

Appendix D

Noise Impact Assessment



CONSULTING ENGINEERS
& SCIENTISTS

DRAFT REPORT

**BANWELL RD FROM TECUMSEH RD EAST TO
THE CPR TRACKS SOUTH OF INTERSECTION RD
NOISE IMPACT ASSESSMENT
CITY OF WINDSOR, ONTARIO**

Project Number: # 0940515

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1. INTRODUCTION

RWDI AIR Inc. (RWDI) was retained by IBI Group (IBI) to conduct an environmental noise impact assessment of the proposed realignment and lane additions to Banwell Road from Tecumseh Road east to the CPR tracks south of Intersection Rd in the City of Windsor, Ontario.

The objective of the study is to update the traffic volumes and minor road alignments from the previous noise study completed in 2007. The report for the 2007 study is entitled “Banwell Rd from Tecumseh Rd East to the CPR tracks south of Intersection Rd, Noise Impact Assessment, City of Windsor, Ontario” written by RWDI Air Inc., September 25, 2007 (2007 RWDI report). This new study updates the traffic data, minor road alignments, and investigation of potential noise mitigation measures.

A glossary of commonly used noise terminology can be found in Appendix A.

1.1 Project Description (Nature of the Undertaking)

The proposed improvements consist of a slight relocation and widening of a 2.6 km long portion of Banwell Road from just north of the Canadian Pacific rail line to Tecumseh Road from two lanes to four lanes. An overpass will be constructed for EC Row Expressway access with appropriate interchanges. Finally, resurfacing the remainder of the roadway will complete the project. Figure 1 illustrates the project limits. Of primary interest is the potential roadway noise impact on residences located along Banwell Road. A new business and commercial area will be developed south of EC Row and is the motivation for the updated study. The proposed business and commercial areas are anticipated to increase the projected traffic volumes used in the 2007 RWDI report.

2. ROAD TRAFFIC NOISE IMPACTS (OPERATIONAL NOISE)

For surface transportation projects it is the operation and maintenance noise, relating to noise from operation of the project following project completion, which is of primary importance. This section of the report provides an evaluation of noise impacts from road traffic noise resulting from the proposed undertaking.

2.1 Applicable Guidelines

There are several transportation noise guidelines that are applicable to this project. Ontario Provincial policies and guidelines from MTO and MOE are directly applicable under the Provincial Class EA process for transportation projects, and are discussed in detail in this report. The documents and policies related to assessing road traffic noise impacts:

- Ontario MOE/MTO, “Joint Protocol”, A Protocol for Dealing With Noise Concerns during the Preparation, Review and Evaluation of Provincial Highway’s Environmental Assessments (MTO & MOE, 1986);
- Ontario MTO, Environmental Office Manual Technical Areas – Noise, EO-V-1000-00 (MTO 1992b); and
- Ontario MTO, Environmental Reference for Highway Design (MTO 2002).

These guidelines generally apply to roadway construction and reconstruction of municipal roads and provincial highways.

The MTO has released an official version of the *Environmental Guide for Noise* (MTO 2006, Version 1.1 July 2008) since the 2007 RWDI report. This guideline applies to major roadway construction and reconstruction of new provincial highways and freeways. This guideline has not been used in this analysis as it does not apply to this situation.

The Joint Protocol evaluates the impact of a project based on an objective level, as well as on a change in sound level. It sets out an Outdoor Objective sound level of 55 dBA L_{eq} or the existing ambient, whichever is higher. The outdoor objective sound level is used to evaluate cumulative sound levels from a 10-year future horizon year (i.e. on traffic volumes 10 years after the completion of the project). Accordingly, a design year of 2027 applies to this project. Once the outdoor objective sound level is reached, the change in sound level is used to evaluate the need for noise mitigation measures.

Noise mitigation is warranted when increases in sound level over the no-build ambient are 5 dB and greater. Mitigation measures can include noise barriers, noise reducing asphalts, and changes in vertical profiles and horizontal alignments. Noise mitigation, where applied, must be administratively, economically and technically feasible, and must provide at least 5 dB of reduction averaged over the first row of noise-sensitive receivers. Mitigation measures are restricted to locations within the roadway right-of-way. Off right-of-way noise mitigation, such as window upgrades and air conditioning are not considered. Noise mitigation requirements are summarized below:

Table 1: Summary of Mitigation Efforts Under Ontario Road Traffic Noise Guidelines

Existing and Future Sound Levels	Change in Noise Level Above Future “No-Build” Ambient (dBA)	Mitigation Effort Required
< 55 dBA	0 to 5	<ul style="list-style-type: none"> None
	> 5	<ul style="list-style-type: none"> None. Sound levels still below 55 dBA Objective
> 55 dBA	0 to 5	<ul style="list-style-type: none"> None
	> 5	<ul style="list-style-type: none"> Investigate noise control measures within right-of-way Noise control measures where used must provide a minimum of 5 dBA of attenuation, averaged over the first row of receivers Mitigated to as close to ambient as possible, where technically, economically and administratively feasible

Notes: Values are L_{eq} (16h) levels for municipal and Provincial Highways, and L_{eq} (24h) for Freeways

Under MTO and MOE policies, L_{eq} (24h) sound levels are used to assess impacts from freeways (400-series major highways), and daytime L_{eq} (16h) sound levels are used to assess impacts from all other Provincial highways and Municipal roadways. As this project is a municipal highway, L_{eq} (16h) values have been used in the assessment.

The Environmental Office Manual, Environmental Reference for Highway Design, and Draft Environmental Guide For Noise are all MTO documents that serve as detailed technical references for assessing vehicular road traffic noise on provincial highways in Ontario.

2.2 Location of Noise Sensitive Areas

2.2.1 Definition of Noise Sensitive Areas

Under current MTO policies, Noise Sensitive Areas (NSAs) include the following land uses, provided they have an Outdoor Living Area (OLA) associated with them (MTO 1996a, 1996b):

- Private homes (single family units and townhouses);
- Multiple unit buildings such as apartments, provided they have a communal OLA associated with them; and
- Hospitals and nursing homes for the aged, provided they have an OLA for use by patients.

The MTO has indicated in its draft Environmental Noise Guide that the following land uses, which are not considered noise sensitive, may be considered as noise sensitive areas in the future:

- Schools, educational facilities and daycare centres where there are OLAs for students;
- Campgrounds that provide overnight accommodation; and
- Hotels and motels with outdoor communal OLAs (e.g., swimming pools) for visitors.

The following land uses are generally not considered by either the MTO or MOE to qualify as NSAs:

- Apartment balconies;
- Cemeteries;
- Parks and picnic areas not part of a defined OLA;
- All commercial; and
- All industrial.

2.2.2 Future Land Uses

Lands that have been zoned for future noise sensitive uses but where NSAs do not currently exist must also be considered under MTO / MOE policies (lands with a plan of subdivision in place). A review of the land use zoning within the project area has been conducted. Land use maps can be found in Appendix B. The land use zoning review indicates no zoned-for-future-use NSAs. Any future noise sensitive land use should be developed with regard to the planned road configuration. A new business and commercial area will be developed south of EC Row and is the motivation for the updated study. The proposed business and commercial areas are anticipated to increase the projected traffic volumes used in the 2007 RWDI report.

2.2.3 Location and Number of NSAs within the Area of Investigation

There are three representative NSAs within the study area for this project, meeting the MTO requirements discussed above. They are three individual or groups of existing single family homes. The NSA's are shown in Figure 1.

2.2.4 Representative NSAs for Analysis

A number of locations NSAs that are representative of potential noise impacts at the noise sensitive areas have been identified and used in the analysis. These representative NSA locations are shown in Figure 1 and described in the following table.

Table 2: Representative NSAs Considered in Analysis

Receptor Location	Description	Distance to Edge of Pavement^[1] (m)	Approx. No. of NSAs Represented^[2]
NR1	Home at 3169 Viola Crescent	24	37
NR2	Home at 11300 Timber Bay Crescent	21	30
NR3	Home at 3463 Banwell Road	8	6

Notes: [1] Distance is with respect to the closest lane of the proposed Banwell Road to the receptor location.
 [2] NSAs represented are houses in the area of the modelled receptor.

The point of reception for impact assessment is the Outdoor Living Area (OLA) of noise sensitive land uses. The OLA may be situated on any side of the receptor, but is generally taken to be the back yard. For assessment purposes, it is taken as a point 3 m from the façade of the receptor, and 1.5 m (composite average height of a standing/sitting person) above the ground surface. Where the actual position of the OLA is unknown, the side closest to the proposed roadway has been assumed. The locations of the points of reception used in the analysis are shown in Figure 1.

The final design of Banwell Road (which is beyond the scope of this study) will be a widening of Banwell Road from 4 lanes to 6 lanes, from EC Row Expressway southerly to the end of the project limits. This change will remove all noise NSAs south of EC Row Expressway that are within this area along Banwell Road and convert them into business or commercial land uses. This will affect NSA identified as NR3.

2.3 Road Traffic Data

Future build traffic data (included directional volumes) was provided by IBI as PM peak hour traffic volumes considered to reflect capacity at full development of this phase (2027 year) within the study area. Existing traffic data (2005 year) were provided in the 2007 RWDI report as PM peak hour traffic volumes as well. The PM peak hour traffic volumes are representative of approximately 10% of the AADT for the roadway. Commercial truck percentage of 3.5% on Banwell Road was documented in the report created by Paradigm Transportation Solution Limited reports dated July 2007 and March 2009. Commercial truck percentage was assumed to be 40% on EC Row Expressway as per the 2007 RWDI report. Medium and heavy truck breakdowns of 38%/62% and 25%/75% on Banwell Road and EC Row Expressway, respectively were used in the analysis.

The traffic data used in the assessment is summarized in the following tables. Raw traffic data can be found in Appendix C.

Table 3: Future “No-Build” Year 2005 Traffic Data

Road	2005 AADT	# of Medium/Heavy Trucks	Posted Speed Limit (km/h)
Banwell Road Southbound (between South Service Road and EC Row)	3,970	45/73	60
Banwell Road Northbound (between South Service Road and EC Row)	3,560	40/66	60
EC Row Expressway Westbound (West of Banwell Road)	13,240	900/2701	100
EC Row Expressway Eastbound (West of Banwell Road)	23,330	1586/4759	100
EC Row Expressway Westbound (East of Banwell Road)	11,610	789/2368	80
EC Row Expressway Eastbound (East of Banwell Road)	18,940	1288/3864	80
Banwell Road Southbound (between Wildwood Drive and EC Row)	6,500	73/120	50
Banwell Road Northbound (between Mulberry Drive and EC Row)	7,880	89/145	50
Banwell Road Southbound (between Tecumseh Road and Wildwood Drive)	5,560	63/103	50
Banwell Road Northbound (between Palmetto Street and Mulberry Drive)	6,360	72/117	50

Table 4: Future “Build” Year 2027 Traffic Data

Road	2027 AADT	# of Medium/Heavy Trucks	Posted Speed Limit (km/h)
Banwell Rd Southbound (between EC Row and Fanelli Access)	20,300	229/374	60
Banwell Rd Northbound (between EC Row and Fanelli Access)	13,690	155/253	60
EC Row Expressway Westbound (West of Banwell Rd)	24,500	1666/4998	100
EC Row Expressway Westbound (on Ramp from Southbound Banwell rd)	4,560	52/84	50
EC Row Expressway Eastbound (West of Banwell Rd)	36,750	2499/7497	100
Banwell Rd Southbound (between Wildwood Dr and EC Row)	19,280	218/356	50
Banwell Rd Northbound (between Mulberry Dr and EC Row)	16,390	185/302	50
Banwell Rd Southbound (between Future Access and Wildwood Dr)	10,550	119/195	50
Banwell Rd Northbound (between Palmetto St and Mulberry Dr)	17,510	198/323	50

2.4 Noise Model Used

Road traffic noise levels were modelled using a spreadsheet model of the “Ontario Road Noise Analysis Method for Environmental Transportation (ORNAMENT)” algorithms (MOE 1989). The algorithms in this spreadsheet form the basis of the STAMSON v5.03 computer program produced by the MOE (MOE 1996). Results from the ORNAMENT calculations and STAMSON are equivalent. Sound levels were predicted using the spreadsheet for both the future “no-build” and future “build” cases. The ORNAMENT model was selected as road-receiver geometries and intervening terrain within the project are relatively “simple”, and the potential for impacts (sound level increases greater than 5 dBA) to result from the proposed undertaking is small.

The following factors were taken into account in the analysis:

- Horizontal and vertical road-receiver geometry;
- Road gradients;
- Intervening terrain types (ground absorption);
- Traffic volumes and percentage of trucks;
- Vehicle speeds; and
- Screening provided by terrain, and houses.

Distances, roadway heights, gradients and receptor locations were obtained from plan drawings and aerial photographs supplied by IBI and 2007 RWDI report.

2.4.1 Existing Noise Barriers

There are no existing noise barriers within the project study area.

2.5 Determination of Potential Impacts

Under the applicable MOE and MTO Protocols and Directives, the assessment of impact is conducted by comparing future “build” sound levels (with the project in place) with future “no-build” sound levels. As indicated previously, future “no-build” traffic data was not available, and therefore year 2005 traffic volumes have been conservatively used instead. Even in a “no-build” situation, traffic volumes would be expected to grow beyond existing levels. Therefore using present year 2005 traffic volumes exaggerates the potential change due to the project and is extra conservative.

Table 5 presents a comparison of future “build” versus future “no-build” sound levels. Sample calculations can be found in Appendix D.

Table 5: Future Noise Levels With and Without the Undertaking - Unmitigated

Receptor Location	No. of NSAs Represented	Future “Build” L _{eq} (16h)	Future “No-Build” L _{eq} (16h)	Change ^[1] (“Build” minus “No-Build”)
NR1	37	62	57	5
NR2	30	63	63	-1
NR3	6	70	64	6

Notes: – All sound levels are in dBA
[1] Discrepancies in values are due to rounding

In keeping with MTO requirements, impacts are also ranked in terms of increasing future “build” sound level (in Table 6), and increasing change in sound level (in Table 7)

Table 6: Ranking of Absolute Future “Build” Noise Levels - Unmitigated

Future Build Sound Level	Receptors in Category	Total No. of Affected NSAs
45 to < 50 dBA	-	-
50 to < 55 dBA	-	-
55 to < 60 dBA	-	-
60 to < 65 dBA	NR1 and NR2	67
65 to < 70 dBA	-	-
70 dBA or greater	NR3	6

Notes: – All sound levels are in dBA

Table 7: Ranking of Change in Sound Levels - Unmitigated

Future Build Sound Level	Receptors in Category	Total No. of Affected NSAs
Increase in Sound Level	> 15 dBA	-
	> 10 to 15 dBA	-
	> 5 to 10 dBA	NR1 and NR3
	0 to 5 dBA	-
Decrease in Sound Level	-5 to < 0 dBA	NR2
	-10 to < -5 dBA	-
	-15 to < -10 dBA	-
	> -15 dBA	-

Notes: – All sound levels are in dBA

The representative NSA's NR1 and NR3 are shown to have changes greater than 5 dB in sound exposures, resulting from the proposed project. As a result, under the applicable MOE and MTO Protocols and Directives, investigation of noise mitigation is required in these areas.

