



Noise & Vibration Impact Study

Proposed Residential Developments at
Third Street, Beaverton, Ontario

Éclat 2DC Inc.
Final Report (rev. 3.0)

July 06, 2022
01940594.001-0101

Éclat 2DC Inc.

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Revisions and publications log

REVISION No.	DATE	DESCRIPTION
1.0	February 06, 2020	Issued to Client
2.0	October 05, 2020	Revised report issued to Client
3.0	July 06, 2022	Revised report per feedback from Municipality, issued to Client

Distribution

1 PDF copy	Mr. Saad Yousaf
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1 Introduction

Englobe Corp was retained by Éclat 2DC Inc. (the Client) to prepare a Noise & Vibration Impact Study for the proposed residential development that will be located between Morrison Avenue and Ethel Park Drive along Third Street in Beaverton, Ontario. The purpose of this study is to assess the noise & vibration impact of the surrounding environment on the proposed development and to make recommendations for mitigation measures for compliance with the Ministry of the Environment, Conservation and Parks (MECP) noise guidelines and the noise & vibration guidelines provided by the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC).



2 Project Description

The site is located on the southern half of the lands between Morrison Ave. and Ethel Park Dr. along Third St. in Beaverton, Ontario. A scaled area map has been included as Figure 1 in Appendix A. The site is directly adjacent to residential lands to the north, south & west, as well as undeveloped residential lands to the east. Zoning maps of the area and area classifications are included in Appendix B. The development will be comprised of nine two-storey homes. Given the early stage of development only the site plan showing the building footprints has been available for review, and has been included as Figure 2 in Appendix A.



3 Noise Sources

3.1 Stationary Noise Sources

The area is primarily residential with no significant stationary noise sources that would impact the site.

3.2 Transportation Noise Sources

The nearest significant transportation noise source is a single railroad main line that runs from north to south and lies 36 metres to the east of the site. The next nearest significant transportation noise source is Highway 23 which runs from north to south and is approximately 850 metres to the east of the site. Given the setback distance away from Highway 23 and the proximity of the rail line, only the rail line has been considered as a significant transportation noise source for this study.

3.2.1 Rail Traffic Data

Rail traffic Data for the CN Bala Subdivision applicable to the year 2020 was obtained directly from CN. The CN rail traffic data was escalated to the year 2032 design condition using the recommended growth rate of 2.5% compounded annually. This traffic growth calculation is recommended by CN for completion of noise studies in the area of interest. Traffic volume data is located in Appendix C. It should be noted that the total traffic volume over a 16-hour daytime period (7h00 to 23h00) is 10 freight trains and 1 passenger train, while the traffic volume over the 8 hour nighttime period (23h00 to 07h00 the next day) is 8 freight trains and 1 passenger train. This results in a higher number of trains per hour during nighttime hours. Therefore, recommendations will be based on the predicted nighttime sound levels.

It should be noted that the new development is more than 400 metres away from any public crossing. Thus, train whistle noise has not been considered in this assessment.

4

4 MECP Sound Level Limit Guidelines

As noted in Section 3, the only noise sources to be considered in this study are transportation noise sources. The applicable guideline limits for sound from transportation noise sources on residential developments is given in Part C of the MECP publication NPC-300 “Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning” [1]. The following sub-sections describe the noise level limits and associated mitigation measures for indoor and outdoor spaces.

4.1 Outdoor Sound Level Limits

The outdoor sound level limits developed by the MECP in NPC-300 for road and rail traffic noise combined are summarized in Table 2. These limits are applicable during daytime periods only at Outdoor Living Areas (OLA) associated with the proposed development. Daytime refers to the hours between 07h00 and 23h00.

Table 1: MECP Outdoor Sound Level Limits

Location	Time Period	Road + Rail Sound Level Limit $L_{eq-16hr}$ (dBA)
Outdoor Living Area	Daytime (07:00 - 23:00)	55

NPC-300 also outlines that a tolerance of not more than 5 dBA above the outdoor noise level criterion shown in Table 1 can be allowed (at the Municipality’s discretion), if it is shown that there is no technically or economically feasible way to achieve the noise level criterion outlined in NPC-300. If the 5 dBA tolerance is used, warning clauses for OLAs are required in the scenarios listed below, per guidelines

from the Ministry of the Environment, Conservation and Parks (MECP) Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300):

- Warning Clause Type A is required when the $L_{eq-16hr}$ is greater than 55 dBA and less than or equal to 60 dBA and no mitigation measures are provided.
- Warning Clause Type B is required when the $L_{eq-16hr}$ is greater than 60 dBA and mitigation measures are implemented, resulting in noise levels greater than 55 dBA and less than or equal to 60 dBA (triggering the 5 dBA tolerance outlined above).

4.2 Indoor Sound Level Limits

The indoor sound level limits developed by the MECP for rail traffic noise are summarized in Table 2. Daytime refers to the hours between 07h00 and 23h00. Nighttime refers to the hours between 23h00 and 07h00 the next day.

Table 2: MECP Indoor Sound Level Limits - Rail Noise

Room	Time Period	Rail Sound Level Limit L_{eq-t} (dBA)
Living / Dining / Den	Daytime (07:00 - 23:00)	40
	Nighttime (23:00 - 07:00)	40
Sleeping Quarters	Daytime (07:00 - 23:00)	40
	Nighttime (23:00 - 07:00)	35

In addition to the noise level criteria shown in Table 2, noise control measures shall be developed according to NPC-300. The requirements pertaining to noise control measures given in NPC-300 vary depending on the plane-of-window (outdoor) noise level, as shown in Table 3 and Table 4.

Table 3: NPC-300 Minimum Ventilation and Warning Clause Requirements - Rail Noise

Point of Assessment	Noise Level (L_{eq})	Ventilation Requirements	Warning Clause
Living room or bedroom plane-of-window Daytime (07h00 to 23h00)	$55 \text{ dBA} < L_{eq} \leq 65 \text{ dBA}$	Forced-air heating with provision for central air conditioning	Type C
	$65 \text{ dBA} < L_{eq}$	Central air conditioning	Type D
Living room or bedroom plane-of-window Night-time (23h00 to 07h00)	$50 \text{ dBA} < L_{eq} \leq 60 \text{ dBA}$	Forced-air heating with provision for central air conditioning	Type C
	$60 \text{ dBA} < L_{eq}$	Central air conditioning	Type D

Table 4: NPC-300 Minimum Building Component Requirements - Rail Noise

Point of Assessment	Noise Level (L_{eq})	Building Façade Requirements
Living room or bedroom plane-of-window Daytime (07h00 to 23h00)	$L_{eq} \leq 60 \text{ dBA}$	Building façade constructions compliant with the Ontario Building Code (OBC)

Point of Assessment	Noise Level (L_{eq})	Building Façade Requirements
Living room or bedroom plane-of-window Daytime (07h00 to 23h00)	$60 \text{ dBA} < L_{eq}$	Building façade constructions shall be designed such that the indoor noise level criteria are achieved
Living room or bedroom plane-of-window Night-time (23h00 to 07h00)	$L_{eq} \leq 55 \text{ dBA}$	Building façade constructions compliant with the Ontario Building Code (OBC)
	$55 \text{ dBA} < L_{eq}$	Building façade constructions shall be designed such that the indoor noise level criteria are achieved

For nighttime receptors whose 24-hour noise level $L_{eq-24hr}$ is greater than 60 dBA, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters.



5 FCM & RAC Guideline

The Guidelines for New Development in Proximity to Railway Operations was released in May of 2013 and were developed through the collaboration of the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC). These guidelines address various construction issues associated with new developments impacted by existing railway corridors, including noise and vibration considerations. Regarding noise, this guideline provides similar limits and recommendations to the MECP guidelines in Section 4.

Key points relevant to the assessment from the document that are not already covered in Section 4 are summarized below:

- Standard recommended building setbacks for new residential development in proximity to railway is 30 metres from a Principle Main Line.
- A safety berm/sound barrier of minimum 5.5 metre height (other heights permissible as determined by acoustic consultant) shall be built that runs parallel to the rail line and breaks the line of site from the residential units.
 - Of note, the Municipality has rejected solutions involving sound barriers installed along / parallel to the rail line, citing that daylight triangles at intersections along Ethel Park Drive would be compromised, along with complications regarding land ownership. As such, the approach for sound barriers in this report is to install them at the perimeter of the proposed development lot lines, at heights resulting in predicted noise levels which comply with MECP criteria provided in Section 4.
- The recommended minimum vibration influence area to be considered is 75 metres from a railway corridor or rail yard. For a development within the 75 metre zone of influence, measurements should be undertaken in order to calculate the resultant internal vibration levels.
- Maximum allowable overall vibration velocity limit for residential dwellings is 0.14 mm/s (RMS) between 4Hz and 200 Hz.
- Vibration mitigation to be incorporated in the building design for all residential units where required as determined by on-site vibration measurements at the proposed building setback distance.

6 Predicted Sound Levels

In order to assess noise levels from transportation noise sources, predictions were made using STAMSON version 5.04, a software package developed by the MECP. Predictions were made for both daytime and nighttime hours at each of the proposed units. For daytime and nighttime plane-of-window sound levels, the noise was predicted at 4.5 metres above grade in order to represent a 2nd storey window. For the OLAs, the sound level was predicted at 1.5 metres above grade. See Figure 3 in Appendix A for receptor locations.

