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TRANSPORTATION NOISE ASSESSMENT

1335-1339 Bank Street
Ottawa, Ontario

Report: 20-109-Traffic Noise

March 3, 2021

PREPARED FOR

Riverside Development GP Inc.
900 Boulevard de la Carrière, Suite 206
Gatineau, QC J8Y 6T5

PREPARED BY

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EXECUTIVE SUMMARY

This report describes a transportation noise assessment undertaken for a proposed residential condominium development located at 1335-1339 Bank Street in Ottawa, Ontario. The development comprises a 26-storey building including a 6-storey podium with commercial units at grade and primarily residential units in the remaining floors above. Indoor amenity space is provided at Levels 1, 7 and 26, while outdoor amenity space is provided at the west side of Levels 7 and 26. The major sources of traffic noise are Riverside Drive, Bank Street and the elevated rail corridor to the south. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; (iv) existing rail counts obtained from VIA Rail train schedules; and (v) architectural drawings provided by Hobin Architecture Inc. in July 2020.

The results of the current analysis indicate that noise levels will range between 55 and 73 dBA during the daytime period (07:00-23:00) and between 58 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (73 dBA) occurs at the south and west façades, which are nearest and most exposed to Bank Street and Riverside Drive. The results also indicate that roadway traffic is the dominant source of transportation noise impacting the development. Building components with a higher Sound Transmission Class (STC) rating will be required exterior noise levels exceed 65 dBA and 60 dBA when considering roadway and railway traffic noise, respectively, as indicated in Figure 3.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. A Warning Clause will also be required in all Lease, Purchase and Sale Agreements.

The noise level predicted at the elevated amenity terraces at Level 7 and 26 is 55 dBA. As this is within the acceptable limits specified by the ENCG, no mitigation is required, provided that a minimum 1.1 m tall parapet will enclose the amenity terraces.

With regard to stationary noise impacts of the development's mechanical equipment onto surrounding noise sensitive properties, a stationary noise study will be performed for the site during the detailed design once mechanical plans become available. This study would assess impacts of stationary noise from rooftop mechanical units and any other stationary sources serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. The best noise strategy would be to locate noisier pieces of equipment on the center of the roof or in a mechanical penthouse. Where necessary noise screens and silencers can be incorporated into the design.

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1.   INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Riverside Development GP Inc. to undertake a transportation noise assessment for a proposed residential condominium development located at 1335-1339 Bank Street in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway and railway traffic.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on architectural drawings provided by Hobin Architecture Inc. in July 2020, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications and rail counts obtained from VIA Rail train schedules.

2.   TERMS OF REFERENCE

The focus of this transportation noise assessment is a proposed residential condominium development located at 1335-1339 Bank Street in Ottawa, Ontario. The subject site is located on the southwest half of a parcel of land bounded by Bank Street to the southwest, Riverside Drive (northbound) to the east, and Riverside Drive (southbound) to the northwest. Throughout this report, the Bank Street elevation is referred to as the west elevation.

The proposed residential condominium development comprises a 26-storey tower with a 6-storey podium. The development includes two levels of underground parking, accessed by Riverside Drive (southbound) via a laneway along the east elevation that passes beneath the building podium. The ground floor provides two lobbies, a café/bar, and indoor amenity space. The floorplan steps back at Level 7 on all sides, with a larger step back at the southwest corner to accommodate rooftop outdoor amenity space, including a swimming pool. Level 7 also includes indoor amenity space and residential units. Above Level 7, the tower rises with a uniform floorplate to Level 26, where the floorplate steps back on the west

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[1] City of Ottawa Environmental Noise Control Guidelines, January 2016
[2] Ontario Ministry of the Environment, Conservation and Parks – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013

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Riverside Development GP Inc.
1335-1339 BANK STREET, OTTAWA: TRANSPORTATION NOISE ASSESSMENT

elevation to provide outdoor amenity space. Level 26 also includes indoor amenity space and a mechanical penthouse. All other floors contain residential units. As the balconies extend less than 4 metres from the façade, they do not require consideration as Outdoor Living Areas (OLA) in this study.

The site is surrounded by a low-rise building to the immediate northeast, low and mid-rise buildings to the southeast, and a cluster of primarily low-rise retail buildings to the southwest across Bank Street. The Rideau River, which flows southwest to northwest, is situated approximately 30 m to the northwest. The remainder of the surroundings are characterized by mostly open green space and parking lots.

The major sources of roadway traffic noise are Bank Street and Riverside Drive. Roadways located more than 100 metres from the site are considered to be insignificant sources of roadway traffic noise. The rail corridor to the south containing the VIA Rail line was also included in this assessment. Figure 1 illustrates a complete site plan with surrounding context.

3.   OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway and railway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

4.   METHODOLOGY

4.1   Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Transportation Noise

4.2.1 Criteria for Transportation Noise

For vehicular and railway traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways and railways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for retail space, living rooms and sleeping quarters, respectively, considering roadway traffic noise as listed in Table 1.

The methods for the analysis of rail noise are similar to those for roadway noise. However, due to the characteristically high noise levels resulting from train operations that occur over short periods (i.e. whistles and brake squealing), and a significant low frequency component produced by the movement of the locomotive along the track, the two sound source types require separate analyses, particularly when assessing indoor sound levels. Therefore, to account for the special character of railway sound, the indoor sound level criteria are more stringent by 5 dBA as compared to the road traffic criteria. This difference typically results in requirements for upgraded glazing elements to provide better noise attenuation by the building envelope. There are no level crossings within the vicinity of the site; therefore, warning whistle bursts are not used along the segment of the rail corridor passing the site. Whistle noise has therefore been disregarded.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD AND RAIL)[3]

Type of Space	Time Period	L_{eq} (dBA)	
		Road	Rail
General offices, reception areas, **retail stores**, etc.	07:00 – 23:00	50	45
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	23:00 – 07:00	45	40
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40	35

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime from a combination of road and rail sources, air conditioning will be required. Upgraded building components will require higher levels of sound attenuation[6] when noise levels due to roadway traffic exceed 65 dBA during the daytime and 60 dBA during the nighttime and railway traffic exceed 60 dBA during the daytime and 55 dBA during the nighttime.

The sound level criterion for outdoor living areas (OLA) is 55 dBA for both railways and roadways, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or

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[3] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[4] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[5] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[6] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

below the criterion. Further, noise levels at OLAs must not exceed 60 dBA in all cases. The OLA criteria exclude the influence from rail whistle noise.

4.2.2 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[7] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Riverside Drive NB	4-Lane Urban Arterial Divided (4-UAD)	60	17,500
Riverside Drive SB			17,500
Bank Street	4-Lane Urban Arterial Undivided (4-UAU)	50	30,000

4.2.3 Railway Traffic Volumes

The ENCG recommends the use of future rail traffic volumes obtained from the applicable rail authority. In the absence of future rail volumes, the existing data should be increase at an annual rate of 2.5% per year for a minimum of 15 years. Existing rail traffic counts used in this assessment were obtained from VIA Rail train schedules and projected to the year 2035. Table 3 summarizes the rail traffic counts used in this assessment.

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[7] City of Ottawa Transportation Master Plan, November 2013

TABLE 3: RAILWAY TRAFFIC DATA

Segment	Train Type	Speed Limit (km/h)	2020 Daytime/Nighttime Traffic Counts	2035 Daytime/Nighttime Traffic Counts
VIA Rail	Passenger (Diesel)	150	**18/2**	**26/3**

4.2.4　Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- The mid-rise buildings to the south were considered as noise barriers.
- A standard 1.1 m tall parapet was assumed to enclose the amenity terraces at Levels 7 and 26.
- Noise receptors were strategically placed at nine (9) locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures 4-9.

4.2.5　Theoretical Railway Traffic Noise Predictions

When an area is influenced by road and rail traffic, the criteria requires the outdoor noise impact from each source to be examined for comparison to respective criterion. Calculations were performed for receptors in close proximity to the railway with the assistance of the MECP rail and road noise analysis program STAMSON 5.04, which incorporates the calculation model '*Sound from Trains Environment*

Analysis Method' (STEAM). The impact from railway noise is then combined with roadway predictions using a logarithmic addition at each point of reception and compared to the relevant criteria.

Similar to the roadway traffic noise calculations, the rail corridor was treated as a line source of noise, and existing buildings were used as noise barriers. In addition to the railway volumes summarized in Table 3, theoretical noise predictions were also based on the following parameters:

- One locomotive was modelled per train, with an average of four cars per train.
- The rail corridor was considered elevated by 12 metres above local grade.
- Whistle events were not considered as there are no at-grade crossings in the area.
- Rail lines were assumed not to be welded.

4.3   Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

As per Section 4.2, when daytime noise levels at the plane of the window exceed 65 dBA and 60 dBA when considering roadway and railway traffic noise, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure[8] considers:

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[8] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

- Window type and total area as a percentage of total room floor area

- Exterior wall type and total area as a percentage of the total room floor area

- Acoustic absorption characteristics of the room

- Outdoor noise source type and approach geometry

- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[9], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, which was prepared for site plan approval, detailed floor layouts and building elevations have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

5.   RESULTS AND DISCUSSION

5.1   Transportation Noise Levels

The results of the roadway and railway noise calculations are summarized in Table 4 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

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[9] CMHC, Road & Rail Noise: Effects on Housing

TABLE 4: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor Number	Height Above Grade (m)	Receptor Location	Roadway Noise Level (dBA)		Railway Noise Level (dBA)		Total Noise Level (dBA)	
			Day	Night	Day	Night	Day	Night
1	19.5	POW – Level 6, Podium East Façade	68	61	52	45	68	61
2	19.5	POW – Level 6, Podium South Façade	73	65	56	50	73	65
3	19.5	POW – Level 6, Podium West Façade	73	65	55	49	73	65
4	79.5	POW – Level 25, Tower East Façade	66	58	N/A	N/A	66	58
5	79.5	POW – Level 25, Tower North Façade	72	64	N/A	N/A	72	64
6	79.5	POW – Level 25, Tower West Façade	73	65	N/A	N/A	73	65
7	79.5	POW – Level 25, Tower South Façade	69	62	56	49	69	62
8	22.5	OLA – Level 7	55	-	N/A	N/A	55	-
9	82.5	OLA – Level 26	55	-	N/A	N/A	55	-

N/A = Railway noise was not included in the noise calculations at the receptor location due to setback distance and/or blockage from surrounding buildings.

The results of the current analysis indicate that noise levels will range between 55 and 73 dBA during the daytime period (07:00-23:00) and between 58 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (73 dBA) occurs at the south and west façades, which are nearest and most exposed to Bank Street and Riverside Drive. The results also indicate that roadway traffic is the dominant source of transportation noise impacting the development.

The noise level predicted at the elevated amenity terraces at Levels 7 and 26 is 55 dBA. As this is within the acceptable limits specified by the ENCG, no mitigation is required, provided that a minimum 1.1 m tall parapet will enclose the amenity terraces.

