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PRELIMINARY
ENVIRONMENTAL NOISE REPORT

PROPOSED FERGUS GOLF COURSE
REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE
TOWNSHIP OF CENTRE WELLINGTON

PREPARED FOR
883890 Ontario Limited c/o Fergus Development Inc.

Revised April 27, 2023
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File: 21-019

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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, 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 55 dBA or less (with exception to one lot that is mitigated to 56 dBA). As per the latest preliminary grading plan, in some cases there are retaining walls proposed along the rear property line of the properties requiring acoustic fences. In these situations, the acoustic fences, as proposed, are to be installed on top of the proposed retaining wall.

Based on the preliminary 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 concept plan. 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 treatment plant(s) are not available at this stage of the project. Once specific information 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 applicable guidelines are met at the proposed residential dwellings.

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, 7, 39, 73 and 74 will be advised through a warning clause that the dwelling is in proximity to a future sanitary pumping station or future water treatment plant(s) whose activities may at times be audible.

1.0 INTRODUCTION

Jade Acoustics Inc. was retained to prepare a revised Preliminary 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 Preliminary Environmental Noise Report dated February 14, 2022 was prepared by Jade Acoustics Inc. for the original application by 883890 Ontario Limited. This revised report has been prepared to address an updated concept plan, updated preliminary grading plan, updated traffic information and review comments provided through the County of Wellington on the February 14, 2022 report. Appendix F of this report includes responses to the comments on the February 14, 2022 noise report and in general the requested text updates based on the comments are addressed within this report.

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 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 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, open space blocks, a stormwater pond, 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:

- Concept Plan prepared by GSP Group dated October 24, 2022;
- Draft Plan of Condominium prepared by R-PE Surveying Ltd. received April 20, 2023;
- Preliminary grading plan prepared by R.J. Burnside & Associates Limited, dated March 16, 2023;
- Road traffic information provided by the County of Wellington on February 13, 2023. Draft road traffic turning movement count (TMC) figures (for the year 2032) provided by BA Group on January 31, 2023; and
- A site visit conducted by Jade Acoustics Inc. on February 17, 2021.

Figure 2 shows the plan of the proposed residential development. The lot numbers identified on Figure 2 have been based on the Draft Plan of Condominium by R-PE Surveying Ltd.

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 2032. Peak hour road traffic volumes (a.m. and p.m.) for Wellington Road 19 and Third Line (year 2032) were used to determine the Summer average daily traffic (SADT) volumes for these two 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. This has been used in the analysis. The percentage of trucks and day/night split for Wellington Road 19 were determined by assessing existing traffic counts (the most recent Summer counts from July 2022) as provided by the County of Wellington.

Further to above, it was determined that the ultimate average annual daily traffic (AADT) and SADT for Third Line (year 2032) would be roughly one thousand (1,000) vehicles. Due to this low traffic volume, Third Line is acoustically insignificant and, as such, 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 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. 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/existing residential dwellings.

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 5001-05 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, condominium documents 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 recently 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 (Leq, 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 5001-01 dated February 15, 2005. 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.

Where applicable, the sound levels were calculated using an absorption coefficient of 0.33 to account for the reduced absorption of the ground area across the single loaded roads. An example of this situation is for the STAMSON calculation applicable to Lot 69, where yard and landscape areas are present as well as Street B (a reflective ground surface) between the dwelling façade and Wellington Road 19 (and less than 50% of the overall ground area between the façade and Wellington Road 19 is reflective ground).

Lot 8 has a rear yard with full 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 rear wall (second storey) is predicted to be 62 dBA (daytime) and 53 dBA (nighttime).

For Lot 74 that is flanking Wellington Road 19, the unmitigated daytime sound level in the rear yard is predicted to be 58 dBA. The unmitigated daytime and nighttime sound levels at the side wall (second storey) are predicted to be 64 dBA and 55 dBA, respectively.

For Lot 60, the dwelling envelope is expected to be configured such that the respective front wall is parallel to Wellington Road 19. As such, the rear yard amenity space would be screened from Wellington Road 19 by the dwelling itself and the unmitigated predicted sound level is less than 55 dBA. There is no acoustic barrier required for Lot 60 with this noted dwelling configuration. The building envelope can be re-evaluated at the time of the Detailed noise report.

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 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 residential dwellings.

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.

Since house plans are not yet available, the final architectural choices cannot be made. Therefore, a preliminary analysis using assumed window and exterior wall percentages has been conducted to provide an indication of the architectural requirements. Once house plans are available, the architectural component requirements should be re-evaluated.

Calculations were completed for the second storey corner bedroom of the worst case location with exposure to Wellington Road 19 (for example, Lot 74 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 25 and exterior walls need to be up to STC 33. These STC ratings comply with the minimum structural and safety requirements provided by standard construction practices; therefore, standard window and exterior wall construction is acoustically acceptable for all proposed residential dwellings.

As a general note here, an STC 54 rating for the roof, normally met by most residential roof construction with ventilated attic space, would be acoustically acceptable.

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 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, condominium documents 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 preliminary grading plan prepared by R J Burnside and Associates Limited, dated March 16, 2023 are given in Table 3 and discussed below. The sound barrier locations and heights are shown on Figure 2. In all cases, the mitigated sound level in the rear yards is predicted to be 55 dBA or less (with exception to Lot 59, where the mitigated sound level is 56 dBA).