Sample outputs from the STAMSON noise prediction model are included in Appendix C. A summary of the results of the prediction model are summarized below in Table 5. The prediction of noise levels was completed at the facades that have the most exposure to the rail noise, in this case the northeast corner of each building. Other facades have shielding from the proposed neighbouring structures of the new development and the existing homes along Third Street.

Table 5: Summary of Predicted Noise Levels for the Development

Location (façade)	Assessment Height Above Grade (m)	Setback Distance from Rail Line (m)	Day Time Sound Level (dBA)	Nighttime Sound Level (dBA)
Part 8 (Northeast) - POR1	4.5	43	68	70
Part 7 (Northeast) - POR2	4.5	55	64	66
Part 6 (Northeast) - POR3	4.5	69	63	65
Part 5 (Northeast) - POR4	4.5	83	62	64
Part 4 (Northeast) - POR5	4.5	99	60	62
Part 3 (Northeast) - POR6	4.5	114	55	57
Part 2 (Northeast) - POR7	4.5	130	54	56
Part 1 (Northeast) - POR8	4.5	145	57	59
Part 9 (Northeast) - POR9	4.5	158	57	59
Part 8 (North) - OLA1	1.5	47	66	N/A

Location (façade)	Assessment Height Above Grade (m)	Setback Distance from Rail Line (m)	Day Time Sound Level (dBA)	Nighttime Sound Level (dBA)
Part 7 (North) - OLA2	1.5	60	63	N/A
Part 6 (North) - OLA3	1.5	74	62	N/A
Part 5 (North) - OLA4	1.5	88	61	N/A
Part 4 (North) - OLA5	1.5	104	59	N/A
Part 3 (North) - OLA6	1.5	119	58	N/A
Part 2 (North) - OLA7	1.5	135	57	N/A
Part 1 (North) - OLA8	1.5	150	56	N/A
Part 9 (North) - OLA9	1.5	163	56	N/A



7 Measured Vibration Amplitude

Ground borne vibration from the train traffic can pass through the track structure, into the ground and can transfer and propagate through the ground to nearby buildings. Vibration levels at such buildings are influenced on the soil and subsurface conditions between the building and the rail corridor.

In order to assess the vibration impact on the proposed development, baseline vibration measurements were undertaken. On September 8th, 2020, a long-term vibration monitor was deployed to collect vibration data at the location shown in Figure 1, Appendix A. Measurements were conducted at the distance corresponding to the closest proposed residential receptor, which is Part 8 (as shown on Figure 1 and Figure 2, Appendix A) approximately 36 metres from rail line. The monitor was retrieved on September 15th and an attended measurement of a single train pass-by was recorded. Results of the monitoring campaign are included in Appendix D. Included in Appendix D is the 24-hour data for September 14 and a plot of the attended measurement on September 15.

Based on a review of the data the vibration velocity (RMS) during a train pass-by can range between 1 and .25 mm/s, with an approximate average of 0.4 mm/s. These vibration amplitudes exceed the vibration limit described in Section 5 (0.14 mm/s RMS between 4 and 200Hz) and, therefore, the proposed development will require vibration mitigation measures. These include Parts 6, 7, and 8 as indicated on the site plan (Figure 2, Appendix A). All other structures further than 75 metres away from the rail line do not require vibration mitigation.

8 Noise Impact Assessment and Recommendations

Given the calculated noise levels in Table 5, noise control measures are recommended in order to comply with the noise level criteria given in Section 4. The noise control measures are discussed in the following section and summarized in Table 6.

Table 6: Summary of Recommended Noise Control Measures

Point of Reception	Noise Barrier?	Ventilation Requirements	Building Component Requirements	Warning Clause
POR1 to POR5	N/A	Central air conditioning	Building façade constructions shall be designed such that the indoor noise level criteria are achieved	Type D
POR6 to POR9	N/A	Forced-air heating w/ provision for central air conditioning	Building façade constructions shall be designed such that the indoor noise level criteria are achieved	Type C
OLA1 to OLA4	Yes	N/A	N/A	Type B
OLA5 to OLA9	No	N/A	N/A	Type A

8.1.1 Outdoor Living Area Noise Control Measures

Per Table 5, noise levels at OLAs 1 to 9 are expected to exceed 55 dBA. Therefore, as outlined in Section 4, noise mitigation measures are required in order to lower the calculated noise levels at outdoor living areas associated with the Project. It is recommended that a noise barrier with a minimum 3.1 metre height be erected along a portion of the northern and eastern backyard property lines associated with

the Project, as shown in Figure 4, Appendix A. This noise barrier reduces the calculated noise levels at OLA1 and OLA4 to below 60 dBA - thus, a Type B warning clause is required for the dwellings on Parts 5, 6, 7 and 8. Calculated noise levels at OLA5 to OLA9 are below 60 dBA without the need for a backyard noise barrier along the northern property line of Parts 1-4 and 9 - thus, a Type A warning clause is required for the dwellings on Parts 1, 2, 3, 4 and 9.

Noise barriers must have a minimum surface density of 20 kg/m². Additionally, noise barriers must be structurally sound, appropriately designed to withstand wind and snow loads, and constructed without cracks or surface gaps. Any gaps under the barrier that are necessary for drainage purposes should be minimized and localized so that the acoustical performance of the barrier is maintained.

8.1.2 Ventilation Requirements

Per Table 5, noise levels at POR6 to POR9 are expected to be between 50 dBA and 60 dBA during nighttime hours (worst-case scenario). Therefore, as outlined in Table 3, forced-air heating with provision for central air conditioning and a warning clause Type C are required for all residential units.

Also per Table 5, noise levels at POR1 to POR5 are expected to exceed 60 dBA during nighttime hours (worst-case scenario). Therefore, as outlined in Table 3, central air conditioning and a warning clause Type D are required for all residential units.

8.1.3 Building Component Requirements

Per Table 5, noise levels at all PORs are expected to exceed 55 dBA during nighttime hours (worst-case scenario). Therefore, as outlined in Table 4, building façade constructions (including exterior walls and windows) shall be designed such that the indoor noise level criteria are achieved.

The sound transmission class (STC) values are developed based on the proposed development's room sizes, exterior wall areas and window/patio door areas. Currently, room layouts, partitions and window sizes have not yet been selected for the project. Once selections are made, they must be reviewed by an acoustical engineer in order to verify that the performance of the entire assembly will meet the criteria outlined in Section 4. A memorandum can be provided by Englobe once the design has progressed in order to address this requirement.

As previously noted, per NPC-300, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters. It is also recommended that east-facing windows be avoided for the dwelling on Part 8 for noise-sensitive rooms such as bedrooms and living areas, as windows/glazing typically limit the achievable STC ratings of the exterior wall assembly.

8.1.4 Warning Clause Requirements

Warning clauses are required to be incorporated into all development agreements, registrations on title and inclusion in Agreement of Purchase and Sale associated with this Project. The warning clauses shall be drafted by a legal expert based on Section C8 of NPC-300, with wording adapted as applicable to this Project.