5.2   Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figure 3):

- **Bedroom Windows**

(i)   Bedroom windows facing north and west in both the tower and podium, as well as those facing south in the podium, will require a minimum STC of 36.

(ii)   Bedroom windows facing east in both the tower and podium as well as south in the tower will require a minimum STC of 32.

(iii)   All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements.

- **Living Room Windows**

(i)   Living room windows facing north and west in both the tower and podium, as well as those facing south in the podium, will require a minimum STC of 31.

(ii)   Living room windows facing east in both the tower and podium as well as south in the tower will require a minimum STC of 27.

(iii)   All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements.

- **Exterior Walls**

(i)   Exterior wall components on the north, east, south and west façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[10].

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[10] J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

The STC requirements apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45, where a window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

6.   CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 55 and 73 dBA during the daytime period (07:00-23:00) and between 58 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (73 dBA) occurs at the south and west façades, which are nearest and most exposed to Bank Street and Riverside Drive. The results also indicate that roadway traffic is the dominant source of transportation noise impacting the development. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA and 60 dBA when considering roadway and railway traffic noise, respectively, as indicated in Figure 3.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The

following Warning Clause[11] will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

"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 roadway and railway traffic may, on occasion, interfere with some activities of the dwelling occupants, as the sound levels exceed the sound level limits of the City and the Ministry of the Environment, Conservation and Parks. To help address the need for sound attenuation, this development includes:

- *STC rated multi-pane glazing elements and spandrel panels*
    - *North and west façade of tower bedroom/living room: STC 36/31*
    - *South and east façade of tower bedroom/living room: STC 32/27*
    - *South façade of podium bedroom/living room: STC 36/31*
    - *East façade of podium bedroom/living room: STC 32/27*
- *STC rated exterior walls*
    - *North, east, south and west façade: STC 45*

This dwelling unit has also been designed with air conditioning. Air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment, Conservation and Parks.

To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features."

The noise level predicted at the elevated amenity terraces at Levels 7 and 26 is 55 dBA. As this is within the acceptable limits specified by the ENCG, no mitigation is required, provided that a minimum 1.1 m tall parapet will enclose the amenity terraces
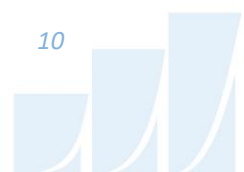
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[11] City of Ottawa Environmental Noise Control Guidelines, January 2016

With regard to stationary noise impacts of the development's mechanical equipment onto surrounding noise sensitive properties, a stationary noise study will be performed for the site during the detailed design once mechanical plans become available. This study would assess impacts of stationary noise from rooftop mechanical units and any other stationary sources serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. The best noise strategy would be to locate noisier pieces of equipment on the center of the roof or in a mechanical penthouse. Where necessary noise screens and silencers can be incorporated into the design.

This concludes our transportation noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

Gradient Wind Engineering Inc.

Michael Lafortune, C.E.T.
Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File 20-109-Traffic Noise

SUBJECT SITE

RIVERSIDE DRIVE NORTHBOUND

RIVERSIDE DRIVE SOUTHBOUND

BANK STREET

VIA RAIL CORRIDOR

PROJECT	1335-1339 BANK STREET, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION	
SCALE	1:2500 (APPROX.)	DRAWING NO. 20-109-1	FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT	
DATE	AUGUST 17, 2020	DRAWN BY S.P.		

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RIVERSIDE DRIVE SOUTHBOUND

RIVERSIDE DRIVE NORTHBOUND

BANK STREET

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| # | OLA RECEPTOR |
| # | POW RECEPTOR |

PROJECT	1335-1339 BANK STREET, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION	
SCALE	1:1000 (APPROX.)	DRAWING NO. 20-109-2	FIGURE 2: RECEPTOR LOCATIONS	
DATE	AUGUST 17, 2020	DRAWN BY S.P.		

BEDROOM/LIVING ROOM WINDOWS: STC 32/27

BEDROOM/LIVING ROOM WINDOWS: STC 36/31

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PROJECT	1335-1339 BANK STREET, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION	
SCALE 1:500 (APPROX.)	DRAWING NO. 20-109-3		FIGURE 3: WINDOW STC REQUIREMENTS	
DATE AUGUST 17, 2020	DRAWN BY S.P.			

PROJECT			DESCRIPTION
1335-1339 BANK STREET, OTTAWA			
TRANSPORTATION NOISE ASSESSMENT			FIGURE 4:
SCALE		DRAWING NO.	STAMSON INPUT PARAMETERS - RECEPTOR 1, 4, 6
1:2000 (APPROX.)		20-109-4	
DATE		DRAWN BY	
AUGUST 17, 2020		S.P.	

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SCALE	1:2000 (APPROX.)	DRAWING NO.	20-109-5	FIGURE 5: STAMSON INPUT PARAMETERS - RECEPTOR 2, 5	
DATE	AUGUST 17, 2020	DRAWN BY	S.P.		

N

3

87°

12

19

9°

12°

248

PROJECT	1335-1339 BANK STREET, OTTAWA	DESCRIPTION	
	TRANSPORTATION NOISE ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO. 20-109-6	FIGURE 6: STAMSON INPUT PARAMETERS - RECEPTOR 3
DATE	AUGUST 17, 2020	DRAWN BY S.P.	

PROJECT	1335-1339 BANK STREET, OTTAWA		DESCRIPTION
	TRANSPORTATION NOISE ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO. 20-109-7	FIGURE 7: STAMSON INPUT PARAMETERS - RECEPTOR 7
DATE	AUGUST 17, 2020	DRAWN BY S.P.	

PROJECT
1335-1339 BANK STREET, OTTAWA
TRANSPORTATION NOISE ASSESSMENT

SCALE
1:2000 (APPROX.)

DRAWING NO.
20-109-8

DATE
AUGUST 17, 2020

DRAWN BY
S.P.

DESCRIPTION

FIGURE 8:
STAMSON INPUT PARAMETERS - RECEPTOR 8

PROJECT	1335-1339 BANK STREET, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION	
SCALE	1:2000 (APPROX.)	DRAWING NO. 20-109-9	FIGURE 9: STAMSON INPUT PARAMETERS - RECEPTOR 9	
DATE	AUGUST 17, 2020	DRAWN BY S.P.		

