NOVATECH

Engineers, Planners & Landscape Architects

Engineering

- Land / Site Development
- Municipal Infrastructure
- Environmental / Water Resources
- Traffic / Transportation
- Structural
- Recreational

Planning

- Land / Site Development
- Planning Application Management
- Municipal Planning Documents & Studies
- Expert Witness (OMB)
- Wireless Industry

Landscape Architecture

- Urban Design & Streetscapes
- Open Space, Parks & Recreation Planning
- Community & Residential Developments
- Commercial & Institutional Sites
- Environmental Restoration

35 Years

Burnett Lands
3370 Greenbank Road, Ottawa

Noise Impact Feasibility Report

Engineering excellence. Planning precision. Inspired landscapes.

BURNETT LANDS

3370 GREENBANK ROAD

NOISE IMPACT FEASIBILITY REPORT

Prepared for:

Claridge Homes

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

December 9, 2016
Revised: March 3, 2017
Revised: January 26, 2018

Novatech File: 111117
Ref: R-2016-174

NOVATECH
Engineers, Planners & Landscape Architects

January 26, 2017

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning Services Branch
110 Laurier Ave. West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: **Mr. Don Herweyer, Manager of Development Review South**

Reference: **Burnett Lands - 3370 Greenbank Road**
Noise Impact Feasibility Report
Novatech File No.: 111117

Enclosed herein are three (3) copies of the "Noise Impact Feasibility Report" for the proposed development of the Burnett Lands located at 3370 Greenbank Road, Ottawa. The report is submitted in support of applications for Official Plan Amendment, Zoning By-Law Amendment and Draft Plan of Subdivision. It will address the environmental impact of noise from traffic on the outdoor living areas, and assess the feasibility of mitigation measures to attenuate noise to acceptable levels.

Should you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH

Marc St. Pierre
Senior Project Manager

Encl.

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF DRAWINGS

LIST OF APPENDICIES

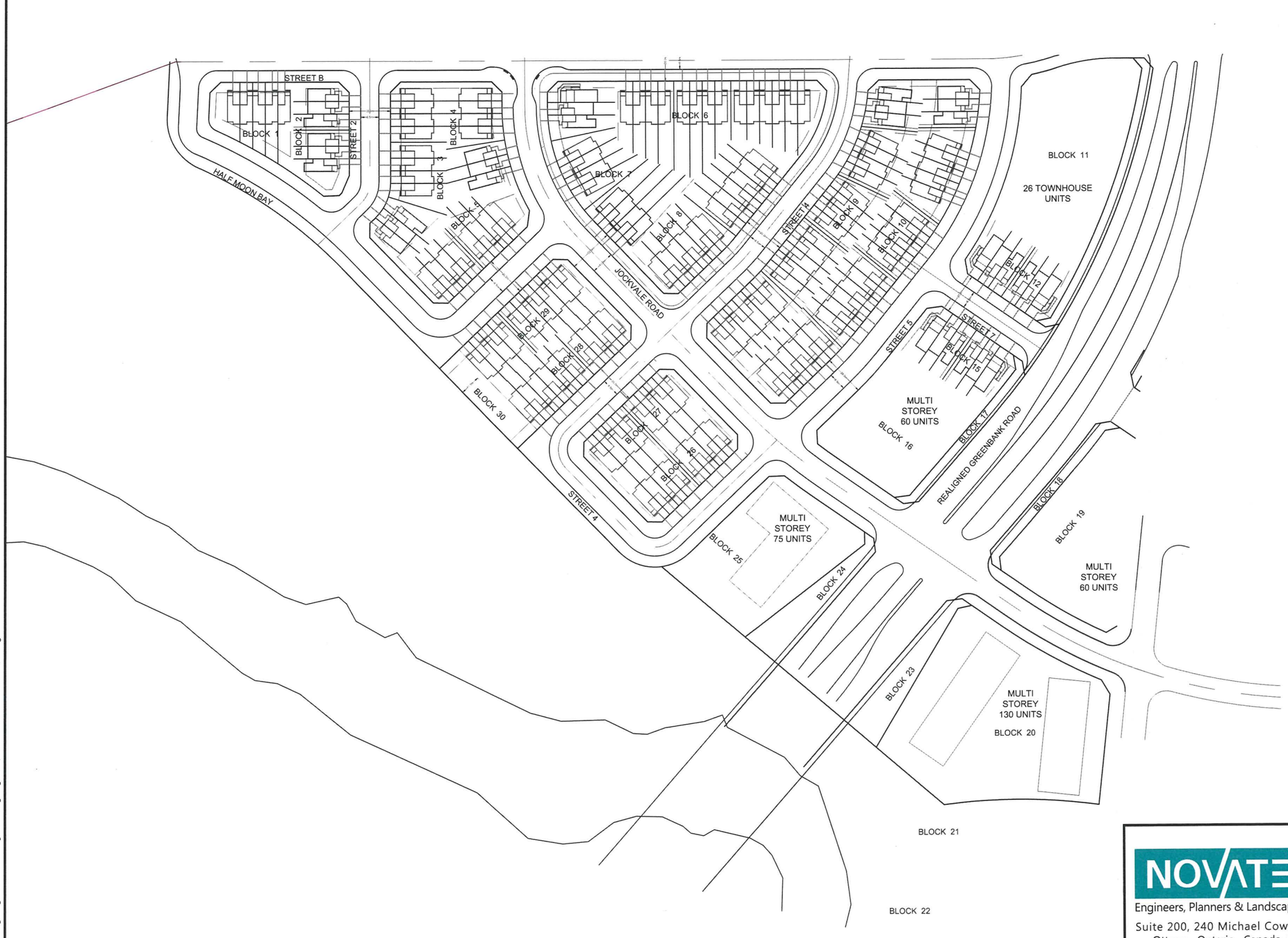
1.0 INTRODUCTION

Novatech has been retained by Claridge Homes (South Nepean) LP to prepare a Noise Impact Feasibility Report in support of an Official Plan Amendment (OPA), a Draft Plan of Subdivision, and a Zoning By-Law Amendment (ZBLA) to allow for the development of the lands at 3370 Greenbank Road, Ottawa. The site is planned to be developed with a mix of 2-storey public street orientated townhomes (169 units), private street oriented townhomes (26 units), three 4-storey residential blocks (195 units), and a 4-storey retirement home (130 units) as shown on **Figure 1**. The proposed development provides access to the future district park- Half Moon Bay Park (along the Jock River), various trails, and to the multi-use path identified in the *Official Plan*, *South Nepean Secondary Plan*, and *South Nepean Community Design Plan.*

The study will assess the environmental impact of noise from traffic on the outdoor living areas, and review the feasibility of mitigation methods. Mitigation of in-door noise levels will not be discussed in this report since floor areas, window/door areas and building sections are not yet available. These components will be reviewed as part of the detailed subdivision design.

1.1 SITE LOCATION AND CONTEXT

The subject site is located within the South Nepean Town Centre limits and is approximately 15.5 hectares in area. Specifically, the site is located immediately north of the Jock River, south of Strandherd Drive and between the Kennedy Burnett Stormwater Management Facility and the existing Greenbank Road as shown on **Figure 2**. The Burnett Municipal Drain is a tributary to the Jock River and travels through the subject site. The subject site currently has farm and accessory structures located near its southern boundary with an existing gravel access on to Greenbank Road. The remainder of the site is currently used for passive agriculture activities. The site is generally flat with a gentle slope from the northeastern corner to the southwestern corner.



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

3370 GREENBANK RD. BURNETT LANDS

CONCEPT PLAN

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE JAN 2018 | JOB 111117 | FIGURE FIGURE 1

M:\2011\111117\CAD\Design\Figures\111117-Fig2-CP.dwg, Fig2-CP, Jan 18, 2018 - 10:02am, szorgel

SHT11X17.DWG 279mmX432mm

Figure 2: Site Location (Base Map Source: GeoOttawa)

The following describes the existing and planned land uses adjacent to the subject site:

North: Lands to the north, owned by Caivan Communities, are currently under the development approval process and have recently obtained OPA and ZBLA approval (Amendment #144) from the City to permit High Rise and Mid Rise Mixed-Use Residential developments, Mid Rise Residential Dwellings, and a Neighbourhood Park as per *Schedule 1- Land Use Plan, South Nepean Secondary Plan (Area 7)*. Further north of the Caivan Communities' development is the planned Barrhaven Town Centre which will include a variety of retail uses to service the surrounding existing and planned residential developments.

East: Lands east of the subject site contain a mixture of low density residential dwellings (single detached houses), a secondary school (St. Joseph Catholic High School), and an existing vegetated area. Greenbank Road currently forms the eastern boundary of the site. The realigned Greenbank Road will bisect the site as per the design by the City.

South: The Jock River runs west – east along the majority of the southern boundary of the property until it turns south near the southeastern corner of the site. The lands south of Jock River are within the *Barrhaven South Community Design Plan* and are intended for a future district park and residential uses as shown on *Figure 17* of the *Barrhaven South Community Design Plan.*

West: The Kennedy Burnett stormwater management facility is located north west of the subject site and drains into the Jock River. Lands immediately west are currently vacant and intended for mostly conservation and residential uses as identified in Schedule B of the Official Plan.