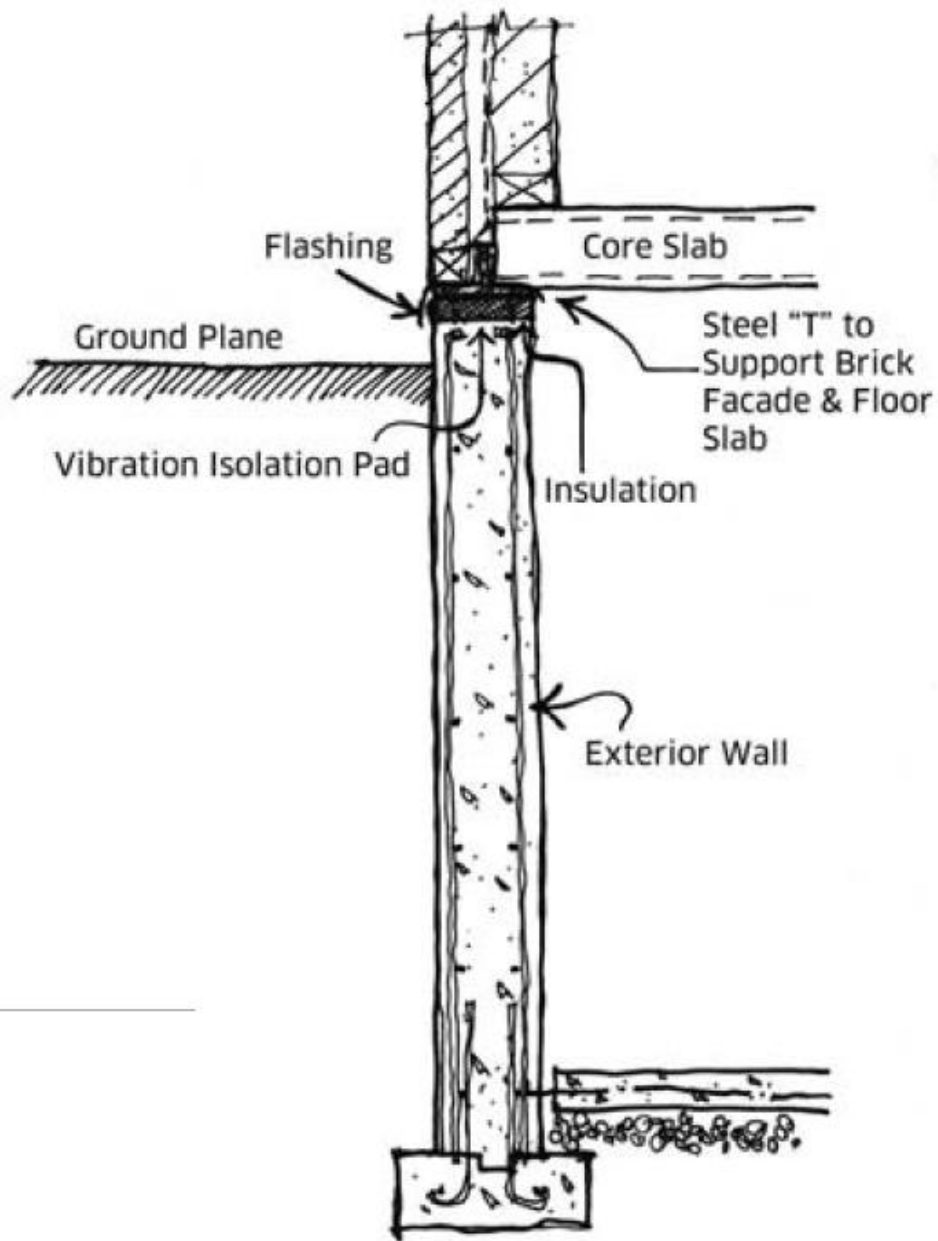
9

9 Vibration Impact Assessment and Recommendations

As stated in Section 7, vibration measurements were completed. Based on the vibration data collected, as per [2], any proposed residential structure within 75 metres of the rail line could experience vibration amplitudes that exceed the vibration limit described in Section 5.0 (0.14 mm/s RMS between 4 and 200Hz). Dwellings within the 75 metre setback from the rail line include Part 6, 7, and 8 as indicated on the site plan (Figure 2, Appendix A). All other structures further than 75 metres away are outside of the vibration zone of influence proposed by the Guidelines for New Development in Proximity to Railway Operations, developed by the FCM and RAC.

Therefore, recommendations to mitigate excess vibration at Part 6, 7, and 8 of the new development are as follows:

- Include provisions for vibration isolation of the upper floors from the foundation wall and any internal column supports using rubber pads designed to deflect 5 to 20mm under load. The final amount of static deflection shall be determined by the manufacturer of the product chosen to be implemented. See Detail 1 below for sample isolation detail.
- Other acceptable vibration isolation solutions can be utilized. For example, utilizing elastomer pads to support the building foundation and isolate the foundation wall from the surrounding ground. The final amount of deflection of the pads to be determined by the manufacturer of the product chosen to be implemented.
- All solutions shall be reviewed and approved by a qualified noise and vibration engineer.



Detail 1: Building Vibration Isolation Detail taken from Figure 13 of [2]



10 Closure

Based on a review of the information provided, the predicted sound levels and the measurements taken, recommendations for ventilation requirements, warning clauses, noise control, vibration isolation and building upgrades have been made based. With the implementation of the recommendations, this project will satisfy the required guidelines for noise and vibration.

We trust this Noise & Vibration Impact Study will satisfy your present project requirements. If you have any questions regarding this matter, please do not hesitate to contact us.



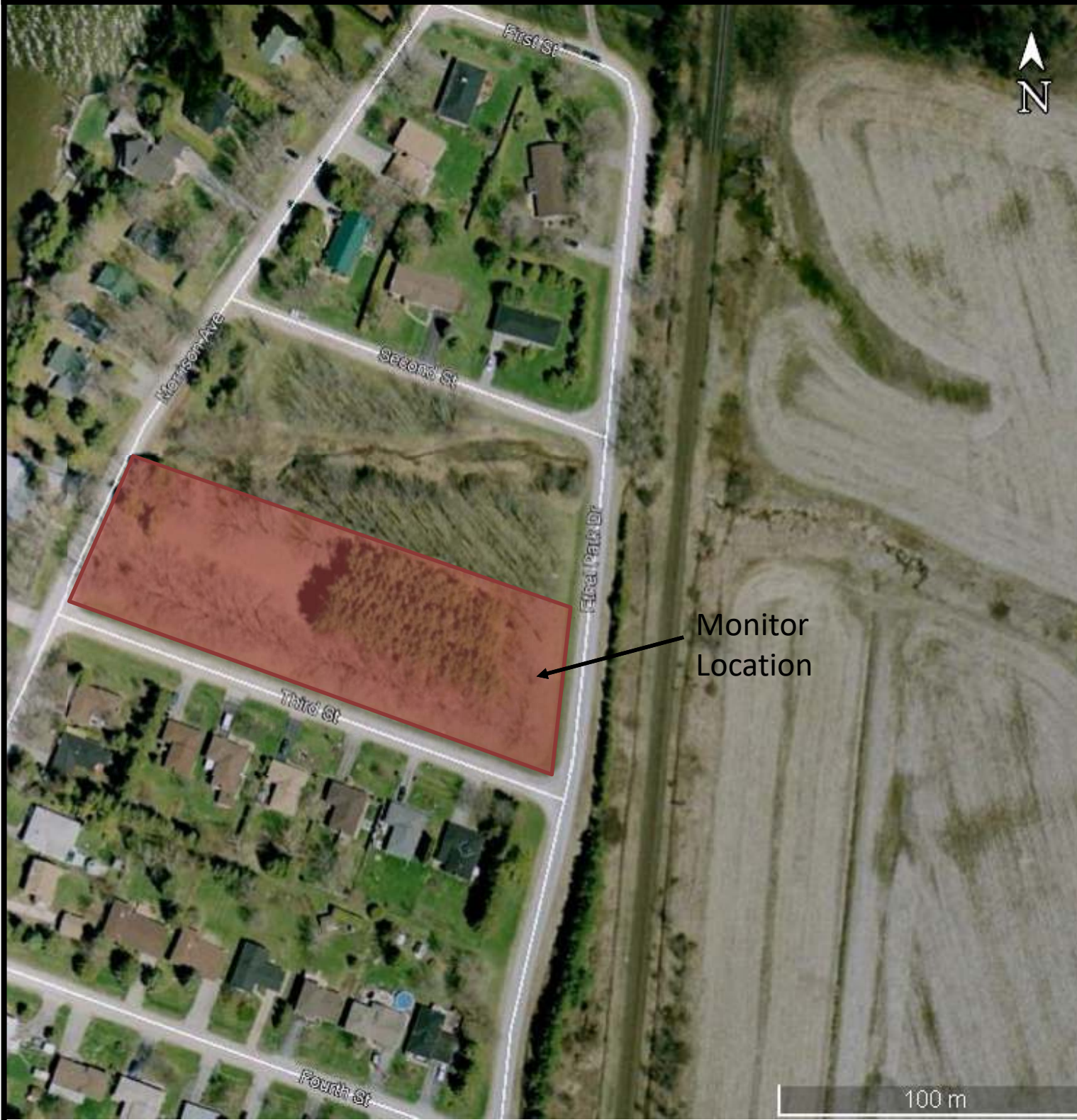
11 References

- [1] Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning, Ontario Ministry of the Environment, Publication NPC-300, August 2013
- [2] Guidelines for New Development in Proximity to Railway Operations - Prepared for the Federation of Canadian Municipalities and the Railway Association of Canada, May 2013
- [3] PC STAMSON v5.04, Computer Program for Road Traffic Noise Assessment, Ontario Ministry of the Environment and Energy, 2000
- [4] Township of Brock Zoning By-Law Plate 'A3' Beaverton
- [5] CN Traffic Count Data - CN Bala Subdivision near 176 Main Street in Beaverton, ON

Appendix A

Drawings and Figures





Note

1. This drawing shall be read in conjunction with the associated technical report

Legend

 Proposed Development

Client:
Éclat 2DC Inc.

Site:
Third Street, Beaverton Ontario

Report Title:
Noise and Vibration Monitoring Report

Drawing Title:
Noise & Vibration Impact Study for Proposed Residential Development

Designed:
RM

Scale:
As Shown

Drawn by:
RM

Date:
Sept 2020

Approved by:
RM

Project No:
IN-SO-40594

Figure No: **1**

Figure 2

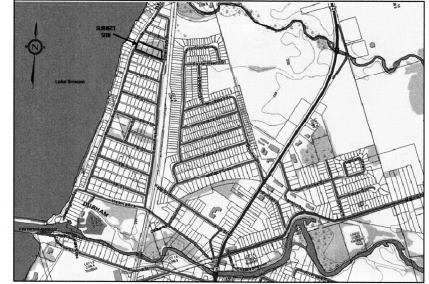
FOR ALL CONSTRUCTION DETAILS
REFER TO DRAWINGS No. STD-1 of 2 and
STD-2 of 2