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APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

```
STAMSON 5.0        NORMAL REPORT        Date: 12-08-2020 15:12:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                 Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA1 (day/night)
-----------------------------------------
Train              ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type               !             !(km/h) !/Train!/Train! type !weld
----------------+------------+------+------+------+------+----
  1.             !  26.0/3.0   ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 1: VIA1 (day/night)
-----------------------------------------
Angle1   Angle2            :  -7.00 deg   12.00 deg
Wood depth                 :     0       (No woods.)
No of house rows           :     0 / 0
Surface                    :     2       (Reflective ground surface)
Receiver source distance   : 243.00 / 243.00 m
Receiver height            :  19.50 / 19.50  m
Topography                 :     2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1             :  -7.00 deg   Angle2 : 12.00 deg
Barrier height             :  46.00 m
Barrier receiver distance  : 154.00 / 154.00 m
Source elevation           :  12.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   3.00 m
Reference angle            :   0.00
```

```
Rail data, segment # 2: VIA2 (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+------+------+------+------+----
  1.             ! 26.0/3.0    ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 2: VIA2 (day/night)
----------------------------------------
Angle1   Angle2            : -21.00 deg   -7.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   : 243.00 / 243.00 m
Receiver height            :  19.50 / 19.50  m
Topography                 :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1             : -21.00 deg   Angle2 : -7.00 deg
Barrier height             :  25.00 m
Barrier receiver distance  :  56.00 / 56.00  m
Source elevation           :  12.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Rail data, segment # 3: VIA3 (day/night)
----------------------------------------
Train            ! Trains     ! Speed !# loc !# Cars! Eng  !Cont
Type             !            !(km/h) !/Train!/Train! type !weld
----------------+------------+------+------+------+------+----
  1.            ! 26.0/3.0   ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 3: VIA3 (day/night)
----------------------------------------
Angle1   Angle2          : -90.00 deg  -21.00 deg
Wood depth              :     0       (No woods.)
No of house rows        :     0 / 0
Surface                 :     2       (Reflective ground surface)
Receiver source distance : 243.00 / 243.00 m
Receiver height         :  19.50 / 19.50  m
Topography              :     2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1          : -57.00 deg   Angle2 : -21.00 deg
Barrier height          :  57.00 m
Barrier receiver distance :  99.00 / 99.00  m
Source elevation        :  12.00 m
Receiver elevation      :   0.00 m
Barrier elevation       :   0.00 m
Reference angle         :   0.00
```

```
Results segment # 1: VIA1 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver     ! Barrier     ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
-----------+------------+------------+-------------
       4.00 !        19.50 !       14.28 !        17.28
       0.50 !        19.50 !       12.06 !        15.06

LOCOMOTIVE (0.00 + 28.23 + 0.00) = 28.23 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
    -7      12    0.00  70.09 -12.10  -9.77   0.00   0.00 -20.00  28.23
----------------------------------------------------------------------


WHEEL (0.00 + 21.30 + 0.00) = 21.30 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
    -7      12    0.00  63.16 -12.10  -9.77   0.00   0.00 -20.00  21.30
----------------------------------------------------------------------


Segment Leq : 29.03 dBA


Results segment # 2: VIA2 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver     ! Barrier     ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
-----------+------------+------------+-------------
       4.00 !        19.50 !       18.69 !        18.69
       0.50 !        19.50 !       17.89 !        17.89

LOCOMOTIVE (0.00 + 32.72 + 0.00) = 32.72 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -21      -7    0.00  70.09 -12.10 -11.09   0.00   0.00 -14.18  32.72
----------------------------------------------------------------------


WHEEL (0.00 + 24.79 + 0.00) = 24.79 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -21      -7    0.00  63.16 -12.10 -11.09   0.00   0.00 -15.19  24.79
----------------------------------------------------------------------


Segment Leq : 33.37 dBA
```

```
Results segment # 3: VIA3 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver      ! Barrier      ! Elevation of
Height  (m) ! Height   (m)  ! Height   (m) ! Barrier Top  (m)
------------+--------------+--------------+-------------
      4.00 !      19.50 !      18.07 !      18.07
      0.50 !      19.50 !      16.65 !      16.65

LOCOMOTIVE (50.63 + 31.00 + 0.00) = 50.67 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
   -90    -57   0.00  70.09 -12.10  -7.37   0.00   0.00   0.00  50.63
--------------------------------------------------------------------
   -57    -21   0.00  70.09 -12.10  -6.99   0.00   0.00 -20.00  31.00
--------------------------------------------------------------------

WHEEL (43.70 + 24.08 + 0.00) = 43.75 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
   -90    -57   0.00  63.16 -12.10  -7.37   0.00   0.00   0.00  43.70
--------------------------------------------------------------------
   -57    -21   0.00  63.16 -12.10  -6.99   0.00   0.00 -20.00  24.08
--------------------------------------------------------------------

Segment Leq : 51.47 dBA

Total Leq All Segments: 51.56 dBA
```

```
Results segment # 1: VIA1 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
-----------+------------+------------+-------------
     4.00 !       19.50 !       14.28 !       17.28
     0.50 !       19.50 !       12.06 !       15.06

LOCOMOTIVE (0.00 + 21.86 + 0.00) = 21.86 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
    -7      12   0.00  63.72 -12.10  -9.77   0.00   0.00 -20.00  21.86
---------------------------------------------------------------------


WHEEL (0.00 + 14.94 + 0.00) = 14.94 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
    -7      12   0.00  56.80 -12.10  -9.77   0.00   0.00 -20.00  14.94
---------------------------------------------------------------------


Segment Leq : 22.66 dBA

Results segment # 2: VIA2 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
-----------+------------+------------+-------------
     4.00 !       19.50 !       18.69 !       18.69
     0.50 !       19.50 !       17.89 !       17.89

LOCOMOTIVE (0.00 + 26.36 + 0.00) = 26.36 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
   -21      -7   0.00  63.72 -12.10 -11.09   0.00   0.00 -14.18  26.36
---------------------------------------------------------------------


WHEEL (0.00 + 18.42 + 0.00) = 18.42 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
   -21      -7   0.00  56.80 -12.10 -11.09   0.00   0.00 -15.19  18.42
---------------------------------------------------------------------


Segment Leq : 27.01 dBA
```

```
Results segment # 3: VIA3 (night)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier      ! Elevation of
Height  (m)  ! Height   (m) ! Height   (m) ! Barrier Top   (m)
------------+-------------+-------------+--------------
      4.00 !         19.50 !        18.07 !          18.07
      0.50 !         19.50 !        16.65 !          16.65

LOCOMOTIVE (44.26 + 24.63 + 0.00) = 44.30 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
  -90    -57   0.00  63.72 -12.10  -7.37   0.00   0.00   0.00  44.26
--------------------------------------------------------------------
  -57    -21   0.00  63.72 -12.10  -6.99   0.00   0.00 -20.00  24.63
--------------------------------------------------------------------

WHEEL (37.33 + 17.71 + 0.00) = 37.38 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
  -90    -57   0.00  56.80 -12.10  -7.37   0.00   0.00   0.00  37.33
--------------------------------------------------------------------
  -57    -21   0.00  56.80 -12.10  -6.99   0.00   0.00 -20.00  17.71
--------------------------------------------------------------------

Segment Leq : 45.10 dBA

Total Leq All Segments: 45.19 dBA
```

```
Road data, segment # 1: RiversideNB1 (day/night)
---------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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: RiversideNB1 (day/night)
-------------------------------------------------
Angle1   Angle2           : -67.00 deg   9.00 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          : 19.50 / 19.50  m
Topography               :      1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Road data, segment # 2: RiversideNB2 (day/night)
--------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 2: RiversideNB2 (day/night)
--------------------------------------------------
Angle1   Angle2          : -90.00 deg   -38.00 deg
Wood depth              :      0       (No woods.)
No of house rows        :      0 / 0
Surface                 :      2       (Reflective ground surface)
Receiver source distance : 29.00 / 29.00  m
Receiver height         : 19.50 / 19.50  m
Topography              :      1       (Flat/gentle slope; no barrier)
Reference angle         :   0.00
```

```
Results segment # 1: RiversideNB1 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 66.92 + 0.00) = 66.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -67      9   0.00  70.67   0.00   0.00  -3.74   0.00   0.00   0.00
66.92
----------------------------------------------------------------------
--

Segment Leq : 66.92 dBA

Results segment # 2: RiversideNB2 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.41 + 0.00) = 62.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90    -38   0.00  70.67   0.00  -2.86  -5.39   0.00   0.00   0.00
62.41
----------------------------------------------------------------------
--

Segment Leq : 62.41 dBA

Total Leq All Segments: 68.24 dBA
```

```
Results segment # 1: RiversideNB1 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.32 + 0.00) = 59.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -67      9  0.00  63.07   0.00   0.00  -3.74   0.00   0.00   0.00
59.32
----------------------------------------------------------------------
--

Segment Leq : 59.32 dBA


Results segment # 2: RiversideNB2 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.81 + 0.00) = 54.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90    -38  0.00  63.07   0.00  -2.86  -5.39   0.00   0.00   0.00
54.81
----------------------------------------------------------------------
--

Segment Leq : 54.81 dBA

Total Leq All Segments: 60.64 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 68.33
                        (NIGHT): 60.76
```

```
STAMSON 5.0          NORMAL REPORT        Date: 12-08-2020 15:30:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                   Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA1 (day/night)
-----------------------------------------
Train            ! Trains     ! Speed !# loc !# Cars! Eng  !Cont
Type             !            !(km/h) !/Train!/Train! type !weld
-----------------+------------+------+------+------+------+----
  1.             ! 26.0/3.0   ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 1: VIA1 (day/night)
-----------------------------------------
Angle1   Angle2         : -13.00 deg   90.00 deg
Wood depth             :     0       (No woods.)
No of house rows       :     0 / 0
Surface                :     2       (Reflective ground surface)
Receiver source distance : 244.00 / 244.00 m
Receiver height        :  19.50 / 19.50  m
Topography             :     2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1         : -13.00 deg   Angle2 : 7.00 deg
Barrier height         :  46.00 m
Barrier receiver distance : 145.00 / 145.00 m
Source elevation       :  12.00 m
Receiver elevation     :   0.00 m
Barrier elevation      :   3.00 m
Reference angle        :   0.00
```

```
Rail data, segment # 2: VIA2 (day/night)
---------------------------------------
Train             ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type              !             !(km/h) !/Train!/Train! type !weld
----------------+------------+------+------+------+------+----
  1.            ! 26.0/3.0   ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 2: VIA2 (day/night)
---------------------------------------
Angle1   Angle2            : -29.00 deg   -13.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   : 244.00 / 244.00 m
Receiver height            :  19.50 / 19.50  m
Topography                 :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1             : -29.00 deg   Angle2 : -13.00 deg
Barrier height             :  25.00 m
Barrier receiver distance  :  52.00 / 52.00  m
Source elevation           :  12.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Rail data, segment # 3: VIA3 (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
----------------+-------------+------+------+------+------+----
  1.            ! 26.0/3.0    ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 3: VIA3 (day/night)
----------------------------------------
Angle1   Angle2            : -78.00 deg   -29.00 deg
Wood depth                 :     0        (No woods.)
No of house rows           :     0 / 0
Surface                    :     2        (Reflective ground surface)
Receiver source distance   : 244.00 / 244.00 m
Receiver height            :  19.50 / 19.50  m
Topography                 :     2        (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1             : -61.00 deg   Angle2 : -29.00 deg
Barrier height             :  57.00 m
Barrier receiver distance  : 100.00 / 100.00 m
Source elevation           :  12.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Results segment # 1: VIA1 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver    ! Barrier      ! Elevation of
Height  (m)  ! Height  (m) ! Height  (m)  ! Barrier Top  (m)
------------+------------+------------+--------------
      4.00 !       19.50 !       14.42 !        17.42
      0.50 !       19.50 !       12.34 !        15.34

LOCOMOTIVE (0.00 + 28.43 + 54.61) = 54.62 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
  -13     7    0.00  70.09 -12.11  -9.54   0.00   0.00 -20.00  28.43
-------------------------------------------------------------------
    7    90    0.00  70.09 -12.11  -3.36   0.00   0.00   0.00  54.61
-------------------------------------------------------------------

WHEEL (0.00 + 21.51 + 47.69) = 47.70 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
  -13     7    0.00  63.16 -12.11  -9.54   0.00   0.00 -20.00  21.51
-------------------------------------------------------------------
    7    90    0.00  63.16 -12.11  -3.36   0.00   0.00   0.00  47.69
-------------------------------------------------------------------

Segment Leq : 55.42 dBA
```

```
Results segment # 2: VIA2 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height   (m) ! Barrier Top  (m)
------------+-------------+--------------+--------------
      4.00 !        19.50 !        18.75 !        18.75
      0.50 !        19.50 !        18.01 !        18.01

LOCOMOTIVE (0.00 + 33.32 + 0.00) = 33.32 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -29    -13   0.00  70.09 -12.11 -10.51   0.00   0.00 -14.14  33.32
-------------------------------------------------------------------

WHEEL (0.00 + 25.45 + 0.00) = 25.45 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -29    -13   0.00  63.16 -12.11 -10.51   0.00   0.00 -15.09  25.45
-------------------------------------------------------------------

Segment Leq : 33.98 dBA
```

GRADIENTWIND
ENGINEERS & SCIENTISTS

```
Results segment # 3: VIA3 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver      ! Barrier      ! Elevation of
Height  (m) ! Height   (m)  ! Height   (m) ! Barrier Top  (m)
------------+---------------+--------------+--------------
     4.00 !         19.50 !         18.07 !         18.07
     0.50 !         19.50 !         16.63 !         16.63

LOCOMOTIVE (47.73 + 30.47 + 0.00) = 47.81 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -78    -61   0.00  70.09 -12.11 -10.25   0.00   0.00   0.00  47.73
-------------------------------------------------------------------
   -61    -29   0.00  70.09 -12.11  -7.50   0.00   0.00 -20.00  30.47
-------------------------------------------------------------------

WHEEL (40.80 + 23.55 + 0.00) = 40.88 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -78    -61   0.00  63.16 -12.11 -10.25   0.00   0.00   0.00  40.80
-------------------------------------------------------------------
   -61    -29   0.00  63.16 -12.11  -7.50   0.00   0.00 -20.00  23.55
-------------------------------------------------------------------

Segment Leq : 48.61 dBA

Total Leq All Segments: 56.27 dBA
```

A17

.

.

