Environmental Noise Feasibility Assessment

350 Wellington Rd 7, Elora

Proposed Residential Development

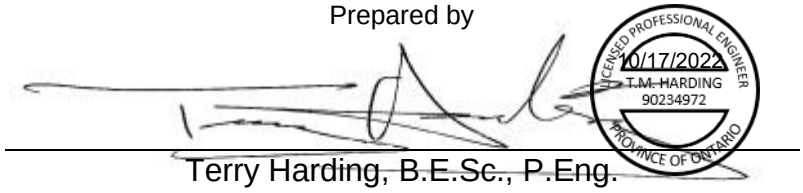
Wellington County, Ontario

October 17, 2022
Project: 122-0178

Prepared for

Elora 7 OP Inc.

Prepared by



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VALCOUSTICS
Canada Ltd.

Version History

Version #	Date	Comments
1.0	October 17, 2022	Issued as Final for submission

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Environmental Noise Feasibility Assessment

350 Wellington Rd 7, Elora

Proposed Residential Development

Wellington County, Ontario

EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) was retained to prepare an Environmental Noise Feasibility Assessment to support the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) application submissions to the Township of Centre Wellington, Wellington County. The proposed residential development will consist of 34 blocks of 2 and 3-storey townhouses for a total of 273 units. In terms of noise compliance, the proposal is concluded as being feasible.

To meet the applicable transportation noise guideline limits, the following noise control measures are required:

- Mandatory air conditioning at the first row of blocks adjacent to Wellington Rd 7, as well as the end blocks at the north and south limits of the site (the two blocks closest to Wellington Rd. 7): Blocks 1, 2, 15 to 28.
- The provision to allow the future installation of air conditioning by the occupant at the second row of blocks adjacent to Wellington Rd 7: Blocks 29 to 34. This provision basically means a forced air heating system (which would be expected regardless.)
- A 1.8 m high acoustic fence is required for the at-grade patios located at the side wall of the end units at the first row of townhouse blocks (adjacent to Wellington Rd. 7), along the edge exposed to the roadway. This involves Blocks 17, 20, 23, 26 (northern unit in each block), and Blocks 19, 22, 25, 28 (southern unit in each block).
- A 2.5 m high sound barrier is required at the blocks siding onto Wellington Rd 7 and involving Blocks 1 and 16 (all units in each block).
- Noise warning clause(s) are required for the affected blocks/dwellings noted above.
- Upgraded construction for the exterior walls and windows beyond the minimum required by the Ontario Building Code requirements is not anticipated. This will require confirmation once detailed interior floor plans and elevations are developed.

1.0 INTRODUCTION

VCL has prepared this Environmental Noise Feasibility Assessment to support the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) application submissions to the Township of Centre Wellington, Wellington County. The application involves a proposed residential development located at 350 Wellington Rd 7 in the Town of Elora.

The sound levels due to the environmental noise sources have been predicted at the proposed site and compared to the applicable Ministry of the Environment, Conservation and Parks (MECP) noise guideline limits.

1.1 THE SITE AND SURROUNDING AREA

Directional references are relative to the project north indication on the concept site plan V3.1, which has Wellington Rd 7 running north-south.

The site is currently vacant agricultural land along the west side of Wellington Rd 7, between Middlebrook Rd to the south and County Rd. 18 (Woolwich St. E.) to the north. Figure 1 shows the key plan.

The subject lands are bounded by:

- Agricultural lands to the west,
- Agricultural land including an existing detached dwelling, with additional detached dwellings beyond, to the north,
- Wellington Rd 7 to the east, with Elora Municipal Cemetery (northern area) and existing detached residential (southern area), immediately beyond, and
- Agricultural lands to the south, with Middlebrook Rd immediately beyond.

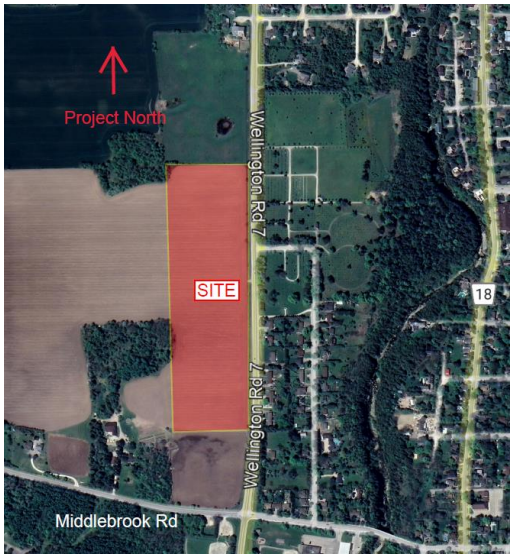

Figure 1: Key Plan

The report is based on the Concept Site Plan V3.3 prepared by We Merchandise Space Inc. dated October 14, 2022. Figure 2 shows the Concept Site Plan.

