are not noise sensitive;
 - Or further investigation of source-based mitigation options for Five Star Oil Change
- Seeking a Class 4 designation approval from the land use planning authority for the Proposed Development; and
- Applying a Type E and Type F warning clause to the Proposed Development.

3.3 RAIL VIBRATION ASSESSMENT

The maximum measured vertical ground-borne vibration level was below the 0.14 mm/s RMS FCM/RAC criterion based on monitoring of the peak particle velocity during six train passbys. As such, no vibration mitigation measures are deemed necessary to meet the applicable criterion.

It is recommended that a railway warning clause regarding the potential for noise and vibration impacts be applied to all sensitive receptor locations within 300 metres of their right-of-way.

4.0 CLOSURE

This noise and vibration assessment has been prepared based on the information provided and/or approved by 2652184 Ontario Inc. This report is intended to provide a reasonable review of available information within an agreed work scope, schedule, and budget. This report was prepared by Dillon for the sole benefit of the 2652184 Ontario Inc. The material in the report reflects Dillon's judgement in light of the information available to Dillon at the time of this report preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that the report is to your satisfaction. Please do not hesitate to contact the undersigned if you have any further questions on this report.

Respectfully Submitted:

DILLON CONSULTING LIMITED



Callum Heggart, P.Eng.

Lucas Arnold, P.Eng.
Associate

FIGURES



Figure 1

Project # 23-6238

Aug 2024

Subject Site and Surrounding Area

1110 Tecumseh Road East, Windsor, Ontario





Figure 2

Combined Road and Rail Noise Impacts without Horn

Project # 23-6238

Aug 2024

1110 Tecumseh Road East, Windsor, Ontario





Figure 3

Project # 23-6238

Aug 2024

Stationary Noise Impacts Tamimi Remedy's RX

1110 Tecumseh Road East, Windsor, Ontario





Figure 4

Project # 23-6238

Aug 2024

Stationary Noise Impacts Five Star Oil Change

1110 Tecumseh Road East, Windsor, Ontario





Figure 5

Project # 23-6238

Aug 2024

Stationary Noise Impacts Heritage Tire Sales

1110 Tecumseh Road East, Windsor, Ontario





Figure 6

**Stationary Noise Impacts
Essex Terminal Railway Siding Yard**

Project # 23-6238

Aug 2024

1110 Tecumseh Road East, Windsor, Ontario





Figure 7

Project # 23-6238

Aug 2024

Vibration Monitoring Location

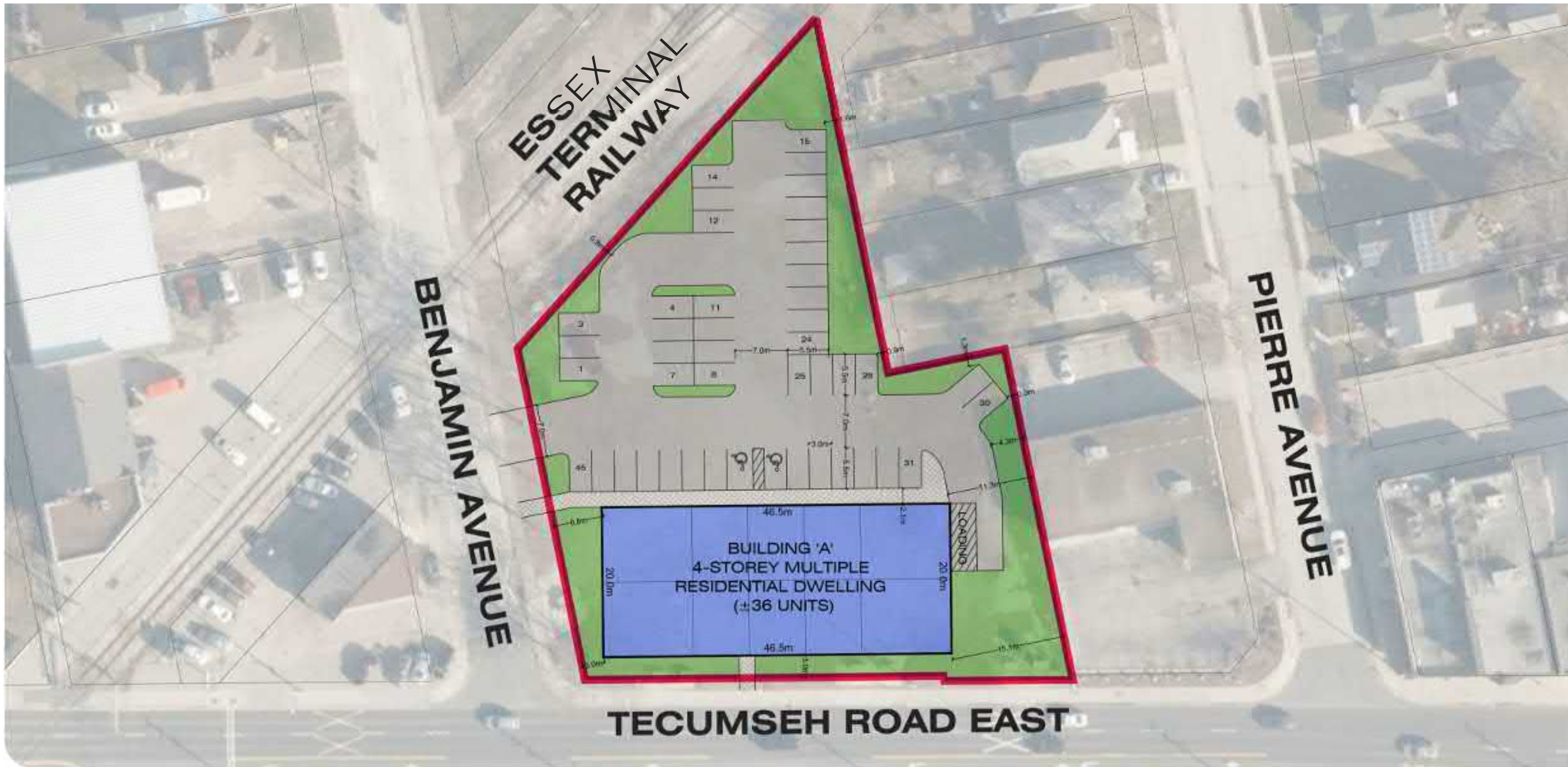
1110 Tecumseh Road East, Windsor, Ontario



