REPORT
Project: 136944-6.04

# NOISE CONTROL FEASIBILITY STUDY
# CRT DEVELOPMENTS INC.
# CRT LANDS PHASE 4

Prepared for CRT DEVELOPMENTS INC
by IBI GROUP

April 2022

# Table of Contents



# List of Tables & Figures



# List of Appendices

# 1 Introduction

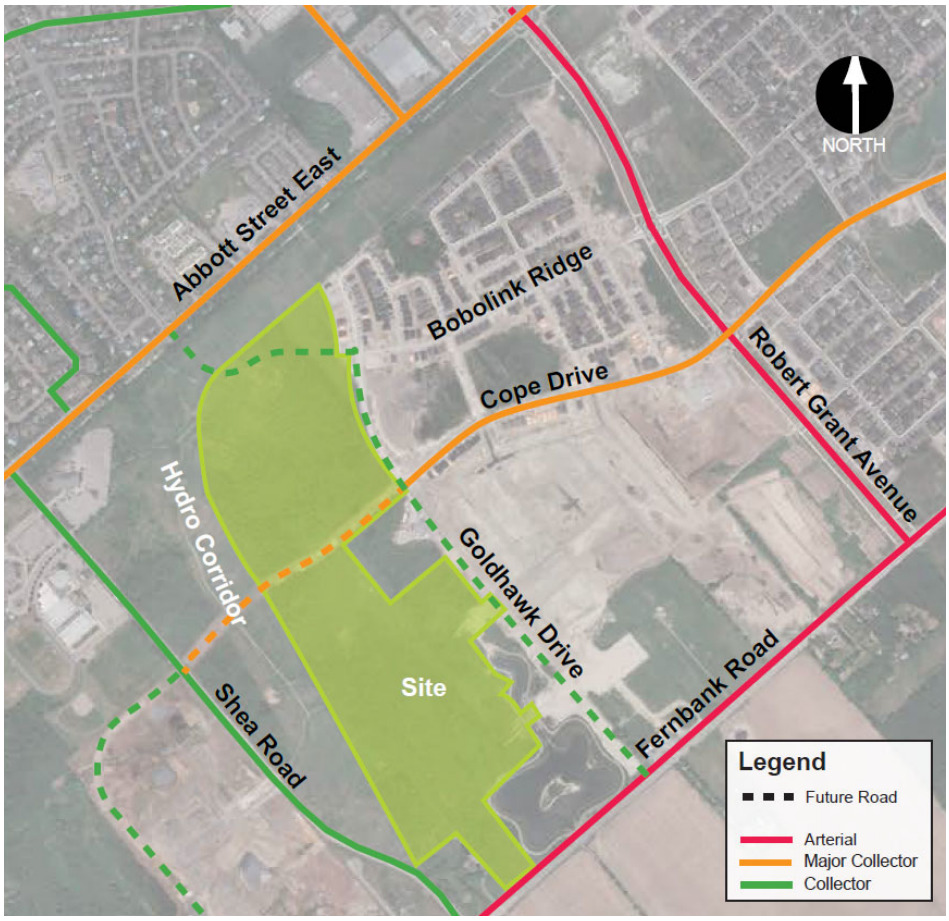
IBI Group (IBI) was retained by CRT Development Inc. to undertake a Noise Control Feasibility Study in support of a Draft Plan of Subdivision application for the proposed CRT Phase 4 "Westwood" residential development to be located at 1555 Shea Road and 5500 Abbott Street East, Ottawa.

The objective of this study is to conduct a preliminary review of the internal and external transportation noise impacts to the site through the use of noise contour lines. This evaluation will help inform preliminary recommendations regarding the usage of any required noise control measures or warning clauses in the Agreement of Purchase and Sale of each dwelling unit for further investigation during the detailed design stage of this assignment.

The site occupies approximately 37 hectares and is generally bound by Abbott Street to the north, Phases 1 to 3 of the CRT Westwood subdivision (under construction) to the east, Fernbank Road to the south, as well as a hydro corridor and Shea Road to the west.

The site location and its surrounding context is illustrated in **Figure 1** below.

Figure 1 – Site Location



# 2 Background

## 2.1 Noise Sources

The proposed development is primarily subjected to traffic noise externally from its boundary streets, including Abbott Street East, Fernbank Road and Shea Road, as well as internally through the extensions of Bobolink Ridge, Goldhawk Drive and Cope Drive.

The site is located outside of the Airport Vicinity Development Zone (AVDZ), as shown on Schedule C-14 of the 2021 Draft Official Plan, therefore aircraft noise was not considered in this study.

There are no rail lines within 500 metres of the site. As such, no consideration has been given to noise impacts from rail traffic in accordance with the *City of Ottawa Environmental Noise Control (ENC) Guidelines*, dated January 2016.

## 2.2 Sound Level Limits for Road Traffic

Sound level criteria for road traffic is taken from the ENC Guidelines and the *Ministry of the Environment Publication NPC-300 (August 2013)*, hereafter referred to as NPC-300. Noise levels are expressed in the form Leq (T) which refers to a weighted level of a steady sound carrying the same total energy in the time period T (in hours) as the observed fluctuation sound.

### 2.2.1 Indoor Sound Level Criterion

The recommended indoor sound, the sound level criteria from Table 2.2b of the ENC Guidelines are as follows:

- Bedrooms – 23:00 to 07:00 – 40 dBA Leq (8)
- Other areas – 07:00 to 23:00 – 45 dBA Leq (16)

The sound levels are based on the windows and doors to an indoor space being closed.

For the purpose of assessing indoor sound levels, receptors are located at the building facade to align with the plan of the window 1.5 metres above the ground for daytime noise and at the plane of the bedroom window 4.5 metres above the ground for nighttime noise.

As per NPC-300 C7.1.2.1 and C7.1.2.2, when the outdoor noise levels at the living room window are greater than 55 dBA and less than or equal to 65 dBA and/or greater than 50 dBA and less than or equal to 60 dBA at the bedroom window, then a warning clause is required along with forced air heating and a provision for central air conditioning.