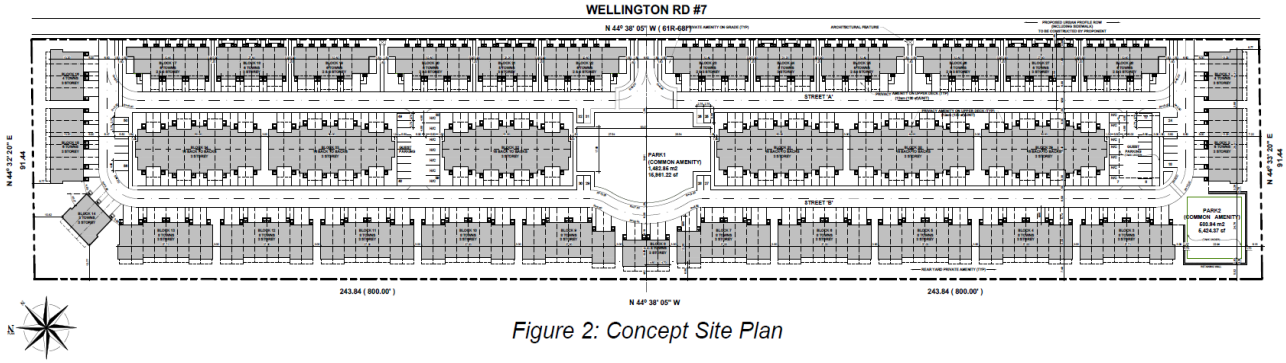

Figure 2: Concept Site Plan

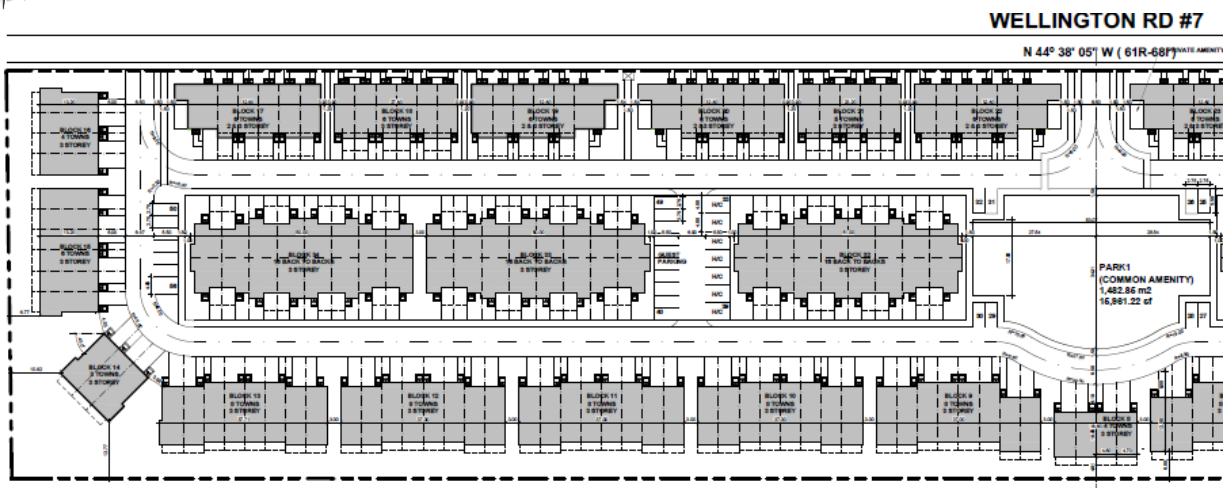

Figure 2a: Site Plan (North Half)

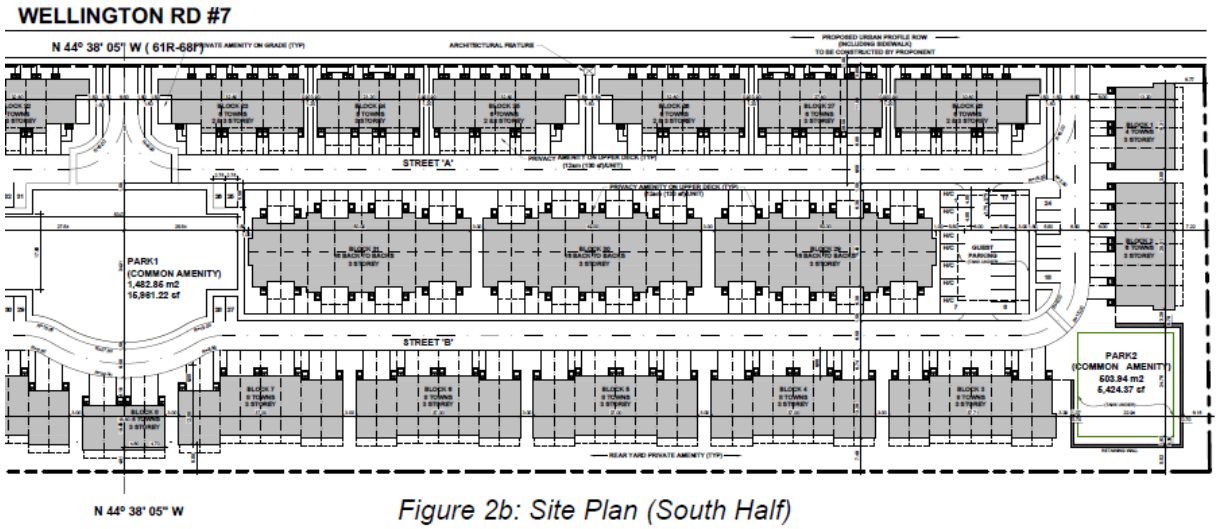

Figure 2b: Site Plan (South Half)

1.2 PROPOSED DEVELOPMENT

The site is 11 acres (4.45 hectares). The townhouse blocks are arranged in three rows parallel to Wellington Rd 7, with the blocks at the northern and southern limits wrapping around to side onto Wellington Rd #7.

Most of the blocks propose private outdoor amenity spaces on upper elevated decks with at-grade rear yard amenity spaces for the end blocks siding onto Wellington Rd 7, at the north and south limits of the site. Grade-level patios are also proposed for many of the end units at the first row of blocks adjacent to Wellington Rd. 7. The elevated decks are located at the west (sheltered) side of the building at the first row of blocks closest to Wellington Rd 7, with the decks being at the east and west sides at the second row. At-grade rear yard amenity spaces are also proposed at the last row furthest from Wellington Rd 7, also at the west (sheltered) side of the building.

Two common amenity spaces (parks) are proposed: Park1 being at the geometric centre of the site, and Park2 at the southwest corner.

2.0 TRANSPORTATION NOISE REVIEW

2.1 ENVIRONMENTAL NOISE GUIDELINES

The applicable noise guidelines for new residential development are those in MECP Publication NPC-300, *"Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning"*.

The environmental noise guidelines of the MECP, as provided in Publication NPC-300, are discussed briefly below and summarized in Appendix A.

2.1.1 Architectural Elements

For daytime, the indoor criterion for road noise is $L_{eq\ Day}$(1) of 45 dBA for sensitive spaces such as living/dining rooms, dens and bedrooms. At night, the indoor criterion for road noise is $L_{eq\ Night}$(2) of 40 dBA for bedrooms.

The architectural design of the building envelope (exterior walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound level limits.

2.1.2 Ventilation

If the daytime sound level ($L_{eq\ Day}$) at the exterior facade of a window into a noise-sensitive space is greater than 65 dBA or the nighttime sound level ($L_{eq\ Night}$) is greater than 60 dBA, means must be provided such that windows can be kept closed for noise control purposes, and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA (inclusive) or nighttime sound levels between 50 dBA and 60 dBA (inclusive), there need only be the "provision

(1) $L_{eq\ Day}$ – 16-hour equivalent continuous sound level, from 0700 to 2300 hours.
(2) $L_{eq\ Night}$ – 8-hour equivalent continuous sound level, from 2300 to 0700 hours.

for adding air conditioning" at a later date. This generally means a forced-air ventilation system that can accept the addition of central air conditioning at some future point (by the occupant). A warning clause advising the occupant of the potential interference with some activities is also required.

