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PRELIMINARY ENVIRONMENTAL NOISE REPORT

PROPOSED RESIDENTIAL DEVELOPMENT
1381 LAKESHORE ROAD EAST
CITY OF MISSISSAUGA
REGION OF PEEL

JADE ACOUSTICS

Prepared for
City Park Homes

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SUMMARY

The proposed residential development is located at the northeast corner of Lakeshore Road East and Dixie Road in the City of Mississauga. It is subject to road traffic noise from Lakeshore Road East and Dixie Road and rail traffic noise from the GO Lakeshore West Line and the CN Oakville Subdivision both contained within the existing rail corridor. The proposed site is located outside the NEP/NEF 25 composite noise contour lines for Toronto Pearson International Airport and outside the airport operating area. Potential noise associated with commercial and industrial facilities in the area has also been evaluated.

The proposed development is comprised of one (1) residential condominium building with ground level retail space including an eight (8) storey east portion and a fifteen (15) storey west portion of the building.

The environmental noise guidelines for transportation and stationary sources of the City of Mississauga, the Region of Peel and the Ministry of the Environment, Conservation and Parks (MOE) set out sound level limits for both the indoor (transportation sources only) and outdoor space (both transportation and stationary sources).

The sound levels for various locations in the residential development were determined using the road traffic data obtained from the City of Mississauga and the Region of Peel and the rail traffic data obtained from GO Transit/Metrolinx and CN. Sound levels due to the adjacent roads and rail were determined using ORNAMENT and STEAM, respectively, the noise prediction models of the MOE.

It was found that with appropriate mitigative measures the residential units in the proposed condominium building will meet the noise guidelines. All residential units require mandatory central air conditioning due to the road and rail traffic.

Sound barriers in the form of an acoustic railing are needed for the roof outdoor amenity area located on top of the eight storey east portion of the proposed building and the private terraces associated with the fifth storey south facing residential units of the fifteen storey west portion of the proposed building. Sound barriers are not required for the north facing ground level outdoor amenity area in the form of a terrace.

Based on the preliminary analysis, window, exterior door and exterior wall construction better than standard construction practices is needed for all proposed residential units. Prior to issuance of building permits, the acoustical requirements should be reviewed by an acoustical consultant to ensure compliance with the applicable acoustical guidelines. Prior to occupancy, the residential units should be inspected by an acoustical consultant to ensure the required mitigation measures have been incorporated.

Where minor excesses exist and noise mitigation measures are required, future occupants will be advised through the use of warning clauses.

Due to their proximity to the existing commercial/industrial developments, all proposed residential units should be provided with a proximity warning clause notifying the purchasers/tenants that the activities and/or equipment associated with the commercial/industrial facilities may at times be audible. See Table 3 and Notes to Table 3.

The existing industries are required to have valid Certificate of Approvals (C of A's) or Environmental Compliance Approvals (ECA's) to show that the appropriate sound level limits are met at the existing residential receptors. Compliance at the existing residences will ensure that the applicable MOE sound level limits due to the stationary noise sources are met at the proposed residential development. Therefore, no additional mitigation measures are required for compliance at the proposed building.

The mechanical drawings and detailed information regarding the mechanical equipment associated with the proposed development, including but not limited to rooftop HVAC units and garage exhaust fans were not available at the time of preparation of this noise report. Once detailed information becomes available, noise analyses should be prepared to ensure that the applicable noise guidelines are met.

1.0 INTRODUCTION

Jade Acoustics Inc. was retained by City Park Homes to prepare a Preliminary Environmental Noise Report to investigate the potential impact of noise on the proposed development to the satisfaction of the City of Mississauga and the Region of Peel.

The proposed site is identified as:

1381 McLaughlin Road
City of Mississauga
Regional Municipality of Peel

The proposed residential development is located at the northeast corner of Lakeshore Road East and Dixie Road. It is bound by Lakeshore Road East to the south, Dixie Road to the west, Cherriebell Road to the east and existing residential lots to the north.