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APPENDIX A

Development Site Plan



2652184 ONTARIO LTD.
1110 TECUMSEH ROAD EAST

SUBJECT AREA
(1.0 291m x 0.954m)

PROPOSED MULTI UNIT
BUILDING (1.36 LN TS)

PROPOSED LANDSCAPED
AREA

PROPOSED SIDEWALK

PROPOSED PARKING
REQUIRED PARKING: 43 SPACES
PROVIDED PARKING: 15 SPACES

PROPOSED MINIMUM SETBACKS
FRONT YARD DEPTH - 3.0m
BACK YARD DEPTH - 11.0m
EXT. SIDE YARD DEPTH - 3.0m

CONCEPTUAL DEVELOPMENT PLAN

File Location:
c:\pw working directory\projects 2023\dillon_34jmm\dms21115\23-6238 - 1110
tecumseh road east - concept plan 24-05-06.dwg
May, 06, 2024 4:44 PM

SOURCE: THE COUNTY OF ESSEX INTERACTIVE MAPPING (2021)

MAP/DRAWING INFORMATION
THIS DRAWING IS FOR INFORMATION PURPOSES ONLY. ALL
DIMENSIONS AND BOUNDARY INFORMATION SHOULD BE
VERIFIED BY AN O.L.S. PRIOR TO CONSTRUCTION.
CREATED BY: JMM
CHECKED BY: KNE
DESIGNED BY: JMM

SCALE: 1:500 (11X17)



PROJECT: 23-6238
STATUS: DRAFT
DATE: 06/05/2024

Zoning District Map 7



LEGEND:

- Zone Boundary¹
- Specific Zoning Exemptions²
S.20 (1) 267/ By-Law 127-2010
- Specific Temporary Zoning Exemptions³
- Registered Plan Parcel Limits
- Ownership Parcel Limits
- Municipal Boundary Line
- Inland Watercourse Flood Prone Area⁴
- Detroit River/Lake St.Clair Flood Prone Area⁴

NOTES:

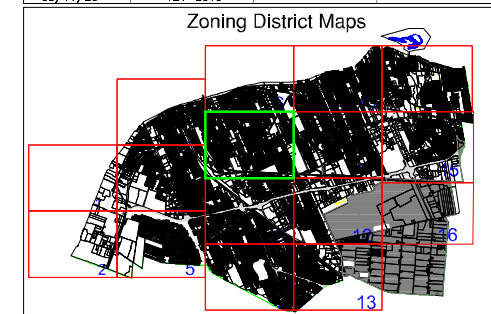
- Each Zoning District symbol corresponds to a zoning district set out in the text of By-Law 8600 (i.e. CD1.1 - Commercial District 1.1.)
- See Subsection 20(1) and the relevant clause for the specific special provisions.
- See Subsection 20(2) and the relevant clause for the specific special provisions.
- Represents the approximate limits of land subject of potential flooding along the Detroit River, Lake St. Clair and inland watercourses as determined by the Essex Region Conservation Authority (ERCA). Within these areas, buildings or structures are generally restricted and possibly prohibited. Application for building permits will be referred to ERCA for its review and the issuance of permits prior to the issuance of any building permit by the City of Windsor.

REVISIONS		REVISIONS	
DATE:	BY-LAW #	DATE:	BY-LAW #
11/05/04	82-2004	08/20/20	85-2020
11/05/04	81-2004	01/27/21	162-2020
12/05/04	87-2003	05/27/21	56-2021
07/06/04	67-2003	07/27/21	76-2021
28/07/04	208-2004	08/31/21	124-2021
17/09/04	257-2004	08/31/21	130-2021
25/11/04	333-2004	12/07/21	175-2021
15/03/05	24-2005	12/07/21	172-2021
25/10/05	254-2005	12/07/21	189-2021
06/11/05	261-2005	12/15/21	139-2021
17/01/06	300-2005	06/22/22	3-2022
Revised:	OMB File 1695	06/22/22	5-2022
13/06/06	B/L# 327, 200	06/22/22	47-2022
21/09/06	156-2006	06/27/22	68-2022
15/11/07	135-2007	09/22/22	86-2022
24/06/08	72-2008	09/22/22	118-2022
17/09/09	113-2009	11/09/22	151-2022
07/04/10	24-2010	05/18/23	20-2023
07/04/10	28-2010	07/10/23	89-2023
07/04/10	30-2010	10/30/23	143-2023
07/04/10	31-2010	12/05/23	67-2022
07/04/10	39-2010	Revised:	File OLT-22-003619
22/10/10	127-2010	11/27/23	156-2023
27/10/10	137-2010		
23/05/11	26-2011		
14/05/11	21-2011		
26/07/11	125-2011		
28/10/11	157-2011		
13/06/06	324-2004		
26/08/09	119-2009		
21/07/11	88-2010		
20/08/12	88-2012		
10/12/12	180-2012		
20/06/13	88-2013		
05/02/14	01-2014		
21/06/14	125-2011		
05/03/15	09-2015		
09/10/15	105-2015		
29/02/16	46-2002		
27/04/16	36-2016		
25/05/16	51-2016		
02/10/16	120-2016		
07/05/17	2-2017		
07/05/17	47-2017		
01/03/18	147-2017		
01/03/18	162-2017		
01/03/18	163-2017		
05/24/18	172-2017		
06/12/18	6-2018		
02/28/19	179-2018		
06/25/19	72-2019		
12/18/19	48-2019 - Correction		
12/18/19	125-2019		
03/11/20	121-2019		

This forms Part of Schedule 'A'.