2.1.3 Outdoors

For outdoor amenity areas ("Outdoor Living Areas" – OLA's), the sound level objective during the daytime is 55 dBA. An excess of up to 5 dBA is considered acceptable if it is not technically or economically feasible to achieve the 55 dBA objective, provided warning clauses are registered on title.

For outdoor terraces, patios and balconies, these are subject to the outdoor sound level guideline limit only if the depth is 4 m or greater.

2.2 TRANSPORTATION NOISE SOURCES

Wellington Rd. 7 immediately adjacent to the site is the primary noise source, with Middlebrook Rd being a minor source due to the greater distance separation and much lower traffic volume. County Rd. 18 (Woolwich St. W.) is over 500 m away and will have no adverse noise impact.

Road traffic data applicable to the future year 2031 condition was taken from the Reference 4 traffic study provided and was projected an additional 1 year to the required 10-year (2032) design condition, using an assumed 2% annual growth rate. The worst-case vehicle count for the am and pm peak hourly condition given in the traffic study was used to obtain the 24-hour volume by applying a x10 factor to the peak hour volume (typical). The reference 1 study also provided the percentage of trucks, with the total truck percentage split into heavy / medium classes using an assumed 60/40 ratio, respectively (considered typical/appropriate for this area). A day/night split of 90/10 was also used, which is typical for well travelled arterial and collector roads. The current posted speeds on Wellington Rd. 7 and Middlebrook Rd. is 50 kph, but the Reference 1 traffic study notes that 60 kph is being considered for Wellington Rd. 7 and has been applied to present a worst-case condition.

Wellington Rd. 7 and Middlebrook Rd exhibit noticeable elevation changes in the vicinity of the site. The estimated road gradient has been used based on the road elevation changes occurring in the immediate vicinity of the site, from area mapping.

The traffic data is shown in Appendix B and summarized in Table 1.

2.2.1 Analysis Method

Using the future road traffic data in Table 1, the 16-hour daytime and 8-hour nighttime sound levels (in terms of $L_{eq\ Day\ 16hr}$ and $L_{eq\ Night\ 8hr}$) were determined using STAMSON V5.04 – ORNAMENT, the computerized road traffic noise prediction model of the MECP. Self-screening by the proposed dwelling(s) was accounted for, where applicable.

The daytime and nighttime sound level calculations at the building facades were assessed at the top floor windows of the blocks with the greatest exposure to the road traffic. Daytime OLA sound

levels were assessed at a location mid-point along the associated building facade, 3 m from the facade, at a standing height of 1.5 m above grade (or elevated deck structure).

2.2.2 Results

The highest daytime and nighttime sound levels occur at the east face of the first-row closet to and with full exposure to Wellington Road 7: the predicted sound levels being 67 dBA and 61 dBA, respectively. This is consistent along all blocks at the first row since the contribution from Middlebrook Rd is insignificant even at the closest (most southern) approach.

At the east face of the second row, the daytime and nighttime sound exposures are predicted to be 57 dBA and 51 dBA, respectively. At the third row, the daytime / nighttime levels are 54 / 47 dBA, respectively, at the east face.

In all cases, lower sound exposures will occur at the fully or partially sheltered building faces, namely, the west face which is fully sheltered, as well as the north and south faces which have partial exposure, relative to Wellington Rd 7.

For the private outdoor spaces, the following are predicted during the daytime:

- Elevated (Level 2) decks at the sheltered (west) side of the 1st row (Blks 17-28): 52 dBA.
- Elevated (Level 2) decks at the exposed (east) side of the 2nd row (Blks 29-34): 53 - 54 dBA depending upon location (highest at the north or south units closet to the internal road access points to Wellington Rd. 7).
- Rear yard at the blocks siding onto Wellington Rd. 7 (Blks 1 & 16, northern unit): 67 dBA.
- Rear yard at the blocks siding onto Wellington Rd. 7 (Blks 2 & 15, northern unit): 56 dBA.
- All remaining locations (Level 2 decks at west side of 2nd row, and rear yards at the west side of the third row): less than 55 dBA.

At the common outdoor amenity space (Park1) the following is predicted during the daytime:

- 52 dBA

Table 2 summarizes the predicted sound levels due to road traffic. A sample sound level calculation is included in Appendix C.

2.2.3 Noise Control Measures

The noise control measures for transportation noise sources can generally be classified into two categories which are interrelated, but which can be treated separately for the most part:

a) Architectural elements to achieve acceptable indoor noise guidelines; and

b) Design features to protect the OLAs.

Table 3 and the Notes to Table 3 summarize the transportation noise abatement requirements for the site.

2.2.3.1 Architectural Elements

The required Sound Transmission Class (STC) ratings for the exterior facades of the proposed building were calculated assuming windows have a surface area equalling 30% of the associated room floor area, and the exterior walls were assumed to have a surface area equal to 80% of the associated room floor area.

Based on the predicted sound levels, exterior wall and window construction meeting the minimum non-acoustical requirements of the OBC will be sufficient to meet the indoor noise criteria.

Note that the final exterior wall and window construction requirements should be verified once detailed floor plans and elevations are available.

2.2.3.2 Ventilation Requirements

Mandatory air conditioning is required at the first row of blocks adjacent to Wellington Rd 7, as well as the end blocks at the north and south limit of the site (the two blocks closest to Wellington Rd. 7): Blocks 1, 2, 15 to 28.

The provision to allow the future installation of air conditioning by the occupant is required at the second row of blocks adjacent to Wellington Rd 7: Blocks 29 to 34. This provision basically means a forced air heating system (which would be expected regardless.)

All remaining residential units have no special ventilation requirements.

Figure 3 and Table 3 summarize the ventilation requirements.

