

DETAILED ENVIRONMENTAL NOISE REPORT

PROPOSED FERGUS GOLF COURSE
REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE
TOWNSHIP OF CENTRE WELLINGTON



PREPARED FOR
Fergus Development Inc.

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SUMMARY

The existing golf course (the “Site”) consists of two (2) parcels; the northwest parcel which is 42.35 ha, situated on the north side of Wellington Road 19, and the southeast parcel which is 39.85 ha, situated on the south side of Wellington Road 19. The proposed residential development is located on the southeast parcel (the “SE Site”) and the communal water and wastewater services are integrated into the existing Golf Course, which will remain a golf course, on the northwest parcel (the “NW Site”). The Site is located in the Township of Centre Wellington, County of Wellington and is subject to road traffic noise from Wellington Road 19. It is not affected by rail, aircraft, or industrial noise sources.

The environmental noise guidelines of the community of Fergus, Township of Centre Wellington, County of Wellington and the Ministry of the Environment, Conservation and Parks (previously, MOE) set out sound level limits for both indoor and outdoor space. Sound levels due to the adjacent roads were determined using ORNAMENT, the noise prediction model of the MOE.

Using the road traffic data obtained from the County of Wellington and the traffic consultant (BA Group) retained by the proponent, the sound levels for various locations within the proposed residential redevelopment were determined. It was found that with appropriate mitigative measures, all lots in the development will meet the noise guidelines.

Lots along Wellington Road 19 require provision for adding central air conditioning by the occupant if noise becomes a concern and a warning clause is recommended. Table 3 and Figure 2 show the central air conditioning requirements.

In addition, the lots with rear yards adjacent to Wellington Road 19 will require acoustic barriers up to 2.5 m high to be installed along the rear and side property lines. The mitigated sound levels in the rear yards are predicted to be 56 dBA or less.

Based on the analysis, exterior wall, window and exterior door construction above typical building practices will not be necessary. Prior to issuance of building permits, the acoustical requirements should be reviewed to ensure compliance with the applicable guidelines. Prior to final occupancy, the lots should be inspected by an acoustical consultant to ensure the required mitigative measures have been incorporated.

Where minor excesses exist or mitigation is required, future occupants will be advised through the use of warning clauses.

A future sanitary pumping station is identified on the development draft plan of subdivision dated June 29, 2026 prepared by GSP Group. A future wastewater treatment plant and water treatment plant are proposed on the NW Site. Detailed information regarding noise sources associated with the sanitary pumping station and water/wastewater treatment plant(s) are not available at this stage of the project. Once specific information is available later during detailed design, a detailed noise analysis should be prepared by the proponent of the sanitary pumping station and water treatment plant(s) to ensure the applicable guidelines are met at all noise sensitive receptors.

A dairy farm is located south of the proposed residential development and with the main building structures setback 200 m from the subject site property line. Existing residential lots are located immediately north and east of the dairy farm, closer than the proposed residential lots. The noise sources associated with normal farm operations are exempt from the applicable NPC-300 noise guidelines as well as the Township of Centre Wellington Noise Control By-law (see report text for details).

Purchasers/tenants of Lots 1, 239, 240 and 345 to 351 will be advised through a warning clause that the dwelling is in proximity to a future sanitary pumping station or future wastewater and water treatment plant(s) whose activities may at times be audible.

1.0 INTRODUCTION

Jade Acoustics Inc. was retained to prepare a Detailed Environmental Noise Report to investigate the potential impact of noise on the proposed residential development to the satisfaction of the Township of Centre Wellington and the County of Wellington.

A Detailed Environmental Noise Report dated July 11, 2024, was prepared by Jade Acoustics Inc. for Fergus Development Inc. Previous to that report, a Detailed Environmental Noise Report dated December 21, 2023, was prepared by Jade Acoustics Inc. for Fergus Development Inc. The July 11, 2024 report was prepared to address Valcoustics Canada Ltd. peer review comments (completed on behalf of the Township of Centre Wellington) on the December 21, 2023, noise report. Subsequent to the July 11, 2024 noise report, Valcoustics Canada Ltd. confirmed that all comments were appropriately addressed via a letter dated September 22, 2024. The latest information used in the preparation of this noise report is documented below, which includes the latest version of the development concept plan. To note for completeness, any previous input from Valcoustics Canada Ltd. on the general approach for the noise report (such as using Summer forecasted traffic) has been followed in the preparation of this report.

To note for general completeness regarding project history, a Preliminary Environmental Noise Report dated February 14, 2022, revised April 21, 2023, was prepared by Jade Acoustics Inc. for the original application by Fergus Development Inc. The April 27, 2023 revised report was prepared to address an updated concept plan, updated preliminary grading plan, updated traffic information and peer review comments (prepared by Valcoustics Canada Ltd.) provided through the County of Wellington on the February 14, 2022 noise report. A few subsequent comments were received on the April 27, 2023 noise report, again from Valcoustics Canada Ltd., which were considered minor in nature and were addressed in the Detailed Environmental Noise Report dated December 21, 2023.

The proposed site is identified as:

NW Site:

Part of Lots 10 and 11

Concession 3 and Part of Road Allowance Between Lots 10 and 11

Concession 3 (stopped up and closed by by-law No.74)

(Geographic Township of West Garafraxa)

Township of Centre Wellington

County of Wellington

SE Site:

Part of Lots 9 and 10

Concession 3

(Geographic Township of West Garafraxa)

Township of Centre Wellington

County of Wellington

The proposal includes redevelopment of the Fergus Golf Course to construct single detached dwellings within the southeast (SE) site.

Surrounding land uses include agricultural land to the north and south, an existing residential development to the east, a dairy farm and existing residential to the southeast and the existing Fergus Golf Club on the northwest (NW) Site, which will remain. The site is bounded by Wellington Road to the west, Third Line to the east as well as open space, existing residential and/or agricultural land to the south and the intersection of Wellington Road and Third Line to the north.

A Key Plan is attached as Figure 1.

The proposed redevelopment is comprised of single detached dwellings, an open space block, a stormwater pond, a park block, a future sanitary pumping station and new internal roads. On the north side of Wellington Road 19 and associated with the proposed development is a future wastewater treatment plant and water treatment plant.

The analysis was based on:

- Development Draft Plan of Subdivision prepared by GSP Group, dated June 29, 2026;
- Grading Plans prepared by R.J. Burnside & Associates Limited, file dated June 12, 2026 and subsequent grading information provided directly to Jade Acoustics Inc. on June 18, 2026 and July 2, 2026;
- Road traffic information (counts from 2022) as well as existing data information via email (from 2025) as provided by the County of Wellington to Jade Acoustics Inc. on February 13, 2023 and May 19, 2026, respectively. Traffic turning movement count (TMC) figure for the year 2038 prepared by BA Group from their traffic study, plotted date May 17, 2026; and;
- A site visit conducted by Jade Acoustics Inc. on June 2, 2026.

Figure 2 shows the plan of the proposed residential development.

All dwellings are expected to be 1 to 2 storey residential buildings.

2.0 NOISE SOURCES

2.1 Transportation Sources

The road traffic on Wellington Road 19 and Third Line is the noise source with a potential impact on the proposed redevelopment. Road traffic information is summarized in Table 1. Correspondence regarding the road traffic information is included in Appendix A.

The ultimate road traffic data for Wellington Road 19 was provided by the traffic consultant, BA Group, in the form of TMC figures for the year 2038. Peak hour road traffic volumes (a.m. and p.m.) for Wellington Road 19 and Third Line (year 2038) were used to determine the Summer Average Daily Traffic (SADT) volumes for these two (2) roads. As discussed with BA Group, the future SADT volumes were calculated by multiplying the higher of the a.m. or p.m. peak hour volumes by ten (10) which means that the peak hour volume was assumed to be 10% of the SADT volumes.

The percentage of trucks and day/night split for Wellington Road 19 were determined by assessing existing traffic counts as provided by the County of Wellington. Additionally, Jade Acoustics discussed the future ultimate traffic conditions with BA Group and confirmed that the vast majority of future vehicles (year 2038) versus existing counts would be passenger vehicles (i.e. not medium and heavy trucks). The truck percentages used in this report, as noted in Table 1 provided later in the report, take into consideration that the existing truck percentages will be reduced under the ultimate future condition.

Further to above, it was determined that the (SADT) for Third Line (year 2038) would be relatively low and acoustically insignificant versus Wellington Road 19. Due to the relatively low traffic volume, Third Line is not considered further in this report. The same conclusion is applicable to the new internal roadways of the proposed subject site that will also have low traffic volumes.

