

Noise and Vibration Feasibility Study

Proposed Residential Development

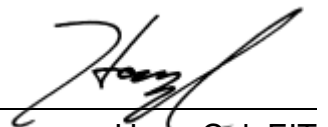
410 Sunset Drive

St. Thomas, ON


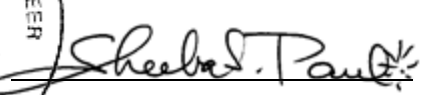
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July 28, 2022

HGC Project No: 02200255

VERSION CONTROL

Noise and Vibration Feasibility Study, Proposed Residential Development, 410 Sunset Drive, St. Thomas Ontario

Ver.	Date	Version Description	Prepared By
1.0	July 28, 2022	Noise and Vibration Feasibility Study for planning and approvals process	H. Cai

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1 Introduction and Summary

HGC Engineering was retained by Quincy Developments Inc. to conduct a noise and vibration feasibility study for a proposed residential development located at 410 Sunset Drive in St. Thomas, Ontario. The residential development will consist of a 4-storey and a 6-storey residential building. The study is required by the Municipality and the Port Stanley Terminal Railway (PSTR) as part of the planning and approvals process.

The primary source of noise is road traffic on Sunset Drive. A secondary source of noise is rail traffic on the PSTR rail. Rail traffic data was obtained from published PSTR schedules, and road traffic data was obtained from the County of Elgin. Rail and road traffic data was used to predict future traffic sound levels at the proposed building façades and outdoor living areas. The predicted sound levels were compared to the guidelines of PSTR and the Ministry of Environment, Conservation and Parks (MECP) to develop noise control recommendations.

The results of the study indicate that the proposed development is feasible with the noise control measures described in this report. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant will be required for the two buildings. The installation of central air conditioning systems will satisfy and exceed ventilation requirements. Noise warning clauses are also required for those units to inform future occupants of the traffic noise impacts and proximity to existing commercial uses. For all units, building constructions meeting the minimum requirement of the Ontario Building Code will provide sufficient acoustical insulation for the indoor spaces.

Ground-borne vibration levels from rail pass-bys were measured at the location of the closest proposed building façade to PSTR railway and were found to be below PSTR limits. Vibration mitigation is not required for the development.

2 Site Description and Noise Sources

Figure 1 is a key plan indicating the location of the proposed site. The site is located at the west side of Sunset Drive and east of the PSTR tracks in St. Thomas, Ontario. Figure 2 shows the site plan by

Edge Architects Ltd, dated July 22, 2022. The proposed development will consist of a 4-storey and a 6-storey residential building with common ground level outdoor amenity spaces.

HGC Engineering personnel visited the site on May 27 and July 9, 2022 to make observations of the acoustical environment and to conduct ground-borne vibration measurements due to rail pass-bys. During the site visit, it was noted that the primary source of noise impacting the site is road traffic on Sunset Drive east of the site area, with some contribution from the PSTR train tracks to the west. Negligible impact from road traffic was observed on Karen Street. The site is currently occupied by a two-storey office building, which will be later demolished for the construction of the proposed buildings. On the southeast corner of the property is a pumping station. Based on site observations, sound emissions from the pump station were not audible and are not expected to significantly affect the proposed development.

The areas surrounding the site are mostly residential and commercial. There are existing single detached dwellings to the west of the site area across the PSTR tracks. To the north of the site area are single storey office buildings and a restaurant (Elgin Harvest), and to the south of the site area is an administrative building (Elgin County Administrative Building). To the east of the area and across Sunset Drive is a hospital (Southwest Centre for Forensic Mental Health Care). An assessment of the separation distances between the site and the adjacent commercial/industrial facilities are described in Section 6.

Although sound emissions from the nearby commercial and institutional buildings was found to be negligible at the site area, it is recommended that a noise warning clause to identify that such commercial and institutional uses may be audible at times be included in the property and tenancy agreements as included in Section 7.

3 Noise and Vibration Level Criteria

3.1 Road Traffic Noise

Guidelines for acceptable levels of road and rail traffic noise impacting residential developments are given in the MECP publication NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, release date October 21, 2013, and are listed in

Table I below. The Federation of Canadian Municipalities (FCM) and Railway Association of Canada (RAC) “Guidelines for New Development in Proximity to Railway Operations”, dated May 2013 (RAC/FCM guidelines were also reviewed dated November 2006).

The values in Table I are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA].

Table I: MECP Road and Rail Traffic Noise Criteria (dBA)

Area	Daytime L_{EQ} (16 hour) Road / Rail	Nighttime L_{EQ} (8 hour) Road / Rail
Outdoor Living Area	55 dBA	--
Inside Living/Dining Rooms	45 / 40 dBA	45 / 40 dBA
Inside Bedrooms	45 / 40 dBA	40 / 35 dBA

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time period between 23:00 and 07:00. The term “Outdoor Living Area” (OLA) is used in reference to an outdoor patio, a backyard, a terrace, or other area where passive recreation is expected to occur. Small balconies are not considered OLAs for the purposes of assessment. Terraces greater than 4 m in depth (measured perpendicular to the building façade) are considered to be OLAs.

The guidelines in the MECP publication allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically, and administratively practical.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise, or when nighttime sound level is greater than 55 dBA or the daytime sound level is greater than 60 dBA due to rail traffic noise. The indoor sound level limits for rail noise sources are 5 dB more stringent than for road sources, to account for the additional low-frequency (rumble) components of locomotives, hence the façade insulation requirements are calculated separately and then combined.

Warning clauses to notify future residents of possible noise excesses are also required when nighttime sound levels exceed 50 dBA at the plane of a bedroom/living/dining room window and when daytime sound levels exceed 55 dBA at the plane of a bedroom/living/dining room window due to road traffic.

PSTR also provide minimum requirements for safety as well as sound and vibration for proposed residential developments located adjacent to their rights-of-way. These include minimum required setbacks, berms, fencing and warning clauses. Appendix A provides the PSTR requirements for residential developments adjacent to a railway right of way.