.


```
Results segment # 1: VIA1 (night)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source        ! Receiver      ! Barrier       ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+------------+------------+-------------
       4.00 !        19.50 !        14.42 !         17.42
       0.50 !        19.50 !        12.34 !         15.34

LOCOMOTIVE (0.00 + 22.06 + 48.24) = 48.26 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
  -13      7   0.00  63.72 -12.11  -9.54   0.00   0.00 -20.00  22.06
---------------------------------------------------------------------
    7     90   0.00  63.72 -12.11  -3.36   0.00   0.00   0.00  48.24
---------------------------------------------------------------------

WHEEL (0.00 + 15.14 + 41.32) = 41.33 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
  -13      7   0.00  56.80 -12.11  -9.54   0.00   0.00 -20.00  15.14
---------------------------------------------------------------------
    7     90   0.00  56.80 -12.11  -3.36   0.00   0.00   0.00  41.32
---------------------------------------------------------------------

Segment Leq : 49.06 dBA
```
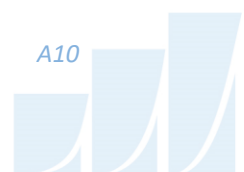
```
Results segment # 2: VIA2 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver     ! Barrier      ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+-------------+-------------+-------------
     4.00 !          19.50 !          18.75 !          18.75
     0.50 !          19.50 !          18.01 !          18.01

LOCOMOTIVE (0.00 + 26.95 + 0.00) = 26.95 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
  -29    -13   0.00  63.72 -12.11 -10.51   0.00   0.00 -14.14  26.95
--------------------------------------------------------------------

WHEEL (0.00 + 19.08 + 0.00) = 19.08 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
  -29    -13   0.00  56.80 -12.11 -10.51   0.00   0.00 -15.09  19.08
--------------------------------------------------------------------

Segment Leq : 27.61 dBA
```

```
Results segment # 3: VIA3 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier       ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+------------+------------+-------------
      4.00 !      19.50 !      18.07 !      18.07
      0.50 !      19.50 !      16.63 !      16.63

LOCOMOTIVE (41.36 + 24.11 + 0.00) = 41.44 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------
  -78    -61   0.00  63.72 -12.11 -10.25   0.00   0.00   0.00  41.36
----------------------------------------------------------------
  -61    -29   0.00  63.72 -12.11  -7.50   0.00   0.00 -20.00  24.11
----------------------------------------------------------------

WHEEL (34.44 + 17.18 + 0.00) = 34.52 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------
  -78    -61   0.00  56.80 -12.11 -10.25   0.00   0.00   0.00  34.44
----------------------------------------------------------------
  -61    -29   0.00  56.80 -12.11  -7.50   0.00   0.00 -20.00  17.18
----------------------------------------------------------------

Segment Leq : 42.24 dBA

Total Leq All Segments: 49.91 dBA
```

```
Road data, segment # 1: RiversideNB1 (day/night)
---------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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: RiversideNB1 (day/night)
-----------------------------------------------
Angle1   Angle2           : -74.00 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          : 19.50 / 19.50  m
Topography               :      1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Road data, segment # 2: RiversideNB2 (day/night)
-------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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 # 2: RiversideNB2 (day/night)
-------------------------------------------------
Angle1   Angle2           : -53.00 deg   -45.00 deg
Wood depth               :      0        (No woods.)
No of house rows         :      0 / 0
Surface                  :      2        (Reflective ground surface)
Receiver source distance : 38.00 / 38.00  m
Receiver height          : 19.50 / 19.50  m
Topography               :      1        (Flat/gentle slope; no barrier)
Reference angle          :    0.00
```

```
Road data, segment # 3: Bank (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  :    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):  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 # 3: Bank (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 : 15.00 / 15.00  m
Receiver height          : 19.50 / 19.50  m
Topography               :     1        (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Results segment # 1: RiversideNB1 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 70.26 + 0.00) = 70.26 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -74     90   0.00  70.67   0.00   0.00  -0.40   0.00   0.00   0.00
70.26
----------------------------------------------------------------------
--

Segment Leq : 70.26 dBA

Results segment # 2: RiversideNB2 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.11 + 0.00) = 53.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -53    -45   0.00  70.67   0.00  -4.04 -13.52   0.00   0.00   0.00
53.11
----------------------------------------------------------------------
--

Segment Leq : 53.11 dBA
```

```
Results segment # 3: Bank (day)
-------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.48 + 0.00) = 68.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90      0   0.00  71.49   0.00   0.00  -3.01   0.00   0.00   0.00
68.48
----------------------------------------------------------------------
--

Segment Leq : 68.48 dBA

Total Leq All Segments: 72.52 dBA


Results segment # 1: RiversideNB1 (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.66 + 0.00) = 62.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -74     90   0.00  63.07   0.00   0.00  -0.40   0.00   0.00   0.00
62.66
----------------------------------------------------------------------
--

Segment Leq : 62.66 dBA
```

```
Results segment # 2: RiversideNB2 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 45.51 + 0.00) = 45.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -53    -45   0.00  63.07   0.00  -4.04 -13.52   0.00   0.00   0.00
45.51
-----------------------------------------------------------------------
--

Segment Leq : 45.51 dBA

Results segment # 3: Bank (night)
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.88 + 0.00) = 60.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -90      0   0.00  63.89   0.00   0.00  -3.01   0.00   0.00   0.00
60.88
-----------------------------------------------------------------------
--

Segment Leq : 60.88 dBA

Total Leq All Segments: 64.92 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 72.62
                         (NIGHT): 65.06
```

```
STAMSON 5.0          NORMAL REPORT        Date: 12-08-2020 15:40:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te                    Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
----------------+------------+------+------+------+------+----
  1.             ! 26.0/3.0   ! 150.0 ! 1.0  ! 4.0 !Diesel!  No

Data for Segment # 1: VIA (day/night)
----------------------------------------
Angle1   Angle2            : 12.00 deg   90.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   : 248.00 / 248.00 m
Receiver height            : 19.50 / 19.50  m
Topography                 :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle            :   0.00


Results segment # 1: VIA (day)
-----------------------------


LOCOMOTIVE (0.00 + 54.27 + 0.00) = 54.27 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------
   12     90   0.00  70.09 -12.18  -3.63   0.00   0.00   0.00  54.27
-----------------------------------------------------------------------


WHEEL (0.00 + 47.35 + 0.00) = 47.35 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------
   12     90   0.00  63.16 -12.18  -3.63   0.00   0.00   0.00  47.35
-----------------------------------------------------------------------

Segment Leq : 55.07 dBA

Total Leq All Segments: 55.07 dBA
```

```
Results segment # 1: VIA (night)
--------------------------------


LOCOMOTIVE (0.00 + 47.90 + 0.00) = 47.90 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
    12    90    0.00  63.72 -12.18  -3.63   0.00   0.00   0.00  47.90
---------------------------------------------------------------------


WHEEL (0.00 + 40.98 + 0.00) = 40.98 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
    12    90    0.00  56.80 -12.18  -3.63   0.00   0.00   0.00  40.98
---------------------------------------------------------------------


Segment Leq : 48.70 dBA

Total Leq All Segments: 48.70 dBA

Road data, segment # 1: RiversideNB (day/night)
-----------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume : 1127/98    veh/TimePeriod  *
Heavy truck volume  :  805/70    veh/TimePeriod  *
Posted speed limit  :   60 km/h
Road gradient       :    0 %
Road pavement       :    1 (Typical asphalt or concrete)


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

    24 hr Traffic Volume (AADT or SADT):  17500
    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: RiversideNB (day/night)
---------------------------------------------
Angle1   Angle2           :   9.00 deg   90.00 deg
Wood depth               :     0       (No woods.)
No of house rows         :     0 / 0
Surface                  :     2       (Reflective ground surface)
Receiver source distance : 19.00 / 19.00  m
Receiver height          : 19.50 / 19.50  m
Topography               :     1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Road data, segment # 2: Bank (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  :    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):  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 # 2: Bank (day/night)
----------------------------------------
Angle1   Angle2           : -87.00 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          : 19.50 / 19.50  m
Topography               :      1      (Flat/gentle slope; no barrier)
Reference angle          :   0.00


Results segment # 1: RiversideNB (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 66.17 + 0.00) = 66.17 dBA
Angle1 Angle2  Alpha  RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
    9     90  0.00  70.67   0.00  -1.03  -3.47   0.00   0.00   0.00
66.17
---------------------------------------------------------------------------
--

Segment Leq : 66.17 dBA
```

```
Results segment # 2: Bank (day)
-------------------------------

Source height = 1.50 m

ROAD (0.00 + 71.42 + 0.00) = 71.42 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
   -87     90   0.00  71.49   0.00   0.00  -0.07   0.00   0.00   0.00
71.42
---------------------------------------------------------------------------
--

Segment Leq : 71.42 dBA

Total Leq All Segments: 72.55 dBA


Results segment # 1: RiversideNB (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.57 + 0.00) = 58.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
     9     90   0.00  63.07   0.00  -1.03  -3.47   0.00   0.00   0.00
58.57
---------------------------------------------------------------------------
--

Segment Leq : 58.57 dBA
```

```
Results segment # 2: Bank (night)
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.82 + 0.00) = 63.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -87     90   0.00  63.89   0.00   0.00  -0.07   0.00   0.00   0.00
63.82
-------------------------------------------------------------------------
--

Segment Leq : 63.82 dBA

Total Leq All Segments: 64.95 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 72.63
                         (NIGHT): 65.06
```

```
STAMSON 5.0          NORMAL REPORT          Date: 12-08-2020 15:50:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: RiversideSB (day/night)
------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  : 1127/98     veh/TimePeriod  *
Heavy truck volume   :  805/70     veh/TimePeriod  *
Posted speed limit   :   60 km/h
Road gradient        :    0 %
Road pavement        :    1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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: RiversideSB (day/night)
---------------------------------------------
Angle1   Angle2           : 12.00 deg   90.00 deg
Wood depth               :    0       (No woods.)
No of house rows         :    0 / 0
Surface                  :    2       (Reflective ground surface)
Receiver source distance : 20.00 / 20.00  m
Receiver height          : 79.50 / 79.50  m
Topography               :    1       (Flat/gentle slope; no barrier)
Reference angle          :  0.00
```

Results segment # 1: RiversideSB (day)

Source height = 1.50 m

ROAD (0.00 + 65.78 + 0.00) = 65.78 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--
    12   90   0.00 70.67   0.00 -1.25 -3.63   0.00   0.00   0.00
65.78

--

Segment Leq : 65.78 dBA

Total Leq All Segments: 65.78 dBA

Results segment # 1: RiversideSB (night)

Source height = 1.50 m

ROAD (0.00 + 58.19 + 0.00) = 58.19 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--
    12   90   0.00 63.07   0.00 -1.25 -3.63   0.00   0.00   0.00
58.19

--

Segment Leq : 58.19 dBA

Total Leq All Segments: 58.19 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.78
                         (NIGHT): 58.19

STAMSON 5.0   NORMAL REPORT   Date: 12-08-2020 15:57:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te   Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: RiversideSB1 (day/night)

Car traffic volume   : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume   : 805/70   veh/TimePeriod *
Posted speed limit   :   60 km/h
Road gradient   :   0 %
Road pavement   :   1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT): 17500
    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: RiversideSB1 (day/night)

