

Noise and Vibration Impact Study

Lot 175 Portage Road, Niagara Falls, Ontario

SW22038.00

Prepared For
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1.0 Introduction

At the request of Rudanco Inc. (Client), Thornton Tomasetti (TT) presents this Noise Impact Study (NIS) regarding the planned residential development located at Lot 175, Portage Road, Niagara Falls Ontario, L2J 0C5 (the Project).

The purpose of this study is to assess the noise impact on the Project from surrounding noise sources and the noise impact of the Project on surrounding noise sensitive areas. This report is intended to support the Official Plan Amendment & Rezoning (OPA/ZBA) application for the Project as a feasibility study.

Where applicable, this report will provide noise control recommendations to meet the requirements of the applicable Land Use Planning Authority (LUPA), and noise criteria developed by the Ontario Ministry of the Environment, Conservation and Parks (MECP).

Where predicted sound impacts are lower than applicable action thresholds identified, the project should be designed to meet the Ontario Building Code (OBC) as a minimum standard.

2.0 Site and Surrounding Area

2.1 Project Location

The Project consists of a pair of 25 and 35 storey residential towers with a connecting structure occupying the lower 2-3 storeys and is located on the southwest side of Portage Road, approximately 100m north of Marineland Parkway.

The Project is bordered on the north by undeveloped lands and the Niagara Parks Floral Showhouse. The Project is bordered on the east by parkland. The Project is bordered on the south and west by light industrial buildings. The Project is located adjacent to the northeast of a spur track that is part of CP Rail's Montrose Subdivision, and approximately 190m east of a main track and siding that are part of CP Rail's Montrose Subdivision. The broader neighborhood includes industrial uses to the southwest of the Project, and residential uses to the west of the Project. The Niagara Falls waterfall is located approximately 750m northeast of the Project.

An illustration of the project location and surrounding area is provided in Figure 1.

2.2 Zoning & Official Plan

The Project site is zoned as TC "Tourist Commercial" under the City of Niagara Falls Zoning By-Law No. 79-200 and designated the same under the City of Niagara Falls Official Plan. Surrounding areas are zoned for Open Space, Light Industrial, Industrial, and further out, Heavy Industrial.

A zoning map is presented in Figure 2.

2.3 Planned Development

The Project will include new 25 and 35 storey residential towers with 2-3 floors of connecting amenity and parking space. The main towers are referred to as North Tower (B) and South Tower (A),

respectively. The Project will include rooftop and basement mechanical rooms, which are anticipated to house all mechanical equipment. The Project will have a maximum height of approximately 124m.

The proposed new site plan is provided in Figure 3.

2.4 Site Inspection

TT personnel attended the Project site on June 2, 2022 in order to inspect the acoustical environment in the area of the Project. The ambient sound environment was observed to be dominated by traffic noise from the adjacent Portage Road and Marineland Parkway which are located east and south of the site respectively. Transportation noise from adjacent roadways are discussed in Section 5.0 of this report.

No individual stationary noise sources were distinguishable from the Project site. The inspection of publicly accessible areas of the surrounding neighborhood did identify a significant industrial facility: Washington Electro Mills, located at 7780 Stanley Avenue, approximately 500m southwest of the Project. Stationary noise sources are discussed in Section 6.0 of this report.

2.1 Topography

Based on the observed and/or reported conditions on the Project site, the site topography is expected to be approximately flat. The elevation east of Portage Road decreases by approximately 20m.

For the purposes of modelling conducted as part of this report, terrain heights on the Project itself were referenced to the proposed grading plan (drawing A2.01 22-05-05_Portage Rd_Draft Set) prepared by Giannone Petricone Associates Inc. Architects and provided to TT by the Client. Terrain heights outside the boundaries of the Project grading plan were referenced to publicly available topographic data from Google Earth.

3.0 Ministry of the Environment Conservation and Parks

The MECP's *Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning* (NPC-300) provides province wide assessment standards and criteria for evaluating noise impacts from transportation sources such as roads, railways and aircraft, as well as stationary sources such as mechanical equipment, and industrial facilities. In preparing this NIS report, TT has referred to *Part A Background and Part C Land Use Planning* of NPC-300.

This NIS report has been prepared to support land use planning decisions, and is not intended to support an application for an Environmental Compliance Approval (ECA) in accordance with *Part B Stationary Sources* of NPC-300, and Section 9 of the Environmental Protection Act.

4.0 Land Use Planning Authority

In addition to the MECP's standards and criteria, some LUPAs impose additional requirements on applications for development approval. The LUPAs for this Project are the Region of Niagara and the City of Niagara Falls.

The City of Niagara Falls Noise By-Law does not identify additional environmental noise requirements or assessments beyond those described by the MECP. The City of Niagara Falls and the Region of Niagara generally defer to the MECP’s standards and guidelines.

5.0 Transportation Noise Assessment

5.1 Critical Transportation Noise Receptors

NPC-300 defines a point of reception for the assessment of transportation noise sources as either the Plane of Window (POW) of a noise sensitive indoor space or an Outdoor Living Area (OLA) representing an area of a noise sensitive land use intended for quiet enjoyment of the outdoor environment.

The POW receptor(s) most likely to be affected by transportation noise are those representing the residential suites of the Project that have maximum exposure to the adjacent railway, Marineland Parkway and Portage Road. Specifically, POW receptors were assessed for the southeast and southwest facades of the two planned tower structures, at the highest elevation with windows.

Based on provided site plans of the Project, TT understands that a total of 5 potential OLAs will be present, including the Level 2 North Terrace, Level 2 Outdoor Amenity, Level 6 Terrace & Green Roof, Level 3 Outdoor Amenity and ground level outdoor amenity. Each of these OLAs has been assessed. Individual suites will have balconies, however because these are less than 4m in depth they have not been considered as OLAs.

The elevation of each level of the Project is illustrated in Figure 3 and summarized in Table 1.

Table 1: Construction Elevations – Transportation Receptors

Floor Level	Elevation (m)	Floor Height (m)	Midpoint Height (m)
2	194.42	8	-
3	198.42	12	-
6	209.42	23	-
25	265.62	79.2	81.5
35	297.72	111.3	113.6

The locations of the critical receptors for transportation noise are summarized in Table 2 and shown in Figure 4. POW elevations were taken to be the midpoint height of the highest floor with windows, and OLA elevations were taken to be 1.5m above the applicable floor or ground level.

Table 2: Points of Reception – Transportation Noise

Receptor ID	Receptor Description	Receptor Location
POW01	North tower, east façade, highest window	Façade centre, 81.5m above ground
POW02	North tower, south façade, highest window	Façade centre, 81.5m above ground
POW03	South tower, east façade, highest window	Façade centre, 113.6m above ground
POW04	South tower, south façade, highest window	Façade centre, 113.6m above ground
OLA01	North tower, 2F north terrace,	Centre, 9.5m above ground

Receptor ID	Receptor Description	Receptor Location
OLA02	North tower, 2F outdoor amenity	Centre, 9.5m above ground
OLA03	South tower, 6F terrace & green roof	Centre, 24.5m above ground
OLA04	South tower, 3F outdoor amenity	Centre, 13.5m above ground
OLA05	Ground level, outdoor amenity	Centre, 1.5m above ground

5.2 Transportation Noise Sources

5.2.1 Road Noise Sources

Marineland Parkway (adjacent to the south) and Portage Road (adjacent to east and southeast) represent the most significant road noise sources for the Project. Traffic data was obtained from the City of Niagara Falls. The data provided was the Turning Movement Count (TMC) information of Marineland Parkway and Portage Road. This data is presented in Appendix B.

The highest hourly volumes of cars, trucks and busses recorded in the TMC data were identified and converted to AADT values by adding the AM and PM peak hour volumes together and multiplying by 5. AADT estimates are summarized in Table 3.

Table 3: Traffic Data Summary

Street	Section	Time Period	Cars		Trucks		Buses		Total
			Year	Volume	Year	Volume	Year	Volume	
Marineland Parkway	West of Portage Road	AM Peak	2021	555	2021	24	2021	0	7395
		PM Peak	2021	886	2021	14	2021	0	
		Daily	2021	7205	2021	190	2021	0	
Portage Road	North of Marineland Parkway	AM Peak	2021	115	2021	3	2021	0	1455
		PM Peak	2021	173	2021	0	2021	0	
		Daily	2021	1440	2021	15	2021	0	
Portage Road	East of Marineland Parkway	AM Peak	2021	642	2021	25	2021	0	8380
		PM Peak	2021	995	2021	14	2021	0	
		Daily	2021	8185	2021	195	2021	0	

The total Annual Average Daily Traffic (AADT) was projected forward to 2035 (10 years after expected completion) using a growth rate of 2% per year from the noted year of measurement.

Because no “Heavy” vehicles were identified in the TMC data, medium and heavy truck percentages were estimated assuming that 25% of the reported truck vehicles would be considered “heavy trucks”, and 75% of the reported truck vehicles would be considered “medium trucks”.

Posted speed limits on Marineland Parkway and Portage Road are both 50 km/hr. Road grades were assumed to be 0% in the area under review. The day/night split was assumed to be 90%/10%.

The traffic data used in the sound level calculations is summarized in Table 4.

Table 4: Traffic Data Summary

Parameter	Marineland Parkway	Portage Road (North)	Portage Road (East)
AADT	7395 (2021)	1455 (2021)	8380 (2021)
% Annual Growth	2%	2%	2%
Years of Annual Growth	14	14	14
% Medium Trucks	1.93%	0.77%	1.75%
% Heavy Trucks	0.64%	0.26%	0.58%
% Day (16h) / Night (8h)	90% / 10%	90% / 10%	90% / 10%
Speed Limit	50 km/hr	50 km/hr	50 km/hr
Gradient	0%	0%	0%

5.2.2 Rail Noise Sources

A railway spur line is located adjacent to the west of the Project. The spur line connects to the end of a main line track which terminates northwest of the Project. Rail traffic data was not available from CP Rail and TT understands that rail traffic on the spur line occurs only occasionally, from once a week to once a month. Therefore a conservative train noise estimate has been used.

There is an at-grade crossing south of the Project, however signage along the road indicates that whistles are not used at the crossing, therefore train whistle noise was not included in the noise models. The track was noted to have jointed rails during the site visit.

No future growth rates are predicted for the CP spur, and associated CP main tracks. Because the main line track terminates at the spur track, it was assumed that the train traffic on the relevant portion of the main line would be the same as the traffic on the spur line. The maximum speed of the tracks was assumed to be 20 mph (~35 km/h) because of the short travel distance between the main line / spur transition, and the industrial facilities serviced by the spur track.

It is TT’s understanding that these rail lines are not regularly used by other railway companies. Therefore, this data, as summarized in Table 5 is considered representative of the total rail traffic volume.

Table 5: CP Rail estimated traffic data summary

Parameter	CP Spur Track	CP Main Track
Train type	Freight	Freight
Number of trains per day Day (07:00 - 23:00) / Night (23:00 - 07:00)	1 / 1	1 / 1
Locomotives per train	1	1
Cars per train	10	10
Maximum speed (mph / km/h)	20 / 35	20 / 35

5.3 Transportation Sound Level Limits

5.3.1 Outdoor Living Areas

Impacts to OLAs from combined road and rail traffic are assessed against a 16-hour daytime (07:00 – 23:00) equivalent sound pressure level (L_{eq}) reported in dBA. The MECP outdoor sound level limits and

the sliding scale of required noise reduction measures for road and rail noise at OLAs are listed in Table 6. Note that whistle noise is not included in the assessment of rail noise at an OLA.

Table 6: MECP Outdoor Sound Level Limit & Mitigation for OLAs – Road & Rail Traffic

Category	Sound Level $L_{eq,16hr}$ (dBA)	Mitigation Measures	NPC-300 Warning Clause Required
Outdoor Limit	55	None	None
OLA Mitigation Threshold	56 - 60	Optional	Type A unless sound level brought below 55 dBA
OLA Mitigation Threshold	>60	Required to achieve sound level below 60 dBA	Type B unless sound level brought below 55 dBA

5.3.2 Indoor Living Areas

Impacts to POWs from combined road and rail (if applicable) traffic are assessed against a 16-hour daytime (07:00 – 23:00) and 8-hour nighttime (23:00 – 07:00) equivalent sound pressure level (L_{eq}) reported in dBA. The combined impact is used to determine the requirement for ventilation and warning clauses. The MECP POW sound level limits and the sliding scale of required noise reduction measures for combined road and rail noise at POWs are listed in Table 7. Note that whistle noise is not included in the assessment of rail noise for this purpose.

Table 7: MECP POW Sound Level Limit: Ventilation & Warning Clauses – Combined Road & Rail Traffic

Category	Daytime $L_{eq,16hr}$ (dBA)	Nighttime $L_{eq,8hr}$ (dBA)	Mitigation Measures	NPC-300 Warning Clause Required
POW Limit	55	50	None	None
POW Mitigation Threshold Living & Bedrooms	56 - 65	51 – 60	Include forced air heating and provision for central air conditioning	Type C
POW Mitigation Threshold Living & Bedrooms	>65	>60	Include central air conditioning	Type D

Impacts to indoor noise levels from road and rail (if applicable) traffic are assessed against a 16-hour daytime (07:00 – 23:00) and 8-hour nighttime (23:00 – 07:00) equivalent sound pressure level (L_{eq}) reported in dBA at the POW receptor. The requirements for building construction to address transportation noise impacts to indoor sound levels are determined independently for road and rail noise, with the resulting requirements then being combined logarithmically. The MECP indoor sound level limits and the required noise reduction measures for road and rail noise at POWs are listed in Table 8. Note that whistle noise is included in the assessment of rail noise for this purpose.

Table 8: MECP Indoor Sound Level Limit & Construction Requirements – Road & Rail Traffic

Category	Daytime L _{eq,16hr} (dBA)	Nighttime L _{eq,8hr} (dBA)	Total L _{eq,24hr} (dBA)	Mitigation Measures
Road Indoor Limit Living Rooms / Bedrooms	45 / 45	45 / 40	-	Not Applicable
Road POW Mitigation Threshold Living & Bedrooms	>65	>60	-	Design building components to achieve indoor sound level limit
Rail Indoor Limit Living Rooms / Bedrooms	40 / 40	40 / 35	-	Not Applicable
Rail POW Mitigation Threshold Living & Bedrooms	>60	>55	-	Design building components to achieve indoor sound level limit
Rail POW Mitigation Threshold Bedrooms	-	-	>60	Minimum of brick veneer or masonry equivalent construction from foundation to rafters in first row of dwellings if within 100m of tracks

5.4 Transportation Sound Level Predictions

5.4.1 Road & Rail Traffic

Calculations of road & rail traffic sound levels were performed using STAMSON 5.04, the software implementation of the MECP ORNAMENT model, which was developed and published by the MECP for transportation noise prediction. Only daytime sound levels are considered for outdoor amenity areas. The calculated sound levels at the receptors are presented in Table 9.

Table 9: Calculated Sound Levels due to Combined Road & Rail Sources

POR ID	Predicted Transportation Sound Levels (dBA)	
	Daytime (07:00–23:00) L _{eq,16hr}	Nighttime (23:00–07:00) L _{eq,8hr}
POR1	52	46
POR2	51	50
POR3	53	48
POR4	52	49
OLA1	50	-
OLA2	50	-
OLA3	53	-
OLA4	53	-
OLA5	52	-

The STAMSON calculation outputs for the traffic noise predictions are attached in Appendix C.

5.5 Transportation Noise Control Recommendations

Noise control recommendations for the identified critical receptors and the corresponding noise sensitive land uses that they represent in the proposed redevelopment are summarized in Table 10 and discussed in the subsequent sections.