2.0 BACKGROUND AND REPORT ASSUMPTIONS AND LIMITATIONS

The City of Ottawa's Official Plan (OP) and Environmental Noise Control Guidelines (ENCG) stipulates that a noise study shall be prepared when a residential development is located within close proximity to surface transportation, stationary sources and aircraft noise sources. This report considers noise from traffic on the future Jockvale Road and Greenbank Road as all other sources of noise are located beyond the limits of consideration as outlined in Section 2.1 of the ENCG. Jockvale Road and Greenbank Road are classified as future collector and arterial roads, respectively, on Schedule E - Urban Road Network in the OP. Jockvale Road will be classified as a 2-lane urban collector and Greenbank Road will be classified as a 4-lane urban arterial divided road. This report also takes into consideration the future bus route on Greenbank Road.

The checklist of required information for a Noise Control Feasibility Study includes an evaluation of alternative site designs and recommendations for alternative site plan design. However, unlike other greenfield subdivisions where the street pattern is not yet established, the South Nepean Town Centre has a fixed street pattern that does not permit significant modifications. The street pattern was deliberately designed through the Secondary Plan process to provide connections between the Town Centre and surrounding communities, provide a pattern of regular development blocks, and integrate different neighbourhoods within the Town Centre. The street pattern is a hierarchical grid of arterial streets, collector streets, and local streets as shown on the Demonstration Plan and accompanying Schedules in the Secondary Plan. No rear lanes exist due to their restricted access by emergency vehicles, solid waste vehicles and snow removal equipment. The Secondary Plan states that the streets establish the basic form and pattern of development in the Town Centre, therefore policies in the Secondary Plan require that plans of subdivision adhere to the grid pattern as shown on the Schedules and Demonstration Plan from the outset in order to achieve the CDP's design objectives. Minor modifications to the street pattern may be made at the discretion of the Director of Planning and Infrastructure Approvals but more significant changes would require a Secondary Plan Amendment. The majority of townhouse blocks on site have been oriented to provide significant shielding for Outdoor Living Areas from Greenbank Road and Jockvale Road on the northern portion of the site.

3.0 CITY OF OTTAWA NOISE CONTROL GUIDELINES

3.1 Sound Level Criteria

The City of Ottawa is concerned with noise from aircraft, roads, transitways, and railways, as expressed in Tables 2.2a: Sound Level Limit for Outdoor Living Areas – Road and Rail, Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail, and Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces – Road and Rail of the ENCG. The maximum suggested sound levels for outdoor and indoor living areas between 7am and 11pm are 55 dBA and 45 dBA, respectively. The maximum suggested sound level for indoor bedrooms is 40dBA between

11pm and 7am. For reference, Tables 2.2a, 2.2b and 2.2c of the ENCG are included in **Appendix A**.

Outdoor Living Area and Plane of Window receivers are defined as:

- **Outdoor Living Area (OLA):** The outdoor amenity area provided for quiet enjoyment of the outdoor environment during the daytime period (i.e., backyards, terraces and patios). OLA noise levels are considered 3.0m from the building façade, 1.5m above grade.
- **Plane of Window (POW):** The indoor living space where the sound levels will affect the living room area during daytime hours and bedrooms during nighttime hours. POW noise levels are considered inside the building, 1.5m above the finished floor.

3.2 Noise Attenuation Requirements

When OLA sound levels are predicted to be approximately equal to or less than 55 dBA attenuation measures are not required. If the predicted noise levels are found to exceed 55 dBA, physical forms of mitigation is suggested and which may also include the provision of warning clauses to inform purchasers of the expected noise levels and specific mitigation measures.

4.0 PREDICTION AND MITIGATION OF NOISE LEVELS

4.1 Road Traffic

Table 1 outlines the traffic parameters used to predict the noise levels for the site.

Table 1: Traffic Parameters

Road	Implied Roadway Class	AADT	Traffic Split (%)		
			Day Night	Medium Trucks	Heavy Trucks
Jockvale	2 Lane Urban Collector	8,000	92/8	7	5
Greenbank	4 Lane Urban Arterial Divided	35,000	92/8	7	5

In addition to the traffic volumes listed in Table 1, Greenbank Road will serve as a transit corridor for 144 bus trips per day. For reference, excerpts from the ENCG confirming the Jockvale Road and Greenbank Road AADT are included in **Appendix A** and an email an confirming the Greenbank Road future bus traffic volumes are included in **Appendix B**.

4.2 Noise Level Analysis

The noise levels for the site were analyzed using version 5.03 of the STAMSON computer noise modelling program. For the most part, due to the planned orientation of the outdoor living areas, noise levels will be below the new OLA guideline of 55 dBA. There are localized areas in which townhomes fronting local streets are exposed to Greenbank Road and Jockvale Road that require physical mitigation. For townhomes on Street 7 (close proximity to Greenbank Road), it is proposed to install a maximum 3.3 meter barrier (combination of noise wall, berm and/or retaining wall) along these back yards which will reduce the noise level from a maximum of 70.18 dBA to

just below 60 dBA. For other OLAs exposed to Jockvale Road it is proposed to install a 2.2m noise wall along the side yards which will reduce the noise levels to below 60 dBA. There is a significant reduction in noise levels throughout the site, however, this is still above the new OLA guideline of 55 dBA (the previous guideline as of January 2016 was 60 dBA). To further reduce the noise level to the new criteria would result in a noise wall higher than 6.0 meters along Greenbank Road and above 3.0m along Jockvale Road. A 6.0m barrier is well in excess of the ENCG and a 3.0 m high barrier would be aesthetically unappealing to the local residents and its advantages (further reducing noise) would be minimal along Jockvale Road and therefore not feasible. As per section 3.4 of the ENCG, if there's no technically or economically feasible way to achieve the City's criteria, a tolerance up to 5 dBA may be granted at the City's discretion. **Tables 2, 3, 4, and 5** show predicted noise levels, mitigated noise levels and the relationship between the height of wall and noise levels at various locations.

The Noise Control Plan (Drawing Number 111117-NC) in **Appendix B** shows the receiver locations, receiver elevations, and receiver distances to noise sources. The noise levels for all receiver locations generated from STAMSON are listed in **Table 2** with detailed modeling results in **Appendix B.**

Table 2: Predicted Noise Levels

Receiver	File	Calculated Noise Level (dBa), 7:00-23:00		Mitigation Method
Name		Un-attenuated	Attenuated	
OLA1	OLA1.te	69.59	59.89	3.1m Noise Barrier*
OLA2	OLA2.te	66.52	58.55	3.1m Noise Barrier* (primarily for OLA1)
OLA3	OLA3.te	70.18	59.94	3.3m Noise Barrier*
OLA4	OLA4.te	66.88	58.72	3.3m Noise Barrier* (primarily for OLA3)
OLA5	OLA5.te	51.81	-	N/A
OLA6	OLA6.te	64.88	58.78	2.2m Noise Wall
OLA7	OLA7.te	54.82	-	N/A
OLA8	OLA8.te	63.86	57.01	2.2m Noise Wall
OLA9	OLA9.te	59.26	53.72	2.2m Noise Wall
OLA10	OLA10.te	54.00	49.66	2.2m Noise Wall (primarily for OLA9)
OLA11	OLA11.te	60.51	56.34	3.1m Noise Barrier at OLA1, 2.2m Wall at OLA11

*Noise Barrier refers to any combination of noise wall, berm and/or retaining wall

Table 3: Predicted Noise Levels at Various Wall Heights, OLA 3

OLA 3		
Height of Wall (m)	**Noise Level Day (dBA)**	**Noise Level Night (dBA)**
3.3	59.94	62.75
3.5	59.34	60.14
4.0	58.07	59.49
4.5	57.06	55.87
5.0	56.24	54.24
5.5	55.62	52.96
6.0	55.17	51.87
6.5	54.88	51.03

Table 4: Predicted Noise Levels at Various Wall Heights, OLA 6

OLA 6		
Height of Wall (m)	**Noise Level Day (dBA)**	**Noise Level Night (dBA)**
2.2	58.78	57.69
2.5	57.76	57.69
3.0	56.18	57.69
3.5	54.95	54.91

Table 5: Predicted Noise Levels at Various Wall Heights, OLA 8

OLA 8		
Height of Wall (m)	**Noise Level Day (dBA)**	**Noise Level Night (dBA)**
2.2	57.01	56.49
2.5	55.64	56.49
3.0	53.54	56.49

It is also recommended that the following noise clauses be registered on title and incorporated into the agreement of purchase and sales:

> "Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and Ministry of the Environment."

> "To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. The measures for sound attenuation utilized is an acoustic barrier to be owned and maintained in the City right of way (or condominium right of way)."

Additionally, with the tolerance of 5 dBA in some areas, it is recommended that Blocks 8-10, 12, 15, 26-29 have an additional noise clause registered on title and incorporated into the agreement of purchase and sales.

> "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 road/rail/Light Rail/transitway 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 by up to 5 dBA."