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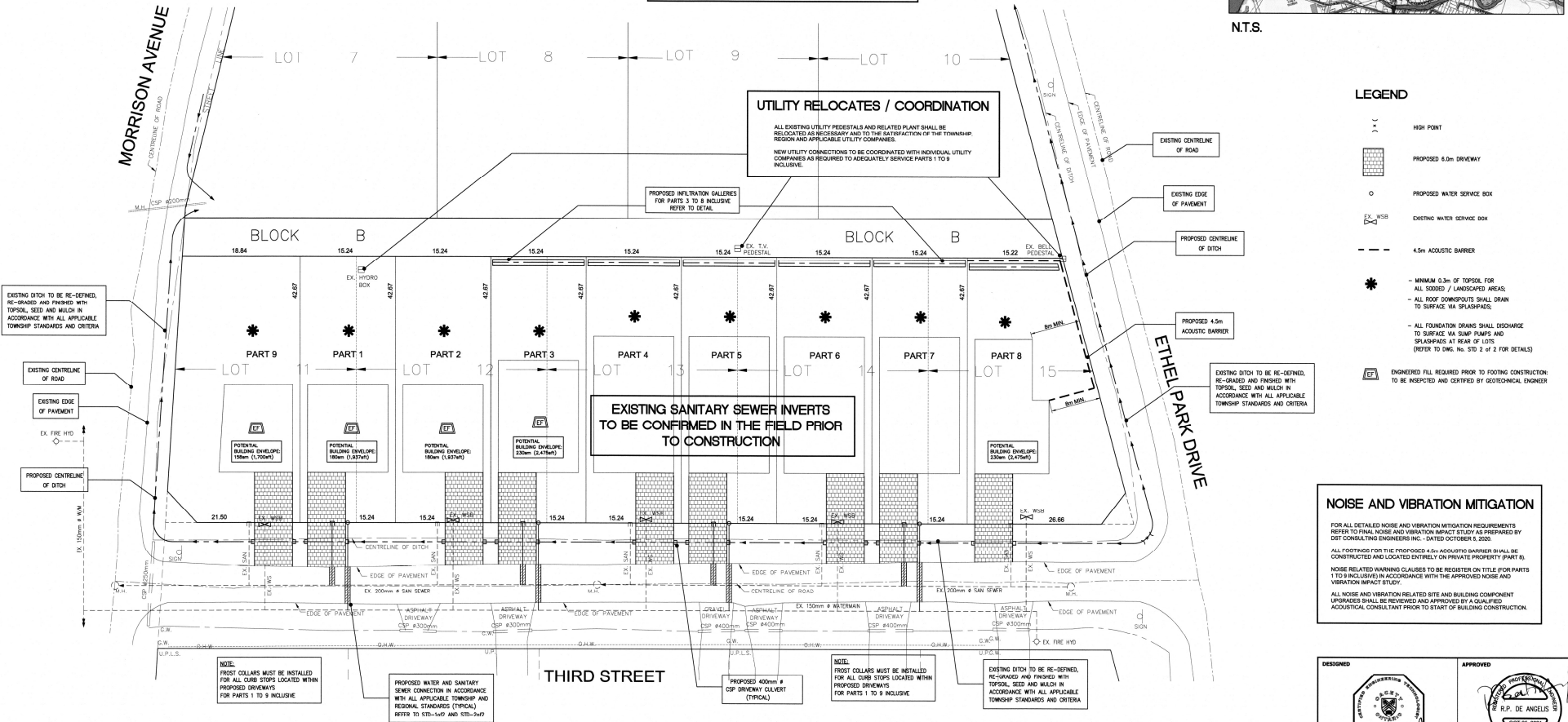
SITE SPECIFIC - SPECIAL NOTES:

- FOR TOPOGRAPHIC INFORMATION REFER TO TOPOGRAPHIC SURVEY AS PREPARED BY MANDARIN SURVEYORS LTD. DATED MARCH 22, 2016.
- FOR DETAILED NOISE MITIGATION REQUIREMENTS REFER TO FINAL NOISE AND VIBRATION IMPACT STUDY AS PREPARED BY DST CONSULTING ENGINEERS INC. DATED OCTOBER 5, 2020.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE APPROVED WATERMAIN MANAGEMENT REPORT AS PREPARED BY CONDELAND ENGINEERING LTD. DATED JANUARY 26, 2021.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE OVERALL APPROVED MUNICIPAL ENGINEERING DRAWING SET AS PREPARED BY CONDELAND ENGINEERING LTD. INCLUDING THE:
 - SERVICING PLAN, DRAWING SRV-1
 - GRADING CONTROL PLAN, DRAWING GRD-1
 - EROSION AND SEDIMENT CONTROL PLAN, DRAWING ESC-1
 - CONSTRUCTION DETAILS AND NOTES, DRAWING STD-1 of 2 and STD-2 of 2
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- LOCATION OF EXISTING UTILITIES TO BE FIELD VERIFIED AND LOCATED BY APPLICABLE AGENCIES AND/OR UTILITY COMPANIES PRIOR TO THE START OF ANY CONSTRUCTION.
- SITE SPECIFIC GRADING PLANS TO BE PREPARED BASED ON DETAILED ARCHITECTURAL DRAWINGS FOR PARTS 1 TO 8 INCLUSIVE AND PRIOR TO BUILDING CONSTRUCTION.
- SITE SPECIFIC GRADING PLANS FOR PARTS 1 TO 8 INCLUSIVE SHALL BE REVIEWED AND APPROVED BY CONDELAND ENGINEERING LTD. PRIOR TO BUILDING CONSTRUCTION.

KEY PLAN:



N.T.S.



NOISE AND VIBRATION MITIGATION

FOR ALL DETAILED NOISE AND VIBRATION MITIGATION REQUIREMENTS REFER TO FINAL NOISE AND VIBRATION IMPACT STUDY AS PREPARED BY DST CONSULTING ENGINEERS INC. - DATED OCTOBER 5, 2020.

ALL FOOTINGS FOR THE PROPOSED 4.5m ACOUSTIC BARRIER SHALL BE CONSTRUCTED AND LOCATED EXACTLY ON PRIVATE PROPERTY (PART 8) IN ACCORDANCE WITH THE APPROVED NOISE AND VIBRATION IMPACT STUDY.

NOISE RELATED WARNING CLAUSES TO BE REGISTER ON TITLE FOR PARTS 1 TO 9 INCLUSIVE IN ACCORDANCE WITH THE APPROVED NOISE AND VIBRATION IMPACT STUDY.

ALL NOISE AND VIBRATION RELATED SITE AND BUILDING COMPONENT UPDATES SHALL BE REVIEWED AND APPROVED BY A QUALIFIED ACOUSTICAL CONSULTANT PRIOR TO START OF BUILDING CONSTRUCTION.

DESIGNED	APPROVED
MICHAEL TRESS P. ENG.	R.P. DE ANGELIS P. ENG.
OCT 28, 2021	OCT 28, 2021

BENCHMARK INFORMATION

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO THE TOWNSHIP OF BROOK BENCHMARK NO. 704006, HAVING AN ELEVATION OF 225.036 METRES. BEAVERTON CONCRETE BOX CULVERT UNDER HIGHWAY No. 489, 3.14m NORTH OF POST OFFICE TABLET IN TOP OF SOUTHWEST CORNER, 45cm NORTH OF SOUTH WALL, 43cm EAST OF WEST END OF CULVERT, ABOUT 2m BELOW HIGHWAY LEVEL.

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NOT FOR CONSTRUCTION



NO.	REVISIONS	DATE	INITIAL
3.	THIRD SUBMISSION, REMOVAL OF RETAINING WALL	OCT 25, 2021	M.F.
2.	SECOND SUBMISSION FOR FINAL APPROVAL	JAN 25, 2021	M.F.
1.	FIRST SUBMISSION FOR TOWNSHIP REVIEW	JUL 7, 2020	M.F.

APPROVED
MICHAEL TRESS P. ENG.

**THIRD STREET
RESIDENTIAL DEVELOPMENT**

SERVICING PLAN

CONDELAND
CONSULTING ENGINEERS & PROJECT MANAGERS
350 Creditstone Road, Unit 200
Concord, Ontario L4K 3Z2

P: (905) 695-2096
F: (905) 695-2099

SCALE: 1:300
JOB NO.: 21-013
DESIGN: M.F.
DRAWN: D.F.

APPROVED: R.D.
DATE: OCT 25, 2021

DWG. SRV-1

Figure 3

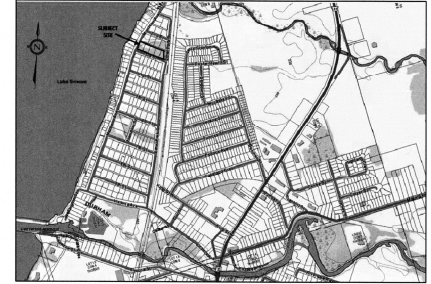
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STD-2 of 2