3.2 Ground-borne Vibration from Rail Traffic

PSTR guidelines require measurements of ground-borne vibration when residential dwelling units are to be located within 75 metres of the railway right-of-way.

Vibration is typically measured in terms of oscillatory velocity or acceleration. The limits for acceptable ground-borne vibration are an RMS velocity of 0.14 mm/s (-17 dB re 1 mm/s) between frequencies of 4 and 200 Hz.

PSTR limits for acceptable ground-borne vibration are also presented as a curve of maximum allowable vibratory acceleration levels, in units of decibels relative to the acceleration due to gravity (dB re 1g), versus one-third octave band frequency.

4 Traffic Sound Level Assessment

4.1 Rail Traffic Data

Rail traffic data for typical operations of the PSTR railway were obtained from PSTR personnel and from the PSTR website and is provided in Appendix B. The PSTR railway line is a spur line and is used for tourist trains during the day with small lightweight locomotives and coaches. The maximum permissible train speed in the area of the site is 24 km/h (15 mph). This maximum speed, as well as the maximum number of cars and locomotives per train were used in the traffic noise analysis to yield a worst cast estimate of train noise.

It is noted that while the PSTR tracks extend past to the site area, the trains are currently scheduled to operate past the site area once a week in the months of July and August only. Typical trains are scheduled to operate from Port Stanley Station to Whytes Park, which stop south of the site and do not pass the site. Nevertheless, this assessment conservatively assumes that all trains can operate past the site area. The current train volumes are projected to 2032 at an annual growth rate of 2.5%.

Table II summarises the rail traffic data used in the analysis.

Table II: Projected Rail Traffic Data Used in Assessment

Type of Train	Number of locomotives	Number of cars	Max Speed (km/h)	Daytime (07:00-23:00) trains	Night-time (23:00-07:00) train
Passenger (PSTR)	1	4	24	8	0

4.2 Road Traffic Data

Traffic data for Sunset Drive was obtained from the County of Elgin in the form of Average Annual Daily Traffic (AADT) traffic values, and is provided in Appendix C. The traffic volume was projected to 2032 at an annual growth rate of 2.5%. A projected volume of 13 363 vehicles per day at a posted speed limit of 60 km/h was applied for the analysis. A commercial vehicle percentage of 4.7% was used, further split into 1.8 % for medium trucks and 2.9 % for heavy trucks as per Ministry of Transportation guidelines. A day/night split of 90 % / 10 % was used.

Table III summarizes the traffic volume data used in this study.

Table III: Projected Road Traffic Data to Year 2032

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Sunset Drive	Daytime	11 462	216	349	12 027
	Nighttime	1 274	24	39	1 337
	Total	12 736	241	388	13 364

4.3 Rail and Road Traffic Noise Predictions

To assess the levels of rail and road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix D.

Predictions of the traffic sound levels were chosen around the proposed residential buildings to obtain an appropriate representation of future sound levels at various façades. Sound levels were predicted at the plane of the top storey bedroom and/or living/dining room windows during daytime and nighttime hours to investigate ventilation and façade construction requirements. Sound levels were also predicted in possible OLA's to investigate the need for noise barriers. Whistle noise was not included in the analysis. Figure 2 shows the preliminary site plan with prediction locations. The results of these predictions are summarized in Table IV and V.

Table IV: Daytime Predicted Traffic Sound Levels [dBA], Without Mitigation

Prediction Location	Building	Description	Daytime L _{EQ-16 hr}		Daytime at Façade Total L _{EQ-16 hr}	Daytime in the OLA Total L _{EQ-16 hr}
			Road	Rail		
[A]	4-Storey Bldg	East façade facing Sunset Dr	63	--	63	--
[B]	4-Storey Bldg	South façade facing Karen St	55	<55	55	--
[C]	4-Storey Bldg	West façade facing PSTR	--	<55	<55	--
[D]	6-Storey Bldg	East façade facing Sunset Dr	60	--	60	--
[E]	6-Storey Bldg	North façade flanking PSTR	56	<55	56	--
[F]	6-Storey Bldg	West façade facing PSTR	--	<55	<55	--
[G]	--	Common amenity space	<55	<55	--	<55

Table V: Nighttime Predicted Traffic Sound Levels [dBA], Without Mitigation

Prediction Location	Building	Description	Nighttime L _{EQ-8 hr}		Nighttime at Façade Total L _{EQ-8 hr}
			Road	Rail	
[A]	4-Storey Bldg	East façade facing Sunset Dr	56	--	56
[B]	4-Storey Bldg	South façade facing Karen St	<50	--	<50
[C]	4-Storey Bldg	West façade facing PSTR	--	--	--
[D]	6-Storey Bldg	East façade facing Sunset Dr	54	--	54
[E]	6-Storey Bldg	North façade flanking PSTR	<50	--	<50
[F]	6-Storey Bldg	West façade facing PSTR	--	--	--

Note: no nighttime rail movements

5 Discussions and Recommendations

The sound level predictions indicate that the future traffic sound levels will have minor excesses over the MECP guidelines at the proposed development. The following discussion outlines the recommendations for acoustic barrier requirements, ventilation requirements, upgraded building façade construction, and warning clauses to achieve the noise criteria stated in Table I.

5.1 Outdoor Living Areas

The predicted daytime sound levels at the ground level common amenity space will less than 55 dBA. No mitigation is required.

5.2 Minimum Setback Distance

PSTR guidelines stipulates a minimum setback distance of 15 m between new dwellings and the spur line right of way. The proposed development plans conform to the setback requirement as the nearest proposed building façade is located more than 15 m way from the rail right-of-way.

5.3 Indoor Living Areas and Ventilation Requirements

Provision for Air Conditioning

The predicted future sound levels outside the top storey windows of the proposed building façades will be between 56 and 65 dBA during the daytime hours and between 51 to 60 dBA during the nighttime hours. To address these excesses, these dwelling units require provisions for the future installation of central air conditioning systems so that windows may be kept closed. This requirement

is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant. The installation of central air conditioning for the whole buildings will satisfy and exceed ventilation requirements. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

5.4 Building Façade Constructions

The predicted sound levels at all façades of the development will not exceed 65 dBA daytime and 60 dBA nighttime, thus will not require detailed building envelope design to conform to noise criteria. Any exterior wall and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the interior spaces.