Should the outdoor noise levels exceed 65 dBA at the living room and/or exceed 60 dBA at the bedroom, then central air conditioning is mandatory and a warning clause is required.

### 2.2.2 Outdoor Sound Level Criterion

As per Table 2.2a of NPC-300, the sound level criteria for the outdoor living area (OLA) during the daytime period between 07:00 and 23:00 hours is 55 dBA Leq (16). Sound levels for the OLA are typically calculated 3 metres from the building face at the centre of the unit or within the centre of the OLA at a height of 1.5 metres above the ground.

If the Leq sound level is less than or equal to the above criteria, then no further action is required by the proponent. If the sound level exceeds the criteria by less than 5 dBA then the proponent may, with City approval, either provide a warning clause to prospective purchasers or install physical attenuation. For sound levels greater than 5 dBA above the criteria control measures are

required to reduce the noise levels as close to 55 dBA as technically, economically and administratively possible. Should the sound levels with the barrier in place exceed 55 dBA, a warning clause is also required.

### 2.2.3 Indoor Sound Level Criterion – Building Components

As per NPC-300 C7.1.3, when the outdoor sound levels are less than or equal to 65 dBA at the living room window and/or less than or equal to 60 dBA at the bedroom level, then the building must be compliant with the Ontario Building Code. Should the outdoor sound levels exceed this criteria, then the building component (walls, windows etc.) must be designed to achieve indoor sound level criteria.

# 3 Roadway Noise

## 3.1 Road Traffic Data

The major sources of traffic noise are expected to originate from the adjacent road network, as well as internally through collector roads extended within the site limits and are described below:

- **Fernbank Road** is an existing two-lane rural road with a posted speed limit of 80 km/h adjacent to the subject property. The TMP 2031 'Network Concept' indicates that this segment of Fernbank Road will ultimately be widened to a four-lane cross-section. For the purposes of this study and to maintain consistency with other noise studies conducted within the Fernbank Community, it is assumed that this segment of Fernbank Road abutting the site will eventually consist of a four-lane, undivided arterial road (4-UAU) cross-section with a posted speed limit of 60km/h. The right-of-way protection abutting the site is 37.5 metres, according to the Official Plan.
- **Abbott Street East** is a major collector road that presently exists from Stittsville Main Street in the west to Terry Fox Drive in the east. This road consists of an urban two-lane, undivided cross-section with a posted speed limit of 40km/h during school days between 7-9:30 AM and 2-5 PM and 50km/h otherwise. For analysis purposes, the posted speed limit was assumed to be 50km/h. Abbott Street E currently has a ROW of 20 metres and a ROW protection of 26 metres.
- **Cope Drive** is a major collector road which will be extended further west of Goldhawk Drive towards Shea Road, bistecting the subject lands. This roadway will consist of a 26.0m right-of-way, a two-lane urban cross-section and a posted speed limit that will not exceed 50km/h.
- **Shea Road** presently exists as a rural collector road with a two-lane cross-section and a posted speed limit of 60 km/h. This roadway generally consists of a 20-metre right-of-way which flares to approximately 26 metres within close proximity to Street 12. Based on a review of the Fernbank Community Design Plan (CDP), it is assumed that Shea Road within close proximity to the subject property will ultimately consist of a two-lane, undivided urban cross-section (2-UCU) and retain its 60km/h posted speed limit.
- **Goldhawk Drive** is proposed as a two-lane, undivided urban collector road (2-UCU) which will generally extend north-south along the eastern boundary of the site. It is assumed that the proposed speed limit of this collector road will not exceed 50km/h.
- **Bobolink Ridge** presently exists as a local road within CRT Phase 1. As part of the proposed development, Bobolink Ridge will be extended further west of Goldhawk Drive with a two-lane, undivided urban collector road (2-UCU) cross-section and an assumed 40km/h posted speed limit to remain consistent with the existing segment further east. Through the subject lands, this collector road will consist of a 24-metre right-of-way.

**Table 3.1** below summarizes the traffic and road parameters used to assess the traffic volume parameters, as extracted from Appendix B of the ENC Guidelines.

TABLE 3.1 – TRAFFIC AND ROAD DATA SUMMARY

| PARAMETER | FERNBANK ROAD (4-UAU) | ABBOTT STREET EAST/ COPE DRIVE (2-UMCU) | SHEA ROAD (2-UCU) | GOLDHAWK DRIVE (2-UCU) | BOBOLINK RIDGE (2-UCU) |
|---|---|---|---|---|---|
| Annual Average Daily Traffic (AADT) | 30,000 | 12,000 | 8,000 | 8,000 | 8,000 |
| Posted Speed Limit (km/h) | 60 | 50 | 60 | 50 | 40 |
| % Medium Trucks | 7% | 7% | 7% | 7% | 7% |
| % Heavy Trucks | 5% | 5% | 5% | 5% | 5% |
| % Daytime Traffic | 92% | 92% | 92% | 92% | 92% |

## 3.2 Calculation Methods

The roadway noise analysis for this study was conducted using STAMSON v5.04, an industry-standard software program developed by the Ontario Ministry of the Environment (MOE).

Noise contours were developed to establish the limits of both the indoor and outdoor noise criteria and were conservatively based on the capacity of each road, as discussed previously in Section 3.1.

Details pertaining to the noise criteria of interest are outlined below:

- The limits of requirements pertaining to a building component review, mandatory air conditioning and a Type 'D' warning clause, the 65 dBA (daytime) and 60 dBA (nighttime) noise contours were analysed at the building face.
- To determine the limits of forced air heating, provision for central air-conditioning and a Type 'C' warning clause, the 55 dBA (daytime) and 50 dBA (nighttime) noise contours were evaluated at the building face.
- The noise criteria limits for the outdoor living areas (OLAs) at 60 dBA and 55 dBA were evaluated under daytime conditions only.