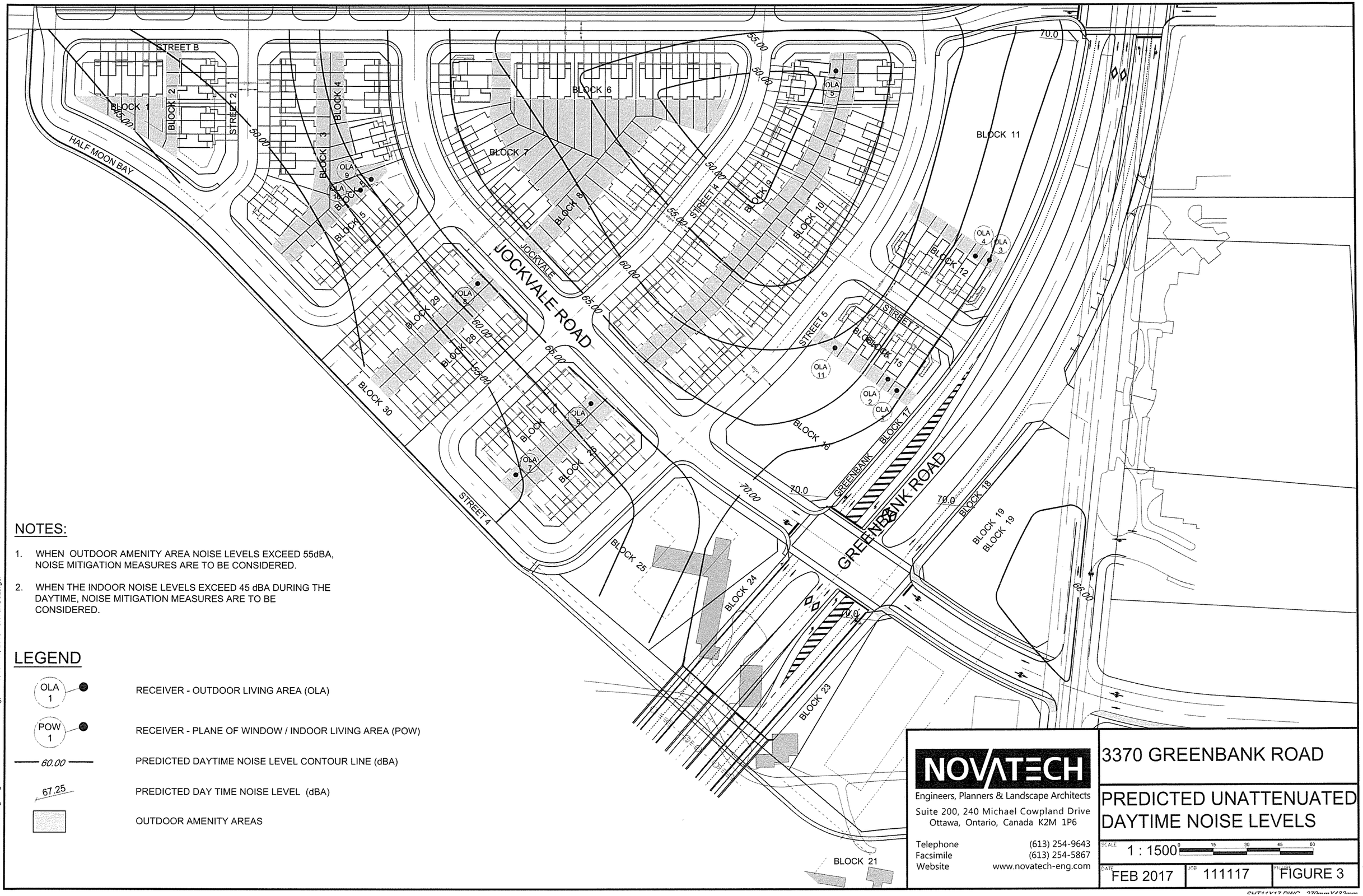
The maximum predicted indoor noise levels (night) for the development is located at the front of the units facing Greenbank Road and is 62.75dBA. The maximum predicted un-attenuated outdoor amenity area noise level for the development is located along Greenbank Road and is 70.18 dBA. When attenuated, the maximum predicted outdoor amenity area noise level is reduced to 60.0 dBA. Refer to the attached **Figure 3** for confirmation of the predicted un-attenuated daytime noise levels and **Figure 4** for confirmation of the predicted un-attenuated nighttime noise levels.

During detailed design, when the floor layouts are finalized, the AIF valves can be verified to ensure the appropriate window and wall type assemblies are installed to mitigate the predicted noise levels. However, based on past experience, the minimum window and wall types assemblies required by the Ontario Building Code (OBC) will be sufficient to mitigate the indoor noise levels below the City's criteria, for all but the units facing Greenbank Road. It is also anticipated the highest indoor sound levels can be mitigated with window type assemblies constructed beyond the OBC minimum standards but still readily available for purchase on the open market.

5.0 CONCLUSIONS

This report confirms the predicted outdoor noise levels for the proposed residential development from the adjacent Jockvale Road and Greenbank Road are in excess of the City of Ottawa's and Ministry of the Environment guidelines. To mitigate the noise levels and inform potential buyers/tenants, the following noise attenuation measures are proposed:

- The installation of an acoustic noise wall, 2.2 meters in height along the side yards of Block 8-10 and 26-29 as indicated on the Noise Control Plan (111117-NC).
- The installation of an acoustic noise barrier (combination of noise wall, berm and/or retaining wall), 3.1-3.3 meters in height along the side and rear yards of Block 12 and 15 as indicated on the Noise Control Plan (111117-NC).
- The inclusion of a noise warning clause registered on title and incorporated into the purchase and sale agreements of the units requiring outdoor noise attenuation as specified in Section 4.2.
- Indoor noise mitigation methods and additional warning clauses to be registered on title and into the sales/rental agreements are to be confirmed during detailed design



NOTES:

1. WHEN OUTDOOR AMENITY AREA NOISE LEVELS EXCEED 55dBA, NOISE MITIGATION MEASURES ARE TO BE CONSIDERED.
2. WHEN THE INDOOR NOISE LEVELS EXCEED 45 dBA DURING THE DAYTIME, NOISE MITIGATION MEASURES ARE TO BE CONSIDERED.

LEGEND

OLA 1	RECEIVER - OUTDOOR LIVING AREA (OLA)
POW 1	RECEIVER - PLANE OF WINDOW / INDOOR LIVING AREA (POW)
60.00	PREDICTED DAYTIME NOISE LEVEL CONTOUR LINE (dBA)
67.25	PREDICTED DAY TIME NOISE LEVEL (dBA)
	OUTDOOR AMENITY AREAS

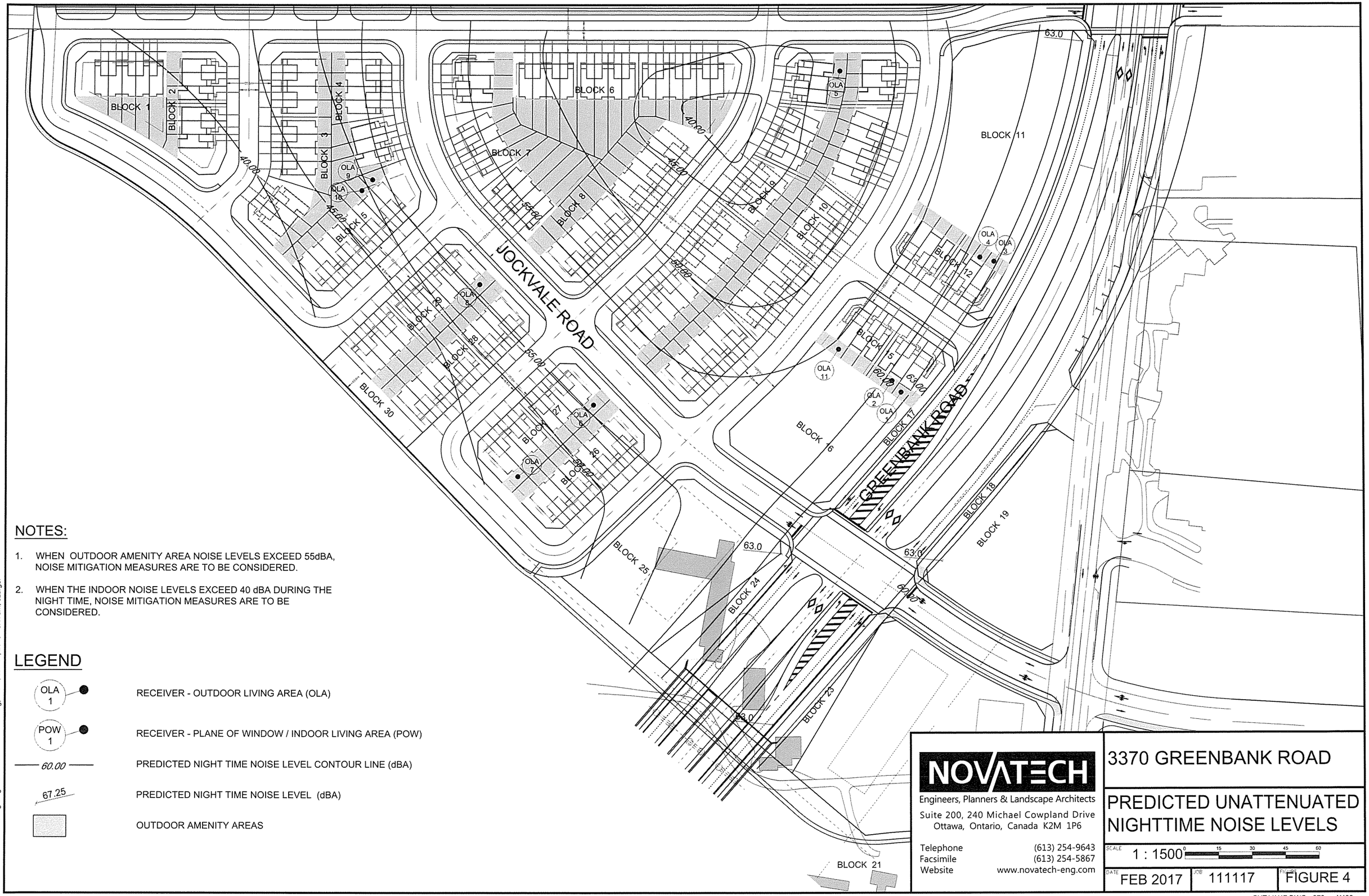
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

3370 GREENBANK ROAD

PREDICTED UNATTENUATED DAYTIME NOISE LEVELS

SCALE 1 : 1500 (0, 15, 30, 45, 60)

DATE FEB 2017 | JOB 111117 | FIGURE FIGURE 3



NOTES:

1. WHEN OUTDOOR AMENITY AREA NOISE LEVELS EXCEED 55dBA, NOISE MITIGATION MEASURES ARE TO BE CONSIDERED.
2. WHEN THE INDOOR NOISE LEVELS EXCEED 40 dBA DURING THE NIGHT TIME, NOISE MITIGATION MEASURES ARE TO BE CONSIDERED.