Table 10: Transportation Noise Control Measures Summary

POR ID	Noise Barrier	Ventilation	Building Components	Warning Clause
POR1	N/A	None	Meet OBC Requirements	None
POR2	N/A	None	Meet OBC Requirements	None
POR3	N/A	None	Meet OBC Requirements	None
POR4	N/A	None	Meet OBC Requirements	None
OLA1	No	N/A	N/A	None
OLA2	No	N/A	N/A	None
OLA3	No	N/A	N/A	None
OLA4	No	N/A	N/A	None
OLA5	No	N/A	N/A	None

5.5.1 Outdoor Living Areas – Barriers

The adjacent railway line is classified as a Spur Line. In accordance with the *Guidelines for New Development in Proximity to Railway Operations Prepared for the Federation of Canadian Municipalities and the Railway Association of Canada (May 2013)*, it is generally recommended that a noise barrier is only required if deemed necessary based on the findings in Section 5.4 of this report.

Sound levels at each of the OLAs associated with the Project are expected to be equal to or lower than 55 dBA, and no additional noise mitigation is required for these OLAs.

5.5.2 Indoor Living Areas - Ventilation

Sensitive receptors along the facades of the Project are expected to face POW sound levels below 55 dBA during the 16-hour day (07:00 – 23:00) and/or 50 dBA during the 8-hour night (23:00 – 07:00) due to road/rail noise, therefore no specific ventilation requirements apply for the purposes of addressing transportation noise.

TT understands that the Project plan includes forced air heating and central air conditioning for the entirety of the Project, therefore the above noted requirements are expected to be met.

5.5.3 Indoor Living Areas - Building Components

Sensitive receptors along the south and west façades of the Project are not expected to face POW sound levels above 60 dBA over a full 24-hour day due to noise from rail traffic, despite being located within 100m of a railway. Therefore, the exterior façade of these receptors are not required to use, as a minimum, brick veneer or masonry equivalent construction from foundation to rafters.

Sensitive receptors along each of the façades of the Project are not expected to face POW sound levels above 65/60 dBA during the 16-hour day (07:00 – 23:00) and/or 60/55 dBA during the 8-hour night (23:00 – 07:00) due to road/rail noise, therefore building components on these façades need only be designed to meet the requirements of OBC.

6.0 Stationary Noise Assessment

6.1 Critical Stationary Noise Receptors

NPC-300 defines a point of reception for the assessment of stationary noise sources as any location on a noise sensitive land use where noise from a stationary source is received. This typically includes both points of reception on building façades, representing the plane-of-window of noise sensitive spaces (POR) and outdoor points of reception representing areas such as balconies, gardens, patios, and terraces (OPOR). These locations may be the same or different from the POW and OLA receptors identified as part of the transportation noise assessment.

6.1.1 Project Receptors

The project point of reception (PPOR) and project outdoor point of reception (POPOR) receptor(s) on the Project most likely to be affected by stationary noise sources are those representing the residential suites and outdoor living areas that have maximum exposure to stationary noise sources associated with the surrounding properties in each direction.

Based on provided site plans of the Project, TT has identified one representative POPOR, located on the south corner of the project podium on the 3rd floor terrace. Individual suites will have balconies, however because these are less than 4m in depth they have not been considered as POPORs.

The locations of the critical receptors on the Project for stationary noise are summarized in Table 11 and shown in Figure 5. PPORs were assessed using a grid of receptors across the full facade, and POPORs were assessed at the most impacted point within 30m of a building façade, 1.5m above ground/floor level.

Table 11: Project Points of Reception – Stationary Noise

Receptor ID	Receptor Description	Receptor Location
PPOR1	North tower	Building evaluation of full façade
PPOR2	South tower	Building evaluation of full façade
PPOR3	South podium	Building evaluation of full façade
POPOR1	South podium	SW corner, 1.5m above ground

6.2 Stationary Noise Sources

NPC-300 defines a stationary source of noise as one or more sources of sound that are normally operated within a given property. Stationary sources typically include mechanical equipment such as Heating, Ventilation and Air Conditioning (HVAC) equipment, standby power generators with routine testing, and heavy vehicle traffic (truck idling, driving, and loading).

Certain sources of noise, such as residential air conditioners, passenger automobile traffic in parking lots, or temporary noise such as that related to construction are not considered to be stationary sources in NPC-300 and are not assessed in this report.

6.2.1 Project Sources

TT understands that due to the nature of the Project (residential) and the fact that the mechanical equipment is to be housed inside the mechanical penthouses, no significant stationary noise sources are anticipated to be present.

6.2.2 Surrounding Sources

Based on a review of satellite imagery, and field inspection, an industrial facility operated by Washington Mills Electro Minerals at 7780 Stanley Avenue represents the only potentially significant stationary noise source in the vicinity of the Project. Table 12 and Figure 5 provide a summary of the assumed surrounding stationary source data. Because TT was unable to inspect equipment installed on surrounding properties, the following assumptions have been made:

- Truck driving was assumed to route from the south side of the source property; and
- A representative noise source was assumed to be located at the northeast corner of the source property.

Table 12: Surrounding Stationary Noise Sources

Source ID	Source Description	Source Location	Source Sound Power	Source Type	Notes & Assumptions
			dBA		
SPS1	Representative Point Source	Northeast corner of 7780 Stanley Avenue facility	110	Steady	
STRDR1	Truck driving	7780 Stanley Avenue facility	104	Steady	10 trucks/hr @ 15 km/hr

6.3 Project Area Classification

NPC-300 defines the applicable sound pressure level limit at a given receptor as the higher of a set exclusionary sound level limit based on the area classification of that receptor, or the actual background sound level at the location of the receptor, whichever is higher. For the purposes of this report, the defined exclusionary limits were used for the purposes of assessing compliance.

The Project is considered to be located in a Class 1 area as defined in NPC-300, based on the surrounding area features and its distance from major roads.

6.3.1 Class 1 Area Exclusionary Sound Level Limits

NPC-300 defines a Class 1 area as having an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as “urban hum” during both day and night.

Table 13 provides a summary of the applicable exclusionary sound level limits for steady noise sources impacting receptors in a Class 1 area. Steady stationary noise sources are assessed against a 1 hour equivalent sound pressure level (L_{eq}) expressed in A-weighted decibels (dBA). Routine testing of emergency equipment, if applicable, is assessed separately from other stationary noise sources, and is compared to sound level limits that are 5 dBA higher than would otherwise apply.

Table 13: Class 1 Exclusionary Sound Level Limits – Steady Noise

Time Period	Normal Operations Steady Noise ($L_{eq,1hr}$ dBA)		Emergency Equipment Testing Steady Noise ($L_{eq,1hr}$ dBA)	
	POR	OPOR	POR	OPOR
Daytime (07:00 – 19:00)	50	50	55	55
Evening (19:00 – 23:00)	50	50	55	55
Nighttime (23:00 – 07:00)	45	-	50	-

6.4 Stationary Sound Level Predictions

Sound levels at the PORs due to the nearby stationary sources were calculated using the software CadnaA in accordance with the methods described in ISO 9613-2. The CadnaA calculation outputs are presented in 0.

6.4.1 Stationary Noise Impacts on The Project

In modelling the impact of stationary noise sources to receptors located on the Project, TT has considered only the identified stationary sources associated with the surrounding area. The impact of stationary noise sources located on the project itself was not considered, as NPC-300 does not consider properties to be sensitive to their own noise sources.

Table 14 provides a summary of the modelling results for stationary noise impacts to the Project, and 0 contains the full modelling output and illustrations.

Table 14: Predicted Stationary Noise Source Impacts to the Project

POR ID	Time Period	Steady Sound Level	Steady Sound Level Limit	Compliance
		L _{eq,1hr} (dBA)	L _{eq,1hr} (dBA)	
PPOR1	Daytime	43	50	Yes
	Evening	43	50	Yes
	Nighttime	43	45	Yes
PPOR2	Daytime	44	50	Yes
	Evening	44	50	Yes
	Nighttime	44	45	Yes
PPOR3	Daytime	45	50	Yes
	Evening	45	50	Yes
	Nighttime	45	45	Yes
POPOR1	Daytime	44	50	Yes
	Evening	44	50	Yes

Noise due to stationary noise sources is predicted to meet the applicable sound level limits at all modeled receptors on the Project.

6.5 Stationary Noise Mitigation Recommendations

6.5.1 Mitigation for Project Receptors

No predicted exceedances of the applicable stationary sound level limits at the Project receptors have been identified; therefore, no mitigation are required.

6.5.2 Mitigation for Surrounding Receptors

No predicted exceedances of the applicable stationary sound level limits at the surrounding receptors have been identified; therefore, no mitigation is required.

7.0 Railway Vibration Assessment

7.1 Vibration Criteria

Currently, there are no guidelines for the impact of railway vibration in the land use approval process in Ontario. However, in May 2013, the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC) issued "Guidelines for New Development in Proximity to Railway Operations" to address developments near railway operations. The FCM/RAC guidelines identify dwellings within 75 meters from railways alignments as susceptible to vibration impact and recommend an overall maximum vibration limit of 0.14 mm/sec root-mean-square (RMS). The limit should be based on a one-second averaging time between 4 Hz and 200 Hz. Mitigation is prescribed when this limit is exceeded.

The FCM/RAC guidelines recommend that vibration measurements be performed on site for at least five train pass bys representative of all train types. However, due to the infrequent nature of rail traffic (which are estimated to pass through from once a week to once a month), a predictive model for the vibration

impact of rail traffic was proposed. The method used is outlined in “Transit Noise and Vibration Impact Assessment Manual” by the Federal Transit Administration (FTA) of the United States of America issued in 2018. This 2006 version of this method is also referenced by the FCM guidelines as additional information on the methods for measurement of ground-borne vibration.

7.2 Vibration Model

Section 6.4 of the FTA manual provides a step-by-step guide on how to predict vibration impact if the ground-borne receiver is within the screening distance rail vibration source. The property line of the Project was measured to be approximately 5m (16.4ft) away from the center of the track. Thus, a General Vibration Assessment is recommended and is used in this report. Information regarding soil properties were taken from the geotechnical report *Geotechnical Investigation Proposed Highrise Development Lot 175 Portage Road Niagara Falls, Ontario*, prepared by Soil-Mat Engineers & Consultants Ltd., dated October 25, 2020 provided by the client.

Three steps are outlined in the manual for railway vibration assessment:

7.2.1 Step 1: Select Base Curve for Ground Surface Vibration Level

TT understands that the spur line connects to existing industrial facilities south (Washington Mills Electro Minerals) and southeast (Saint Gobain Ceramic Materials Canada Inc.) of the Project site. The FTA manual provides initial vibration level curves with respect to distance from the rail track. For the project, the Locomotive Powered Passenger or Freight Curve was chosen based on the assumed train type (Freight).

At approximately 98 ft from the rail to the Project’s North Tower Level 3 building envelope (where the closest residential units to the rail track are located), the initial vibration level is 78.61 VdB (re 1 micro-inch/sec) using the curve’s equation:

$$L_v = 92.28 + 14.81 \log(D) - 14.17 \log(D)^2 + 1.65 \log(D)^3$$

The rest of the General Vibration Assessment method consists of the addition or subtraction of correction factors to determine the predicted final vibration level.

7.2.2 Step 2: Apply Adjustments

This step applies correction factors to the initial vibration level based on the condition of the source (train), the condition of the path (ground), and the conditions of the receiver (the proposed building).

Source (FTA, Table 6-11):

- The speed of the train was assumed to be the lowest at 20 mph with a 50mph reference because the load is assumed to be ceramic and building materials. Additionally, another reason is that the length of the track is short, and a major roadway (Marineland Parkway) intersects with the rail corridor which would limit the speed of the train. This gives a correction factor of -8 VdB
- A stiff primary suspension was assumed because no special treatment is expected on the train itself. This gives a +10VdB correction factor.

- During TT’s site visit, the tracks were found to be worn and dented, which gives a +10 VdB correction factor.
- No Ballast Mats were assumed. However, the tracks are suspended on ballasts which may be expected help reduce ground-borne vibration at the higher frequencies but are less effective on the vibration frequency of the train pass-by.

Path (FTA, Table 6-12):

- Resiliently supported ties were not found during the TT’s site visit. This gives no correction factor.
- The track is open cut but slightly elevated on the ballasts. This gives no correction factor.
- Geologic conditions are not expected to promote efficient vibration propagation. This gives no correction factor.
- The building is assumed to have its foundation on piles (Large Masonry on Piles) based on a conservative estimate from the geological report. This gives a -10 VdB correction factor.

Receiver (FTA, Table 6-13):

- There are 5 floors from the Underground Parking 2 to the North Tower Level 3 Residential Units. The FTA guidelines give a -2 dB reduction per floor. In total, the 5 floors give a -10 VdB correction factor.
- Amplification cause by the building resonances is expected, which gives a +6 VdB correction factor.

7.2.3 Step 3: Inventory of Vibration Impact

The total vibration level after all corrections factors have been applied is 76.61 VdB (re 1 micro-inch/sec). Section 6.2 of the FTA manual (FTA, Table 6-3) recommends a limit of 80 VdB for a Category 2 (residences) and Infrequent Events (less than 30 events per day). Thus, the projected vibration is less than the impact threshold and vibration impact is unlikely. Vibration mitigation measures are not expected to be required.

The General Vibration Assessment result is summarized in Table 15.

Table 15: Summary of General Vibration Assessment

Correction Type	Parameter	Initial Value/ Correction Factor (VdB re micro-inch/sec)	Description
Initial Curve	-	78.61	Locomotive Freight Curve
Source	Speed	-8	20 mph
	Vehicle Parameters	10	Stiff Primary Suspension
	Track Conditions	10	Worn or Corrugated Track
	Track Treatments	0	No
Path	Resilient Ties	0	No
	Track Structure	0	Open Cut
	Ground-born Propagation Effects	0	None

Correction Type	Parameter	Initial Value/ Correction Factor (VdB re micro-inch/sec)	Description
	Coupling to building foundation	-10	Large Masonry on Piles
Receiver	Floor-to-floor Attenuation	-10	5 floors from the basement slab
	Amplification due to Resonance	6	Amplification expected
	Total	76.61	-
	Meets 80 VdB impact threshold?		Yes

7.2.4 Ground-borne Noise Impact

Based on the FTA’s ground-borne vibration to noise conversion table (FTA Table 6-14), a conservative mid-frequency peak was used (30 Hz to 60 Hz). Therefore, ground-borne noise from the train passing to the closest residential suite is predicted to be 41.61 dBA which is below the noise impact threshold of 43 dBA. No ground-borne noise mitigation measures are expected to be required.

8.0 Concluding Comments

Noise impacts associated with the proposed development at Lot 175, Portage Road, Niagara Falls, Ontario are expected to be able to meet all applicable MECP noise limits with the inclusion of noise control measures and warning clauses as presented in Section 5.5 of this report for transportation noise sources and Section 6.5 of this report for stationary noise sources. The proposed development should therefore be approved.

As the design of the redevelopment proceeds, and mechanical equipment is selected, acoustical modelling of the impacts of this equipment should be confirmed in order to evaluate compliance with applicable MECP limits at surrounding sensitive receptors, and confirm that impacts to the Project itself will be acceptable.

Please do not hesitate to contact us if there are any questions.