2.6 Investigation of Noise Mitigation

Based on the projected increase in sound levels resulting from the project, an investigation of noise mitigation measures is required.

- Noise mitigation should be investigated within the right-of-way (off-right-of-way noise mitigation measures such as window upgrades and air conditioning are not considered).
- Mitigation measures should achieve at least 5 dB of attenuation over the first row of affected receivers
- Mitigation should be implemented where administratively, technically and economically feasible.

2.6.1 Potential Noise Mitigation Measures

Noise mitigation measures that in general can feasibly be implemented within the right-of-way include:

- Changes to vertical and horizontal alignments
- Changes to pavement surface types.
- Acoustical barriers (noise walls and berms)

Horizontal and Vertical Alignments

Horizontal changes in alignment can result in increases or decreases in noise levels at noise sensitive receptors, through moving the roadway closer or further away. However, the changes that result are limited, since the distance to the roadway must be doubled for a 3 to 5 dB decrease in noise level to result. For this particular project, the alignment is constrained by the location and width of the right-of-way, and the location of noise sensitive receptors. Changes to the horizontal alignment within the right-of-way will result in negligible changes in sound levels at NSAs and therefore this mitigation method has not been investigated further.

Vertical changes in alignment can affect noise at NSAs by affecting the line-of-sight between the roadway sources and the receiver. This affects ground attenuation and barrier effects of the surrounding topography. For example, placing the roadway at the bottom of a shallow in-cut can create a natural barrier effect at the edge of the excavation. However, this may create drainage issues or other issues with highway construction and maintenance. Paradoxically, elevated roadways located on embankments or structures may also have reduced noise levels, as the structure/berm can act as a noise barrier for ground level receptors, blocking the line-of-sight for roadway lanes on the “far side” of the road from the receptor in question. For the project in question, changes in the vertical alignment are constrained by the existing roadway base course and structures, and therefore any changes in vertical profile that can be accommodated will result in negligible acoustical changes off-site. Therefore, this mitigation method has not been investigated further

Pavement Type

For vehicles travelling at highway speeds, the majority of the noise produced is due to interactions between the tires and pavement surface. The type of pavement surface can therefore substantially affect off-site noise levels. The following table illustrates the relative sound levels produced by different pavement types and the relative cost per tonne for asphalt pavements (concrete pavement costs are subject to more variables in the design of the system).

Table 8: Noise Emission Level From Various Pavement Types (Relative to “Normal”)

Pavement Type	Relative Sound Emission Level (dB)	Approximate Costs ^[1]
Grooved Concrete	+ 1 to + 4	Variable
Normal Dense-graded Friction Course (DFC)	0	\$45 / tonne
Open-graded Friction Course (OFC)	- 2.5	\$65 / tonne to \$100 / tonne
Stone Mastic Asphalt (SMA)	- 2.5	\$100 / tonne

Notes: [1] Relative costs based on 2004 noise reducing asphalt studies conducted by the Regional Municipality of Waterloo, and the University of Waterloo – Centre for Pavement and Transportation Technology.

Noise reducing asphalts may cost twice as much as conventional DFC mixes, and by themselves produce noise reductions of only 2.5 dB, half of the 5 dB minimum required for noise mitigation to be considered effective under the *Environmental Noise Guide*. Other mitigation

measures must therefore be employed in conjunction with noise-reducing pavements to meet the 5 dB requirements (e.g., barriers or alignment changes). As alignment changes have already been ruled out as an effective mitigation measure for this project, and noise barriers by themselves will produce the required 5 dB reduction in noise level, pavement type as a noise mitigation measure has not been investigated further.

Noise Barriers

Noise barriers reduce noise levels at protected receptors through blocking the path of sound waves emanating from the source towards the receiver, and by absorbing or reflecting the incident sound energy away. Therefore, a noise barrier must at least break the line-of-sight between the source (the roadway) and the receptor (the ground-level OLA of the NSA under investigation). Such a barrier will provide at least 5 dB of attenuation.

Noise barriers can be formed of earthen berms, engineered noise walls, or some combination of the two. Where earthen berms are used, side slopes of 3:1 should be used for drainage and erosion control and right-of-way maintenance. Where noise walls are to be used, they should be free of gaps and cracks, and have a minimum surface density (mass per unit of face area) of 20 kg/m² (4 lb. per sq. ft.). It is preferable that barriers are sound absorptive at least on the roadway side, and this is mandatory in situations where parallel barriers (e.g., barriers on both sides of a roadway) are proposed. Noise wall costs typically around \$500 per m² of face area (\$2000 per running metre length for a 4.0 m high barrier).

Cost Effectiveness of Mitigation

Noise mitigation must be cost effective and economically feasible. Under current practices, the MTO uses a maximum cost of \$50,000 to \$100,000 per protected receptor. An average value of \$75,000 per protected receptor has been used in this assessment.

Barrier Aesthetics

Noise wall colour and surface appearance and other aesthetic features must be considered in the detailed design. Landscaping, including planting of trees, shrubs and ground cover must be considered for noise berms and berm/wall combinations.

2.6.2 Recommended Noise Mitigation Measures

Two noise walls are proposed as mitigation measures. Noise wall locations are shown in **Figure 1**. Noise barrier characteristics and effectiveness are evaluated in Table 9 below:

Table 9: Noise Barriers and Barrier Cost Effectiveness

Barrier Name	Affected Modelled NSAs	No of Affected Residences ^[1]	Average Reduction (dB)	Barrier Height (m)	Barrier Length (m)	Approximate Barrier Cost Per Receptor ^[2]	Economically Feasible? ^[3]
Bar1	NR1	37	9	3.0	450	\$18,300	Yes

- Notes:
- [1] The number of affected residences in the first row of houses which will be protected by the noise barrier
 - [2] Based on a barrier cost of \$500 per m² of face area, divided by the number of affected residences
 - [3] “Yes” if barrier costs is less than \$75,000 per receptor; else, “No”

Noise barriers are expected to be administratively infeasible for NR3 as the homes within this NSA are constructed with driveways that are facing toward Banwell Road.

The single barrier for NR1 is economically feasible based on a cost of \$75,000 per receptor. This barrier also meets the criteria for administrative and technical feasibility.

2.6.3 Mitigated Noise Levels

Noise levels with the proposed noise barriers in place are shown in Table 10.

Table 10: Future Noise Levels With and Without the Undertaking - Mitigated

Receptor Location	No. of NSAs Represented	Future Build L _{eq} (16h)	Future No-Build L _{eq} (16h)	Change ^[1] (Build – No-Build)
NR1	37	53	57	-3
NR2	30	63	63	-1
NR3	6	70	64	6

- Notes:
- All sound levels are in dBA
 - “Mitigated” includes the effects of the additional barrier outlined above and shown in Figure 1.
 - [1] Discrepancies in values are due to rounding

3. CONSTRUCTION NOISE IMPACTS

Construction noise impacts are temporary in nature, and largely unavoidable. With adequate controls, impacts can be minimized. However, for some periods of time and types of work, construction noise will be noticeable. This section of the report provides an evaluation of noise impacts from construction resulting from the undertaking, and discusses guideline and Code of Practice requirements to minimize impacts.

3.1 Construction Noise Guidelines

3.1.1 Local Noise Control Bylaws

Portions of the proposed project lie within the following local jurisdictions:

- City of Windsor
- Town of Tecumseh

Bylaws restricting noise generally and specifically noise from construction activity exist within these jurisdictions. The applicable by-law requirements are summarized below. Copies of the bylaws can be found in Appendix E.

Table 11: Applicable Local Noise Control Bylaws

Jurisdiction	Bylaw No.	Bylaw Provision
Town of Tecumseh	2002-07	<p>Section 3 No person within the boundary of the municipality shall emit or cause or permit the emission of sound resulting from an act listed herein, and which sound is clearly audible at a Point of Reception:</p> <p>(c) The operation of any combustion engine or pneumatic device without an effective exhaust or intake muffling device in good working order and in constant operation.</p> <p>(g) The operation of any item of Construction Equipment in a Residential Area, Agricultural Area or Commercial Area without effective muffling devices in good working order and in consistent operation.</p> <p>Section 4 No person within the municipality shall emit or cause the emission of sound resulting from any act in Table 4-1, hereinafter set out, if clearly audible at a Point of Reception located in an area of the municipality within a prohibited time shown for such an area.</p> <p>Table 4-1 Item 15. The operation of any equipment in connection within construction between the hours of 8:00pm to 7:00am.</p>
City of Windsor	6716	<p>Section 2 No person within the boundary of the municipality shall emit or cause or permit the emission of sound resulting from an act listed herein, and which sound is clearly audible at a point of reception:</p> <p>(7) The operation of any item of construction equipment in a residential area without effective muffling devices in good working order and in constant operation.</p> <p>Section 3 No person within the municipality shall emit or cause or permit the emission of sound resulting from any act listed in Table 3-1, hereinafter set out, if clearly audible at a point of reception located in an area of the municipality indicated within a prohibited time shown for such an area.</p> <p>Table 3-1 Item 13. The operation of any equipment in connection within construction between the hours of 8:00pm to 6:00am.</p>

Any required exemptions and permits should be sought from the Town of Tecumseh and City of Windsor, for any work to be performed outside of the allowable time periods listed above. If an exemption cannot be obtained, then construction must proceed in accordance with the Bylaw requirements.

3.1.2 MOE Model Municipal Noise Control Bylaw

The MOE stipulates limits on noise emissions from individual items of equipment, rather than for overall construction noise. In the presence of persistent noise complaints, sound emission standards for the various types of construction equipment used on the project should be checked to ensure that they meet the specified limits contained in MOE Publication NPC-115 – “Construction Equipment”, as follows (MOE 1977b):

Table 12: NPC-115 Maximum Noise Emission Levels for Typical Construction Equipment

Type of Unit	Maximum Sound Level ^[1] (dBA)	Distance (m)	Power Rating (kW)
Excavation Equipment ^[2]	83	15	Less than 75 kW
	85	15	75 kW or Greater
Pneumatic Equipment ^[3]	85	7	-
Portable Compressors	76	7	-

- Notes:** [1] Maximum permissible sound levels presented here are for equipment manufactured after Jan. 1, 1981.
 [2] Excavation equipment includes bulldozers, backhoes, front end loaders, graders, excavators, steam rollers and other equipment capable of being used for similar applications.
 [3] Pneumatic equipment includes pavement breakers.

Blasting is not anticipated as part of the construction phase, and has therefore not been considered in this assessment.

3.2 Anticipated Construction Activities

The following construction activities are anticipated as part of this project:

- Removing existing surface pavements;
- Construction and rehabilitation of the base course;

- Addition of new lane(s);
- Construction of new bridges and overpass structures (including pile driving); and
- Paving (and repaving) of the roadway surface.

3.3 Anticipated Construction Noise Levels

Construction activities will vary temporally and spatially as the project progresses. Noise levels from construction at a given receptor location will also vary over time as different activities take place, and as those activities change location within the right-of-way.

At this time, detailed construction noise plans are not available. An analysis of potential worst-case construction noise levels has been conducted based on generic data (equipment types and activities). The analysis, including anticipated construction sound levels, is provided in Appendix F.

3.4 Construction Code of Practice Requirements (Mitigation)

To minimize the potential for construction noise impacts, it is recommended that provisions be written into the contract documentation for the contractor, as outlined below.

- Construction should be limited to the time periods allowed by the locally applicable bylaws. If construction activities are required outside of these hours, permits / exemptions must be sought from all governing bodies in advance.
- There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Consideration could be given to establishing amalgamated criteria for the project. Enforcement of noise control by-laws is the responsibility of the City and County for all work done by Contractors.

- All equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- The contract documents should contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are, in effect.
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with MOE NPC-115 guidelines, as outlined in Section 3.
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.

4. CONCLUSIONS AND RECOMMENDATIONS

The potential environmental noise impacts of the proposed Banwell Road project have been assessed. Both operational and construction noise impacts have been considered. The following conclusions and recommendations result in:

- Unmitigated changes in sound levels resulting from the project are greater than 5 dB at some noise sensitive receptors of concern. Additional noise mitigation at these locations has been investigated. Proposed mitigation measures, in the form of noise walls, are shown in Figure 1 and discussed in Section 2.6.

- Noise barrier heights, location, extents, and aesthetic features should be further reviewed during the Detailed Design, to ensure that the barriers are adequate acoustically and meet the local requirements.
- Construction noise impacts are temporary in nature but will be noticeable at times in residential NSAs. Noise related to pile driving activities associated with bridge construction will be substantial at some NSAs, and it is recommended that pile driving be restricted to daytime hours. Methods to minimize construction noise impacts should be included in the Construction Code of Practice, as outlined in the text.

5. REFERENCES

Ontario Ministry of the Environment (MOE), 1977a, *Model Municipal Noise Control Bylaw*, which includes Publication NPC-103 – Procedures

Ontario Ministry of the Environment (MOE), 1977b, *Model Municipal Noise Control Bylaw*, which includes Publication NPC-115 – Construction Equipment

Ontario Ministry of the Environment (MOE), 1989, *Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)*

Ontario Ministry of the Environment (MOE), 1996, STAMSON v5.03: Road, Rail and Rapid Transit Noise Prediction Model

Ontario Ministry of the Environment (MOE) / Ontario Ministry of Transportation (MTO), 1986, “Joint Protocol”, *A Protocol for Dealing With Noise concerns during the Preparation, Review and Evaluation of Provincial Highway’s Environmental Assessments*

Ontario Ministry of Transportation (MTO), 1992b, *Environmental Office Manual Technical Areas – Noise*, EO-V-1000-00

Ontario Ministry of Transportation (MTO), 2002, *Environmental Reference for Highway Design*
 Ontario Ministry of Transportation (MTO), 2005, *Draft Environmental Guide For Noise* (not in force)

FIGURES



LEGEND:

	Noise Barrier
	Representative NSA's For Noise Modeling
	NSA's Within Study Area

Project Limits Showing Future-"Build" Location, Noise Sensitive Areas (NSA's), and Barrier Location

Banwell Road Noise Study - Windsor, Ontario



Drawn by: NTN Figure: 1
 Approx. Scale: 1:8000
 Date Revised: June 18, 2009



Project #0940515



APPENDIX A

COMMONLY USED NOISE TERMINOLOGY ¹

Airborne Sound*: Sound that reaches the point of interest by propagation through air.