City of Windsor Zoning By-law 8600

Scale 1:6000



Zoning District Map 7



APPENDIX B

Road/Rail Traffic Data

Rank	TC Number	Railway Company	Region	Province	Access	Jurisdiction	Mile	Subdivision	Spur Mile Point	Spur Name	Location	Latitude	Longitude	Road Authority	Protection	Accident	Fatality	Injury	Total Trains Daily	Vehicles Daily	Train Max Speed (mph)	Road Speed (km/h)	Lanes	Tracks	IsUrban
1691	31978	ETR	ONT	ON	Public	F	2	Mainline			Tecumseh Rd East	42.2994	-83.0092	Windsor (ON)	Active - FLB	0	0	0	2	28900	10	70	5	1	Y



Tecumseh Road East Annual Average Daily Traffic
Provided by The City of Windsor



Project #21-037 - City of Windsor

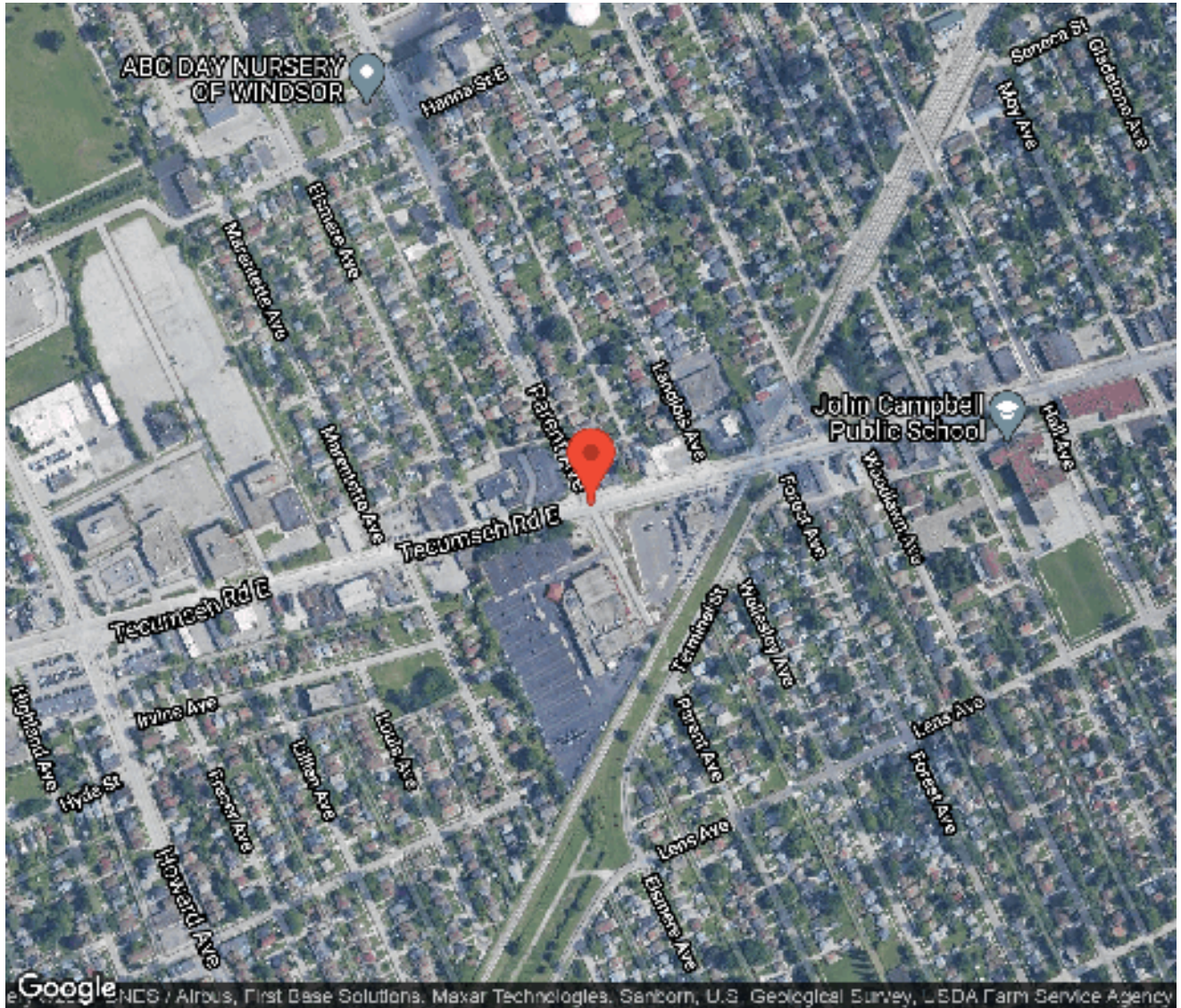
Intersection Count Report

Intersection:	TECUMSEH RD E & PARENT AVE
Municipality:	Windsor
Count Date:	Mar 23, 2021
Site Code:	2103700004
Count Categories:	Cars, Medium Trucks + Buses, Heavy Trucks, Peds, Bicycles
Count Period:	07:00-10:00, 11:00-14:00, 15:00-18:00
Weather:	Clear



Traffic Count Map

Intersection: TECUMSEH RD E & PARENT AVE
Site Code: 2103700004
Municipality: Windsor
Count Date: Mar 23, 2021





Traffic Count Summary

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

PARENT AVE - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	37	0	29	0	66	1	1	0	1	0	2	1	68
08:00 - 09:00	62	1	40	0	103	10	0	2	2	0	4	1	107
09:00 - 10:00	67	1	64	0	132	9	0	1	3	0	4	0	136
BREAK													
11:00 - 12:00	87	1	68	0	156	17	1	1	2	0	4	17	160
12:00 - 13:00	80	2	64	0	146	8	10	1	2	0	13	4	159
13:00 - 14:00	60	1	87	0	148	14	2	0	4	0	6	3	154
BREAK													
15:00 - 16:00	131	2	92	0	225	7	3	3	4	0	10	8	235
16:00 - 17:00	126	0	81	0	207	6	0	4	4	0	8	5	215
17:00 - 18:00	118	2	80	0	200	8	5	2	1	0	8	8	208
GRAND TOTAL	768	10	605	0	1383	80	22	14	23	0	59	47	1442



Traffic Count Summary

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

TECUMSEH RD E - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Medium Trucks + Buses, Heavy Trucks, Bicycles						Includes Cars, Medium Trucks + Buses, Heavy Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	1	441	60	0	502	3	45	365	0	0	410	1	912
08:00 - 09:00	1	620	63	0	684	1	76	508	2	0	586	1	1270
09:00 - 10:00	1	633	51	0	685	0	63	530	3	0	596	1	1281
BREAK													
11:00 - 12:00	2	708	58	0	768	3	76	706	2	0	784	1	1552
12:00 - 13:00	0	734	69	0	803	2	64	727	6	0	797	3	1600
13:00 - 14:00	2	790	73	0	865	4	74	724	2	0	800	0	1665
BREAK													
15:00 - 16:00	6	899	82	0	987	5	106	836	5	0	947	5	1934
16:00 - 17:00	0	754	84	0	838	2	96	836	4	0	936	3	1774
17:00 - 18:00	0	604	78	0	682	1	97	706	1	0	804	2	1486
GRAND TOTAL	13	6183	618	0	6814	21	697	5938	25	0	6660	17	13474