Yours Truly,

Thornton Tomasetti



Robert Fuller, P.Eng.
Project Engineer

Reviewed by:

Stephen McCann, P.Eng.
Associate

Disclaimer

Achieving the required noise control requirements relies on correct incorporation of noise control recommendations into Architectural and Mechanical drawings and specifications, as well as correct installation during construction. On Request, TT will conduct drawing reviews and onsite reviews of noise control measures and provide observations as appropriate; however, notwithstanding the foregoing, it is expressly understood and agreed that TT shall not have control or charge of, and shall not be responsible for the acts or omissions, including but not limited to means, methods, techniques, sequences and procedures, of the Design Professionals and/or Contractors performing design and/or construction on the Project. Accordingly, TT shall not be held responsible for the failure of any party to properly incorporate the noise control measures stated in this report.

9.0 References

- [1] Ontario MECP, *Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning, Publication NPC-300*, 2013.
- [2] FCM/RAC, *Guidelines for New Development in Proximity to Railway Operations*, 2013.
- [3] FTA, *Transit Noise and Vibration Impact Assessment*, 2006.

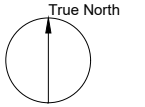
Appendix A: Figures

- Figure 1: Project Location & Surroundings
- Figure 2: Zoning Map
- Figure 3: Project Site Plan
- Figure 4: Transportation Noise PORs & Sources
- Figure 5: Stationary Noise PORs & Sources



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TT PROJECT CODE

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0	2022/06/13	FOR INFORMATION ONLY, NOT FOR CONSTRUCTION
1	2021/AM/DD	FOR INFORMATION ONLY, NOT FOR CONSTRUCTION

PROJECT NAME
 LOT 175
 PORTAGE ROAD
 NIAGARA FALLS

DRAWING NAME
 FIGURE 1:
 PROJECT LOCATION
 & SURROUNDINGS

SCALE ON DRAWING DATE 2022/06/13

Project SK. No SHEET 1 OF 1

ZONING BY-LAW

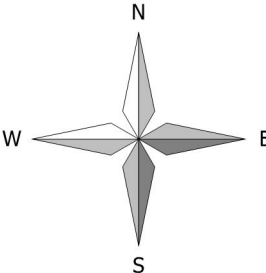
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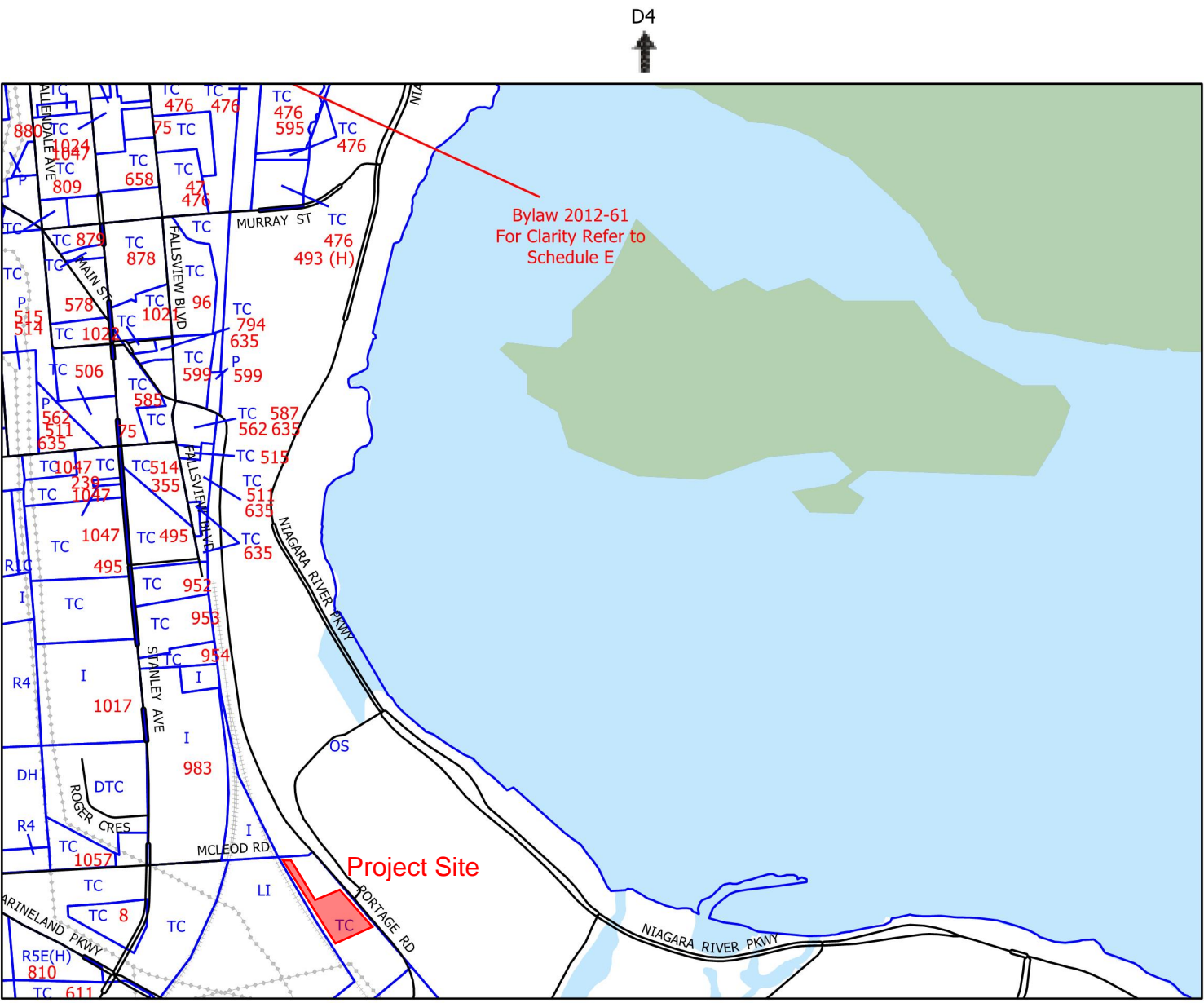
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EXCEPTIONS & SPECIAL PROVISION NO.
SEE SECTION 19

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99-117	02-136	04-126	09-139	13-110
99-272	02-210	05-014	10-120	15-139
00-103	03-009	07-001	12-062	16-049
01-090	04-017	07-022	12-080	16-053
01-149	04-073	07-195	12-081	17-062
01-185	03-046	07-154	12-082	18-022
02-066	02-202	08-011	13-077	
02-110	03-164	08-039	13-108	



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OCTOBER 2018



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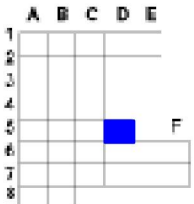
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C5

CITY OF NIAGARA FALLS
Planning & Development Department



Scale 1:13 000



Project Site

D5



ZONING BY-LAW

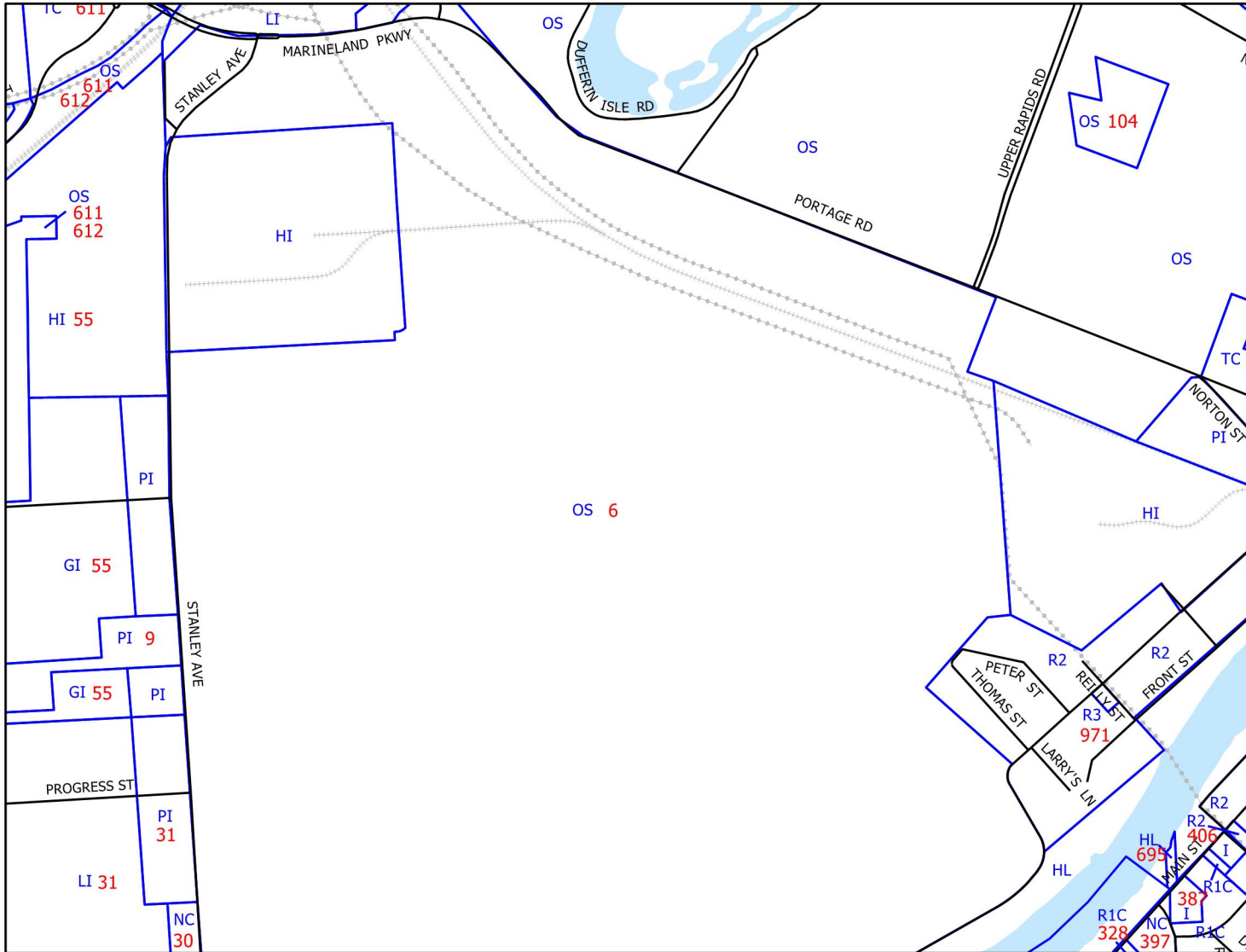
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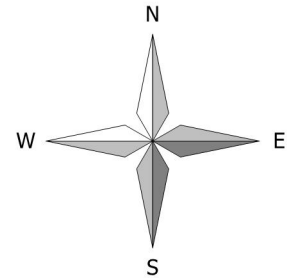
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SEE SECTION 19

- 03-046
- 04-159
- 05-047
- 12-121



E6



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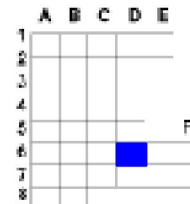


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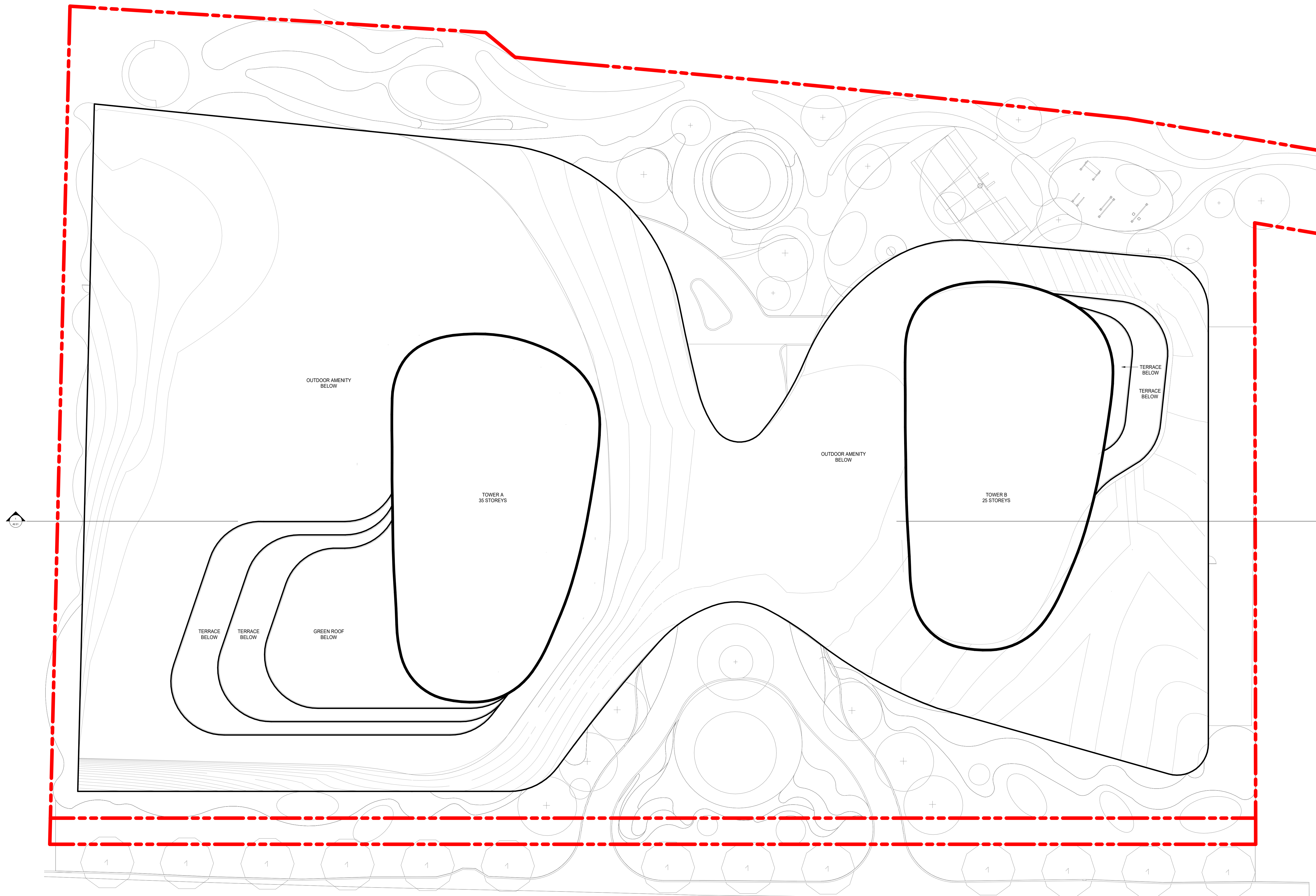


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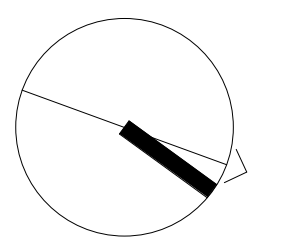
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petricone
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RUDANCO INC.