The site is not affected by aircraft or rail traffic.

2.2 Stationary Sources

A dairy farm is located south of the proposed residential development and with the main building structures setback 200 m from the subject site property line. For general information, existing residential lots are located immediately north and east of the dairy farm, closer than the proposed residential lots. As per NPC-300, "Part B and Part C of this guideline do not apply to the noise impact of stationary sources associated with agricultural operations during the course of normal farm practice which are addressed through the Farming and Food Production Protection Act, 1998". To note here, Part B of NPC-300 is applicable to Stationary Sources and Part C is applicable to Land Use Planning. The noise sources associated with normal farm operations are

exempt from the applicable NPC-300 noise guidelines as well as the Township of Centre Wellington Noise Control By-law (as noted in more detail later). As such, in the context of this noise report, the existing dairy farm does not require investigation or analysis and was not assessed further. To clarify, the Farming and Food Production Act, 1998, includes noise source exemptions for normal farming operations and the Dairy Farm located south of the subject site is within the category of farm operations that receive exemption status.

A future sanitary pumping station is proposed near the middle southeast portion of the proposed development. A future wastewater treatment plant and water treatment plant are proposed on the northwest (NW) Site to service the proposed dwellings. Detailed information regarding noise sources associated with the sanitary pumping station and water treatment plant(s) are not available at this stage of the project. The proposed sanitary pumping station and water treatment plant(s) are in proximity to proposed residential dwellings and existing noise sensitive receptors. Once the specific building and mechanical information is determined and the site plan is available, a detailed noise analysis should be prepared by the proponent of the sanitary pumping station and water treatment plant(s) to ensure the MOE noise guidelines are met at the proposed residential dwellings as well as existing noise sensitive receptors. To note here for completeness, noise sensitive receptors include vacant lands where a noise sensitive land use is permitted and is to be investigated as needed.

3.0 ENVIRONMENTAL NOISE CRITERIA

The MOE document “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning, Publication NPC-300”, dated August, 2013, released October 21, 2013 (updated final version # 22) was used in the analysis. A brief summary of the NPC-300 guidelines is given in Appendix B.

The Township of Centre Wellington and the County of Wellington follow the MOE environmental noise criteria which are summarized below.

3.1 Transportation Sources

3.1.1 Indoors

If the nighttime (11:00 p.m. to 7:00 a.m.) sound level in terms of Leq at the exterior face of a bedroom or living/dining room window is greater than 60 dBA and/or if the daytime (7:00 a.m. to 11:00 p.m.) sound level in terms of Leq at the exterior face of a bedroom or living/dining room window is greater than 65 dBA, means must be provided so that windows can be kept closed for noise control purposes and central air conditioning is required.

For nighttime sound levels (LeqNight) greater than 50 dBA to less than or equal to 60 dBA on the exterior face of a bedroom or living/dining room window and/or daytime sound levels (LeqDay) greater than 55 dBA to less than or equal to 65 dBA on the exterior face of a bedroom or living/dining room window, there need only be the provision for adding central air conditioning by the occupant at a later date. This typically involves a ducted heating system sized to accommodate the addition of central air conditioning by the occupant at a later date. A warning clause advising the occupant of the potential interference with some activities is also required.

In all cases, air cooled condenser units must not exceed an AHRI sound rating of 7.6 bels. As noted in MOE document NPC-300, the location and installation of the outdoor air conditioning device should comply with the sound level limits of Publication NPC-216 or should comply with other criteria specified by the municipality. The air cooled condenser units must be sited in accordance with the zoning by-laws with respect to setbacks as well as location.

The current Township of Centre Wellington Noise By-law Number 6001-24 which regulates, prohibits and otherwise controls noise, has no sound level limits for the air conditioner condenser units.

As required by the MOE, the indoor noise criteria for road traffic noise is 40 dBA (Leq8hour) for the bedrooms during nighttime hours, 45 dBA (Leq8hour) for the living/dining rooms during nighttime hours and 45 dBA (Leq16hour) for the living/dining rooms and bedrooms during daytime hours. These criteria are used to determine the architectural requirements.

3.1.2 Outdoors

Based on the MOE guidelines, for outdoor amenity areas (Outdoor Living Area – OLA) a design goal of 55 dBA daytime (7:00 a.m. to 11:00 p.m.) sound level is used with an excess not greater than 5 dBA considered acceptable in some cases. Where the unmitigated sound level during the day exceeds 55 dBA (LeqDay) but is less than 60 dBA (LeqDay), a warning clause is required and mitigation should be considered. When the unmitigated sound level exceeds 60 dBA, sound barriers and warning clauses are generally required to achieve as close to 55 dBA as is technically, economically and administratively feasible.

The definition of outdoor amenity area as defined by the MOE is given below.

"Outdoor Living Area (OLA)

(applies to impact assessments of transportation sources) means that part of a noise sensitive land use that is:

- intended and designed for the quiet enjoyment of the outdoor environment; and
- readily accessible from the building.

The OLA includes:

- backyards, front yards, gardens, terraces or patios;
- balconies and elevated terraces (e.g. rooftops), with a minimum depth of 4 metres, that are not enclosed, provided they are the only outdoor living area (OLA) for the occupant; or
- common outdoor living areas (OLAs) associated with high-rise multi-unit buildings."

In this case, it is expected that any proposed balconies and/or elevated terraces associated with the single detached dwellings will be less than 4.0 m deep and as such are not considered to be noise sensitive receptors. The rear yards associated with the residential dwellings have been investigated. See Section 4.1 for further discussion.

For both indoor and outdoor conditions, where the acoustic criteria are exceeded, warning clauses must be placed in offers of purchase and sale or lease agreements and in the subdivision agreement.

3.2 Stationary Sources

The guidelines of the Ontario Ministry of the Environment, Conservation and Parks (previously, MOE) for stationary sources are to be used for commercial/industrial facilities.

The MOE has published the document NPC-300 titled “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”.

The MOE also has vibration guidelines with respect to stationary sources, NPC-207. These guidelines require that the peak vibration velocities not exceed 0.3 mm/s at the point of reception during the day or night.

The MOE recognizes the need for back-up beepers/alarms as safety devices and as such does not have any guidelines or criteria to address these sources.

It should be noted that the MOE guidelines do not require that the source be inaudible, but rather that specific sound level limits be achieved.

With respect to stationary sources of noise in urban areas, the MOE guidelines require that the sound level due to the stationary source at the building façade and outdoor amenity spaces not exceed the sound level due to road traffic and in certain situations due to rail traffic in any hour of source operation, subject to specific exclusions. Tables C-5, C-6, C-7 and C-8 included in Appendix B provide the exclusion limit values of one-hour equivalent sound level (L_{eq} , dBA) and impulsive sound level (L_{LM} , dBAI).

In addition, the MOE guidelines require that most industries have a valid Environmental Compliance Approval (ECA) or its precursor, a Certificate of Approval (C of A) to operate.

In general, if the criteria for a stationary source of noise are exceeded, the MOE recommends that control be implemented at the source rather than at the receiver. Alternatively, if the receiver is set back from the source or if a physical barrier is constructed so that the criteria can be met at the receiver, no additional mitigative measures are required. Treatment of the receptor building by the use of suitable wall and window construction and central air conditioning to keep windows closed is not an acceptable solution to the MOE in Class 1 and 2 areas (urban). In addition, a warning clause in offers of purchase and sale and/or lease agreement noting the proximity of dwellings to such a source should be considered.

3.3 Township of Centre Wellington Noise Control By-Law

The Township of Centre Wellington has a noise control by-law to prohibit or regulate noise likely to disturb the inhabitants of the Township; Noise By-law Number 6001-24 dated March 25, 2024.

The by-law does not provide specific sound level limits but rather provides qualitative information with respect to sources and provides prohibitions by time and place. The by-law does clearly indicate an “Exemption of Normal Farm Practices”. The exemption language coincides with the language used in NPC-300, referencing the Farming and Food Protection Act, 1998.

In summary and as relevant to the subject site development, the MOE guidelines and the noise control by-law identify normal farm operations (which are expected at the nearby farm) to be exempt from the stationary noise source analysis in the context of this report. Therefore, the activities associated with the farm are not considered further in this report.