Ambient or Background Noise: The ambient noise from all sources other than the sound of interest (i.e. sound other than that being measured). Under most MOE guidelines, aircraft overflights and train noise, due to their transient nature, are normally excluded from measurements of background noise.

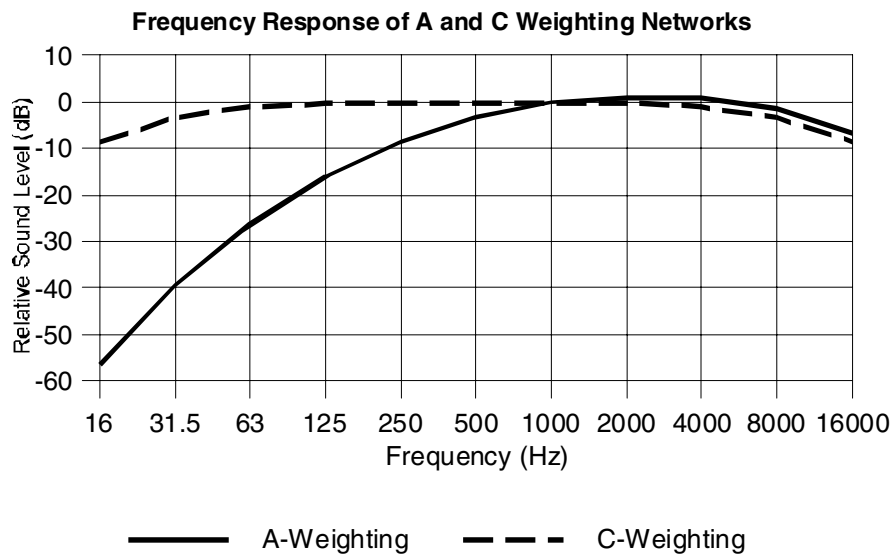
Articulation Index (AI)*: A numerically calculated measure of the intelligibility of transmitted or processed speech. It takes into account the limitations of the transmission path and the background noise. The articulation index can range in magnitude between 0 and 1.0. If the AI is less than 0.1, speech intelligibility is generally low. If it is above 0.6, speech intelligibility is generally high.

Attenuation*: The reduction of sound intensity by various means (e.g., air, humidity, porous materials, etc.).

dB - Decibel: The logarithmic units associated with sound pressure level, sound power level, or acceleration level. See sound pressure level, for example.

dB A - Decibel, A-Weighted: The logarithmic units associated with a sound pressure level, where the sound pressure signal has been filtered using a frequency weighting that mimics the response of the human ear to quiet sound levels. The resultant sound pressure level is therefore representative of the subjective response of the human ear. A-weighted sound pressure levels are denoted by the suffix 'A' (ie. dBA), and the term pressure is normally omitted from the description (i.e., sound level or noise level).

dB C - Decibel, C-Weighted: The logarithmic units associated with a sound pressure level, where the



sound pressure signal has been filtered using a frequency weighting that mimics the response of the human ear to loud sound levels. C-weighted sound pressure levels are denoted by the suffix 'C' (ie.

¹1. Definitions with a "*" marker originally from "Noise Control Terms Made Somewhat Easier", by David Kelso (Minnesota Pollution Control Agency), and Al Perez (Northern Sound), Minneapolis, Minnesota May, 1983, as modified on the Noise Pollution Clearinghouse website www.nonoise.org.

dB). C-weighted levels are often used in low-frequency noise analysis, as the filtering effect is nearly flat at lower frequencies.

dB or **dB_{Lin}** - **Decibel, Linear**: The logarithmic units associated with a sound pressure level, where the sound pressure signal is unfiltered, and represents the full spectrum of incoming noise.

Calibrator (Acoustical)*: A device which produces a known sound pressure on the microphone of a sound level measurement system, and is used to adjust the system to standard specifications.

Directivity Factor (Q) (also, **Directional** or **Directionality Factor**): A factor mathematically related to Directivity Index, used in calculating propagated sound levels to account for the effect of reflecting surfaces near to the source. For example, for a source in free space where the sound is radiating spherically, $Q = 1$. For a source located on or very near to a surface (such as the ground, a wall, rooftop, etc.), where the sound is radiating hemispherically, $Q = 2$. This accounts for the additional sound energy reflecting off the surface, and translates into a +3 dB add.

Directivity Index*: In a given direction from a sound source, the difference in decibels between (a) the sound pressure level produced by the source in that direction, and (b) the space-average sound pressure level of that source, measured at the same distance.

Effective Perceived Noise Level (EPNdB): A complex measure of perceived noisiness derived by making adjustments to the magnitude of measured sound levels in narrow frequency bands (1/3 octaves) for tonality and rise time of the noise. EPNdB values are the base measure of an individual overflight noise exposure from aircraft under the NEF metric, analogous to the manner in which SEL is used for computing $L_{eq}(24)$.

Energy Equivalent Sound Level (L_{eq}): An energy-average sound level taken over a specified period of time. It represents the average sound pressure encountered for the period. The time period is often added as a suffix to the label (i.e., $L_{eq}(24)$ for the 24-hour equivalent sound level). L_{eq} is usually A-weighted. An L_{eq} value expressed in dBA is a good, single value descriptor of the annoyance of noise.

Exceedance Noise Level (L_N): The noise level exceeded N% of the time. It is a statistical measure of the noise level. For highly varying sounds, the L_{90} represents the background noise level, L_{50} represents the median or typical noise level, and L_{10} represents the short term peak noise levels, such as those due to occasional traffic or a barking dog.

Far Field*: Describes a region in free space where the sound pressure level from a source obeys the inverse-square law (the sound pressure level decreases 6 dB with each doubling of distance from the source). Also, in this region the sound particle velocity is in phase with the sound pressure. Closer to the source where these two conditions do not hold constitutes the “near field” region.

Free Sound Field (Free Field)*: A sound field in which the effects of obstacles or boundaries on sound propagated in that field are negligible.

Frequency*: The number of times per second that the sine wave of sound or of a vibrating object repeats itself. Now expressed in hertz (Hz), formerly in cycles per second (cps).

Hertz (Hz)*: Unit of measurement of frequency, numerically equal to cycles per second.

Human Perception of Sound: The human perception of noise impact is an important consideration in qualifying the noise effects caused by projects. The following table presents a general guideline.

Increase in Noise Level (dBA)	Perception
1 to 3	insignificant due to imperceptibility
4 to 5	just-noticeable difference
6 to 9	marginally significant
10 or more	significant, perceived as a doubling of sound exposure

Impact Insulation Class (IC)*: A single-figure rating that compares the impact sound insulating capabilities of floor-ceiling assemblies to a reference contour.

Impact Sound*: The sound produced by the collision of two solid objects, e.g., footsteps, dropped objects, etc., on an interior surface (wall, floor, or ceiling) of a building. Typical industrial sources include punch presses, forging hammers, etc.

Impulsive Noise*: a) Single or multiple sound pressure peak(s) (with either a rise time less than 200 milliseconds or total duration less than 200 milliseconds) spaced at least by 500 millisecond pauses, b) A sharp sound pressure peak occurring in a short interval of time.

Infrasonic*: Sounds of a frequency lower than 20 hertz.

Insertion Loss (IL): The arithmetic difference between the sound level from a source before and after the installation of a noise mitigation measure, at the same location. Insertion loss is typically presented as a positive number, i.e., the post-mitigation sound level is lower than the pre-mitigation level. Insertion loss is expressed in dB and is usually specified per 1/1 octave band, per 1/3 octave band, or overall.

Intensity*: The sound energy flow through a unit area in a unit time.

Low Frequency Noise (LFN): Noise in the low frequency range, from infrasonic sounds (<20 Hz) up to 100 Hz.

Masking*: a) The process by which the threshold of audibility for a sound is raised by the presence of another (masking) sound, or b) The amount by which the threshold of audibility of a sound is raised by the presence of another (masking) sound.

Near Field*: The sound field very near to a source, where sound pressure does not obey the inverse-square law and the particle velocity is not in phase with the sound pressure.

Noise: Unwanted sound.

Noise Criteria (NC) Curves: A single number rating for noise in 1/1-octave frequency bands which is sensitive to the relative loudness and speech interference properties of a given sound spectrum. The method consists of a family of criteria curves extending from 63 Hz to 8000 Hz, and a tangency rating procedure. Originally proposed by Bernanek in 1957. While other more modern criteria curve rating schemes exist (NCB, RC, RC Mark II, RNC, etc.), NC curves are still widely used in determining acceptability of noise levels within spaces. Level of NC 25 to NC 35 are usually considered acceptable for residences, private offices, and schools.

Noise Isolation Class (NIC)*: A single number rating derived in a prescribed manner from the measured values of noise reduction between two areas or rooms. It provides an evaluation of the sound isolation between two enclosed spaces that are acoustically connected by one or more paths.

Noise Reduction (NR)*: The numerical difference, in decibels, of the average sound pressure levels in two areas or rooms. A measurement of "noise reduction" combines the effect of the sound transmission loss performance of structures separating the two areas or rooms, plus the effect of acoustic absorption present in the receiving room.

Noise Reduction Coefficient (NRC)*: A measure of the acoustical absorption performance of a material, calculated by averaging its sound absorption coefficients at 250, 500, 1000 and 2000 Hz, expressed to the nearest multiple of 0.05.

Noise Level: Same as Sound Level, except applied to unwanted sounds.

Noise Exposure Forecast (NEF): A calculated measure of aircraft noise based on the type of aircraft in use, the take-off and landing patterns of the aircraft, and times of operation. It represents the noise exposure over a typical 24 hour period. A penalty is applied to nighttime operation.

Peak Sound Pressure Level: Same as Sound Pressure Level except that peak (not peak-to-peak) sound pressure values are used in place of RMS pressures.

Quasi-Steady Impulsive Noise: Noise composed of a series of short, discrete events, characterized by rapid rise times, but with less than 0.5 seconds elapsing between events.

RMS Sound Pressure: The square-root of the mean-squared pressure of a sound (usually the result of an RMS detector on a microphone signal).

Reverberant Field*: The region in a room where the reflected sound dominates, as opposed to the region close to the noise source where the direct sound dominates.

Reverberation*: The persistence of sound in an enclosed space, as a result of multiple reflections, after the sound source has stopped.

Reverberation Time (RT)*: The reverberation time of a room is the time taken for the sound pressure level to decrease 60 dB from its steady-state value when the source of sound energy is suddenly interrupted. It is a measure of the persistence of an impulsive sound in a room as well as of the amount of acoustical absorption present inside the room. Rooms with long reverberation times are called live rooms.

Sabin*: A measure of the sound absorption of a surface; it is the equivalent of one square metre of a perfectly absorptive surface (or one square foot in imperial units).

Sound: a dynamic (fluctuating) pressure.

Sound Exposure Level (SEL): An L_{eq} referenced to a one second duration. Also known as the Single Event Level. It is a measure of the cumulative noise exposure for a single event. It provides a measure of the accumulation of sound energy over the duration of the event.

Sound Level (SL): The A-weighted Sound Pressure Level expressed in dBA.

Sound Level Meter*: An instrument comprised of a microphone, amplifier, output meter, and frequency-weighting networks which is used for the measurement of noise and sound levels.

Sound Pressure Level (SPL): The logarithmic ratio of the RMS sound pressure to the sound pressure at the threshold of hearing. The sound pressure level is defined by equation (1) where P is the RMS pressure due to a sound and P_0 is the reference pressure. P_0 is usually taken as 2.0×10^{-5} Pascals.

$$(1) \text{ SPL (dB)} = 20 \log(P_{\text{RMS}}/P_0)$$

Sound Power Level (PWL): The logarithmic ratio of the instantaneous sound power (energy) of a noise source to that of an international standard reference power. The sound power level is defined by equation (2) where W is the sound power of the source in watts, and W_0 is the reference power of 10^{-12} watts.

$$(2) \text{ PWL (dB)} = 10 \log(W/W_0)$$

Interrelationships between sound pressure level (SPL) and sound power level (PWL) depend on the location and type of source.

Sound Transmission Class (STC)*: The preferred single figure rating system designed to give an estimate of the sound insulation properties of a structure or a rank ordering of a series of structures.

Sound Transmission Loss (STL)*: A measure of sound insulation provided by a structural configuration. Expressed in decibels, it is 10 times the logarithm to the base 10 of the reciprocal of the sound transmission coefficient of the configuration.

Spectrum*: The description of a sound wave's resolution into its components of frequency and amplitude.

Speech Interference Level (SIL)*: A calculated quantity providing a guide to the interference of a noise with the reception of speech. The speech-interference level is the arithmetic average of the octave band levels of the interfering noise in the most important part of the speech frequency range. The levels in octave bands centered at 500, 1000, and 2000 Hz are commonly averaged to determine the speech-interference level.

Speed (Velocity) of Sound in Air*: 344 m/s (1128 ft/s) at 70°F (21°C) in air at sea level.