The analysis was based on the following:

- Site and floor plans, elevations and sections all prepared by Graciani + Corazza Architects dated August 14, 2020;
- Road traffic information provided by the City of Mississauga, and the Region of Peel;
- Rail traffic information provided by GO Transit/Metrolinx and CN; and
- Site visit conducted by Jade Acoustics Inc. staff on June 9, 2020.

A Key Plan is attached as Figure 1.

The proposed development is comprised of one (1) condominium residential building with ground level retail space, three (3) levels of underground parking, a ground level outdoor amenity area in the form of a terrace located on the north side of the building, six (6) ground level visitor/retail parking spaces, a drop off area and other internal driveways. The east portion of the proposed building is an eight (8) storey structure with a rooftop outdoor amenity area. The west portion consist of a fifteen (15) storey structure. Figure 2 shows the proposed development.

2.0 NOISE SOURCES

2.1 Transportation Sources

The noise sources to be investigated for potential impact on the proposed development are road traffic on Lakeshore Road East and Dixie Road and rail traffic on both the GO Lakeshore West Line and the CN Oakville Subdivision situated within the existing rail corridor located approximately 260 m north of the proposed development. Due to the separation distance, ground-borne vibration generated by train passbys is insignificant at the proposed site. Therefore, railway vibration is not considered further in the report.

The site is not impacted by aircraft traffic.

2.1.1 Road Traffic

Cherriebell Road is a local road and, as such, acoustically insignificant. Therefore, this road is not considered further in the report.

The ultimate road traffic data for Lakeshore Road East and Dixie Road used in the analysis was provided by the City of Mississauga on June 9, 2020 and the Region of Peel on June 8 and 10, 2020, respectively. Road traffic is summarized in Table 1. Correspondence regarding the road traffic information is included as Appendix A.

2.1.2 Rail Traffic

The rail traffic data for the two principal main lines (GO Lakeshore West Line and CN Oakville Subdivision) located within the existing rail corridor was provided by GO Transit/Metrolinx on June 23, 2020 and CN on July 10, 2020.

As the information provided by GO Transit/Metrolinx is applicable for a 10-year horizon, no escalation factor was used in the analysis. The data reflects the future scenario for the GO Lakeshore West Line.

As required by CN, an escalation factor of 2.5% per annum was used for the Oakville Subdivision. The time period for the analysis was taken to be 10 years; therefore, the train volume was escalated to the year 2030. CN has indicated that anti-whistling bylaws are in effect at all three at-grade crossing in the area. Therefore, no whistle noise was included in the analysis. All rail tracks within the rail corridor are constructed of welded rail. This has been accounted for in the analysis.

Rail traffic is summarized in Table 1. Correspondence regarding the rail traffic information is included as Appendix A.

2.2 Stationary Sources

There are many existing commercial and industrial uses located in a southerly direction and a westerly direction from the proposed development, south of Lakeshore Road East. The commercial and industrial buildings are listed in Table A below and shown on Figure 1.

TABLE A
COMMERCIAL AND INDUSTRIAL USES

ID Number	Facility	Address	Operations	D-6 Classification
1	Small Arms Inspection Building	1352 Lakeshore Rd. East	Arts and Cultural Programs	Class I
2	Region of Peel / G.E. Booth (Lakeview) WWTP	1300 Lakeshore Rd. East	Waste Water Treatment Plant	Class III
3	McKenna Logistics	1260 Lakeshore Rd. East	Logistics, Warehousing and Distribution	Class II
4	Canadian Food for Children	1258 Lakeshore Rd. East	Warehouse	Class II
5	Blue Bird	1230 Lakeshore Rd. East	Self Storage	Class II
6	Citube Ltd.	1200 Lakeshore Rd. East	Custom Metal Fabrication Plant	Class II
7	Plaster Form Inc. / Armstrong	1180 Lakeshore Rd. East	Manufacturer of Commercial and Residential Ceiling	Class II
8	Allegion	1076 Lakeshore Rd. East	Residential and Commercial Locks, Door Closer and Exit Devices, Steel Doors and Frames	Class II
9	EMRG	1083 Rangeview Rd.	Property Restoration and Professional Services	Class II
10	Kotyck Bros. Limited	1076 Rangeview Rd.	Plumbing, Heating, Hydraulic and Industrial Products/Solutions	Class II
11	Ilsco of Canada Co.	1050 Lakeshore Rd. East	Manufacturer of Electrical Connectors and Accessories	Class II

The existing non-residential development that is currently operational, closest to the proposed site is the Small Arms Inspection building located approximately 70 m southwest of the proposed site.