The off-set distances presented in **Table 3.2** below were measured from the right-of-way centreline or from the centre of the right-of-way protection for each roadway identified for inclusion in the noise analysis, as discussed in the preceding section.

TABLE 3.2: NOISE CONTOUR OFFSETS

| NOISE CRITERIA | | DISTANCE FROM CENTRELINE (M) | | | | |
|---|---|---|---|---|---|---|
| | | FERNBANK (4-UAU 60) | ABBOTT ST E/ COPE DRIVE (2-UMCU 50) | SHEA ROAD (2-UCU 60) | GOLDHAWK DRIVE (2-UCU 50) | BOBOLINK RIDGE (2-UCU 40) |
| Indoor Daytime | 65 dBA | 37.2 | 17.4 | 16.8 | 12.7 | 8.4 |
| | 55 dBA | 149.0 | 69.5 | 67.2 | 54.4 | 42.5 |
| Indoor Nighttime | 60 dBA | 27.4 | 10.9 | 10.3 | 7.3 | 4.8 |
| | 50 dBA | 118.7 | 53.0 | 51.2 | 41.0 | 31.5 |
| Outdoor Living Area (Daytime Only) | 60 dBA | 74.4 | 34.7 | 33.6 | 27.2 | 21.2 |
| | 55 dBA | 149.0 | 69.5 | 67.2 | 54.4 | 42.5 |

Based on **Table 3.2** above for the indoor noise evaluation, the daytime contours for the arterial and collector roads are further from centreline than the nighttime levels for each criterion. As such, only the daytime levels will be considered in the noise analysis for this study. Noise contours for both indoor (daytime only) and outdoor noise evaluation are shown in **Figure 2**. These contours have not been adjusted to reflect screening from proposed buildings. For clarity purposes, the noise contours have not been extended beyond the contours of an intersecting road.

For the 65dBA (daytime) and 60 dBA (nighttime) contour lines associated with undivided, urban collector roads (2-UCU), the road centreline offset was determined to be less than 15 metres in all scenarios with the exception of daytime conditions with a posted speed limit of 60km/h for Shea Road. As the STAMSON noise software was not programmed to calculate source-receiver distances below 15 metres, a divergence calculation was conducted instead and the results are included in **Appendix A**, along with the remainder of the STAMSON calculations performed for this study.

Given that Goldhawk Drive and Bobolink Ridge consist of 24-metre rights-of-way and the limit of the 65dBA noise contour for these roads would occur approximately 12.7m and 8.4m from the centreline, respectively, it can be concluded that no dwelling units along Goldhawk Drive or Bobolink Ridge would experience these noise levels. Similarly, the closest dwelling units to Shea Road are located an approximate 41.7-metre off-set distance from the roadway centreline which is well outside of the 16.8 metres requiring a Type ‘D’ warning clause.

Abbott Street East is separated from the subject development by a significant distance of at least 140 metres. This wide buffer includes a hydro easement, as well as right-of-way protected to accommodate the Trans Canada Trail immediately to the north. As such, the noise contour lines indicated in **Table 3.2** above will fall outside of the proposed development and therefore no further discussion of the traffic impacts associated with this major collector road are required for this study.

# 4 Results

## 4.1 Indoor Sound Levels

The 55 dBA (daytime) contours shown on **Figure 2** represent the limit in which a Type 'C' warning clause and forced air heating with provision for central air conditioning are required for the residential units. Similarly, the 65 dBA (daytime) contours represent the limit in which a Type 'D' warning clause, central air conditioning and an acoustical review/design of the building components are required. As noted in Section 3.2, the noise contours have not been adjusted to account for screening by the proposed buildings. The exact number of units that exceed either the 65 dBA or 55 dBA thresholds will be determined during detailed design phase.

A summary of the results of each roadway is as follows:

**Fernbank Road (4-UAU 60km/h)** – The Fernbank Road 65 dBA noise contour would be located just 2 metres inside the property line and therefore is not likely to impact the stacked townhome units in Block 304 with the highest exposure to this arterial road. As such, it is not expected that any of these dwelling units will require a Type 'D' warning clause or accompanying noise abatement measures.

The 55 dBA noise contour, extending approximately 149.0 metres beyond the right-of-way centreline, is expected encompass more than half of the stacked townhome units in Block 304. The noise impacts will be slightly reduced due to the presence of a window street, Street 13, which will provide increased separation distance between Fernbank traffic noise and the dwelling units.

**Cope Drive (2-UMCU 50km/h)** – As shown on **Figure 2**, the 65 dBA contour will be located approximately 17.4 metres from the Cope centreline or 4.4 metres beyond the Cope Drive right-of-way limit and therefore the requirement for a Type 'D' warning clause would be limited to any units directly fronting or flanking Cope Drive.

Select units located between 17.4- and 69.5-metre off-set distance defining the 55 dBA (daytime) contour will require an alternative means of ventilation and a Type 'C' warning clause. It should be noted, however, that these units will be screened by dwellings directly abutting Cope Drive and therefore the actual number of units requiring a Type 'C' warning clause is expected to be significantly less than those included within the 55 dBA contour.

**Shea Road (2-UCU 60 km/h)** – A select number of dwelling units within closest proximity to Shea Road are expected to require a Type 'C' warning clause.

**Goldhawk Drive (2-UCU 50km/h)** – A select number of dwelling units within closest proximity to Goldhawk Drive are expected to require a Type 'C' warning clause.

**Bobolink Ridge (2-UCU 40km/h)** – All dwelling units directly fronting or flanking Bobolink Ridge will experience noise levels above 55 dBA (daytime), requiring alternative means of ventilation and a Type 'C' warning clause.

Warning clauses for indoor noise are as follows:

Type 'C'

*"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."*

Type 'D'

*"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria."*

## 4.2 Outdoor Sound Levels

The outdoor 60 dBA contour on **Figure 2** represents the limit in which physical attenuation is required in the outdoor living areas (OLAs) of residential units. For units between the 60 dBA and 55 dBA contours, physical attenuation may not be required but should be considered as stated in Part 4, Section 3.4 of the ENC Guidelines. As noted in Section 3.2, the noise contours have not been adjusted to account for screening by the proposed buildings.