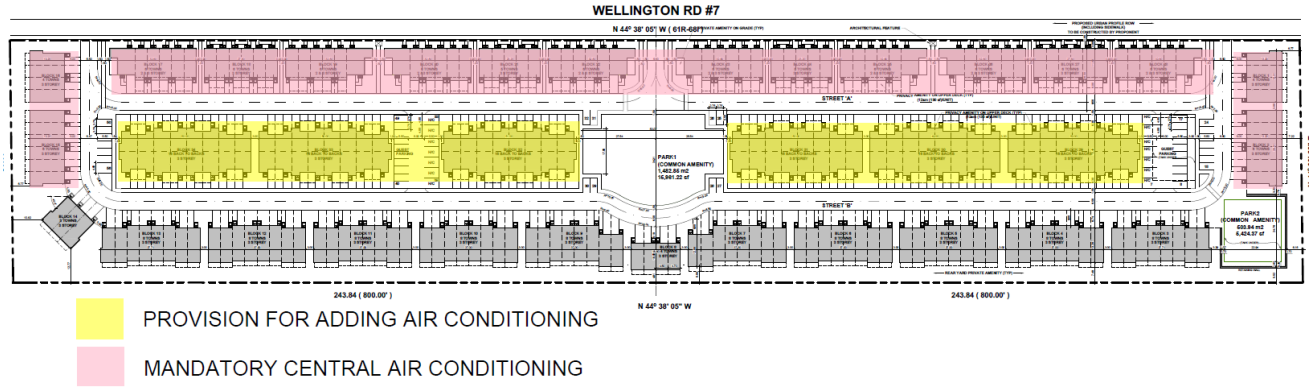

Figure 3: Ventilation Measures

2.2.3.3 Outdoors

This assessment assumes the elevated decks and at-grade patios are or may be at least 4 m deep and therefore considered as Outdoor Living Areas (OLA's) and subject to the associated sound level limits in NPC-300.

Despite this, all of the elevated decks are predicted as being below the OLA sound level limit and therefore physical noise control measures are not anticipated. An exception will be for the at-grade patios located at the side wall of the building at some end units at the first row (adjacent to Wellington Rd. 7). For this case, a 1.8 m high acoustic fence is required along the edge exposed to the roadway, and involves:

- Block 17, 20, 23, 26 (northern unit in each block).
- Block 19, 22, 25, 28 (southern unit in each block).
- See Table 3 and Figure 4 below.

At the blocks siding onto Wellington Rd 7:

- A 2.5 m high sound barrier will achieve 59 dBA at the worst-case location which is within the 60 dBA upper limit allowed under the MECP guidelines.
- Achieving the lower 55 dBA limit requires a 3.5 m high sound barrier which is considered inappropriate within the context of this site and moderate off-site roadways.
- The 2.5 m high sound barrier involves Block 1 and Block 16.
- See Table 3 and Figure 4 below.

At all other townhouse blocks, as well as the common outdoor Park1 and Park2 spaces, the sound levels are below the 55 dBA guideline and physical noise mitigation in the form of sound barriers is not required.

Sound barriers must be of solid construction with no gaps, cracks, or holes, and meet a minimum surface density of 20 kg/sq. m and can include earth berms, concrete, masonry or wood acoustic fences or combination of berms and acoustic fences. The requirements should be updated when lot grading plans are available.