5.5 Assessment of Ground-borne Vibration from Rail Traffic

Measurements were performed on the site at grade, at approximately 28 m from the railway right-of-way. The vibration measurement location is indicated on Figure 2. Ground-borne vibration measurements were measured for 2 train pass-bys using an HP 3569A Real Time Frequency Analyzer outfitted with a Wilcoxon Research type 793V velocity transducer correctly field calibrated before the measurement. Vibration measurements were obtained for one scheduled train operating on the PSTR tracks during a round-trip movement, passing through the site area twice. The results of the measurements are presented in Table VI showing the maximum vibration level measurements during each of the train pass-bys. Figures 3 and 4 show the vibration velocity levels and acceleration spectrum of the pass-bys.

Table VI: Maximum RMS Vibration Velocity Measurements of Train Pass-bys

Train Pass-by	30 m from right of way (mm/s)	Criteria (mm/s)
1	0.045	0.14
2	0.025	

The results indicate that vibration levels are below the PSTR criteria of 0.14 mm/s and vibration mitigation measures are not required for this proposed development.

6 MECP Guidelines for Land Use Compatibility and Distance Separation

MECP Guidelines D-1, 'Land Use Compatibility' and D-6 'Compatibility Between Industrial Facilities and Sensitive Land Uses' were prepared to address the potential incompatibility of industrial land uses and noise sensitive land uses in relation to land use approvals under the Planning Act. They recommend that studies be conducted to investigate the feasibility of providing sufficient mitigation when noise sensitive land uses are proposed within the potential zone of influence of an existing industry/commercial facility. The mitigation can be provided at the source, or can be incorporated on the development lands where the industrial/commercial facility is operating in compliance with legislated Ministry requirements.

While nearby commercial and institutional facilities are not necessarily classified as industries, D-1 and D-6 guidelines are still consulted to assess separation distances between land uses.

In planning a sensitive land use near an existing industrial/commercial area, guideline D-6 suggests certain potential zones of influence for the industry, depending on the characterization of that industry. Three classes of industry are defined, as follows:

Class I Industrial Facility

A place of business for a small scale, self-contained plant or building which produces/stores a product which is contained in a package and has a low probability of fugitive emissions. Outputs are infrequent, and could be point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration. There are daytime operations only, with infrequent movement of products and/or heavy trucks and no outside storage.

Class II Industrial Facility

A place of business for medium scale processing and manufacturing with outdoor storage of wastes or materials (i.e. it has an open process) and/or there are periodic outputs of minor annoyance. There are occasional outputs of either point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration, and low probability of fugitive emissions. Shift operations are



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permitted and there is frequent movement of products and/or heavy trucks during daytime hours.

Class III Industrial Facility

A place of business for large scale manufacturing or processing, characterized by: large physical size, outside storage of raw and finished products, large production volumes and continuous movement of products and employees during daily shift operation. It has frequent outputs of major annoyance and there is high probability of fugitive emissions.

For screening purposes, guideline D-6 outlines some potential influence areas for the different classes of industry, as follows. Outside these potential influence areas, it is unlikely that an industry which has been appropriately classified will have significant impact.

Class I – 70 m
Class II – 300 m
Class III – 1000 m

Guideline D-6 acknowledges that the actual influence areas may be less, subject to site specific studies performed in accordance with guideline NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”. Notwithstanding the actual influence area of an industry, in order to minimize the potential for future land use conflicts, the MECP recommends that certain minimum separation distances be respected, as follows:

Class I – 20 m
Class II – 70 m
Class III – 300 m

The MECP recognizes that these minimum separation distances may not always be viable in certain cases, particularly in those cases of redevelopment, infilling and mixed-use areas, where the zoning or official plan has left no available land buffer. In those instances, the overall feasibility of the proposal is based on the anticipated adverse effects from the industrial/commercial use, including any mitigative measures that might be applied to address anticipated impacts.

6.1 Adjacent Land Uses

Commercial Facilities to the North

To the north of the site area is a restaurant (Elgin Harvest) and offices (Winmar Property Restoration Specialists). These facilities may be considered as Class 1 industries, since the majority of the processes occur indoor with few deliveries and are daytime only operations. The closest facility (Winmar) is approximately 20 m from the closest proposed building. These facilities fall outside of the minimum separation distance, but are within the potential influence area for Class I industries. Based on site observations, sounds from the facilities were not audible at the proposed development and are not expected to significantly impact the site.

Institutional Facilities to the South and East

To the northeast of the proposed development is a psychiatric hospital (Southwest Centre for Forensic Mental Health Care) located 200 m away, which may be considered a Class II industry, since it may feature frequent movement of products or may include shift work. The facility falls outside of the minimum separation distance, but is within the potential influence area. Based on site observations, sound emissions from the hospital were not audible, and are not expected to significantly impact the site.

Sources Connected to Emergency Services

It is also noted that the hospital to the northeast can have sounds associated with emergency vehicles and sirens. Typically, sounds connected with emergency measures undertaken for the immediate health, safety or welfare of inhabitants, such as the usage of emergency sirens, are not required for noise impact assessments, as per MECP guidelines. Nevertheless, it is recommended that a noise warning clause be included in the property and tenancy agreements to inform future occupants of the proximity to these uses.

7 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all units with anticipated traffic sound level excesses. The following noise warning clauses are required for specific dwellings as indicated in Table VII.

Suggested wording for future dwellings which have sound levels in excess of MECP criteria but do not require mitigation measures is given below.

A):

Purchasers/tenants are advised that sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

Suggested wording for future dwellings which have provisions for central air conditioning to be installed is given below.

B):

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

Suggested wording for future dwelling units in close proximity to institutional and commercial buildings is given below.

C):

Purchasers are advised that due to the proximity of the existing commercial and institutional buildings, sound levels from the facilities may be at times be audible.

These sample clauses are provided by the MECP as examples, and can be modified by the Municipality as required.