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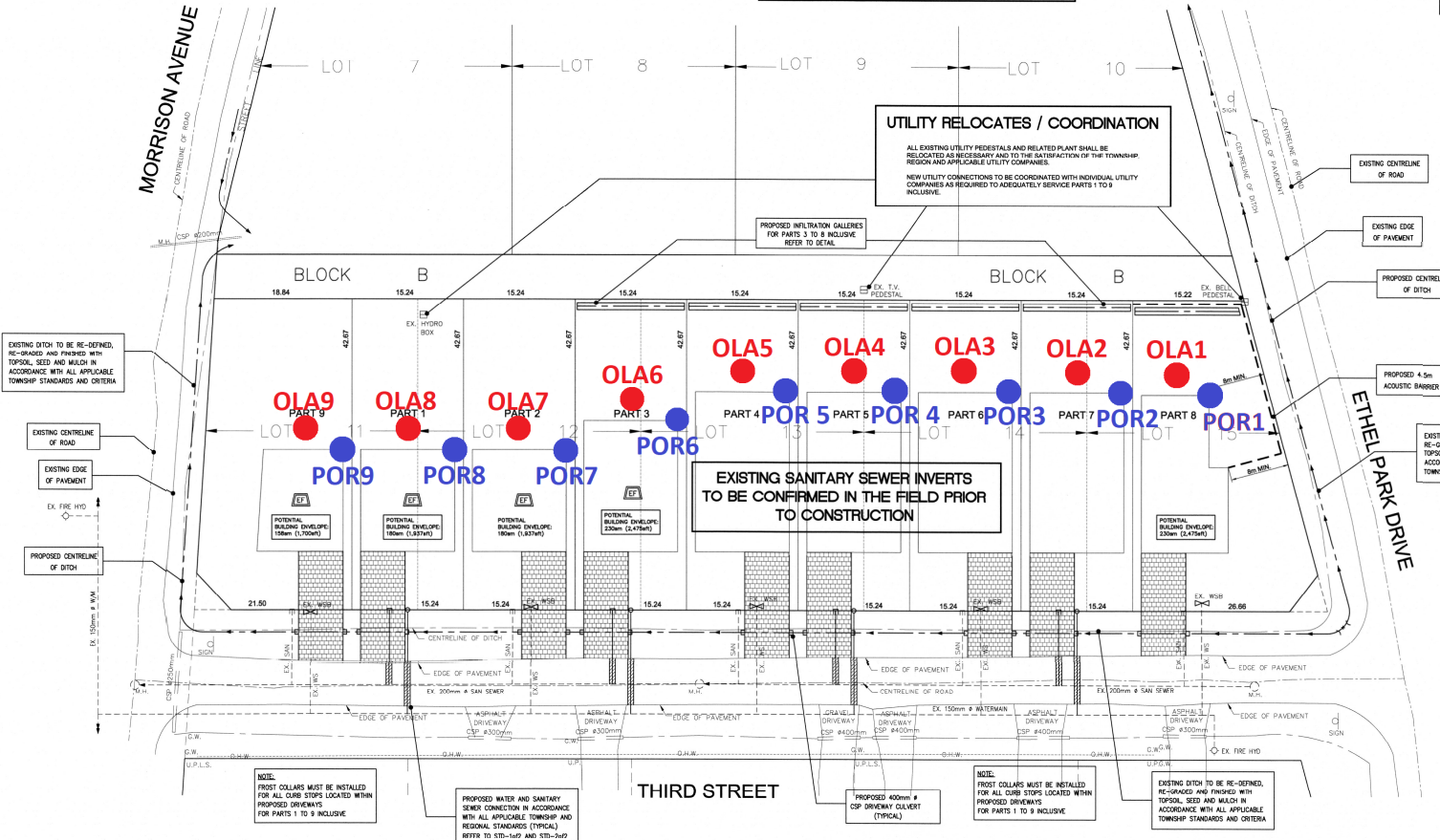
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- FOR DETAILED NOISE MITIGATION REQUIREMENTS REFER TO FINAL NOISE AND VIBRATION IMPACT STUDY AS PREPARED BY DST CONSULTING ENGINEERS INC. DATED OCTOBER 5, 2020.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE APPROVED STORMWATER MANAGEMENT REPORT AS PREPARED BY CONDELAND ENGINEERING LTD. DATED JANUARY 26, 2021.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE OVERALL APPROVED MUNICIPAL ENGINEERING DRAWING SET AS PREPARED BY CONDELAND ENGINEERING LTD. INCLUDING THE:
 - SERVICING PLAN, DRAWING SRV-1
 - GRADING CONTROL PLAN, DRAWING GRD-1
 - EROSION AND SEDIMENT CONTROL PLAN, DRAWING ESC-1
 - CONSTRUCTION DETAILS AND NOTES, DRAWING STD-1 of 2 and STD-2 of 2
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- LOCATION OF EXISTING UTILITIES TO BE FIELD VERIFIED AND LOCATED BY APPLICABLE AGENCIES AND/OR UTILITY COMPANIES PRIOR TO THE START OF ANY CONSTRUCTION.
- SITE SPECIFIC GRADING PLANS TO BE PREPARED BASED ON DETAILED ARCHITECTURAL DRAWINGS FOR PARTS 1 TO 9 INCLUSIVE AND PRIOR TO BUILDING CONSTRUCTION.
- SITE SPECIFIC GRADING PLANS FOR PARTS 1 TO 9 INCLUSIVE SHALL BE REVIEWED AND APPROVED BY CONDELAND ENGINEERING LTD. PRIOR TO BUILDING CONSTRUCTION.

KEY PLAN:



N.T.S.



UTILITY RELOCATES / COORDINATION
ALL EXISTING UTILITY PEDESTALS AND RELATED PLANT SHALL BE RELOCATED AS NECESSARY AND TO THE SATISFACTION OF THE TOWNSHIP REGIONAL AND APPLICABLE UTILITY COMPANIES.
NEW UTILITY CONNECTIONS TO BE COORDINATED WITH INDIVIDUAL UTILITY COMPANIES AS REQUIRED TO ADEQUATELY SERVICE PARTS 1 TO 9 INCLUSIVE.

EXISTING SANITARY SEWER INVERTS TO BE CONFIRMED IN THE FIELD PRIOR TO CONSTRUCTION

LEGEND

- HIGH POINT
- PROPOSED 6.0m DRIVEWAY
- PROPOSED WATER SERVICE BOX
- EXISTING WATER SERVICE BOX
- 4.5m ACROUSTIC BARRIER
- MINIMUM 0.3% OF TOPSOIL FOR ALL 5000EFD / LANDSCAPED AREAS.
- ALL ROOF GUTTERS SHALL DRAIN TO SURFACE VIA SPLASHPADS.
- ALL FOUNDATION DRAINS SHALL DISCHARGE TO SURFACE VIA SUMP PUMPS AND SPLASHPADS AT REAR OF LOTS (REFER TO D.M. No. STD-2 of 2 FOR DETAILS)
- ENGINEERED FILL REQUIRED PRIOR TO FOOTING CONSTRUCTION TO BE INSPECTED AND CERTIFIED BY GEOTECHNICAL ENGINEER

NOISE AND VIBRATION MITIGATION

FOR ALL DETAILED NOISE AND VIBRATION MITIGATION REQUIREMENTS REFER TO FINAL NOISE AND VIBRATION IMPACT STUDY AS PREPARED BY DST CONSULTING ENGINEERS INC. - DATED OCTOBER 5, 2020.
ALL FOOTINGS FOR THE PROPOSED 4.5m ACROUSTIC BARRIER SHALL BE CONSTRUCTED AND LOCATED EXACTLY ON PRIVATE PROPERTY (PART 8) NOISE RELATED WARNING CLAUSES TO BE REGISTER ON TITLE FOR PARTS 1 TO 9 INCLUSIVE IN ACCORDANCE WITH THE APPROVED NOISE AND VIBRATION IMPACT STUDY.
ALL NOISE AND VIBRATION RELATED SITE AND BUILDING COMPONENT UPDATES SHALL BE REVIEWED AND APPROVED BY A QUALIFIED ACROUSTICAL CONSULTANT PRIOR TO START OF BUILDING CONSTRUCTION.

DESIGNED: [Signature] APPROVED: [Signature]

CONDELAND CONSULTING ENGINEERS & PROJECT MANAGERS
350 Creditstone Road, Unit 200
Concord, Ontario L4K 3Z2
P: (905) 695-2096 F: (905) 695-2099

BENCHMARK INFORMATION

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO THE TOWNSHIP OF BROOK BENCHMARK NO. 704006, HAVING AN ELEVATION OF 225.036 METRES. BEAVERTON CONCRETE BOX CULVERT UNDER HIGHWAY No. 489, 3.14m NORTH OF POST OFFICE TABLET IN TOP OF SOUTHWEST CORNER, 45cm NORTH OF SOUTH WALL, 43cm EAST OF WEST END OF CULVERT, ABOUT 2m BELOW HIGHWAY LEVEL.

ISSUED FOR APPROVAL ONLY

NOT FOR CONSTRUCTION



NO.	REVISIONS	DATE	INITIAL
3.	THIRD SUBMISSION, REMOVAL OF RETAINING WALL	OCT.25,2021	M.F.
2.	SECOND SUBMISSION FOR FINAL APPROVAL	JAN.25,2021	M.F.
1.	FIRST SUBMISSION FOR TOWNSHIP REVIEW	JUL.7,2020	M.F.

APPROVED

THIRD STREET RESIDENTIAL DEVELOPMENT

SERVICING PLAN

SCALE: 1:300 JOB NO. 21-013
DESIGN: M.F. APPROVED: R.D. P. (905) 695-2096
DRAWN: D.F. DATE: OCT. 25, 2021 F. (905) 695-2099

DWG. SRV-1

Figure 4

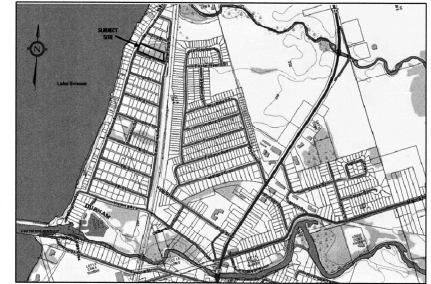
FOR ALL CONSTRUCTION DETAILS
REFER TO DRAWINGS No. STD-1 of 2 and
STD-2 of 2