For Lot 54, a 2.0 m high acoustic fence is required to be installed along the rear and side property lines. For the adjacent Lot 55, a 2.0 m high acoustic fence is required to be installed along the rear property line. For Lot 59, the 2.0 m high acoustic fence is required to be installed along the side property line and returned to the side wall of the dwelling. In terms of Lot 59, there is a significant grade difference between Lot 59 and the adjacent Lot 55.

As Lot 55 is depressed the acoustic fence along the rear property line of Lot 55 is not providing attenuation for the elevated receptor located in the rear yard of Lot 59. Instead of using unreasonably high barriers, a minor exceedance of 1 dBA, with result of 56 dBA in the rear yard of Lot 59, is considered acoustically acceptable.

For Lots 1, 7, 73 and 74 a 2.0 m high acoustic fence is required to be installed along the side property line and returned to the side wall of the respective dwelling.

For Lots 71 and 72 a 2.5 m high acoustic fence is required to be installed along the side property line and returned to the side wall of the respective dwelling.

For Lots 8 to 12, a 2.5 m high acoustic fence is required. For Lots 13 to 15, a 2.0 m high acoustic fence is required. To re-iterate from above, the barriers in question are proposed to achieve a mitigated sound level of 55 dBA. The acoustic fence is to be installed along the rear property line of the respective lots, as shown on Figure 2. The 2.5 m high acoustic fence and 2.0 m high acoustic fence required for Lots 8 and 15, respectively, are to be installed along the rear and side property lines of the respective lots and return to the side wall of the respective dwellings, as shown on Figure 2. A 2.5 m high acoustic fence could be proposed along Lots 8 to 15 to keep the fence heights consistent for urban design and aesthetics reasons.

Alternatively, if the Town would like to have a consistent acoustic fence height along Wellington Road 19, a 2.0 m high acoustic fence could be used for all lots directly adjacent to Wellington Road 19 that require acoustic barriers. In such a case and consideration of all the respective lots, the predicted mitigated sound level would be 58 dBA or less (i.e. it is considered acceptable within the NPC-300 guidelines to accept a mitigated sound level that is less than 60 dBA). For Lots 71 and 72 that are setback from Wellington Road, a 2.0 m high acoustic fence to achieve a mitigated sound level of 55 dBA would be evaluated when the final grading plan is ready (as there could be benefits here if the base of barrier grade was raised). The final acoustic barrier heights would be determined at the time of the detailed environmental noise report, coinciding with the final site plan and final grading plan being available.

Further to above and as shown on the preliminary grading plan, Lots 1, 7, 13 to 15, 73 and 74 include retaining walls proposed along the rear property line of the respective dwellings (and the proposed acoustic fences are shown on top of the retaining walls).

For the analysis work completed, the base of acoustic barrier elevation has been considered as the “top of wall” retaining wall elevation. Therefore, any potential changes to the preliminary grading plan related to the acoustic fences and/or retaining walls will need to be reviewed by an acoustical consultant to confirm sound level compliance is achieved. In

general and to note here, the acoustic fence designs are to be consistent with the locations shown on Figure 2 of this noise report.

As requested by the Township of Centre Wellington through review comments on the February 14, 2022 noise report, the proponent (883890 Ontario Limited) investigated the possibility of using berms instead of acoustic barriers. Based on their review, it is not feasible to construct berms due to grading constraints at this site (i.e. with the grades as they are, the use of berms would severely impact the usability of the lots such that it is not a practical design change). There were only two lots at the southwest corner of the site (Lots 54 and 55) where perhaps berms instead of acoustic fences would be feasible. At this time and similar to the original February 14, 2022 submitted noise report, the proponent again is proposing acoustic fences in order to achieve mitigated sound levels that are in compliance with the MOE NPC-300 noise guidelines. The proponent is requesting the Township to consider the concept plan and acoustic fences as shown on Figure 2.

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/m^2 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 times the distance between the side wall and the sound barrier, past the rear wall of the house. An acoustic gate of 20 kg/m^2 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/m^2 and more than 10 kg/m^2. 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.

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, condominium documents and in the subdivision agreement.

5.2 Stationary Sources

As discussed in Section 2.2, for the future sanitary pumping station 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 residential dwellings.

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 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 residential dwellings.

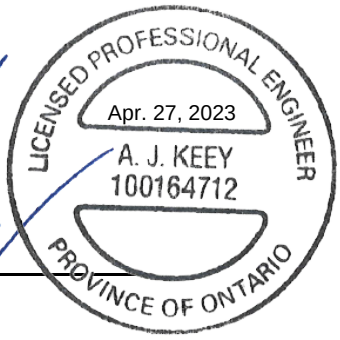
A detailed environmental noise report will need to be prepared once the detailed grading plans are available for the subject lands to ensure the appropriate criteria are achieved.

Prior to the issuance of building permits, the house plans should be reviewed by an acoustical consultant to ensure compliance with the applicable guidelines.

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.

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Chris Kellar, P.Eng.

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7.0 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 5001-05, February 15, 2005.