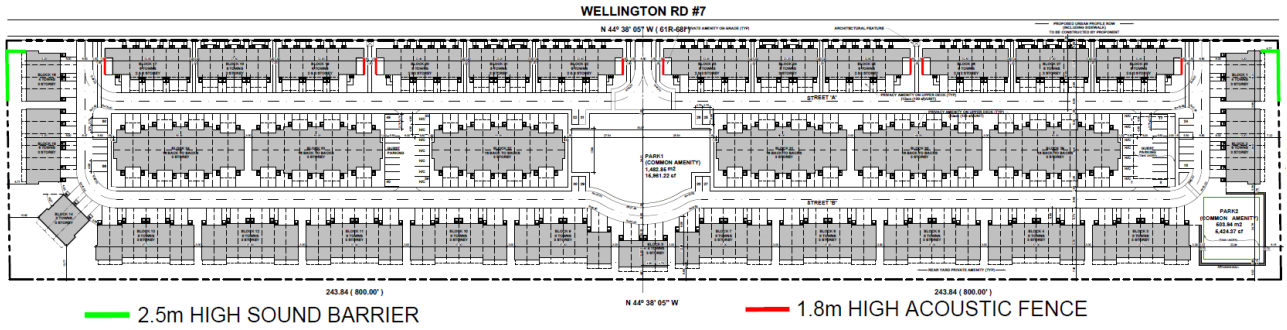

Figure 4: Sound Barrier Requirements

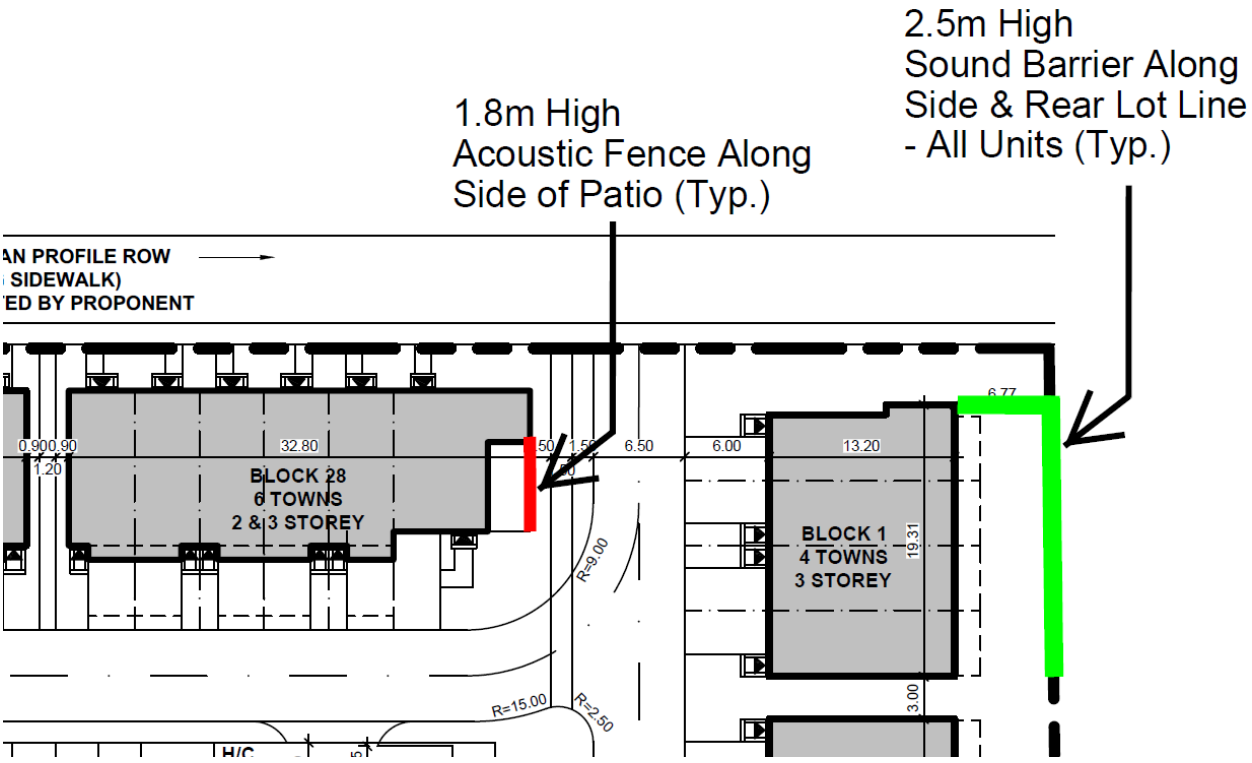

Figure 4a: Sound Barrier Requirements (Detail)

2.2.3.4 Warning Clauses

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing noise sources. Where the guideline sound level limits are exceeded, appropriate warning clauses should be registered on title or included in the development agreement that is registered on title. The warning clauses should also be included in agreements of Offers of Purchase and Sale and lease/rental agreements to make future occupants aware of the potential noise situation.

Table 3 and the notes to Table 3 summarize the warning clauses for the site.

3.0 STATIONARY (INDUSTRY) NOISE REVIEW

With respect to the NPC-300 noise guidelines, this site is considered a Class 2 area.

Several small industrial related uses are located west of the site, at the south side of County Rd 18 (Woolwich St. W.). The two closest are Summit Laser & Manufacturing (7453 County Rd. W.) and Artech Millwrights Ltd (7447 County Rd. 18). Relative to the subject site, the closest property line to property line separation is approximately 400m in both cases.

Neither of these nor other industrial uses in the immediate area are not expected to create adverse noise impact at the subject site due to the large separation distance. It is also noted that existing residential dwellings are much closer to these industrial uses, and it can be presumed these

industrial uses facilities are currently compliant with the applicable noise guideline limits at the closer residences. The proposed site, which is further away, will therefore also comply by default. Further, the minimum 400 m separation to the closet portion of the proposed site falls beyond the 300 m buffer setback for heavy industry advocated by MECP where noise should be investigated.

3.1 NOISE CONTROL MEASURES

A noise warning clause that advises the presence of these industrial uses and that associated sounds may be audible at times is the only requirement necessary, as a precaution. See Table 3.

4.0 CONCLUSIONS

The noise control measures needed to demonstrate compliance with the minimum noise guideline requirements are not onerous and would not be an impediment to the proposed townhouse development. Such acoustical mitigation measures/design features are commonly found in many residential developments adjacent to arterial and collector roadways throughout southern Ontario.

Potential noise generated by the existing small industrial uses in the area and closest to the site can be concluded as being in compliance with the applicable noise guideline requirements and are not expected to cause adverse noise impact. The large distance separation, relatively small scale and likelihood that these facilities will only operate during the daytime all suggest these sources are not problematic and would not present an impediment to the townhouse uses being proposed. It is also noted that existing residential uses are closer, and presumably are not subject to adverse noise impacts.

In summary of the above, the proposed townhouse development is feasible relative to compliance with the applicable noise guideline requirements.

5.0 REFERENCES

1. PC STAMSON 5.04, “Computer Program for Road Traffic Noise Assessment”, Ontario Ministry of the Environment.

2. Building Practice Note No. 56: "Controlling Sound Transmission into Buildings", by J.D. Quirt, Division of Building Research, National Council of Canada, September 1985.

3. MOE Publication NPC-300, “Stationary and Transportation Sources — Approval and Planning” Ontario Ministry of the Environment, August 2013.

4. “0328 Wellington Rd 7, Traffic Impact Study”, R.J. Burnside Associates Limited, December 2021.

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TABLE 1 ROAD TRAFFIC DATA

Roadway	24 hr Volume	Day/Night Split (%)	% Trucks(2)		Speed Limit (kph)
			Medium	Heavy	
Wellington Rd 7 (1)	9 100 (9 282)	90 / 10	3.60	5.30	60
Middlebrook Rd (3)	1 530 (1 561)	90 / 10	7.28	10.92	50

Notes:

(1) Data obtained from the Reference 3 traffic study, applicable to the year 2031. The value in parentheses has been projected to the year 2032 design condition using an assumed 2% growth rate compounded annually.

(2) Total truck percentage is based on the Reference 3 traffic study. Medium /Heavy split is assumed.

TABLE 2 PREDICTED TRANSPORTATION SOUND LEVELS

Location	Source	Distance (m)[(1)]	$L_{eq\ Day}$ (dBA)	$L_{eq\ Night}$ (dBA)
Block 28, East Facade	Wellington Rd 7	18	67	61
	Middlebrook Rd	255	39	32
	Total	**—**	**67**	**61**
Block 29, East Facade	Wellington Rd 7	49	57	51
	Middlebrook Rd	287	37	30
	Total	**—**	**57**	**51**
Block 3, East Facade	Wellington Rd 7	85	53	47
	Middlebrook Rd	287	37	30
	Total	**—**	**54**	**47**
Block 28, West Face L2 Deck	Wellington Rd 7	32	52	—
	Total	**—**	**52**	**—**
Block 28, South At-Grade Patio	Wellington Rd 7	25	60	—
	Total	**—**	**60**	**—**
Block 29, East Face L2 Deck	Wellington Rd 7	49	54	—
	Total	**—**	**54**	**—**
Block 1, South At-Grade Patio/Rear Yard	Wellington Rd 7	20	67	—
	Total	**—**	**67**	**—**

Note:

(1) Distances as measured from centreline of roadway to the assessment receptor.