ISSUED FOR APPROVAL ONLY
NOT FOR CONSTRUCTION

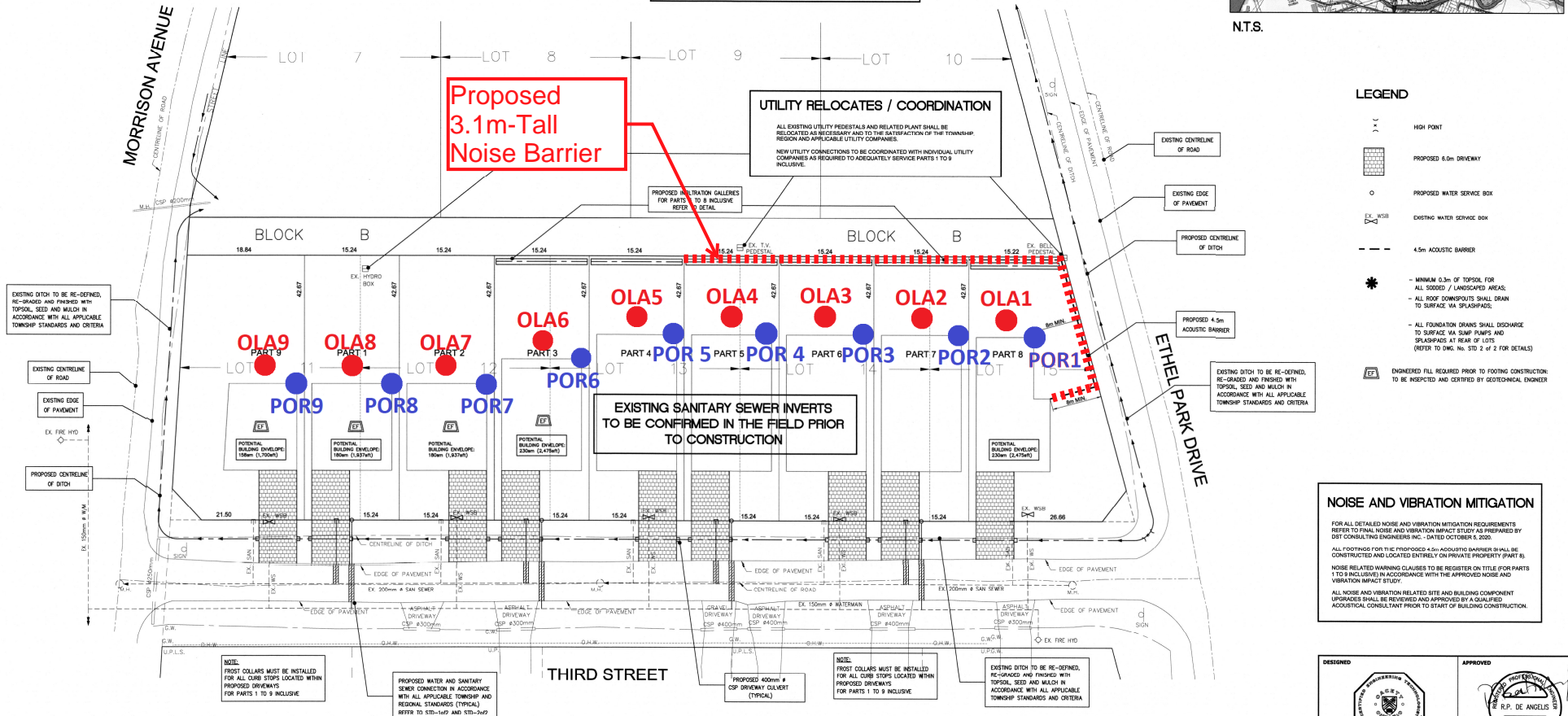
SITE SPECIFIC - SPECIAL NOTES:

- FOR TOPOGRAPHIC INFORMATION REFER TO TOPOGRAPHIC SURVEY AS PREPARED BY MANDARIN SURVEYORS LTD. DATED MARCH 22, 2016.
- FOR DETAILED NOISE MITIGATION REQUIREMENTS REFER TO FINAL NOISE AND VIBRATION IMPACT STUDY AS PREPARED BY DST CONSULTING ENGINEERS INC. DATED OCTOBER 5, 2020.
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KEY PLAN:



N.T.S.



LEGEND

- HIGH POINT
- PROPOSED 6.0m DRIVEWAY
- PROPOSED WATER SERVICE BOX
- EXISTING WATER SERVICE BOX
- 4.5m ACOUSTIC BARRIER
- MINIMUM 0.3% OF TOPSOIL FOR ALL 5000E2 / LANDSCAPED AREAS.
- ALL ROOF GUTTERS SHALL DRAIN TO SURFACE VIA SPLASHPADS.
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- ENGINEERED FILL REQUIRED PRIOR TO FOOTING CONSTRUCTION TO BE INSPECTED AND CERTIFIED BY GEOTECHNICAL ENGINEER



NOISE AND VIBRATION MITIGATION

FOR ALL DETAILED NOISE AND VIBRATION MITIGATION REQUIREMENTS REFER TO FINAL NOISE AND VIBRATION IMPACT STUDY AS PREPARED BY DST CONSULTING ENGINEERS INC. - DATED OCTOBER 5, 2020.

ALL FOOTINGS FOR THE PROPOSED 4.5m ACOUSTIC BARRIER SHALL BE CONSTRUCTED AND LOCATED EXACTLY ON PRIVATE PROPERTY (PART 8) IN ACCORDANCE WITH THE APPROVED NOISE AND VIBRATION IMPACT STUDY.

NOISE RELATED WARNING CLAUSES TO BE REGISTERED ON TITLE FOR PARTS 1 TO 9 INCLUSIVE IN ACCORDANCE WITH THE APPROVED NOISE AND VIBRATION IMPACT STUDY.

ALL NOISE AND VIBRATION RELATED SITE AND BUILDING COMPONENT UPDATES SHALL BE REVIEWED AND APPROVED BY A QUALIFIED ACOUSTICAL CONSULTANT PRIOR TO START OF BUILDING CONSTRUCTION.

DESIGNED:  APPROVED: 

MICHAEL TRESS
P. ENG. (1998)

R.P. DE ANGELIS
P. ENG. (1988)

CONDELAND

CONSULTING ENGINEERS & PROJECT MANAGERS
350 Creditstone Road, Unit 200
Concord, Ontario L4K 3Z2
P: (905) 695-2096
F: (905) 695-2099

SCALE: 1:300 JOB NO.: 21-013
DESIGN: M.P. APPROVED: R.D.
DRAWN: D.F. DATE: OCT. 25, 2021 DWG. SRV-1

BENCHMARK INFORMATION

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ISSUED FOR APPROVAL ONLY

NOT FOR CONSTRUCTION

MUNICIPALITY



REGION



APPROVED

NO.	REVISIONS	DATE	INITIAL
3.	THIRD SUBMISSION, REMOVAL OF RETAINING WALL	OCT.25,2021	M.F.
2.	SECOND SUBMISSION FOR FINAL APPROVAL	JAN.25,2021	M.F.
1.	FIRST SUBMISSION FOR TOWNSHIP REVIEW	JUL.7,2020	M.F.