PSTR guidelines as attached recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all dwelling units located within 300 m near a spur line will be required. The warning clause can be amended as required by the Municipality.



D):

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

8 Summary and Recommendations

The following list and Table VII summarize the recommendations made in this report. The reader is referred to previous sections of the report where these recommendations are applied and discussed in more detail.

1. Forced air ventilation systems with ductwork sized for future installation of central air conditioning systems will be required for the two residential buildings. The installation of central air conditioning will satisfy and exceed ventilation requirements.
2. Building construction conforming to the minimum standards of the Ontario Building Code will provide sufficient acoustical insulation for indoor spaces.
3. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of traffic noise issues and proximity to existing commercial and institutional land uses.

Table VII: Summary of Noise Control Requirements and Noise Warning Clauses

Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Constructions
Proposed 4-Storey Building	--	Forced Air	A, B, C, D	OBC
Future 6-Storey Building	--	Forced Air	A, B, C, D	OBC

Notes:

* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.

-- No specific requirements

OBC – Ontario Building Code

LR/DR – Living Room/Dining Room

BR – Bedroom

8.1 Implementation

To ensure that the noise control recommendations outlined above are properly implemented, it is recommended that:

1. Prior to the issuance of occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly installed and constructed.



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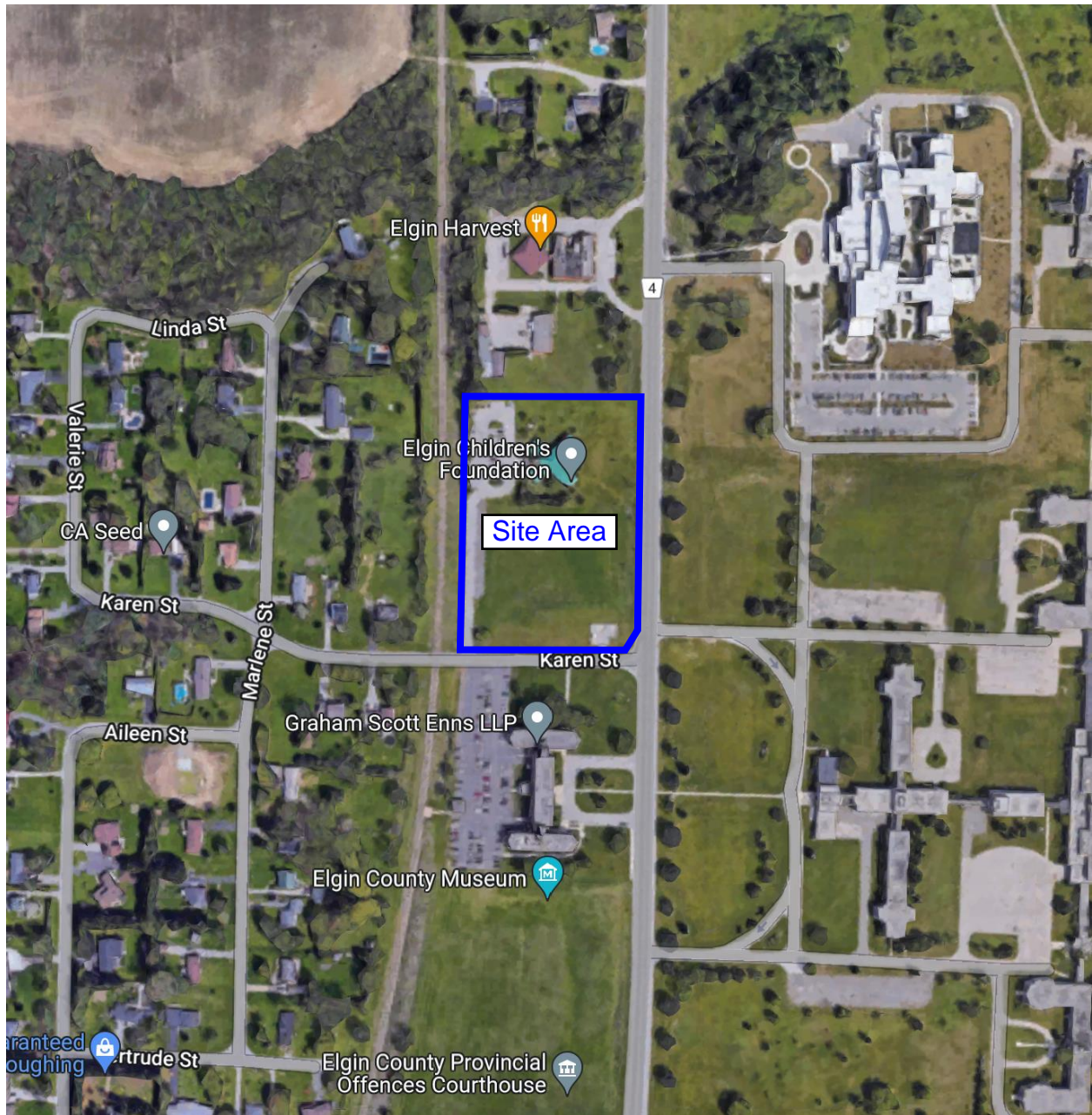
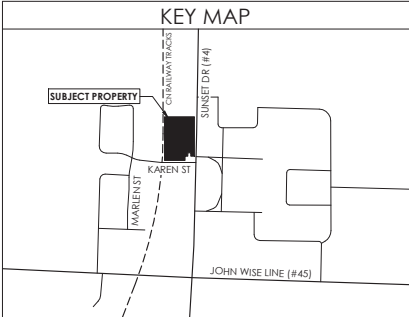
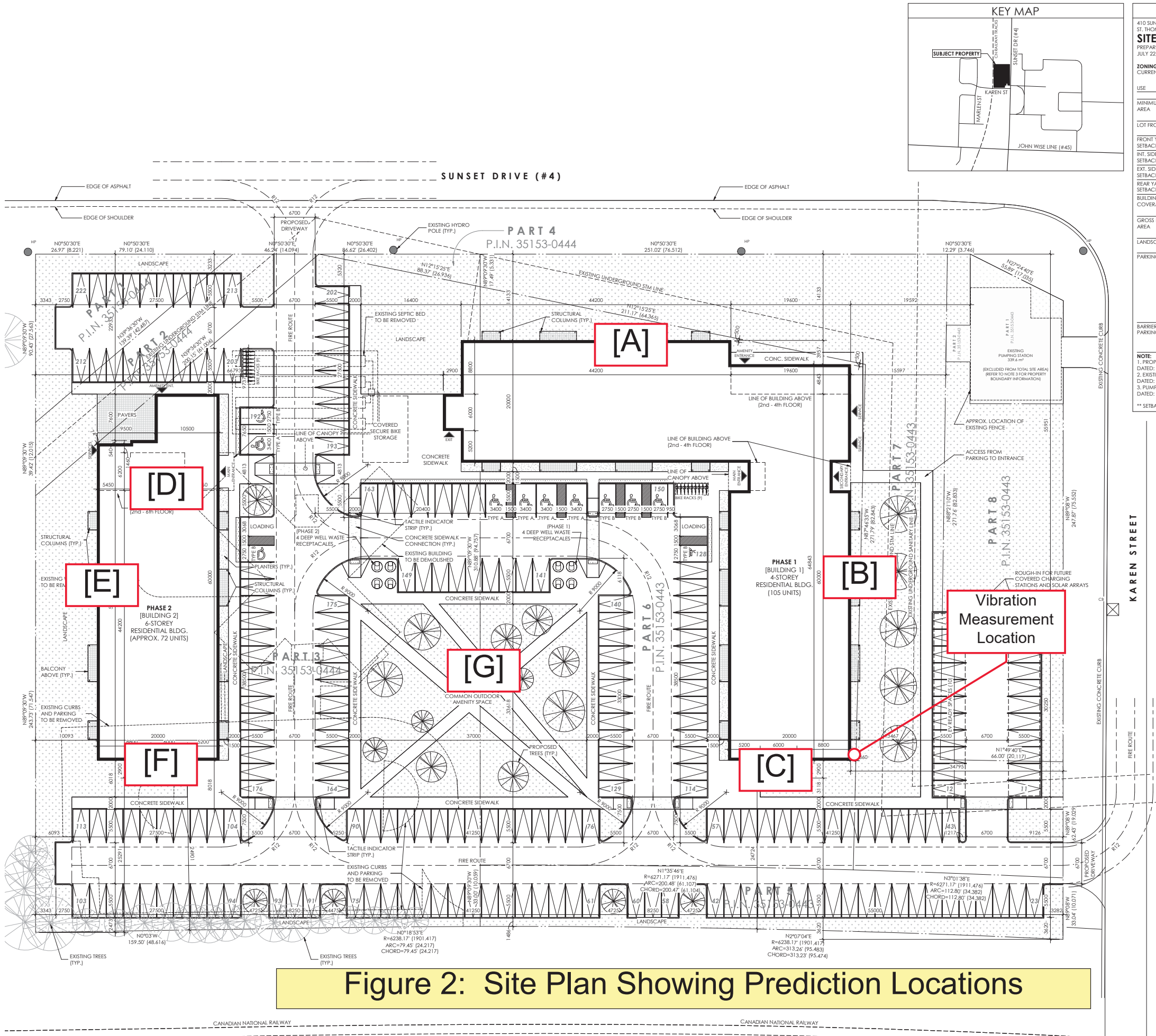