6. Preliminary Environmental Noise Report dated February 14, 2022, prepared by Jade Acoustics Inc.

TABLE 1

PROPOSED FERGUS GOLD COURSE REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE

TOWNSHIP OF CENTRE WELLINGTON

SUMMARY OF ROAD TRAFFIC DATA

ROAD	WELLINGTON ROAD 19
SADT*	8,550
No. of Lanes	2
Posted Speed (km/h)	80
Trucks (%)	7.3
Medium/Heavy Split (%)	63/37
Gradient (%)	Up to 2
Day/Night Split (%)	93.8/6.2
R.O.W. Width (m)	30

* SADT: Summer Annual Average Daily Traffic (year 2032).

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
8	Rear Yard	Wellington Road 19	30.0	62	--
	Rear Wall	Wellington Road 19	33.0	62	53
53	Rear Yard	Wellington Road 19	98.0	52	--
	Side Wall	Wellington Road 19	84.5	53	44
54	Rear Yard	Wellington Road 19	44.5	60	--
	Rear Wall	Wellington Road 19	45.5	60	51
59	Rear Yard	Wellington Road 19	41.0	58	--
	Side Wall	Wellington Road 19	25.5	64	55
69	Front Wall	Wellington Road 19	41.0	62	54
74	Rear Yard	Wellington Road 19	39.0	58	--
	Side Wall	Wellington Road 19	25.5	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, 7, 73 and 74	Provision for Adding	Standard	Standard	2.0 m**	A, B, C, D
Lots 8 to 12, 71 and 72	Provision for Adding	Standard	Standard	2.5 m***	A, B, C
Lots 13 to 15, 54, 55 and 59	Provision for Adding	Standard	Standard	2.0 m**	A, B, C
Lot 39	--	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. The sound barrier heights must be confirmed once a detailed grading plan is available.

*** 2.5 m high acoustic fence. See Figure 2 and text for details. The sound barrier heights must be confirmed once a detailed grading plan is available.

\# 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). Values shown are based on preliminary calculations using standard assumptions. See text for details.

3. STC – Sound Transmission Class Rating (Reference ASTM-E413). Values 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, condominium documents and to be included in offers of purchase and sale or lease agreements on designated lots:

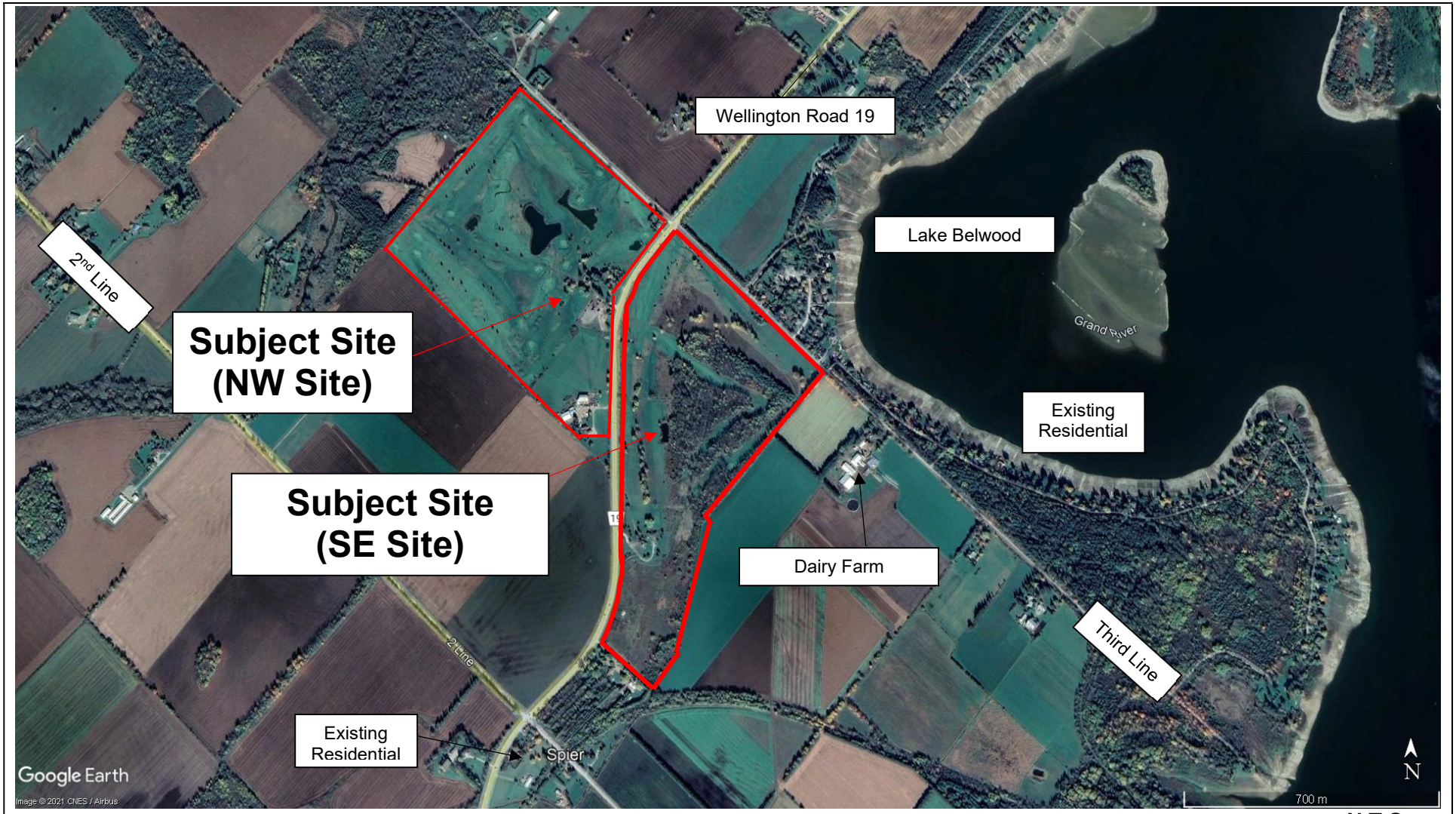
   A. "Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits 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 waste 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.