4.0 NOISE IMPACT ASSESSMENT

4.1 Transportation Sources

For road traffic noise, the sound level in terms of Leq, the energy equivalent continuous sound level for both day (Leq16hour, daytime) and night (Leq8hour, nighttime) was determined using the MOE Traffic Noise Prediction Model (ORNAMENT).

Table 2 provides a summary of the predicted sound levels outdoors due to road traffic at specific locations without any mitigative measures. Appendix C gives sample calculations. The topography between the source and the receiver has been taken into account. Shielding provided by the existing and proposed buildings has also been accounted for in the analysis. The rear yard receiver was assumed to be 3 m from the centre of the rear wall of the house.

The road gradient for Wellington Road 19 is up to 2% in some areas adjacent to the site. There is a sample calculation attached to the noise report that shows the road gradient set to 2% at Lot 351. In general, the stretch of Wellington Road spanning from opposite Lot 285 to opposite Lot 351 has a 2% gradient and then it is a 1% gradient heading further north through northeast. This has been accounted for in the noise analysis.

Lot 1 has a rear yard with exposure to Wellington Road 19 and the unmitigated daytime sound level in the rear yard is predicted to be 62 dBA. The sound level at the side wall (second storey) is predicted to be 65 dBA (daytime) and 56 dBA (nighttime).

For Lot 346 that has a rear façade parallel to Wellington Road 19, the unmitigated daytime sound level in the rear yard is predicted to be 64 dBA. The unmitigated daytime and nighttime sound levels at the rear wall (second storey) are predicted to be 65 dBA and 57 dBA, respectively.

Table 2 provides a summary of the predicted sound levels outdoors due to road traffic at specific locations (the lots listed above as well as others) without any mitigative measures. Appendix C includes sample calculations.

Where the sound level limits are expected to be exceeded, mitigative measures and warning clauses are required.

4.2 Stationary Sources

As discussed in Section 2.2, for the future sanitary pumping station and wastewater and water treatment plant(s), a detailed noise analysis should be prepared by the proponent of these uses to ensure the MOE noise guidelines are met at the proposed/existing noise sensitive receptors.

5.0 NOISE ABATEMENT REQUIREMENTS

The noise mitigation requirements for both the indoor and outdoor locations are detailed below. Table 3 and Figure 2 provide a summary of the acoustical mitigative requirements for the lots in this development.

5.1 Roads

5.1.1 Indoors

Architectural Component Requirements

The indoor sound level criteria for road traffic can be achieved in all cases by using appropriate architectural elements for external walls, windows, exterior doors, and roof construction. The indoor sound level limit for road traffic noise is 40 dBA (Leq8hour) for the bedrooms during nighttime hours, 45 dBA (Leq8hour) for the living/dining rooms during nighttime hours and 45 dBA (Leq16hour) for the living/dining rooms and bedrooms during daytime hours. These criteria have been used in this analysis. The characteristic spectrum for road traffic has been accounted for in the determination of the architectural components. Appendix D contains a sample calculation of the architectural component selection.

Calculations were completed for the second storey corner bedroom of the worst case location with exposure to Wellington Road 19 (for example, Lot 1, that is directly adjacent to Wellington Road 19). For the bedroom, the wall parallel to Wellington Road 19 (side wall) was assumed to be 55% of the floor area and the wall perpendicular to Wellington Road (rear wall) was also assumed to be 55% of the floor area. The windows were assumed on both the walls and to be 25% of the associated floor area.

Based on the ratios mentioned above, windows and exterior doors need to be up to STC 26 and exterior walls need to be up to STC 34. These STC ratings comply with the minimum structural and safety requirements provided by standard construction practices; therefore, standard exterior wall construction as well as standard window and exterior door construction is acoustically acceptable for all proposed residential dwellings.

Ventilation Requirements

Where the sound level from road traffic is greater than 60 dBA (LeqNight) or greater than 65 dBA (LeqDay) on the outside face of a bedroom or living/dining room window, the indoor sound level criteria would not be met with open windows and provisions must be met to permit the windows to remain closed. The MOE guidelines require central air conditioning. Based on the analysis, central air conditioning is not required for any of the proposed lots.

Where the nighttime sound level (Leq8hour) is between 51 dBA and 60 dBA inclusive and daytime sound level (Leq16hour) is between 56 dBA and 65 dBA inclusive, the provision for adding central air conditioning by the occupants must be made. Based on the analysis, lots adjacent to Wellington Road 19 (or in very close proximity) require the provision for adding central air conditioning and a warning clause. See Table 3 and Figure 2 for details.

The outdoor air conditioning condenser units must be sited in accordance with the Township's zoning by-laws. Even though the Township of Centre Wellington does not limit the sound rating for the outdoor air conditioning condenser units, we recommend that an AHRI sound rating of 7.6 bels not be exceeded.

Warning clauses will also be required to be placed in offers of purchase and sale, lease agreements and in the subdivision agreement for all relevant lots to make future occupants aware of the potential noise situation. See Table 3 for details.

5.1.2 Outdoors

The outdoor amenity area is required to be exposed to a sound level of less than 55 dBA during the day. A 5 dBA increase is considered acceptable in certain situations. Typically, if the sound level is above 55 dBA, some form of mitigation is recommended, and warning clauses are required. Where the sound levels exceed 60 dBA, mitigation is required.

Sound barrier requirements evaluated using the grading plan provided by R J Burnside and Associates Limited (as per Section 1.0 of this report) are given in Table 3 and discussed below. The sound barrier locations and heights are shown on Figure 2. In the majority of cases, the mitigated sound level in the rear yards is predicted to be 55 dBA or less. There are certain lots where a barrier has been proposed where the resultant mitigated sound level is 56 dBA or less. In all cases, the reported mitigated predicted sound level is in the rear yard of the noted lots.

For Lot 1, a 2.5 m high acoustic fence is required to be installed along the rear and side property line and returned to the side wall of the respective dwelling. The mitigated predicted sound level is 56 dBA. In general, the NPC-300 guideline permits a mitigated sound level between 55 dBA to 60 dBA as acceptable and in this case a 1 dBA exceedance over 55 dBA is considered to be acoustically acceptable.

For Lots 171 to 184, a 2.5 m high acoustic fence is required. The mitigated predicted sound levels are either 55 dBA or 56 dBA.

A 2.0 m high acoustic fence is required to be installed along the rear property line of Lot 284. The mitigated predicted sound level is less than 55 dBA.

For Lots 285 to 295, installation of a 2.5 m high acoustic fence along the rear property line is required to achieve a predicted sound level of 56 dBA.

For Lots 296 to 329, a 2.0 m high acoustic fence is required to be installed along the rear property line. The mitigated predicted sound level is 55 dBA or less.

A 2.5 m high acoustic fence is required along the rear property line of Lots 330 to 350. Following implementation of this mitigation measure, the predicted sound level is 56 dBA or less. For a specific stretch of acoustic fence and effected rear yards (at Lots 340 to 350) the grading plan (referenced in Section 1.0) shows a slope towards the rear property line, included in such a way that the rear yard receptor would be at a higher elevation than the base of barrier elevation (i.e. along the property line). As discussed with Fergus Development Inc., a retaining wall will be included at these lots to raise the base of acoustic fence elevation. The retaining wall would be up to 1 m high. The noise analysis in question, that resulted in a predicted mitigated 56 dBA sound level, has taken into account a 1 m retaining wall with a 2.5 m high acoustic fence on top. It is acknowledged here that the grading can be further adjusted later during detailed design (i.e. potential to use retaining walls or to eliminate the retaining walls by modifying the slope/grading in this area).

For Lot 351, installation of a 2.5 m high acoustic fence along the rear and side property lines, with a return to the side wall of the dwelling, is required to achieve a predicted sound level of 56 dBA.

Lots 2, 170 and 185 rear yard predicted sound levels were investigated. Based on the adjacent lot requiring an acoustic fence, Lots 2, 170 and 185 will have a predicted sound level of 55 dBA or less and therefore do not require an acoustic fence on their respective property.

To note here for completeness, as requested by the Township of Centre Wellington through review comments on the February 14, 2022 noise report prepared by Jade Acoustics Inc., the proponent (Fergus Development Inc.) investigated the possibility of using berms as acoustic barriers instead of acoustic fences (and at that time a few acoustic fences on retaining walls). Based on the review by Fergus Development Inc., it was not feasible to construct berms due to grading constraints at this site (i.e. the use of berms would severely impact the usability of the lots such that it is not a practical design change, among other concerns).

No other lots require sound barriers.