Figure 1: Key Plan



ZONING DATA CHART			
410 SUNSET DR. ST. THOMAS, ON SITE PLAN - PHASE 1 & 2 PREPARED BY EDGE ARCHITECTS LTD. JULY 22, 2022			
ZONING COMPLIANCE CHART CURRENT ZONING: OFFICE PROFESSIONAL (AS NOTED ON CENTRAL ELGIN OFFICIAL PLAN)			
USE	MULTI-RESIDENTIAL DEVELOPMENT + MIXED-USE		
	REQUIRED	PHASE 1	PHASE 2
MINIMUM LOT AREA	---	18,234.4 m ² (EXCLUDES PUMP STATION SITE AREA = 339.6 m ²)	18,234.4 m ² (EXCLUDES PUMP STATION SITE AREA = 339.6 m ²)
LOT FRONTAGE	---	87.7m (@ KAREN ST)	87.7m (@ KAREN ST)
FRONT YARD SETBACK (S) **	---	34.8m [BUILDING 1]	N/A [BUILDING 2]
INT. SIDE YARD SETBACK (W) **	---	24.7m [BUILDING 1]	24.9m [BUILDING 2]
EXT. SIDE YARD SETBACK (E) **	---	14.1m [BUILDING 1]	22.9m [BUILDING 2]
REAR YARD SETBACK (N) **	---	66.8m [BUILDING 1]	10.1m [BUILDING 2]
BUILDING COVERAGE	---	BUILDING 1: 2,180.8 m ² EXISTING BLDG: 642.5 m ² TOTAL= 2,823.3 m ²	BUILDING 1: 2,180.8 m ² BUILDING 2: 1,142.3 m ² TOTAL= 3,323.0 m ²
GROSS FLOOR AREA	---	BUILDING 1 GFA: 8,481.7 m ² BUILDING 2 GFA: 5,924.8 m ²	BUILDING 1 GFA: 8,481.7 m ² BUILDING 2 GFA: 5,924.8 m ²
LANDSCAPED	---	10,191.0 m ² (EXCLUDES PUMP STATION SITE)	8,463.5 m ² (EXCLUDES PUMP STATION SITE)
PARKING	---	EXISTING PARKING: APPROX. 45 SPACES PROPOSED PARKING: 118 SPACES TOTAL PARKING: 163 SPACES 1.12 SPACES/ UNIT + APPROX. 45 FOR OFFICE	PROPOSED PARKING: 222 SPACES 1.25 SPACES/ UNIT ASSUMING: BUILDING 1: 105 UNITS BUILDING 2: 72 UNITS
BARRIER-FREE PARKING	---	8 SPACES 4 TYPE A; 4 TYPE B	11 SPACES (PROVIDED) 5 TYPE A; 6 TYPE B
NOTE: 1. PROPERTY BOUNDARY INFORMATION FROM SURVEY PLAN FROM 'DONALD L. HOUGHTON'; DATED: SEPTEMBER 19, 1990. 2. EXISTING SITE CONDITION AND SITE CONTEXT FROM TOPOGRAPHICAL BASE PLAN FROM 'STANTEC'; DATED: JUNE 09, 2009. 3. PUMPING STATION PROPERTY BOUNDARY INFORMATION FROM SURVEY PLAN FROM 'FIS LAND SURVEYORS'; DATED: MARCH 14, 2011. ** SETBACKS SHOWN ONLY FOR THE PROPOSED BUILDINGS			