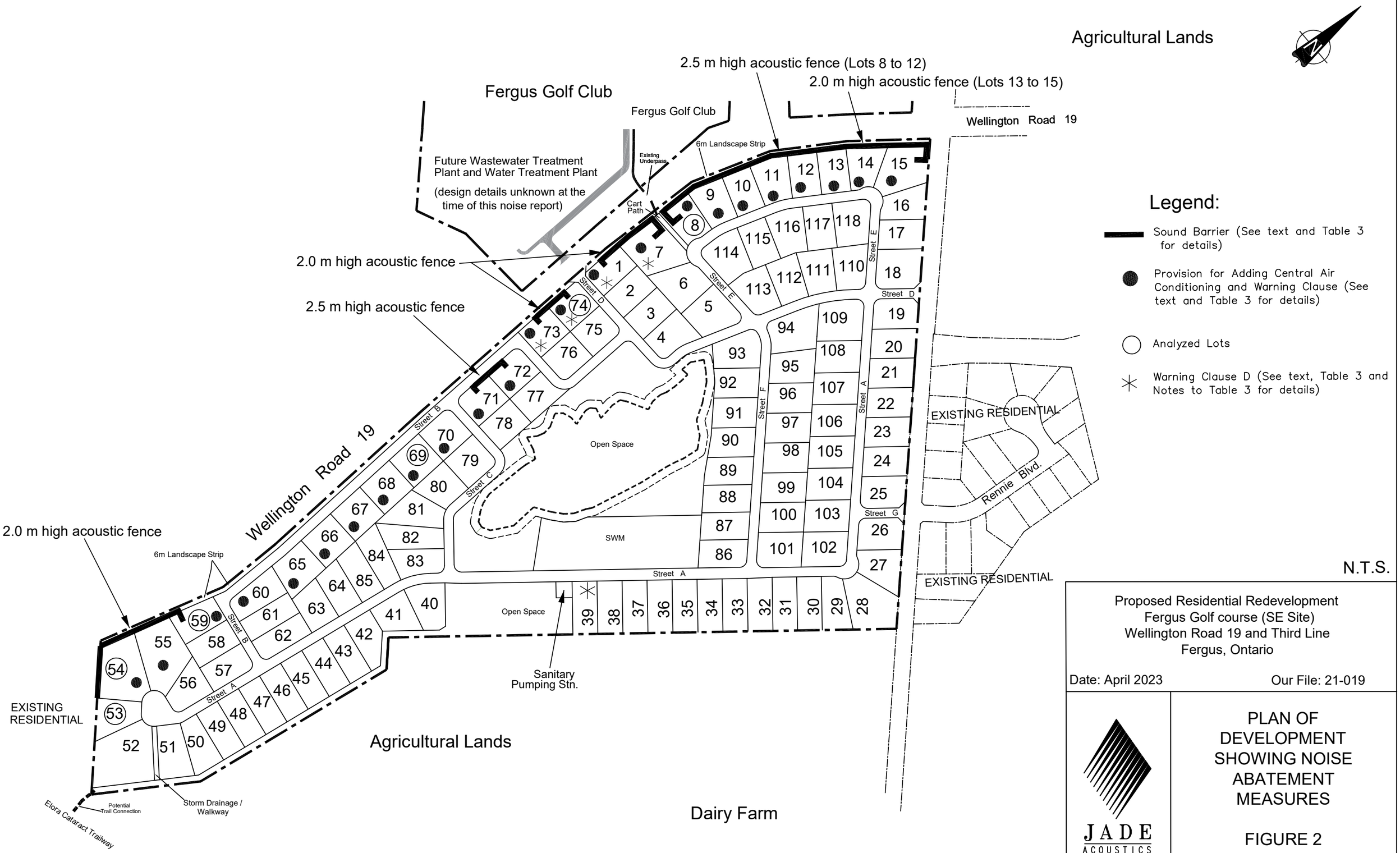
Proposed Residential Redevelopment
Fergus Golf Course
County of Wellington

Date: April 2023 **File: 21-019**

KEY PLAN

FIGURE 1

JADE ACOUSTICS



Proposed Residential Redevelopment
Fergus Golf course (SE Site)
Wellington Road 19 and Third Line
Fergus, Ontario