All other commercial and industrial developments listed in Table A above are situated approximately 230 m or more from the proposed development. The separation distance between the existing Region of Peel waste water treatment plant and the proposed site is a minimum of 230 m.

Section 4.2 provides details of the noise assessment of the non-residential uses listed in Table A.

A car dealership building, which is no longer in use, is located at the northwest corner of Lakeshore Road East and Dixie Road. This commercial site is proposed to be re-zoned for a mixed-use development that includes a high-rise residential building with ground level retail spaces. As the existing commercial operation has seized to exist, it is not considered further in the report.

The Long Branch GO Station facility and the Willowbrook Rail Yard and Maintenance facility are located approximately 700 m and 3000 m, respectively, from the proposed development. Due to the separation distances and partial screening by the intervening developments, these two facilities are acoustically insignificant at the subject site. Therefore, the Long Branch GO Station facility and the Willowbrook Rail Yard and Maintenance facility are not considered further in the report.

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 City of Mississauga Official Plan (Section 6.10, Noise, pages dated March 13, 2017, August 2, 2017 and March 13, 2019) was also used in the analysis.

The environmental noise criteria used for residential developments in the City of Mississauga and the Region of Peel and the GO Transit/Metrolinx, CN and MOE environmental noise criteria are summarized below.

3.1 Transportation Sources

3.1.1 Indoors

Road and Rail Traffic

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/exterior door is 60 dBA or greater 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/exterior door is greater than 65 dBA, means must be provided so that windows and/or exterior doors 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 60 dBA on the exterior face of a bedroom or living/dining room window/exterior door 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/exterior door, 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. The air-cooled condenser units must be sited in accordance with the zoning by-laws with respect to setbacks as well as location.

As required by the MOE, indoor noise criteria for road traffic noise is 40 dBA (Leq8hour) for the bedrooms during nighttime hours, 45 dBA (Leq8hour) for 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 due to the road traffic.

The MOE indoor noise criteria for rail traffic are 5 dB more stringent when compared with the indoor noise criteria for road traffic to account for special character of railway noise. Therefore, for rail traffic, indoor noise criteria are 35 dBA (Leq8hour) for the bedrooms during nighttime hours, 40 dBA (Leq8hour) for living/dining rooms during nighttime hours and 40 dBA (Leq16hour) for the living/dining rooms and bedrooms during daytime hours. These criteria are used to determine the architectural requirements due to the rail traffic.

In addition, the MOE requires that exterior walls be constructed of brick veneer or masonry equivalent construction from the foundation to the rafters for the first wall of dwellings when the predicted Leq24 hour sound level exceeds 60 dBA and when the first row of dwellings is located within 100 m from the rail tracks.

According to the MOE guidelines, whistle noise typically generated by locomotives/trains approaching level crossings is to be used for an assessment of the building component requirements but not for assessments of the sound barrier and ventilation requirements.

Railway Guidelines

GO Transit/Metrolinx and CN have guidelines which apply to residential developments adjacent to their rights-of-way. In general, the railway guidelines follow the MOE guidelines for indoor and outdoor sound level limits.

In addition, the railways require that for a principal main line:

- a minimum setback of 30 m from the right-of-way be maintained. The minimum setback requirements can be reduced by introducing a crash wall;
- a safety berm (minimum height 2.5 m)/sound barrier (minimum total height 5.5 m above top-of-rail) be constructed along the CP right-of-way;
- brick veneer or acoustically equivalent masonry exterior wall construction for the first row of dwellings regardless of predicted Leq24 hour sound level;
- ground vibration transmission be assessed through site tests. If an excess exists, all residential units within 75 m of the nearest track should be protected; and

- all residential units within 300 m of the right-of-way have a warning clause placed in offers of purchase and sale, in lease agreements and in the development agreement, making future residents aware of the existence of the railway.