Sample calculations of the sound barrier analysis are included as Appendix E.

Generally, if a sound barrier is to be used, the sound barrier may be a fence, made of any one or a combination of various materials, berm, or a berm/fence combination. The sound barrier should be of continuous construction, with no gaps and should have a minimum surface density of

20 kg/m² or more. Appropriate treatment of the sound barrier at all discontinuities and points of termination would be required to ensure that the sound barrier is effective. This would involve extending the sound barrier to the front property line; returning to the side wall of the house or extending the sound barrier for a minimum of three (3) times the distance between the side wall and the sound barrier, past the rear wall of the house. An acoustic gate of 20 kg/m² is very heavy. Therefore, if a gate is required, provided that it is of continuous construction with no gaps between the boards, it may have a surface density of less than 20 kg/m² and more than 10 kg/m². In addition, any gaps at the bottom of the gate should be kept to a minimal height.

Gaps at the bottom of the acoustic fence are discouraged. If drainage gaps are necessary, special design techniques to create interrupted line of sight under the acoustic fence are required.

There are several cases noted above that indicate the acoustic fence is to return to the side wall of the respective dwelling. Figure 2 shows the acoustic barrier locations in a generalized manner (i.e. the exact point where the barrier returns from the property line to the dwelling structure is not known at this time). At this stage of development, preliminary building envelope and footprint locations are known, but the building footprint especially will be refined at building permit stage when actual architectural plans and site plans are prepared for each respective lot. For the individual site plans created per each lot, the acoustic fence should be shown returning to the dwelling structure, as applicable.

Where an excess will remain or where mitigation is required, a warning clause should be placed in offers of purchase and sale or lease agreements and in the subdivision agreement.

5.2 Stationary Sources

As discussed in Section 2.2, for the future sanitary pumping station and wastewater and water treatment plant(s), a detailed noise analysis should be prepared by the proponent of these uses to ensure the MOE noise guidelines are met at the proposed/existing noise sensitive receptors.

6.0

CONCLUSIONS

With the incorporation of the items discussed (see Table 3, Notes to Table 3 and Figure 2), the sound levels will be within the appropriate MOE, community of Fergus, Township of Centre Wellington, County of Wellington environmental noise criteria. In accordance with Township, County and Ministry implementation guidelines where mitigation is required, future occupants will be advised through the use of warning clauses.

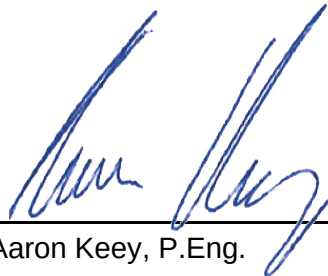
For the future sanitary pumping station and wastewater and water treatment plant(s), a detailed noise analysis should be prepared during detailed design by the proponent of these uses to ensure the MOE noise guidelines are met at the proposed/existing noise sensitive receptors.

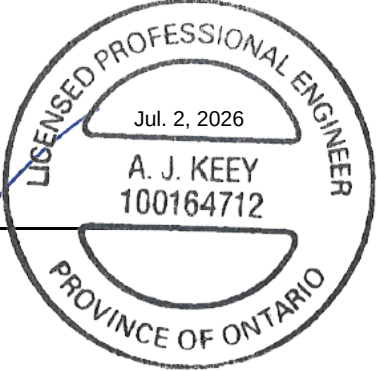
Prior to the issuance of building permits, the house plans should be reviewed by an acoustical consultant to ensure compliance with the applicable guidelines. The acoustic barriers should also be reviewed at that time to confirm they are proposed at the correct locations on the lot specific site plans and returning to the dwelling structures, as required.

Prior to final occupancy, an acoustical consultant shall confirm that the acoustical requirements are in compliance with the acoustical report.

Respectfully submitted,

JADE ACOUSTICS INC.

Per: 
Aaron Keey, P.Eng.



AK/AC/jg
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7.0 STATEMENT OF LIMITATIONS

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The material in this report reflects Jade Acoustics' professional judgment based on the information available to Jade Acoustics at the time of preparing this report. The recommendations and conclusions in this report are based on the information provided at the time of the preparation of this report, as detailed within the report. The client should review the information used in the preparation of the report to ensure that it is accurate.

Jade Acoustics assumes that information provided by third parties is accurate and without error unless it is manifestly incorrect. Jade Acoustics is not responsible for updating the report to reflect changes to information subsequent to the production of this report which may affect the conclusions and recommendations in the report unless explicitly instructed by the client.

Jade Acoustics is not qualified to advise with respect to any matters not related to acoustics. Jade Acoustics is not liable for any failure to implement the recommendations outlined in the report or resulting repercussions.

8.0 REFERENCES

1. "Model Municipal Noise Control By-Law" Final Report, Ontario Ministry of the Environment, August, 1978.
2. "ORNAMENT – Ontario Road Noise Analysis Method for Environment and Transportation", Ontario Ministry of the Environment, October, 1989.
3. "Building Practice Note No. 56: Controlling Sound Transmission into Buildings", J.D. Quirt, Division of Building Research, National Research Council of Canada, September, 1985.
4. "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", Ontario Ministry of the Environment, Conservation and Parks, Publication NPC-300, August, 2013, released October 21, 2013 (updated final version # 22).
5. Township of Centre Wellington Noise By-Law Number 6001-24, March 25, 2024.
6. Preliminary Environmental Noise Report dated February 14, 2022, revised April 27, 2023 prepared by Jade Acoustics Inc.
7. Detailed Environmental Noise Report dated December 21, 2023, prepared by Jade Acoustics Inc.
8. Detailed Environmental Noise Report dated July 11, 2024, prepared by Jade Acoustics Inc.

TABLE 1

PROPOSED FERGUS GOLF COURSE REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE

TOWNSHIP OF CENTRE WELLINGTON

SUMMARY OF ROAD TRAFFIC DATA

ROAD	WELLINGTON ROAD 19
SADT*	10,850
No. of Lanes	2
Posted Speed (km/h)	80
Trucks (%)	5.6
Medium/Heavy Split (%)	27/73
Gradient (%)	Up to 2
Day/Night Split (%)	93.8/6.2
R.O.W. Width (m)	30

* SADT: Summer Annual Average Daily Traffic (year 2038).

TABLE 2

PROPOSED FERGUS GOLF COURSE REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE

TOWNSHIP OF CENTRE WELLINGTON

**SAMPLE OF PREDICTED UNMITIGATED SOUND LEVELS
OUTDOORS DUE TO ROAD TRAFFIC**

Lots	Location*	Source	Distance (m)	Leq (dBA)	
				Day	Night
1	Rear Yard	Wellington Road 19	30.8	62	--
	Side Wall	Wellington Road 19	26.8	65	56
180	Rear Yard	Wellington Road 19	30.3	63	--
	Rear Wall	Wellington Road 19	27.3	63	54
283	Rear Yard	Wellington Road 19	91.8	55	--
286	Rear Yard	Wellington Road 19	40.4	62	--
	Rear Wall	Wellington Road 19	43.4	62	53
346	Rear Yard	Wellington Road 19	29.0	64	--
185	Rear Yard	Wellington Road 19	66.8	57	--
314	Rear Yard	Wellington Road 19	29.6	58	--
	Rear Wall	Wellington Road 19	32.5	64	55

* Rear yard location taken 3 m from rear wall and 1.5 m above grade. Wall locations were taken at 4.5 m above ground for both daytime and nighttime hours.

TABLE 3

PROPOSED FERGUS GOLF COURSE REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE

TOWNSHIP OF CENTRE WELLINGTON

SUMMARY OF MINIMUM NOISE ABATEMENT MEASURES

Lots	Air Conditioning^{(1)#}	Exterior Wall^{(2)*}	Window STC Rating^{(3)*}	Sound Barrier⁽⁴⁾	Warning Clause⁽⁵⁾
Lots 1 and 346 to 351	Provision for Adding	Standard	Standard	2.5 m***	A, B, C, D
Lots 171 to 184, 285 to 295 and 330 to 345	Provision for Adding	Standard	Standard	2.5 m***	A, B, C
Lots 284 and 296 to 329	Provision for Adding	Standard	Standard	2.0 m**	A, B, C
Lots 2, 3 and 170	Provision for Adding	Standard	Standard	No	A, B
Lots 239 and 240	--	Standard	Standard	No	D
All other lots	No Special Requirements				

* Based on preliminary calculations. See Section 5.1 for details.