Date: April 2023 Our File: 21-019

JADE ACOUSTICS

PLAN OF DEVELOPMENT SHOWING NOISE ABATEMENT MEASURES

FIGURE 2

APPENDIX A

CORRESPONDENCE REGARDING ROAD TRAFFIC

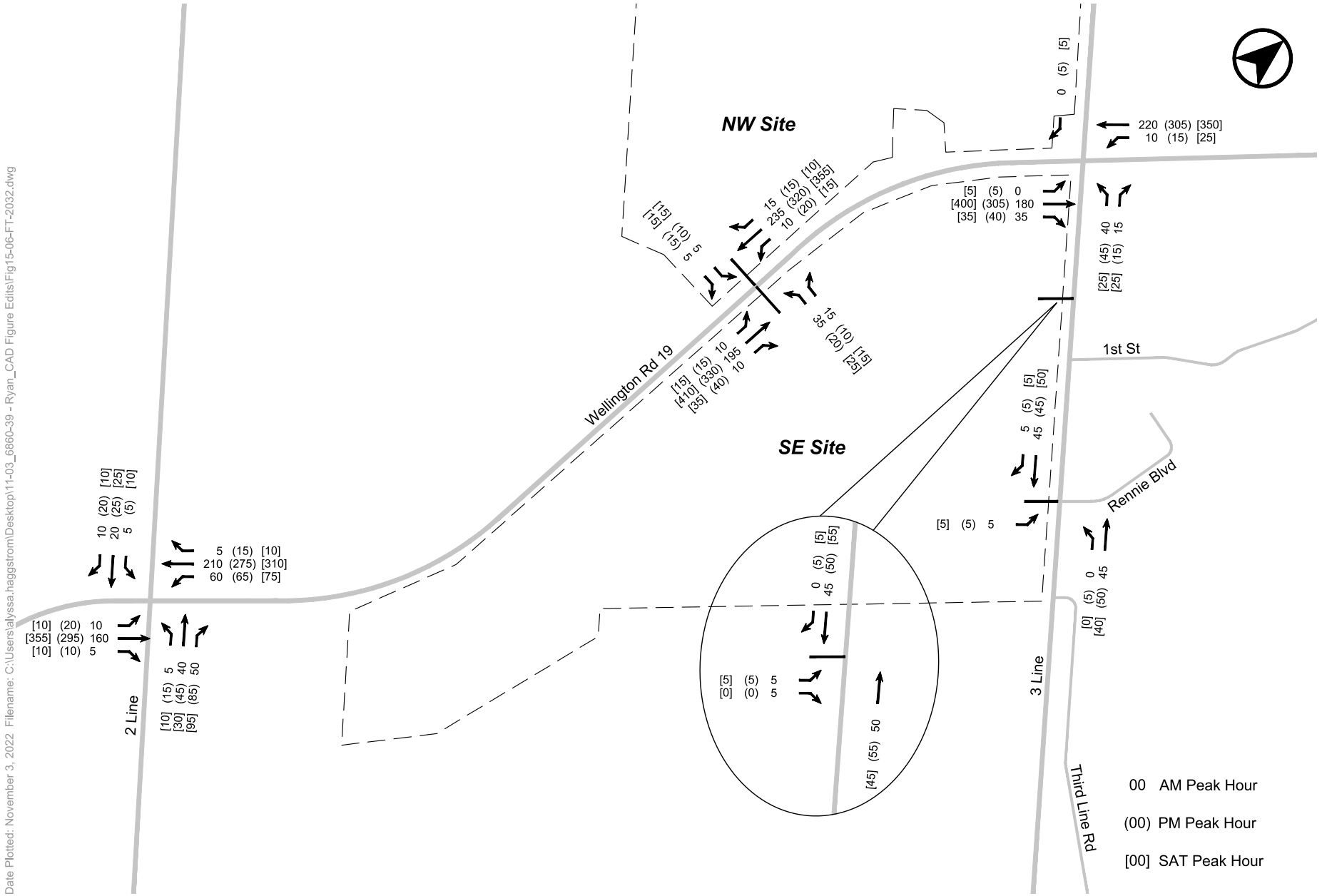


FIGURE 15 2032 FUTURE TOTAL TRAFFIC VOLUMES

Report-2.3		Location :	1901EW	WR19 - 0.1 km NorthEast of Second Line ~ Conc.2-3														
		Direction :	East + West	Road :														
		Dates :	07/05/2022															
			11	21	31	41	51	61	71	81	91	101	111	121	131			
Speeds,km/h ------>			11	21	31	41	51	61	71	81	91	101	111	121	131	140	Total	Pace Speed	Number In Pace
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			5	94.8-114.8	
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		4	92.4-112.4	
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		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		1			13	79.6-99.6	6
5:15	5:30						3	3	5	7		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						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**	71.0-91.0	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**	72.1-92.1	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**	62.0-82.0	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**	74.8-94.8	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	8	13	8					**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	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**	74.3-94.3	5
23:30	**23:45**							2	1	4	1					**8**	71.7-91.7	6
23:45	**OO:OO**							1		1						**2**	44.3-64.3	1
23:00	**OO:OO**				1	1		4	4	10	7					**6**	74.3-94.3	
Total				**21**	**34**	**126**	**733**	**893**	**1243**	**1619**	**561**	**51**	**9**	**2**		**5292**		
				0.4%	0.6%	2.4%	13.9%	16.9%	23.5%	30.6%	10.6%	1.0%	0.2%	0.0%				
AM PEAK				**3**	**4**	**5**	**27**	**25**	**35**	**38**	**12**	**3**	**1**	**1**		**109**		
period				9:00	8:00	8:00	7:45	7:45	10:45	10:45	7:15	6:30	0:30	1:15		7:45		
% of class				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%	3.4%	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
NAME: Fergus Golf Course Redevelopment
REFERENCE DRAWINGS: Preliminary Grading Plan
LOCATION: Lot 74, 4.5 m above grade, side wall, daytime