Angle1   Angle2   : -46.00 deg   90.00 deg
Wood depth   :   0   (No woods.)
No of house rows   :   0 / 0
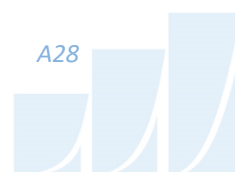Surface   :   2   (Reflective ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height   : 79.50 / 79.50 m
Topography   :   1   (Flat/gentle slope; no barrier)
Reference angle   :   0.00

```
Road data, segment # 2: RiversideSB2 (day/night)
--------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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 # 2: RiversideSB2 (day/night)
--------------------------------------------------
Angle1   Angle2          : -90.00 deg   -61.00 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         : 79.50 / 79.50  m
Topography              :      1      (Flat/gentle slope; no barrier)
Reference angle         :   0.00
```

```
Road data, segment # 3: Bank (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   :    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):  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 # 3: Bank (day/night)
----------------------------------------
Angle1   Angle2            :   3.00 deg   90.00 deg
Wood depth                 :     0       (No woods.)
No of house rows           :     0 / 0
Surface                    :     2       (Reflective ground surface)
Receiver source distance   :  28.00 / 28.00  m
Receiver height            :  79.50 / 79.50  m
Topography                 :     1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00
```

```
Results segment # 1: RiversideSB1 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 69.45 + 0.00) = 69.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
    -46      90   0.00  70.67   0.00   0.00  -1.22   0.00   0.00   0.00
69.45
--------------------------------------------------------------------------
--

Segment Leq : 69.45 dBA

Results segment # 2: RiversideSB2 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.74 + 0.00) = 62.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
    -90     -61   0.00  70.67   0.00   0.00  -7.93   0.00   0.00   0.00
62.74
--------------------------------------------------------------------------
--

Segment Leq : 62.74 dBA
```

```
Results segment # 3: Bank (day)
-------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.62 + 0.00) = 65.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
     3     90   0.00  71.49   0.00  -2.71  -3.16   0.00   0.00   0.00
65.62
----------------------------------------------------------------------
--

Segment Leq : 65.62 dBA

Total Leq All Segments: 71.56 dBA


Results segment # 1: RiversideSB1 (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.85 + 0.00) = 61.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -46     90   0.00  63.07   0.00   0.00  -1.22   0.00   0.00   0.00
61.85
----------------------------------------------------------------------
--

Segment Leq : 61.85 dBA
```

```
Results segment # 2: RiversideSB2 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.14 + 0.00) = 55.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
   -90    -61   0.00  63.07   0.00   0.00  -7.93   0.00   0.00   0.00
55.14
---------------------------------------------------------------------------
--

Segment Leq : 55.14 dBA

Results segment # 3: Bank (night)
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.03 + 0.00) = 58.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
     3     90   0.00  63.89   0.00  -2.71  -3.16   0.00   0.00   0.00
58.03
---------------------------------------------------------------------------
--

Segment Leq : 58.03 dBA

Total Leq All Segments: 63.97 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 71.56
                         (NIGHT): 63.97
```

GRADIENTWIND
ENGINEERS & SCIENTISTS

```
STAMSON 5.0          NORMAL REPORT         Date: 12-08-2020 16:09:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te                  Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: RiversideSB1 (day/night)
-------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume : 1127/98    veh/TimePeriod  *
Heavy truck volume  :  805/70    veh/TimePeriod  *
Posted speed limit  :   60 km/h
Road gradient       :    0 %
Road pavement       :    1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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: RiversideSB1 (day/night)
-----------------------------------------------
Angle1  Angle2             :   0.00 deg  12.00 deg
Wood depth                 :     0      (No woods.)
No of house rows           :     0 / 0
Surface                    :     2      (Reflective ground surface)
Receiver source distance   : 20.00 / 20.00  m
Receiver height            : 79.50 / 79.50  m
Topography                 :     1      (Flat/gentle slope; no barrier)
Reference angle            :   0.00
```

```
Road data, segment # 2: RiversideSB2 (day/night)
-------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 2: RiversideSB2 (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 :  20.00 / 20.00  m
Receiver height         :  79.50 / 79.50  m
Topography              :      1        (Flat/gentle slope; no barrier)
Reference angle         :   0.00
```

```
Road data, segment # 3: Bank (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   :    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):  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 # 3: Bank (day/night)
---------------------------------------
Angle1   Angle2            : -87.00 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            :  79.50 / 79.50  m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00


Results segment # 1: RiversideSB1 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.66 + 0.00) = 57.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
    0     12   0.00  70.67   0.00  -1.25 -11.76   0.00   0.00   0.00
57.66
----------------------------------------------------------------------
--

Segment Leq : 57.66 dBA
```

```
Results segment # 2: RiversideSB2 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.67 + 0.00) = 65.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -90    -14   0.00  70.67   0.00  -1.25  -3.74   0.00   0.00   0.00
65.67
------------------------------------------------------------------------
--

Segment Leq : 65.67 dBA


Results segment # 3: Bank (day)
-------------------------------

Source height = 1.50 m

ROAD (0.00 + 71.42 + 0.00) = 71.42 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -87     90   0.00  71.49   0.00   0.00  -0.07   0.00   0.00   0.00
71.42
------------------------------------------------------------------------
--

Segment Leq : 71.42 dBA

Total Leq All Segments: 72.59 dBA
```

```
Results segment # 1: RiversideSB1 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.06 + 0.00) = 50.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
    0     12   0.00  63.07   0.00  -1.25 -11.76   0.00   0.00   0.00
50.06
---------------------------------------------------------------------------
--

Segment Leq : 50.06 dBA

Results segment # 2: RiversideSB2 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.08 + 0.00) = 58.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
  -90    -14   0.00  63.07   0.00  -1.25  -3.74   0.00   0.00   0.00
58.08
---------------------------------------------------------------------------
--

Segment Leq : 58.08 dBA
```

```
Results segment # 3: Bank (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.82 + 0.00) = 63.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
    -87      90   0.00  63.89   0.00   0.00  -0.07   0.00   0.00   0.00
63.82
------------------------------------------------------------------------
--

Segment Leq : 63.82 dBA

Total Leq All Segments: 64.99 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 72.59
                         (NIGHT): 64.99
```