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

North Approach - PARENT AVE

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	6	0	8	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	6	0	6	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30	14	0	10	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	11	0	4	0	15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
08:00	9	0	10	0	19	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	5
08:15	12	0	5	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:30	25	0	15	0	40	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	2
08:45	13	1	8	0	22	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
09:00	20	0	18	0	38	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	4
09:15	15	0	15	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
09:30	17	1	18	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
09:45	14	0	11	0	25	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
SUBTOTAL	162	2	128	0	292	3	0	2	0	5	1	0	1	0	2	0	0	2	0	2	20



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

North Approach - PARENT AVE

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
11:00	22	0	14	0	36	0	1	1	0	2	1	0	0	0	1	0	0	0	0	0	4
11:15	14	0	22	0	36	1	0	0	0	1	2	0	0	0	2	0	0	0	0	0	4
11:30	19	0	18	0	37	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
11:45	27	0	13	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
12:00	17	1	19	0	37	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
12:15	18	0	14	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30	25	0	16	0	41	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	4
12:45	19	0	14	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
13:00	12	0	21	0	33	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
13:15	18	0	25	0	43	2	0	1	0	3	1	0	0	0	1	0	0	0	0	0	3
13:30	11	0	19	0	30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4
13:45	15	0	20	0	35	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5
SUBTOTAL	217	1	215	0	433	5	1	4	0	10	5	0	0	0	5	0	2	0	0	2	39



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

North Approach - PARENT AVE

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	30	1	18	0	49	2	0	1	0	3	0	0	0	0	0	0	0	1	0	1	4
15:15	34	0	23	0	57	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	1
15:30	37	0	24	0	61	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0
15:45	26	1	22	0	49	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
16:00	32	0	19	0	51	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
16:15	31	0	18	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
16:30	32	0	21	0	53	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0
16:45	31	0	20	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:00	50	0	30	0	80	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3
17:15	22	0	15	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:30	21	1	16	0	38	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
17:45	24	0	18	0	42	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
SUBTOTAL	370	3	244	0	617	4	0	5	0	9	1	0	2	0	3	0	1	2	0	3	21
GRAND TOTAL	749	6	587	0	1342	12	1	11	0	24	7	0	3	0	10	0	3	4	0	7	80



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

South Approach - PARENT AVE

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	0	2	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1	2	3	0	6	0	0	0	0	0	0	0	1	0	1	0	1	2	0	3	2



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

South Approach - PARENT AVE

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
11:00	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
11:30	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	7
12:00	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:15	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
12:45	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
13:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
13:15	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
13:45	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	12	0	6	0	18	1	0	1	0	2	0	0	0	0	0	0	2	1	0	3	24	



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

South Approach - PARENT AVE

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	1	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	3
15:30	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
15:45	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
16:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
16:30	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3
17:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
17:15	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
17:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
17:45	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
SUBTOTAL	7	6	8	0	21	0	0	0	0	0	0	0	0	0	0	1	3	1	0	5	21
GRAND TOTAL	20	8	17	0	45	1	0	1	0	2	0	0	1	0	1	1	6	4	0	11	47



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

East Approach - TECUMSEH RD E

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	0	66	10	0	76	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	2
07:15	0	108	9	0	117	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0
07:30	1	124	16	0	141	0	3	0	0	3	0	1	1	0	2	0	1	0	0	1	1
07:45	0	129	21	0	150	0	3	0	0	3	0	2	1	0	3	0	0	1	0	1	0
08:00	0	145	17	0	162	0	4	1	0	5	0	3	0	0	3	0	0	0	0	0	0
08:15	0	142	15	0	157	0	7	0	0	7	0	4	0	0	4	0	0	0	0	0	0
08:30	0	176	12	0	188	0	1	0	0	1	0	5	0	0	5	0	0	0	0	0	1
08:45	1	131	18	0	150	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
09:00	0	142	16	0	158	0	2	1	0	3	1	4	0	0	5	0	0	0	0	0	0
09:15	0	159	10	0	169	0	2	0	0	2	0	6	0	0	6	0	0	0	0	0	0
09:30	0	137	11	0	148	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0
09:45	0	170	11	0	181	0	1	1	0	2	0	5	0	0	5	0	0	1	0	1	0
SUBTOTAL	2	1629	166	0	1797	0	29	3	0	32	1	35	3	0	39	0	1	2	0	3	4



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

East Approach - TECUMSEH RD E

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
11:00	1	154	9	0	164	0	3	0	0	3	0	1	0	0	1	0	0	0	0	0	2
11:15	0	175	14	0	189	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	1
11:30	0	174	15	0	189	0	3	0	0	3	0	3	0	0	3	0	0	0	0	0	0
11:45	1	184	20	0	205	0	4	0	0	4	0	1	0	0	1	0	2	0	0	2	0
12:00	0	191	16	0	207	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	1
12:15	0	171	17	0	188	0	4	0	0	4	0	5	0	0	5	0	1	0	0	1	0
12:30	0	169	18	0	187	0	4	2	0	6	0	4	1	0	5	0	0	0	0	0	1
12:45	0	177	14	0	191	0	4	0	0	4	0	1	1	0	2	0	0	0	0	0	0
13:00	0	171	17	0	188	0	3	1	0	4	0	4	1	0	5	0	1	0	0	1	1
13:15	0	185	16	0	201	0	1	0	0	1	0	4	0	0	4	0	2	0	0	2	0
13:30	2	198	15	0	215	0	2	1	0	3	0	1	0	0	1	0	1	0	0	1	3
13:45	0	207	20	0	227	0	7	1	0	8	0	2	0	0	2	0	1	1	0	2	0
SUBTOTAL	4	2156	191	0	2351	0	37	5	0	42	0	30	3	0	33	0	9	1	0	10	9