Due a separation distance of approximately 260 m, it is only the last bullet that applies to the proposed development.

3.1.2 Outdoors

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."

For the outdoor amenity areas, a design goal of 55 dBA for the daytime period between 7:00 a.m. to 11:00 p.m. is used for road and rail traffic. In some cases, an excess not exceeding 5 dBA is considered acceptable. Where the unmitigated sound levels during the day exceed 55 dBA (Leq16hour, daytime) but are equal to or less than 60 dBA (Leq16hour, daytime), a warning clause is required and mitigation should be considered. Where the unmitigated sound levels exceed 60 dBA, mitigation measures and a warning clause are required.

The City of Mississauga requires that the acoustic fence portion of the sound barrier not exceed 2.4 m in height.

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 included in the development agreement.

3.2 Stationary Sources

MOE Noise Guidelines

The guidelines of the Ontario Ministry of the Environment, Conservation and Parks (MOE) for stationary sources included in the NPC-300 document titled "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning" are to be used for commercial and industrial facilities.

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 of NPC-300 included in Appendix B provided the exclusion limit values of one-hour equivalent sound level (Leq,dBA) and impulsive sound level (L_{LM},dBAI).

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 City of Mississauga Official Plan

Based on Section 6.10.3, titled “Road Noise” included in Chapter 6 of the City of Mississauga Official Plan, a noise study is required to be prepared for the residential land use located within 50 m of arterial roads. Based on Section 6.10.4, titled “Rail Noise, Safety and Vibration” a noise study is required to be prepared for residential land uses located within 300 m of principal main rail lines. The study is to determine the appropriate acoustic design to the satisfaction of the City.

The City of Mississauga has indoor sound level criteria for road and rail traffic which consist of the indoor sound level limits from Table C-2 and the supplementary indoor sound level limits from Table C-9 both included in the MOE NPC-300 noise guidelines.

3.4 City of Mississauga Noise Control By-law and Nuisance Type Noise By-law

The City of Mississauga has two by-laws to prohibit or regulate unusual noises likely to disturb the inhabitants of the City; Noise Control By-law Number 360-79 and Nuisance Type Noise By-law Number 785-80. The by-laws do not provide specific sound level limits, but rather provides qualitative information with respect to sources and prohibitions by time and place.

3.5 Region of Peel Guidelines

The Region of Peel document titled “General Guidelines for the Preparation of Acoustical Report in the Region of Peel” dated November, 2012, outlines requirements for the assessment of proposed residential developments.

4.0 NOISE IMPACT ASSESSMENT

4.1 Transportation Sources

For road and rail traffic noise, the sound levels in terms of Leq, the energy equivalent continuous sound levels for both day (Leq16) and night (Leq8) were determined using the MOE Traffic Noise Prediction Models, ORNAMENT for road traffic and STEAM for rail traffic.

The analysis was based on the site and architectural plans mentioned in Section 1.0. The topography between the source and the receiver and screening effect due to the proposed and existing buildings, where applicable, have been taken into account.

An outdoor amenity space (rooftop) is shown on top of the eight (8) storey high east part of the proposed building. The outdoor noise sensitive receptor was taken to be in the middle of this space. The outdoor noise sensitive receptor was also taken to be in the middle of the proposed ground level outdoor amenity space in the form of a terrace located immediately north of the subject condominium building.

Several fifth floor south facing residential units associated with the fifteen (15) storey high west part of the subject condominium building are proposed with more than 4.0 m deep private terraces. Based on the MOE noise guidelines, these terraces are considered to be noise sensitive receptors and, as such, they were included in the analysis.

Based on the architectural plans, all balconies and other private terraces associated with the condominium building are less than 4.0 m deep; therefore, according to the MOE noise guidelines, they are not noise sensitive receptors that require mitigation measures. As such, the balconies and private terraces, other than the private terraces mentioned above, were not considered further in the report.