GRADIENT**WIND**

ENGINEERS & SCIENTISTS

```
STAMSON 5.0        NORMAL REPORT      Date: 12-08-2020 16:30:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te               Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA1 (day/night)
------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+------+------+------+------+----
  1.             !  26.0/3.0   ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 1: VIA1 (day/night)
------------------------------------------
Angle1   Angle2           :  -7.00 deg   90.00 deg
Wood depth                :     0       (No woods.)
No of house rows          :     0 / 0
Surface                   :     2       (Reflective ground surface)
Receiver source distance  : 295.00 / 295.00 m
Receiver height           :  79.50 / 79.50  m
Topography                :     2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :  -7.00 deg   Angle2 : 9.00 deg
Barrier height            :  46.00 m
Barrier receiver distance : 196.00 / 196.00 m
Source elevation          :  12.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   3.00 m
Reference angle           :   0.00
```
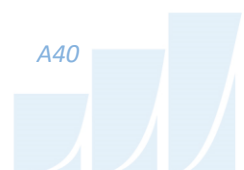
```
Rail data, segment # 2: VIA2 (day/night)
----------------------------------------
Train            ! Trains     ! Speed !# loc !# Cars! Eng  !Cont
Type             !            !(km/h) !/Train!/Train! type !weld
-----------------+------------+------+------+------+------+----
   1.            ! 26.0/3.0   ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 2: VIA2 (day/night)
----------------------------------------
Angle1   Angle2           : -16.00 deg   -7.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      2       (Reflective ground surface)
Receiver source distance : 295.00 / 295.00 m
Receiver height          :  79.50 / 79.50  m
Topography               :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1           : -16.00 deg   Angle2 : -7.00 deg
Barrier height           :  25.00 m
Barrier receiver distance : 103.00 / 103.00 m
Source elevation         :  12.00 m
Receiver elevation       :   0.00 m
Barrier elevation        :   0.00 m
Reference angle          :   0.00
```

```
Rail data, segment # 3: VIA3 (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
----------------+-------------+------+------+------+------+----
  1.             ! 26.0/1.0    ! 150.0 !  1.0 !  4.0 !Diesel!  No

Data for Segment # 3: VIA3 (day/night)
----------------------------------------
Angle1   Angle2             : -78.00 deg   -16.00 deg
Wood depth                  :     0       (No woods.)
No of house rows            :     0 / 0
Surface                     :     2       (Reflective ground surface)
Receiver source distance    : 295.00 / 295.00 m
Receiver height             :  79.50 / 79.50  m
Topography                  :     2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1              : -41.00 deg   Angle2 : -16.00 deg
Barrier height              :  57.00 m
Barrier receiver distance   : 151.00 / 151.00 m
Source elevation            :  12.00 m
Receiver elevation          :   0.00 m
Barrier elevation           :   0.00 m
Reference angle             :   0.00
```

```
Results segment # 1: VIA1 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver     ! Barrier      ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+--------------+--------------+-------------
      4.00  !      79.50   !      34.31   !      37.31
      0.50  !      79.50   !      31.98   !      34.98

LOCOMOTIVE (0.00 + 29.21 + 53.68) = 53.70 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj   F.Adj   W.Adj   H.Adj   B.Adj  SubLeq
--------------------------------------------------------------------------
    -7      9   0.00  70.09  -12.94  -10.51   0.00    0.00  -17.43  29.21
--------------------------------------------------------------------------
     9     90   0.00  70.09  -12.94   -3.47   0.00    0.00    0.00  53.68
--------------------------------------------------------------------------

WHEEL (0.00 + 20.77 + 46.76) = 46.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj   F.Adj   W.Adj   H.Adj   B.Adj  SubLeq
--------------------------------------------------------------------------
    -7      9   0.00  63.16  -12.94  -10.51   0.00    0.00  -18.95  20.77
--------------------------------------------------------------------------
     9     90   0.00  63.16  -12.94   -3.47   0.00    0.00    0.00  46.76
--------------------------------------------------------------------------

Segment Leq : 54.50 dBA
```

```
Results segment # 2: VIA2 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver      ! Barrier        ! Elevation of
Height   (m) ! Height   (m)  ! Height   (m)   ! Barrier Top  (m)
------------+------------+------------+-------------
      4.00 !          79.50 !          57.33 !          57.33
      0.50 !          79.50 !          56.11 !          56.11

LOCOMOTIVE (0.00 + 44.14 + 0.00) = 44.14 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -16    -7   0.00  70.09 -12.94 -13.01   0.00   0.00   0.00  44.14*
   -16    -7   0.00  70.09 -12.94 -13.01   0.00   0.00   0.00  44.14
----------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 37.22 + 0.00) = 37.22 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -16    -7   0.00  63.16 -12.94 -13.01   0.00   0.00   0.00  37.22*
   -16    -7   0.00  63.16 -12.94 -13.01   0.00   0.00   0.00  37.22
----------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 44.94 dBA
```

```
Results segment # 3: VIA3 (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver     ! Barrier      ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+--------------+--------------+--------------
     4.00 !        79.50 !        47.00 !        47.00
     0.50 !        79.50 !        45.21 !        45.21

LOCOMOTIVE (50.28 + 33.52 + 0.00) = 50.37 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
  -78    -41   0.00  70.09 -12.94  -6.87   0.00   0.00   0.00  50.28
---------------------------------------------------------------------
  -41    -16   0.00  70.09 -12.94  -8.57   0.00   0.00 -15.06  33.52
---------------------------------------------------------------------

WHEEL (43.36 + 25.22 + 0.00) = 43.42 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
---------------------------------------------------------------------
  -78    -41   0.00  63.16 -12.94  -6.87   0.00   0.00   0.00  43.36
---------------------------------------------------------------------
  -41    -16   0.00  63.16 -12.94  -8.57   0.00   0.00 -16.43  25.22
---------------------------------------------------------------------

Segment Leq : 51.17 dBA

Total Leq All Segments: 56.47 dBA
```

```
Results segment # 1: VIA1 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver      ! Barrier       ! Elevation of
Height  (m)  ! Height   (m)  ! Height   (m)  ! Barrier Top   (m)
------------+-------------+-------------+--------------
     4.00 !          79.50 !         34.31 !          37.31
     0.50 !          79.50 !         31.98 !          34.98

LOCOMOTIVE (0.00 + 22.84 + 47.31) = 47.33 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj  SubLeq
---------------------------------------------------------------------
    -7      9   0.00  63.72 -12.94 -10.51   0.00   0.00 -17.43  22.84
---------------------------------------------------------------------
     9     90   0.00  63.72 -12.94  -3.47   0.00   0.00   0.00  47.31
---------------------------------------------------------------------

WHEEL (0.00 + 14.40 + 40.39) = 40.40 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj  SubLeq
---------------------------------------------------------------------
    -7      9   0.00  56.80 -12.94 -10.51   0.00   0.00 -18.95  14.40
---------------------------------------------------------------------
     9     90   0.00  56.80 -12.94  -3.47   0.00   0.00   0.00  40.39
---------------------------------------------------------------------

Segment Leq : 48.13 dBA
```

```
Results segment # 2: VIA2 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier       ! Elevation of
Height   (m) ! Height   (m) ! Height   (m)  ! Barrier Top  (m)
------------+------------+------------+-------------
       4.00 !       79.50 !       57.33 !       57.33
       0.50 !       79.50 !       56.11 !       56.11

LOCOMOTIVE (0.00 + 37.77 + 0.00) = 37.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
  -16     -7   0.00  63.72 -12.94 -13.01   0.00   0.00   0.00  37.77*
  -16     -7   0.00  63.72 -12.94 -13.01   0.00   0.00   0.00  37.77
--------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 30.85 + 0.00) = 30.85 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------
  -16     -7   0.00  56.80 -12.94 -13.01   0.00   0.00   0.00  30.85*
  -16     -7   0.00  56.80 -12.94 -13.01   0.00   0.00   0.00  30.85
--------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 38.57 dBA
```

```
Results segment # 3: VIA3 (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+------------+------------+-------------
      4.00 !        79.50 !        47.00 !        47.00
      0.50 !        79.50 !        45.21 !        45.21

LOCOMOTIVE (39.14 + 22.38 + 0.00) = 39.23 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
  -78    -41   0.00  58.95 -12.94  -6.87   0.00   0.00   0.00  39.14
----------------------------------------------------------------------
  -41    -16   0.00  58.95 -12.94  -8.57   0.00   0.00 -15.06  22.38
----------------------------------------------------------------------

WHEEL (32.22 + 14.08 + 0.00) = 32.28 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
  -78    -41   0.00  52.03 -12.94  -6.87   0.00   0.00   0.00  32.22
----------------------------------------------------------------------
  -41    -16   0.00  52.03 -12.94  -8.57   0.00   0.00 -16.43  14.08
----------------------------------------------------------------------

Segment Leq : 40.03 dBA

Total Leq All Segments: 49.15 dBA
```

```
Road data, segment # 1: RiversideNB1 (day/night)
--------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  :  1127/98    veh/TimePeriod  *
Heavy truck volume   :   805/70    veh/TimePeriod  *
Posted speed limit   :    60 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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: RiversideNB1 (day/night)
--------------------------------------------------
Angle1   Angle2           : -32.00 deg   90.00 deg
Wood depth               :     0       (No woods.)
No of house rows         :     0 / 0
Surface                  :     2       (Reflective ground surface)
Receiver source distance : 66.00 / 66.00  m
Receiver height          : 79.50 / 79.50  m
Topography               :     1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Road data, segment # 2: RiversideNB2 (day/night)
---------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 2: RiversideNB2 (day/night)
-------------------------------------------------
Angle1   Angle2          : -90.00 deg  -3.00 deg
Wood depth              :     0       (No woods.)
No of house rows        :     0 / 0
Surface                 :     2       (Reflective ground surface)
Receiver source distance : 78.00 / 78.00  m
Receiver height         : 79.50 / 79.50  m
Topography              :     1       (Flat/gentle slope; no barrier)
Reference angle         :  0.00
```

```
Road data, segment # 3: Bank (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  :    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):  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 # 3: Bank (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 : 19.00 / 19.00  m
Receiver height          : 79.50 / 79.50  m
Topography               :      1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Results segment # 1: RiversideNB1 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.54 + 0.00) = 62.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -32     90   0.00  70.67   0.00  -6.43  -1.69   0.00   0.00   0.00
62.54
----------------------------------------------------------------------
--

Segment Leq : 62.54 dBA


Results segment # 2: RiversideNB2 (day)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.35 + 0.00) = 60.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90     -3   0.00  70.67   0.00  -7.16  -3.16   0.00   0.00   0.00
60.35
----------------------------------------------------------------------
--

Segment Leq : 60.35 dBA
```

```
Results segment # 3: Bank (day)
-------------------------------

Source height = 1.50 m

ROAD (0.00 + 67.45 + 0.00) = 67.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -90      0  0.00  71.49   0.00  -1.03  -3.01   0.00   0.00   0.00
67.45
------------------------------------------------------------------------
--

Segment Leq : 67.45 dBA

Total Leq All Segments: 69.26 dBA


Results segment # 1: RiversideNB1 (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.95 + 0.00) = 54.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -32     90  0.00  63.07   0.00  -6.43  -1.69   0.00   0.00   0.00
54.95
------------------------------------------------------------------------
--

Segment Leq : 54.95 dBA
```

```
Results segment # 2: RiversideNB2 (night)
-------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.75 + 0.00) = 52.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -90    -3   0.00  63.07   0.00  -7.16  -3.16   0.00   0.00   0.00
52.75
-----------------------------------------------------------------------
--

Segment Leq : 52.75 dBA

Results segment # 3: Bank (night)
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.86 + 0.00) = 59.86 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -90     0   0.00  63.89   0.00  -1.03  -3.01   0.00   0.00   0.00
59.86
-----------------------------------------------------------------------
--

Segment Leq : 59.86 dBA

Total Leq All Segments: 61.67 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 69.48
                        (NIGHT): 61.91
```

```
STAMSON 5.0          NORMAL REPORT        Date: 13-08-2020 10:02:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Bank1 (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  :    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):  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: Bank1 (day/night)
---------------------------------------
Angle1   Angle2        : -90.00 deg   -83.00 deg
Wood depth            :     0      (No woods.)
No of house rows      :     0 / 0
Surface               :     2       (Reflective ground surface)
Receiver source distance :  21.00 / 21.00  m
Receiver height       :  22.50 / 22.50  m
Topography            :     2       (Flat/gentle slope; with barrier)
Barrier angle1        : -90.00 deg   Angle2 : -83.00 deg
Barrier height        :  26.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation      :   0.00 m
Receiver elevation    :   0.00 m
Barrier elevation     :   0.00 m
Reference angle       :   0.00
```

```
Road data, segment # 2: Bank2 (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  :    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):  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 # 2: Bank2 (day/night)
-----------------------------------------
Angle1   Angle2            : -83.00 deg   70.00 deg
Wood depth                 :     0       (No woods.)
No of house rows           :     0 / 0
Surface                    :     2       (Reflective ground surface)
Receiver source distance   :  21.00 / 21.00  m
Receiver height            :  22.50 / 22.50  m
Topography                 :     2       (Flat/gentle slope; with barrier)
Barrier angle1             : -83.00 deg   Angle2 : 70.00 deg
Barrier height             :  22.10 m
Barrier receiver distance  :   6.00 / 6.00   m
Source elevation           :   0.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Road data, segment # 3: Bank3 (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  :    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):  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 # 3: Bank3 (day/night)
------------------------------------------
Angle1   Angle2            :  70.00 deg   90.00 deg
Wood depth                 :      0        (No woods.)
No of house rows           :      0 / 0
Surface                    :      2        (Reflective ground surface)
Receiver source distance   :  21.00 / 21.00  m
Receiver height            :  22.50 / 22.50  m
Topography                 :      2        (Flat/gentle slope; with barrier)
Barrier angle1             :  70.00 deg   Angle2 : 90.00 deg
Barrier height             :  81.00 m
Barrier receiver distance  :   5.00 / 5.00   m
Source elevation           :   0.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Road data, segment # 4: RiversideNB1 (day/night)
---------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume : 1127/98     veh/TimePeriod  *
Heavy truck volume  :  805/70     veh/TimePeriod  *
Posted speed limit  :   60 km/h
Road gradient       :    0 %
Road pavement       :    1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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 # 4: RiversideNB1 (day/night)
------------------------------------------------
Angle1  Angle2         :  13.00 deg   90.00 deg
Wood depth             :      0       (No woods.)
No of house rows       :      0 / 0
Surface                :      2       (Reflective ground surface)
Receiver source distance :  53.00 / 53.00  m
Receiver height        :  22.50 / 4.50   m
Topography             :      2       (Flat/gentle slope; with barrier)
Barrier angle1         :  13.00 deg   Angle2 : 90.00 deg
Barrier height         :  22.10 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation       :   0.00 m
Receiver elevation     :   0.00 m
Barrier elevation      :   0.00 m
Reference angle        :   0.00
```

```
Road data, segment # 5: RiversideNB2 (day/night)
--------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  :  1127/98    veh/TimePeriod  *
Heavy truck volume   :   805/70    veh/TimePeriod  *
Posted speed limit   :    60 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 5: RiversideNB2 (day/night)
--------------------------------------------------
Angle1   Angle2          : -38.00 deg   13.00 deg
Wood depth              :      0       (No woods.)
No of house rows        :      0 / 0
Surface                 :      2       (Reflective ground surface)
Receiver source distance : 53.00 / 53.00  m
Receiver height         : 22.50 / 22.50  m
Topography              :      2       (Flat/gentle slope; with barrier)
Barrier angle1          : -38.00 deg   Angle2 : 13.00 deg
Barrier height          : 26.00 m
Barrier receiver distance : 14.00 / 14.00  m
Source elevation        :   0.00 m
Receiver elevation      :   0.00 m
Barrier elevation       :   0.00 m
Reference angle         :   0.00
```

```
Road data, segment # 6: RiversideNB3 (day/night)
--------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)


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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 6: RiversideNB3 (day/night)
--------------------------------------------------
Angle1   Angle2          : -90.00 deg   -6.00 deg
Wood depth              :      0       (No woods.)
No of house rows        :      0 / 0
Surface                 :      2       (Reflective ground surface)
Receiver source distance : 66.00 / 66.00  m
Receiver height         : 22.50 / 22.50  m
Topography              :      2       (Flat/gentle slope; with barrier)
Barrier angle1          : -90.00 deg   Angle2 : -6.00 deg
Barrier height          : 25.60 m
Barrier receiver distance :  9.00 / 9.00   m
Source elevation        :   0.00 m
Receiver elevation      :   0.00 m
Barrier elevation       :   0.00 m
Reference angle         :   0.00
```

```
Road data, segment # 7: RiversideSB1 (day/night)
--------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  :  1127/98    veh/TimePeriod  *
Heavy truck volume   :   805/70    veh/TimePeriod  *
Posted speed limit   :    60 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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 # 7: RiversideSB1 (day/night)
-----------------------------------------------
Angle1   Angle2          : -90.00 deg   -25.00 deg
Wood depth              :      0       (No woods.)
No of house rows        :      0 / 0
Surface                 :      2       (Reflective ground surface)
Receiver source distance : 63.00 / 63.00  m
Receiver height         : 22.50 / 22.50  m
Topography              :      2       (Flat/gentle slope; with barrier)
Barrier angle1          : -90.00 deg   Angle2 : -25.00 deg
Barrier height          : 22.10 m
Barrier receiver distance : 14.00 / 14.00  m
Source elevation        :  0.00 m
Receiver elevation      :  0.00 m
Barrier elevation       :  0.00 m
Reference angle         :  0.00
```

```
Road data, segment # 8: RiversideSB2 (day/night)
-------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume : 1127/98     veh/TimePeriod  *
Heavy truck volume  :  805/70     veh/TimePeriod  *
Posted speed limit  :   60 km/h
Road gradient       :    0 %
Road pavement       :    1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 8: RiversideSB2 (day/night)
-------------------------------------------------
Angle1   Angle2         : -25.00 deg  -13.00 deg
Wood depth             :     0       (No woods.)
No of house rows       :     0 / 0
Surface                :     2       (Reflective ground surface)
Receiver source distance : 63.00 / 63.00  m
Receiver height        : 22.50 / 22.50  m
Topography             :     2       (Flat/gentle slope; with barrier)
Barrier angle1         : -25.00 deg   Angle2 : -13.00 deg
Barrier height         : 81.00 m
Barrier receiver distance : 15.00 / 15.00  m
Source elevation       :  0.00 m
Receiver elevation     :  0.00 m
Barrier elevation      :  0.00 m
Reference angle        :  0.00
```
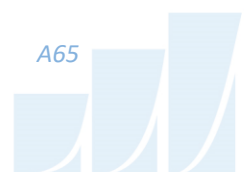
```
Results segment # 1: Bank1 (day)
-------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        22.50 !       18.50 !        18.50

ROAD (0.00 + 44.73 + 0.00) = 44.73 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -83   0.00  71.49   0.00  -1.46 -14.10   0.00   0.00 -11.20
44.73
-------------------------------------------------------------------------
--

Segment Leq : 44.73 dBA


Results segment # 2: Bank2 (day)
-------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        22.50 !       16.50 !        16.50

ROAD (0.00 + 51.43 + 0.00) = 51.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -83     70   0.00  71.49   0.00  -1.46  -0.71   0.00   0.00 -17.90
51.43
-------------------------------------------------------------------------
--

Segment Leq : 51.43 dBA
```

```
Results segment # 3: Bank3 (day)
--------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        22.50 !       17.50 !        17.50

ROAD (0.00 + 41.01 + 0.00) = 41.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
    70      90   0.00  71.49   0.00  -1.46  -9.54   0.00   0.00 -19.47
41.01
-----------------------------------------------------------------------
--

Segment Leq : 41.01 dBA

Results segment # 4: RiversideNB1 (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        22.50 !        6.65 !         6.65

ROAD (0.00 + 43.26 + 0.00) = 43.26 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
    13      90   0.00  70.67   0.00  -5.48  -3.69   0.00   0.00 -18.23
43.26
-----------------------------------------------------------------------
--

Segment Leq : 43.26 dBA
```

```
Results segment # 5: RiversideNB2 (day)
-----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        22.50 !       16.95 !         16.95

ROAD (0.00 + 39.71 + 0.00) = 39.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -38     13   0.00  70.67   0.00  -5.48  -5.48   0.00   0.00 -20.00
39.71
----------------------------------------------------------------------
--

Segment Leq : 39.71 dBA


Results segment # 6: RiversideNB3 (day)
-----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        22.50 !       19.64 !         19.64

ROAD (0.00 + 45.09 + 0.00) = 45.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90     -6   0.00  70.67   0.00  -6.43  -3.31   0.00   0.00 -15.84
45.09
----------------------------------------------------------------------
--

Segment Leq : 45.09 dBA
```

```
Results segment # 7: RiversideSB1 (day)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver     ! Barrier       ! Elevation of
Height  (m)  ! Height   (m) ! Height  (m)   ! Barrier Top  (m)
------------+------------+------------+--------------
     1.50 !        22.50 !       17.83 !         17.83

ROAD (0.00 + 48.22 + 0.00) = 48.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90    -25   0.00  70.67   0.00  -6.23  -4.42   0.00   0.00 -11.78
48.22
----------------------------------------------------------------------
--

Segment Leq : 48.22 dBA

Results segment # 8: RiversideSB2 (day)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver     ! Barrier       ! Elevation of
Height  (m)  ! Height   (m) ! Height  (m)   ! Barrier Top  (m)
------------+------------+------------+--------------
     1.50 !        22.50 !       17.50 !         17.50

ROAD (0.00 + 32.67 + 0.00) = 32.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -25    -13   0.00  70.67   0.00  -6.23 -11.76   0.00   0.00 -20.00
32.67
----------------------------------------------------------------------
--

Segment Leq : 32.67 dBA

Total Leq All Segments: 54.95 dBA
```