PORTAGE RD

LOT 175 PORTAGE ROAD, CITY OF NIAGARA FALLS,
ONTARIO L2J0C5

SHEET TITLE

SITE PLAN

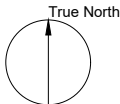
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PROJECT NO.: 21140
SHEET NUMBER

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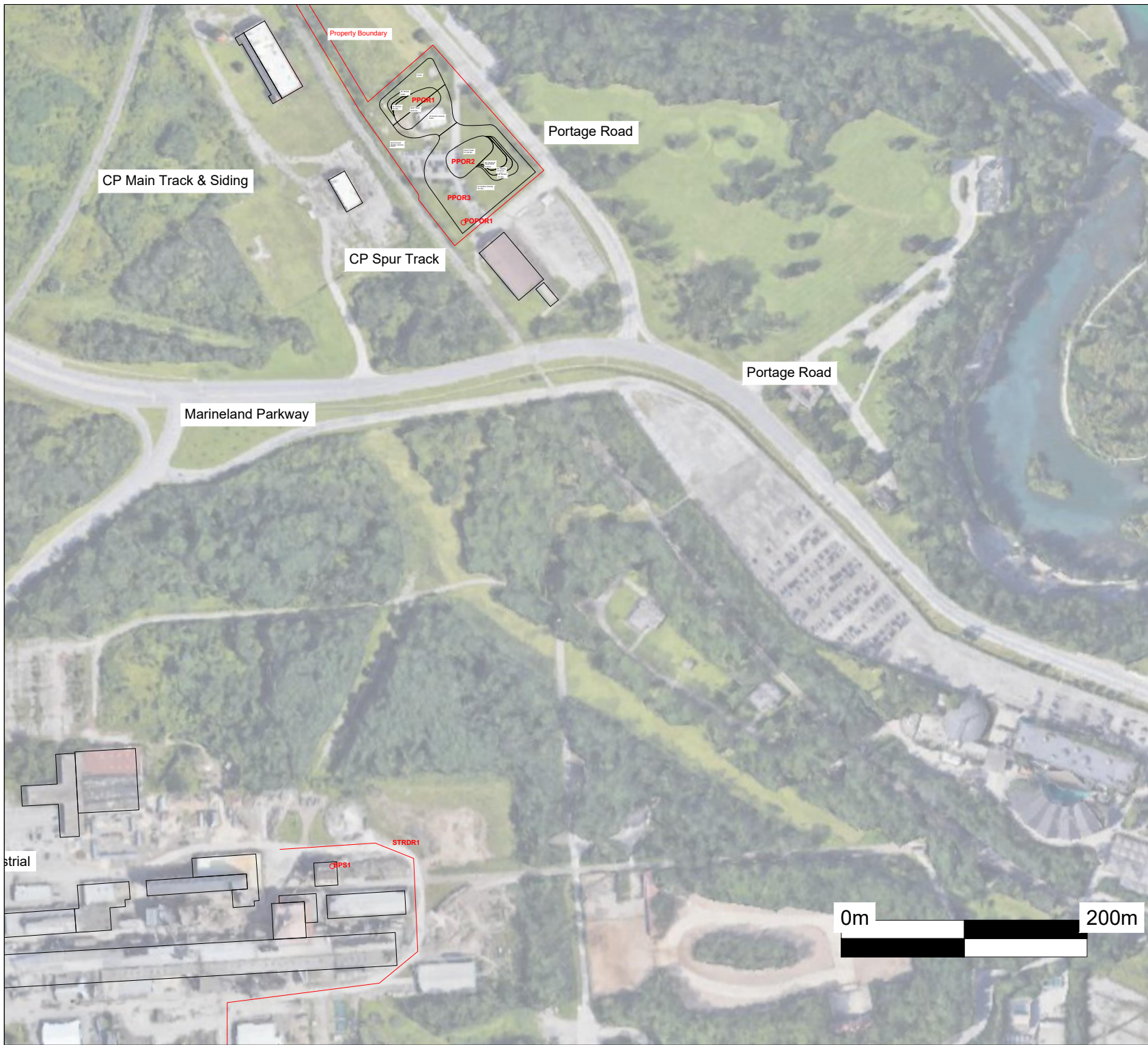
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PROJECT NAME
 LOT 175
 PORTAGE ROAD
 NIAGARA FALLS

DRAWING NAME
 FIGURE 4:
 TRANSPORTATION NOISE
 PORs & SOURCES

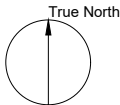
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Project SK. No SHEET 1 OF 1



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PROJECT NAME
 LOT 175
 PORTAGE ROAD
 NIAGARA FALLS

DRAWING NAME
 FIGURE 5:
 STATIONARY NOISE
 PORs & SOURCES

SCALE ON DRAWING	DATE
Project SK. No	SHEET
	1 OF 1

Appendix B: Traffic Data

Portage Rd @ Marineland Pkwy

Morning Peak Diagram

Specified Period

From: 8:00:00
To: 10:00:00

One Hour Peak

From: 8:45:00
To: 9:45:00

Municipality: Niagara Falls
Site #: 000000037
Intersection: Portage Rd & Marineland Pkwy
TFR File #: 37
Count date: 1-Dec-2021

Weather conditions:
Clear/Dry
Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Portage Rd runs W/E

North Leg Total: 119
North Entering: 55
North Peds: 0
Peds Cross: \times

Cyclists	1	0	1
Trucks	0	1	1
Cars	5	48	53
Totals	6	49	



Cyclists	0
Trucks	2
Cars	62
Totals	64

East Leg Total: 667
East Entering: 389
East Peds: 0
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
1	13	327	341



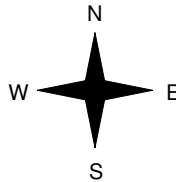
Portage Rd



Cars	Trucks	Cyclists	Totals
53	1	0	54
322	13	0	335
375	14	0	



Marineland Pkwy



Cyclists	Trucks	Cars	Totals
0	1	9	10
0	10	219	229
0	11	228	



Portage Rd



Cars	Trucks	Cyclists	Totals
267	11	0	278

Peds Cross: \times
West Peds: 0
West Entering: 239
West Leg Total: 580

Comments

Portage Rd @ Marineland Pkwy

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:00:00

To: 17:00:00

Municipality: Niagara Falls
Site #: 0000000037
Intersection: Portage Rd & Marineland Pkwy
TFR File #: 37
Count date: 1-Dec-2021

Weather conditions:

Clear/Dry

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Portage Rd runs W/E

North Leg Total: 173

North Entering: 121

North Peds: 0

Peds Cross: \times

Cyclists	0	0	0
Trucks	0	0	0
Cars	27	94	121
Totals	27	94	



Cyclists 0

Trucks 0

Cars 52

Totals 52

East Leg Total: 1009

East Entering: 433

East Peds: 0

Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	9	404	413



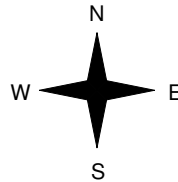
Portage Rd



Cars	Trucks	Cyclists	Totals
47	0	0	47
377	9	0	386
424	9	0	



Marineland Pkwy



Cyclists	Trucks	Cars	Totals
0	0	5	5
0	5	477	482
0	5	482	



Portage Rd



Cars	Trucks	Cyclists	Totals
571	5	0	576

Peds Cross: \times

West Peds: 0

West Entering: 487

West Leg Total: 900

Comments

Appendix C: Transportation Noise Predictions

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 09:51:25
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: olal.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
* 1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

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

Train type: No Name	! Unadj. ! Trains	! Annual % ! Increase	! Years of ! Growth
1. Freight	! 1.0/1.0	! 0.00	! 0.00 !

Data for Segment # 1: CP Spur (day/night)

 Angle1 Angle2 : -55.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 38.40 / 38.40 m
 Receiver height : 9.50 / 9.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Rail data, segment # 2: CP Main (day/night)

Train Type	! Trains	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
* 1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

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

Train type: No Name	! Unadj. ! Trains	! Annual % ! Increase	! Years of ! Growth
1. Freight	! 1.0/1.0	! 0.00	! 0.00 !

Data for Segment # 2: CP Main (day/night)

Angle1 Angle2 : -52.00 deg 52.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 213.50 / 213.50 m
 Receiver height : 9.50 / 9.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 43.28 + 0.00) = 43.28 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	90	0.00	48.31	-4.08	-0.94	0.00	0.00	0.00	43.28

WHEEL (0.00 + 37.50 + 0.00) = 37.50 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	90	0.00	42.52	-4.08	-0.94	0.00	0.00	0.00	37.50

Segment Leq : 44.30 dBA

Results segment # 2: CP Main (day)

LOCOMOTIVE (0.00 + 34.39 + 0.00) = 34.39 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-52	52	0.00	48.31	-11.53	-2.38	0.00	0.00	0.00	34.39

WHEEL (0.00 + 28.60 + 0.00) = 28.60 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-52	52	0.00	42.52	-11.53	-2.38	0.00	0.00	0.00	28.60

Segment Leq : 35.41 dBA

Total Leq All Segments: 44.83 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 46.29 + 0.00) = 46.29 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	90	0.00	51.32	-4.08	-0.94	0.00	0.00	0.00	46.29

WHEEL (0.00 + 40.51 + 0.00) = 40.51 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	90	0.00	45.53	-4.08	-0.94	0.00	0.00	0.00	40.51

Segment Leq : 47.31 dBA

Results segment # 2: CP Main (night)

LOCOMOTIVE (0.00 + 37.40 + 0.00) = 37.40 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-52	52	0.00	51.32	-11.53	-2.38	0.00	0.00	0.00	37.40

WHEEL (0.00 + 31.61 + 0.00) = 31.61 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-52	52	0.00	45.53	-11.53	-2.38	0.00	0.00	0.00	31.61

Segment Leq : 38.42 dBA

Total Leq All Segments: 47.84 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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) : 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93

Heavy Truck % of Total Volume : 0.64

Day (16 hrs) % of Total Volume : 90.00

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

Angle1 Angle2 : 14.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 229.10 / 229.10 m

Receiver height : 9.50 / 9.50 m

Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

 Car traffic volume : 1710/190 veh/TimePeriod
 Medium truck volume : 13/1 veh/TimePeriod
 Heavy truck volume : 4/0 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

 Angle1 Angle2 : -90.00 deg 26.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 60.40 / 60.40 m
 Receiver height : 9.50 / 9.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

 Source height = 0.89 m

ROAD (0.00 + 46.10 + 0.00) = 46.10 dBA

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

14	90	0.00	61.69	0.00	-11.84	-3.74	0.00	0.00	0.00
46.10									

 Segment Leq : 46.10 dBA

Results segment # 2: PRN (day)

 Source height = 0.69 m

ROAD (0.00 + 45.43 + 0.00) = 45.43 dBA

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

-90	26	0.00	53.39	0.00	-6.05	-1.91	0.00	0.00	0.00
45.43									

Segment Leq : 45.43 dBA

Total Leq All Segments: 48.79 dBA

Results segment # 1: MP (night)

Source height = 0.89 m

ROAD (0.00 + 39.54 + 0.00) = 39.54 dBA

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

--									
14	90	0.00	55.13	0.00	-11.84	-3.74	0.00	0.00	0.00
39.54									

--

Segment Leq : 39.54 dBA

Results segment # 2: PRN (night)

Source height = 0.50 m

ROAD (0.00 + 38.22 + 0.00) = 38.22 dBA

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

--									
-90	26	0.00	46.18	0.00	-6.05	-1.91	0.00	0.00	0.00
38.22									

--

Segment Leq : 38.22 dBA

Total Leq All Segments: 41.94 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.25
 (NIGHT): 48.83

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 10:09:37
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola2.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -75.00 deg 32.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 54.50 / 54.50 m
 Receiver height : 9.50 / 9.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Rail data, segment # 2: CP Main (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

Data for Segment # 2: CP Main (day/night)

Angle1 Angle2 : -50.00 deg -19.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 252.20 / 252.20 m
 Receiver height : 9.50 / 9.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 40.44 + 0.00) = 40.44 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	32	0.00	48.31	-5.60	-2.26	0.00	0.00	0.00	40.44

WHEEL (0.00 + 34.65 + 0.00) = 34.65 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	32	0.00	42.52	-5.60	-2.26	0.00	0.00	0.00	34.65

Segment Leq : 41.46 dBA

Results segment # 2: CP Main (day)

LOCOMOTIVE (0.00 + 28.41 + 0.00) = 28.41 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	-19	0.00	48.31	-12.26	-7.64	0.00	0.00	0.00	28.41

WHEEL (0.00 + 22.62 + 0.00) = 22.62 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	-19	0.00	42.52	-12.26	-7.64	0.00	0.00	0.00	22.62

Segment Leq : 29.43 dBA

Total Leq All Segments: 41.72 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 43.45 + 0.00) = 43.45 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	32	0.00	51.32	-5.60	-2.26	0.00	0.00	0.00	43.45

WHEEL (0.00 + 37.67 + 0.00) = 37.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	32	0.00	45.53	-5.60	-2.26	0.00	0.00	0.00	37.67

Segment Leq : 44.47 dBA

Results segment # 2: CP Main (night)

LOCOMOTIVE (0.00 + 31.42 + 0.00) = 31.42 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	-19	0.00	51.32	-12.26	-7.64	0.00	0.00	0.00	31.42

WHEEL (0.00 + 25.63 + 0.00) = 25.63 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	-19	0.00	45.53	-12.26	-7.64	0.00	0.00	0.00	25.63

Segment Leq : 32.44 dBA

Total Leq All Segments: 44.73 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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): 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93

Heavy Truck % of Total Volume : 0.64

Day (16 hrs) % of Total Volume : 90.00

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

Angle1 Angle2 : 0.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 202.20 / 202.20 m

Receiver height : 9.50 / 9.50 m

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

Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

Car traffic volume : 1710/190 veh/TimePeriod

Medium truck volume : 13/1 veh/TimePeriod

Heavy truck volume : 4/0 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

Angle1 Angle2 : -43.00 deg 64.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 47.30 / 47.30 m

Receiver height : 9.50 / 9.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

Source height = 0.89 m

ROAD (0.00 + 47.38 + 0.00) = 47.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
0	90	0.00	61.69	0.00	-11.30	-3.01	0.00	0.00	0.00

SubLeq
 47.38

Segment Leq : 47.38 dBA

Results segment # 2: PRN (day)

Source height = 0.69 m

ROAD (0.00 + 46.14 + 0.00) = 46.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-43	64	0.00	53.39	0.00	-4.99	-2.26	0.00	0.00	0.00

SubLeq
 46.14

Segment Leq : 46.14 dBA

Total Leq All Segments: 49.81 dBA

Results segment # 1: MP (night)

Source height = 0.89 m

ROAD (0.00 + 40.82 + 0.00) = 40.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
0	90	0.00	55.13	0.00	-11.30	-3.01	0.00	0.00	0.00

SubLeq
 40.82

Segment Leq : 40.82 dBA

Results segment # 2: PRN (night)

 Source height = 0.50 m

ROAD (0.00 + 38.94 + 0.00) = 38.94 dBA

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

 --

-43	64	0.00	46.18	0.00	-4.99	-2.26	0.00	0.00	0.00
38.94									

 --

Segment Leq : 38.94 dBA

Total Leq All Segments: 42.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.44
 (NIGHT): 46.96

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 10:12:15
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola3.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains	! Speed ! (km/h)	!# loc !/Train	!# Cars !/Train	! Eng type	!Cont !weld
* 1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

* 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	! 1.0/1.0	! 0.00	! 0.00 !