** 2.0 m high acoustic fence. See Figure 2 and text for details.

*** 2.5 m high acoustic fence. See Figure 2 and text for details.

It is recommended that air conditioning condenser units have an AHRI sound rating of 7.6 bels or less.

See Notes to Table 3 on following pages.

NOTES TO TABLE 3

1. Provision for adding central air conditioning would involve a ducted heating system sized to accommodate the addition of central air conditioning by the occupant at a later date. The air cooled condenser unit must be located in compliance with NPC-216 (or other criteria specified by the municipality) and must not exceed on AHRI sound rating of 7.6 bels.
2. STC – Sound Transmission Class Rating (Reference ASTM-E413). Results shown are based on preliminary calculations using standard assumptions. See text for details.
3. STC – Sound Transmission Class Rating (Reference ASTM-E413). Results shown are based on preliminary calculations using standard assumptions. See text for details.
4. Sound barriers must be of solid construction with no gaps and have a minimum surface density of 20 kg/m^2 . Earthen berms, solid walls/fences of adequate density or combinations of berms and walls/fences may be used. See text for details.
5. Warning Clauses to be placed in the subdivision agreement and to be included in offers of purchase and sale or lease agreements on designated lots:
 - 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 on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.”
 - B. “Purchasers/tenants are advised that 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 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, Conservation and Parks. (Note: locate air cooled condenser unit in a noise insensitive area and ensure that the unit has an AHRI sound rating not exceeding 7.6 bels.)”.
 - C. “Purchasers/tenants are advised that the acoustical berm and/or barrier as installed shall be maintained, repaired or replaced by the owner. Any maintenance, repair or replacement shall be with the same material, to the same standards and having the same colour and appearance of the original.”

- D. "Purchasers/tenants are advised that the dwelling unit is in proximity to a future sanitary pumping station or wastewater and water treatment plant(s), whose activities may at time be audible."
6. Conventional ventilated attic roof construction meeting typical construction practices is satisfactory in all cases.



N.T.S.

**Proposed Residential Redevelopment
Fergus Golf Course
County of Wellington**

Date: July 2026

File: 21-019-02

KEY PLAN

FIGURE 1

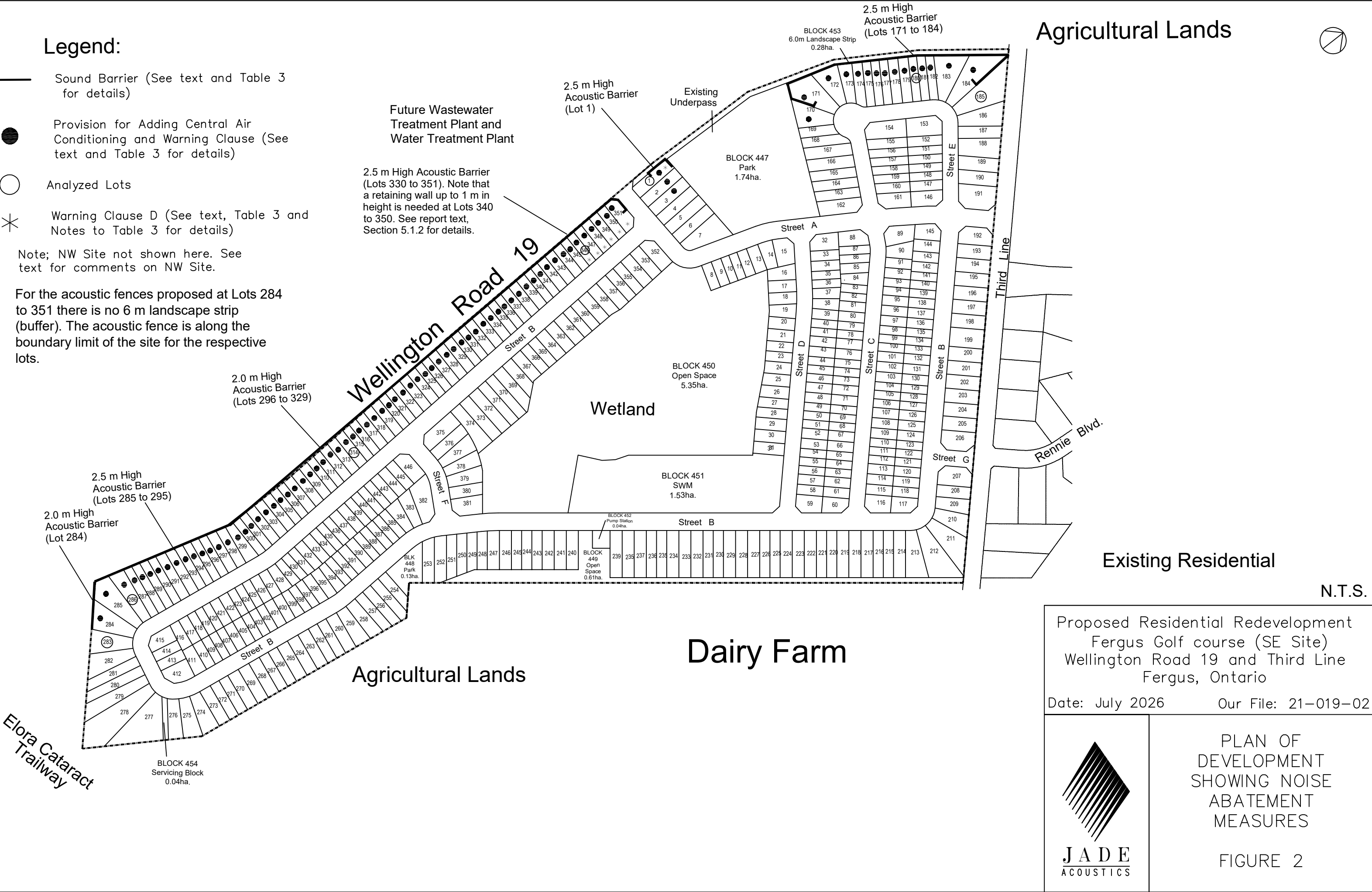


Legend:

- Sound Barrier (See text and Table 3 for details)
- Provision for Adding Central Air Conditioning and Warning Clause (See text and Table 3 for details)
- Analyzed Lots
- * Warning Clause D (See text, Table 3 and Notes to Table 3 for details)

Note; NW Site not shown here. See text for comments on NW Site.

For the acoustic fences proposed at Lots 284 to 351 there is no 6 m landscape strip (buffer). The acoustic fence is along the boundary limit of the site for the respective lots.



APPENDIX A

CORRESPONDENCE REGARDING ROAD TRAFFIC

RE: Wellington Road 19 - Traffic Count Request - Jade File 21-019-02



Kayla Martin <kaylam@wellington.ca>

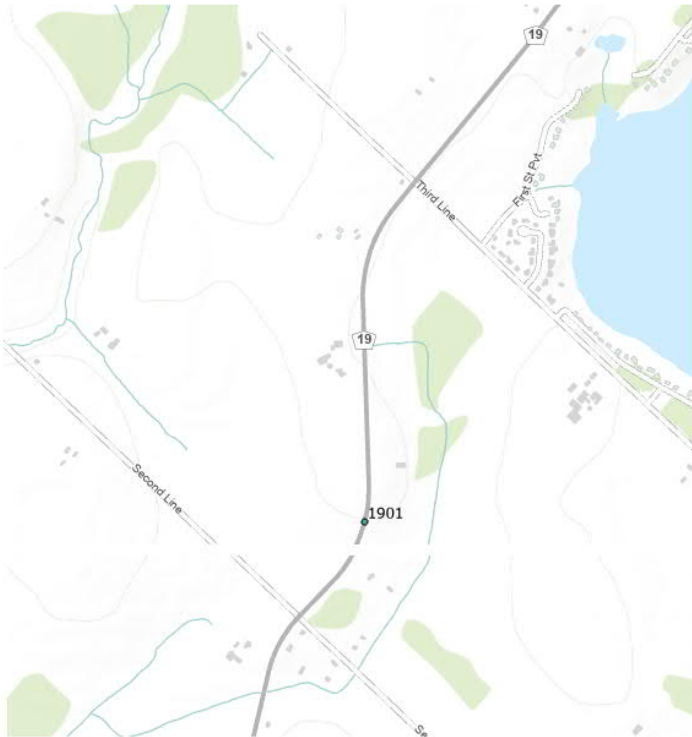
To: Aaron Keey

You replied to this message on 2026-05-19 9:20 AM.