LEGEND

- OLA 1 — RECEIVER - OUTDOOR LIVING AREA (OLA)
- POW 1 — RECEIVER - PLANE OF WINDOW / INDOOR LIVING AREA (POW)
- 60.00 — PREDICTED NIGHT TIME NOISE LEVEL CONTOUR LINE (dBA)
- 67.25 — PREDICTED NIGHT TIME NOISE LEVEL (dBA)
- OUTDOOR AMENITY AREAS

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

3370 GREENBANK ROAD

PREDICTED UNATTENUATED NIGHTTIME NOISE LEVELS

SCALE 1 : 1500 (0, 15, 30, 45, 60)
DATE FEB 2017
JOB 111117
FIGURE FIGURE 4

This report is respectfully submitted for City of Ottawa approval.

NOVATECH

Prepared by:

Steve Zorgel, P.Eng.
Project Coordinator | Engineering

Reviewed by:

Drew Blair, P.Eng.
Project Manager | Land Development Engineering

Appendix A
Environmental Noise Control Guidelines Excerpts

Table 2.2a: Sound Level Limit for Outdoor Living Areas - Road and Rail
(from NPC-300, 2013 Table C-1)

Time Period	Required L_{eq} (16) (dBA)
16-hour, 07:00 – 23:00	55

Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail
(from NPC-300, 2013 Table C-2)

Type of Space	Time Period	Required L_{eq} (dBA) Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
	23:00 – 07:00	40	35

The Province also provides for supplementary indoor sound level limits for land uses not generally considered noise sensitive (see Table 2.2c below). These good practice design objectives should be addressed in any noise study prepared for the City. These supplementary sound level limits are based on the windows and doors to an indoor space being closed.

Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces - Road and Rail (adapted from NPC-300 Table C-9)

Type of Space	Time Period	Required L_{eq} (dBA) Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Theatres, places of worship, libraries, individual or semi- private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions

Table B1 Traffic And Road Parameters To Be Used For Sound Level Predictions

Row Width (m)	Implied Roadway Class	AADT Vehicles/Day	Posted Speed Km/Hr	Day/Night Split %	Medium Trucks %	Heavy Trucks % [1]
NA [2]	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6 UAD)	50,000	50-80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10,000	50-80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8,000	40-50	92/8	7	5

[1] The MOE Vehicle Classification definitions should be used to estimate automobiles, medium trucks and heavy trucks.

[2] The number of lanes is determined by the future mature state of the roadway.

Note:
1) This schedule forms part of the Official Plan of the City of Ottawa and must be read in conjunction with the text.
2) This schedule is intended as a framework for planning and design;consequently alignments of proposed roads are approximate and subject to detailed study.
3) An unidentified new facility from Highway 416 to Highway 417 East is not shown.

Note:
1) La présente annexe fait partie du Plan officiel de la Ville d'Ottawa et doit être consultée en se reportant au texte même du Plan officiel.
2) La présente annexe doit servir de guide en matière de planification et de conception;il s'ensuit que le tracé des routes proposées n'est qu'approximatif et donnera lieu à une étude plus approfondie.
3) Une nouvelle installation non identifiée et située entre l'autoroute 416 et l'autoroute 417E n'apparaît pas.

E

SEE SCHEDULE F
VOIR ANNEXE F

Rivière des Outaouais / Ottawa River

City of / Ville de GATINEAU

Fallowfield

Macdonald-Cartier International Airport
Aéroport international Macdonald-Cartier

Notre-Dame-des-Champs

Navan

Carlsbad Springs

Richmond

Manotick

City of Ottawa Official Plan Consolidation and Amendments

Ville d'Ottawa Plan officiel Amendement au plan directeur approuvé

# 14 (09/2004)	# 96 (03/2012)	# 192 (08/2017)
# 44 (06/2006)	# 97 (03/2012)	
# 50 (06/2006)	#113 (11/2012)	
# 77 (06/2009)	#123 (09/2019)	
# 76	#173 (01/2017)	

OMB decision/Décision de la CAMO - N° 1787; 2711;PL#160875

Official Plan - Schedule E
Urban Road Network

Prepared by: Planning and Growth Management Department, Mapping & Graphics Unit

Plan officiel - Annexe E
Routes Arterial - Urbain

Preparé par : Service de l'urbanisme et de la gestion de la croissance, Unité de la cartographie et des graphiques

Provincial Highway — **Route provinciale**
City Freeway — **Autoroute de ville**

Federally Owned Road — **Chemins de propriété fédéral**
Existing — Établie
Proposed (Alignment defined) — Proposé (Alignement déterminée)

Arterials — **Artère**
Existing — Établie
Proposed (Alignment Defined) — Proposé (Alignement déterminée)
Conceptual (Alignment Undefined) — Conceptuelle (Alignement à déterminée)

Major Collectors — **Grande collectrice**
Existing — Établie
Proposed — Proposé

Collectors — **Collectrice**
Existing — Établie
Proposed — Proposé

Ottawa

Scale / Échelle
2km 1 0 1 2 3 4km

Appendix B
Correspondence

Steve Zorgel

From: Armstrong, Jennifer (Transportation) <jenniferm.armstrong@ottawa.ca>
Sent: September-19-16 11:56 AM
To: Mark Bowen
Cc: McKinney, Frank
Subject: FW: Greenbank Rd/SW Transitway Extension

Hi Mark,

Here is the input from Transit Services regarding the future bus volumes.

Best Regards,
Jennifer

Jennifer Armstrong, Ph.D., P.Eng.
Senior Project Manager, Transportation Modelling
Transportation Planning Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext. 22899
JenniferM.Armstrong@ottawa.ca

From: Washnuk, Derek
Sent: Monday, September 19, 2016 11:51 AM
To: Armstrong, Jennifer (Transportation)
Cc: McKinney, Frank
Subject: Re: Greenbank Rd/SW Transitway Extension

Hi Jennifer,

Sorry for the delay. Below is the response from our route planning team:

In our current plan, we would extend the 95. However, The volume would really depend of the demand. I don't think we would extend every trip on day 1.

It is fair to say that when the extension of the Transitway opens, we will have a 15 minutes service from 6:00 to 24:00 in both directions = 4x18=72 per direction.

Again, this number will increase over time and it will depend on density and what developer will built.

Derek

Sent from my iPhone

On Sep 19, 2016, at 11:44 AM, Armstrong, Jennifer (Transportation) <jenniferm.armstrong@ottawa.ca> wrote:

> Hi Derek,
>
> Do you have any timelines for when this information might be available? The consultant is wondering if it might be ready today.
>
> Note that I'll be away for just over two weeks beginning Thursday, so if the data won't be ready until after I'm gone, it would be greatly appreciated if you could cc Frank on your response.
>
> Thanks,
> Jennifer
>
> ---
>
> **From:** Washnuk, Derek
> **Sent:** Wednesday, September 14, 2016 1:03 PM
> **To:** Armstrong, Jennifer (Transportation)
> **Subject:** RE: Greenbank Rd/SW Transitway Extension
>
> Hi Jennifer,
>
> I've sent this to our route planning group for input, and will get back to you as soon as possible,
>
> Derek
>
> ---
>
> **From:** Armstrong, Jennifer (Transportation)
> **Sent:** Wednesday, September 14, 2016 12:48 PM
> **To:** Washnuk, Derek
> **Cc:** McKinney, Frank; Mucsi, Kornel
> **Subject:** FW: Greenbank Rd/SW Transitway Extension
>
> Hi Derek,
>
> Would you be able to respond to the question below? We can estimate the AM and PM bus volumes from the TRANS model, but the number won't include any out-of-service buses, and I have no basis for estimating daily volumes.
>
> Regards,
> Jennifer
>
> ---
>
> **From:** McKinney, Frank
> **Sent:** Wednesday, September 14, 2016 11:14 AM
> **To:** Armstrong, Jennifer (Transportation)
> **Cc:** Mucsi, Kornel
> **Subject:** Fw: Greenbank Rd/SW Transitway Extension
>
> Hi Jennifer, can you help with this answer?
>
> Sent from my BlackBerry 10 smartphone on the TELUS network.
>
> ---
>
> **From:** Jennifer Luong <j.luong@novatech-eng.com>

Sent: Wednesday, September 14, 2016 10:55 AM
To: McKinney, Frank
Cc: Brad Byvelds; Mark Bowen; Renaud, Jean-Charles; Greg MacDonald
Subject: Greenbank Rd/SW Transitway Extension

Good morning Frank,
We're preparing a noise study in support of a Draft Plan application for the Burnett Lands at 3370 Greenbank Road to confirm the noise impact of the future Greenbank Road and SW Transitway on the proposed residential development.