A summary of the results for each roadway is as follows:

**Fernbank Road (4-UAU 60km/h)** – Not Applicable: The only dwelling units which fall within the 55dBA (daytime) contour limit associated with Fernbank Road traffic are stacked townhomes, which do not have OLAs, as defined in the ENC Guidelines. Therefore, no outdoor noise analysis is required for the proposed development with respect to Fernbank traffic.

**Cope Drive (2-UMCU 50km/h)** – As the 60 dBA outdoor contour is located approximately 34.7 m from the centreline of the road, only select units flanking this major collector and within closest proximity to its right-of-way will require physical attenuation, as indicated on **Figure 2**. There are three (3) potential locations where noise barriers may be required and each should have a height of 2.2 metres, consistent with previous phases of CRT Lands. At locations where noise levels are below 60 dBA but above 55 dBA, a warning clause Type 'A' could be considered in lieu of a barrier.

**Shea Road (2-UCU 60 km/h)** – The 60 dBA contour line grazes the edge of the property line for Block 305, Unit 336 which has the highest exposure to noise from Shea Road. The point of reception for the OLA would be measured 3 metres setback from the centre of the façade and therefore is well separated from the 60 dBA contour line by at least 10 metres and therefore unlikely to trigger noise attenuation. This location may trigger a warning clause Type 'A', which will be investigated further, once a more detailed Plan of Subdivision is established and following Draft Approval.

**Goldhawk Drive (2-UCU 50km/h)** – As the 60 dBA outdoor contour is located approximately 27.2 m from the centreline of the road, only outdoor living areas (OLAs) flanking Goldhawk Drive and within closest proximity to its right-of-way will require physical attenuation, as indicated on **Figure 2**. There is one (1) potential noise barrier location where noise barriers may be required and each should have a height of 2.2 metres, consistent with previous phases of CRT Lands. During the detailed noise analysis, if the unattenuated noise level is determined to be below 60 dBA but above 55 dBA, a Type 'A' warning clause could be considered in lieu of a barrier.

**Bobolink Ridge (2-UCU 40km/h)** – As the 60 dBA outdoor contour is located approximately 21.2 m from the centreline of the road, only outdoor living areas (OLAs) directly flanking Bobolink Ridge will require physical attenuation. As indicated in **Figure 2**, there are five (5) potential locations identified which may require 2.2-metre height noise barriers. At locations where the noise level is below 60 dBA but above 55 dBA, a Type 'A' warning clause could be considered in lieu of a barrier.

Due to overland flow routes drainage and access easements, it may not be practical to construct a continuous barrier along the collector or major collector roads described above, including Cope Drive, Goldhawk Drive or Bobolink Ridge. In these situations, implementing a partial barrier will mitigate noise impacts but may not reduce levels to below 55 dBA, therefore a Type 'B' warning clause may still be required for select units.

Warning clauses for outdoor noise are as follows:

Type ‘A’

*“Purchasers/tenants are advised that sound levels due to increasing Fernbank Road, Cope Drive, Goldhawk Drive and Bobolink Ridge traffic volumes may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City’s and the Ministry of the Environment’s noise criteria.”*

Type ‘B’

*“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing Fernbank Road, Cope Drive, Shea Road, Goldhawk Drive and Bobolink Ridge traffic volumes may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the City’s and the Ministry of the Environment’s noise criteria.”*