Hi Aaron,

Below is the traffic count data we have along that stretch of WR 19.

Counting Station ID	SPRING					SUMMER					FALL					AVERAGES				
	Total of Passenger Car	Total Small Truck	Total Truck/Busses	Total Tractor Trailer	Total	Total of Passenger Car	Total Small Truck	Total Truck/Busses	Total Tractor Trailer	Total	Total of Passenger Car	Total Small Truck	Total Truck/Busses	Total Tractor Trailer	Total	Average of Passenger Car	Average Small Truck	Average Truck/Busses	Average Tractor Trailer	AADT
1901 (Counted in 2025)	5214	91	58	351	5714	6528	87	65	410	7090	5347	89	60	288	5784	5,696	89	61	350	6,196



Thanks,
Kayla

Kayla Martin

Engineering Technologist

County of Wellington

74 Woolwich Street, Guelph, ON N1H 3T9

T: 519.837.2600 x 2261 | E: kaylam@wellington.ca

Report-2.3	Location : 1901EW Direction : East + West Dates : 07/06/2022																WR19 - 0.1 km NorthEast of Second Line ~ Conc.2-3 Road :																Total	Pace Speed	Number In Pace
	11	21	31	41	51	61	71	81	91	101	111	121	131	140																					
Speeds,km/h ----->	11	21	31	41	51	61	71	81	91	101	111	121	131	140																					
00:00 0:15						2	1	1	1	2						7	53.1-73.1	4																	
0:15 0:30						1		1	1							3	53.7-73.7	2																	
0:30 0:45								1		3		1				5	94.8-114.8	4																	
0:45 1:00										1						1	79.8-99.8	1																	
00:00 1:00						3	1	3	2	6		1		1		5	14.9-114.9																		
1:00 1:15								1		1		1	1			4	92.4-112.4	3																	
1:15 1:30									1	1					1	3	78.1-98.1	2																	
1:30 1:45									1							1	68.7-88.7	1																	
1:45 2:00										1						1	72.5-92.5	1																	
1:00 2:00								1	2	3	1	1	1	1		4	12.4-112.4																		
2:00 2:15					1	1										2	36.0-56.0	2																	
2:15 2:30					1	1										2	38.9-58.9	2																	
2:30 2:45									1							1	65.2-85.2	1																	
2:45 3:00										2						2	77.7-97.7	2																	
2:00 3:00					2	2			1	2						2	77.7-97.7																		
3:00 3:15							1									1	50.2-70.2	1																	
3:15 3:30						1			2	1						4	74.0-94.0	3																	
3:30 3:45																																			
3:45 4:00																																			
3:00 4:00						1	1		2	1						4	74.0-94.0																		
4:00 4:15										1						1	78.4-98.4	1																	
4:15 4:30							1	1				1				4	60.7-80.7	2																	
4:30 4:45							1	3	1	2	1					8	56.1-76.1	5																	
4:45 5:00								2	2	2	1					7	63.4-83.4	5																	
4:00 5:00						1	6	4	2	5	1	1				1	78.4-98.4																		
5:00 5:15			2			2	1	1	1	5						13	79.6-99.6	6																	
5:15 5:30						3	3	5	7	1	1	1				20	70.8-90.8	12																	
5:30 5:45					1	2	8	1	2	3	1	1				19	48.7-68.7	11																	
5:45 6:00						5	5	1	4	4	2					21	57.1-77.1	11																	
5:00 6:00				2		1	12	17	8	14	13	4	2			13	79.6-99.6																		
6:00 6:15				1	1	1	2	3	3	9	8					28	78.3-98.3	19																	
6:15 6:30				2		2	8	4	5	12	8	2				43	76.7-96.7	22																	
6:30 6:45							9	8	4	15	9	3				48	77.7-97.7	25																	
6:45 7:00							1	7	13	7	14	10	2			54	77.9-97.9	28																	
6:00 7:00			3	1	4	26	28	19	50	35	7					28	78.3-98.3																		
7:00 7:15						1	4	8	14	18	5					50	72.5-92.5	35																	
7:15 7:30						1	8	5	14	26	12	2				68	74.1-94.1	45																	
7:30 7:45						1	14	20	14	24	8	1	1			83	66.6-86.6	41																	
7:45 8:00						4	27	25	16	25	12					109	49.7-69.7	52																	
7:00 8:00					7	53	58	58	93	37	3	1				68	74.1-94.1																		
8:00 8:15					4	5	8	9	19	32	3					80	70.2-90.2	51																	
8:15 8:30				1	2	3	18	18	19	33	1					95	70.4-90.4	52																	
8:30 8:45					1	1	17	11	28	24	7	1				90	67.5-87.5	54																	
8:45 9:00					2	4	12	8	21	20	8	1				76	73.2-93.2	44																	
8:00 9:00			1	9	13	55	46	87	109	19	2					76	73.2-93.2																		
9:00 9:15			3	1	2	14	10	17	16	4						67	68.6-88.6	35																	
9:15 9:30					3	13	11	20	23	4	3					77	68.4-88.4	44																	
9:30 9:45					5	14	11	17	22	6						75	73.8-93.8	41																	
9:45 10:00					2	11	9	22	19	9	1					73	68.3-88.3	45																	
9:00 10:00				3	1	12	52	41	76	80	23	4				75	73.8-93.8																		
10:00 10:15					3	9	17	16	15	5						65	61.6-81.6	35																	
10:15 10:30					4	11	13	17	15	3	1					64	64.3-84.3	34																	
10:30 10:45						5	13	22	20	9	2					71	66.8-86.8	43																	
10:45 11:00					1	14	11	35	38	6						105	69.0-89.0	77																	
10:00 11:00					8	39	54	90	88	23	3					105	69.0-89.0																		
11:00 11:15					2	10	14	14	24	8						72	73.1-93.1	42																	
11:15 11:30					3	16	18	29	27	2						95	69.4-89.4	62																	
11:30 11:45				1	4	11	14	21	33	7	1					92	68.4-88.4	55																	
11:45 12:00					4	10	15	28	14	11						78	71.8-91.8	46																	
11:00 12:00				1	9	47	61	92	98	28	1					72	73.1-93.1																		