Riverside Development GP Inc.
1335-1339 BANK STREET, OTTAWA: TRANSPORTATION NOISE ASSESSMENT

```
Results segment # 1: Bank1 (night)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
      1.50 !       22.50 !       18.50 !        18.50

ROAD (0.00 + 37.13 + 0.00) = 37.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90    -83   0.00  63.89   0.00  -1.46 -14.10   0.00   0.00 -11.20
37.13
----------------------------------------------------------------------
--

Segment Leq : 37.13 dBA


Results segment # 2: Bank2 (night)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
      1.50 !       22.50 !       16.50 !        16.50

ROAD (0.00 + 43.83 + 0.00) = 43.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -83     70   0.00  63.89   0.00  -1.46  -0.71   0.00   0.00 -17.90
43.83
----------------------------------------------------------------------
--

Segment Leq : 43.83 dBA
```

```
Results segment # 3: Bank3 (night)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
      1.50  !       22.50 !      17.50 !       17.50

ROAD (0.00 + 33.42 + 0.00) = 33.42 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
    70     90   0.00  63.89   0.00  -1.46  -9.54   0.00   0.00 -19.47
33.42
--------------------------------------------------------------------------
--

Segment Leq : 33.42 dBA

Results segment # 4: RiversideNB1 (night)
------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+------------+--------------
      1.50  !        4.50 !       2.23 !        2.23

ROAD (0.00 + 34.86 + 0.00) = 34.86 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
    13     90   0.00  63.07   0.00  -5.48  -3.69   0.00   0.00 -19.04
34.86
--------------------------------------------------------------------------
--

Segment Leq : 34.86 dBA
```

```
Results segment # 5: RiversideNB2 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier       ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
      1.50 !        22.50 !        16.95 !        16.95

ROAD (0.00 + 32.11 + 0.00) = 32.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -38      13   0.00  63.07   0.00  -5.48  -5.48   0.00   0.00 -20.00
32.11
----------------------------------------------------------------------
--

Segment Leq : 32.11 dBA


Results segment # 6: RiversideNB3 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier       ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
      1.50 !        22.50 !        19.64 !        19.64

ROAD (0.00 + 37.49 + 0.00) = 37.49 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
----------------------------------------------------------------------
--
   -90      -6   0.00  63.07   0.00  -6.43  -3.31   0.00   0.00 -15.84
37.49
----------------------------------------------------------------------
--

Segment Leq : 37.49 dBA
```

```
Results segment # 7: RiversideSB1 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
     1.50 !        22.50 !        17.83 !        17.83

ROAD (0.00 + 40.63 + 0.00) = 40.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------
--
   -90    -25   0.00  63.07   0.00  -6.23  -4.42   0.00   0.00 -11.78
40.63
---------------------------------------------------------------------
--

Segment Leq : 40.63 dBA

Results segment # 8: RiversideSB2 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
     1.50 !        22.50 !        17.50 !        17.50

ROAD (0.00 + 25.08 + 0.00) = 25.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------
--
   -25    -13   0.00  63.07   0.00  -6.23 -11.76   0.00   0.00 -20.00
25.08
---------------------------------------------------------------------
--
Segment Leq : 25.08 dBA

Total Leq All Segments: 47.30 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 54.95
                         (NIGHT): 47.30
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-08-2020 10:29:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te                  Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Bank (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  :    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):  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: Bank (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 : 20.00 / 20.00  m
Receiver height        : 82.50 / 82.50  m
Topography             :     2     (Flat/gentle slope; with barrier)
Barrier angle1         : -90.00 deg   Angle2 : 90.00 deg
Barrier height         : 82.10 m
Barrier receiver distance :  4.00 / 4.00   m
Source elevation       :  0.00 m
Receiver elevation     :  0.00 m
Barrier elevation      :  0.00 m
Reference angle        :  0.00
```

```
Road data, segment # 2: RiversideNB1 (day/night)
-------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume : 1127/98     veh/TimePeriod  *
Heavy truck volume  :  805/70     veh/TimePeriod  *
Posted speed limit  :   60 km/h
Road gradient       :    0 %
Road pavement       :    1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 2: RiversideNB1 (day/night)
-------------------------------------------------
Angle1   Angle2             : -2.00 deg   90.00 deg
Wood depth                  :     0        (No woods.)
No of house rows            :     0 / 0
Surface                     :     2        (Reflective ground surface)
Receiver source distance    : 87.00 / 87.00  m
Receiver height             : 82.50 / 82.50  m
Topography                  :     2        (Flat/gentle slope; with barrier)
Barrier angle1              : -2.00 deg   Angle2 : 90.00 deg
Barrier height              : 82.10 m
Barrier receiver distance   : 21.00 / 21.00  m
Source elevation            :  0.00 m
Receiver elevation          :  0.00 m
Barrier elevation           :  0.00 m
Reference angle             :  0.00
```

```
Road data, segment # 3: RiversideNB2 (day/night)
---------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume :  1127/98    veh/TimePeriod  *
Heavy truck volume  :   805/70    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 3: RiversideNB2 (day/night)
-----------------------------------------------
Angle1   Angle2           : -24.00 deg   -2.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      2       (Reflective ground surface)
Receiver source distance : 87.00 / 87.00  m
Receiver height          : 82.50 / 82.50  m
Topography               :      2       (Flat/gentle slope; with barrier)
Barrier angle1           : -24.00 deg   Angle2 : -2.00 deg
Barrier height           : 86.90 m
Barrier receiver distance : 20.00 / 20.00  m
Source elevation         :   0.00 m
Receiver elevation       :   0.00 m
Barrier elevation        :   0.00 m
Reference angle          :   0.00
```

```
Road data, segment # 4: RiversideNB3 (day/night)
-------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  :  1127/98    veh/TimePeriod  *
Heavy truck volume   :   805/70    veh/TimePeriod  *
Posted speed limit   :    60 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 4: RiversideNB3 (day/night)
-----------------------------------------------
Angle1   Angle2            : -90.00 deg   5.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  95.00 / 95.00  m
Receiver height            :  82.50 / 82.50  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             : -90.00 deg   Angle2 : 5.00 deg
Barrier height             :  86.90 m
Barrier receiver distance  :  18.00 / 18.00  m
Source elevation           :   0.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Road data, segment # 5: RiversideSB1 (day/night)
--------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  :  1127/98    veh/TimePeriod  *
Heavy truck volume   :   805/70    veh/TimePeriod  *
Posted speed limit   :   60 km/h
Road gradient        :    0 %
Road pavement        :    1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 5: RiversideSB1 (day/night)
--------------------------------------------------
Angle1   Angle2          : -90.00 deg   -20.00 deg
Wood depth              :      0       (No woods.)
No of house rows        :      0 / 0
Surface                 :      2       (Reflective ground surface)
Receiver source distance :  29.00 / 29.00  m
Receiver height         :  82.50 / 82.50  m
Topography              :      2       (Flat/gentle slope; with barrier)
Barrier angle1          : -90.00 deg   Angle2 : -20.00 deg
Barrier height          :  82.10 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation        :   0.00 m
Receiver elevation      :   0.00 m
Barrier elevation       :   0.00 m
Reference angle         :   0.00
```

```
Road data, segment # 6: RiversideSB2 (day/night)
--------------------------------------------------
Car traffic volume   : 14168/1232  veh/TimePeriod  *
Medium truck volume  :  1127/98    veh/TimePeriod  *
Heavy truck volume   :   805/70    veh/TimePeriod  *
Posted speed limit   :    60 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

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

     24 hr Traffic Volume (AADT or SADT):  17500
     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 # 6: RiversideSB2 (day/night)
--------------------------------------------------
Angle1   Angle2            : -5.00 deg   28.00 deg
Wood depth                 :     0        (No woods.)
No of house rows           :     0 / 0
Surface                    :     2        (Reflective ground surface)
Receiver source distance   : 30.00 / 30.00  m
Receiver height            : 82.50 / 82.50  m
Topography                 :     2        (Flat/gentle slope; with barrier)
Barrier angle1             : -5.00 deg   Angle2 : 28.00 deg
Barrier height             : 82.10 m
Barrier receiver distance  : 18.00 / 18.00  m
Source elevation           :  0.00 m
Receiver elevation         :  0.00 m
Barrier elevation          :  0.00 m
Reference angle            :  0.00
```

```
Road data, segment # 7: RiversideSB3 (day/night)
--------------------------------------------------
Car traffic volume  : 14168/1232  veh/TimePeriod  *
Medium truck volume : 1127/98     veh/TimePeriod  *
Heavy truck volume  :  805/70     veh/TimePeriod  *
Posted speed limit  :   60 km/h
Road gradient       :    0 %
Road pavement       :    1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    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 # 7: RiversideSB3 (day/night)
--------------------------------------------------
Angle1   Angle2          :  28.00 deg   90.00 deg
Wood depth              :     0        (No woods.)
No of house rows        :     0 / 0
Surface                 :     2        (Reflective ground surface)
Receiver source distance : 30.00 / 30.00  m
Receiver height         : 82.50 / 82.50  m
Topography              :     2        (Flat/gentle slope; with barrier)
Barrier angle1          :  28.00 deg   Angle2 : 90.00 deg
Barrier height          :  86.90 m
Barrier receiver distance : 18.00 / 18.00  m
Source elevation        :   0.00 m
Receiver elevation      :   0.00 m
Barrier elevation       :   0.00 m
Reference angle         :   0.00
```

```
Results segment # 1: Bank (day)
--------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
     1.50 !       82.50 !       66.30 !       66.30

ROAD (0.00 + 53.58 + 0.00) = 53.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -90     90   0.00  71.49   0.00  -1.25   0.00   0.00   0.00 -16.66
53.58
------------------------------------------------------------------------
--

Segment Leq : 53.58 dBA


Results segment # 2: RiversideNB1 (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
     1.50 !       82.50 !       62.95 !       62.95

ROAD (0.00 + 41.85 + 0.00) = 41.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
    -2     90   0.00  70.67   0.00  -7.63  -2.91   0.00   0.00 -18.27
41.85
------------------------------------------------------------------------
--

Segment Leq : 41.85 dBA
```

```
Results segment # 3: RiversideNB2 (day)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
      1.50 !       82.50 !       63.88 !       63.88

ROAD (0.00 + 33.90 + 0.00) = 33.90 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -24     -2   0.00  70.67   0.00  -7.63  -9.13   0.00   0.00 -20.00
33.90
------------------------------------------------------------------------
--

Segment Leq : 33.90 dBA


Results segment # 4: RiversideNB3 (day)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
      1.50 !       82.50 !       67.15 !       67.15

ROAD (0.00 + 41.16 + 0.00) = 41.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -90      5   0.00  70.67   0.00  -8.02  -2.78   0.00   0.00 -18.71
41.16
------------------------------------------------------------------------
--

Segment Leq : 41.16 dBA
```

```
Results segment # 5: RiversideSB1 (day)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
--------------------------------------
Source      ! Receiver    ! Barrier      ! Elevation of
Height  (m) ! Height  (m) ! Height  (m)  ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        82.50 !       51.77 !        51.77

ROAD (0.00 + 45.57 + 0.00) = 45.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -90    -20   0.00  70.67   0.00  -2.86  -4.10   0.00   0.00 -18.13
45.57
-----------------------------------------------------------------------
--

Segment Leq : 45.57 dBA


Results segment # 6: RiversideSB2 (day)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
--------------------------------------
Source      ! Receiver    ! Barrier       ! Elevation of
Height  (m) ! Height  (m) ! Height  (m)   ! Barrier Top  (m)
------------+-------------+------------+--------------
     1.50 !        82.50 !       33.90 !        33.90

ROAD (0.00 + 40.29 + 0.00) = 40.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
    -5     28   0.00  70.67   0.00  -3.01  -7.37   0.00   0.00 -20.00
40.29
-----------------------------------------------------------------------
--

Segment Leq : 40.29 dBA
```

```
Results segment # 7: RiversideSB3 (day)
-----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver     ! Barrier      ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+-------------+-------------+---------------
      1.50 !        82.50 !        33.90 !        33.90

ROAD (0.00 + 43.99 + 0.00) = 43.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
    28     90   0.00  70.67   0.00  -3.01  -4.63   0.00   0.00 -19.03
43.99
------------------------------------------------------------------------
--

Segment Leq : 43.99 dBA

Total Leq All Segments: 55.19 dBA

Results segment # 1: Bank (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver     ! Barrier      ! Elevation of
Height  (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
------------+-------------+-------------+---------------
      1.50 !        82.50 !        66.30 !        66.30

ROAD (0.00 + 45.98 + 0.00) = 45.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -90     90   0.00  63.89   0.00  -1.25   0.00   0.00   0.00 -16.66
45.98
------------------------------------------------------------------------
--

Segment Leq : 45.98 dBA
```