Would you be able to assist with estimating daily bus volumes for the SW Transitway that will be in the median of Greenbank Rd from Chapman Mill Drive (south of Strandherd) to Cambrian? For noise assessments we typically consider capacity versus projected volumes, so I'm not sure if there's a theoretical capacity for the transitway or if projected volumes would suffice? I seem to remember projected volumes of 40-50 buses/day for the North South Arterial but I could be off on that.

Also would you be able to provide an update on timing of the Greenbank Road/SW Transitway project?

Thank you,

Jennifer Luong, P.Eng.
Project Manager
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6
Office: 613-254-9643
Fax: 613-254-5867

Appendix C
STAMPSON Noise Modelling Results and Noise Control Plan

STAMSON 5.0 SUMMARY REPORT Date: 14-12-2017 19:23:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola1.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

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

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 74.00 / 77.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 3.10 m
Barrier receiver distance : 3.00 / 6.00 m
Source elevation : 94.16 m
Receiver elevation : 93.90 m
Barrier elevation : 93.75 m
Reference angle : 0.00

Road data, segment # 2: GREENBANK S (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 : 1 %
Road pavement : 1 (Typical asphalt or concrete)

```
Data for Segment # 2: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  16.40 / 16.40  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -49.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.75 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


Road data, segment # 3: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -49.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  16.40 / 16.40  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -49.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :   8.00 / 8.00   m
Source elevation          :  93.75 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00


Road data, segment # 4: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  51.10 / 51.10  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -49.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.80 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -49.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  51.10 / 51.10  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -49.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :   8.00 / 8.00   m
Source elevation          :  93.80 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00
```

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	45.64	45.64
2.GREENBANK S	1.50	47.31	47.31
3.GREENBANK S	1.50	57.25	57.25
4.GREENBANK N	1.50	44.90	44.90
5.GREENBANK N	1.50	54.93	54.93
Total			59.84 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	47.22	47.22 *
2.GREENBANK S	1.50	43.88	43.88
3.GREENBANK S	1.50	55.65	55.65
4.GREENBANK N	1.50	41.99	41.99
5.GREENBANK N	1.50	56.62	56.62 *
Total			59.64 dBA

* Bright Zone !

RT/Custom data, segment # 1: GBANK (day/night)
---
1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg -49.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 33.90 / 33.90 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -49.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 4.00 / 4.00 m

```
Source elevation          :  94.22 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


RT/Custom data, segment # 2: GBANK (day/night)
-----------------------------------------------
1 - Bus:
Traffic volume    :   128/16    veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 2: GBANK (day/night)
----------------------------------------
Angle1   Angle2           : -49.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  33.90 / 33.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -49.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :   8.00 / 8.00   m
Source elevation          :  94.22 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    30.41 !    30.41
 2.GBANK            !     0.50 !    39.99 !    39.99
--------------------+---------+---------+---------
                      Total                  40.44 dBA


Result summary (night)
----------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    28.77 !    28.77
 2.GBANK            !     0.50 !    44.01 !    44.01 *
```

	Total		44.14 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 59.89
(NIGHT): 59.76

STAMSON 5.0 SUMMARY REPORT Date: 10-01-2018 15:26:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	1 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	76.00 / 79.00 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 90.00 deg
Barrier height	:	3.10 m
Barrier receiver distance	:	5.00 / 8.00 m
Source elevation	:	94.16 m
Receiver elevation	:	93.90 m
Barrier elevation	:	93.75 m
Reference angle	:	0.00

Road data, segment # 2: GREENBANK S (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	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

```
Data for Segment # 2: GREENBANK S (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   -12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  22.90 / 22.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -12.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          :  93.75 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


Road data, segment # 3: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)
----------------------------------------------
Angle1   Angle2           : -12.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  22.90 / 22.90  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -12.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :  14.50 / 14.50  m
Source elevation          :  93.75 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00


Road data, segment # 4: GREENBANK N (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          :     1 %
Road pavement          :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  57.60 / 57.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -12.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          :  93.80 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (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  :  57.60 / 57.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -12.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :  14.50 / 14.50  m
Source elevation          :  93.80 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00
```

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	46.68	46.68
2.GREENBANK S	1.50	47.59	47.59
3.GREENBANK S	1.50	54.65	54.65
4.GREENBANK N	1.50	45.50	45.50
5.GREENBANK N	1.50	54.41	54.41
Total			58.50 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	47.04	47.04 *
2.GREENBANK S	1.50	44.54	44.54
3.GREENBANK S	1.50	51.20	51.20
4.GREENBANK N	1.50	43.04	43.04
5.GREENBANK N	1.50	54.76	54.76 *
Total			57.24 dBA

* Bright Zone !

RT/Custom data, segment # 1: GBANK (day/night)
---
1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg -12.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 40.40 / 40.40 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -12.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 4.50 / 4.50 m

```
Source elevation          :  94.22 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


RT/Custom data, segment # 2: GBANK (day/night)
-----------------------------------------------
1 - Bus:
Traffic volume    :   128/16    veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 2: GBANK (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  :  40.40 / 40.40  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -12.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :  14.50 / 14.50  m
Source elevation          :  94.22 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00

Result summary (day)
--------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    30.85 !    30.85
 2.GBANK            !     0.50 !    39.06 !    39.06
--------------------+---------+---------+---------
                      Total                  39.67 dBA


Result summary (night)
----------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    29.58 !    29.58
 2.GBANK            !     0.50 !    41.90 !    41.90 *
--------------------+---------+---------+---------
```

Total	42.15 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 58.55
(NIGHT): 57.38

STAMSON 5.0 SUMMARY REPORT Date: 14-12-2017 22:52:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg -48.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	2 (Reflective ground surface)
Receiver source distance	:	146.10 / 146.10 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -48.00 deg
Barrier height	:	3.30 m
Barrier receiver distance	:	7.50 / 7.50 m
Source elevation	:	94.16 m
Receiver elevation	:	93.90 m
Barrier elevation	:	93.90 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	-48.00 deg 90.00 deg
Wood depth	0 (No woods.)
No of house rows	1 / 0
Surface	1 (Absorptive ground surface)
Receiver source distance	146.10 / 146.10 m
Receiver height	1.50 / 4.50 m
Topography	2 (Flat/gentle slope; with barrier)
Barrier angle1	-48.00 deg Angle2 : 90.00 deg
Barrier height	6.00 m
Barrier receiver distance	3.00 / 3.00 m
Source elevation	94.16 m
Receiver elevation	93.90 m
Barrier elevation	94.05 m
Reference angle	0.00

Road data, segment # 3: GREENBANK S (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	1 %
Road pavement	1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)

Angle1 Angle2	-90.00 deg 50.00 deg
Wood depth	0 (No woods.)
No of house rows	0 / 0
Surface	1 (Absorptive ground surface)
Receiver source distance	15.00 / 15.00 m
Receiver height	1.50 / 4.50 m
Topography	2 (Flat/gentle slope; with barrier)
Barrier angle1	-90.00 deg Angle2 : 50.00 deg
Barrier height	3.30 m
Barrier receiver distance	6.40 / 6.40 m
Source elevation	94.25 m
Receiver elevation	93.90 m
Barrier elevation	93.90 m

```
Reference angle          :   0.00


Road data, segment # 4: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK S (day/night)
---------------------------------------------
Angle1   Angle2          :  50.00 deg   90.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      1       (Absorptive ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height          :   1.50 / 4.50   m
Topography               :      2       (Flat/gentle slope; with
barrier)
Barrier angle1           :  50.00 deg   Angle2 : 90.00 deg
Barrier height           :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation         :  94.25 m
Receiver elevation       :  93.90 m
Barrier elevation        :  94.05 m
Reference angle          :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (day/night)
---------------------------------------------
Angle1   Angle2          : -90.00 deg   50.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height          :   1.50 / 4.50   m
Topography               :      2       (Flat/gentle slope; with
barrier)
Barrier angle1           : -90.00 deg   Angle2 : 50.00 deg
Barrier height           :   3.30 m
Barrier receiver distance :   6.40 / 6.40   m
```

```
Source elevation          :  94.28 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00


Road data, segment # 6: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 6: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           :  50.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  50.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  94.28 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.JOCKVALE         !     1.50 !    43.34 !    43.34
 2.JOCKVALE         !     1.50 !    35.27 !    35.27
 3.GREENBANK S      !     1.50 !    57.62 !    57.62
 4.GREENBANK S      !     1.50 !    47.85 !    47.85
 5.GREENBANK N      !     1.50 !    54.44 !    54.44
 6.GREENBANK N      !     1.50 !    45.36 !    45.36
--------------------+---------+---------+---------
                      Total                 59.90 dBA
```

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	43.47	43.47	*
2.JOCKVALE	1.50	34.24	34.24	
3.GREENBANK S	1.50	61.05	61.05	*
4.GREENBANK S	1.50	44.35	44.35	
5.GREENBANK N	1.50	57.11	57.11	*
6.GREENBANK N	1.50	42.42	42.42	
Total			62.69 dBA	

RT/Custom data, segment # 1: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg 50.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 31.20 / 31.20 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 50.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 6.40 / 6.40 m
Source elevation : 94.65 m
Receiver elevation : 93.90 m
Barrier elevation : 93.90 m
Reference angle : 0.00

RT/Custom data, segment # 2: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : 50.00 deg 90.00 deg
Wood depth : 0 (No woods.)

```
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  31.20 / 31.20  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  50.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  94.65 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	39.56	39.56
2.GBANK	0.50	30.77	30.77
Total			40.10 dBA

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	44.40	44.40 *
2.GBANK	0.50	29.10	29.10
Total			44.53 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 59.94
                           (NIGHT): 62.75
```