The highest sound levels due to the road and rail traffic are predicted at the south and west walls of the proposed condominium building. The unmitigated sound levels at the 8th floor south walls and 15th floor west walls are predicted to be between 70 dBA and 71 dBA during the daytime hours (7:00 a.m. and 11:00 p.m.) and 64 dBA during the nighttime hours (11:00 p.m. and 7:00 a.m.).

For the rooftop outdoor amenity space and three (3) south facing 5th floor residential private terraces, the unmitigated daytime sound levels are predicted to be between 64 dBA and 65 dBA. The unmitigated daytime sound level of less than 55 dBA is predicted for the ground level terrace located on the north side of the condominium building.

Table 2 provides a summary of the predicted sound levels outdoors due to road and rail traffic at specific locations without mitigative measures. Appendix C gives sample calculations.

Where the sound level limits are predicted to exceed the noise guidelines, mitigative measures and warning clauses are required to address road and rail traffic.

4.2 Stationary Sources

The potential noise impact of stationary sources on the proposed development was reviewed based on observations during the site visit conducted by Jade Acoustics Inc. personnel.

As noted in Section 2.2, the closest non-residential use located approximately 70 m from the proposed development is the Small Arms Inspection building. Due to the type of activity noted in Table A of Section 2.2, existing and future operations are not anticipated to cause noise impacts on the proposed development. Therefore, a detailed noise impact assessment of the Small Arms Inspection building is not required and, as such, not completed as part of the noise review addressed in the report.

All other non-residential uses listed in Table A are located 230 m or more from the proposed development. Due to the acoustically significant separation distances and expected high ambient sound levels set by road traffic, noise impacts on the proposed development are not anticipated. In addition, many of these facilities are required to have valid Certificate of Approval (C of A) or Environmental Compliance Approval (ECA) permits issued by the MOE to confirm that their operations are in compliance with legal requirements. This means that they are required to meet the applicable MOE NPC-300 noise guidelines at any existing noise sensitive receptors.

Located to the west of the proposed development are several mid-rise and high-rise apartment buildings positioned closer to the existing commercial and industrial facilities. Also, a high-rise residential development has already been proposed for the currently closed commercial site located at the northwest corner of Lakeshore Road East and Dixie Road. All these residential developments are considered to be noise sensitive receptors with respect to the existing commercial and industrial facilities.

As stated above, many of the existing non-residential uses are required to be in compliance with the MOE noise requirements at the closer receptors. Therefore, the applicable guideline noise limits are expected to be met at the proposed development as well. A detailed noise assessment is not needed and, as such, has not been completed.

5.0 IMPACT OF THE DEVELOPMENT ON THE ENVIRONMENT

In general, the main sources of noise due to the development of potentially adverse impact on sensitive land-uses are the loading areas and mechanical equipment including air conditioning equipment, an emergency generator, and garage exhaust fans.

Noise from garbage pick-up and moving operations are of short duration and generally do not warrant special mitigative measures. As an administrative control measure, garbage collection and moving operations would need to be limited to the daytime hours between 7:00 a.m. and 7:00 p.m.

Mechanical equipment should comply with the requirements of the Ontario Ministry of the Environment, Conservation and Parks Publication NPC-300. These criteria require that the noise from a stationary source not exceed the applicable sound level limits, in any one hour period.

There are existing sensitive land-uses located immediately north of the proposed condominium building.

The noise from the mechanical equipment proposed for this development should be addressed when information becomes available. With appropriate mitigation it is feasible to meet the applicable sound level limits at the existing noise sensitive receptors.

6.0 IMPACT OF THE DEVELOPMENT ON ITSELF

When evaluating the potential effect of the development on itself, consideration must be given to the control of air-borne and structure-borne noise generated within the building itself. The areas to be investigated are the common boundaries both vertically and horizontally, between suites; between suites and recreational spaces; and between suites and mechanical areas.

The performance of a boundary with respect to air-borne noise is measured in terms of Sound Transmission Class (STC). This is an approximation of the amount of sound reduction provided by the boundary. The Ontario Building Code (OBC) requires a minimum STC 50 between residential dwelling units and between dwelling units and areas within which noise may be generated. STC 55 construction is required between residential units and elevator shafts and garbage chutes.