12:00	12:15				2	20	27	35	25	3			112	62.9-82.9	66
12:15	12:30	2	4	4	12	13	15	21	5				76	67.7-87.7	38
12:30	12:45		2		1	14	13	31	26	4			91	72.1-92.1	58
12:45	13:00			1	4	16	17	32	9				79	71.9-91.9	49
12:00	13:00	2	6	8	50	69	98	104	21				91	72.1-92.1	
13:00	13:15	2	2	5	17	16	24	25	6				97	74.5-94.5	51
13:15	13:30			1	8	10	23	29	13				84	77.2-97.2	54
13:30	13:45			2	14	17	26	24	5				88	69.7-89.7	52
13:45	14:00			3	7	15	31	20	4				80	69.2-89.2	52
13:00	14:00	2	2	11	46	58	104	98	28				84	77.2-97.2	
14:00	14:15			1	15	10	25	25	10	2			88	71.1-91.1	52
14:15	14:30	1		4	11	29	26	20	4				95	59.4-79.4	56
14:30	14:45			2	15	10	24	25	7				83	69.1-89.1	51
14:45	15:00			1	3	15	10	17	45	10	1		102	74.0-94.0	68
14:00	15:00	1	1	10	56	59	92	115	31	3			102	74.0-94.0	
15:00	15:15	6	3	2	13	11	27	31	7				100	71.3-91.3	60
15:15	15:30		1	1	9	25	25	23	6				90	62.9-82.9	54
15:30	15:45			1	16	12	30	38	10				107	70.4-90.4	70
15:45	16:00			1	11	24	26	41	5				108	68.5-88.5	75
15:00	16:00	6	5	4	49	72	108	133	28				100	71.3-91.3	
16:00	16:15			2	20	21	38	46	14				141	70.5-90.5	85
16:15	16:30	1	3	5	13	21	35	42	9				129	69.4-89.4	81
16:30	16:45				21	30	42	46	10	1			150	67.3-87.3	90
16:45	17:00		1	2	23	21	28	41	14		1		131	71.8-91.8	75
16:00	17:00	1	4	9	77	93	143	175	47	1	1		131	74.8-94.8	
17:00	17:15		1	2	11	18	32	49	14	1			128	72.3-92.3	82
17:15	17:30		1	2	12	30	17	35	18	2	1		118	76.8-96.8	61
17:30	17:45			3	19	23	17	30	5	2			99	71.2-91.2	48
17:45	18:00				7	16	19	31	15		1		89	74.6-94.6	54
17:00	18:00	2	7	49	87	85	145	52	5	1	1		118	76.8-96.8	
18:00	18:15		2	6	20	12	27	15					82	76.8-96.8	46
18:15	18:30			1	15	12	15	23	17	1			84	73.5-93.5	45
18:30	18:45				10	13	18	28	11	2			82	74.4-94.4	51
18:45	19:00				10	10	9	30	6	2			67	72.6-92.6	42
18:00	19:00		3	41	55	54	108	49	5				82	76.8-96.8	
19:00	19:15		3	10	12	15	23	17	1				81	76.8-96.8	47
19:15	19:30			2	9	8	12	8	11	1	1		52	74.2-94.2	25
19:30	19:45			3	4	9	17	24	8	1			66	70.7-90.7	41
19:45	20:00			2	7	8	9	19	9	1			55	73.3-93.3	31
19:00	20:00			10	30	37	53	74	45	4	1		81	76.8-96.8	
20:00	20:15			2	7	5	9	19	7	3			52	71.6-91.6	29
20:15	20:30			1	5	8	8	13	6				41	72.9-92.9	23
20:30	20:45			1	3	5	11	11	14	3			48	76.6-96.6	26
20:45	21:00		1		7	3	6	13	6				40	77.2-97.2	26
20:00	21:00		1	4	22	21	36	56	35	6			40	77.2-97.2	
21:00	21:15			2	12	6	8	13	3				44	70.9-90.9	21
21:15	21:30			1	2	5	3	12	2				25	71.1-91.1	16
21:30	21:45				2	3	1	4	6				16	80.2-100.2	11
21:45	22:00				3	2	3	9	2	1			20	75.1-95.1	14
21:00	22:00		3	19	16	15	38	13	1				16	80.2-100.2	
22:00	22:15					3	7	4					21	71.2-91.2	15
22:15	22:30				1	3		7	2				13	71.8-91.8	9
22:30	22:45				2			6	3				11	76.3-96.3	9
22:45	23:00					3	6	2	1				12	60.6-80.6	9
22:00	23:00			3	9	13	22	10					11	76.3-96.3	
23:00	23:15				1		1	3	3	3			11	72.0-92.0	8
23:15	23:30		1					2	3				6	74.9-94.9	5
23:30	23:45					2	1	4	1				8	71.7-91.7	6
23:45	00:00					1		1					2	44.3-64.3	1
23:00	00:00		1	1		4	4	10	7				6	74.3-94.3	
Total		21	34	126	733	893	1243	1619	561	51	9	2		5292	
AM PEAK		0.4%	0.6%	2.4%	13.9%	16.9%	23.5%	30.6%	10.6%	1.0%	0.2%	0.0%			
period		3	4	5	27	25	35	38	12	3	1	1		109	
% of class		9:00	8:00	8:00	7:45	7:45	10:45	10:45	7:15	6:30	0:30	1:15	7:45		
		14.3%	11.8%	4.0%	3.7%	2.8%	2.8%	2.3%	2.1%	5.9%	11.1%	50.0%		2.1%	
PM PEAK		6	4	5	23	30	42	49	18	3	1	1		150	
period		15:00	12:15	13:00	16:45	16:30	16:30	17:00	17:15	20:00	16:45	17:45	16:30		
% of class		28.6%	11.8%	4.0%	3.1%	5.4%	3.4%	3.0%	3.2%	5.9%	11.1%	50.0%		2.8%	

15% Percentile :	59	KPH
50% Percentile :	78	KPH
85% Percentile :	90	KPH
95% Percentile :	97	KPH

20 KPH Pace Speed:	72.6-92.6	KPH
Number in Pace:	2877	
Percent in Pace:	54.4	%
Number of Vehicles >80 KPH:	2366	
Percent of Vehicles >80 KPH:	44.7	%
Mean Speed(Average):	76	KPH

APPENDIX B

ENVIRONMENTAL NOISE CRITERIA

ONTARIO MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MOE)

Reference: "Environmental Noise Guidelines Stationary and Transportation Sources – Approval and Planning", Publication NPC-300, August, 2013, released October 21, 2013 (updated final version #22).

SOUND LEVEL CRITERIA FOR ROAD AND RAIL NOISE

TABLE C-1

Sound Level Limit for Outdoor Living Areas

Road and Rail

Time Period	Leq (16) (dBA)
16 hr., 07:00 - 23:00	55

TABLE C-2

Indoor Sound Level Limits

Road and Rail

Type of Space	Time Period	Leq (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

SOUND LEVEL CRITERIA FOR AIRCRAFT NOISE

TABLE C-3

Outdoor Aircraft Noise Limit

Time Period	NEF/NEP
24-hour	30

TABLE C-4

Indoor Aircraft Noise Limit (Applicable over 24-hour period)

Type of Space	Indoor NEF/NEP*
Living/dining/den areas of residences, hospitals, nursing/retirement homes, schools, daycare centres, etc.	5
Sleeping Quarters	0

- * The indoor NEF/NEP values in Table C-4 are used to determine acoustical insulation requirements based on the NEF/NEP contour maps.

SOUND LEVEL CRITERIA FOR STATIONARY SOURCES

TABLE C-5

Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

TABLE C-6

**Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)
Plane of Window of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

TABLE C-7

**Exclusion Limit Values for Impulsive Sound Level (L_{LM}, dBAI)
Outdoor Points of Reception**

Time of Day	Actual Number of Impulses in Period of One Hour	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 23:00	9 or more	50	50	45	55
	7 to 8	55	55	50	60
	5 to 6	60	60	55	65
	4	65	65	60	70
	3	70	70	65	75
	2	75	75	70	80
	1	80	80	75	85

TABLE C-8

**Exclusion Limit Values of Impulsive Sound Level (L_{LM} , dBAI)
Plane of Window - Noise Sensitive Spaces (Day/Night)**

Actual Number of Impulses in Period of One Hour	Class 1 Area (07:00-23:00)/ (23:00-07:00)	Class 2 Area (07:00-23:00)/ (23:00-07:00)	Class 3 Area (07:00-19:00)/ (19:00-07:00)	Class 4 Area (07:00-23:00)/ (23:00-07:00)
9 or more	50/45	50/45	45/40	60/55
7 to 8	55/50	55/50	50/45	65/60
5 to 6	60/55	60/55	55/50	70/65
4	65/60	65/60	60/55	75/70
3	70/65	70/65	65/60	80/75
2	75/70	75/70	70/65	85/80
1	80/75	80/75	75/70	90/85

SUPPLEMENTARY SOUND LEVEL LIMITS

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-4. Table C-9 and Table C-10 are expanded versions of Table C-2 and Table C-4, and present guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed. The sound level limits in Table C-9 and Table C-10 are presented as information, for good-practice design objectives.

TABLE C-9

**Supplementary Indoor Sound Level Limits
Road and Rail**

Type of Space	Time Period	Leq (Time Period) (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, 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

TABLE C-10

**Supplementary Indoor Aircraft Noise Limit
(Applicable over 24-hour period)**

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

- * The indoor NEF/NEP values in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

APPENDIX C

SAMPLE CALCULATION OF PREDICTED UNMITIGATED SOUND LEVELS

APPENDIX C-1
SAMPLE CALCULATION OF PREDICTED SOUND LEVELS

FILE: 21-019-02
NAME: Fergus Golf Course Redevelopment
REFERENCE DRAWINGS: Grading Plan
LOCATION: Lot 1, 4.5 m above grade, side wall, daytime

Noise Source:	Wellington Road 19
Time Period:	16 hr. (day)
Distance (m):	26.8

CALCULATION OF PREDICTED SOUND LEVELS*

Reference Leq (dBA)*:	69.82
Height and/or Distance Correction (dBA):	-3.96
Finite Element Correction (dBA):	-1.31
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.

LeqDay (dBA):	64.56
---------------	-------

* Leq determined using the computerized model of the Ministry of the Environment, Conservation and Parks Noise Assessment Guidelines, STAMSON Version 5.04 (ORNAMENT). See attached printouts.