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

East Approach - TECUMSEH RD E

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	2	251	18	0	271	0	5	0	0	5	0	0	0	0	0	0	1	0	0	1	3
15:15	2	218	20	0	240	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	1
15:30	1	213	24	0	238	0	4	0	0	4	0	1	0	0	1	0	3	1	0	4	0
15:45	1	191	19	0	211	0	4	0	0	4	0	2	0	0	2	0	0	0	0	0	1
16:00	0	181	21	0	202	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
16:15	0	187	29	0	216	0	7	0	0	7	0	5	0	0	5	0	1	0	0	1	0
16:30	0	171	16	0	187	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0
16:45	0	194	18	0	212	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	0
17:00	0	153	18	0	171	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0
17:15	0	174	21	0	195	0	3	1	0	4	0	2	0	0	2	0	0	0	0	0	1
17:30	0	145	20	0	165	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
17:45	0	119	18	0	137	0	1	0	0	1	0	1	0	0	1	0	3	0	0	3	0
SUBTOTAL	6	2197	242	0	2445	0	32	1	0	33	0	18	0	0	18	0	10	1	0	11	8
GRAND TOTAL	12	5982	599	0	6593	0	98	9	0	107	1	83	6	0	90	0	20	4	0	24	21



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

West Approach - TECUMSEH RD E

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	12	58	0	0	70	0	2	0	0	2	1	3	0	0	4	0	0	0	0	0	0
07:15	6	77	0	0	83	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0
07:30	11	109	0	0	120	0	3	0	0	3	0	4	0	0	4	0	1	0	0	1	0
07:45	13	100	0	0	113	0	4	0	0	4	2	2	0	0	4	0	0	0	0	0	1
08:00	15	126	0	0	141	1	4	0	0	5	0	0	0	0	0	0	0	0	0	0	0
08:15	17	112	0	0	129	1	4	0	0	5	0	2	0	0	2	0	0	0	0	0	1
08:30	23	136	1	0	160	2	3	0	0	5	0	1	0	0	1	0	1	0	0	1	0
08:45	16	112	1	0	129	1	4	0	0	5	0	3	0	0	3	0	0	0	0	0	0
09:00	12	120	0	0	132	0	6	0	0	6	1	1	0	0	2	0	0	0	0	0	1
09:15	13	122	1	0	136	1	1	0	0	2	1	4	0	0	5	0	0	0	0	0	0
09:30	19	135	1	0	155	1	5	0	0	6	0	1	0	0	1	0	0	0	0	0	0
09:45	15	134	1	0	150	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	172	1341	5	0	1518	7	37	0	0	44	5	23	0	0	28	0	2	0	0	2	3



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

West Approach - TECUMSEH RD E

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
11:00	20	159	0	0	179	0	3	0	0	3	0	3	0	0	3	0	0	0	0	0	0
11:15	12	185	1	0	198	0	2	0	0	2	1	2	0	0	3	0	0	0	0	0	0
11:30	18	175	1	0	194	2	3	0	0	5	0	4	0	0	4	0	0	0	0	0	0
11:45	23	164	0	0	187	0	2	0	0	2	0	4	0	0	4	0	0	0	0	0	1
12:00	22	194	2	0	218	0	3	0	0	3	0	2	0	0	2	0	1	0	0	1	2
12:15	15	162	2	0	179	0	2	0	0	2	0	3	0	0	3	0	1	0	0	1	0
12:30	12	166	2	0	180	1	4	0	0	5	0	2	0	0	2	0	0	0	0	0	1
12:45	13	179	0	0	192	0	4	0	0	4	1	3	0	0	4	0	1	0	0	1	0
13:00	29	167	1	0	197	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	0
13:15	13	173	0	0	186	1	3	1	0	5	0	0	0	0	0	0	0	0	0	0	0
13:30	13	184	0	0	197	1	5	0	0	6	1	2	0	0	3	0	0	0	0	0	0
13:45	16	178	0	0	194	0	6	0	0	6	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	206	2086	9	0	2301	5	38	1	0	44	3	29	0	0	32	0	4	0	0	4	4



Traffic Count Data

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Municipality: Windsor
 Count Date: Mar 23, 2021

West Approach - TECUMSEH RD E

Start Time	Cars					Medium Trucks + Buses					Heavy Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	26	225	1	0	252	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0
15:15	20	205	3	0	228	1	1	0	0	2	0	3	0	0	3	0	0	0	0	0	1
15:30	27	222	0	0	249	3	1	0	0	4	0	1	0	0	1	0	0	0	0	0	3
15:45	28	171	1	0	200	0	3	0	0	3	0	2	0	0	2	0	0	0	0	0	1
16:00	24	192	0	0	216	0	6	0	0	6	0	1	0	0	1	0	0	0	0	0	2
16:15	17	204	1	0	222	0	1	0	0	1	1	5	0	0	6	0	0	0	0	0	0
16:30	24	233	3	0	260	1	2	0	0	3	0	1	0	0	1	0	0	0	0	0	0
16:45	29	185	0	0	214	0	3	0	0	3	0	2	0	0	2	0	1	0	0	1	1
17:00	31	188	0	0	219	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0
17:15	27	190	0	0	217	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1
17:30	19	171	0	0	190	1	2	0	0	3	0	1	0	0	1	0	0	0	0	0	0
17:45	19	147	1	0	167	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	1
SUBTOTAL	291	2333	10	0	2634	6	22	0	0	28	2	21	0	0	23	0	2	0	0	2	10
GRAND TOTAL	669	5760	24	0	6453	18	97	1	0	116	10	73	0	0	83	0	8	0	0	8	17

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 08:30:00
To: 09:30:00

Intersection: TECUMSEH RD E & PARENT AVE
Site Code: 2103700004
Count Date: Mar 23, 2021

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: TECUMSEH RD E runs E/W

North Approach

	Out	In	Total
	130	121	251
MTB	3	5	8
HT	1	2	3
	1	1	2
Totals	135	129	264

PARENT AVE

	1	0	0	0
HT	0	0	1	0
MTB	1	0	2	0
	56	1	73	0
Totals	58	1	76	0

East Approach

	Out	In	Total
	665	565	1230
MTB	8	16	24
HT	16	11	27
	0	3	3
Totals	689	595	1284

TECUMSEH RD E

	HT	MTB		Totals
0	0	0	0	0
0	2	4	64	70
1	9	14	490	514
0	0	0	3	3

Peds: 10

Peds: 1



Peds: 1

Peds: 0

TECUMSEH RD E

Totals		MTB	HT	
0	0	0	0	0
57	56	1	0	0
630	608	7	15	0
2	1	0	1	0

West Approach

	Out	In	Total
	557	664	1221
MTB	18	8	26
HT	11	15	26
	1	1	2
Totals	587	688	1275

Totals	0	2	5	0
	0	1	2	0
MTB	0	0	0	0
HT	0	0	1	0
	0	1	2	0

PARENT AVE

South Approach

	Out	In	Total
	3	5	8
MTB	0	0	0
HT	1	1	2
	3	0	3
Totals	7	6	13

- Cars

MTB - Medium Trucks + Buses HT - Heavy Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Count Date: Mar 23, 2021
 Period: 07:00 - 10:00