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -90.00 deg 14.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 73.80 / 73.80 m
 Receiver height : 24.50 / 24.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 39.00 + 0.00) = 39.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	48.31	-6.92	-2.38	0.00	0.00	0.00	39.00

WHEEL (0.00 + 33.21 + 0.00) = 33.21 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	42.52	-6.92	-2.38	0.00	0.00	0.00	33.21

Segment Leq : 40.02 dBA

Total Leq All Segments: 40.02 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 42.01 + 0.00) = 42.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	51.32	-6.92	-2.38	0.00	0.00	0.00	42.01

WHEEL (0.00 + 36.22 + 0.00) = 36.22 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	45.53	-6.92	-2.38	0.00	0.00	0.00	36.22

Segment Leq : 43.03 dBA

Total Leq All Segments: 43.03 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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): 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93

Heavy Truck % of Total Volume : 0.64

Day (16 hrs) % of Total Volume : 90.00

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

Angle1 Angle2 : -22.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 161.40 / 161.40 m

Receiver height : 24.50 / 24.50 m

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

Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

Car traffic volume : 1710/190 veh/TimePeriod

Medium truck volume : 13/1 veh/TimePeriod

Heavy truck volume : 4/0 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

```
-----
Angle1 Angle2 : -65.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 31.40 / 31.40 m
Receiver height : 24.50 / 24.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 3: PRE (day/night)

```
-----
Car traffic volume : 9720/1080 veh/TimePeriod *
Medium truck volume : 174/19 veh/TimePeriod *
Heavy truck volume : 58/6 veh/TimePeriod *
Posted speed limit : 50 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): 8380
Percentage of Annual Growth : 2.00
Number of Years of Growth : 14.00
Medium Truck % of Total Volume : 1.75
Heavy Truck % of Total Volume : 0.58
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 3: PRE (day/night)

```
-----
Angle1 Angle2 : -33.00 deg -22.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 161.40 / 161.40 m
Receiver height : 24.50 / 24.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Results segment # 1: MP (day)

Source height = 0.89 m

ROAD (0.00 + 49.31 + 0.00) = 49.31 dBA

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

```
-----
--
-22 90 0.00 61.69 0.00 -10.32 -2.06 0.00 0.00 0.00
49.31
```

 --

Segment Leq : 49.31 dBA

Results segment # 2: PRN (day)

Source height = 0.69 m

ROAD (0.00 + 49.53 + 0.00) = 49.53 dBA

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

--									
-65	90	0.00	53.39	0.00	-3.21	-0.65	0.00	0.00	0.00
49.53									

--

Segment Leq : 49.53 dBA

Results segment # 3: PRE (day)

Source height = 0.87 m

ROAD (0.00 + 39.62 + 0.00) = 39.62 dBA

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

--									
-33	-22	0.00	62.08	0.00	-10.32	-12.14	0.00	0.00	0.00
39.62									

--

Segment Leq : 39.62 dBA

Total Leq All Segments: 52.65 dBA

Results segment # 1: MP (night)

Source height = 0.89 m

ROAD (0.00 + 42.75 + 0.00) = 42.75 dBA

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

--									
-22	90	0.00	55.13	0.00	-10.32	-2.06	0.00	0.00	0.00
42.75									

 --

Segment Leq : 42.75 dBA

Results segment # 2: PRN (night)

Source height = 0.50 m

ROAD (0.00 + 42.32 + 0.00) = 42.32 dBA

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

--									
-65	90	0.00	46.18	0.00	-3.21	-0.65	0.00	0.00	0.00
42.32									

--

Segment Leq : 42.32 dBA

Results segment # 3: PRE (night)

Source height = 0.86 m

ROAD (0.00 + 33.01 + 0.00) = 33.01 dBA

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

--									
-33	-22	0.00	55.46	0.00	-10.32	-12.14	0.00	0.00	0.00
33.01									

--

Segment Leq : 33.01 dBA

Total Leq All Segments: 45.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.88
 (NIGHT): 47.63

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 10:14:41
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola4.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 32.20 / 32.15 m
 Receiver height : 13.50 / 13.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Rail data, segment # 2: CP Main (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 2: CP Main (day/night)

Angle1 Angle2 : -48.00 deg 35.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 293.10 / 293.10 m
 Receiver height : 13.50 / 13.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 44.99 + 0.00) = 44.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	48.31	-3.32	0.00	0.00	0.00	0.00	44.99

WHEEL (0.00 + 39.20 + 0.00) = 39.20 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	42.52	-3.32	0.00	0.00	0.00	0.00	39.20

Segment Leq : 46.01 dBA

Results segment # 2: CP Main (day)

LOCOMOTIVE (0.00 + 32.03 + 0.00) = 32.03 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	35	0.00	48.31	-12.91	-3.36	0.00	0.00	0.00	32.03

WHEEL (0.00 + 26.25 + 0.00) = 26.25 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	35	0.00	42.52	-12.91	-3.36	0.00	0.00	0.00	26.25

Segment Leq : 33.05 dBA

Total Leq All Segments: 46.22 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 48.01 + 0.00) = 48.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	51.32	-3.31	0.00	0.00	0.00	0.00	48.01

WHEEL (0.00 + 42.22 + 0.00) = 42.22 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	45.53	-3.31	0.00	0.00	0.00	0.00	42.22

Segment Leq : 49.03 dBA

Results segment # 2: CP Main (night)

LOCOMOTIVE (0.00 + 35.04 + 0.00) = 35.04 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	35	0.00	51.32	-12.91	-3.36	0.00	0.00	0.00	35.04

WHEEL (0.00 + 29.26 + 0.00) = 29.26 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	35	0.00	45.53	-12.91	-3.36	0.00	0.00	0.00	29.26

Segment Leq : 36.06 dBA

Total Leq All Segments: 49.24 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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): 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93

Heavy Truck % of Total Volume : 0.64

Day (16 hrs) % of Total Volume : 90.00

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

Angle1 Angle2 : -33.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 131.30 / 131.30 m

Receiver height : 13.50 / 13.50 m

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

Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

Car traffic volume : 1710/190 veh/TimePeriod

Medium truck volume : 13/1 veh/TimePeriod

Heavy truck volume : 4/0 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

Angle1 Angle2 : -26.00 deg 84.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 73.30 / 73.30 m

Receiver height : 13.50 / 13.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: PRE (day/night)

 Car traffic volume : 9720/1080 veh/TimePeriod *
 Medium truck volume : 174/19 veh/TimePeriod *
 Heavy truck volume : 58/6 veh/TimePeriod *
 Posted speed limit : 50 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): 8380
 Percentage of Annual Growth : 2.00
 Number of Years of Growth : 14.00
 Medium Truck % of Total Volume : 1.75
 Heavy Truck % of Total Volume : 0.58
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: PRE (day/night)

 Angle1 Angle2 : -39.00 deg -32.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 131.30 / 131.30 m
 Receiver height : 13.50 / 13.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

 Source height = 0.89 m

ROAD (0.00 + 50.61 + 0.00) = 50.61 dBA

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

 --
 -33 90 0.00 61.69 0.00 -9.42 -1.65 0.00 0.00 0.00
 50.61

 --

Segment Leq : 50.61 dBA

Results segment # 2: PRN (day)

 Source height = 0.69 m

ROAD (0.00 + 44.36 + 0.00) = 44.36 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 --
 -26 84 0.00 53.39 0.00 -6.89 -2.14 0.00 0.00 0.00
 44.36

 --

Segment Leq : 44.36 dBA

Results segment # 3: PRE (day)

 Source height = 0.87 m

ROAD (0.00 + 38.55 + 0.00) = 38.55 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 --
 -39 -32 0.00 62.08 0.00 -9.42 -14.10 0.00 0.00 0.00
 38.55

 --

Segment Leq : 38.55 dBA

Total Leq All Segments: 51.75 dBA

Results segment # 1: MP (night)

 Source height = 0.89 m

ROAD (0.00 + 44.05 + 0.00) = 44.05 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 --
 -33 90 0.00 55.13 0.00 -9.42 -1.65 0.00 0.00 0.00
 44.05

 --

Segment Leq : 44.05 dBA

Results segment # 2: PRN (night)

 Source height = 0.50 m

ROAD (0.00 + 37.15 + 0.00) = 37.15 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

```
-----
--
-26      84      0.00  46.18   0.00  -6.89  -2.14   0.00   0.00   0.00
37.15
-----
--
```

Segment Leq : 37.15 dBA

Results segment # 3: PRE (night)

Source height = 0.86 m

ROAD (0.00 + 31.94 + 0.00) = 31.94 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

```
-----
--
-39     -32      0.00  55.46   0.00  -9.42 -14.10   0.00   0.00   0.00
31.94
-----
--
```

Segment Leq : 31.94 dBA

Total Leq All Segments: 45.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.82
 (NIGHT): 50.65

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 10:22:39
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola5.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 15.00 / 15.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Rail data, segment # 2: CP Main (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 2: CP Main (day/night)

Angle1 Angle2 : -50.00 deg 52.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 228.70 / 228.70 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 48.31 + 0.00) = 48.31 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	48.31	0.00	0.00	0.00	0.00	0.00	48.31

WHEEL (0.00 + 42.52 + 0.00) = 42.52 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	42.52	0.00	0.00	0.00	0.00	0.00	42.52

Segment Leq : 49.33 dBA

Results segment # 2: CP Main (day)

LOCOMOTIVE (0.00 + 34.01 + 0.00) = 34.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	52	0.00	48.31	-11.83	-2.47	0.00	0.00	0.00	34.01

WHEEL (0.00 + 28.22 + 0.00) = 28.22 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	52	0.00	42.52	-11.83	-2.47	0.00	0.00	0.00	28.22

Segment Leq : 35.03 dBA

Total Leq All Segments: 49.49 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 51.32 + 0.00) = 51.32 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	51.32	0.00	0.00	0.00	0.00	0.00	51.32

WHEEL (0.00 + 45.53 + 0.00) = 45.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	45.53	0.00	0.00	0.00	0.00	0.00	45.53

Segment Leq : 52.34 dBA

Results segment # 2: CP Main (night)

LOCOMOTIVE (0.00 + 37.02 + 0.00) = 37.02 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	52	0.00	51.32	-11.83	-2.47	0.00	0.00	0.00	37.02

WHEEL (0.00 + 31.23 + 0.00) = 31.23 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	52	0.00	45.53	-11.83	-2.47	0.00	0.00	0.00	31.23

Segment Leq : 38.04 dBA

Total Leq All Segments: 52.50 dBA

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

 Car traffic volume : 8556/951 veh/TimePeriod *
 Medium truck volume : 169/19 veh/TimePeriod *
 Heavy truck volume : 56/6 veh/TimePeriod *
 Posted speed limit : 50 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): 7395
 Percentage of Annual Growth : 2.00
 Number of Years of Growth : 14.00
 Medium Truck % of Total Volume : 1.93
 Heavy Truck % of Total Volume : 0.64
 Day (16 hrs) % of Total Volume : 90.00

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

 Angle1 Angle2 : -36.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 185.70 / 185.70 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

Source height = 0.89 m

ROAD (0.00 + 49.21 + 0.00) = 49.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-36	90	0.00	61.69	0.00	-10.93	-1.55	0.00	0.00	0.00	49.21

Segment Leq : 49.21 dBA

Total Leq All Segments: 49.21 dBA

Results segment # 1: MP (night)

 Source height = 0.89 m

ROAD (0.00 + 42.65 + 0.00) = 42.65 dBA

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

 --

-36	90	0.00	55.13	0.00	-10.93	-1.55	0.00	0.00	0.00
42.65									

 --

Segment Leq : 42.65 dBA

Total Leq All Segments: 42.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.36
 (NIGHT): 52.93

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 10:39:10
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow1.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

 Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 68.80 / 68.80 m
 Receiver height : 81.50 / 81.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 No Whistle
 Barrier angle1 : -90.00 deg Angle2 : -58.00 deg
 Barrier height : 123.80 m
 Barrier receiver distance : 43.90 / 43.90 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	81.50 !	32.05 !	32.05
0.50 !	81.50 !	29.82 !	29.82

LOCOMOTIVE (0.00 + 14.65 + 36.77) = 36.80 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-58	0.00	48.31	-6.61	-7.50	0.00	0.00	-19.54	14.65
-58	0	0.00	48.31	-6.61	-4.92	0.00	0.00	0.00	36.77

WHEEL (0.00 + 8.85 + 30.98) = 31.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-58	0.00	48.31	-6.61	-7.50	0.00	0.00	-19.54	14.65
-58	0	0.00	48.31	-6.61	-4.92	0.00	0.00	0.00	36.77

-90	-58	0.00	42.52	-6.61	-7.50	0.00	0.00	-19.55	8.85
-58	0	0.00	42.52	-6.61	-4.92	0.00	0.00	0.00	30.98

Segment Leq : 37.82 dBA

Total Leq All Segments: 37.82 dBA

Results segment # 1: CP Spur (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	81.50	32.05	32.05
0.50	81.50	29.82	29.82

LOCOMOTIVE (0.00 + 17.66 + 39.78) = 39.81 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-58	0.00	51.32	-6.61	-7.50	0.00	0.00	-19.54	17.66
-58	0	0.00	51.32	-6.61	-4.92	0.00	0.00	0.00	39.78

WHEEL (0.00 + 11.86 + 33.99) = 34.02 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-58	0.00	45.53	-6.61	-7.50	0.00	0.00	-19.55	11.86
-58	0	0.00	45.53	-6.61	-4.92	0.00	0.00	0.00	33.99

Segment Leq : 40.83 dBA

Total Leq All Segments: 40.83 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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): 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93
 Heavy Truck % of Total Volume : 0.64
 Day (16 hrs) % of Total Volume : 90.00

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

 Angle1 Angle2 : -23.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 221.60 / 221.60 m
 Receiver height : 81.50 / 81.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -23.00 deg Angle2 : 9.00 deg
 Barrier height : 123.80 m
 Barrier receiver distance : 43.90 / 43.90 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

 Car traffic volume : 1710/190 veh/TimePeriod
 Medium truck volume : 13/1 veh/TimePeriod
 Heavy truck volume : 4/0 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 31.90 / 30.70 m
 Receiver height : 81.50 / 81.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

 Source height = 0.89 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.89	81.50	65.53	65.53

ROAD (0.00 + 22.49 + 46.52) = 46.54 dBA

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

--
-23 9 0.00 61.69 0.00 -11.69 -7.50 0.00 0.00 -20.00
22.49

--
9 90 0.00 61.69 0.00 -11.69 -3.47 0.00 0.00 0.00
46.52

Segment Leq : 46.54 dBA

Results segment # 2: PRN (day)

Source height = 0.69 m

ROAD (0.00 + 50.11 + 0.00) = 50.11 dBA

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

--
-90 90 0.00 53.39 0.00 -3.28 0.00 0.00 0.00 0.00
50.11

Segment Leq : 50.11 dBA

Total Leq All Segments: 51.69 dBA

Results segment # 1: MP (night)

Source height = 0.89 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
0.89 ! 81.50 ! 65.53 ! 65.53

ROAD (0.00 + 15.93 + 39.96) = 39.98 dBA

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

--
-23 9 0.00 55.13 0.00 -11.69 -7.50 0.00 0.00 -20.00
15.93

```
-----
--
  9      90      0.00  55.13   0.00 -11.69  -3.47   0.00   0.00   0.00
39.96
-----
```

Segment Leq : 39.98 dBA

Results segment # 2: PRN (night)

Source height = 0.50 m

ROAD (0.00 + 43.07 + 0.00) = 43.07 dBA

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