TABLE 3 NOISE ABATEMENT REQUIREMENTS(1)

Building	Air Conditioning(2)	Exterior Wall(3)	Exterior Window(4)	Sound Barrier	Warning Clauses(5)
Block 1, 16	Mandatory	No special acoustical requirement		2.5 m (all units)	A + B + D
Blocks 17, 20, 23, 26	Mandatory	No special acoustical requirement		1.8 m (north unit only)	A + B + D
Blocks 19,22, 25, 28	Mandatory	No special acoustical requirement		1.8 m (south unit only)	A + B + D
Blocks 2, 15, 18, 21, 24, 27	Mandatory	No special acoustical requirement		none	A + B + D
Blocks 29 to 34	Provision for adding	No special acoustical requirement		none	A + C + D
All remaining residential units	None	No special acoustical requirement		None	D

Notes:

(1) Where means must be provided to allow windows to remain closed for noise control purposes, a commonly used technique is air conditioning. Air conditioning equipment must comply with any guidelines laid out within the local municipal code.

(2) Provision for adding air conditioning typically takes the form of a forced air ventilation system sized to accommodate the addition of central air conditioning at a future date (by the occupant).

(3) STC – Sound Transmission Class Rating (Reference ASTM E-413).

(4) A sliding glass walkout door should be considered as a window and be included in the percentage of glazing. Window and exterior wall requirements were based on standard assumptions and should be reviewed once building (floor) plans are finalized.

(5) Standard example warning clauses to be registered on title and be included in Offers of Purchase and Sale and Leases on designated units:

A. "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 traffic may occasionally interfere with some activities of the dwelling occupants as the sound level may exceed the noise guidelines of the Municipality and the Ministry of the Environment."

B. "This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

C. "This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

D. "Purchasers/tenants are advised that due to the proximity of the nearby industrial/commercial uses, sound levels from these facilities may be audible at times."

(7) Conventional roof construction meeting Ontario Building Code requirements is satisfactory in all cases.

(8) All exterior doors shall be fully weather-stripped.

APPENDIX A

ENVIRONMENTAL NOISE GUIDELINES

APPENDIX A

ENVIRONMENTAL NOISE GUIDELINES

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP)

Reference: MECP Publication NPC-300, October 2013: "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning".

SPACE	SOURCE	TIME PERIOD	CRITERION
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	Road	23:00 to 07:00	45 dBA
	Rail	23:00 to 07:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Sleeping quarters	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 0
Sleeping quarters	Road	23:00 to 07:00	40 dBA
	Rail	23:00 to 07:00	35 dBA
	Aircraft	24-hour period	NEF/NEP 0
Outdoor Living Areas	Road and rail	07:00 to 23:00	55 dBA Up to 60 dBA allowed in some cases
Outdoor Points of Reception	Aircraft	24-hour period	NEF/NEP 30[#]
	Stationary Source		
	Class 1 Area	07:00 to 19:00[(1)]	50[*] dBA
		19:00 to 23:00[(1)]	50[*] dBA
	Class 2 Area	07:00 to 19:00[(2)]	50[*] dBA
		19:00 to 23:00[(2)]	45[*] dBA
	Class 3 Area	07:00 to 19:00[(3)]	45[*] dBA
		19:00 to 23:00[(3)]	40[*] dBA
	Class 4 Area	07:00 to 19:00[(4)]	55[*] dBA
		19:00 to 23:00[(4)]	55[*] dBA

.../cont'd

SPACE	SOURCE	TIME PERIOD	CRITERION
Plane of Window to Noise Sensitive Spaces	Stationary Source		
	Class 1 Area	07:00 to 19:00(1)	50* dBA
		19:00 to 23:00(1)	50* dBA
		23:00 to 07:00(1)	45* dBA
	Class 2 Area	07:00 to 19:00(2)	50* dBA
		19:00 to 23:00(2)	50* dBA
		23:00 to 07:00(2)	45* dBA
	Class 3 Area	07:00 to 19:00(3)	45* dBA
		19:00 to 23:00(3)	45* dBA
		23:00 to 07:00(3)	40* dBA
	Class 4 Area	07:00 to 19:00(4)	60* dBA
		19:00 to 23:00(4)	60* dBA
		23:00 to 07:00(4)	55* dBA

\# may not apply to in-fill or re-development
* or the minimum hourly background sound level (Leq,1hr) due to road traffic, if higher
(1) Class 1 Area: Urban
(2) Class 2 Area: Urban during day; rural-like evening and night
(3) Class 3 Area: Rural
(4) Class 4 Area: Subject to land use planning authority's approval

Reference: MECP Publication ISBN 0-772902804-5, 1987: "Environmental Noise Assessment in Land-Use Planning".

EXCESS ABOVE RECOMMENDED SOUND LEVEL LIMITS (dBA)	CHANGE IN SUBJECTIVE LOUDNESS ABOVE	MAGNITUDE OF THE NOISE PROBLEM	NOISE CONTROL MEASURES (OR ACTION TO BE TAKEN)
No excess (<55 dBA)	—	No expected noise problem	None
1 to 5 inclusive (56 to 60 dBA)	Noticeable louder	Slight noise impact	If no physical measures are taken, then prospective purchasers or tenants should be made aware by suitable warning clauses.
6 to 10 inclusive (61 - 65 dBA)	Almost twice as loud	Definite noise impact	Recommended.
11 to 15 inclusive (66 - 70 dBA)	Almost three times as loud	Serious noise impact	Strongly Recommended.
16 and over (>70 dBA)	Almost four times as loud	Very serious noise impact	Strongly Recommended (may be mandatory).