STAMSON 5.0 SUMMARY REPORT Date: 10-01-2018 15:30:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg -84.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	1 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	144.30 / 144.30 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -84.00 deg
Barrier height	:	3.30 m
Barrier receiver distance	:	12.80 / 12.80 m
Source elevation	:	94.10 m
Receiver elevation	:	93.90 m
Barrier elevation	:	93.90 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-84.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	1 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	144.30 / 144.30 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-84.00 deg Angle2 : 90.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	3.00 / 3.00 m
Source elevation	:	94.10 m
Receiver elevation	:	93.90 m
Barrier elevation	:	94.05 m
Reference angle	:	0.00

Road data, segment # 3: GREENBANK S (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	:	1 %
Road pavement	:	1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)

Angle1 Angle2	:	-90.00 deg 14.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	21.30 / 21.30 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 14.00 deg
Barrier height	:	3.30 m
Barrier receiver distance	:	12.70 / 12.70 m
Source elevation	:	94.25 m
Receiver elevation	:	93.90 m
Barrier elevation	:	93.90 m

```
Reference angle          :   0.00


Road data, segment # 4: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK S (day/night)
-----------------------------------------------
Angle1   Angle2          :  14.00 deg   90.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      1       (Absorptive ground surface)
Receiver source distance  :  21.30 / 21.30  m
Receiver height          :   1.50 / 4.50   m
Topography               :      2       (Flat/gentle slope; with
barrier)
Barrier angle1           :  14.00 deg   Angle2 : 90.00 deg
Barrier height           :   6.00 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation         :  94.25 m
Receiver elevation       :  93.90 m
Barrier elevation        :  94.05 m
Reference angle          :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (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  :  52.30 / 52.30  m
Receiver height          :   1.50 / 4.50   m
Topography               :      2       (Flat/gentle slope; with
barrier)
Barrier angle1           : -90.00 deg   Angle2 : 14.00 deg
Barrier height           :   3.30 m
Barrier receiver distance :  12.80 / 12.80  m
```

```
Source elevation          :  94.28 m
Receiver elevation        :  93.90 m
Barrier elevation         :  93.90 m
Reference angle           :   0.00


Road data, segment # 6: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 6: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           :  14.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  52.30 / 52.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  14.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          :  94.28 m
Receiver elevation        :  93.90 m
Barrier elevation         :  94.05 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.JOCKVALE         !     1.50 !    24.92 !    24.92
 2.JOCKVALE         !     1.50 !    36.34 !    36.34
 3.GREENBANK S      !     1.50 !    55.46 !    55.46
 4.GREENBANK S      !     1.50 !    48.01 !    48.01
 5.GREENBANK N      !     1.50 !    54.43 !    54.43
 6.GREENBANK N      !     1.50 !    45.91 !    45.91
--------------------+---------+---------+---------
                      Total                 58.67 dBA
```

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	21.92	21.92	*
2.JOCKVALE	1.50	35.60	35.60	
3.GREENBANK S	1.50	52.33	52.33	
4.GREENBANK S	1.50	44.96	44.96	
5.GREENBANK N	1.50	55.26	55.26	*
6.GREENBANK N	1.50	43.43	43.43	
Total			57.51 dBA	

RT/Custom data, segment # 1: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: GBANK (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 : 37.60 / 37.60 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 14.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 12.80 / 12.80 m
Source elevation : 94.65 m
Receiver elevation : 93.90 m
Barrier elevation : 93.90 m
Reference angle : 0.00

RT/Custom data, segment # 2: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : 14.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0

```
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  37.60 / 37.60  m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             :  14.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance  :   4.50 / 4.50   m
Source elevation           :  94.65 m
Receiver elevation         :  93.90 m
Barrier elevation          :  94.05 m
Reference angle            :   0.00
```

Result summary (day)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	39.08	39.08
2.GBANK	0.50	31.15	31.15
Total			39.73 dBA

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	42.30	42.30 *
2.GBANK	0.50	29.88	29.88
Total			42.54 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 58.72
                           (NIGHT): 57.65
```

STAMSON 5.0 SUMMARY REPORT Date: 04-01-2018 07:28:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: GREENBANK S (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 : 1 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: GREENBANK S (day/night)

Angle1 Angle2 : -90.00 deg -36.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 111.20 / 111.20 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: GREENBANK S (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 : 1 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: GREENBANK S (day/night)

Angle1 Angle2 : -36.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 111.20 / 111.20 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -36.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 95.00 m
Receiver elevation : 93.80 m
Barrier elevation : 93.98 m

```
Reference angle          :   0.00


Road data, segment # 3: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2          : -90.00 deg   -36.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      1       (Absorptive ground surface)
Receiver source distance : 138.20 / 138.20 m
Receiver height          :   1.50 / 4.50   m
Topography               :      1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00


Road data, segment # 4: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2          : -36.00 deg   90.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      1       (Absorptive ground surface)
Receiver source distance : 138.20 / 138.20 m
Receiver height          :   1.50 / 4.50   m
Topography               :      2       (Flat/gentle slope; with
barrier)
Barrier angle1           : -36.00 deg   Angle2 : 90.00 deg
Barrier height           :   6.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation         :  95.00 m
Receiver elevation       :  93.80 m
Barrier elevation        :  93.98 m
Reference angle          :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.GREENBANK S	1.50	48.43	48.43
2.GREENBANK S	1.50	42.58	42.58
3.GREENBANK N	1.50	46.86	46.86
4.GREENBANK N	1.50	41.39	41.39
Total			51.76 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.GREENBANK S	1.50	41.91	41.91
2.GREENBANK S	1.50	41.43	41.43
3.GREENBANK N	1.50	40.43	40.43
4.GREENBANK N	1.50	40.43	40.43
Total			47.12 dBA

RT/Custom data, segment # 1: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg -36.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 125.30 / 125.30 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

RT/Custom data, segment # 2: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -36.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 125.30 / 125.30 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -36.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 95.00 m
Receiver elevation : 93.80 m
Barrier elevation : 93.98 m
Reference angle : 0.00

Result summary (day)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	31.59	31.59
2.GBANK	0.50	25.50	25.50
Total			32.55 dBA

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	26.32	26.32
2.GBANK	0.50	25.93	25.93
Total			29.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.81
(NIGHT): 47.19

STAMSON 5.0 SUMMARY REPORT Date: 03-01-2018 23:40:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola6.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg -52.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	18.40 / 18.40 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -52.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.00 / 4.00 m
Source elevation	:	93.51 m
Receiver elevation	:	93.60 m
Barrier elevation	:	93.67 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	-52.00 deg 74.00 deg
Wood depth	0 (No woods.)
No of house rows	0 / 0
Surface	1 (Absorptive ground surface)
Receiver source distance	18.40 / 18.40 m
Receiver height	1.50 / 4.50 m
Topography	2 (Flat/gentle slope; with barrier)
Barrier angle1	-52.00 deg Angle2 : 74.00 deg
Barrier height	2.20 m
Barrier receiver distance	7.20 / 7.20 m
Source elevation	93.51 m
Receiver elevation	93.60 m
Barrier elevation	93.60 m
Reference angle	0.00

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

Car traffic volume	6477/563 veh/TimePeriod
Medium truck volume	515/45 veh/TimePeriod
Heavy truck volume	368/32 veh/TimePeriod
Posted speed limit	60 km/h
Road gradient	1 %
Road pavement	1 (Typical asphalt or concrete)

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

Angle1 Angle2	74.00 deg 90.00 deg
Wood depth	0 (No woods.)
No of house rows	0 / 0
Surface	1 (Absorptive ground surface)
Receiver source distance	18.40 / 18.40 m
Receiver height	1.50 / 4.50 m
Topography	2 (Flat/gentle slope; with barrier)
Barrier angle1	74.00 deg Angle2 : 90.00 deg
Barrier height	6.00 m
Barrier receiver distance	10.70 / 10.70 m
Source elevation	93.51 m
Receiver elevation	93.60 m
Barrier elevation	93.70 m

```
Reference angle          :   0.00


Road data, segment # 4: GREENBANK S (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK S (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 116.40 / 116.40 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -11.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :  94.78 m
Receiver elevation        :  93.60 m
Barrier elevation         :  93.60 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK S (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK S (day/night)
-----------------------------------------------
Angle1   Angle2           : -11.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 116.40 / 116.40 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -11.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  10.00 / 10.00  m
```

```
Source elevation          :  94.78 m
Receiver elevation        :  93.60 m
Barrier elevation         :  93.70 m
Reference angle           :   0.00


Road data, segment # 6: GREENBANK N (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 6: GREENBANK N (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   -11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 151.60 / 151.60 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -11.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :  94.68 m
Receiver elevation        :  93.60 m
Barrier elevation         :  93.60 m
Reference angle           :   0.00


Road data, segment # 7: GREENBANK N (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 7: GREENBANK N (day/night)
---------------------------------------------
Angle1   Angle2           : -11.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 151.60 / 151.60 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
```

```
Barrier angle1            : -11.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :  94.68 m
Receiver elevation        :  93.60 m
Barrier elevation         :  93.70 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	43.31	43.31	
2.JOCKVALE	1.50	56.67	56.67	
3.JOCKVALE	1.50	41.74	41.74	
4.GREENBANK S	1.50	47.01	47.01	
5.GREENBANK S	1.50	42.45	42.45	
6.GREENBANK N	1.50	51.95	51.95	
7.GREENBANK N	1.50	44.68	44.68	
Total			58.78	dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	40.19	40.19	
2.JOCKVALE	1.50	56.13	56.13	*
3.JOCKVALE	1.50	36.77	36.77	
4.GREENBANK S	1.50	44.58	44.58	*
5.GREENBANK S	1.50	41.22	41.22	
6.GREENBANK N	1.50	50.03	50.03	*
7.GREENBANK N	1.50	42.57	42.57	
Total			57.68	dBA