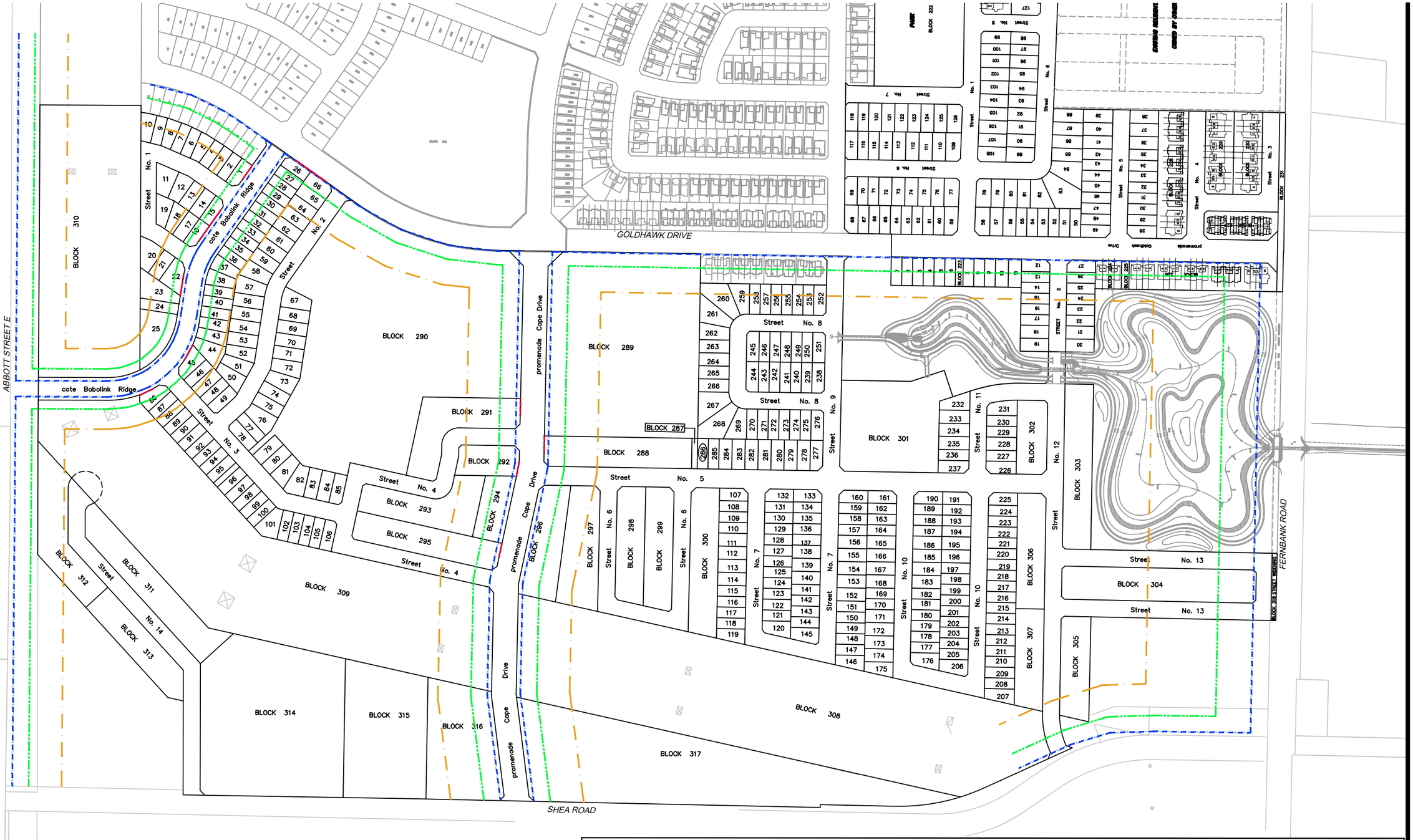
# 5 Conclusion

IBI Group (IBI) was retained by CRT Development Inc. to undertake a Noise Control Feasibility Study in support of a Draft Plan of Subdivision application for the proposed CRT Phase 4 “Westwood” residential development to be located at 1555 Shea Road and 5500 Abbott Street East, Ottawa. The exact location and number of residential units requiring noise warning clauses, ventilation, air conditioning requirements, acoustical review/design of building components, as well as the location and size of any physical attenuation measures, including noise barriers or berms, will be determined during the detailed design stage, following Draft Approval.

# 6 Professional Authorization

Prepared By:


Ben Pascolo-Neveu, P.Eng.




LEGEND:

- POTENTIAL NOISE BARRIER LOCATION
- 65 dBA INDOOR NOISE CONTOUR
- 60 dBA OUTDOOR NOISE CONTOUR
- 55 dBA INDOOR AND OUTDOOR NOISE CONTOUR

CENTERLINE OFFSETS:

| | FERNBANK 4-UAU 60 | ABBOTT / COPE 2-UMCU 50 | SHEA 2-UCU 60 | GOLDHAWK 2-UCU 50 | BOBOLINK 2-UCU 40 |
|---|---|---|---|---|---|
| 65 dBA INDOOR (DAY) | 37.2m | 17.4m | 16.8m | 12.7m | 8.4m |
| 60 dBA OUTDOOR (DAY) | 74.4m | 34.7m | 33.6m | 27.2m | 21.2m |
| 55 dBA INDOOR/OUTDOOR (DAY) | 149.0m | 69.5m | 67.2m | 54.4m | 42.5m |

Project Title
NOISE CONTROL FEASIBILITY STUDY
CRT DEVELOPMENT - PHASE 4
1555 SHEA ROAD & 5500 ABBOTT STREET EAST
CRT DEVELOPMENTS INC.

Scale
N.T.S.

Drawing Title
NOISE PLAN

Sheet No.
FIGURE 2

P:\136944_CRT_Lands_Ph7\7.0_Production\7.03_Design\04_Civil_Land_Adequacy Report\Noise\FIGURE 2 INTERIM NOISE PLAN.dwg Layout Name: FIGURE 2 Plot Style: ---- Plot Scale: 1:2.5849 Plotted At: 3/29/2022 3:56 PM Last Saved By: Isabel.Loewen Last Saved At: Mar. 29, 22

# Appendix A – Noise Calculations

Fernbank Road
4-UAU 60km/h

STAMSON 5.0 NORMAL REPORT Date: 16-01-2020 17:27:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4-UAU.te Time Period: Day/Night 16/8 hours
Description: FERNBANK 65dBA/60 dBA

Road data, segment # 1: 4-UAU (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | : 24288/2112 | veh/TimePeriod * |
| Medium truck volume | : 1932/168 | veh/TimePeriod * |
| Heavy truck volume | : 1380/120 | veh/TimePeriod * |
| Posted speed limit | : 60 | km/h |
| Road gradient | : 1 | % |
| Road pavement | : 1 | (Typical asphalt or concrete) |

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

| | | |
|---|---|---|
| 24 hr Traffic Volume (AADT or SADT) | | 30000 |
| Percentage of Annual Growth | : | 0.00 |
| Number of Years of Growth | : | 0.00 |
| Medium Truck % of Total Volume | : | 7.00 |
| Heavy Truck % of Total Volume | : | 5.00 |
| Day (16 hrs) % of Total Volume | : | 92.00 |

Data for Segment # 1: 4-UAU (day/night)
---

| | | | |
|---|---|---|---|
| Angle1 Angle2 | : | -90.00 deg | 90.00 deg |
| Wood depth | : | 0 | (No woods.) |
| No of house rows | : | 0 / 0 | |
| Surface | : | 1 | (Absorptive ground surface) |
| Receiver source distance | : | 37.20 / 27.40 | m |
| Receiver height | : | 1.50 / 4.50 | m |
| Topography | : | 1 | (Flat/gentle slope; no barrier) |
| Reference angle | : | 0.00 | |

Results segment # 1: 4-UAU (day)
---

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 73.01 | 0.00 | -6.55 | -1.46 | 0.00 | 0.00 | 0.00 | 65.00 |

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: 4-UAU (night)
---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 65.41 | 0.00 | -4.11 | -1.30 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 60.00

STAMSON 5.0 NORMAL REPORT Date: 17-01-2020 13:49:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4-UAU.te Time Period: Day/Night 16/8 hours
Description: FERNBANK 60 dBA