APPENDIX B

ROAD TRAFFIC DATA

BURNSIDE

0328 Wellington Road 7
Traffic Impact Study

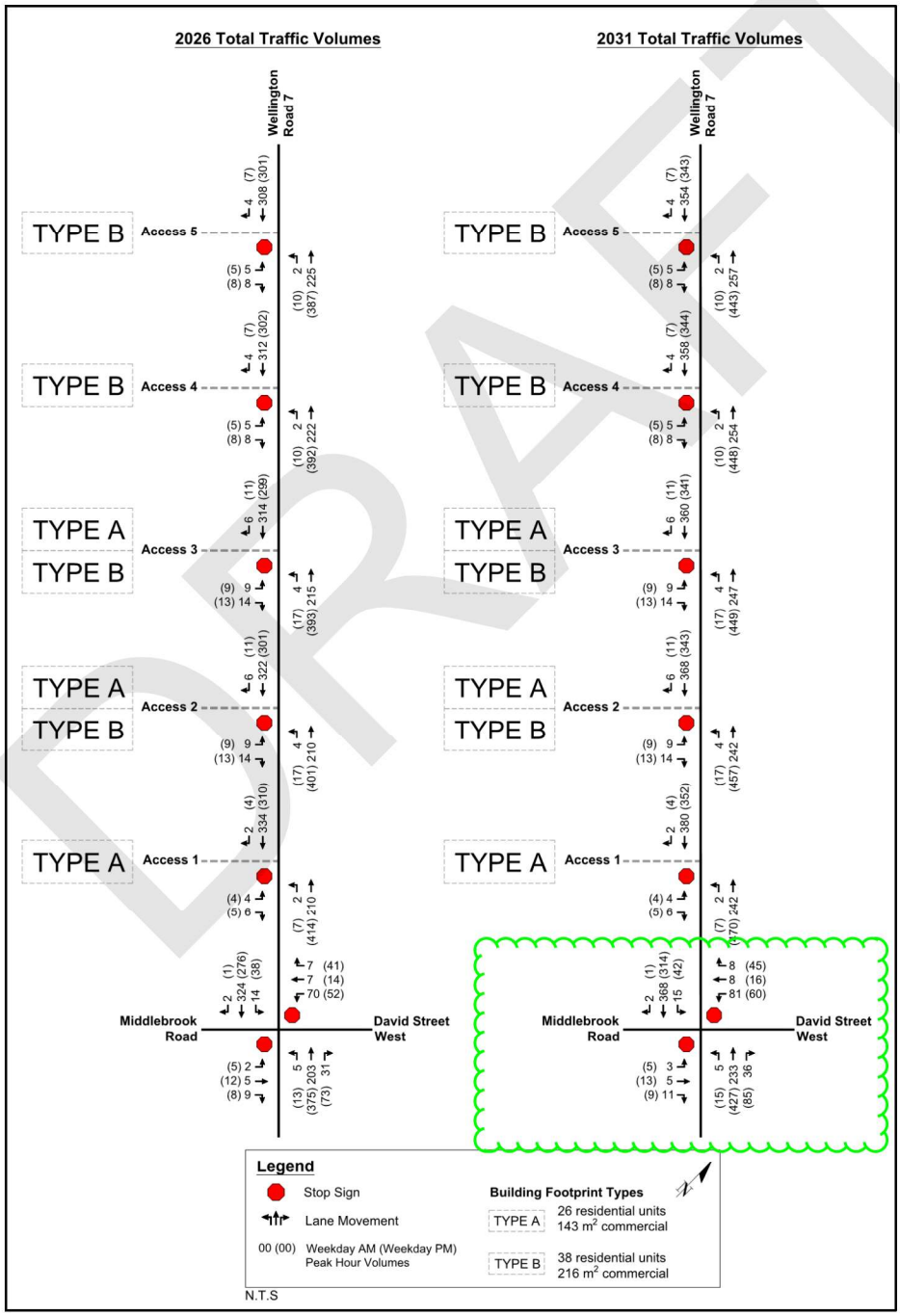
Radaja Inc.

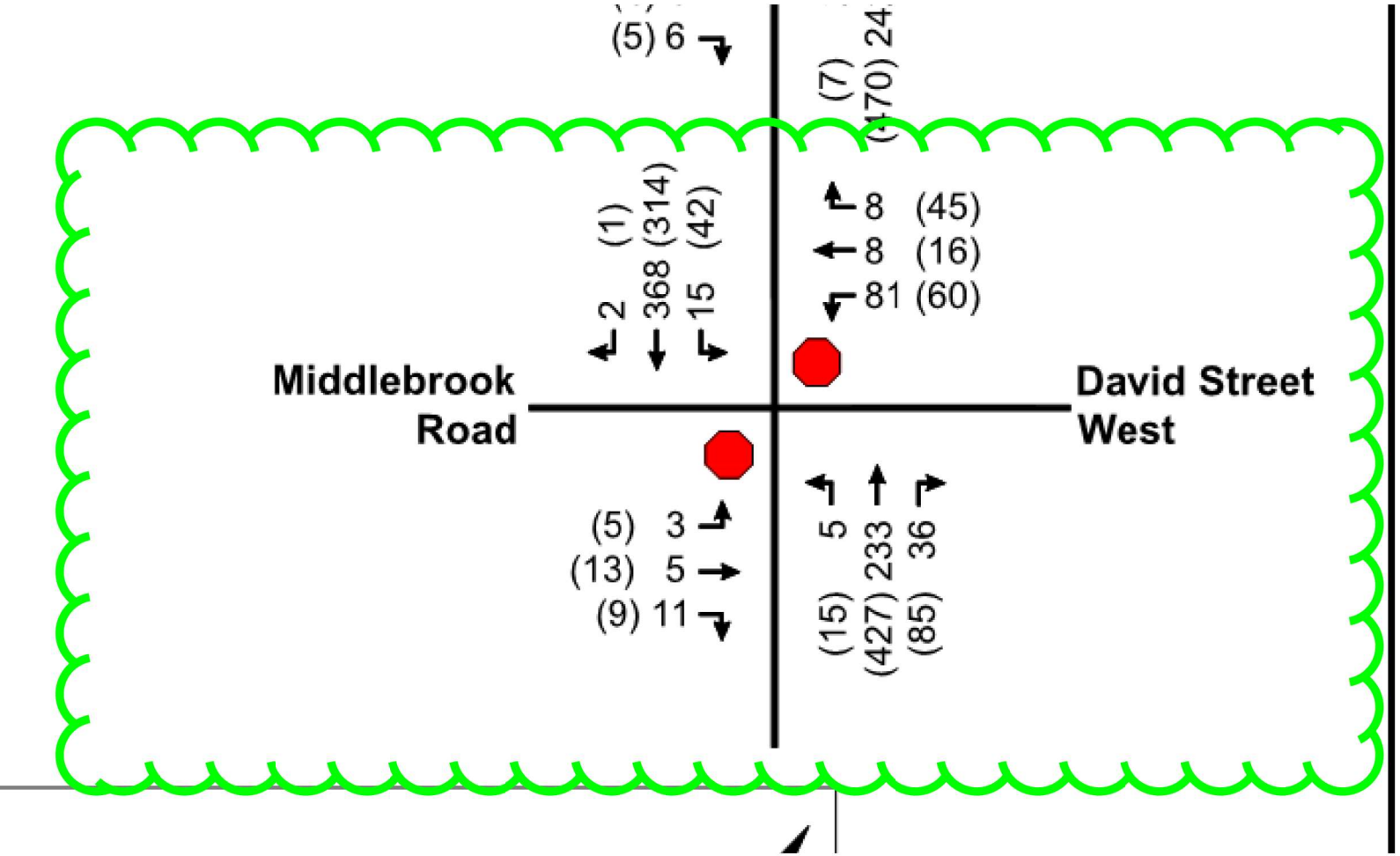
5.0 Total Conditions

5.1 Total Traffic Volumes

Total traffic volumes consist of background traffic volumes in Figure 3 plus site traffic shown in Figure 5. The resulting 2026 and 2031 total traffic volumes are shown in Figure 6.