```
RT/Custom data, segment # 1: GBANK (day/night)
-----------------------------------------------
1 - Bus:
Traffic volume    :   128/16    veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 1: GBANK (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   -11.00 deg
```

```
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      1       (Absorptive ground surface)
Receiver source distance   : 134.00 / 134.00 m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             : -90.00 deg   Angle2 : -11.00 deg
Barrier height             :   2.20 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation           :  95.25 m
Receiver elevation         :  93.60 m
Barrier elevation          :  93.60 m
Reference angle            :   0.00


RT/Custom data, segment # 2: GBANK (day/night)
-----------------------------------------------
1 - Bus:
Traffic volume     :   128/16    veh/TimePeriod
Speed              :    60 km/h

Data for Segment # 2: GBANK (day/night)
---------------------------------------
Angle1   Angle2            : -11.00 deg   90.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      1       (Absorptive ground surface)
Receiver source distance   : 134.00 / 134.00 m
Receiver height            :   1.50 / 4.50   m
Topography                 :      2       (Flat/gentle slope; with
barrier)
Barrier angle1             : -11.00 deg   Angle2 : 90.00 deg
Barrier height             :   6.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation           :  95.25 m
Receiver elevation         :  93.60 m
Barrier elevation          :  93.70 m
Reference angle            :   0.00


Result summary (day)
--------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    29.08 !    29.08
 2.GBANK            !     0.50 !    24.72 !    24.72
--------------------+---------+---------+---------
                      Total                 30.44 dBA
```

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)	
1.GBANK	0.50	28.30	28.30	*
2.GBANK	0.50	25.14	25.14	
Total			30.01	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.78
(NIGHT): 57.69

STAMSON 5.0 SUMMARY REPORT Date: 02-01-2018 18:30:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola7unat.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 60	km/h
Road gradient	: 1	%
Road pavement	: 1	(Typical asphalt or concrete)

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

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

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

Angle1 Angle2	: -90.00 deg	-4.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 64.80 / 64.80	m
Receiver height	: 1.50 / 4.50	m
Topography	: 2	(Flat/gentle slope; with barrier)
Barrier angle1	: -90.00 deg	Angle2 : -4.00 deg
Barrier height	: 6.00	m
Barrier receiver distance	: 25.00 / 25.00	m
Source elevation	: 93.51	m
Receiver elevation	: 93.60	m
Barrier elevation	: 93.67	m
Reference angle	: 0.00	

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 60	km/h
Road gradient	: 1	%
Road pavement	: 1	(Typical asphalt or concrete)

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

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

Data for Segment # 2: JOCKVALE (day/night)
------------------------------------------
Angle1   Angle2           :  -4.00 deg   11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  64.80 / 64.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: JOCKVALE (day/night)
--------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod
Medium truck volume :   515/45    veh/TimePeriod
Heavy truck volume  :   368/32    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: JOCKVALE (day/night)
------------------------------------------
Angle1   Angle2           :  11.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  64.80 / 64.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            :  11.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :  93.51 m
Receiver elevation        :  93.60 m
Barrier elevation         :  95.70 m
Reference angle           :   0.00


Road data, segment # 4: GREENBANK S (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK S (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   22.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.40 / 120.40 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : 22.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :  96.13 m
Receiver elevation        :  93.60 m
Barrier elevation         :  93.67 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK S (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK S (day/night)
-----------------------------------------------
Angle1   Angle2           :  22.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.40 / 120.40 m
Receiver height           :   1.50 / 4.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   2.53 m
Reference angle           :   0.00


Road data, segment # 6: GREENBANK S (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       :     2 %
```

```
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 6: GREENBANK S (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   22.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 155.60 / 155.60 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : 22.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :  96.11 m
Receiver elevation        :  93.60 m
Barrier elevation         :  93.67 m
Reference angle           :   0.00


Road data, segment # 7: GREENBANK N (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       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 7: GREENBANK N (day/night)
---------------------------------------------
Angle1   Angle2           :  22.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 155.60 / 155.60 m
Receiver height           :   1.50 / 4.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   2.51 m
Reference angle           :   0.00


Result summary (day)
--------------------

                   !  source  !   Road    !  Total
                   !  height  !   Leq     !   Leq
                   !    (m)   !  (dBA)    !  (dBA)
-------------------+---------+---------+---------
 1.JOCKVALE        !     1.50 !    42.75 !    42.75
 2.JOCKVALE        !     1.50 !    45.91 !    45.91
 3.JOCKVALE        !     1.50 !    40.20 !    40.20
```

4.GREENBANK S	1.50	42.43	42.43
5.GREENBANK S	1.50	50.86	50.86
6.GREENBANK S	1.50	40.97	40.97
7.GREENBANK N	1.50	49.08	49.08
Total			54.79 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	38.85	38.85
2.JOCKVALE	1.50	38.89	38.89
3.JOCKVALE	1.50	35.49	35.49
4.GREENBANK S	1.50	41.62	41.62
5.GREENBANK S	1.50	44.31	44.31
6.GREENBANK S	1.50	40.33	40.33
7.GREENBANK N	1.50	42.64	42.64
Total			49.52 dBA

RT/Custom data, segment # 1: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg 22.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 138.00 / 138.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 22.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 9.00 / 9.00 m
Source elevation : 96.58 m
Receiver elevation : 93.60 m
Barrier elevation : 93.70 m
Reference angle : 0.00

RT/Custom data, segment # 2: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2	: 22.00 deg	90.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 138.00 / 138.00 m	
Receiver height	: 1.50 / 4.50 m	
Topography	: 3	(Elevated; no barrier)
Elevation	: 2.88 m	
Reference angle	: 0.00	

Result summary (day)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	24.66	24.66
2.GBANK	0.50	33.13	33.13
Total			33.71 dBA

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)
1.GBANK	0.50	25.43	25.43
2.GBANK	0.50	28.21	28.21
Total			30.05 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.82
(NIGHT): 49.57

STAMSON 5.0 SUMMARY REPORT Date: 02-01-2018 19:29:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola8.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg -53.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	17.80 / 17.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -53.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	4.00 / 4.00 m
Source elevation	:	93.55 m
Receiver elevation	:	93.70 m
Barrier elevation	:	93.85 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	-53.00 deg 72.00 deg
Wood depth	0 (No woods.)
No of house rows	0 / 0
Surface	1 (Absorptive ground surface)
Receiver source distance	17.80 / 17.80 m
Receiver height	1.50 / 4.50 m
Topography	2 (Flat/gentle slope; with barrier)
Barrier angle1	-53.00 deg Angle2 : 72.00 deg
Barrier height	2.20 m
Barrier receiver distance	6.65 / 6.65 m
Source elevation	93.55 m
Receiver elevation	93.70 m
Barrier elevation	93.70 m
Reference angle	0.00

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

Car traffic volume	6477/563 veh/TimePeriod
Medium truck volume	515/45 veh/TimePeriod
Heavy truck volume	368/32 veh/TimePeriod
Posted speed limit	60 km/h
Road gradient	1 %
Road pavement	1 (Typical asphalt or concrete)

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

Angle1 Angle2	72.00 deg 90.00 deg
Wood depth	0 (No woods.)
No of house rows	0 / 0
Surface	1 (Absorptive ground surface)
Receiver source distance	17.80 / 17.80 m
Receiver height	1.50 / 4.50 m
Topography	2 (Flat/gentle slope; with barrier)
Barrier angle1	72.00 deg Angle2 : 90.00 deg
Barrier height	6.00 m
Barrier receiver distance	10.70 / 10.70 m
Source elevation	93.55 m
Receiver elevation	93.70 m
Barrier elevation	93.65 m

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	43.28	43.28	
2.JOCKVALE	1.50	56.67	56.67	
3.JOCKVALE	1.50	42.27	42.27	
Total			57.01	dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	40.00	40.00	
2.JOCKVALE	1.50	56.34	56.34	*
3.JOCKVALE	1.50	37.27	37.27	
Total			56.49	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.01
(NIGHT): 56.49

STAMSON 5.0 SUMMARY REPORT Date: 03-01-2018 01:58:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola9.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg -30.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	28.80 / 28.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -30.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	12.70 / 12.70 m
Source elevation	:	93.60 m
Receiver elevation	:	94.00 m
Barrier elevation	:	94.10 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-30.00 deg 58.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	28.80 / 28.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-30.00 deg Angle2 : 58.00 deg
Barrier height	:	2.20 m
Barrier receiver distance	:	8.50 / 8.50 m
Source elevation	:	93.60 m
Receiver elevation	:	94.00 m
Barrier elevation	:	93.85 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563 veh/TimePeriod
Medium truck volume	:	515/45 veh/TimePeriod
Heavy truck volume	:	368/32 veh/TimePeriod
Posted speed limit	:	60 km/h
Road gradient	:	1 %
Road pavement	:	1 (Typical asphalt or concrete)