Road data, segment # 1: 4-UAU (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | : 24288/2112 | veh/TimePeriod * |
| Medium truck volume | : 1932/168 | veh/TimePeriod * |
| Heavy truck volume | : 1380/120 | veh/TimePeriod * |
| Posted speed limit | : 60 | km/h |
| Road gradient | : 1 | % |
| Road pavement | : 1 | (Typical asphalt or concrete) |

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

| | | |
|---|---|---|
| 24 hr Traffic Volume (AADT or SADT) | : | 30000 |
| Percentage of Annual Growth | : | 0.00 |
| Number of Years of Growth | : | 0.00 |
| Medium Truck % of Total Volume | : | 7.00 |
| Heavy Truck % of Total Volume | : | 5.00 |
| Day (16 hrs) % of Total Volume | : | 92.00 |

Data for Segment # 1: 4-UAU (day/night)
---

| | | |
|---|---|---|
| Angle1 Angle2 | : -90.00 deg | 90.00 deg |
| Wood depth | : 0 | (No woods.) |
| No of house rows | : 0 / 0 | |
| Surface | : 1 | (Absorptive ground surface) |
| Receiver source distance | : 74.44 / 27.40 | m |
| Receiver height | : 1.50 / 4.50 | m |
| Topography | : 1 | (Flat/gentle slope; no barrier) |
| Reference angle | : 0.00 | |

Results segment # 1: 4-UAU (day)
---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 73.01 | 0.00 | -11.55 | -1.46 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

Results segment # 1: 4-UAU (night)

---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 65.41 | 0.00 | -4.11 | -1.30 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 60.00

STAMSON 5.0 NORMAL REPORT Date: 17-01-2020 13:46:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4-UAU.te Time Period: Day/Night 16/8 hours
Description: FERNBANK 55/ 50 dBA

Road data, segment # 1: 4-UAU (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | : 24288/2112 | veh/TimePeriod * |
| Medium truck volume | : 1932/168 | veh/TimePeriod * |
| Heavy truck volume | : 1380/120 | veh/TimePeriod * |
| Posted speed limit | : 60 | km/h |
| Road gradient | : 1 | % |
| Road pavement | : 1 | (Typical asphalt or concrete) |

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

| | | |
|---|---|---|
| 24 hr Traffic Volume (AADT or SADT) | : 30000 | |
| Percentage of Annual Growth | : 0.00 | |
| Number of Years of Growth | : 0.00 | |
| Medium Truck % of Total Volume | : 7.00 | |
| Heavy Truck % of Total Volume | : 5.00 | |
| Day (16 hrs) % of Total Volume | : 92.00 | |

Data for Segment # 1: 4-UAU (day/night)
---

| | | |
|---|---|---|
| Angle1 Angle2 | : -90.00 deg | 90.00 deg |
| Wood depth | : 0 | (No woods.) |
| No of house rows | : 0 / 0 | |
| Surface | : 1 | (Absorptive ground surface) |
| Receiver source distance | : 149.04 / 118.73 | m |
| Receiver height | : 1.50 / 4.50 | m |
| Topography | : 1 | (Flat/gentle slope; no barrier) |
| Reference angle | : 0.00 | |

Results segment # 1: 4-UAU (day)
---

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 73.01 | 0.00 | -16.55 | -1.46 | 0.00 | 0.00 | 0.00 | 55.00 |

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: 4-UAU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 65.41 | 0.00 | -14.11 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 50.00

# Abbott Street East & Cope Drive
# 2-UMCU 50 km/h

2-UMCU6560 day night (night divergence req'd)
STAMSON 5.0 NORMAL REPORT Date: 09-07-2020 11:41:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu.te Time Period: Day/Night 16/8 hours
Description: 2-UMCU 65 dBA Daytime, 60 dBA Nighttime

Road data, segment # 1: 2-UMCU (day/night)
---

| | | | |
|---|---|---|---|
| Car traffic volume | : | 9715/845 veh/TimePeriod | * |
| Medium truck volume | : | 773/67 veh/TimePeriod | * |
| Heavy truck volume | : | 552/48 veh/TimePeriod | * |
| Posted speed limit | : | 50 km/h | |
| Road gradient | : | 1 % | |
| Road pavement | : | 1 (Typical asphalt or concrete) | |

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

| | | |
|---|---|---|
| 24 hr Traffic Volume (AADT or SADT) | : | 12000 |
| Percentage of Annual Growth | : | 0.00 |
| Number of Years of Growth | : | 0.00 |
| Medium Truck % of Total Volume | : | 7.00 |
| Heavy Truck % of Total Volume | : | 5.00 |
| Day (16 hrs) % of Total Volume | : | 92.00 |

Data for Segment # 1: 2-UMCU (day/night)
---

| | | | |
|---|---|---|---|
| Angle1 Angle2 | : | -90.00 deg | 90.00 deg |
| Wood depth | : | 0 | (No woods.) |
| No of house rows | : | 0 / 0 | |
| Surface | : | 1 | (Absorptive ground surface) |
| Receiver source distance | : | 17.37 / 15.00 | m |
| Receiver height | : | 1.50 / 4.50 | m |
| Topography | : | 1 | (Flat/gentle slope; no barrier) |
| Reference angle | : | 0.00 | |

Results segment # 1: 2-UMCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 67.51 | 0.00 | -1.06 | -1.46 | 0.00 | 0.00 | 0.00 | 65.00 |

2-UMCU6560 day night (night divergence req'd)
Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: 2-UMCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 58.61 + 0.00) = 58.61 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 59.91 | 0.00 | 0.00 | -1.30 | 0.00 | 0.00 | 0.00 | 58.61 |

Segment Leq : 58.61 dBA

Total Leq All Segments: 58.61 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 58.61

STAMSON 5.0 NORMAL REPORT Date: 09-07-2020 11:09:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu.te Time Period: Day/Night 16/8 hours
Description: 2-UMCU 60 dBA Daytime

Road data, segment # 1: 2-UMCU (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | 9715/845 | veh/TimePeriod * |
| Medium truck volume | 773/67 | veh/TimePeriod * |
| Heavy truck volume | 552/48 | veh/TimePeriod * |
| Posted speed limit | 50 km/h | |
| Road gradient | 1 % | |
| Road pavement | 1 (Typical asphalt or concrete) | |