APPENDIX C-2
SAMPLE CALCULATION OF PREDICTED SOUND LEVELS

FILE: 21-019-02

NAME: Fergus Golf Course Redevelopment

REFERENCE DRAWINGS: Grading Plan

LOCATION: Lot 1, 4.5 m above grade, side wall, nighttime

Noise Source: Wellington Road 19

Time Period: 8 hr. (night)

Distance (m): 26.8

CALCULATION OF PREDICTED SOUND LEVELS*

Reference Leq (dBA)*: 61.07

Height and/or Distance Correction (dBA): -3.96

Finite Element Correction (dBA): -1.31

Allowance for Screening (dBA): 0.00

Allowance for Future Growth (dBA): incl.

LeqNight (dBA): 55.80

* Leq determined using the computerized model of the Ministry of the Environment, Conservation and Parks Noise Assessment Guidelines, STAMSON Version 5.04 (ORNAMENT). See attached printouts.

Filename: lot1br.te **Time Period:** Day/Night 16/8 hours
Description: Lot 1 building requirement

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

```
-----
Car traffic volume : 9607/635   veh/TimePeriod  *
Medium truck volume : 153/10    veh/TimePeriod  *
Heavy truck volume : 417/28     veh/TimePeriod  *
Posted speed limit : 80 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): 10850
Percentage of Annual Growth          : 0.00
Number of Years of Growth            : 0.00
Medium Truck % of Total Volume       : 1.50
Heavy Truck % of Total Volume        : 4.10
Day (16 hrs) % of Total Volume       : 93.80
```

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             : 1           (Absorptive ground surface)
Receiver source distance : 26.80 / 26.80 m
Receiver height      : 4.50 / 4.50 m
Topography          : 1           (Flat/gentle slope; no barrier)
Reference angle      : 0.00
```

Results segment # 1: Wellington (day)

Source height = 1.42 m

ROAD (0.00 + 64.56 + 0.00) = 64.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	69.82	0.00	-3.96	-1.31	0.00	0.00	0.00	64.56

Segment Leq : 64.56 dBA

Total Leq All Segments: 64.56 dBA

Results segment # 1: Wellington (night)

Source height = 1.43 m

ROAD (0.00 + 55.80 + 0.00) = 55.80 dBA

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

-90	90	0.57	61.07	0.00	-3.96	-1.31	0.00	0.00	0.00	55.80
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 55.80 dBA

Total Leq All Segments: 55.80 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.56
(NIGHT): 55.80

APPENDIX C-3
SAMPLE CALCULATION OF PREDICTED SOUND LEVELS

FILE: 21-019-02
NAME: Fergus Golf Course Redevelopment
REFERENCE DRAWINGS: Grading Plan
LOCATION: Lot 1, 1.5 m above grade, rear yard

Noise Source:	Wellington Road 19
Time Period:	16 hr. (day)
Distance (m):	30.8

CALCULATION OF PREDICTED SOUND LEVELS*

Reference Leq (dBA)*:	69.82
Height and/or Distance Correction (dBA):	-5.19
Finite Element Correction (dBA):	-2.61
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.

LeqDay (dBA):	62.03
---------------	-------

* Leq determined using the computerized model of the Ministry of the Environment, Conservation and Parks Noise Assessment Guidelines, STAMSON Version 5.04 (ORNAMENT). See attached printouts.

Filename: lot1ry.te Time Period: Day/Night 16/8 hours
 Description: Lot 1 rear yard

Road data, segment # 1: Wellington (day)

```
-----
Car traffic volume : 9607      veh/TimePeriod *
Medium truck volume : 153      veh/TimePeriod *
Heavy truck volume : 417       veh/TimePeriod *
Posted speed limit : 80 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): 10850
Percentage of Annual Growth         : 0.00
Number of Years of Growth           : 0.00
Medium Truck % of Total Volume      : 1.50
Heavy Truck % of Total Volume       : 4.10
Day (16 hrs) % of Total Volume      : 93.80
```

Data for Segment # 1: Wellington (day)

```
-----
Angle1 Angle2      : -36.00 deg 90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0
Surface             : 1          (Absorptive ground surface)
Receiver source distance : 30.80 m
Receiver height      : 1.50 m
Topography           : 2          (Flat/gentle slope; with barrier)
Barrier angle1       : -36.00 deg Angle2 : 90.00 deg
Barrier height        : 0.10 m
Barrier receiver distance : 7.20 m
Source elevation      : 432.35 m
Receiver elevation     : 431.48 m
Barrier elevation      : 431.50 m
Reference angle       : 0.00
```

Results segment # 1: Wellington (day)

Source height = 1.42 m

Barrier height for grazing incidence

```
-----
Source      ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
1.42 ! 1.50 ! 1.67 ! 433.17
```

ROAD (0.00 + 62.03 + 0.00) = 62.03 dBA

```
-----
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-----
-36 90 0.66 69.82 0.00 -5.19 -2.61 0.00 0.00 0.00 62.03
-----
```

Segment Leq : 62.03 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.03

APPENDIX D

SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION

APPENDIX D-1

SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION*

FILE: 21-019-02

NAME: Fergus Golf Course Redevelopment

REFERENCE DRAWINGS: Grading Plan

LOCATION: Lot 1, corner bedroom, daytime

ROAD

Wall area as a percentage of floor area:	Side:	55%
	Rear:	55%

Window area as a percentage of floor area:	Side:	25%
	Rear:	25%

Number of components: 4

Outdoor Leq:	Side:	65 (+3 for reflections) = 68 dBA
	Rear:	62 (+3 for reflections) = 65 dBA

Indoor Leq: 45

Noise Reduction (dBA):	Side:	23
	Rear:	20

Noise Spectrum:	Mixed Road Traffic	Angle Correction: 0
-----------------	--------------------	---------------------

Absorption:	Medium
-------------	--------

APPROPRIATE ELEMENTS

		Configuration	STC Rating
Wall	Side	Standard	STC 34
	Rear	Standard	STC 31
Window	Side	Standard	STC 26
	Rear	Standard	STC 23

* Based upon "Controlling Sound Transmission into Buildings", Building Practice Note 56 by National Research Council of Canada, September, 1985.

Note: The STC ratings noted above are considered to be met by standard building construction techniques (i.e. upgraded exterior walls and windows are not expected).

APPENDIX E

SAMPLE CALCULATION OF SOUND BARRIER ANALYSES

Filename: lot1ry.te Time Period: Day/Night 16/8 hours
 Description: Lot 1 rear yard - Mitigated

Road data, segment # 1: Wellington (day)

```
-----
Car traffic volume : 9607                      veh/TimePeriod *
Medium truck volume : 153                      veh/TimePeriod *
Heavy truck volume : 417                      veh/TimePeriod *
Posted speed limit : 80 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): 10850
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 4.10
Day (16 hrs) % of Total Volume : 93.80
```

Data for Segment # 1: Wellington (day)

```
-----
Angle1 Angle2 : -36.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.80 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -36.00 deg Angle2 : 90.00 deg
Barrier height : 0.10 m
Barrier receiver distance : 7.20 m
Source elevation : 432.35 m
Receiver elevation : 431.48 m
Barrier elevation : 431.50 m
Reference angle : 0.00
```

Results segment # 1: Wellington (day)

Source height = 1.42 m

Barrier height for grazing incidence

```
-----
Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
1.42 ! 1.50 ! 1.67 ! 433.17
```

ROAD (0.00 + 62.03 + 0.00) = 62.03 dBA

```
-----
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-----
-36 90 0.66 69.82 0.00 -5.19 -2.61 0.00 0.00 0.00 62.03
-----
```

Segment Leq : 62.03 dBA

Total Leq All Segments: 62.03 dBA

Barrier table for segment # 1: Wellington (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	433.30	57.43	57.43
1.90	433.40	57.33	57.33
2.00	433.50	57.17	57.17
2.10	433.60	56.96	56.96
2.20	433.70	56.71	56.71
2.30	433.80	56.42	56.42
2.40	433.90	56.10	56.10
2.50	434.00	55.77	55.77
2.60	434.10	55.42	55.42
2.70	434.20	55.08	55.08
2.80	434.30	54.73	54.73
2.90	434.40	54.38	54.38
3.00	434.50	54.04	54.04
3.10	434.60	53.71	53.71
3.20	434.70	53.38	53.38
3.30	434.80	53.07	53.07
3.40	434.90	52.77	52.77
3.50	435.00	52.47	52.47
3.60	435.10	52.19	52.19
3.70	435.20	51.92	51.92

The predicted mitigated sound level with a 2.5 m high acoustic fence installed (as shown on Figure 2) is 55.77 dBA.