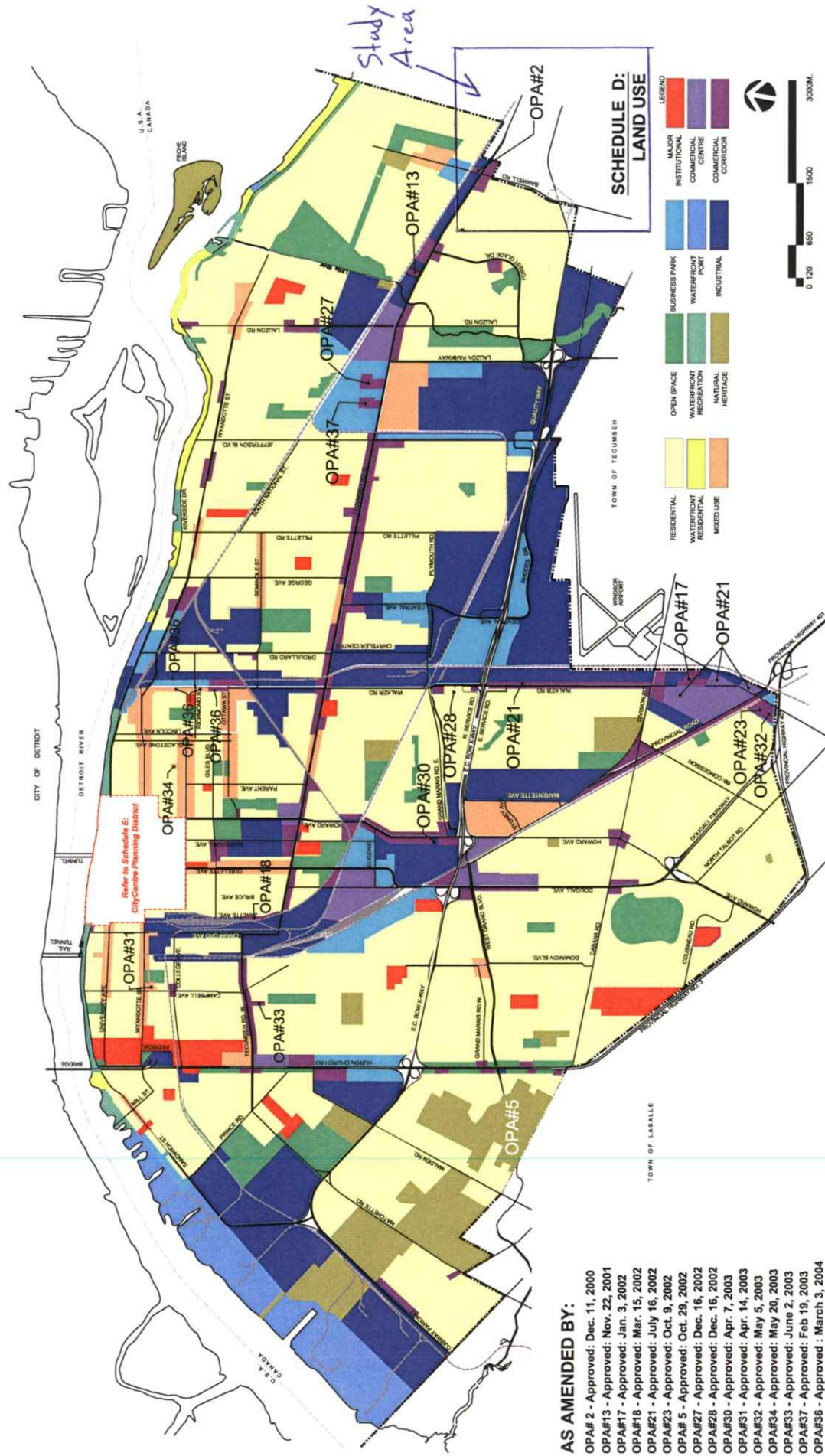
Threshold of Audibility (Threshold of Detectability)*: The minimum sound pressure level at which a person can hear a specified frequency of sound over a specified number of trials.

Transmission Loss: A measure of the reduction in sound energy resulting from incident sound waves striking a wall, partition or enclosure, and radiating through to the other side. Mathematically, the transmission coefficient τ is the ratio of transmitted acoustic power to the incident acoustic power, and in decibels, the Transmission Loss (TL) of the wall is:

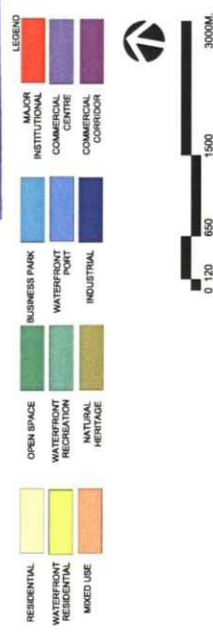
$$(3) \text{ TL} = 10 \log (1 / \tau)$$

The TL of a wall varies by frequency. The associated noise reduction (NR) due to the TL of the wall is a function of the TL and the acoustical parameters of the receiving space. For noise radiating from an enclosure into the outdoors, $\text{NR} \approx (\text{TL} + 6)$.

APPENDIX B



**SCHEDULE D:
LAND USE**



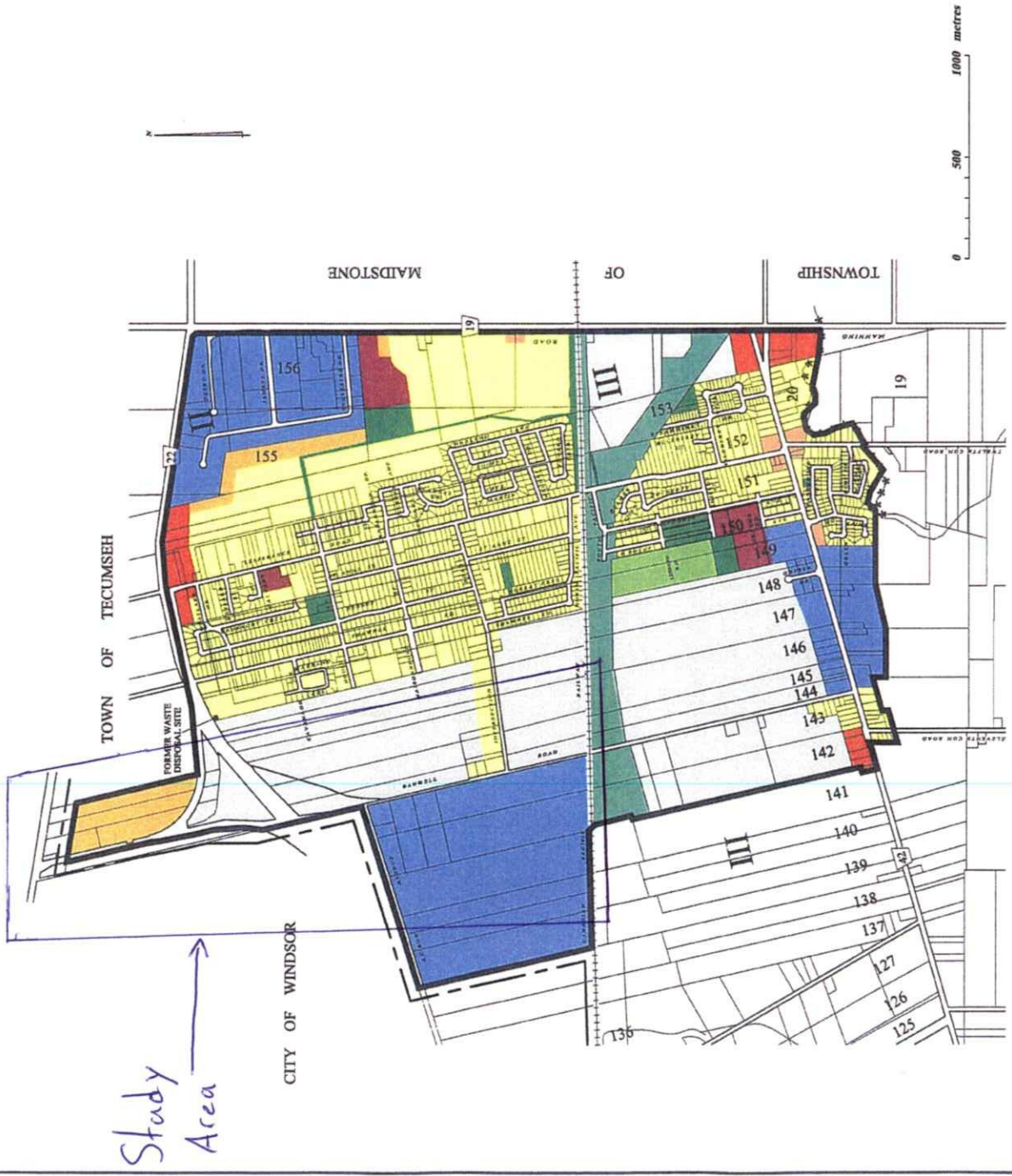
City of Windsor Official Plan: Volume I
Date of OMB Approval : September 25, 2000
Office Consolidation : June 1, 2004

AS AMENDED BY:

- OPA# 2 - Approved: Dec. 11, 2000
- OPA#13 - Approved: Nov. 22, 2001
- OPA#17 - Approved: Jan. 3, 2002
- OPA#18 - Approved: Mar. 15, 2002
- OPA#21 - Approved: July 16, 2002
- OPA#23 - Approved: Oct. 9, 2002
- OPA# 5 - Approved: Oct. 29, 2002
- OPA#27 - Approved: Dec. 16, 2002
- OPA#28 - Approved: Dec. 16, 2002
- OPA#30 - Approved: Apr. 7, 2003
- OPA#31 - Approved: Apr. 14, 2003
- OPA#32 - Approved: May 5, 2003
- OPA#34 - Approved: May 20, 2003
- OPA#33 - Approved: June 2, 2003
- OPA#37 - Approved: Feb 19, 2003
- OPA#36 - Approved : March 3, 2004

SCHEDULE "A-1"
 TOWNSHIP OF SANDWICH SOUTH
 OFFICIAL PLAN
 TECUMSEH HAMLET
 URBAN AREA
 LAND USE PLAN

- Urban Area Boundary
- Low Density Residential
- Medium Density Residential
- Neighbourhood Commercial
- General Commercial
- Business Park
- Community Facility
- Natural Environment
- Recreational
- Hamlet Development
- Ontario Hydro Right of Way
- ***** Floodway



Study Area

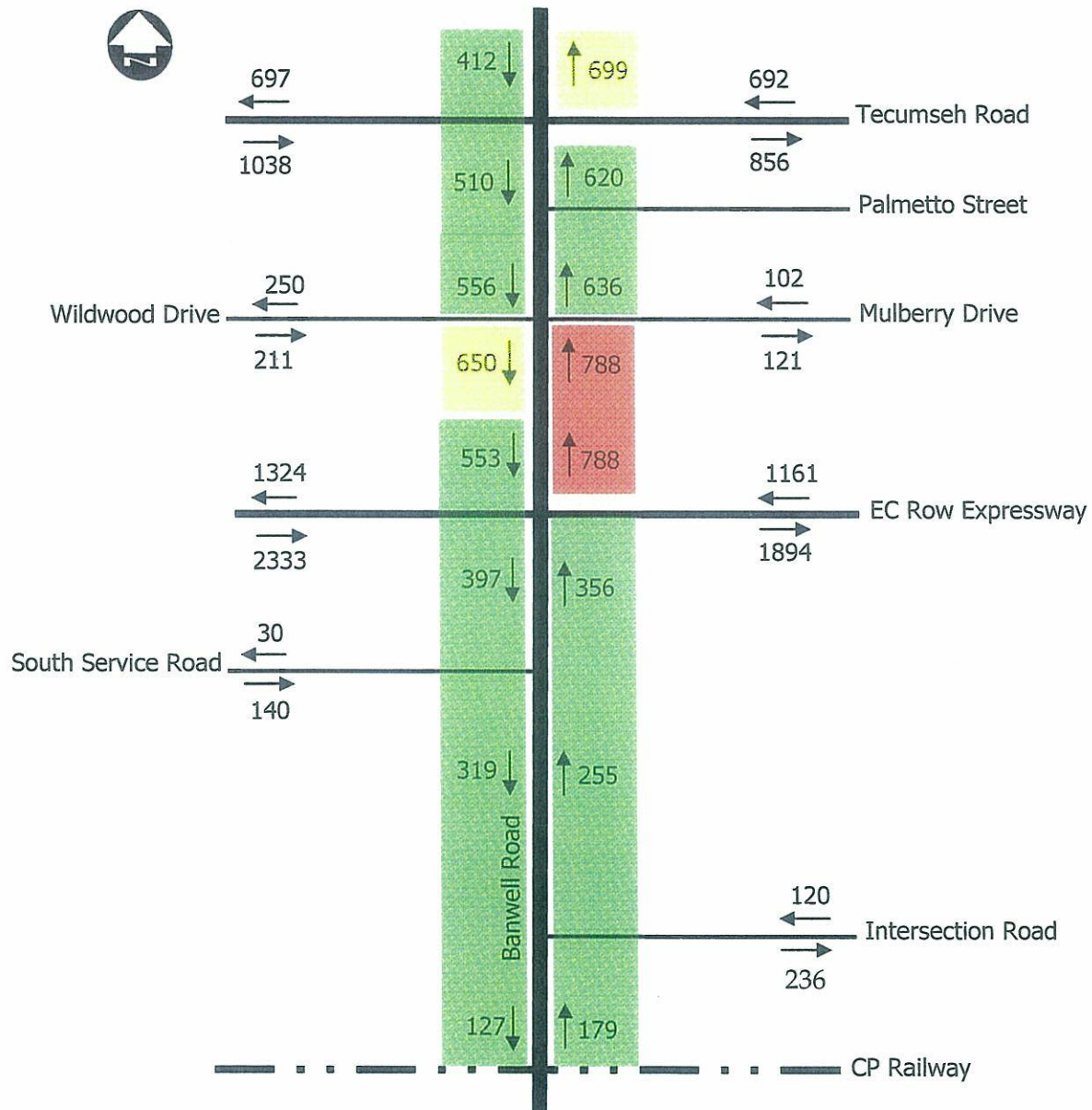
APPENDIX C

BANWELL ROAD CLASS ENVIRONMENTAL ASSESSMENT STUDY FROM TECUMSEH ROAD EAST TO THE CPR TRACKS SOUTH OF INTERSECTION ROAD

NEED AND JUSTIFICATION

3. Traffic Projections for the Banwell Road Corridor (2005 – 2027)

2005 PM Peak Hour Traffic Volumes on Banwell Road ¹



LEGEND

Volume/Capacity Ratios

< 0.8 – Good Level of Service

0.8 – 0.9 – Fair Level of Service

> 0.9 – Poor Level of Service



RWDI AIR Inc.
Banwell Road Noise Assessment

<u>Summary</u>	
Section of Road	Banwell Rd Southbound (between South Service Road and EC Row)
Existing (2005) Peak PM Traffic	397
Calculated (2005) AADT	3,970
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	SB
# of cars	3256
# of med trucks	45
# of heavy trucks	73