Figure 6: 2026 and 2031 Total Traffic Volumes




(5) 6
(7)
(170) 24
(1)
(314)
(42)
2
368
15
8 (45)
8 (16)
81 (60)
Middlebrook Road
David Street West
(5) 3
(13) 5
(9) 11
5
233
36
(15)
(427)
(85)

APPENDIX C

TRANSPORTATION SOURCE SAMPLE CALCULATION

```
STAMSON 5.04        SUMMARY REPORT        Date: 17-10-2022 12:17:58
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: row1.te              Time Period: Day/Night 16/8 hours
Description: First Row_East Face


Road data, segment # 1: Wellington (day/night)
----------------------------------------------
Car traffic volume  :  7610/846   veh/TimePeriod  *
Medium truck volume :   301/33    veh/TimePeriod  *
Heavy truck volume  :   443/49    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   9100
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :   1.00
    Medium Truck % of Total Volume     :   3.60
    Heavy Truck  % of Total Volume     :   5.30
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Wellington (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  18.00 / 18.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Middlebrook (day/night)
-----------------------------------------------
Car traffic volume  :  1149/128   veh/TimePeriod  *
Medium truck volume :   102/11    veh/TimePeriod  *
Heavy truck volume  :   153/17    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   1530
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :   1.00
    Medium Truck % of Total Volume     :   7.28
    Heavy Truck  % of Total Volume     :  10.92
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 2: Middlebrook (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 255.00 / 255.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Wellington	1.52	67.38	67.38
2.Middlebrook	1.82	38.71	38.71
Total			67.39 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Wellington	1.52	60.83	60.83
2.Middlebrook	1.82	32.16	32.16
Total			60.84 dBA

```
TOTAL Leq FROM ALL SOURCES (DAY): 67.39
                           (NIGHT): 60.84
```

```
STAMSON 5.04        NORMAL REPORT        Date: 17-10-2022 12:36:27
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: ola3a_55.te          Time Period: Day/Night 16/8 hours
Description: Block 1 Rear Yard - With Mitigation 55 dBA

Road data, segment # 1: Wellington (day/night)
----------------------------------------------
Car traffic volume  :  7610/846   veh/TimePeriod  *
Medium truck volume :   301/33    veh/TimePeriod  *
Heavy truck volume  :   443/49    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   9100
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :   1.00
    Medium Truck % of Total Volume     :   3.60
    Heavy Truck  % of Total Volume     :   5.30
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Wellington (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 2
House density             :     80 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  20.00 / 85.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.50 m

Barrier receiver distance :   6.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Middlebrook (day/night)
-----------------------------------------------
Car traffic volume  :  1149/128   veh/TimePeriod  *
Medium truck volume :   102/11    veh/TimePeriod  *
Heavy truck volume  :   153/17    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   1530
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :   1.00
    Medium Truck % of Total Volume     :   7.28
    Heavy Truck  % of Total Volume     :  10.92
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 2: Middlebrook (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 1
House density             :     30 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 252.00 / 287.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.50 m
Barrier receiver distance :   6.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

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

Source height = 1.52 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.52 !        1.50 !        1.51 !         1.51

ROAD (0.00 + 55.76 + 0.00) = 55.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  68.17   0.00  -1.25   0.00   0.00   0.00 -11.16  55.76
-------------------------------------------------------------------------------
Segment Leq : 55.76 dBA

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

Source height = 1.82 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.82 !        1.50 !        1.51 !         1.51

ROAD (0.00 + 32.03 + 0.00) = 32.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.44  60.93   0.00 -17.65  -1.06   0.00   0.00 -10.18  32.03
-------------------------------------------------------------------------------

Segment Leq : 32.03 dBA

Total Leq All Segments: 55.78 dBA
```

```
STAMSON 5.04        NORMAL REPORT        Date: 17-10-2022 12:46:42
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: ola3a_60.te          Time Period: Day/Night 16/8 hours
Description: Block 1 Rear Yard - With Mitigation 60 dBA


Road data, segment # 1: Wellington (day/night)
-----------------------------------------------
Car traffic volume  :  7610/846   veh/TimePeriod  *
Medium truck volume :   301/33    veh/TimePeriod  *
Heavy truck volume  :   443/49    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   9100
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :   1.00
    Medium Truck % of Total Volume     :   3.60
    Heavy Truck  % of Total Volume     :   5.30
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Wellington (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 2
House density             :     80 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  20.00 / 85.00  m
Receiver height           :   1.50 / 7.50   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 :   6.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Middlebrook (day/night)
-----------------------------------------------
Car traffic volume  :  1149/128   veh/TimePeriod  *
Medium truck volume :   102/11    veh/TimePeriod  *
Heavy truck volume  :   153/17    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   1530
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :   1.00
    Medium Truck % of Total Volume     :   7.28
    Heavy Truck  % of Total Volume     :  10.92
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Middlebrook (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 1
House density             :     30 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 252.00 / 287.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   6.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Wellington (day)
-------------------------------------
Source height = 1.52 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.52 !        1.50 !        1.51 !         1.51

ROAD (0.00 + 59.20 + 0.00) = 59.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  68.17   0.00  -1.25   0.00   0.00   0.00  -7.72  59.20
-------------------------------------------------------------------------------

Segment Leq : 59.20 dBA
```

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

Source height = 1.82 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.82 !        1.50 !        1.51 !         1.51

ROAD (0.00 + 34.49 + 0.00) = 34.49 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.51  60.93   0.00 -18.46  -1.19   0.00   0.00  -6.80  34.49
-------------------------------------------------------------------------------

Segment Leq : 34.49 dBA

Total Leq All Segments: 59.21 dBA
```