Peak Hour Data (08:30 - 09:30)

Start Time	North Approach PARENT AVE						South Approach PARENT AVE						East Approach TECUMSEH RD E						West Approach TECUMSEH RD E						Total Vehic es
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
08:30	27	0	15	0	2	42	0	0	0	0	0	0	0	182	12	0	1	194	25	141	1	0	0	167	403
08:45	14	1	8	0	2	23	0	1	2	0	0	3	1	133	18	0	0	152	17	119	1	0	0	137	315
09:00	20	0	20	0	4	40	0	1	0	0	0	1	1	148	17	0	0	166	13	127	0	0	1	140	347
09:15	15	0	15	0	2	30	0	0	3	0	0	3	0	167	10	0	0	177	15	127	1	0	0	143	353
Grand Total	76	1	58	0	10	135	0	2	5	0	0	7	2	630	57	0	1	689	70	514	3	0	1	587	1418
Approach %	56.3	0.7	43	0	-	-	0	28.6	71.4	0	-	-	0.3	91.4	8.3	0	-	-	11.9	87.6	0.5	0	-	-	-
Totals %	5.4	0.1	4.1	0	9.5	0	0.1	0.4	0	0.5	0.1	44.4	4	0	48.6	4.9	36.2	0.2	0	41.4					
PHF	0.7	0.25	0.73	0	0.8	0	0.5	0.42	0	0.58	0.5	0.87	0.79	0	0.89	0.7	0.91	0.75	0	0.88	0.88	0.88	0.88	0.88	0.88
Cars	73	1	56	0	130	0	1	2	0	3	1	608	56	0	665	64	490	3	0	557	1355				
% Cars	96.1	100	96.6	0	96.3	0	50	40	0	42.9	50	96.5	98.2	0	96.5	91.4	95.3	100	0	94.9	95.6				
Medium Trucks + Buses	2	0	1	0	3	0	0	0	0	0	0	7	1	0	8	4	14	0	0	18	29				
% Medium Trucks + Buses	2.6	0	1.7	0	2.2	0	0	0	0	0	0	1.1	1.8	0	1.2	5.7	2.7	0	0	3.1	2				
Heavy Trucks	1	0	0	0	1	0	0	1	0	1	1	15	0	0	16	2	9	0	0	11	29				
% Heavy Trucks	1.3	0	0	0	0.7	0	0	20	0	14.3	50	2.4	0	0	2.3	2.9	1.8	0	0	1.9	2				
Bicycles	0	0	1	0	1	0	1	2	0	3	0	0	0	0	0	0	1	0	0	1	5				
% Bicycles	0	0	1.7	0	0.7	0	50	40	0	42.9	0	0	0	0	0	0	0.2	0	0	0.2	0.4				
Peds					10	-				0	-					1	-			1	-	12			
% Peds					83.3	-				0	-					8.3	-			8.3	-				

Peak Hour Diagram

Specified Period

From: 11:00:00
To: 14:00:00

One Hour Peak

From: 13:00:00
To: 14:00:00

Intersection: TECUMSEH RD E & PARENT AVE
Site Code: 2103700004
Count Date: Mar 23, 2021

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: TECUMSEH RD E runs E/W

North Approach

	Out	In	Total
	141	139	280
MTB	4	5	9
HT	2	2	4
	1	1	2
Totals	148	147	295

PARENT AVE

	0	1	0	0
HT	0	0	2	0
MTB	2	0	2	0
	85	0	56	0
Totals	87	1	60	0

East Approach

	Out	In	Total
	831	761	1592
MTB	16	18	34
HT	12	8	20
	6	1	7
Totals	865	788	1653

TECUMSEH RD E

	HT	MTB		Totals
0	0	0	0	0
0	1	2	71	74
1	6	15	702	724
0	0	1	1	2

Peds: 14

Peds: 0



Peds: 4

Peds: 3

TECUMSEH RD E

Totals		MTB	HT	
0	0	0	0	0
73	68	3	1	1
790	761	13	11	5
2	2	0	0	0

West Approach

	Out	In	Total
	774	847	1621
MTB	18	16	34
HT	7	11	18
	1	5	6
Totals	800	879	1679

Totals	2	0	4	0
	1	0	3	0
MTB	1	0	1	0
HT	0	0	0	0
	0	0	0	0

PARENT AVE

South Approach

	Out	In	Total
	4	3	7
MTB	2	1	3
HT	0	0	0
	0	1	1
Totals	6	5	11

- Cars

MTB - Medium Trucks + Buses HT - Heavy Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Count Date: Mar 23, 2021
 Period: 11:00 - 14:00

Peak Hour Data (13:00 - 14:00)