RWDI AIR Inc.
Banwell Road Noise Assessment

<u>Summary</u>	
Section of Road	Banwell Rd Northbound (between South Service Road and EC Row)
Existing (2005) Peak PM Traffic	356
Calculated (2005) AADT	3,560
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	NB
# of cars	2920
# of med trucks	40
# of heavy trucks	66

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	EC Row Expressway WestBound (West of Banwell Rd)
Existing (2005) Peak PM Traffic	1,324
Calculated (2005) AADT	13,240
Total truck percentage	40%
% of total trucks that are medium size	25%
% of total trucks that are heavy size	75%
% of vehicles during daytime hours	68%

	Day (16h)
	WB
# of cars	5402
# of med trucks	900
# of heavy trucks	2701

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	EC Row Expressway EastBound (West of Banwell Rd)
Existing (2005) Peak PM Traffic	2,333
Calculated (2005) AADT	23,330
Total truck percentage	40%
% of total trucks that are medium size	25%
% of total trucks that are heavy size	75%
% of vehicles during daytime hours	68%

	Day (16h)
	EB
# of cars	9519
# of med trucks	1586
# of heavy trucks	4759

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	EC Row Expressway WestBound (East of Banwell Rd)
Existing (2005) Peak PM Traffic	1,161
Calculated (2005) AADT	11,610
Total truck percentage	40%
% of total trucks that are medium size	25%
% of total trucks that are heavy size	75%
% of vehicles during daytime hours	68%

	Day (16h)
	WB
# of cars	4737
# of med trucks	789
# of heavy trucks	2368

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary
 Section of Road EC Row Expressway EastBound (East of Banwell Rd)
 Existing (2005) Peak PM Traffic 1,894
 Calculated (2005) AADT 18,940
 Total truck percentage 40%
 % of total trucks that are medium size 25%
 % of total trucks that are heavy size 75%
 % of vehicles during daytime hours 68%

	Day (16h)
	EB
# of cars	7728
# of med trucks	1288
# of heavy trucks	3864

RWDI AIR Inc.
Banwell Road Noise Assessment

<u>Summary</u>	
Section of Road	Banwell Rd Southbound (between Wildwood Dr and EC Row)
Existing (2005) Peak PM Traffic	650
Calculated (2005) AADT	6,500
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	SB
# of cars	5332
# of med trucks	73
# of heavy trucks	120

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary
 Section of Road Banwell Rd Northbound (between Mulberry Dr and EC Row) 788
 Existing (2005) Peak PM Traffic
 Calculated (2005) AADT 7,880
 Total truck percentage 3.5%
 % of total trucks that are medium size 38%
 % of total trucks that are heavy size 62%
 % of vehicles during daytime hours 85%

	Day (16h)
	NB
# of cars	6464
# of med trucks	89
# of heavy trucks	145

RWDI AIR Inc.
Banwell Road Noise Assessment

<u>Summary</u>	
Section of Road	Banwell Rd Southbound (between Tecumseh Rd and Wildwood Dr)
Existing (2005) Peak PM Traffic	556
Calculated (2005) AADT	5,560
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	SB
# of cars	4561
# of med trucks	63
# of heavy trucks	103

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary
 Section of Road Banwell Rd Northbound (between Palmetto St and Mulberry Dr) 636
 Existing (2005) Peak PM Traffic 6,360
 Calculated (2005) AADT 3.5%
 Total truck percentage 38%
 % of total trucks that are medium size 62%
 % of total trucks that are heavy size 85%
 % of vehicles during daytime hours

	Day (16h)
	NB
# of cars	5217
# of med trucks	72
# of heavy trucks	117

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	Banwell Rd Southbound (between EC Row and Fanelli Access)
Future (2027) Peak PM Traffic	2,030
Calculated (2027) AADT	20,300
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	SB
# of cars	16651
# of med trucks	229
# of heavy trucks	374

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	Banwell Rd Northbound (between EC Row and Fanelli Access)
Future (2027) Peak PM Traffic	1,369
Calculated (2027) AADT	13,690
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	NB
# of cars	11229
# of med trucks	155
# of heavy trucks	253

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	EC Row Expressway WestBound (West of Banwell Rd)
Future (2027) Peak PM Traffic	2,450
Calculated (2027) AADT	24,500
Total truck percentage	40%
% of total trucks that are medium size	25%
% of total trucks that are heavy size	75%
% of vehicles during daytime hours	68%

	Day (16h)
	WB
# of cars	9996
# of med trucks	1666
# of heavy trucks	4998

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	EC Row Expressway WestBound (On Ramp from Southbound Banwell Road)
Future (2027) Peak PM Traffic	456
Calculated (2027) AADT	4,560
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	WB
# of cars	3740
# of med trucks	52
# of heavy trucks	84

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	EC Row Expressway EastBound (West of Banwell Rd)
Future (2027) Peak PM Traffic	3,675
Calculated (2027) AADT	36,750
Total truck percentage	40%
% of total trucks that are medium size	25%
% of total trucks that are heavy size	75%
% of vehicles during daytime hours	68%

	Day (16h)
	EB
# of cars	14994
# of med trucks	2499
# of heavy trucks	7497

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	Banwell Rd Southbound (between Wildwood Dr and EC Row)
Future (2027) Peak PM Traffic	1,928
Calculated (2027) AADT	19,280
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	SB
# of cars	15814
# of med trucks	218
# of heavy trucks	356

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	Banwell Rd Northbound (between Mulberry Dr and EC Row)
Future (2027) Peak PM Traffic	1,639
Calculated (2027) AADT	16,390
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	NB
# of cars	13444
# of med trucks	185
# of heavy trucks	302

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	Banwell Rd Southbound (between Future Access and Wildwood Dr)
Future (2027) Peak PM Traffic	1,055
Calculated (2027) AADT	10,550
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	SB
# of cars	8654
# of med trucks	119
# of heavy trucks	195

RWDI AIR Inc.
Banwell Road Noise Assessment

Summary

Section of Road	Banwell Rd Northbound (between Palmetto St and Mulberry Dr)
Future (2027) Peak PM Traffic	1,751
Calculated (2027) AADT	17,510
Total truck percentage	3.5%
% of total trucks that are medium size	38%
% of total trucks that are heavy size	62%
% of vehicles during daytime hours	85%

	Day (16h)
	NB
# of cars	14363
# of med trucks	198
# of heavy trucks	323

APPENDIX D

APPENDIX E

AMENDED BY:
By-law 8952, dated April 21, 1987 (approved by Minister of Environment Aug. 24/87)
By-law 10277, dated May 22, 1990
By-law 11621, dated Nov. 1, 1993 (approved by Minister of Environment June 16/94)
By-law 178-1998, June 8, 1998 (approved by Minister of Environment July 30/98)
By-law 191-1998, June 15, 1998 (approved by Minister of Environment July 30/98)
By-law 272-1998, August 31, 1998 (approved by Minister of Environment Jan. 26/99)
By-law 113-1999, April 26, 1999 (approved by Minister of Environment May 28, 1999)
By-law 344-1999, Nov. 15, 1999 (approved by Minister of Environment Feb. 2, 2000)
By-law No. 445-2001, December 3, 2001 (approval not needed – per George Wilkki legal opinion att'd)
By-law No. 182-2004, June 14, 2004 (new Municipal Act – Minister approval no longer necessary)
By-law No. 173-2006, Sept. 11/06
By-law No. 7-2008, Jan. 14/08

B I L L
No. 279
1 9 8 0

BY - L A W N U M B E R 6716

A BY-LAW RESPECTING THE EMISSION OF
SOUNDS

Passed the 22nd day of September, 1980.

WHEREAS Section 129 of the Municipal Act, 2001, as amended, provides that the councils of local municipalities may pass by-laws for regulating or prohibiting with respect to noise; (**amended By-law 182, 2004, June 14, 2004**)

AND WHEREAS it is deemed expedient to reduce and control such sound or vibration;

NOW THEREFORE the Council of The Corporation of the City of Windsor enacts as follows:

1. **INTERPRETATION**

- (1) In this by-law,
 - (a) "Construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earth moving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and highway building, concreting, equipment installation and alteration and the structural installation of construction components and materials in any form or for any purpose, and includes any work in connection therewith;
 - (b) "Construction Equipment" means any equipment or device designed and intended for use in construction or material handling, including but not limited to, air tools, bulldozers, tractors, excavators, trenchers, cranes, derricks, loaders, scrapers, pavers, generators, off-highway haulers or trucks, ditchers, compactors and rollers, pumps, concrete mixers, graders or other material handling equipment;
 - (c) "Conveyance" includes a vehicle and any other device employed to transport a person or persons or goods from place to place but does not include any such device or vehicle if operated only within the premises of a person;
 - (d) "Corporation" means The Corporation of the City of Windsor;
 - (e) "Council" means the Council of The Corporation of the City of Windsor;

- (f) "Highway" includes a common and public highway, street, avenue, parkway, driveway, square, place, bridge, viaduct or trestle designed and intended for, or used by, the general public for the passage of vehicles;
- (g) "Minister" means Minister of the Environment;
- (h) "Ministry" means Ministry of the Environment;
- (i) "Motor Vehicle" includes an automobile, motorcycle, and any other vehicle propelled or driven otherwise than by muscular power; but does not include the cars of electric or steam railways, or other motor vehicles running only upon rails, or a motorized snow machine, traction engine, farm tractor, self-propelled implement of husbandry or road-building machine within the meaning of the Highway Traffic Act;
- (j) "Motorized Conveyance" means a conveyance propelled or driven otherwise than by muscular, gravitational or wind power;
- (k) "Municipality" means the land within the geographic limit of the City of Windsor;
- (l) "Noise" means unwanted sound;
- (m) "Noise Control Officer" means a Police Officer of the City of Windsor or any person designated by Council as responsible for the administration of this by-law from time to time;
- (n) "Point of Reception" means any point on the premises of a person where sound or vibration originating from other than those premises is received.

(2) Zones

In this by-law,

- (a) "Residential Area" means those areas of the Municipality designated as residential in By-law Number 8600 and designated as residential and planned development in By-law Number 3072 of the Corporation as may be amended from time to time. **(B/L 8952, eff. Aug. 24/87)**
- (b) "Commercial Area" means those areas of the municipality designated as commercial in By-law Numbers 8600 and 3072 of the Corporation as may be amended from time to time. **(B/L 8952, eff. Aug. 24/87)**

2. **GENERAL PROHIBITIONS**

No person within the boundary of the municipality shall emit or cause or permit the emission of sound resulting from an act listed herein, and which sound is clearly audible at a point of reception:

- (1) Racing of any motorized conveyance other than in a racing event regulated by law;
- (2) The operation of a motor vehicle in such a way that the tires squeal;
- (3) The operation of any combustion engine or pneumatic device without an effective exhaust or intake muffling device in good working order and in constant operation;
- (4) The operation of a vehicle or a vehicle with a trailer resulting in banging, clanking, squealing or other like sounds due to improperly secured load or equipment, or inadequate maintenance;
- (5) The operation of an engine or motor in, or on, any motor vehicle or item of attached auxiliary equipment for a continuous period exceeding five minutes, while such vehicle is stationary in a residential area unless,
 - (i) the original equipment manufacturer specifically recommends a longer idling period for normal and efficient operation of the motor vehicle in which case such recommended period shall not be exceeded; or,
 - (ii) operation of such engine or motor is essential to a basic function of the vehicle or equipment, including but not limited to, operation of ready-mixed concrete trucks, lift platforms and refuse compactors; or
 - (iii) weather conditions justify the use of heating or refrigerating systems powered by the motor or engine for the safety and welfare of the operator, passengers or animals, or the preservation of perishable cargo, and the vehicle is stationary for purposes of delivery or loading; or
 - (iv) prevailing low temperatures make longer idling periods necessary immediately after starting the motor or engine; or,
 - (v) the idling is for the purpose of cleaning and flushing the radiator and associated circulation system for seasonal change of antifreeze, cleaning of the fuel system, carburettor or the like, when such work is performed other than for profit.
- (6) The operation of a motor vehicle horn or other warning device except where required or authorized by law or in accordance with good safety practices;
- (7) The operation of any item of construction equipment in a residential area without effective muffling devices in good working order and in constant operation.
- (8) *Dynamic braking or engine braking or engine retarding of a motor vehicle.* **(added By-law 182-2004, June 14, 2004)**

2.1 AREA PROHIBITION

No person shall idle, or permit the idling of, a bus, for a continuous period exceeding 15 minutes, if the idling sound of the bus is clearly audible at a point of reception within the boundaries of the City Centre Business Improvement Area, as described in Schedule “A” attached hereto. **(added B/L 178-1998, June 8/98, eff. July 30/98)**

2.2 MOTOR VEHICLES – STEREOS/ELECTRONIC DEVICES

No person within the municipality shall emit or cause or permit the emission of sound resulting from the operation of any stereo or other electronic device designed to create, transmit, reproduce or amplify sound in or on a motor vehicle, which is audible at a distance of 8 metres (26 feet) from such motor vehicle. **(section added B/L 173-2006, Sept. 11/06)**

3. PROHIBITIONS BY TIME AND PLACE

No person within the municipality shall emit or cause or permit the emission of sound resulting from any act listed in Table 3.1, hereinafter set out, if clearly audible at a point of reception located in an area of the municipality indicated within a prohibited time shown for such an area.