THIRD STREET RESIDENTIAL DEVELOPMENT

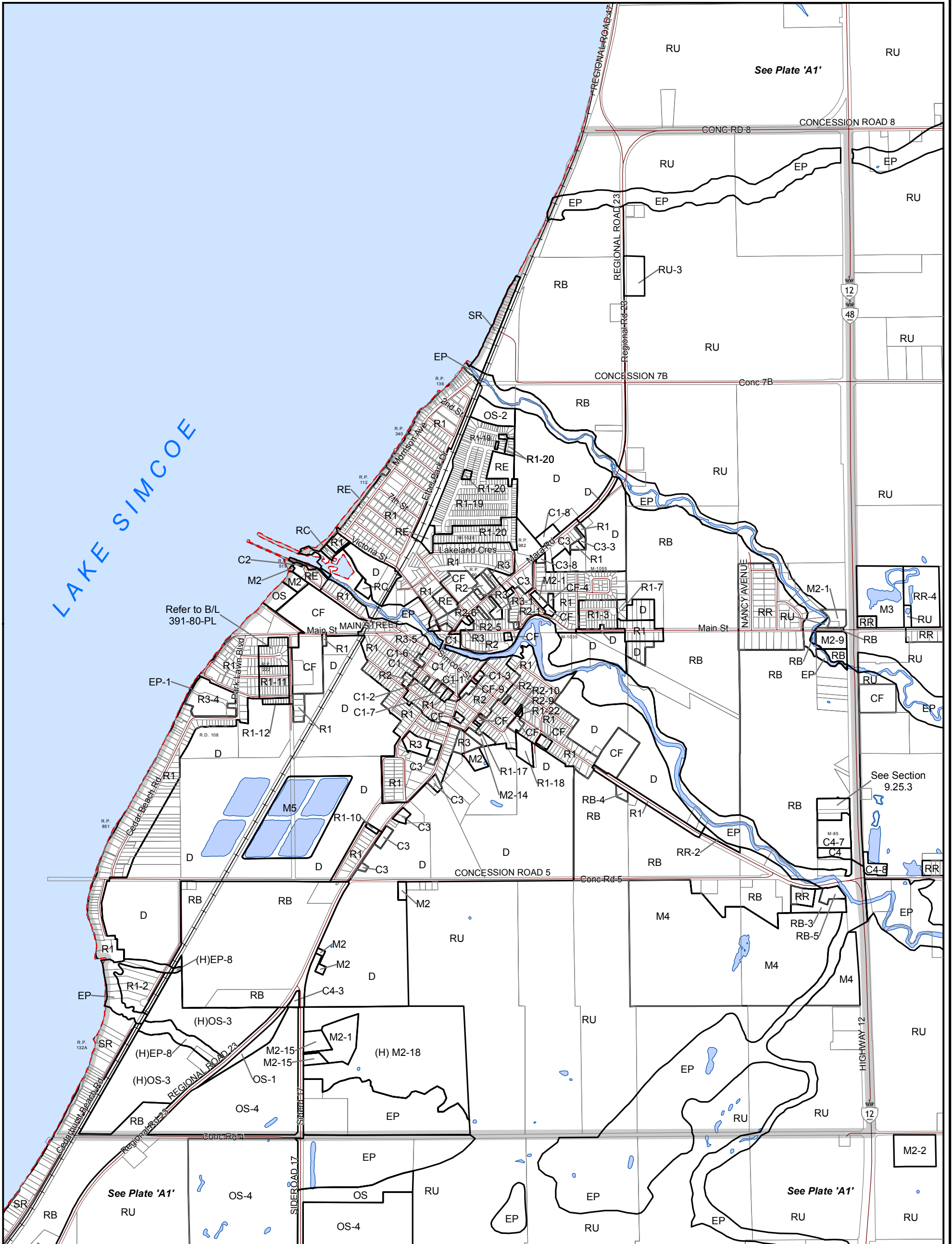
SERVICING PLAN

Appendix B

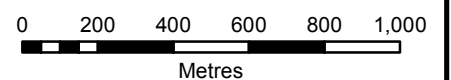
Zoning Maps



eNGLOBE



- | | | |
|-------------------------------|---------------------------------|--------------------------------|
| EP - Environmental Protection | R1 - Residential Type One | C4 - Highway Commercial |
| RE - Recreation | R2 - Residential Type Two | HC - Hamlet Commercial |
| OS - Open Space | R3 - Residential Type Three | RC - Resort Commercial |
| RU - Rural | CF - Community Facility | M1 - Restricted Industrial |
| RB - Rural Buffer | D - Development | M2 - General Industrial |
| RR - Rural Residential | C1 - General Commercial | M3 - Rural Industrial |
| HR - Hamlet Residential | C2 - Local Commercial | M4 - Extractive Industrial |
| SR - Shoreline Residential | C3 - Special Purpose Commercial | M5 - Waste Disposal Industrial |



1:20,000



PLATE "B"
PERMITTED USES
AND ACTIVITIES IN GENERAL ZONE CATEGORIES
CORPORATION OF THE TOWNSHIP OF BROCK

Line	Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	Zones	EP	OS	RE	RU	RB	RR	HR	SR	R1	R2	R3	CF	D	C1	C2	C3	C4	HC	RC	M1	M2	M3	M4	M5
28	Contractor's Yard																					•			
29	Convenience Store														•	•	•		•	•					
30	Crisis Care Residence									•(r)	•(r)	•(r)													
31	Dairy																					•	•		
32	Day Care Centre												•						•						
33	Dry Cleaner's Distribution Centre														•		•		•						
34	Dry Cleaning Plant																				•	•			
35	Eating Establishment														•		•	•	•	•	•	•	•		
36	Eating Establishment, Drive-In																•	•	•						
37	Equipment Sales or Rental-Light														•		•						•		
38	Equipment Sales or Rental-Heavy																				•	•			
39	Fairgrounds			•									•												
40	Farm	•(o)			•	•																			
41	Farm Implement Dealer																•	•			•	•	•		
42	Farm, Specialized	•(d)			•																	•	•		
43	Farm Produce Retail Outlet				•(e)	•(e)																			
44	Feedmill																					•	•	•	
45	Forestry	•(d)	•		•	•																			
46	Funeral Home															•			•						
47	Furniture & Appliance Store															•		•							
48	Government Administration Offices or Building												•			•									
49	Grocery Store															•		•							
50	Group Home									•(t)	•(t)	•(t)													
51	Historical Site			•	•								•		•										
52	Home Industry				•(u)	•(u)																			
53	Home Occupation				•(k)	•(k)	•(k)	•(k)	•(k)	•(k)	•(k)			•(k)											
54	Hospital												•												
55	Hotel															•					•				
56	Institution -Religious, Fraternal, or Public												•		•										
57	Landscape Contractor																•	•	•		•				

PLATE "B"
PERMITTED USES
AND ACTIVITIES IN GENERAL ZONE CATEGORIES
CORPORATION OF THE TOWNSHIP OF BROCK

Line	Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	Zones	EP	OS	RE	RU	RB	RR	HR	SR	R1	R2	R3	CF	D	C1	C2	C3	C4	HC	RC	M1	M2	M3	M4	M5	
85	Post Office												•		•				•							
86	Printing Establishment														•				•		•	•				
87	Public Use	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)	•(g)
88	Quarry																							•		
89	Recreation Centre			•									•													
90	Resort Establishment																			•						
91	Retail Beverage Outlet														•		•									
92	Retail Commercial Establishment														•				•		•(f)	•(f)				
93	Salvage Yard																					•			•	
94	Sand, Gravel, Rock Stockpiling Operation																							•		
95	Sawmill				•(q)																					
96	School												•													
97	Service Shop, Personal														•	•	•		•							
98	Summer Camp																			•						
99	Tourist Home														•				•							
100	Truck Transport Terminal																				•	•				
101	Veterinary Clinic														•(l)			•	•(l)			•	•			
102	Warehouse																				•	•				
103	Waste Disposal Area																								•	
104	Wayside Pit or Quarry																							•		
105	Wholesale Commercial Establishment																				•(f)	•(f)				
106	Workshop, Custom																		•		•	•				

Appendix C

Traffic Data STAMSON Output



eNGLOBE



Train Count Data

TRANSMITTAL

To: DST CONSULTING
Destinataire : ENGINEERS INC.
A Division of Englobe
3397 American Drive,
Units 14 & 15
Mississauga ON, L4V
1T8
Canada

Project : BAL – 64.15 – 176 Main St, Beaverton ON

Att'n: Ryan Matheson
From: Michael Vallins
Expéditeur :

Routing: rmatheson@dstgroup.com
Date: 2020/01/17

Cc: Adjacent Development
CN via e-mail

Urgent For Your Use For Review For Your Information Confidential

Re: Train Traffic Data – CN Bala Subdivision near 176 Main St in Beaverton, ON

Please find attached the requested Train Traffic Data. The application fee in the amount of **\$500.00** +HST will be invoiced.

Should you have any questions, please do not hesitate to contact the undersigned at 905-669-3264.

Sincerely,
CN Design & Construction


Michael Vallins P.Eng
Manager of Public Works
permits.gld@cn.ca

Date: 2020/01/17

Project Number: BAL – 64.15 – 176 Main St, Beaverton ON

Dear Iwona:

Re: Train Traffic Data – CN Bala Subdivision near 176 Main St in Beaverton, ON

The following is provided in response to Ryan’s 2020/01/13 request for information regarding rail traffic in the vicinity of 176 Main St in Beaverton at approximately Mile 64.15 on CN’s Bala Subdivision.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

Typical daily traffic volumes at this site location are as follows:

*Maximum train speed is given in Miles per Hour

	0700-2300			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	10	140	60	4
Way Freight	0	25	60	4
Passenger	1	10	65	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	8	140	60	4
Way Freight	0	25	60	4
Passenger	1	10	65	2

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN’s Bala Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are three (3) at-grade crossings in the immediate vicinity of the study area at Mile 63.88 Simcoe St, Mile 64.06 Victoria St, and Mile 64.98 Alsops Beach Rd. Anti-whistling bylaws are not in effect at these crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 286,000 lbs.

The single mainline track is considered continuously welded rail throughout the study area.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Adjacent Development, Canadian National Railway Properties at Proximity@cn.ca should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,



Michael Vallins P.Eng
Manager of Public Works
permits.gld@cn.ca

Filename: 3rd POR1.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR1 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 43.00 / 43.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	67.40	60.27	--	--	68.17 *
Total					68.17 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	69.50	62.36	--	--	70.27 *
Total					70.27 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 68.17
 (NIGHT): 70.27

Filename: 3rd_por2.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR2 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 12.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 55.00 / 55.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	63.49	56.28	--	--	64.25 *
Total					64.25 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	65.58	58.36	--	--	66.33 *
Total					66.33 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 64.25
 (NIGHT): 66.33

Filename: 3rd_por3.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR3 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 12.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 69.00 / 69.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	62.02	54.70	--	--	62.76 *
Total					62.76 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	64.11	56.78	--	--	64.85 *
Total					64.85 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 62.76
 (NIGHT): 64.85

Filename: 3rd_por4.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR4 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 12.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 83.00 / 83.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	60.82	53.42	--	--	61.55 *
Total					61.55 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	62.91	55.50	--	--	63.63 *
Total					63.63 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 61.55
 (NIGHT): 63.63

Filename: 3rd_por5.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR5 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 12.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 99.00 / 99.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	59.67	52.19	--	--	60.38 *
Total					60.38 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	61.77	54.28	--	--	62.48 *
Total					62.48 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 60.38
 (NIGHT): 62.48

Filename: 3rd_por6.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR6 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg -45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 114.00 / 114.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	53.86	46.04	--	--	54.52 *
Total					54.52 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	55.95	48.13	--	--	56.61 *
Total					56.61 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 54.52
 (NIGHT): 56.61

Filename: 3rd_por7.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR7 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg -45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 130.00 / 130.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	53.00	45.13	--	--	53.66 *
Total					53.66 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	55.10	47.21	--	--	55.75 *
Total					55.75 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 53.66
 (NIGHT): 55.75

Filename: 3rd_por8.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR8 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (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 : 145.00 / 145.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	56.50	48.82	--	--	57.18 *
Total					57.18 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	58.59	50.90	--	--	59.27 *
Total					59.27 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 57.18
 (NIGHT): 59.27