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

| | |
|---|---|
| 24 hr Traffic Volume (AADT or SADT) | 12000 |
| Percentage of Annual Growth | 0.00 |
| Number of Years of Growth | 0.00 |
| Medium Truck % of Total Volume | 7.00 |
| Heavy Truck % of Total Volume | 5.00 |
| Day (16 hrs) % of Total Volume | 92.00 |

Data for Segment # 1: 2-UMCU (day/night)
---

| | | |
|---|---|---|
| Angle1 Angle2 | -90.00 deg | 90.00 deg |
| Wood depth | 0 | (No woods.) |
| No of house rows | 0 / 0 | |
| Surface | 1 | (Absorptive ground surface) |
| Receiver source distance | 34.74 / 53.01 | m |
| Receiver height | 1.50 / 4.50 | m |
| Topography | 1 | (Flat/gentle slope; no barrier) |
| Reference angle | 0.00 | |

Results segment # 1: 2-UMCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 67.51 | 0.00 | -6.05 | -1.46 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

Results segment # 1: 2-UMCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 59.91 | 0.00 | -8.61 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00

STAMSON 5.0 NORMAL REPORT Date: 09-07-2020 11:06:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu.te Time Period: Day/Night 16/8 hours
Description: 2-UMCU 55 dBA Daytime, 50 dBA Nighttime

Road data, segment # 1: 2-UMCU (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | 9715/845 | veh/TimePeriod * |
| Medium truck volume | 773/67 | veh/TimePeriod * |
| Heavy truck volume | 552/48 | veh/TimePeriod * |
| Posted speed limit | 50 km/h | |
| Road gradient | 1 % | |
| Road pavement | 1 (Typical asphalt or concrete) | |

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

| | |
|---|---|
| 24 hr Traffic Volume (AADT or SADT) | 12000 |
| Percentage of Annual Growth | 0.00 |
| Number of Years of Growth | 0.00 |
| Medium Truck % of Total Volume | 7.00 |
| Heavy Truck % of Total Volume | 5.00 |
| Day (16 hrs) % of Total Volume | 92.00 |

Data for Segment # 1: 2-UMCU (day/night)
---

| | | |
|---|---|---|
| Angle1 Angle2 | -90.00 deg | 90.00 deg |
| Wood depth | 0 | (No woods.) |
| No of house rows | 0 / 0 | |
| Surface | 1 | (Absorptive ground surface) |
| Receiver source distance | 69.47 / 53.01 | m |
| Receiver height | 1.50 / 4.50 | m |
| Topography | 1 | (Flat/gentle slope; no barrier) |
| Reference angle | 0.00 | |

Results segment # 1: 2-UMCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 67.51 | 0.00 | -11.05 | -1.46 | 0.00 | 0.00 | 0.00 | 55.00 |

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: 2-UMCU (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 59.91 | 0.00 | -8.61 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 50.00

Shea Road
2-UCU 60 km/h

STAMSON 5.0 NORMAL REPORT Date: 07-03-2022 15:11:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu60.te Time Period: Day/Night 16/8 hours
Description: 2-UCU 65 dBA (day) & 60 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 16.78 / 15.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 67.27 | 0.00 | -0.81 | -1.46 | 0.00 | 0.00 | 0.00 | 65.00 |

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 58.37 + 0.00) = 58.37 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 59.67 | 0.00 | 0.00 | -1.30 | 0.00 | 0.00 | 0.00 | 58.37 |

Segment Leq : 58.37 dBA

Total Leq All Segments: 58.37 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 58.37

FF

FF

STAMSON 5.0 NORMAL REPORT Date: 07-03-2022 15:13:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu60.te Time Period: Day/Night 16/8 hours
Description: 2-UCU 60 dBA (day) & 50 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 33.59 / 51.17 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 67.27 | 0.00 | -5.81 | -1.46 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 59.67 | 0.00 | -8.37 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00

FF

FF

STAMSON 5.0 NORMAL REPORT Date: 07-03-2022 15:15:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu60.te Time Period: Day/Night 16/8 hours
Description: 2-UCU 55 dBA (day) & 50 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 67.22 / 51.17 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 67.27 | 0.00 | -10.81 | -1.46 | 0.00 | 0.00 | 0.00 | 55.00 |

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 59.67 | 0.00 | -8.37 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 50.00

FF

FF

Goldhawk Drive

2-UCU 50 km/h

2-UCU6560 day night (divergence req'd)
STAMSON 5.0 NORMAL REPORT Date: 09-07-2020 11:32:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu.te Time Period: Day/Night 16/8 hours
Description: 2-UCU 65 dBA Daytime, 60 dBA Nighttime

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 64.29 + 0.00) = 64.29 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 65.75 | 0.00 | 0.00 | -1.46 | 0.00 | 0.00 | 0.00 | 64.29 |

2-UCU6560 day night (divergence req'd)

Segment Leq : 64.29 dBA

Total Leq All Segments: 64.29 dBA

Results segment # 1: 2-UCU (night)

Source height = 1.50 m

ROAD (0.00 + 56.85 + 0.00) = 56.85 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 58.16 | 0.00 | 0.00 | -1.30 | 0.00 | 0.00 | 0.00 | 56.85 |

Segment Leq : 56.85 dBA

Total Leq All Segments: 56.85 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.29
(NIGHT): 56.85

STAMSON 5.0 NORMAL REPORT Date: 07-03-2022 17:06:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu50.te Time Period: Day/Night 16/8 hours
Description: 2-UCU 60 dBA (day) & 50 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.22 / 40.99 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 65.75 | 0.00 | -4.30 | -1.46 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 58.16 | 0.00 | -6.86 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00

FF

FF

STAMSON 5.0 NORMAL REPORT Date: 09-07-2020 11:13:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu.te Time Period: Day/Night 16/8 hours
Description: 2-UCU 55 dBA Daytime, 50 dBA Nighttime