Noise from garbage pick-up is of short duration and generally does not warrant special mitigation measures.

The garage exhaust fans, emergency generator and roof mounted air conditioning equipment will be designed to not exceed the applicable sound level limits at the exterior face of the proposed building where windows and exterior doors will be located and at the outdoor amenity space.

Consideration should be given to the noise impact at the residential suites in the vicinity of potentially noisy areas (e.g., garbage room, loading bays, mechanical rooms, indoor amenity spaces). Special sound isolation construction may be required to adequately mitigate the potential noise impact. The incorporation of secondary sound isolation ceilings, floating floors, or cavity walls are some examples. With a sound isolation ceiling, structural clearance may have to be increased to maintain ceiling height.

When addressing structure-borne noise, impact sounds are evaluated using the Impact Insulation Class (IIC) rating system. This system is configured in the same format as the STC rating system to allow for easier comparison when evaluating the acoustical performance of a partition. The National Building Code and the Ontario Building Code do not specify a minimum IIC rating for impact sound isolation. To ensure that impact sounds are not a problem, consideration should be given to the performance of the floor/ceiling systems, particularly when unlike spaces are stacked vertically, during the design process.

All of these items should be evaluated prior to issuance of building permits.

Also, the noise from the mechanical equipment proposed for this development should be addressed when information becomes available. With appropriate mitigation it is feasible to meet the applicable sound level limits at the proposed noise sensitive receptors.

7.0 NOISE MITIGATION 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 noise mitigation requirements for the proposed condominium building.

7.1 Transportation Sources

7.1.1 Indoors

As required, indoor sound level criteria for road and rail traffic can be achieved in all cases by using appropriate architectural elements for exterior walls, windows, exterior doors, and roof construction. The indoor limit for road traffic noise is 40 dBA for the bedrooms during nighttime hours, 45 dBA for the living/dining rooms during nighttime hours and 45 dBA for the living/dining rooms and bedrooms during daytime hours. The MOE indoor sound level limits for rail traffic are 5 dBA lower when compared with the indoor sound level limits for road traffic. These criteria have been used in this analysis. The characteristic spectra for road and rail traffic has been accounted for in the determination of the architectural components.

In order to determine the overall window, exterior door and exterior wall requirements, both the road traffic and rail traffic have been included in the analysis. The requirements for each source were assessed separately and then combined to determine the overall requirements.

Sample architectural component selection calculations are shown in Appendix D.

As no suite layout plans are available at this time, it has been assumed that the worst case would involve a top floor corner bedroom. Both exterior walls of the corner bedroom were assumed to be 20% of the associated floor area. The windows/exterior doors were assumed to be installed in both walls and have the surface area equal to 60% of the associated floor area each.

Based on the preliminary analysis, windows and exterior doors need to be up to STC 38 and exterior walls need to be up to STC 41. An STC rating of 38 for windows and exterior doors and an STC rating of 41 for exterior walls exceed window, exterior door and exterior wall construction which compiles with the minimum structural and safety requirements of standard construction.

The acoustical performance of windows and exterior doors as a whole depends on glass configuration/thickness, air space, material used for frames and construction details including seals. Therefore, the acoustical performance of the glass configuration alone

expressed as a sound transmission class (STC) rating, generally available in the literature, does not address the STC rating of the whole window and exterior door. Same glass configurations with different frame materials and/or construction details often produce different STC ratings. Therefore, it is recommended that prior to installation, STC test results of window and exterior door configurations from an accredited laboratory be provided to ensure that the selected windows and exterior doors meet the required STC ratings.

Since condominium unit plans are not yet available, the final architectural choices cannot be made. Once plans become available, the noise control requirements should be re-evaluated to determine the final requirements.

Based on the exposure to the road and rail noise, central air conditioning and warning clauses are required for all proposed residential units.

See Table 3 and Figure 2 for a summary of minimum noise mitigation measures.

For the proposed condominium building, the air conditioning system should be designed to meet the MOE NPC-300 noise guideline limits.