TABLE 3-1

	PROHIBITED PERIOD OF TIME	
	Commercial Area	Residential Area
1. The operation of a combustion engine which, (i) is, or (ii) is used in, or (iii) is intended for use in, a toy, or a model or replica of any device, which model or replica has no function other than amusement and which is not a conveyance.	Midnight to 7:00 A.M.	At all times
2. The sound from or created by any radio, phonograph, tape player, television, public address system, sound equipment, loud speaker, or any musical or sound producing instrument of whatever kind when the same is played or operated in such manner or with such volume as to disturb the peace, quiet, comfort or repose of any individual in any office, dwelling house, apartment, hotel, hospital, or any other type of residence (B/L 11621, eff. June 16/94)	At all times	At all times
3. The operation of any auditory signalling device, including but not limited to the ringing of bells or gongs and the blowing of horns or sirens or whistles, or the production, reproduction or amplification of any similar sounds by electronic means, except where required or authorized by law or in accordance with good safety practices.	Midnight to 7:00 A.M.	At all times
4. The operation of any powered rail car including but not limited to refrigeration cars, locomotives or self-propelled passenger cars, while stationary on property not owned or controlled by a railway governed by the Canada Railway Act.	Midnight to 7:00 A.M.	At all times
5. The operation of any motorized conveyance other than on a highway or other place intended for its operation	Midnight to 7:00 A.M.	At all times

6.	The venting, release or pressure relief of air, steam or other gaseous material, product or compound from any autoclave, boiler, pressure vessel, pipe, valve, machine, device or system.	Midnight to 7:00 A.M.	9:00 P.M. to 8:00 A.M.
7.	The operation of a commercial car wash with air drying equipment	Midnight to 7:00 A.M.	11:00 P.M. to 8:00 A.M.
8.	Yelling, shouting, hooting, whistling or singing.	Midnight to 7:00 A.M.	At all times
9.	The operation of a power assisted hang glider or parafoil	Midnight to 7:00 A.M.	At all times
10.	The operation of any item of snow making equipment.	Midnight to 7:00 A.M.	At all times
11.	All selling or advertising by shouting or outcry of amplified sound.	Midnight to 7:00 A.M.	At all times
12.	Loading, unloading, delivering, packing, unpacking, or otherwise handling any containers, products, materials, or refuse, whatsoever, unless necessary for the maintenance of essential services or the moving of private household effects.		8:00 P.M. to 6:00 A.M.
13.	The operation of any equipment in connection with construction.		8:00 P.M. to 6:00 A.M.
14.	The operation or use of any tool for domestic purposes other than snow removal	Midnight to 7:00 A.M.	9:00 P.M. to 8:00 A.M.
15.	The operation of solid waste bulk lift or refuse compacting equipment.		8:00 P.M. to 6:00 A.M.
16.	The operation of a commercial car wash of a type other than mentioned in Item 7.	Midnight to 7:00 A.M.	11:00 P.M. to 8:00 A.M.
17.	Persistent barking, calling or whining or other similar persistent noise making by any domestic pet or any other animal kept or used for any purpose other than agricultural. (added B/L 113-1999, Apr.26/99, eff. May 28/99)	At all times	At all times

3.1 EXEMPTION (added B/L 445-2001, Dec.3/2001)

Table 3-1, paragraph 17, of section 3 shall not apply to:

- (a) A veterinary hospital, clinic, office or veterinary service lawfully operated and supervised by a veterinarian licensed to practice in Ontario;
- (b) An animal shelter operated by the Windsor-Essex County Humane Society, Erie Wildlife Rescue Inc., or a shelter lawfully operated by the Ontario Humane Society;
- (c) Premises registered as a research facility in accordance with the *Animals For Research Act*, as amended;
- (d) Kennels licensed by The Corporation of the City of Windsor;
- (e) Pet shops licensed by The Corporation of the City of Windsor;
- (f) Any person in charge of a traveling circus, exhibition, or road show, or any employee thereof, lawfully displaying animals within the City of Windsor;
- (g) Any person licensed or exempted as an operator of an animal supply facility in accordance with the *Animals For Research Act*, as amended, or the employees of such facility, during the course of their duties;
- (h) Any person who operates an elementary school, secondary school, college, university or provincial institution that contains a research facility exempted from registration under the *Animals For Research Act*, as amended;
- (i) Any person who operates, or who is employed by, an establishment which lawfully carries on the business of supplying animals to elementary schools, secondary schools, colleges, universities or provincial institutions;

- (j) Dogs maintained in a zoo, fair, exhibition, carnival, menagerie or circus operated or licensed by The Corporation of the City of Windsor or other governmental agency;
- (k) The Corporation of the City of Windsor or other governmental authority while lawfully operating a public park, exhibit, or zoological garden, and maintaining animals therein; and
- (l) Any dog owned, possessed or harboured by the Windsor Police Service, Ontario Provincial Police, Royal Canadian Mounted Police or any other local police or other government enforcement agency.”

4. **EXCEPTION**

Notwithstanding any other provision of this by-law, it shall be lawful to emit or cause or permit the emission of sound or vibration in connection with:

- (1) Emergency measures undertaken,
 - (a) for the immediate health, safety or welfare or the inhabitants or any of them; or,
 - (b) for the preservation or restoration of property; unless such sound or vibration is clearly of a longer duration or nature more disturbing than is reasonably necessary for the accomplishment of such emergency purpose.

5. **GRANT OF EXCEPTION BY COUNCIL**

(1) Application to Council

Notwithstanding anything contained in this By-law, any person may make application to Council to be granted an exemption from any of the provisions of this By-law with respect to any source of sound or vibration for which he might be prosecuted and Council, by resolution, may refuse to grant any exemption or may grant the exemption applied for or any exemption of lesser effect, and any exemption granted shall specify the time period, not in excess of six (6) months, during which it is effective and may contain such terms and conditions as Council sees fit.

(2) Decision

In deciding whether to grant the exemption, Council shall give the applicant and any person opposed to the application, an opportunity to be heard and may consider such other matters as it sees fit.

(3) Breach

Breach by the applicant of any of the terms or conditions of any exemption granted by Council shall render the exemption null and void.

6. **EXEMPTION OF TRADITIONAL, FESTIVE OR RELIGIOUS ACTIVITIES**

Notwithstanding any other provision of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound or vibration in connection with any of the hereinafter listed traditional, festive, religious and other activities, namely:

(a) — International Freedom Festival;

(b) — Emancipation Day;

(c) — Firemen's Field Day;

(d) — Carrousel of the Nations;

(e) — Ringing of church bells or chimes. **(amended B/L 11621, eff. June 16/94)**

(f) — Festival Epieure **(added B/L 191-1998, June 15/98, eff. July 30/98)**

— (f) — Challenge Cup, provided however that same is held on the grounds of the St. Clair College of Applied Arts and Technology, 2000 Talbot Road West **(added B/L 272-1998, eff. Jan. 26/99)**

(Section 6 REPEALED AND SUBSTITUTED – SEE BELOW – By-law 7-2008, Jan. 14/08)

6.1 **EXEMPT ACTIVITIES**

Notwithstanding any other provisions of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound or vibration in connection with any of the hereinafter listed activities, namely:

(a) Ringing of church bells or chimes.

6.2 **TEMPORARY NOISE BY-LAW EXEMPTION PERMITS**

Despite any other provisions of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound, if the Corporation's General Manager of Client and Protective Services, or his or her designate, has issue to such person a Temporary Noise By-law Exemption Permit, and such person complies with the terms and conditions in the said Temporary Noise By-law Exemption Permit.”

(Section 6 SUBSTITUTED – B/L 7-2008, Jan.14/08)

7. **SEVERABILITY**

If a Court of competent jurisdiction should declare any section or part of a section of this by-law to be invalid, such section or part of a section shall not be construed as having persuaded or influenced Council to pass the remainder of the by-law and it is hereby declared that the remainder of the by-law shall be valid and shall remain in force.

8. **PENALTY**

Every person who contravenes any of the provisions of this by-law is guilty of an offence and shall, upon conviction thereof, forfeit and pay a penalty of not more than Five Thousand Dollars (\$5,000), exclusive of costs and every such fine is recoverable under the Provincial Offences Act. **(amended B/L 10277, May 22/90; B/L 344-1999, Nov.15/99)**

9. That By-law Number 137, as amended, is repealed.

10. This by-law shall come into full force and take effect upon the day following the final passing thereof upon which it is approved by the Minister of the Environment.

(SIGNED) "A. H. WEEKS"

MAYOR

(SIGNED) "J. B. ADAMAC"

CLERK

First Reading - September 22, 1980
Second Reading - September 22, 1980
Third Reading - September 22, 1980

NOTE: By-law No. 6716 is approved pursuant to the provisions of The Environmental Protection Act, 1971, as amended, at Toronto, this 17th day of February, 1981. (original certificate attached to book copy of By-law 6716)

(SIGNED) "HARRY PARROTT"
MINISTER OF THE ENVIRONMENT

(added B/L 178-1998, June 8/98, eff, July 30/98)

SCHEDULE "A"
TO BY-LAW NUMBER 178-1998

The Downtown Area of the City of Windsor bounded,

- a) on the north, by the Detroit River;
- b) on the east, by a line down the middle of Glengarry Avenue from the Detroit River to the middle of Chatham Street; thence westerly along the middle of Chatham Street to the middle of McDougall Street; thence southerly along the middle of McDougall Street to the middle of Tuscarora Street; thence westerly along the middle of Tuscarora Street to the middle of Windsor Avenue; thence southerly along the middle of Windsor Avenue to the middle of Elliott Street;
- c) on the south, by a line down the middle of Elliott Street from the middle of Windsor Avenue westerly to Victoria Avenue; thence northerly along the middle of Victoria Avenue to the middle of Elliott Street; thence westerly along the middle of Elliott Street to the alley between Victoria Avenue and Dougall Avenue; and
- d) on the west, by a line down the middle of the alley between Victoria Avenue and Dougall Avenue from Elliott Street to the middle of Park Street; thence westerly along the middle of Park Street to the middle of Church Street; thence northerly along the middle of Church Street to the middle of Pitt Street; thence westerly along the middle of Pitt Street to the middle of Bruce Avenue; thence northerly along the middle of Bruce Avenue to the Detroit River.

Re: amending BL 445-2001

I am of the opinion that we do not need Ministerial approval for the amendment of the noise bylaw to delete police dogs from its purview.

Should we be increasing the effect of the bylaw we would need approval. Reducing its effect is in my opinion different. As another example of this, for every event we hold where breach of the noise bylaw is a concern, we pass a temporary waiver of the noise bylaw. These waivers are not submitted to the Ministry for approval before taking effect.

In my opinion, the bylaw is valid as is and can be acted upon immediately.

George A. Wilkki
Director of Legal Services

MAYOR – MAIRE
ED RENAUD
DEPUTY MAYOR – SOUS MAIRE
GARY McNAMARA
COUNCILLORS - CONSEILLERS
JOE BACHETTI
MARCEL BLAIS
GUY DORION
THOMAS FUERTH
DOREEN OUELLETTE

917 LESPERANCE ROAD
TECUMSEH, ONTARIO • N8N 1W9

PHONE (519) 735-2184 • FACSIMILE (519) 735-6712
www.town.tecumseh.on.ca

THE CORPORATION OF THE



TOWN OF TECUMSEH CORPORATE SERVICES DEPARTMENT

DIRECTOR OF CORPORATE SERVICES
LUC GAGNON
lgagnon@town.tecumseh.on.ca

**ASSISTANT DIRECTOR OF
CORPORATE SERVICES**
IDA GEE
igee@town.tecumseh.on.ca

CLERK
LAURA MOY
lmoy@town.tecumseh.on.ca

DEPUTY CLERK / DEPUTY TREASURER
SUSAN MAZZEI
smazzei@town.tecumseh.on.ca

January 2, 2003

Mr. Robert Heuton, Manager
Ontario Court of Justice
Provincial Offences Court
Westcourt Place, Suite 300
251 Goyeau, 3rd Floor
Windsor, ON N9A 6V2

Dear Mr.Heuton:

Re: Provincial Offences Act – Part I approval – Set Fines
By-law No. 2002-07 – Emissions of Sound

Attached please find a photocopy of the letter, with attachments, all as dated December 18, 2002, from Alexander M. Graham, Regional Senior Justice, Ontario Court of Justice, respecting the Order approving the set fine amounts for the above By-law. A certified copy of the By-law is also attached.

Trusting this to be satisfactory, I remain,

Yours very truly,

TOWN OF TECUMSEH



Laura Moy, A.M.C.T.
Clerk

LM/df

Attachments – as referenced above

c.c. Sgt. Dave Strang, Tecumseh O.P.P.

OFFICE OF THE REGIONAL SENIOR JUSTICE
ONTARIO COURT OF JUSTICE
WEST REGION

COURT HOUSE
15TH FLOOR, UNIT "G"
80 DUNDAS STREET
LONDON, ONTARIO
N6A 6B3



CABINET DU JUGE PRINCIPAL REGIONAL
COUR DE JUSTICE DE L'ONTARIO
REGION DE L'OUEST

TELEPHONE/TÉLÉPHONE (519) 660-2292
FAX/TÉLÉCOPIEUR (519) 660-3138

RECEIVED

DEC 23 2002

December 18, 2002

Per:
TOWN OF TECUMSEH

Ms. Laura Moy, Clerk
Corporation of the Town of Tecumseh
917 Lesperance Road
Tecumseh ON N8N 1W9

Dear Ms. Moy:

**Re: Set Fines - Provincial Offences Act - Part I
By-law Number 2002-07, The Town of Tecumseh**

Enclosed herewith is a copy of an Order, and a copy of a schedule of set fines for the above referenced By-Law, the By-law indicated in the schedule.

The setting of the fines does not constitute my approval of the short form of wording used to describe the offences.

I have forwarded the original of the Order and the schedule of the set fines to the Ontario Court of Justice in Windsor, together with a certified copy of the By-law.

Yours truly,

A handwritten signature in black ink, appearing to read 'A. M. Graham', with a long horizontal flourish extending to the right.

Alexander M. Graham
Regional Senior Justice
West Region

Enclosures
/ec

ONTARIO COURT OF JUSTICE

PROVINCIAL OFFENCES ACT

PART I

IT IS ORDERED pursuant to the provisions of the Provincial Offences Act and the rules for the Ontario Court of Justice that the amount set opposite each of the offences in the schedule of offences under the Provincial Statutes and Regulations thereunder and Municipal By-law No. 2002-07 of The Town of Tecumseh, attached hereto is the set fine including costs, for those offences. This Order is to take effect December 18, 2002.

Dated at London this 18th day of December, 2002.

A handwritten signature in black ink, appearing to be 'A.M. Graham', with a long horizontal line extending to the right.