Noise Source:	Wellington Road 19
Time Period:	16 hr. (day)
Distance (m):	25.5

CALCULATION OF PREDICTED SOUND LEVELS*

Reference Leq (dBA)*:	68.99
Height and/or Distance Correction (dBA):	-3.63
Finite Element Correction (dBA):	-1.31
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.
LeqDay (dBA):	64.05

* 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
NAME: Fergus Golf Course Redevelopment
REFERENCE DRAWINGS: Preliminary Grading Plan
LOCATION: Lot 74, 4.5 m above grade, side wall, nighttime

Noise Source:	Wellington Road 19
Time Period:	8 hr. (night)
Distance (m):	25.5

CALCULATION OF PREDICTED SOUND LEVELS*

Reference Leq (dBA)*:	60.14
Height and/or Distance Correction (dBA):	-3.63
Finite Element Correction (dBA):	-1.31
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.
LeqNight (dBA):	55.20

* 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.

```
STAMSON 5.0        NORMAL REPORT        Date: 10-04-2023 14:23:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: lot74br.te           Time Period: Day/Night 16/8 hours
Description: Lot 74 Building Requirement

Road data, segment # 1: Wellington (day/night)
----------------------------------------------
Car traffic volume  :  7434/491   veh/TimePeriod  *
Medium truck volume :   369/24    veh/TimePeriod  *
Heavy truck volume  :   217/14    veh/TimePeriod  *
Posted speed limit  :    80 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):   8550
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   4.60
    Heavy Truck  % of Total Volume     :   2.70
    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  :  25.50 / 25.50  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 = 1.28 m

ROAD (0.00 + 64.05 + 0.00) = 64.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.58  68.99   0.00  -3.63  -1.31   0.00   0.00   0.00  64.05
-------------------------------------------------------------------------------

Segment Leq : 64.05 dBA

Total Leq All Segments: 64.05 dBA
```

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

Source height = 1.28 m

ROAD (0.00 + 55.20 + 0.00) = 55.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.58  60.14   0.00  -3.63  -1.31   0.00   0.00   0.00  55.20
-------------------------------------------------------------------------------

Segment Leq : 55.20 dBA

Total Leq All Segments: 55.20 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 64.05
                                  (NIGHT):55.20
```

APPENDIX C-3
SAMPLE CALCULATION OF PREDICTED SOUND LEVELS

FILE: 21-019
NAME: The Villages at Fairview Greens
REFERENCE DRAWINGS: Preliminary Grading Plan
LOCATION: Lot 8, 1.5 m above grade, rear yard

Noise Source:	Wellington Road 19
Time Period:	16 hr. (day)
Distance (m):	30.0

CALCULATION OF PREDICTED SOUND LEVELS*

Reference Leq (dBA)*:	68.60
Height and/or Distance Correction (dBA):	-5.00
Finite Element Correction (dBA):	-1.46
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.
LeqDay (dBA):	62.15

* 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.

```
STAMSON 5.0        NORMAL REPORT        Date: 19-04-2023 10:58:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: lot8ry.te            Time Period: Day/Night 16/8 hours
Description: Lot 8 rear yard unmitigated

Road data, segment # 1: Wellington (day)
---------------------------------------
Car traffic volume  :  7434            veh/TimePeriod  *
Medium truck volume :   369         veh/TimePeriod  *
Heavy truck volume  :   217           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):   8550
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   4.60
    Heavy Truck  % of Total Volume     :   2.70
    Day (16 hrs) % of Total Volume     :  93.80

Data for Segment # 1: Wellington (day)
---------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 m
Receiver height           :   1.50 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.10 m
Barrier receiver distance :   5.00 m
Source elevation          : 432.30 m
Receiver elevation        : 432.25 m
Barrier elevation         : 432.35 m
Reference angle           :   0.00

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

Source height = 1.28 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.28 !        1.50 !        1.37 !       433.72

ROAD (0.00 + 62.15 + 0.00) = 62.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90     90   0.66  68.60   0.00  -5.00  -1.46   0.00   0.00   0.00  62.15
-------------------------------------------------------------------------------