Road data, segment # 1: 2-UCU (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | 6477/563 | veh/TimePeriod * |
| Medium truck volume | 515/45 | veh/TimePeriod * |
| Heavy truck volume | 368/32 | veh/TimePeriod * |
| Posted speed limit | 50 km/h | |
| Road gradient | 1 % | |
| Road pavement | 1 (Typical asphalt or concrete) | |

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

| | |
|---|---|
| 24 hr Traffic Volume (AADT or SADT) | 8000 |
| Percentage of Annual Growth | 0.00 |
| Number of Years of Growth | 0.00 |
| Medium Truck % of Total Volume | 7.00 |
| Heavy Truck % of Total Volume | 5.00 |
| Day (16 hrs) % of Total Volume | 92.00 |

Data for Segment # 1: 2-UCU (day/night)
---

| | | |
|---|---|---|
| Angle1 Angle2 | -90.00 deg | 90.00 deg |
| Wood depth | 0 | (No woods.) |
| No of house rows | 0 / 0 | |
| Surface | 1 | (Absorptive ground surface) |
| Receiver source distance | 54.43 / 40.99 | m |
| Receiver height | 1.50 / 4.50 | m |
| Topography | 1 | (Flat/gentle slope; no barrier) |
| Reference angle | 0.00 | |

Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 65.75 | 0.00 | -9.29 | -1.46 | 0.00 | 0.00 | 0.00 | 55.00 |

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

↟

Results segment # 1: 2-UCU (night)

---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 58.16 | 0.00 | -6.86 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 50.00

↟

↟

Bobolink Ridge
2-UCU 40 km/h

STAMSON 5.0 NORMAL REPORT Date: 07-03-2022 14:56:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu40.te Time Period: Day/Night 16/8 hours
Description: 2-ucu 65 dBA (day) & 60 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 62.50 + 0.00) = 62.50 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 63.96 | 0.00 | 0.00 | -1.46 | 0.00 | 0.00 | 0.00 | 62.50 |

Segment Leq : 62.50 dBA

Total Leq All Segments: 62.50 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 55.06 + 0.00) = 55.06 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 56.36 | 0.00 | 0.00 | -1.30 | 0.00 | 0.00 | 0.00 | 55.06 |

Segment Leq : 55.06 dBA

Total Leq All Segments: 55.06 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 62.50
(NIGHT): 55.06

FF

FF

STAMSON 5.0 NORMAL REPORT Date: 07-03-2022 14:59:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu40.te Time Period: Day/Night 16/8 hours
Description: 2-ucu 60 dBA (day) & 50 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.22 / 31.52 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 63.96 | 0.00 | -2.50 | -1.46 | 0.00 | 0.00 | 0.00 | 60.00 |

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 56.36 | 0.00 | -5.06 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00

FF

FF

STAMSON 5.0 NORMAL REPORT Date: 01-04-2022 16:08:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu40.te Time Period: Day/Night 16/8 hours
Description: UCU 40 55 dBA (day)/ 50 dBA (night)

Road data, segment # 1: 2-UCU (day/night)
---
Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-UCU (day/night)
---
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 42.47 / 31.52 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

FF
Results segment # 1: 2-UCU (day)
---

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 63.96 | 0.00 | -7.50 | -1.46 | 0.00 | 0.00 | 0.00 | 55.00 |

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

FF
Results segment # 1: 2-UCU (night)
---

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.57 | 56.36 | 0.00 | -5.06 | -1.30 | 0.00 | 0.00 | 0.00 | 50.00 |

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

FF

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 50.00

FF

FF

# Divergent Calculations

**CRT Phase 4 Divergence Calculations**

**Divergence Calculations - For Source-Receiver Distances < 15m Apart**

**Divergence - Line Source - 60 dBA (Nighttime) - 2-UCU 60km/h**

| | | | | |
|---|---|---|---|---|
| Origin | Distance | d1 | 15 | m |
| | Noise | n1 | 58.37 | dBA |
| Receiver | Noise | n2 | 60 | dBA |
| Distance (est) | | d2 | 10.306027 | |

Note: Distance (est) = d1 / (10^((n2-n1)/10))
*When n2>n1

**Divergence - Line Source - 65 dBA (Daytime) - 2-UCU 50km/h**

| | | | | |
|---|---|---|---|---|
| Origin | Distance | d1 | 15 | m |
| | Noise | n1 | 64.29 | dBA |
| Receiver | Noise | n2 | 65 | dBA |
| Distance (est) | | d2 | 12.737707 | |

Note: Distance (est) = d1 / (10^((n2-n1)/10))
*When n2>n1

**Divergence - Line Source - 60 dBA (Nighttime) - 2-UCU 50km/h**

| | | | | |
|---|---|---|---|---|
| Origin | Distance | d1 | 15 | m |
| | Noise | n1 | 56.85 | dBA |
| Receiver | Noise | n2 | 60 | dBA |
| Distance (est) | | d2 | 7.2625855 | |

Note: Distance (est) = d1 / (10^((n2-n1)/10))
*When n2>n1

**Divergence - Line Source - 65 dBA (Daytime) - 2-UCU 40km/h**

| | | | | |
|---|---|---|---|---|
| Origin | Distance | d1 | 15 | m |
| | Noise | n1 | 62.5 | dBA |
| Receiver | Noise | n2 | 65 | dBA |
| Distance (est) | | d2 | 8.4351199 | |

Note: Distance (est) = d1 / (10^((n2-n1)/10))
*When n2>n1

**Divergence - Line Source - 60 dBA (Nighttime) - 2-UCU 40km/h**

| | | | | |
|---|---|---|---|---|
| Origin | Distance | d1 | 15 | m |
| | Noise | n1 | 55.06 | dBA |
| Receiver | Noise | n2 | 60 | dBA |
| Distance (est) | | d2 | 4.809404 | |

Note: Distance (est) = d1 / (10^((n2-n1)/10))
*When n2>n1