Alexander M. Graham
Regional Senior Justice
West Region

THE CORPORATION OF THE TOWN OF TECUMSEH

PART 1 PROVINCIAL OFFENCES ACT

By-law 2002-07 - A By-law Respecting the Emission of Sounds

Item	Column 1 Short form wording	Column 2 Provision creating or defining offence	Column 3 Set Fine (includes costs)
1	Causing or permitting sound from any motorized conveyance by racing.	Sect. 3 (a)	\$105.00
2	Causing or permitting sound by the squealing of tires.	Sect. 3 (b)	\$105.00
3	Causing or permitting sound from a combustion engine or pneumatic device without an effective exhaust or intake muffling device.	Sect. 3 (c)	\$105.00
4	Causing or permitting sound from a Motor Vehicle or a Motor Vehicle with a trailer improperly maintained.	Sect. 3 (d)	\$105.00
5	Causing or permitting sound from a motor or Motor Vehicle while stationary in a Residential Area for a period exceeding 5 minutes.	Sect. 3 (e)	\$105.00
6	Causing or permitting sound from a motor vehicle horn or other warning device.	Sect. 3 (f)	\$105.00
7	Causing or permitting sound from construction equipment without an effective muffling device.	Sect. 3 (g)	\$105.00
8	Causing or permitting sound through the detonation of fireworks or explosive devices.	Sect. 4 Table 4-1 # 1	\$105.00
9	Causing or permitting sound through the discharge of a firearm.	Sect. 4 Table 4-1 # 2	\$105.00

- | | | | |
|----|-----------------------------------------------------------------------------------------------------------|---------------------------|----------|
| 10 | Causing or permitting sound from a combustion engine in use in or intended for use in a toy or model. | Sect. 4
Table 4-1 # 3 | \$105.00 |
| 11 | Causing or permitting sound from any electronic device or musical instrument. | Sect. 4
Table 4-1 # 4 | \$105.00 |
| 12 | Causing or permitting sound from any auditory signaling device. | Sect. 4
Table 4-1 # 5 | \$105.00 |
| 13 | Causing or permitting sound from the operation of any powered rail car or refrigeration car. | Sect. 4
Table 4-1 # 6 | \$105.00 |
| 14 | Causing or permitting sound from any Motorized Conveyance in an area not intended for it's operation. | Sect. 4
Table 4-1 # 7 | \$105.00 |
| 15 | Causing or permitting sound by the venting, releasing or pressure relief of air, steam or other material. | Sect. 4
Table 4-1 # 8 | \$105.00 |
| 16 | Causing or permitting sound by permitting a domestic pet or animal to bark, call or whine. | Sect. 4
Table 4-1 # 9 | \$105.00 |
| 17 | Causing or permitting sound by operating a commercial car wash with air drying equipment. | Sect. 4
Table 4-1 # 10 | \$105.00 |
| 18 | Causing or permitting sound by yelling, shouting and hooting. | Sect. 4
Table 4-1 # 11 | \$105.00 |

THE CORPORATION OF THE TOWN OF TECUMSEH

BY-LAW 2002-07

A by-law respecting the emission of sounds

WHEREAS it is expedient to exercise the power conferred upon the Council by the Environmental Protection Act, R. S. O. 1990, c. E-19, as amended, and other statutory authority; and

WHEREAS a recognized body of scientific and technological knowledge exists by which sound and vibration may be substantially reduced; and

WHEREAS the people have a right to and should be ensured an environment free from unusual, unnecessary, or excessive sound or vibration which may degrade the quality and tranquillity of their life or cause nuisance; and

WHEREAS it is the policy of the Council to reduce and control such sound or vibration;

NOW THEREFORE, the Council of The Corporation of the Town of Tecumseh enacts as follows:

1. INTERPRETATION

(1) In this by-law

(a) Construction

"Construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earth moving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and highway building, concreting, equipment installation and alteration and structural installation of construction components and materials in any form or for any purpose, and includes any work in connection therewith;

(b) Construction Equipment

"Construction Equipment" means any equipment or device designed and intended for use in construction, or material handling, including but not limited to air compressors, pile drivers, pneumatic or hydraulic tools, bulldozers, tractors, excavators, trenchers, cranes, derricks, loaders, scrapers, pavers, generators, off-highway haulers or trucks, ditchers, compactors and rollers, pumps, concrete mixers, graders, or other material handling equipment;

(c) Conveyance

"Conveyance" includes a vehicle and any other device employed to transport a person or persons or goods from place to place but does not include any such device or vehicle if operated only within the premises of a person;

(d) Corporation

"Corporation" means The Corporation of the Town of Tecumseh;

(e) Council

“Council” means the Council of The Corporation of the Town of Tecumseh;

(f) Highway

“Highway” includes a common and public highway, street, avenue parkway, driveway, square, place, bridge, viaduct or trestle designed and intended for, or used by the general public for the passage of vehicles;

(g) Minister

“Minister” means Minister of the Environment;

(h) Ministry

“Ministry” means The Ministry of the Environment;

(i) Motor Vehicle

“Motor Vehicle” includes an automobile, motorcycle, and any other vehicle propelled or driven otherwise than by muscular power, but does not include the cars of electric or steam railways; or other motor vehicles running only upon rails, or a motorized snow vehicle, traction engine, farm tractor, self-propelled implement of husbandry or road-building machine within the meaning of The Highway Traffic Act, R.S.O. 1990, c. H.8, as amended.

(j) Motorized Conveyance

“Motorized Conveyance” means a conveyance propelled or driven otherwise than by muscular, gravitational or wind power;

(k) Municipality

“Municipality” means the land within the geographic limit of The Corporation of the Town of Tecumseh;

(l) Noise

“Noise” means unwanted sound;

(m) Noise Control Officer

“Noise Control Officer” means a Police Officer of the Town of Tecumseh or any person designated by Council as responsible for the administration of this by-law from time to time;

(n) Point of Reception

“Point of reception” means any point on the premises of a person where sound or vibration originating from other than those premises is received.

(o) Provincial Offences Act

“Provincial Offences Act” means the Provincial Offences Act, R.S.O. 1990, c. P.33, as amended, and the regulations thereunder.

2. ZONE

(1) In this by-law

(a) Residential Area

“Residential Area” means those areas of the municipality designated as residential in the following by-laws of the former municipalities of:

The Town of Tecumseh By-law number 1746

The Township of Sandwich South By-law number 85-18

The Village of St. Clair Beach By-law number 2065

as may be amended from time to time or consolidated into one by-law.

(b) Agricultural Area

“Agricultural Area” means those areas of the municipality designate as agricultural in the following by-laws of the former municipalities of:

The Town of Tecumseh By-law number 1746

The Township of Sandwich South By-law number 85-18

The Village of St. Clair Beach By-law number 2065

as may be amended from time to time or consolidated into one by-law.

(c) Commercial Area

“Commercial Area” means those areas of the municipality designated as commercial in the following by-laws of the former municipalities of:

The Town of Tecumseh By-law number 1746

The Township of Sandwich South By-law number 85-18

The Village of St. Clair Beach By-law number 2065

as may be amended from time to time or consolidated into one by-law.

3. GENERAL PROHIBITIONS

No person within the boundary of the municipality shall emit or cause or permit the emission of sound resulting from an act listed herein, and which sound is clearly audible at a Point of Reception:

- (a) Racing of any Motorized Conveyance other than in a racing event regulated by law.
- (b) The operation of a Motor Vehicle in such a way that the tires squeal.
- (c) The operation of any combustion engine or pneumatic device without an effective exhaust or intake muffling device in good working order and in constant operation.
- (d) The operation of a Motor Vehicle or a Motor Vehicle with a trailer resulting in banging, clanging, squealing or other like sounds due to improperly secured load or equipment, or inadequate maintenance.

- (e) The operation of an engine or motor in, or on, any Motor Vehicle or item of attached auxiliary equipment for a continuous period exceeding five minutes, while such Motor Vehicle is stationary in a Residential Area unless:
 - (i) the original equipment manufacturer specifically recommends a longer idling period for normal and efficient operation of the Motor Vehicle in which case such recommended period shall not be exceeded; or
 - (ii) operation of such engine or motor is essential to a basic function of the Motor Vehicle or equipment, including but not limited to, operation of ready-mixed concrete trucks, lift platforms and refuse compactors; or
 - (iii) weather conditions justify the use of heating or refrigerating systems powered by the motor or engine for the safety and welfare of the operator, passengers or animals, or the preservation of perishable cargo, and the Motor Vehicle is stationary for purposes of delivery or loading; or
 - (iv) prevailing low temperatures make longer idling periods necessary immediately after starting the motor or engine; or
 - (v) the idling is for the purpose of cleaning and flushing the radiator and associated circulation system for seasonal change of antifreeze, cleaning of the fuel system, carburetor or the like, when such work is performed other than for profit.
- (f) The operation of a Motor Vehicle horn or other warning device except where required or authorized by law or in accordance with good safety practices.
- (g) The operation of any item of Construction Equipment in a Residential Area, Agricultural Area or Commercial Area without effective muffling devices in good working order and in constant operation.

4. PROHIBITIONS BY TIME AND PLACE

No person within the municipality shall emit or cause the emission of sound resulting from any act listed in Table 4-1, hereinafter set out, if clearly audible at a Point of Reception located in an area of the municipality within a prohibited time shown for such an area.

**TABLE 4-1
PROHIBITIONS BY TIME AND PLACE**

	Prohibitions Period of Time		
	Residential Area	Agricultural Area	Commercial Area
1. The detonation of fireworks or explosive devices not used in construction.	At all times except for the celebrations of Victoria Day, the birthday of the reigning Sovereign, Canada Day (July 1 st), the American Independence Day (July 4 th) and New Year's Eve (December 31 st)		At all times
2. The discharge of firearms.	At all times	As Approved	At all times
3. The operation of a combustion engine which, (i) is, or (ii) is use in, or (iii) is intended for use in, a toy or a model or replica of any device, which model or replica has no function other than amusement and which is not a conveyance.	8:00 p.m. to 8:00 a.m.	8:00 p.m. to 8:00 a.m.	8:00 p.m. to 8:00 a.m.
4. The sound from or created by any radio, phonograph, tape player, television, public address system, sound equipment, loud speaker, or any musical or sound producing instrument of whatever kind when the same is played or operated in such a manner or with such volume as to disturb the peace, quiet, comfort or repose of any individual in any office, dwelling house, apartment, hotel, hospital, or any other type of residence.	At all times	At all times	At all times
5. The operation of any auditory signaling device, including but not limited to the ringing of bells or gongs and the blowing of horns or sirens or whistles, or the production, reproduction or amplification of any similar sounds by electronic means except where required or authorized by law or in accordance with good safety practices.	At all times	10:00 p.m. to 8:00 a.m.	10:00 p.m. to 8:00 a.m.

	Prohibitions Period of Time		
	Residential Area	Agricultural Area	Commercial Area
6. The operation of any powered rail car including but not limited to refrigeration cars, locomotives or self-propelled passenger cars, which stationary on property not owned or controlled by a railway governed by the Canada Railway Act.	At all times	10:00 p.m. to 8:00 a.m.	11:00 p.m. to 7:00 a.m.
7. The operation of any Motorized Conveyance other than on a Highway or other place intended for its operation.	At all times		11:00 p.m. to 7:00 a.m.
8. The venting, release or pressure relief of air, steam or other gaseous material, product or compound from any autoclave, boiler pressure vessel, pipe, valve, machine device or system.	9:00 p.m. to 8:00 a.m.		11:00 p.m. to 7:00 a.m.
9. Persistent barking, calling or whining or other similar persistent noise making by any domestic pet or any other animal kept or used for any purpose other than agriculture.	At all times	At all times	At all times
10. The operation of a commercial car wash with air drying equipment.	At all times	11:00 p.m. to 7:00 a.m.	11:00 p.m. to 7:00 a.m.
11. Yelling, shouting and hooting.	At all times		11:00 p.m. to 7:00 a.m.
12. The operation of a power assisted hang glider or parafoil.	At all times		11:00 p.m. to 7:00 a.m.
13. All selling or advertising by shouting or outcry or amplified sound.	9:00 p.m. to 7:00 a.m.	9:00 p.m. to 7:00 a.m.	9:00 p.m. to 7:00 a.m.
14. Loading, unloading, delivering, packing, unpacking, or otherwise handling any containers, products, materials, or refuse, whatsoever, unless necessary for the maintenance of essential services or the moving of private household effects.	8:00 p.m. to 7:00 a.m.	9:00 p.m. to 6:00 a.m.	9:00 p.m. to 6:00 a.m.
15. The operation of any equipment in connection with construction.	8:00 p.m. to 7:00 a.m.	8:00 p.m. to 7:00 a.m.	8:00 p.m. to 7:00 a.m.
16. The operation or use of any tool for domestic purposes other than snow removal.	9:00 p.m. to 8:00 a.m.		
17. <u>The operation of power lawn mowers.</u>	<u>10:00 p.m. to 7:00 a.m.</u>		
18. The operation of a commercial car wash of a type other than mentioned in item 10.	At all times		

5. EXEMPTION FOR PUBLIC SAFETY

Notwithstanding any other provision of this by-law, it shall be lawful to emit or cause or permit the emission of sound or vibration in connection with emergency measures undertaken

- (a) for the immediate health, safety or welfare of the inhabitants or any of them; or
- (b) for the preservation or restoration of property;

unless such sound or vibration is clearly of a longer duration or nature more disturbing, than is reasonably necessary for the accomplishment of such emergency purpose.

6. GRANT OF EXEMPTION BY COUNCIL

(a) Application to Council

Notwithstanding anything contained in this by-law, any person may make application to Council to be granted an exemption from any of the provisions of this by-law with respect to any source of sound or vibration for which he/she might be prosecuted and Council, by resolution, may refuse to grant any exception or may grant the exemption applied for or any exemption of lesser effect and any exemption granted shall specify the time period, not in excess of six (6) months, during which it is effective and may contain such terms and conditions as Council sees fit.

(b) Decision

In deciding whether to grant the exemption, Council shall give the applicant and any person opposed to the application an opportunity to be heard and may consider such other matters as it sees fit.

(c) Breach

Breach by the applicant of any of the terms or conditions of any exemption granted by Council shall render the exemption null and void.

7. EXEMPTION OF TRADITIONAL, FESTIVE OR RELIGIOUS ACTIVITIES

Notwithstanding any other provisions of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound or vibration in connection with any of the hereinafter listed traditional, festive, religious and other activities, namely:

- (a) Corn Festival; and
- (b) Ringing of Church bells or chimes.

8. EXEMPTION OF ESSENTIAL SERVICES

Notwithstanding any other provisions of this by-law, essential services and incidental noise from all activities of the Corporation of the Town of Tecumseh, or its servants or agents, associated with the provision of maintenance and essential services is permissible.

9. SEVERABILITY

If any court of competent jurisdiction should declare any section of this by-law to be invalid, such section or part of a section shall not be construed as having persuaded or influenced Council to pass the remainder of the by-law and it is hereby declared that the remainder of the by-law shall be valid and shall remain in force.