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ISSUED FOR:

SCHEMATIC DESIGN

DEVELOPED DESIGN

SITE PLAN APPROVAL

BUILDING PERMIT

BIDDING/TENDER

NO.	REVISION DESCRIPTION	DATE

PRELIMINARY
NOT FOR CONSTRUCTION
2022.07.22

EDGE
ARCHITECTS LTD
www.edgeld.ca

ARCHITECT'S SEAL

PROJECT NAME

410 SUNSET DR MULTI-RES
410 SUNSET DR, ST. THOMAS, ON

CLIENT

410 SUNSET INC.
49 KINGSPARK CRESCENT, LONDON, ON, N6H 4C3

DRAWING TITLE

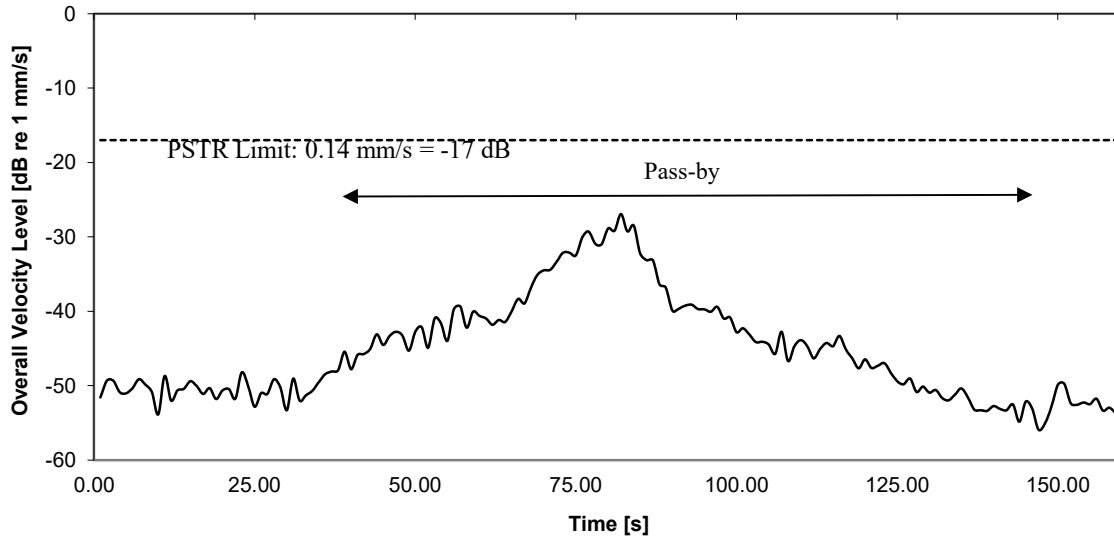
SITE PLAN

PROJECT NUMBER	DRAWING NUMBER
22005	SP1.1
SCALE	
As indicated	

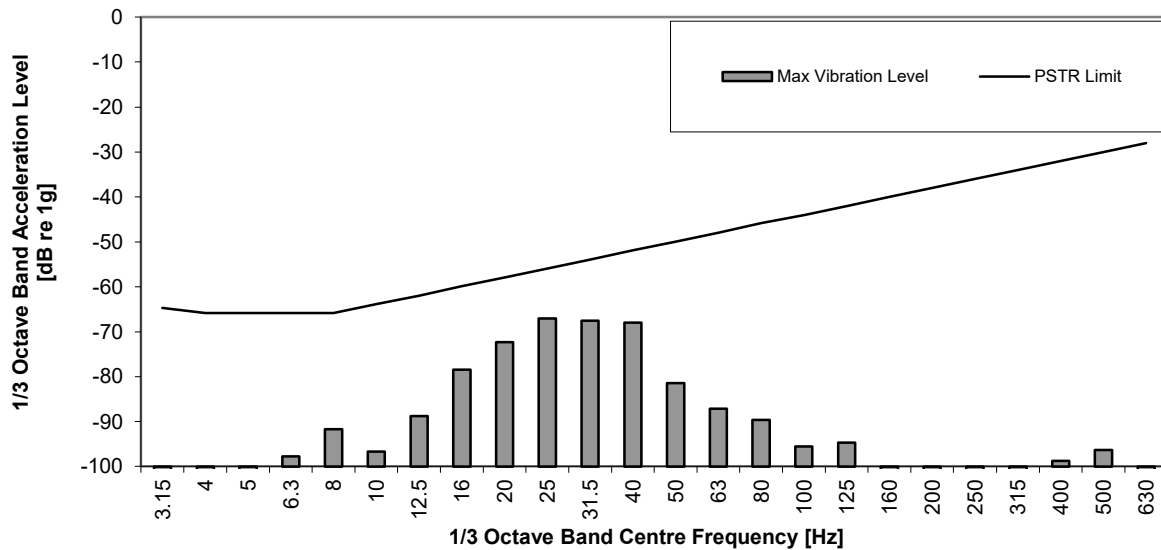
SHEET SIZE

24x36

**Figure 3a: Northbound passby, 30 m from right-of-way
Measured Vibratory Velocity Level**



**Figure 3b: Northbound passby, 30m from right-of-way
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



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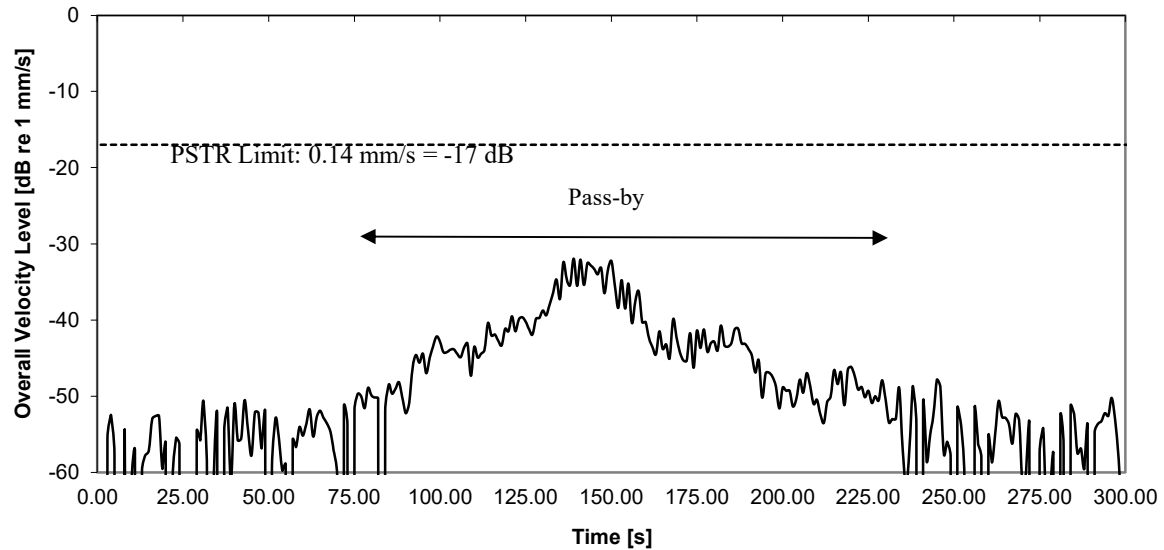


NOISE

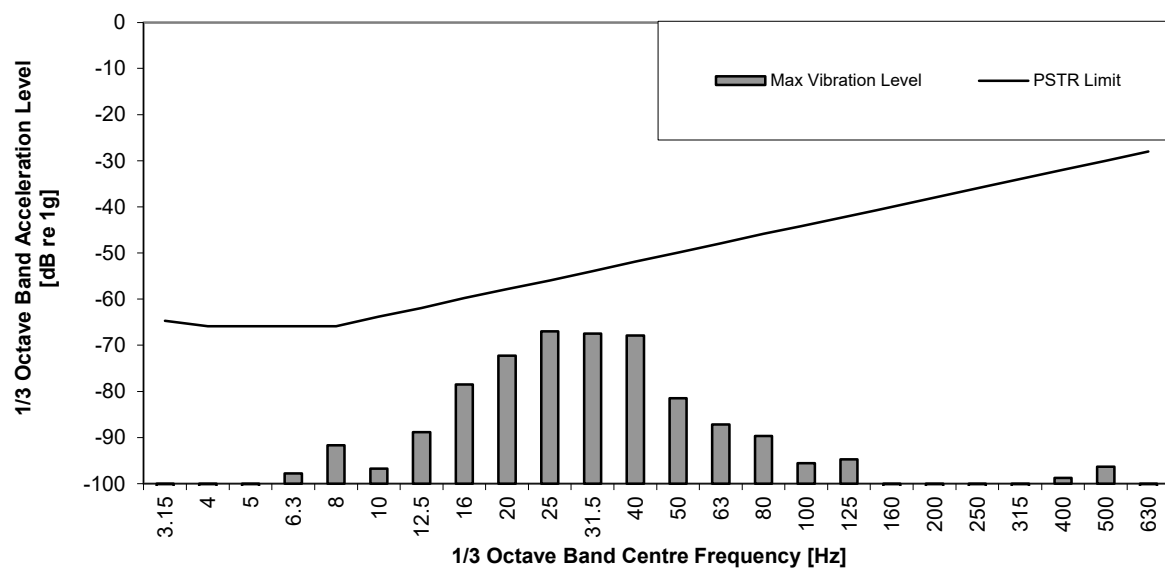


VIBRATION

**Figure 4a: Southbound passby, 30 m from right-of-way
Measured Vibratory Velocity Level**



**Figure 4b: Southbound passby, 30 m from right-of-way
Acceleration Spectrum @ Peak Level (1 sec. Duration)**



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NOISE



VIBRATION

Appendix A

PSTR Requirements



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VIBRATION



SPUR REQUIREMENTS

- A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 15 metres.
- B. The Developer/Owner shall, as a minimum, install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line. The Developer/Owner may conduct this work up to 3 metres on the PSTR side of the mutual property line as to not interfere with normal train operations.
- C. The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way: "Warning: Port Stanley Terminal Rail or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). PSTR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way."
- D. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway and be substantiated by a drainage report to the satisfaction of the Railway.
- E. The Developer/Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the fencing, and if necessary the safety berm, and vibration isolation measures implemented are not to be tampered with or altered and further that the Developer/Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of PSTR.
- F. The Developer/Owner enter into an Agreement stipulating how PSTR's concerns will be resolved and will pay PSTR's reasonable costs in preparing and negotiating the agreement.
- G. The Developer/Owner may be required to grant PSTR an environmental easement for operational noise and vibration emissions, registered against the subject property in favour of PSTR.
- H. The owner acknowledges that should the usage on the Right of Way change the following caveats are in place.
 - 1. The fence as noted in paragraph B may be augmented with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.0 metres above grade at the property line, with side slopes not steeper than 2.5 to 1
 - 2. Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ± 3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.
- I. The cost of all measures above will be borne by the Developer/Owner.