Warning clauses will also be required to be placed in offers of purchase and sale, lease agreements and included in agreements that are registered on title, including condominium disclosure statements and declarations for all relevant residential units to make future occupants aware of the potential noise situation. See Table 3 for details.

7.1.2 Outdoors

The outdoor amenity area is required to be exposed to sound levels of less than or equal to 55 dBA during the day. A 5 dB increase is considered acceptable in certain situations. Typically, if the sound level is above 55 dBA, some form of mitigation and a warning clause is required.

As noted in Section 4.1, the unmitigated sound levels due to the road and rail traffic at the rooftop outdoor amenity space located on top of the east part of the proposed building and three (3) south facing 5th floor private terraces exceed 60 dBA. Therefore, sound barriers are required.

Accounting for a 1.07 m high sound barrier, the mitigated sound level at the outdoor spaces mentioned above is predicted to be 59 dBA. This sound barrier height is equal to a typical railing height of 42 inches. As the predicted mitigated sound level is within the 5 dBA range above 55 dBA, it is expected to be acceptable to the City of Mississauga and Region of Peel. A 2.2 m high sound barrier and a 3.1 m high sound barrier would be

needed for the private terraces and the rooftop outdoor amenity space, respectively to achieve 55 dBA. As these heights are excessive, the height of 1.07 m is considered to be more reasonable. Therefore, a minimum 1.07 m high railing that satisfies the acoustic requirements of a minimum surface density of 20 kg/m^2 and a continuous construction with no vertical or horizontal gaps is considered to be acoustically sufficient.

Based on the architectural plans dated August 14, 2020, a 1.07 m acoustic railing is proposed for the three (3) south facing private terraces. A 1.8 m high acoustic railing is proposed for the 9th floor rooftop outdoor amenity space to meet the wind study recommendations. The 1.8 m high acoustic railing is predicted to achieve a mitigated sound level of 58 dBA.

The proposed acoustic railing should be installed along the north and east edge of the rooftop outdoor amenity space and along the edges of the 5th storey private terraces as shown on Figure 2. Appendix E includes the sound barrier calculations.

Alternatively, if it is found that the railing having the acoustic properties as described above are not desirable or practicable, a stronger warning clause could be implemented for these locations upon approval of this approach by the City of Mississauga and Region of Peel.

The unmitigated daytime sound levels due to the road and rail traffic within the ground level outdoor amenity area (terrace) located on the north side of the proposed building is predicted to be less than 55 dBA. Therefore, a sound barrier is not required for this location.

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. 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.

7.2 Stationary Sources

Based on Section 4.2, the existing commercial and industrial facilities are expected to meet the applicable MOE noise guidelines at the proposed development. Therefore, mitigation measures to address the stationary sources of noise are not required to be implemented by the proponent of the subject site.

Due to their proximity to the existing commercial and industrial facilities, all proposed residential units should be provided with a proximity warning clause notifying the purchases/tenants that the activities and/or equipment associated with the commercial and industrial facilities may at time be audible. See Table 3 and Notes to Table 3.

8.0 RECOMMENDATIONS

1. The requirements as stipulated in Table 3 should be incorporated into the proposed development.

2. Prior to final development application approval, detailed noise report should be prepared once the final plans become available to ensure that the appropriate criteria are achieved. The report should include detailed reviews of the sound barrier, architectural component and central air conditioning requirements to address both the road traffic and the rail traffic.

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

4. Prior to final occupancy, the condominium building including the residential units should be inspected by an acoustical consultant to ensure the required mitigative measures have been incorporated.

9.0 CONCLUSIONS

Based on the acoustical analysis, with the incorporation of the appropriate acoustical abatement measures, the sound levels will be within the applicable noise guidelines. In accordance with the City of Mississauga, Region of Peel, Ontario Ministry of Environment, Conservation and Parks, CN and GO Transit/Metrolinx implementation guidelines where mitigation is required, future occupants will be advised through the use of warning clauses.

Respectfully submitted,

JADE ACOUSTICS INC.

Per: _____
Davor Sikic, P.Eng.