Segment Leq : 62.15 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 62.15
```

APPENDIX D

SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION

APPENDIX D-1
SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION*

FILE: 21-019
NAME: Fergus Golf Course Redevelopment
REFERENCE DRAWINGS: Preliminary Grading Plan
LOCATION: Lot 74, corner bedroom

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:	64 (+3 for reflections) = 67 dBA
	Rear:	61 (+3 for reflections) = 64 dBA
Indoor Leq:	45	
Noise Reduction (dBA):	Side:	22
	Rear:	19
Noise Spectrum:	Mixed Road Traffic	Angle Correction: 0
Absorption:	Medium	

APPROPRIATE ELEMENTS

		Configuration	STC Rating
Wall	Side	Standard	STC 33
	Rear	Standard	STC 30
Window	Side	Standard	STC 25
	Rear	Standard	STC 22

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

APPENDIX E

SAMPLE CALCULATION OF SOUND BARRIER ANALYSES

```
STAMSON 5.0        NORMAL REPORT        Date: 19-04-2023 10:58:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: lot8ry.te            Time Period: Day/Night 16/8 hours
Description: Lot 8 rear yard mitigated

Road data, segment # 1: Wellington (day)
----------------------------------------
Car traffic volume  :  7434            veh/TimePeriod  *
Medium truck volume :   369         veh/TimePeriod  *
Heavy truck volume  :   217           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):   8550
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   4.60
    Heavy Truck  % of Total Volume     :   2.70
    Day (16 hrs) % of Total Volume     :  93.80

Data for Segment # 1: Wellington (day)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 m
Receiver height           :   1.50 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.10 m
Barrier receiver distance :   5.00 m
Source elevation          : 432.30 m
Receiver elevation        : 432.25 m
Barrier elevation         : 432.35 m
Reference angle           :   0.00

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

Source height = 1.28 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.28 !        1.50 !        1.37 !       433.72

ROAD (0.00 + 62.15 + 0.00) = 62.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90     90   0.66  68.60   0.00  -5.00  -1.46   0.00   0.00   0.00  62.15
-------------------------------------------------------------------------------