```
-----
--
 -90     90     0.00  46.18   0.00  -3.11   0.00   0.00   0.00   0.00
43.07
-----
```

Segment Leq : 43.07 dBA

Total Leq All Segments: 44.80 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.87
(NIGHT): 46.27

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 11:02:36
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow2.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 34.30 / 34.30 m
 Receiver height : 81.50 / 81.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Rail data, segment # 2: CP Main (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0 !	! 35.0 !	! 1.0 !	! 10.0 !	!Diesel!	No

Data for Segment # 2: CP Main (day/night)

Angle1 Angle2 : -50.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 228.20 / 228.20 m
 Receiver height : 81.50 / 81.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 44.71 + 0.00) = 44.71 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	48.31	-3.59	0.00	0.00	0.00	0.00	44.71

WHEEL (0.00 + 38.92 + 0.00) = 38.92 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	42.52	-3.59	0.00	0.00	0.00	0.00	38.92

Segment Leq : 45.73 dBA

Results segment # 2: CP Main (day)

LOCOMOTIVE (0.00 + 30.92 + 0.00) = 30.92 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	0	0.00	48.31	-11.82	-5.56	0.00	0.00	0.00	30.92

WHEEL (0.00 + 25.13 + 0.00) = 25.13 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	0	0.00	42.52	-11.82	-5.56	0.00	0.00	0.00	25.13

Segment Leq : 31.94 dBA

Total Leq All Segments: 45.91 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 47.72 + 0.00) = 47.72 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	51.32	-3.59	0.00	0.00	0.00	0.00	47.72

WHEEL (0.00 + 41.93 + 0.00) = 41.93 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	45.53	-3.59	0.00	0.00	0.00	0.00	41.93

Segment Leq : 48.74 dBA

Results segment # 2: CP Main (night)

LOCOMOTIVE (0.00 + 33.93 + 0.00) = 33.93 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	0	0.00	51.32	-11.82	-5.56	0.00	0.00	0.00	33.93

WHEEL (0.00 + 28.14 + 0.00) = 28.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	0	0.00	45.53	-11.82	-5.56	0.00	0.00	0.00	28.14

Segment Leq : 34.95 dBA

Total Leq All Segments: 48.92 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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): 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93

Heavy Truck % of Total Volume : 0.64

Day (16 hrs) % of Total Volume : 90.00

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

Angle1 Angle2 : -31.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 202.70 / 202.70 m

Receiver height : 81.50 / 81.50 m

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

Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

Car traffic volume : 1710/190 veh/TimePeriod

Medium truck volume : 13/1 veh/TimePeriod

Heavy truck volume : 4/0 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 70.70 / 70.70 m


```
Receiver height      : 81.50 / 81.50 m
Topography           : 2 (Flat/gentle slope; with barrier)
Barrier angle1       : 46.00 deg Angle2 : 90.00 deg
Barrier height       : 123.80 m
Barrier receiver distance : 43.60 / 43.60 m
Source elevation     : 0.00 m
Receiver elevation   : 0.00 m
Barrier elevation    : 0.00 m
Reference angle      : 0.00
```

Results segment # 1: MP (day)

Source height = 0.89 m

ROAD (0.00 + 48.65 + 0.00) = 48.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-31	90	0.00	61.69	0.00	-11.31	-1.72	0.00	0.00	0.00

SubLeq
48.65

Segment Leq : 48.65 dBA

Results segment # 2: PRN (day)

Source height = 0.69 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.69	81.50	31.67	31.67

ROAD (40.73 + 20.87 + 0.00) = 40.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
0	46	0.00	53.39	0.00	-6.73	-5.93	0.00	0.00	0.00

SubLeq
40.73

46	90	0.00	53.39	0.00	-6.73	-6.12	0.00	0.00	-19.66
----	----	------	-------	------	-------	-------	------	------	--------

20.87

Segment Leq : 40.77 dBA

Total Leq All Segments: 49.31 dBA

Results segment # 1: MP (night)

 Source height = 0.89 m

ROAD (0.00 + 42.09 + 0.00) = 42.09 dBA

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

-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
--	--	--	--	--	--	--	--	--	--
-31	90	0.00	55.13	0.00	-11.31	-1.72	0.00	0.00	0.00
42.09									

 Segment Leq : 42.09 dBA

Results segment # 2: PRN (night)

 Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
-----	-----	-----	-----
0.50	81.50	31.55	31.55

ROAD (33.52 + 13.67 + 0.00) = 33.57 dBA

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

-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
--	--	--	--	--	--	--	--	--	--
0	46	0.00	46.18	0.00	-6.73	-5.93	0.00	0.00	0.00
33.52									

-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
--	--	--	--	--	--	--	--	--	--
46	90	0.00	46.18	0.00	-6.73	-6.12	0.00	0.00	-19.66
13.67									

 Segment Leq : 33.57 dBA

Total Leq All Segments: 42.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.94
 (NIGHT): 49.84

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 11:04:57
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow3.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -90.00 deg 44.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 80.00 / 80.00 m
 Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 39.75 + 0.00) = 39.75 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	44	0.00	48.31	-7.27	-1.28	0.00	0.00	0.00	39.75

WHEEL (0.00 + 33.97 + 0.00) = 33.97 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	44	0.00	42.52	-7.27	-1.28	0.00	0.00	0.00	33.97

Segment Leq : 40.77 dBA

Total Leq All Segments: 40.77 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 42.76 + 0.00) = 42.76 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	44	0.00	51.32	-7.27	-1.28	0.00	0.00	0.00	42.76

WHEEL (0.00 + 36.98 + 0.00) = 36.98 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	44	0.00	45.53	-7.27	-1.28	0.00	0.00	0.00	36.98

Segment Leq : 43.78 dBA

Total Leq All Segments: 43.78 dBA

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

```

Car traffic volume : 8556/951 veh/TimePeriod *
Medium truck volume : 169/19 veh/TimePeriod *
Heavy truck volume : 56/6 veh/TimePeriod *
Posted speed limit : 50 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): 7395
Percentage of Annual Growth : 2.00
Number of Years of Growth : 14.00
Medium Truck % of Total Volume : 1.93
Heavy Truck % of Total Volume : 0.64
Day (16 hrs) % of Total Volume : 90.00
    
```

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

```

Angle1 Angle2 : -20.00 deg 22.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 175.00 / 175.00 m
Receiver height : 113.60 / 113.60 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
    
```

Road data, segment # 2: PRN (day/night)

```

Car traffic volume : 1710/190 veh/TimePeriod
Medium truck volume : 13/1 veh/TimePeriod
Heavy truck volume : 4/0 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
    
```

Data for Segment # 2: PRN (day/night)