Filename: 3rd_por9.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at POR9 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 5.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 158.00 / 158.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	56.25	48.54	--	--	56.93 *
Total					56.93 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	58.34	50.62	--	--	59.02 *
Total					59.02 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 56.93
 (NIGHT): 59.02

Filename: 3rd_OLA1.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA1 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 47.00 / 47.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	65.35	58.43	--	--	66.15 *
Total					66.15 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	67.44	60.51	--	--	68.24 *
Total					68.24 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 66.15
 (NIGHT): 68.24

Filename: 3rd_OLA2.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA2 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 20.00 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 : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	62.66	55.65	--	--	63.45 *
Total					63.45 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	64.75	57.73	--	--	65.54 *
Total					65.54 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 63.45
 (NIGHT): 65.54

Filename: 3rd_OLA3.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA3 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 19.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 74.00 / 74.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	61.17	54.09	--	--	61.95 *
Total					61.95 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	63.26	56.17	--	--	64.04 *
Total					64.04 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 61.95
 (NIGHT): 64.04

Filename: 3rd_OLA4.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA4 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 18.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 88.00 / 88.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	59.92	52.79	--	--	60.69 *
Total					60.69 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	62.02	54.87	--	--	62.79 *
Total					62.79 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 60.69
 (NIGHT): 62.79

Filename: 3rd_OLA5.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA5 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 17.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 104.00 / 104.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	58.72	51.53	--	--	59.48 *
Total					59.48 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1. CN Main Line	60.82	53.61	--	--	61.58 *
Total					61.58 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 59.48
 (NIGHT): 61.58

Filename: 3rd_OLA6.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA6 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 5.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 119.00 / 119.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	57.13	49.87	--	--	57.88 *
Total					57.88 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	59.22	51.96	--	--	59.97 *
Total					59.97 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 57.88
 (NIGHT): 59.97

Filename: 3rd_OLA7.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA7 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 3.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 135.00 / 135.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	56.13	48.84	--	--	56.87 *
Total					56.87 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	58.23	50.92	--	--	58.97 *
Total					58.97 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 56.87
 (NIGHT): 58.97

Filename: 3rd_OLA8.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA8 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 7.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 150.00 / 150.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	55.65	48.33	--	--	56.39 *
Total					56.39 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	57.75	50.41	--	--	58.49 *
Total					58.49 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 56.39
 (NIGHT): 58.49

Filename: 3rd_OLA9.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA9 - no barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 10.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 163.00 / 163.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	55.25	47.91	--	--	55.99 *
Total					55.99 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	57.35	49.99	--	--	58.08 *
Total					58.08 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 55.99
 (NIGHT): 58.08

Filename: 3rdolalm.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA1 - 3.1m barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 47.00 / 47.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 No Whistle
 Barrier angle1 : -90.00 deg Angle2 : 45.00 deg
 Barrier height : 3.10 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	59.38	49.90	--	--	59.84 *
Total					59.84 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	61.47	51.99	--	--	61.93 *
Total					61.93 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 59.84
 (NIGHT): 61.93

Filename: 3rdola2m.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA2 - 3.1m barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 20.00 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 : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 No Whistle
 Barrier angle1 : -90.00 deg Angle2 : 20.00 deg
 Barrier height : 3.10 m
 Barrier receiver distance : 24.00 / 24.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	58.61	48.48	--	--	59.01 *
Total					59.01 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	60.71	50.57	--	--	61.11 *
Total					61.11 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 59.01
 (NIGHT): 61.11

Filename: 3rdola3m.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA3 - 3.1m barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc / Train	# Cars / Train	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 19.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 74.00 / 74.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 No Whistle
 Barrier angle1 : -90.00 deg Angle2 : 19.00 deg
 Barrier height : 3.10 m
 Barrier receiver distance : 38.00 / 38.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	57.63	47.38	--	--	58.02 *
Total					58.02 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	59.73	49.46	--	--	60.12 *
Total					60.12 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 58.02
 (NIGHT): 60.12

Filename: 3rdola4m.te Time Period: Day/Night 16/8 hours
 Description: Sound level prediction at OLA4 - 3.1m barrier.

Rail data, segment # 1: CN Main Line (day/night)

Train Type	Trains	Speed (km/h)	# loc	# Cars	Eng type	Cont weld
* 1. Freight	13.4/10.8	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	1.3/1.3	105.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	Freight	10.0/8.0	2.50	12.00
2.	Passenger	1.0/1.0	2.50	12.00

Data for Segment # 1: CN Main Line (day/night)

Angle1 Angle2 : -90.00 deg 18.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 88.00 / 88.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 No Whistle
 Barrier angle1 : -90.00 deg Angle2 : 18.00 deg
 Barrier height : 3.10 m
 Barrier receiver distance : 53.00 / 53.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Result summary (day)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	56.62	46.31	--	--	57.01 *
Total					57.01 dBA

* Bright Zone !

Result summary (night)

	Loc Leq (dBA)	Wheel Leq (dBA)	Whistle Left Leq (dBA)	Whistle Right Leq (dBA)	Total Leq (dBA)
1.CN Main Line	58.72	48.39	--	--	59.10 *
Total					59.10 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 57.01
 (NIGHT): 59.10

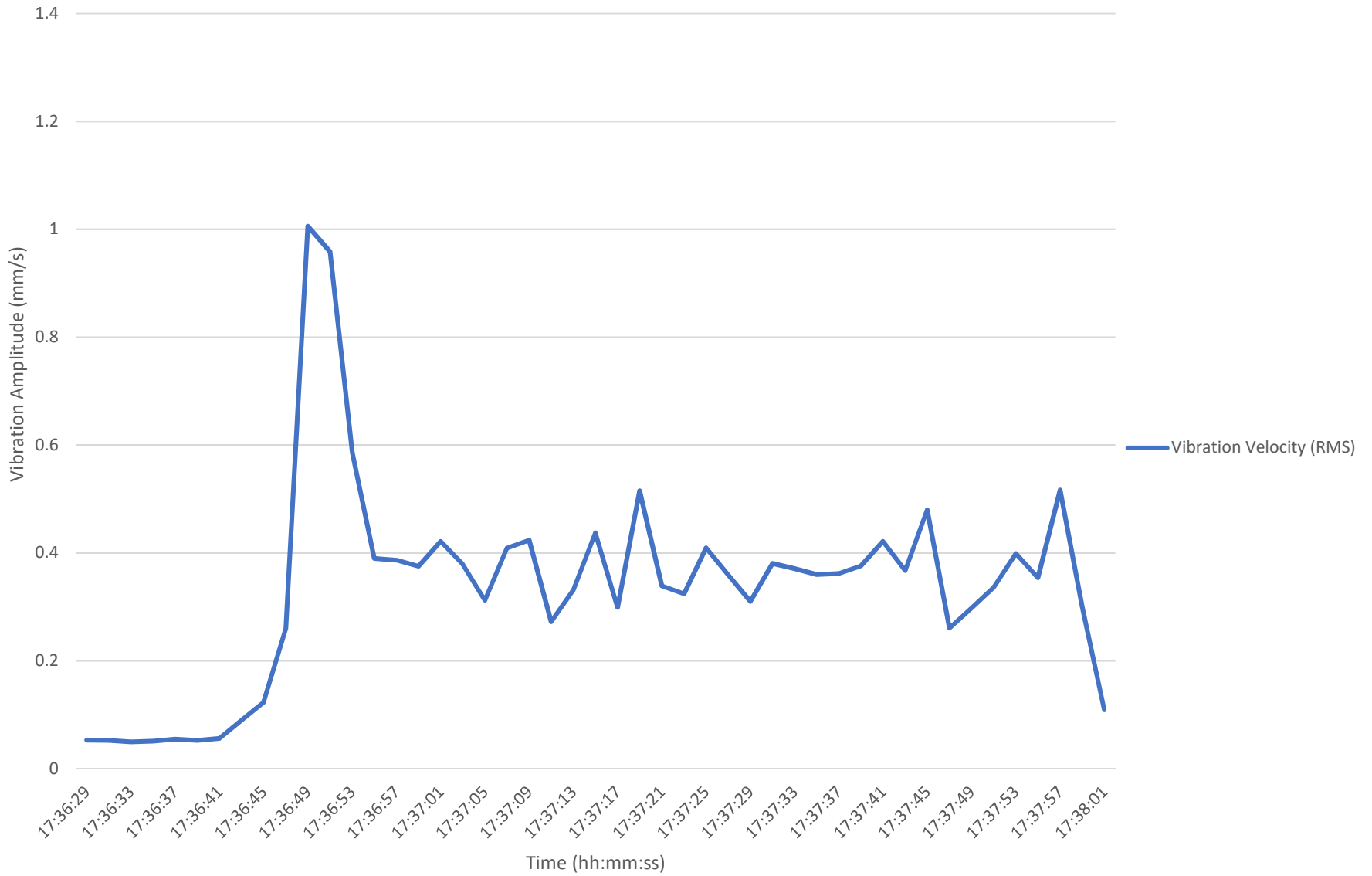
Appendix D

Vibration Measurement Results



eNGLOBE

Vibration Velocity (RMS) vs. Time, Measured at 8 Metres from Road on September 15, 2020 - Attended Measurement Single Train Pass-By



Vibration Velocity (RMS) vs. Time, Measured at 8 Metres from Road on September 14, 2020