Start Time	North Approach PARENT AVE						South Approach PARENT AVE						East Approach TECUMSEH RD E						West Approach TECUMSEH RD E						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
13:00	12	0	22	0	2	34	0	0	1	0	1	1	0	179	19	0	1	198	29	170	1	0	0	200	433
13:15	21	0	26	0	3	47	0	0	1	0	0	1	0	192	16	0	0	208	14	176	1	0	0	191	447
13:30	11	1	19	0	4	31	1	0	1	0	1	2	2	202	16	0	3	220	15	191	0	0	0	206	459
13:45	16	0	20	0	5	36	1	0	1	0	1	2	0	217	22	0	0	239	16	187	0	0	0	203	480
Grand Total	60	1	87	0	14	148	2	0	4	0	3	6	2	790	73	0	4	865	74	724	2	0	0	800	1819
Approach %	40.5	0.7	58.8	0	-	-	33.3	0	66.7	0	-	-	0.2	91.3	8.4	0	-	-	9.3	90.5	0.3	0	-	-	-
Totals %	3.3	0.1	4.8	0	8.1	-	0.1	0	0.2	0	0.3	-	0.1	43.4	4	0	47.6	-	4.1	39.8	0.1	0	-	44	-
PHF	0.71	0.25	0.84	0	0.79	-	0.5	0	1	0	0.75	-	0.25	0.91	0.83	0	0.9	-	0.64	0.95	0.5	0	0.97	0.95	-
Cars	56	0	85	0	141	-	1	0	3	0	4	-	2	761	68	0	831	-	71	702	1	0	774	1750	
% Cars	93.3	0	97.7	0	95.3	-	50	0	75	0	66.7	-	100	96.3	93.2	0	96.1	-	95.9	97	50	0	96.8	96.2	-
Medium Trucks + Buses	2	0	2	0	4	-	1	0	1	0	2	-	0	13	3	0	16	-	2	15	1	0	18	40	
% Medium Trucks + Buses	3.3	0	2.3	0	2.7	-	50	0	25	0	33.3	-	0	1.6	4.1	0	1.8	-	2.7	2.1	50	0	2.3	2.2	-
Heavy Trucks	2	0	0	0	2	-	0	0	0	0	0	-	0	11	1	0	12	-	1	6	0	0	7	21	
% Heavy Trucks	3.3	0	0	0	1.4	-	0	0	0	0	0	-	0	1.4	1.4	0	1.4	-	1.4	0.8	0	0	0.9	1.2	-
Bicycles	0	1	0	0	1	-	0	0	0	0	0	-	0	5	1	0	6	-	0	1	0	0	1	8	
% Bicycles	0	100	0	0	0.7	-	0	0	0	0	0	-	0	0.6	1.4	0	0.7	-	0	0.1	0	0	0.1	0.4	-
Peds	-	-	-	-	14	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	0	-	21
% Peds	-	-	-	-	66.7	-	-	-	-	-	14.3	-	-	-	-	-	19	-	-	-	-	-	0	-	-

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 15:00:00
To: 16:00:00

Intersection: TECUMSEH RD E & PARENT AVE
Site Code: 2103700004
Count Date: Mar 23, 2021

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: TECUMSEH RD E runs E/W

North Approach

	Out	In	Total
	216	184	400
MTB	6	4	10
HT	2	1	3
	1	2	3
Totals	225	191	416

PARENT AVE

	1	0	0	0
HT	1	0	1	0
MTB	3	0	3	0
	87	2	127	0
Totals	92	2	131	0

East Approach

	Out	In	Total
	960	953	1913
MTB	18	8	26
HT	4	9	13
	5	1	6
Totals	987	971	1958

TECUMSEH RD E

	HT	MTB		Totals
0	0	0	0	0
0	1	4	101	106
0	8	5	823	836
0	0	0	5	5

Peds: 7



Peds: 5

Peds: 5

Peds: 8

TECUMSEH RD E

Totals		MTB	HT	
0	0	0	0	0
82	81	0	0	1
899	873	18	4	4
6	6	0	0	0

West Approach

	Out	In	Total
	929	962	1891
MTB	9	21	30
HT	9	5	14
	0	6	6
Totals	947	994	1941

Totals	3	3	4	0
	2	2	3	0
MTB	0	0	0	0
HT	0	0	0	0
	1	1	1	0

PARENT AVE

South Approach

	Out	In	Total
	7	13	20
MTB	0	0	0
HT	0	0	0
	3	0	3
Totals	10	13	23

- Cars

MTB - Medium Trucks + Buses HT - Heavy Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: TECUMSEH RD E & PARENT AVE
 Site Code: 2103700004
 Count Date: Mar 23, 2021
 Period: 15:00 - 18:00

Peak Hour Data (15:00 - 16:00)

Start Time	North Approach PARENT AVE						South Approach PARENT AVE						East Approach TECUMSEH RD E						West Approach TECUMSEH RD E						Total Vehi cles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
15:00	32	1	20	0	4	53	0	0	0	0	0	0	2	257	18	0	3	277	27	227	1	0	0	255	585
15:15	34	0	25	0	1	59	1	2	2	0	3	5	2	224	20	0	1	246	21	209	3	0	1	233	543
15:30	39	0	24	0	0	63	0	0	2	0	4	2	1	221	25	0	0	247	30	224	0	0	3	254	566
15:45	26	1	23	0	2	50	2	1	0	0	1	3	1	197	19	0	1	217	28	176	1	0	1	205	475
Grand Total	131	2	92	0	7	225	3	3	4	0	8	10	6	899	82	0	5	987	106	836	5	0	5	947	2169
Approach %	58.2	0.9	40.9	0	-	-	30	30	40	0	-	-	0.6	91.1	8.3	0	-	-	11.2	88.3	0.5	0	-	-	-
Totals %	6	0.1	4.2	0	10.4	-	0.1	0.1	0.2	0	0.5	-	0.3	41.4	3.8	0	45.5	-	4.9	38.5	0.2	0	-	43.7	-
PHF	0.84	0.5	0.92	0	0.89	0.38	0.38	0.5	0	0.5	0.75	0.87	0.82	0	0.89	0.88	0.92	0.42	0	0.93	0.93	0.93	0.93	0.93	
Cars	127	2	87	0	216	7	2	2	3	0	7	7	6	873	81	0	960	101	823	5	0	929	2112		
% Cars	96.9	100	94.6	0	96	70	66.7	66.7	75	0	70	70	100	97.1	98.8	0	97.3	95.3	98.4	100	0	98.1	97.4	97.4	
Medium Trucks + Buses	3	0	3	0	6	0	0	0	0	0	0	0	0	18	0	0	18	4	5	0	0	9	33		
% Medium Trucks + Buses	2.3	0	3.3	0	2.7	0	0	0	0	0	0	0	0	2	0	0	1.8	3.8	0.6	0	0	1	1.5	1.5	
Heavy Trucks	1	0	1	0	2	0	0	0	0	0	0	0	0	4	0	0	4	1	8	0	0	9	15		
% Heavy Trucks	0.8	0	1.1	0	0.9	0	0	0	0	0	0	0	0	0.4	0	0	0.4	0.9	1	0	0	1	0.7	0.7	
Bicycles	0	0	1	0	1	1	1	1	1	0	3	3	0	4	1	0	5	0	0	0	0	0	0	9	
% Bicycles	0	0	1.1	0	0.4	33.3	33.3	25	0	30	30	30	0	0.4	1.2	0	0.5	0	0	0	0	0	0	0.4	
Peds					7	-					8	-					5	-					5	-	25
% Peds					28	-					32	-					20	-					20	-	-



APPENDIX C

Warning Clauses and Building Component Analysis

Warning Clauses

All warning clauses should be included in agreements that are registered on title for all Offers of Purchase and Sale, lease/rental agreements, and condominium declarations.