```

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
    
```

Receiver source distance : 25.00 / 25.00 m
 Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: PRE (day/night)

 Car traffic volume : 9720/1080 veh/TimePeriod *
 Medium truck volume : 174/19 veh/TimePeriod *
 Heavy truck volume : 58/6 veh/TimePeriod *
 Posted speed limit : 50 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): 8380
 Percentage of Annual Growth : 2.00
 Number of Years of Growth : 14.00
 Medium Truck % of Total Volume : 1.75
 Heavy Truck % of Total Volume : 0.58
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: PRE (day/night)

 Angle1 Angle2 : -31.00 deg -20.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 175.00 / 175.00 m
 Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

 Source height = 0.89 m

ROAD (0.00 + 44.70 + 0.00) = 44.70 dBA

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

 --
 -20 22 0.00 61.69 0.00 -10.67 -6.32 0.00 0.00 0.00
 44.70

 --

Segment Leq : 44.70 dBA

Results segment # 2: PRN (day)

Source height = 0.69 m

ROAD (0.00 + 51.17 + 0.00) = 51.17 dBA

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

-90	90	0.00	53.39	0.00	-2.22	0.00	0.00	0.00	0.00
51.17									

Segment Leq : 51.17 dBA

Results segment # 3: PRE (day)

Source height = 0.87 m

ROAD (0.00 + 39.27 + 0.00) = 39.27 dBA

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

-31	-20	0.00	62.08	0.00	-10.67	-12.14	0.00	0.00	0.00
39.27									

Segment Leq : 39.27 dBA

Total Leq All Segments: 52.28 dBA

Results segment # 1: MP (night)

Source height = 0.89 m

ROAD (0.00 + 38.14 + 0.00) = 38.14 dBA

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

-20	22	0.00	55.13	0.00	-10.67	-6.32	0.00	0.00	0.00
38.14									

Segment Leq : 38.14 dBA

Results segment # 2: PRN (night)

Source height = 0.50 m

ROAD (0.00 + 43.96 + 0.00) = 43.96 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

-90	90	0.00	46.18	0.00	-2.22	0.00	0.00	0.00	0.00
-----	----	------	-------	------	-------	------	------	------	------

43.96

--

Segment Leq : 43.96 dBA

Results segment # 3: PRE (night)

Source height = 0.86 m

ROAD (0.00 + 32.65 + 0.00) = 32.65 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

-31	-20	0.00	55.46	0.00	-10.67	-12.14	0.00	0.00	0.00
-----	-----	------	-------	------	--------	--------	------	------	------

32.65

--

Segment Leq : 32.65 dBA

Total Leq All Segments: 45.22 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.57
 (NIGHT): 47.57

STAMSON 5.0 NORMAL REPORT Date: 22-06-2022 11:06:29
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow4.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

Data for Segment # 1: CP Spur (day/night)

Angle1 Angle2 : -90.00 deg 41.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 40.30 / 40.30 m
 Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Rail data, segment # 2: CP Main (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc ! /Train!	!# Cars ! /Train!	! Eng ! type	!Cont !weld
1. Freight	! 1.0/1.0	! 35.0	! 1.0	! 10.0	!Diesel!	No

Data for Segment # 2: CP Main (day/night)

Angle1 Angle2 : -47.00 deg 28.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 279.80 / 279.80 m
 Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 No Whistle
 Reference angle : 0.00

Results segment # 1: CP Spur (day)

LOCOMOTIVE (0.00 + 42.63 + 0.00) = 42.63 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	41	0.00	48.31	-4.29	-1.38	0.00	0.00	0.00	42.63

WHEEL (0.00 + 36.84 + 0.00) = 36.84 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	41	0.00	42.52	-4.29	-1.38	0.00	0.00	0.00	36.84

Segment Leq : 43.65 dBA

Results segment # 2: CP Main (day)

LOCOMOTIVE (0.00 + 31.80 + 0.00) = 31.80 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-47	28	0.00	48.31	-12.71	-3.80	0.00	0.00	0.00	31.80

WHEEL (0.00 + 26.01 + 0.00) = 26.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-47	28	0.00	42.52	-12.71	-3.80	0.00	0.00	0.00	26.01

Segment Leq : 32.82 dBA

Total Leq All Segments: 43.99 dBA

Results segment # 1: CP Spur (night)

LOCOMOTIVE (0.00 + 45.64 + 0.00) = 45.64 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	41	0.00	51.32	-4.29	-1.38	0.00	0.00	0.00	45.64

WHEEL (0.00 + 39.85 + 0.00) = 39.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	41	0.00	45.53	-4.29	-1.38	0.00	0.00	0.00	39.85

Segment Leq : 46.66 dBA

Results segment # 2: CP Main (night)

LOCOMOTIVE (0.00 + 34.81 + 0.00) = 34.81 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-47	28	0.00	51.32	-12.71	-3.80	0.00	0.00	0.00	34.81

WHEEL (0.00 + 29.02 + 0.00) = 29.02 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-47	28	0.00	45.53	-12.71	-3.80	0.00	0.00	0.00	29.02

Segment Leq : 35.83 dBA

Total Leq All Segments: 47.00 dBA

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

Car traffic volume : 8556/951 veh/TimePeriod *

Medium truck volume : 169/19 veh/TimePeriod *

Heavy truck volume : 56/6 veh/TimePeriod *

Posted speed limit : 50 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): 7395

Percentage of Annual Growth : 2.00

Number of Years of Growth : 14.00

Medium Truck % of Total Volume : 1.93

Heavy Truck % of Total Volume : 0.64

Day (16 hrs) % of Total Volume : 90.00

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

Angle1 Angle2 : -31.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 154.60 / 154.60 m

Receiver height : 113.60 / 113.60 m

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

Reference angle : 0.00

Road data, segment # 2: PRN (day/night)

Car traffic volume : 1710/190 veh/TimePeriod

Medium truck volume : 13/1 veh/TimePeriod

Heavy truck volume : 4/0 veh/TimePeriod

Posted speed limit : 50 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: PRN (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 64.70 / 64.70 m

Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: PRE (day/night)

 Car traffic volume : 9720/1080 veh/TimePeriod *
 Medium truck volume : 174/19 veh/TimePeriod *
 Heavy truck volume : 58/6 veh/TimePeriod *
 Posted speed limit : 50 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): 8380
 Percentage of Annual Growth : 2.00
 Number of Years of Growth : 14.00
 Medium Truck % of Total Volume : 1.75
 Heavy Truck % of Total Volume : 0.58
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: PRE (day/night)

 Angle1 Angle2 : -38.00 deg -31.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 154.60 / 154.60 m
 Receiver height : 113.60 / 113.60 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: MP (day)

 Source height = 0.89 m

ROAD (0.00 + 49.83 + 0.00) = 49.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-31	90	0.00	61.69	0.00	-10.13	-1.72	0.00	0.00	0.00

SubLeq

--

49.83

--

Segment Leq : 49.83 dBA

Results segment # 2: PRN (day)

 Source height = 0.69 m

ROAD (0.00 + 44.03 + 0.00) = 44.03 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

0	90	0.00	53.39	0.00	-6.35	-3.01	0.00	0.00	0.00
---	----	------	-------	------	-------	-------	------	------	------

44.03

--

Segment Leq : 44.03 dBA

Results segment # 3: PRE (day)

Source height = 0.87 m

ROAD (0.00 + 37.84 + 0.00) = 37.84 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

-38	-31	0.00	62.08	0.00	-10.13	-14.10	0.00	0.00	0.00
-----	-----	------	-------	------	--------	--------	------	------	------

37.84

--

Segment Leq : 37.84 dBA

Total Leq All Segments: 51.06 dBA

Results segment # 1: MP (night)

Source height = 0.89 m

ROAD (0.00 + 43.27 + 0.00) = 43.27 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

-31	90	0.00	55.13	0.00	-10.13	-1.72	0.00	0.00	0.00
-----	----	------	-------	------	--------	-------	------	------	------

43.27

--

Segment Leq : 43.27 dBA

Results segment # 2: PRN (night)

Source height = 0.50 m

ROAD (0.00 + 36.82 + 0.00) = 36.82 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

0	90	0.00	46.18	0.00	-6.35	-3.01	0.00	0.00	0.00
---	----	------	-------	------	-------	-------	------	------	------

36.82

--

Segment Leq : 36.82 dBA

Results segment # 3: PRE (night)

Source height = 0.86 m

ROAD (0.00 + 31.23 + 0.00) = 31.23 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--

-38	-31	0.00	55.46	0.00	-10.13	-14.10	0.00	0.00	0.00
-----	-----	------	-------	------	--------	--------	------	------	------

31.23

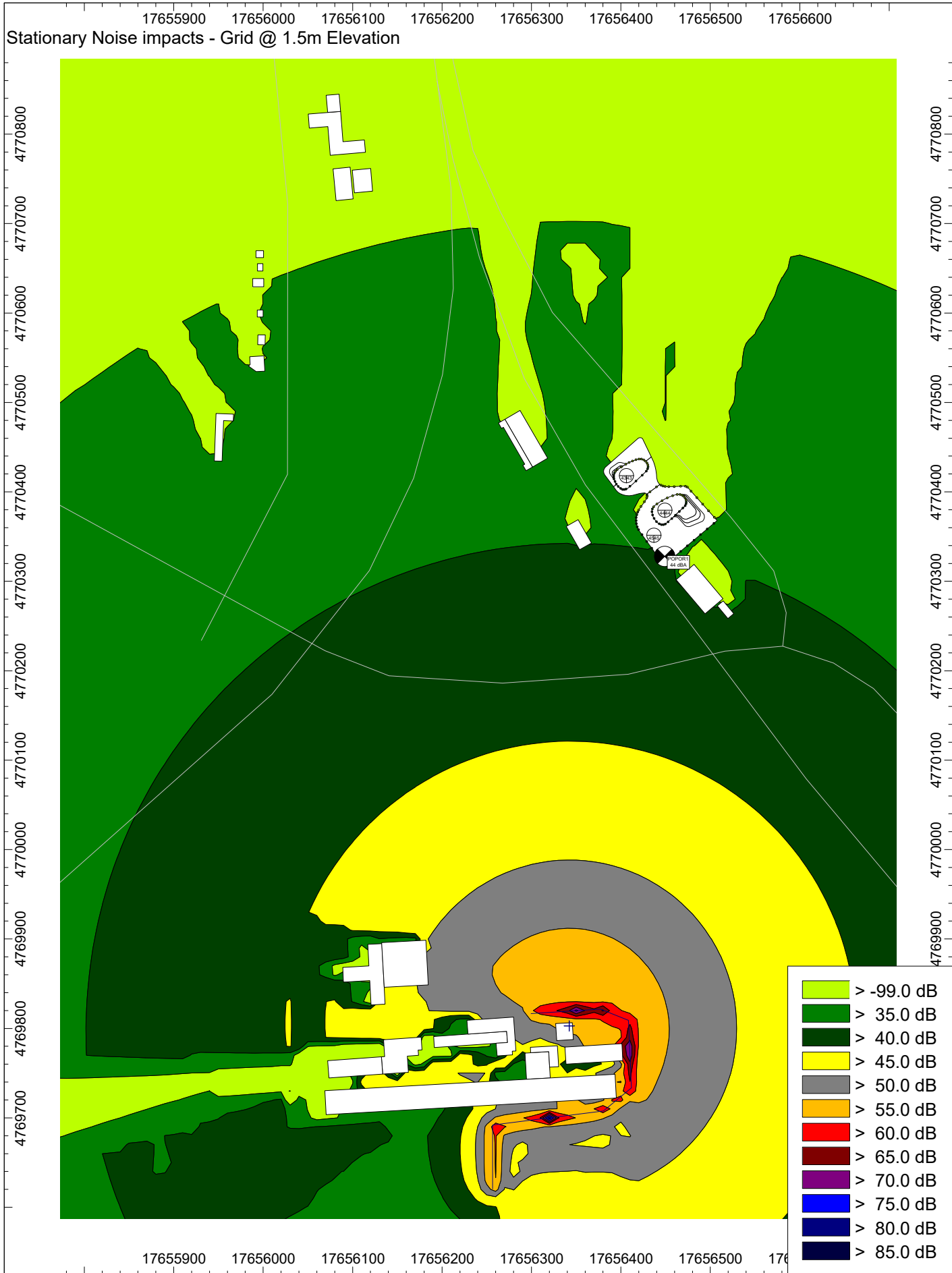
--

Segment Leq : 31.23 dBA

Total Leq All Segments: 44.37 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.84
 (NIGHT): 48.90

Appendix D: CadnaA Calculation Output



Report (20220601 NIS_Cadna.cna)

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius #(Unit,LEN)	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section #(Unit,LEN)	1000.00
Min. Length of Section #(Unit,LEN)	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature #(Unit,TEMP)	10
rel. Humidity (%)	70
Ground Absorption G	0.80
Wind Speed for Dir. #(Unit,SPEED)	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

Result Table

Receiver		Land Use	Limiting Value			rel. Axis			Lr w/o Noise Control		dL req.		Lr w/ Noise Control		Exceeding		passive NC
Name	ID		Day	Night	Station	Distance	Height	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
			dB(A)	dB(A)	m	m	m	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
POPOR1	POPOR1		0	0	346	511.23	12.00	44.1	44.1	44.1	44.1	0.0	0.0	-	-	-	-

Group Day and Night

Name	Expression	Partial Sum Level
		POPOR1
	Day	Evening
		Night

Partial Day/Night

Source		Partial Level			
Name	M.	ID	POPOR1		
			Day	Evening	Night
SPS1		SPS1	44.0	44.0	44.0
STRDR1		STRDR1	25.8	25.8	25.8

Sound Sources

Point Sources

Name	M.	ID	Result. PWL			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				X	Y	Z	
			(dBA)	(dBA)	(dBA)				dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)	(m)	(m)	
SPS1		SPS1	110.0	110.0	110.0	Lw	110		0.0	0.0	0.0							0.0	500	(none)	1.00	g17656342.28	4769802.77	22.00

Line Sources

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src					
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number	Speed			
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				dB(A)	dB(A)	dB(A)	dB(A)	(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night	(km/h)	
STRDR1		STRDR1	98.5	98.5	98.5	72.2	72.2	72.2	PWL-Pt	104		0.0	0.0	0.0								0.0	500	(none)	10.0	10.0	10.0	15.0

Geometry Line Sources

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(m)	(m)	(m)	(m)	(m)	(m)
STRDR1	1.50	r	17656256.55	4769620.46	1.50	0.00
			17656256.55	4769691.87	1.50	0.00
			17656380.39	4769707.68	1.50	0.00
			17656411.82	4769733.48	1.50	0.00
			17656408.45	4769809.19	1.50	0.00
			17656377.04	4769821.63	1.50	0.00
			17656299.59	4769816.59	1.50	0.00

Area Sources

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src			
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				dB(A)	dB(A)	dB(A)	dB(A)	(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night

Geometry Area Sources

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(m)	(m)	(m)	(m)	(m)	(m)

Vertical Area Sources

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night			
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				dB(A)	dB(A)	dB(A)	dB(A)	(m²)		(min)	(min)	(min)	(dB)	(Hz)	

Geometry Vertical Area Sources

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(m)	(m)	(m)	(m)	(m)	(m)

Road

Name	M.	ID	Lme			Count Data		exact Count Data			Speed Limit		SCS	Surface		Gradient	Mult. Reflection					
			Day	Evening	Night	DTV	Str.class.	M			p (%)			Auto	Truck	Dist.	Dstro	Type	Drefl	Hbuild	Dist.	
			(dBA)	(dBA)	(dBA)			Day	Evening	Night	Day	Evening	Night	(km/h)	(km/h)		(dB)		(%)	(dB)	(m)	(m)

Geometry Road

Name	Height		Coordinates				Dist	LSlope
	Begin	End	x	y	z	Ground	(m)	(%)
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(%)

Receptors

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height	Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type		X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)					(m)	(m)	(m)
POPOR1		POPOR1	44.1	44.1	44.1	0.0	0.0	0.0		x	Total	1.50	17656448.92	4770327.78	13.50

Obstacles

Barriers

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height	
			left	right		horz.	vert.	Begin	End
			(m)	(m)	(m)	(m)	(m)	(m)	

Geometry Barriers

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates					
			left	right		horz.	vert.	Begin	End	x	y	z	Ground		
			(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	

Building

Name	M.	ID	RB	Residents	Absorption	Height	
						Begin	End
						(m)	
		Notes_Project_Buildings	x	0		8.00	a
		Notes_Project_Buildings	x	0		12.00	a
		Notes_Project_Buildings	x	0		4.00	a
		Notes_Project_Buildings	x	0		123.80	a
		Notes_Project_Buildings	x	0		23.00	a
		Notes_Project_Buildings	x	0		19.50	a
		Notes_Project_Buildings	x	0		16.00	a
		Notes_Project_Buildings	x	0		91.70	a
		Notes_Project_Buildings	x	0		12.00	a
		Notes_Project_Buildings	x	0		8.00	a
		Notes_Surrounding_Buildings	x	0		13.00	a
		Notes_Surrounding_Buildings	x	0		7.50	a
		Notes_Surrounding_Buildings	x	0		8.80	a
		Notes_Surrounding_Buildings	x	0		8.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		8.50	a
		Notes_Surrounding_Buildings	x	0		8.00	a
		Notes_Surrounding_Buildings	x	0		15.00	a
		Notes_Surrounding_Buildings	x	0		12.00	a
		Notes_Surrounding_Buildings	x	0		8.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		6.00	a
		Notes_Surrounding_Buildings	x	0		8.00	a
		Notes_Surrounding_Buildings	x	0		5.50	a
		Notes_Surrounding_Buildings	x	0		29.00	a
		Notes_Surrounding_Buildings	x	0		9.00	a
		Notes_Surrounding_Buildings	x	0		21.00	a
		Notes_Surrounding_Buildings	x	0		25.00	a
		Notes_Surrounding_Buildings	x	0		10.00	a
		Notes_Surrounding_Buildings	x	0		11.00	a
		Notes_Surrounding_Buildings	x	0		7.00	a
		Notes_Surrounding_Buildings	x	0		5.00	a
		Notes_Surrounding_Buildings	x	0		8.00	a

Geometry Building

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin	End	x	y	z	Ground
						(m)	(m)	(m)	(m)	(m)	(m)
		Notes_Project_Buildings	x	0		8.00	a	17656391.71	4770405.78	8.00	0.00
								17656394.83	4770401.54	8.00	0.00
								17656396.83	4770399.48	8.00	0.00
								17656399.06	4770398.00	8.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin (m)	x (m)	y (m)	z (m)
							17656402.50	4770396.62	8.00	0.00
							17656405.82	4770395.91	8.00	0.00
							17656409.26	4770395.70	8.00	0.00
							17656413.30	4770396.07	8.00	0.00
							17656417.72	4770397.27	8.00	0.00
							17656420.55	4770398.02	8.00	0.00
							17656423.58	4770398.51	8.00	0.00
							17656426.51	4770398.73	8.00	0.00
							17656427.94	4770398.28	8.00	0.00
							17656428.97	4770397.29	8.00	0.00
							17656443.55	4770408.23	8.00	0.00
							17656442.07	4770409.69	8.00	0.00
							17656440.87	4770411.98	8.00	0.00
							17656440.13	4770415.52	8.00	0.00
							17656439.72	4770419.61	8.00	0.00
							17656439.11	4770424.59	8.00	0.00
							17656438.16	4770428.73	8.00	0.00
							17656436.69	4770433.42	8.00	0.00
							17656433.94	4770439.25	8.00	0.00
		Notes_Project_Buildings	x	0		12.00 a	17656428.97	4770397.29	12.00	0.00
							17656429.49	4770395.94	12.00	0.00
							17656429.41	4770394.62	12.00	0.00
							17656428.36	4770391.84	12.00	0.00
							17656424.41	4770386.06	12.00	0.00
							17656420.66	4770380.98	12.00	0.00
							17656419.21	4770378.41	12.00	0.00
							17656418.24	4770376.01	12.00	0.00
							17656417.44	4770373.08	12.00	0.00
							17656416.97	4770369.55	12.00	0.00
							17656417.07	4770366.40	12.00	0.00
							17656417.72	4770362.68	12.00	0.00
							17656418.87	4770359.40	12.00	0.00
							17656420.80	4770356.02	12.00	0.00
							17656448.31	4770317.88	12.00	0.00
							17656507.58	4770367.86	12.00	0.00
							17656475.20	4770404.48	12.00	0.00
							17656473.23	4770405.95	12.00	0.00
							17656471.02	4770406.54	12.00	0.00
							17656462.75	4770406.01	12.00	0.00
							17656456.33	4770405.76	12.00	0.00
							17656450.63	4770405.78	12.00	0.00
							17656448.19	4770406.17	12.00	0.00
							17656445.94	4770406.88	12.00	0.00
							17656443.55	4770408.23	12.00	0.00
		Notes_Project_Buildings	x	0		4.00 a	17656433.94	4770439.25	4.00	0.00
							17656424.65	4770458.63	4.00	0.00