Appendix B

Rail Traffic Data



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NOISE



VIBRATION

PSTR SCHEDULE & FARES



BUY TICKETS

July

Weekends, Canada Day the 1st and Friday the 2nd
at 11:00 AM, 1:00 PM & 3:00 PM
[Extended Parkside Trip](#) on Saturdays at 11:00 AM



August

Weekends & Civic Holiday on the 2nd
at 11:00 AM, 1:00 PM & 3:00 PM
[Extended Parkside Trip](#) on Saturdays at 11:00 AM



September

Saturdays, Sundays & Labour Day the 6th
at 11:00 AM, 1:00 PM & 3:00 PM

October

Saturdays, Sundays & Thanksgiving Day the 11th
at 11:00 AM, 1:00 PM & 3:00 PM
[Pumpkin Trains](#) on the 16th & 17th



November

[Santa Treats Trains](#) on 20th, 21st, 27th & 28th
at 11:00 AM, 1:00 PM & 3:00 PM



December

[Santa Treats Trains](#) on the 4th, 5th, 11th, 12th, 18th & 19th
at 11:00 AM, 1:00 PM & 3:00 PM



Fares for Scenic Train Ride: Adults \$15.00, Child (2-14) \$9.00 plus tax

Fares for Extended Parkside Trip: Adults \$20.00, Child (2-14) \$12.50 plus tax

[Charter Group Bookings](#) with advance notice.

Available for the [Red Caboose](#), Entertainment / Dining Train or regular equipment.

For charter reservations call 519-782-3730 local or click here to [contact](#) PSTR

Regular rides are one hour in duration and run rain or shine.

Days of operation, schedule, fares and equipment subject to change without notice.

- See Valley View, woodlands and wild flowers
- Locomotives "Stanley", "Albert", "Winnie" and "Donald"
- Tour a restored CN Caboose
- 1929 Snow Plow

- The Circus Car



Port Stanley Terminal Rail Inc.
309 Bridge Street
Port Stanley, Ontario, Canada
N5L 1C5

Station phone line

519-7

0

Checkout

Fax 519-782-3250

Station hours on scheduled days are 10:00 AM to 4:00 PM

Murder Mysteries, Teddy Bear, Easter Egg Hunt, Rare Milage Trip, Pumpkin Train, Santa Treats plus more. Click [here](#) to check for availability of these unique rides.

For directions to PSTR and information about, click here: [About PSTR](#)

All trains depart from and return to the station in Port Stanley next to the King George Lift Bridge and operate rain or shine. Both open and closed cars are used. Closed cars are heated in cool weather.



Appendix C

Road Traffic Data



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VIBRATION

For Project:	4.3 - #4 North of #57 SB					
Project Notes:						
Location/Name:	Merged					
Report Generated:	2021-05-12	08:57				
Speed Intervals	1 km/h					
Time Intervals	Instant					
Traffic Report From	2021-05-10	13:00:00	through	2021-05-12	08:59:59	
85th Percentile Speed	67 km/h					
85th Percentile Vehicles	15873					
Max Speed	125 km/h	on	2021-05-11	20:02:48		
Total Vehicles	18674					
AADT:	10185					

Volumes - weekly counts

Time	5 Day	7 Day
Average Daily	6224	6224
AM Peak	712	712
PM Peak	997	997

Speed

Speed Limit:	60
85th Percentile Speed:	67
Average Speed:	60.43

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	2749	5429	1249	N/A	N/A	N/A	N/A
% over limit	51.0	47.8	64.7	N/A	N/A	N/A	N/A
Avg Speeder	65.7	65.6	66.5	N/A	N/A	N/A	N/A

Class Counts

Number	%
VEH_SM	109
VEH_MED	17683
VEH_LG	882
[VEH_SM=motorcycle,	VEH_MED = sedan,
	VEH_LG = truck]

Appendix D

Sample STAMSON 5.04 Output



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VIBRATION

Filename: b.te Time Period: Day/Night 16/8 hours
 Description: Pred. Loc. [B], 4-storey bldg, south facade

Rail data, segment # 1: PSTR (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /!Train	!# Cars /!Train	! Eng type	!Cont weld
1.	! 8.0/0.0	! 24.0	! 1.0	! 4.0	!Diesel	! No

Data for Segment # 1: PSTR (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 75.00 / 75.00 m
 Receiver height : 10.50 / 10.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: PSTR (day)

LOCOMOTIVE (0.00 + 43.49 + 0.00) = 43.49 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.31	56.49	-9.19	-3.81	0.00	0.00	0.00	43.49

WHEEL (0.00 + 31.59 + 0.00) = 31.59 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.42	45.55	-9.93	-4.03	0.00	0.00	0.00	31.59

Segment Leq : 43.76 dBA

Total Leq All Segments: 43.76 dBA

Results segment # 1: PSTR (night)

LOCOMOTIVE (0.00 + -13.00 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.42	45.55	-9.93	-4.03	0.00	0.00	0.00	31.59

-90 0 0.31 0.00 -9.19 -3.81 0.00 0.00 0.00 -13.00

WHEEL (0.00 + -13.96 + 0.00) = 0.00 dBA

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

-90 0 0.42 0.00 -9.93 -4.03 0.00 0.00 0.00 -13.96

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

Road data, segment # 1: Sunset Dr (day/night)

Car traffic volume : 11462/1274 veh/TimePeriod *

Medium truck volume : 216/24 veh/TimePeriod *

Heavy truck volume : 349/39 veh/TimePeriod *

Posted speed limit : 60 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 10185

Percentage of Annual Growth : 2.50

Number of Years of Growth : 11.00

Medium Truck % of Total Volume : 1.80

Heavy Truck % of Total Volume : 2.90

Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Sunset Dr (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 60.00 / 60.00 m

Receiver height : 10.50 / 10.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Results segment # 1: Sunset Dr (day)

Source height = 1.31 m

ROAD (0.00 + 54.88 + 0.00) = 54.88 dBA

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

0 90 0.40 67.26 0.00 -8.40 -3.98 0.00 0.00 0.00 54.88



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NOISE



VIBRATION

Segment Leq : 54.88 dBA

Total Leq All Segments: 54.88 dBA

Results segment # 1: Sunset Dr (night)

Source height = 1.31 m

ROAD (0.00 + 48.36 + 0.00) = 48.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.40	60.75	0.00	-8.40	-3.98	0.00	0.00	0.00	48.36

Segment Leq : 48.36 dBA

Total Leq All Segments: 48.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.20
(NIGHT): 48.36



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NOISE



VIBRATION