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

Angle1 Angle2	:	58.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	28.80 / 28.80 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	58.00 deg Angle2 : 90.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	5.00 / 5.00 m
Source elevation	:	93.60 m
Receiver elevation	:	94.00 m
Barrier elevation	:	94.10 m

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	43.79	43.79	
2.JOCKVALE	1.50	52.99	52.99	
3.JOCKVALE	1.50	40.99	40.99	
Total			53.72	dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	39.44	39.44	
2.JOCKVALE	1.50	51.78	51.78	*
3.JOCKVALE	1.50	38.16	38.16	
Total			52.20	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.72
(NIGHT): 52.20

STAMSON 5.0 SUMMARY REPORT Date: 03-01-2018 02:04:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola10.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg -27.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	34.50 / 34.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : -27.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	12.90 / 12.90 m
Source elevation	:	93.61 m
Receiver elevation	:	93.90 m
Barrier elevation	:	94.10 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-27.00 deg 2.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	34.50 / 34.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-27.00 deg Angle2 : 2.00 deg
Barrier height	:	2.20 m
Barrier receiver distance	:	14.40 / 14.40 m
Source elevation	:	93.61 m
Receiver elevation	:	93.90 m
Barrier elevation	:	93.85 m
Reference angle	:	0.00

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

Car traffic volume	:	6477/563 veh/TimePeriod
Medium truck volume	:	515/45 veh/TimePeriod
Heavy truck volume	:	368/32 veh/TimePeriod
Posted speed limit	:	60 km/h
Road gradient	:	1 %
Road pavement	:	1 (Typical asphalt or concrete)

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

Angle1 Angle2	:	2.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	34.50 / 34.50 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	2.00 deg Angle2 : 90.00 deg
Barrier height	:	6.00 m
Barrier receiver distance	:	6.50 / 6.50 m
Source elevation	:	93.61 m
Receiver elevation	:	93.90 m
Barrier elevation	:	94.10 m

Reference angle : 0.00

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	43.25	43.25	
2.JOCKVALE	1.50	47.13	47.13	
3.JOCKVALE	1.50	42.96	42.96	
Total			49.66	dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	39.27	39.27	
2.JOCKVALE	1.50	45.98	45.98	*
3.JOCKVALE	1.50	40.26	40.26	
Total			47.69	dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.66
(NIGHT): 47.69

STAMSON 5.0 SUMMARY REPORT Date: 10-01-2018 15:34:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola11.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	60 km/h	
Road gradient	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

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

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

Angle1 Angle2	:	-90.00 deg 90.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	1 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	74.30 / 77.00 m
Receiver height	:	1.50 / 4.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 90.00 deg
Barrier height	:	3.10 m
Barrier receiver distance	:	3.00 / 6.00 m
Source elevation	:	93.75 m
Receiver elevation	:	93.75 m
Barrier elevation	:	93.60 m
Reference angle	:	0.00

Road data, segment # 2: GREENBANK S (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	:	1 %	
Road pavement	:	1 (Typical asphalt or concrete)	

```
Data for Segment # 2: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.30 / 50.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.75 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


Road data, segment # 3: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.30 / 50.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  93.75 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00


Road data, segment # 4: GREENBANK N (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          :     1 %
Road pavement          :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.60 / 85.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.80 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.60 / 85.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  93.80 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00
```

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	45.57	45.57
2.GREENBANK S	1.50	43.41	43.41
3.GREENBANK S	1.50	51.76	51.76
4.GREENBANK N	1.50	40.53	40.53
5.GREENBANK N	1.50	48.87	48.87
Total			54.72 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	47.22	47.22 *
2.GREENBANK S	1.50	41.48	41.48
3.GREENBANK S	1.50	51.11	51.11 *
4.GREENBANK N	1.50	39.10	39.10
5.GREENBANK N	1.50	47.48	47.48 *
Total			54.15 dBA

* Bright Zone !

RT/Custom data, segment # 1: GBANK (day/night)
---
1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg -10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 67.80 / 67.80 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -10.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 4.00 / 4.00 m

```
Source elevation          :  94.22 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00

RT/Custom data, segment # 2: GBANK (day/night)
-----------------------------------------------
1 - Bus:
Traffic volume    :   128/16    veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 2: GBANK (day/night)
---------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  67.80 / 67.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.10 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  94.22 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    25.51 !    25.51
 2.GBANK            !     0.50 !    33.59 !    33.59
--------------------+---------+---------+---------
                      Total                 34.22 dBA


Result summary (night)
----------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    25.39 !    25.39
 2.GBANK            !     0.50 !    34.43 !    34.43 *
--------------------+---------+---------+---------
```

Total	34.94 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 54.76
(NIGHT): 54.20

STAMSON 5.0 SUMMARY REPORT Date: 10-01-2018 15:39:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola1122.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

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

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 74.30 / 77.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.20 m
Barrier receiver distance : 3.00 / 6.00 m
Source elevation : 93.75 m
Receiver elevation : 93.75 m
Barrier elevation : 93.60 m
Reference angle : 0.00

Road data, segment # 2: GREENBANK S (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 : 1 %
Road pavement : 1 (Typical asphalt or concrete)

```
Data for Segment # 2: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.30 / 50.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.75 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


Road data, segment # 3: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.30 / 50.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  93.75 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00


Road data, segment # 4: GREENBANK N (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         :     1 %
Road pavement         :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.60 / 85.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.80 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.60 / 85.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  93.80 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	48.97	48.97
2.GREENBANK S	1.50	43.41	43.41
3.GREENBANK S	1.50	53.34	53.34
4.GREENBANK N	1.50	40.53	40.53
5.GREENBANK N	1.50	49.98	49.98
Total			56.31 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	47.22	47.22 *
2.GREENBANK S	1.50	41.48	41.48
3.GREENBANK S	1.50	51.11	51.11 *
4.GREENBANK N	1.50	39.10	39.10
5.GREENBANK N	1.50	47.48	47.48 *
Total			54.15 dBA

* Bright Zone !

RT/Custom data, segment # 1: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg -10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 67.80 / 67.80 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -10.00 deg
Barrier height : 6.00 m

```
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  94.22 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


RT/Custom data, segment # 2: GBANK (day/night)
----------------------------------------------
1 - Bus:
Traffic volume    :   128/16    veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 2: GBANK (day/night)
---------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  67.80 / 67.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  94.22 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    25.51 !    25.51
 2.GBANK            !     0.50 !    34.97 !    34.97
--------------------+---------+---------+---------
                      Total                 35.44 dBA
```

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)	
1.GBANK	0.50	25.39	25.39	
2.GBANK	0.50	34.43	34.43	*
Total			34.94	dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 56.34
(NIGHT): 54.20

STAMSON 5.0 SUMMARY REPORT Date: 10-01-2018 15:40:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola1125.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

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

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 74.30 / 77.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.50 m
Barrier receiver distance : 3.00 / 6.00 m
Source elevation : 93.75 m
Receiver elevation : 93.75 m
Barrier elevation : 93.60 m
Reference angle : 0.00

Road data, segment # 2: GREENBANK S (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 : 1 %
Road pavement : 1 (Typical asphalt or concrete)

```
Data for Segment # 2: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.30 / 50.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.75 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


Road data, segment # 3: GREENBANK S (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: GREENBANK S (day/night)
--------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.30 / 50.30  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  93.75 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00


Road data, segment # 4: GREENBANK N (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          :     1 %
Road pavement          :     1 (Typical asphalt or concrete)

Data for Segment # 4: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.60 / 85.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -90.00 deg   Angle2 : -10.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  93.80 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


Road data, segment # 5: GREENBANK N (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       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: GREENBANK N (day/night)
-----------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.60 / 85.60  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  93.80 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.JOCKVALE	1.50	47.76	47.76
2.GREENBANK S	1.50	43.41	43.41
3.GREENBANK S	1.50	52.88	52.88
4.GREENBANK N	1.50	40.53	40.53
5.GREENBANK N	1.50	49.68	49.68
Total			55.80 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)	
1.JOCKVALE	1.50	47.22	47.22	*
2.GREENBANK S	1.50	41.48	41.48	
3.GREENBANK S	1.50	51.11	51.11	*
4.GREENBANK N	1.50	39.10	39.10	
5.GREENBANK N	1.50	47.48	47.48	*
Total			54.15 dBA	

* Bright Zone !

RT/Custom data, segment # 1: GBANK (day/night)

1 - Bus:
Traffic volume : 128/16 veh/TimePeriod
Speed : 60 km/h

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

Angle1 Angle2 : -90.00 deg -10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 67.80 / 67.80 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -10.00 deg
Barrier height : 6.00 m

```
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :  94.22 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.95 m
Reference angle           :   0.00


RT/Custom data, segment # 2: GBANK (day/night)
-----------------------------------------------
1 - Bus:
Traffic volume    :   128/16    veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 2: GBANK (day/night)
----------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  67.80 / 67.80  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with
barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :  22.00 / 22.00  m
Source elevation          :  94.22 m
Receiver elevation        :  93.75 m
Barrier elevation         :  93.75 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Gen    !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.GBANK            !     0.50 !    25.51 !    25.51
 2.GBANK            !     0.50 !    34.56 !    34.56
--------------------+---------+---------+---------
                      Total                  35.07 dBA
```

Result summary (night)

	source height (m)	Gen Leq (dBA)	Total Leq (dBA)	
1.GBANK	0.50	25.39	25.39	
2.GBANK	0.50	34.43	34.43	*
Total			34.94	dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 55.83
(NIGHT): 54.20