Segment Leq : 62.15 dBA


Total Leq All Segments: 62.15 dBA
```

Barrier table for segment # 1: Wellington (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	434.15	56.95	56.95
1.90	434.25	56.67	56.67
2.00	434.35	56.35	56.35
2.10	434.45	56.01	56.01
2.20	434.55	55.66	55.66
2.30	434.65	55.30	55.30
2.40	434.75	54.94	54.94
2.50	434.85	54.59	54.59
2.60	434.95	54.24	54.24
2.70	435.05	53.90	53.90
2.80	435.15	53.57	53.57
2.90	435.25	53.26	53.26
3.00	435.35	52.95	52.95
3.10	435.45	52.66	52.66
3.20	435.55	52.37	52.37
3.30	435.65	52.10	52.10
3.40	435.75	51.84	51.84
3.50	435.85	51.59	51.59
3.60	435.95	51.35	51.35
3.70	436.05	51.12	51.12

TOTAL Leq FROM ALL SOURCES (DAY): 62.15

The predicted mitigated sound level with a 2.5 m high acoustic fence installed (as shown on Figure 2) is 54.59 dBA.

APPENDIX F

RESPONSES TO REVIEW COMMENTS

RESPONSE TO REVIEW COMMENTS

For consistency and completeness, we have reiterated the comments along with Jade's response.

Noise comments by Valcoustics Canada Ltd., on behalf of the Township of Centre Wellington, via letter dated January 11, 2023.

Comment:

"The noise assessment has applied the Ministry of Environment, Conservation and Parks (MECP) noise guideline limits and requirements as outlined in Publication NPC-300. This is considered appropriate."

Response: Noted

Comment:

"Section 2.1 of the report indicates that the only significant transportation noise source that will impact the site is road traffic on Wellington Road 19. The traffic volumes on the roadways internal to the development and on Third Line are low resulting in their noise impact being below the guideline limits. We agree with this assessment."

Response: Noted

Comment:

"Section 2.1 of the report also indicates that ultimate traffic information was provided from the traffic consultant. It is our understanding that the peer review of the traffic study has raised some concerns about the traffic information. The noise study should be updated using the updated traffic information prepared to respond to the traffic study peer review comments. The assessment should also consider Summer Average Daily Traffic volumes to reflect higher traffic volumes generated by the golf course and the seasonal campgrounds in the area."

Response: Noted. The report has been updated accordingly.

Comment:

"Section 2.2 of the report provides a discussion regarding the stationary noise sources that could impact the development site. The study identifies a dairy farm to the south and indicates that the sound level limits would inherently be met at the proposed development because there are closer residential dwellings to the north and east where the guideline limits are required to be met. The existing dwellings all appear to be on the east side of Third Line whereas the proposed development will be on the west side of Third Line. The existing dwellings have a different orientation to the dairy farm than the proposed development and may benefit from acoustical screening that the proposed development would not receive. Thus, additional discussion regarding the dairy farm noise emissions is needed."

Response: Further discussion has been provided in the text of the updated noise report. In summary, the farm operation is exempt from the noise guidelines and the noise by-law and does not require assessment in the context of this report.

Comment:

"Section 2.2 of the report also indicates that a pumping station will be constructed on the development site and a water treatment plant will be constructed on the north side of Wellington Road 19. These are correctly identified as being stationary noise sources whose sound emissions must comply with the NPC-300 guideline requirements at the existing dwellings as well as those within the proposed development. Detailed noise studies will need to be prepared in support of these facilities (i.e. the pumping station and waste water treatment plant) to ensure their noise emissions are in compliance with the noise guideline limits at this proposed development as well as at all existing noise sensitive land uses. This should be included in the list of recommendations provided in section 6.0 Conclusions of the report."

Response: The requested language has been included in the updated noise report.

Comment:

"Section 4.1 of the report indicates that a ground absorption coefficient of 0.33 has been applied, where applicable. It is not clear where this has been applied. In addition, the ORNAMENT model requires a ground absorption coefficient of 0 be used when at least 50% of the ground surface between the road source and the receiver is sound reflective. If at least 50% of the ground surface is sound reflective, the ground absorption coefficient should be 0. If there is less than 50% of reflective ground between the source and the receptor, the 0.33 ground absorption coefficient is acceptable."

Response: We are in agreement on how reflection is applied. For this project, it is applicable to lots located across the single loaded road that is between the lots and Wellington Road 19. For clarity, this situation is now described in the text of the report.

Comment:

"In Section 5.1.1 under Ventilation, there is a recommendation that the outdoor air conditioning condenser units have an AHRI sound rating of 7.6 bels or less. This recommendation should be included in Table 3 which summarizes the noise mitigation requirements for the proposed development".

Response: The requested language has been included in the updated noise report.

Comment:

"Section 5.1.2 of the report recommends 2.0 m high sound barrier fences for the dwellings (i.e. Lots 1, 7 to 15, 54, 55, 59, 60, 65, 73 and 74) immediately adjacent to Wellington Road 19. The County of Wellington requests mitigation measures other than sound barrier fences, such as an earth berm across the entirety of Wellington Road 19 and/or increased setback distances (as provided for Lots 66 to 72). If the latter is applied, enhanced landscaping is required. In all situations, design and aesthetics are to be considered to the satisfaction of the Township and the County."

Response: The proponent (883890 Ontario Limited) investigated the possibly of using berms instead of acoustic barriers. Based on their review, it is not feasible to construct berms due to grading constraints at this site. There were only two lots at the southwest corner of the site (Lots 54 and 55) where perhaps berms instead of acoustic fences would be feasible. At this time, the proponent again is proposing acoustic fences in order to achieve mitigated sound levels that are in compliance with the MOE NPC-300 noise guidelines. The proponent is requesting the Township to consider the concept plan and acoustic fences as shown on Figure 2.

Comment:

"Section 5.1.2 of the report also recommends a minimum surface density of 10 kg/m2 for any gate in the recommended sound barriers. This is not in conformance with the MECP NPC-300 guideline that requires sound barriers to have a minimum surface density of 20 kg/m2 except for temporary or rooftop barriers. However, due to the minimal amount of sound attenuation that the sound barriers (if used) need to provide for this development, the reduced weight for the gates is considered acceptable where sound barriers must be used."

Response: Noted.

Comment:

"*Regarding Table 1 - Summary of Road Traffic Data, clarification regarding these items is needed:*

- *The medium/heavy split used in the analysis is somewhat different than the 60%/40% indicated;*

- *The road gradient is indicated as being up to 2% in Table 1. However, the sample calculation for the Lot 8 OLA uses a 1% road gradient; and*

- *Table 1 indicates the day/night split is 94/6. However, the analysis uses a day/night split of 93/7.*

Response: The report has been updated with revised traffic information. Regardless, for the comments above, the medium/heavy split percentage was a matter of rounding. The road gradient is indicated as up to 2% and is accurate as noted. Wellington Road, in the area of Lot 8 (the sample calculation), the road profile in close proximity of the respective lot is actually 1%. The day/night split was a typographical error. As noted, revised traffic data and updates to the calculations has been completed based on the latest traffic information.

Comment:

"*Table 3 provides a summary of the noise mitigation recommendations for the proposed development. Note 2 to the table should indicate that the sound barrier heights must be confirmed once a detailed grading plan is available."*

Response: The requested language has been included in the updated noise report.

Comment:

"*Table 3 recommends noise warning clauses regarding the future stationary noise sources be used for Lots 1, 7, 39, 73 and 74. The rationale for only selecting these lots has not been provided within the report. Is this determined from setback distance (as per D-1/D-6)? If so, what distance has been used?"*

Response: Our experience with D-series guidelines was a factor in the decision for the lots with the proximity warning clause applied. To note here, it is expected that all the lots at the residential development will meet the minimum recommended separation distances in the D-series guidelines. In terms of the D-2 guidelines specifically, the WWTP anticipated for this project is in the lowest category of noise impact (based on the forecasted sewage capacity). Aside from distance/setback, experience with the expected noise sources in question and line-of-sight exposure were considered.

Comment:

"The report should confirm that all requirements of the local noise by-law will be adhered to."

Response: The noise by-law was reviewed and referenced in the original report in terms of the relevance to residential air conditioner condenser units. However, a specific section has been included now that discusses further details of the local noise by-law, including but not limited to, the exemption of normal farm operations (and it coincides with NPC-300). On occasion, Noise By-Laws may indicate relevant numerical sound level criteria that is applicable to the land-use planning process. This is not the case with the Township of Centre Wellington's Noise By-Law.