Type C: "This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

Type D: "This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

Type E: "Purchasers/tenants are advised that due to the proximity of adjacent industries, noise from the industries may at times be audible."

Type F: "Purchasers/tenants are advised that sound levels due to the adjacent industries are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."

Essex Terminal Railway Warning Clause: "Warning: Essex Terminal Railway or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). Essex Terminal Railway will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."



APPENDIX D

Stamson Modelling

Filename: TSouth.te Time Period: 1 hours
Description: 1110 Tecumseh Rd East - South Facade

Road data, segment # 1: tecumseh

Car traffic volume : 1900 veh/TimePeriod
Medium truck volume : 30 veh/TimePeriod
Heavy truck volume : 14 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: tecumseh

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface) Receiver source distance : 15.00 m
Receiver height : 10.50 m
Topography : 1 (Flat/gentle slope; no barrier) Reference angle : 0.00

Results segment # 1: tecumseh

Source height = 0.92 m

ROAD (0.00 + 66.18 + 0.00) = 66.18 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq -----
----- -90 90
0.41 67.18 0.00 0.00 -1.00 0.00 0.00 0.00 66.18 -----

Segment Leq : 66.18 dBA

Total Leq All Segments: 66.18 dBA

TOTAL Leq FROM ALL SOURCES: 66.18

Filename: tnorth.te Time Period: 16 hours
 Description: 1110 Tecumseh Road East - North Facade

Rail data, segment # 1: ETR

```

-----
Train          ! Trains      ! Trains      ! Speed !#
Loc !# Cars! Eng !Cont
Type          ! (Left)      ! (Right)     ! (km/h)
!/Train!/Train! type !weld
-----+-----+-----+-----+-----
----+-----+-----+-----
  1.          ! 0.5/0.5    ! 0.5/0.5    ! 16.0 !
6.0 !224.0 !Diesel! No
  
```

Data for Segment # 1: ETR

```

-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      :           0   (No woods.)
No of house rows :           0
Surface         :           1   (Absorptive
ground surface)
Receiver source distance : 48.00 m
Receiver height  : 10.50 m
Topography      :           1   (Flat/gentle
slope; no barrier)
Whistle Angle   :           0 deg   Track 1
Reference angle  :           0.00
  
```

↑
 Results segment # 1: ETR

```

-----
LOCOMOTIVE (0.00 + 54.56 + 0.00) = 54.56 dBA
Angle1 Angle2 Alpha RefLeq D. Adj F. Adj W. Adj H. Adj
  
```

Phase 1 - Impulsive

B. Adj SubLeq

 -90 90 0.31 62.00 -6.64 -0.80 0.00 0.00
 0.00 54.56

WHEEL (0.00 + 42.19 + 0.00) = 42.19 dBA

Angle1 Angle2 Alpha RefLeq D. Adj F. Adj W. Adj H. Adj
 B. Adj SubLeq

 -90 90 0.42 50.38 -7.17 -1.02 0.00 0.00
 0.00 42.19

LEFT WHISTLE (0.00 + 56.00 + 0.00) = 56.00 dBA

Angle1 Angle2 Alpha RefLeq D. Adj F. Adj W. Adj H. Adj
 B. Adj SubLeq

 -83 0 0.31 66.61 -6.64 -3.97 0.00 0.00
 0.00 56.00

RIGHT WHISTLE (0.00 + 56.00 + 0.00) = 56.00 dBA

Angle1 Angle2 Alpha RefLeq D. Adj F. Adj W. Adj H. Adj
 B. Adj SubLeq

 0 83 0.31 66.61 -6.64 -3.97 0.00 0.00
 0.00 56.00

Segment Leq : 60.41 dBA

Phase 1 - Impulsive

Total Leq All Segments: 60.41 dBA



TOTAL Leq FROM ALL SOURCES: 60.41





APPENDIX E

D-6 Classification Criteria

Category	Outputs	Scale	Process	Operations/Intensity	Possible Examples
Class I	<ul style="list-style-type: none"> • Noise: Sound not audible off property • Dust and/or Odour: Infrequent and not intense • Vibration: No ground borne vibration on plant property 	<ul style="list-style-type: none"> • No outside storage • Small scale plant or scale is irrelevant in relation to all other criteria for this Class 	<ul style="list-style-type: none"> • Self-contained plant or building which produces/stores a packaged product. Low probability of fugitive emissions 	<ul style="list-style-type: none"> • Daytime operations only • Infrequent movement of products and/or heavy trucks 	<ul style="list-style-type: none"> • Electronics manufacturing and repair • Furniture repair and refinishing • Beverages bottling • Auto parts supply • Packaging and crafting services • Distribution of dairy products • Laundry and linen supply
Class II	<ul style="list-style-type: none"> • Noise: Sound occasionally audible off property • Dust and/or Odour: Frequent and occasionally intense • Vibration: Possible groundborne vibration, but cannot be perceived off property 	<ul style="list-style-type: none"> • Outside storage permitted • Medium level of production allowed 	<ul style="list-style-type: none"> • Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions 	<ul style="list-style-type: none"> • Shift operations permitted • Frequent movement of products and/or heavy trucks with the majority of movements during daytime hours 	<ul style="list-style-type: none"> • Magazine printing • Paint spray booths • Metal command • Electrical production manufacturing • Manufacturing of dairy products • Dry cleaning services • Feed packing plant
Class III	<ul style="list-style-type: none"> • Noise: sound frequently audible off property • Dust and/or Odour: Persistent and/or intense • Vibration: Ground-borne vibration can frequently be perceived off property 	<ul style="list-style-type: none"> • Outside storage of raw and finished products • Large production levels 	<ul style="list-style-type: none"> • Open process • Frequent outputs of major annoyances • High probability of fugitive emissions 	<ul style="list-style-type: none"> • Continuous movement of products and employees • Daily shift operations permitted 	<ul style="list-style-type: none"> • Manufacturing of paint and varnish • Organic chemicals manufacturing • Breweries • Solvent recovery plants • Soaps and detergent manufacturing • Manufacturing of resins and costing • Metal manufacturing

REFERENCES

Ontario Ministry of Environment Publication NPC-300, Environmental Noise Guideline, Stationary and Transportation Sources- Approval and Planning, October 2013.

US FTA Transit Noise and Vibration Impact Assessment Manual, 2018

Guidelines for New Development in Proximity to Railway Operations, Railway Association of Canada and Federation of Canadian Municipalities, May 2013.