							17656424.00	4770459.56	4.00	0.00
							17656422.77	4770460.41	4.00	0.00
							17656421.42	4770460.61	4.00	0.00
							17656420.19	4770460.37	4.00	0.00
							17656419.33	4770459.88	4.00	0.00
							17656382.42	4770427.24	4.00	0.00
							17656381.53	4770426.14	4.00	0.00
							17656380.79	4770424.62	4.00	0.00
							17656380.59	4770422.45	4.00	0.00
							17656381.04	4770420.53	4.00	0.00
							17656381.84	4770419.17	4.00	0.00
							17656391.71	4770405.78	4.00	0.00
		Notes_Project_Buildings	x	0		123.80 a	17656437.54	4770384.53	123.80	0.00
							17656443.06	4770388.39	123.80	0.00
							17656449.27	4770392.01	123.80	0.00
							17656454.43	4770394.54	123.80	0.00
							17656461.26	4770396.92	123.80	0.00
							17656464.62	4770397.35	123.80	0.00
							17656467.35	4770396.81	123.80	0.00
							17656469.13	4770395.93	123.80	0.00
							17656470.70	4770394.45	123.80	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin (m)	x (m)	y (m)	z (m)
							17656472.45	4770391.94	123.80	0.00
							17656473.21	4770389.80	123.80	0.00
							17656473.08	4770387.64	123.80	0.00
							17656472.51	4770385.76	123.80	0.00
							17656471.07	4770383.63	123.80	0.00
							17656467.50	4770380.13	123.80	0.00
							17656458.84	4770372.02	123.80	0.00
							17656450.73	4770364.80	123.80	0.00
							17656448.66	4770363.62	123.80	0.00
							17656446.35	4770363.18	123.80	0.00
							17656444.21	4770363.56	123.80	0.00
							17656441.52	4770365.05	123.80	0.00
							17656438.32	4770368.37	123.80	0.00
							17656435.90	4770372.39	123.80	0.00
							17656434.85	4770375.94	123.80	0.00
							17656434.70	4770379.48	123.80	0.00
							17656435.71	4770382.32	123.80	0.00
		Notes_Project_Buildings	x	0		23.00 a	17656467.35	4770396.81	23.00	0.00
							17656469.08	4770396.42	23.00	0.00
							17656470.72	4770395.35	23.00	0.00
							17656483.04	4770381.50	23.00	0.00
							17656483.78	4770380.19	23.00	0.00
							17656484.15	4770378.64	23.00	0.00
							17656484.11	4770377.09	23.00	0.00
							17656483.63	4770375.39	23.00	0.00
							17656482.73	4770374.02	23.00	0.00
							17656481.12	4770372.70	23.00	0.00
							17656474.02	4770369.71	23.00	0.00
							17656472.45	4770369.45	23.00	0.00
							17656470.99	4770369.58	23.00	0.00
							17656469.69	4770370.02	23.00	0.00
							17656468.29	4770370.93	23.00	0.00
							17656466.94	4770372.42	23.00	0.00
							17656465.83	4770373.33	23.00	0.00
							17656464.39	4770374.02	23.00	0.00
							17656462.86	4770374.27	23.00	0.00
							17656461.08	4770374.12	23.00	0.00
							17656467.50	4770380.13	23.00	0.00
							17656471.07	4770383.63	23.00	0.00
							17656472.51	4770385.76	23.00	0.00
							17656473.08	4770387.64	23.00	0.00
							17656473.21	4770389.80	23.00	0.00
							17656472.45	4770391.94	23.00	0.00
							17656470.70	4770394.45	23.00	0.00
							17656469.13	4770395.93	23.00	0.00
		Notes_Project_Buildings	x	0		19.50 a	17656467.35	4770396.81	19.50	0.00
							17656469.15	4770396.99	19.50	0.00
							17656470.63	4770396.67	19.50	0.00
							17656471.89	4770396.04	19.50	0.00
							17656472.81	4770395.34	19.50	0.00
							17656487.55	4770378.62	19.50	0.00
							17656488.27	4770377.60	19.50	0.00
							17656488.73	4770375.92	19.50	0.00
							17656488.79	4770374.75	19.50	0.00
							17656488.54	4770373.16	19.50	0.00
							17656487.89	4770371.75	19.50	0.00
							17656486.57	4770370.26	19.50	0.00
							17656485.13	4770369.41	19.50	0.00
							17656475.67	4770365.52	19.50	0.00
							17656474.27	4770365.32	19.50	0.00
							17656472.70	4770365.45	19.50	0.00
							17656471.06	4770366.06	19.50	0.00
							17656469.99	4770366.82	19.50	0.00
							17656465.70	4770371.57	19.50	0.00
							17656464.44	4770372.49	19.50	0.00
							17656462.83	4770373.10	19.50	0.00
							17656461.45	4770373.23	19.50	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin	x	y	z
						(m)	(m)	(m)	(m)	(m)
						17656459.97	4770373.08	19.50	0.00	
						17656461.08	4770374.12	19.50	0.00	
						17656462.86	4770374.27	19.50	0.00	
						17656464.39	4770374.02	19.50	0.00	
						17656465.83	4770373.33	19.50	0.00	
						17656466.94	4770372.42	19.50	0.00	
						17656468.29	4770370.93	19.50	0.00	
						17656469.69	4770370.02	19.50	0.00	
						17656470.99	4770369.58	19.50	0.00	
						17656472.45	4770369.45	19.50	0.00	
						17656474.02	4770369.71	19.50	0.00	
						17656481.12	4770372.70	19.50	0.00	
						17656482.73	4770374.02	19.50	0.00	
						17656483.63	4770375.39	19.50	0.00	
						17656484.11	4770377.09	19.50	0.00	
						17656484.15	4770378.64	19.50	0.00	
						17656483.78	4770380.19	19.50	0.00	
						17656483.04	4770381.50	19.50	0.00	
						17656470.72	4770395.35	19.50	0.00	
						17656469.08	4770396.42	19.50	0.00	
		Notes_Project_Buildings	x	0		16.00 a	17656469.15	4770396.99	16.00	0.00
							17656470.89	4770397.09	16.00	0.00
							17656472.50	4770396.80	16.00	0.00
							17656473.97	4770396.07	16.00	0.00
							17656474.98	4770395.19	16.00	0.00
							17656492.40	4770375.39	16.00	0.00
							17656493.06	4770374.14	16.00	0.00
							17656493.43	4770372.50	16.00	0.00
							17656493.37	4770371.12	16.00	0.00
							17656492.95	4770369.63	16.00	0.00
							17656492.16	4770368.27	16.00	0.00
							17656491.12	4770367.28	16.00	0.00
							17656490.17	4770366.66	16.00	0.00
							17656477.52	4770361.35	16.00	0.00
							17656476.25	4770361.09	16.00	0.00
							17656475.05	4770361.09	16.00	0.00
							17656473.46	4770361.48	16.00	0.00
							17656472.21	4770362.18	16.00	0.00
							17656471.23	4770363.03	16.00	0.00
							17656464.70	4770370.41	16.00	0.00
							17656463.58	4770371.32	16.00	0.00
							17656462.14	4770371.97	16.00	0.00
							17656460.53	4770372.26	16.00	0.00
							17656458.84	4770372.02	16.00	0.00
							17656459.97	4770373.08	16.00	0.00
							17656461.45	4770373.23	16.00	0.00
							17656462.83	4770373.10	16.00	0.00
							17656464.44	4770372.49	16.00	0.00
							17656465.70	4770371.57	16.00	0.00
							17656469.99	4770366.82	16.00	0.00
							17656471.06	4770366.06	16.00	0.00
							17656472.70	4770365.45	16.00	0.00
							17656474.27	4770365.32	16.00	0.00
							17656475.67	4770365.52	16.00	0.00
							17656485.13	4770369.41	16.00	0.00
							17656486.57	4770370.26	16.00	0.00
							17656487.89	4770371.75	16.00	0.00
							17656488.54	4770373.16	16.00	0.00
							17656488.79	4770374.75	16.00	0.00
							17656488.73	4770375.92	16.00	0.00
							17656488.27	4770377.60	16.00	0.00
							17656487.55	4770378.62	16.00	0.00
							17656472.81	4770395.34	16.00	0.00
							17656471.89	4770396.04	16.00	0.00
							17656470.63	4770396.67	16.00	0.00
		Notes_Project_Buildings	x	0		91.70 a	17656406.90	4770403.51	91.70	0.00
							17656413.41	4770409.03	91.70	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin (m)	x (m)	y (m)	z (m)
							17656427.30	4770421.93	91.70	0.00
							17656429.41	4770424.70	91.70	0.00
							17656430.37	4770426.88	91.70	0.00
							17656430.40	4770429.23	91.70	0.00
							17656429.77	4770431.29	91.70	0.00
							17656428.22	4770433.59	91.70	0.00
							17656426.61	4770435.19	91.70	0.00
							17656424.22	4770436.42	91.70	0.00
							17656421.61	4770436.76	91.70	0.00
							17656418.79	4770436.42	91.70	0.00
							17656415.13	4770435.25	91.70	0.00
							17656410.76	4770433.66	91.70	0.00
							17656407.58	4770432.05	91.70	0.00
							17656403.53	4770429.81	91.70	0.00
							17656397.19	4770425.79	91.70	0.00
							17656394.63	4770423.71	91.70	0.00
							17656393.28	4770422.24	91.70	0.00
							17656392.16	4770419.77	91.70	0.00
							17656391.87	4770417.25	91.70	0.00
							17656392.00	4770416.13	91.70	0.00
							17656392.68	4770413.05	91.70	0.00
							17656394.02	4770410.12	91.70	0.00
							17656395.80	4770407.50	91.70	0.00
							17656398.29	4770404.83	91.70	0.00
							17656400.93	4770403.16	91.70	0.00
							17656402.89	4770402.55	91.70	0.00
							17656404.67	4770402.71	91.70	0.00
		Notes_Project_Buildings	x	0		12.00 a	17656402.27	4770429.00	12.00	0.00
							17656401.09	4770429.35	12.00	0.00
							17656400.01	4770429.36	12.00	0.00
							17656398.62	4770428.97	12.00	0.00
							17656391.65	4770424.04	12.00	0.00
							17656390.94	4770423.18	12.00	0.00
							17656390.39	4770422.02	12.00	0.00
							17656390.19	4770420.74	12.00	0.00
							17656390.35	4770419.56	12.00	0.00
							17656390.99	4770418.02	12.00	0.00
							17656392.00	4770416.13	12.00	0.00
							17656391.87	4770417.25	12.00	0.00
							17656392.16	4770419.77	12.00	0.00
							17656393.28	4770422.24	12.00	0.00
							17656394.63	4770423.71	12.00	0.00
							17656397.19	4770425.79	12.00	0.00
		Notes_Project_Buildings	x	0		8.00 a	17656402.27	4770429.00	8.00	0.00
							17656403.53	4770429.81	8.00	0.00
							17656406.78	4770431.61	8.00	0.00
							17656405.44	4770431.61	8.00	0.00
							17656404.03	4770431.77	8.00	0.00
							17656400.28	4770432.85	8.00	0.00
							17656399.15	4770432.95	8.00	0.00
							17656397.79	4770432.80	8.00	0.00
							17656396.55	4770432.35	8.00	0.00
							17656395.92	4770431.97	8.00	0.00
							17656389.37	4770427.30	8.00	0.00
							17656388.56	4770426.50	8.00	0.00
							17656387.66	4770425.10	8.00	0.00
							17656387.28	4770423.68	8.00	0.00
							17656387.19	4770422.42	8.00	0.00
							17656387.43	4770421.03	8.00	0.00
							17656388.11	4770419.52	8.00	0.00
							17656392.68	4770413.05	8.00	0.00
							17656392.00	4770416.13	8.00	0.00
							17656390.35	4770419.56	8.00	0.00
							17656390.19	4770420.74	8.00	0.00
							17656390.39	4770422.02	8.00	0.00
							17656390.94	4770423.18	8.00	0.00
							17656391.65	4770424.04	8.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin (m)	x (m)	y (m)	z (m)
							17656398.62	4770428.97	8.00	0.00
							17656400.01	4770429.36	8.00	0.00
							17656401.09	4770429.35	8.00	0.00
		Notes_Surrounding_Buildings	x	0		13.00	a17656270.21	4770481.14	13.00	0.00
							17656301.20	4770427.85	13.00	0.00
							17656318.12	4770437.69	13.00	0.00
							17656287.13	4770490.98	13.00	0.00
		Notes_Surrounding_Buildings	x	0		7.50	a17656270.21	4770481.14	7.50	0.00
							17656301.20	4770427.85	7.50	0.00
							17656293.85	4770423.59	7.50	0.00
							17656290.34	4770429.64	7.50	0.00
							17656292.50	4770430.90	7.50	0.00
							17656268.67	4770472.15	7.50	0.00
							17656266.51	4770470.90	7.50	0.00
							17656263.01	4770476.97	7.50	0.00
		Notes_Surrounding_Buildings	x	0		8.80	a17656338.98	4770361.30	8.80	0.00
							17656353.82	4770335.33	8.80	0.00
							17656367.02	4770342.87	8.80	0.00
							17656352.18	4770368.84	8.80	0.00
		Notes_Surrounding_Buildings	x	0		8.00	a17656461.69	4770301.86	8.00	0.00
							17656481.87	4770318.88	8.00	0.00
							17656514.19	4770280.56	8.00	0.00
							17656494.01	4770263.54	8.00	0.00
		Notes_Surrounding_Buildings	x	0		6.00	a17656514.33	4770278.06	6.00	0.00
							17656526.28	4770263.90	6.00	0.00
							17656519.78	4770258.42	6.00	0.00
							17656507.84	4770272.58	6.00	0.00
		Notes_Surrounding_Buildings	x	0		8.50	a17656097.24	4770763.07	8.50	0.00
							17656100.62	4770727.55	8.50	0.00
							17656081.45	4770725.73	8.50	0.00
							17656078.08	4770761.25	8.50	0.00
		Notes_Surrounding_Buildings	x	0		8.00	a17656099.58	4770759.67	8.00	0.00
							17656101.98	4770734.43	8.00	0.00
							17656122.44	4770736.37	8.00	0.00
							17656120.05	4770761.62	8.00	0.00
		Notes_Surrounding_Buildings	x	0		15.00	a17656086.57	4770825.50	15.00	0.00
							17656089.34	4770791.52	15.00	0.00
							17656113.26	4770793.47	15.00	0.00
							17656114.39	4770779.65	15.00	0.00
							17656075.03	4770776.44	15.00	0.00
							17656072.41	4770808.57	15.00	0.00
							17656051.67	4770806.87	15.00	0.00
							17656050.39	4770822.55	15.00	0.00
		Notes_Surrounding_Buildings	x	0		12.00	a17656086.57	4770825.50	12.00	0.00
							17656085.01	4770844.67	12.00	0.00
							17656070.50	4770843.49	12.00	0.00
							17656072.07	4770824.32	12.00	0.00
		Notes_Surrounding_Buildings	x	0		8.00	a17655947.26	4770487.62	8.00	0.00
							17655945.36	4770434.63	8.00	0.00
							17655954.15	4770434.31	8.00	0.00
							17655955.78	4770479.62	8.00	0.00
							17655966.53	4770479.23	8.00	0.00
							17655966.81	4770486.92	8.00	0.00
		Notes_Surrounding_Buildings	x	0		6.00	a17655992.29	4770534.47	6.00	0.00
							17656001.95	4770535.05	6.00	0.00
							17656000.92	4770552.09	6.00	0.00
							17655985.01	4770551.13	6.00	0.00
							17655985.53	4770542.55	6.00	0.00
							17655983.82	4770540.50	6.00	0.00
		Notes_Surrounding_Buildings	x	0		6.00	a17655994.10	4770575.56	6.00	0.00
							17656002.41	4770575.42	6.00	0.00
							17656002.22	4770564.54	6.00	0.00
							17655993.91	4770564.69	6.00	0.00
		Notes_Surrounding_Buildings	x	0		6.00	a17655993.47	4770603.29	6.00	0.00
							17655993.47	4770595.63	6.00	0.00
							17655999.90	4770595.63	6.00	0.00
							17655999.90	4770603.29	6.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin (m)	x (m)	y (m)	z (m)
		Notes_Surrounding_Buildings	x	0		6.00	a17655988.31	4770638.46	6.00	0.00
							17656000.58	4770638.46	6.00	0.00
							17656000.58	4770629.26	6.00	0.00
							17655988.31	4770629.26	6.00	0.00
		Notes_Surrounding_Buildings	x	0		6.00	a17655993.66	4770655.18	6.00	0.00
							17655993.57	4770646.99	6.00	0.00
							17655999.76	4770646.89	6.00	0.00
							17655999.69	4770655.08	6.00	0.00
		Notes_Surrounding_Buildings	x	0		6.00	a17655991.88	4770669.64	6.00	0.00
							17656000.45	4770669.64	6.00	0.00
							17656000.45	4770661.99	6.00	0.00
							17655991.88	4770661.98	6.00	0.00
		Notes_Surrounding_Buildings	x	0		8.00	a17656132.63	4769894.88	8.00	0.00
							17656136.42	4769827.18	8.00	0.00
							17656120.71	4769826.30	8.00	0.00
							17656119.20	4769853.43	8.00	0.00
							17656089.81	4769851.78	8.00	0.00
							17656088.90	4769868.14	8.00	0.00
							17656118.28	4769869.79	8.00	0.00
							17656116.92	4769894.01	8.00	0.00
		Notes_Surrounding_Buildings	x	0		5.50	a17656132.58	4769895.88	5.50	0.00
							17656181.90	4769898.64	5.50	0.00
							17656184.69	4769848.76	5.50	0.00
							17656135.37	4769846.00	5.50	0.00
		Notes_Surrounding_Buildings	x	0		29.00	a17656190.62	4769791.01	29.00	0.00
							17656272.24	4769796.66	29.00	0.00
							17656273.09	4769784.27	29.00	0.00
							17656191.48	4769778.62	29.00	0.00
		Notes_Surrounding_Buildings	x	0		9.00	a17656228.94	4769793.67	9.00	0.00
							17656227.86	4769809.18	9.00	0.00
							17656279.99	4769812.79	9.00	0.00
							17656282.62	4769774.85	9.00	0.00
							17656278.53	4769774.57	9.00	0.00
							17656278.82	4769770.37	9.00	0.00
							17656261.51	4769769.17	9.00	0.00
							17656260.52	4769783.40	9.00	0.00
							17656273.09	4769784.27	9.00	0.00
							17656272.24	4769796.66	9.00	0.00
		Notes_Surrounding_Buildings	x	0		21.00	a17656327.11	4769805.41	21.00	0.00
							17656345.71	4769806.49	21.00	0.00
							17656346.81	4769787.54	21.00	0.00
							17656328.21	4769786.46	21.00	0.00
		Notes_Surrounding_Buildings	x	0		25.00	a17656292.72	4769772.47	25.00	0.00
							17656319.37	4769773.99	25.00	0.00
							17656321.04	4769744.71	25.00	0.00
							17656294.39	4769743.19	25.00	0.00
		Notes_Surrounding_Buildings	x	0		10.00	a17656393.38	4769748.83	10.00	0.00
							17656068.89	4769730.34	10.00	0.00
							17656070.42	4769703.59	10.00	0.00
							17656394.90	4769722.08	10.00	0.00
		Notes_Surrounding_Buildings	x	0		11.00	a17656299.06	4769772.83	11.00	0.00
							17656298.71	4769778.85	11.00	0.00
							17656328.97	4769780.57	11.00	0.00
							17656330.30	4769757.25	11.00	0.00
							17656320.36	4769756.68	11.00	0.00
							17656319.37	4769773.99	11.00	0.00
		Notes_Surrounding_Buildings	x	0		7.00	a17656337.37	4769779.15	7.00	0.00
							17656401.05	4769782.93	7.00	0.00
							17656402.18	4769763.91	7.00	0.00
							17656338.50	4769760.12	7.00	0.00
		Notes_Surrounding_Buildings	x	0		5.00	a17656134.60	4769787.41	5.00	0.00
							17656176.64	4769790.34	5.00	0.00
							17656177.65	4769775.95	5.00	0.00
							17656173.35	4769775.65	5.00	0.00
							17656173.74	4769769.95	5.00	0.00
							17656161.11	4769769.07	5.00	0.00
							17656162.38	4769750.93	5.00	0.00