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```
Results segment # 2: RiversideNB1 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
     1.50 !        82.50 !       62.95 !        62.95

ROAD (0.00 + 34.25 + 0.00) = 34.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
    -2     90   0.00  63.07   0.00  -7.63  -2.91   0.00   0.00 -18.27
34.25
-----------------------------------------------------------------------
--

Segment Leq : 34.25 dBA

Results segment # 3: RiversideNB2 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
     1.50 !        82.50 !       63.88 !        63.88

ROAD (0.00 + 26.31 + 0.00) = 26.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -24     -2   0.00  63.07   0.00  -7.63  -9.13   0.00   0.00 -20.00
26.31
-----------------------------------------------------------------------
--

Segment Leq : 26.31 dBA
```

```
Results segment # 4: RiversideNB3 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
--------------------------------------
Source       ! Receiver    ! Barrier       ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
      1.50 !        82.50 !        67.15 !        67.15

ROAD (0.00 + 33.56 + 0.00) = 33.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
    -90        5   0.00  63.07   0.00  -8.02  -2.78   0.00   0.00 -18.71
33.56
---------------------------------------------------------------------------
--

Segment Leq : 33.56 dBA


Results segment # 5: RiversideSB1 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
--------------------------------------
Source       ! Receiver    ! Barrier       ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+------------+------------+--------------
      1.50 !        82.50 !        51.77 !        51.77

ROAD (0.00 + 37.97 + 0.00) = 37.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
---------------------------------------------------------------------------
--
    -90      -20   0.00  63.07   0.00  -2.86  -4.10   0.00   0.00 -18.13
37.97
---------------------------------------------------------------------------
--

Segment Leq : 37.97 dBA
```

```
Results segment # 6: RiversideSB2 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
     1.50 !       82.50 !       33.90 !        33.90

ROAD (0.00 + 32.69 + 0.00) = 32.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   -5     28   0.00  63.07   0.00  -3.01  -7.37   0.00   0.00 -20.00
32.69
-----------------------------------------------------------------------
--

Segment Leq : 32.69 dBA

Results segment # 7: RiversideSB3 (night)
-------------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
     1.50 !       82.50 !       33.90 !        33.90

ROAD (0.00 + 36.40 + 0.00) = 36.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----------------------------------------------------------------------
--
   28     90   0.00  63.07   0.00  -3.01  -4.63   0.00   0.00 -19.03
36.40
-----------------------------------------------------------------------
--

Segment Leq : 36.40 dBA
Total Leq All Segments: 47.59 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 55.19
                         (NIGHT): 47.59
```