10. PENALTY

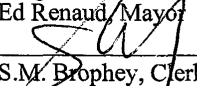
Every person who contravenes any of the provisions of this by-law is guilty of an offence and shall, upon conviction thereof, forfeit and pay a penalty of not more than Five Thousand Dollars (\$5,000.00), exclusive of costs, and every such fine is recoverable under the *Provincial Offences Act*.

11. That By-law No. 2001-12 and any other by-laws which are inconsistent with this by-law are hereby repealed.

12. This by-law shall come into full force and take effect upon the day following the final passing thereof and upon which it is approved by the Minister of Environment and Energy.

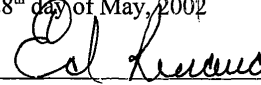
READ a first time time , this 22nd day of January, 2002

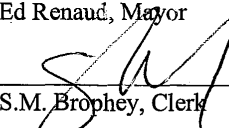


Ed Renaud, Mayor


S.M. Brophy, Clerk

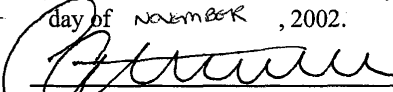
READ a second, third time and finally passed, this 28th day of May, 2002



Ed Renaud, Mayor


S.M. Brophy, Clerk

THIS By-law is approved pursuant to the provisions of the Environmental Protection Act, R.S.O. 1990, c. E-19, as amended, at Toronto, this 6th day of November, 2002.



MINISTER OF ENVIRONMENT

THE CORPORATION OF THE TOWN OF TECUMSEH

PART 1 PROVINCIAL OFFENCES ACT

By-law 2002-07 - A By-law Respecting the Emission of Sounds

1	Causing or permitting sound from any motorized conveyance by racing.	Sect. 3 (a)	\$105.00
2	Causing or permitting sound by the squealing of tires.	Sect. 3 (b)	\$105.00
3	Causing or permitting sound from a combustion engine or pneumatic device without an effective exhaust or intake muffling device.	Sect. 3 (c)	\$105.00
4	Causing or permitting sound from a Motor Vehicle or a Motor Vehicle with a trailer improperly maintained.	Sect. 3 (d)	\$105.00
5	Causing or permitting sound from a motor or Motor Vehicle while stationary in a Residential Area for a period exceeding 5 minutes.	Sect. 3 (e)	\$105.00
6	Causing or permitting sound from a motor vehicle horn or other warning device.	Sect. 3 (f)	\$105.00
7	Causing or permitting sound from construction equipment without an effective muffling device.	Sect. 3 (g)	\$105.00
8	Causing or permitting sound through the detonation of fireworks or explosive devices.	Sect. 4 Table 4-1 # 1	\$105.00
9	Causing or permitting sound through the discharge of a firearm.	Sect. 4 Table 4-1 # 2	\$105.00

10	Causing or permitting sound from a combustion engine in use in or intended for use in a toy or model.	Sect. 4 Table 4-1 # 3	\$105.00
11	Causing or permitting sound from any electronic device or musical instrument.	Sect. 4 Table 4-1 # 4	\$105.00
12	Causing or permitting sound from any auditory signaling device.	Sect. 4 Table 4-1 # 5	\$105.00
13	Causing or permitting sound from the operation of any powered rail car or refrigeration car.	Sect. 4 Table 4-1 # 6	\$105.00
14	Causing or permitting sound from any Motorized Conveyance in an area not intended for it's operation.	Sect. 4 Table 4-1 # 7	\$105.00
15	Causing or permitting sound by the venting, releasing or pressure relief of air, steam or other material.	Sect. 4 Table 4-1 # 8	\$105.00
16	Causing or permitting sound by permitting a domestic pet or animal to bark, call or whine.	Sect. 4 Table 4-1 # 9	\$105.00
17	Causing or permitting sound by operating a commercial car wash with air drying equipment.	Sect. 4 Table 4-1 # 10	\$105.00
18	Causing or permitting sound by yelling, shouting and hooting.	Sect. 4 Table 4-1 # 11	\$105.00

APPENDIX F



Highway Construction Noise Assessment - Roadway Construction

Job No: 0940515
Job Name: Banwell Road Noise Study

2. Compaction of Subgrade

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
5	2	111	83	Compactor
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	2	111		

1. Removal of Overburden

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
2	1	109	81	Excavators
14	3	108	76	Haul truck (Typical 3-axe)
3	1	110	82	Bulldozers
4	1	112	84	Scrapers
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	6	116		

4. Compaction of Base Course

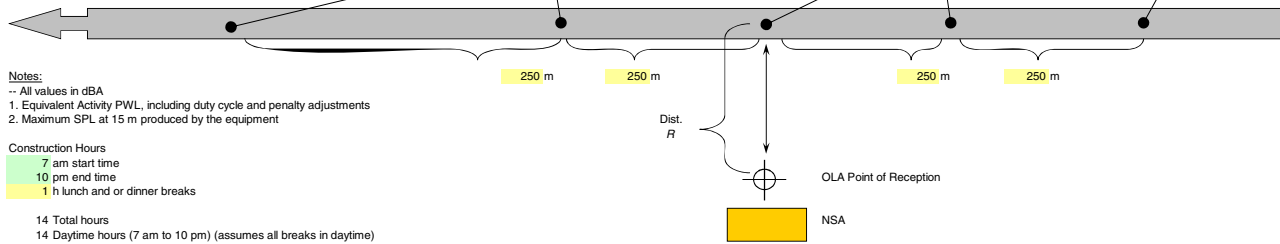
Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
5	1	108	83	Compactor
11	1	108	80	Graders
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	2	111		

3. Base Course

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
1	2	110	79	Backhoes / Wheeled Loaders
3	1	110	82	Bulldozers
14	4	110	76	Haul truck (Typical 3-axe)
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	7	114		

5. Surface Course

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
1	2	110	79	Backhoes / Wheeled Loaders
14	3	108	76	Haul truck (Typical 3-axe)
12	1	105	77	Asphalt Spreader
6	1	98	73	Road Roller
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	7	113		



Predicted Construction Noise Levels

Receptor No.	Description	Distance to Centre-line R (m)	Approximate Screening (dBA)	L _{eq} (1h) ¹	L _{max} ²	L ₁₀ ³	L _{dn} ⁴
NR1	Home at 3169 Viola Crescent	30	0	77	77	80	75
NR2	Home at 11300 Timber Bay Crescent	22	0	80	80	83	77
NR3	Home at 3463 Banwell Road	13	0	84	84	87	82
...							
...							
...							
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...							
...							
...							

- Notes:
- All values are in dBA unless otherwise noted
 - 1. Equivalent Activity PWL for the group (includes duty cycle, penalties and no of vehicle adjustments) + 10 log (2 / (4³ · 14³ · S · R · dist²))
 - 2. Higher of L_{eq} (1 h) or (Max of (Max SPL for each group + 20 log (15 / SR · dist))
 - 3. L_{eq} (1 h) + 3 dB, based on typical construction sites, per RCNM
 - 4. Based on L_{eq} (1 h) values and construction hours, includes a 10 dB penalty for night-time operations (10 pm to 7 am)



Highway Construction Noise Assessment - Roadway Resurfacing

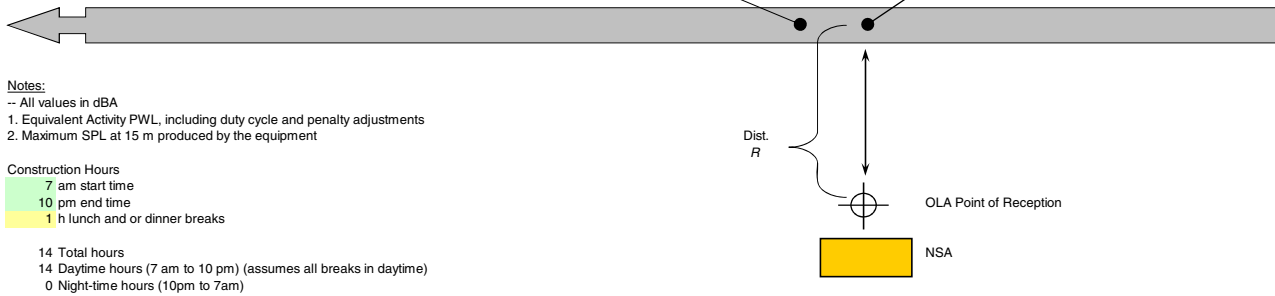
Job No: 0940515
Job Name: Banwell Road Noise Study

1. Removal of Original Surface

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
13	1	120	90	Pavement Milling Machines (scarifier)
1	1	107	79	Backhoes / Wheeled Loaders
14	3	108	76	Haul truck (Typical 3-axle)
16	1	120	90	Hoe Ram / Pavement Breaker
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	6	123		

2. Resurfacing

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
1	2	110	79	Backhoes / Wheeled Loaders
14	3	108	76	Haul truck (Typical 3-axle)
12	1	105	77	Asphalt Spreader
6	1	98	73	Road Roller
		0	0	
		0	0	
		0	0	
		0	0	
TOTAL	7	113		



Predicted Construction Noise Levels - Removal of Original Surface

Receptor No.	Description	Distance to Centre-line <i>R</i> (m)	Approximate Screening (dBA)	$L_{eq}(1h)$ ^{1.}	L_{max} ^{2.}	L_{10} ^{3.}	L_{dn} ^{4.}
NR1	Home at 3169 Viola Crescent	30	0	85	85	88	83
NR2	Crescent	22	0	88	88	91	86
NR3	Home at 3463 Banwell Road	13	0	93	93	96	90
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Predicted Construction Noise Levels - Resurfacing

Receptor No.	Description	Distance to Centre-line <i>R</i> (m)	Approximate Screening (dBA)	$L_{eq}(1h)$ ^{1.}	L_{max} ^{2.}	L_{10} ^{3.}	L_{dn} ^{4.}
NR1	Home at 3169 Viola Crescent	30	0	75	75	78	73
NR2	Home at 11300 Timber Bay Crescent	22	0	78	87	81	76
NR3	Home at 3463 Banwell Road	13	0	83	91	86	80
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- Notes:
- All values are in dBA unless otherwise noted
 - 1. Equivalent Activity PWL for the group (includes duty cycle, penalties and no of vehicle adjustments) + 10 log (2 / (4*3.14* S-R dist²))
 - 2. Higher of $L_{eq}(1h)$ or (Max of (Max SPL for each group + 20 log (15 / SR - dist))
 - 3. $L_{eq}(1h)$ + 3 dB, based on typical construction sites, per RCNM
 - 4. Based on $L_{eq}(1h)$ values and construction hours, includes a 10 dB penalty for night-time operations (10 pm to 7 am)



Highway Construction Noise Assessment - Bridges and Embankments

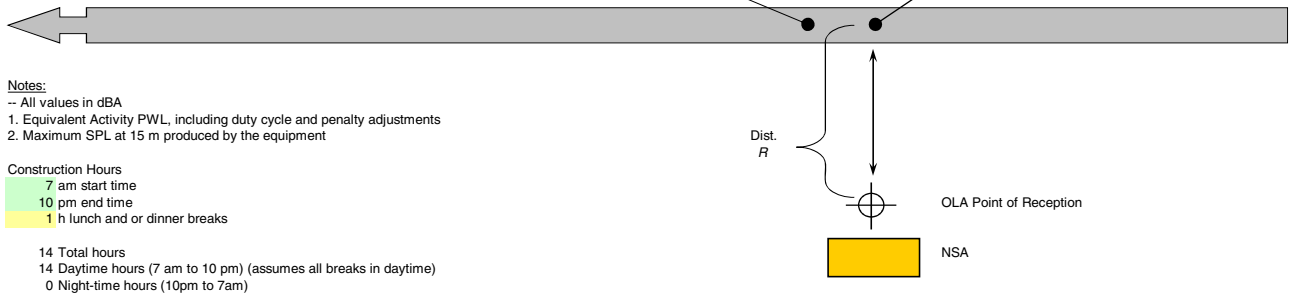
Job No: 0940515
Job Name: Banwell Road Noise Study

1. Construction of Embankments

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
1	1	107	79	Backhoes / Wheeled Loaders
14	3	108	76	Haul truck (Typical 3-axle)
2	1	109	81	Excavators
3	1	110	82	Bulldozers
4	1	112	84	Scrapers
5	1	108	83	Compactor
		0	0	
		0	0	
TOTAL	8	117		

2. Bridge Construction

Type	Amt	Act. PWL ¹	Max. SPL ²	Equipment
1	1	107	79	Backhoes / Wheeled Loaders
8	1	104	76	Boom (Hoist) Trucks
14	3	108	76	Haul truck (Typical 3-axle)
18	1	127	97	Pile Driver - Diesel Hammer
7	1	105	81	Cranes
9	1	107	79	Concrete trucks
10	1	106	81	Concrete pumps
		0	0	
TOTAL	9	127		



Predicted Construction Noise Levels - Construction of Embankments

Receptor No.	Description	Distance to Centre-line <i>R</i> (m)	Approximate Screening (dBA)	$L_{eq}(1h)^1$	L_{max}^2	L_{10}^3	L_{dn}^4
NR2	Home at 11300 Timber Bay Crescent	80	0	71	71	74	68
...							
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Predicted Construction Noise Levels - Bridge Construction

Receptor No.	Description	Distance to Centre-line <i>R</i> (m)	Approximate Screening (dBA)	$L_{eq}(1h)^1$	L_{max}^2	L_{10}^3	L_{dn}^4
NR2	Home at 11300 Timber Bay Crescent	80	0	81	82	84	78
...							
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...							
...							
...							

- Notes:
- All values are in dBA unless otherwise noted
 - 1. Equivalent Activity PWL for the group (includes duty cycle, penalties and no of vehicle adjustments) + 10 log (2 / (4*3.14* S-R dist²))
 - 2. Higher of $L_{eq}(1h)$ or (Max of (Max SPL for each group + 20 log (15 / SR- dist))
 - 3. $L_{eq}(1h)$ + 3 dB, based on typical construction sites, per RCNM
 - 4. Based on $L_{eq}(1h)$ values and construction hours, includes a 10 dB penalty for night-time operations (10 pm to 7 am)



LEGEND:

	Noise Barrier
	Representative NSA's For Noise Modeling
	NSA's Within Study Area

Project Limits Showing Future-"Build" Location, Noise Sensitive Areas (NSA's), and Barrier Location

Banwell Road Noise Study - Windsor, Ontario



Drawn by: NTN Figure: 1
 Approx. Scale: 1:8000
 Date Revised: June 18, 2009



Project #0940515