LICENSED PROFESSIONAL ENGINEER
Aug. 18, 2020
D. SIKIC
100026328
PROVINCE OF ONTARIO

Per: _____
Dalila C. Giusti, P.Eng.

LICENSED PROFESSIONAL ENGINEER
Aug. 18, 2020
D.C. GIUSTI
16267304
PROVINCE OF ONTARIO

DS/DCG/sh
J:\Reports\19-085 Aug 18-20 1381 Lakeshore Road East.doc

10.0 REFERENCES

1. "Model Municipal Noise Control By-Law", Final Report, by the 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. “STEAM – Sound From Trains Environmental Analysis Method”, Ontario Ministry of the Environment, July 1990

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

5. "General Guidelines for the Preparation of Acoustical Reports in the Region of Peel", November, 2012.

6. “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, Ontario Ministry of the Environment, Publication NPC-300, August, 2013, released October 21, 2013, (updated final version # 22).

7. “Impulse Vibration in Residential Buildings”, Ontario Ministry of the Environment, Publication NPC-207 (Draft), November, 1983.

8. City of Mississauga Noise Control By-law Number 360-79, (Amended by 77-85, 1298-86, 755-87, 62-92, 230-94, 303-00, 495-03, 124-05, 110-06, 92-07, 120-07, 127-07, 73-08, 99-08 and 299-08), January 28, 1980.

9. City of Mississauga Nuisance Type Noise By-Law Number 785-80 (amended by By-laws 226-82 and 69-92), October 15, 1980.

10. City of Mississauga Official Plan-Part 2, Section 6 “Value the Environment”, March 13, 2019.

TABLE 1

PROPOSED RESIDENTIAL DEVELOPMENT

1381 LAKESHORE ROAD EAST

CITY OF MISSISSAUGA

REGION OF PEEL

SUMMARY OF TRAFFIC DATA

A. ROAD TRAFFIC

ROAD	LAKESHORE ROAD EAST	DIXIE ROAD
AADT*	41,000 (ultimate)	16,678 (ultimate)
No. of Lanes	4	2
Speed (km/hr)	50	50
Trucks (%)	6	5.9**(7.88***)
Medium/Heavy Split (%)	55/45	89.3/10.7**(90.7/9.3***)
Gradient (%)	Up to 2	Up to 2
Day/Night Split (%)	90/10	92/8
Ultimate R.O.W. (m)	30	20

* AADT: Annual Average Daily Traffic.

** Daytime

*** Nighttime

TABLE 1 - Continued

PROPOSED RESIDENTIAL DEVELOPMENT

1381 LAKESHORE ROAD EAST

CITY OF MISSISSAUGA

REGION OF PEEL

SUMMARY OF TRAFFIC DATA

B. RAIL TRAFFIC – GO LAKESHORE WEST LINE

GO Transit/Metrolinx	GO Trains	
	Day (7:00 a.m. to 11:00 p.m.)	Night (11:00 p.m. to 7:00 a.m.)
No. of Trains*	45 (diesel)/147 (electric)	9 (diesel)/37 (electric)
No. of Locomotive	1	1
No. of Cars	12	12
Maximum Speed (km/h)	153**	153**

* Data provided by GO Transit/Metrolinx applicable within at least a 10-year time horizon. These volumes have not been escalated in the analysis. As advised by GO Transit/Metrolinx, the noise analysis was based on all trains having diesel locomotives.

** A speed of 150 km/h used in the analysis as this is the maximum speed input in the Stamson noise model.

TABLE 1 - Continued

PROPOSED RESIDENTIAL DEVELOPMENT

1381 LAKESHORE ROAD EAST

CITY OF MISSISSAUGA

REGION OF PEEL

SUMMARY OF TRAFFIC DATA

C. RAIL TRAFFIC – CN OAKVILLE SUBDIVISION

CN	Way Freight Trains	
	Day (7:00 a.m. to 11:00 p.m.)	Night (11:00 p.m. to 7:00 a.m.)
Way Freight Trains		
No. of Trains*	2	5
No. of Locomotive	4	4
No. of Cars	25	25
Maximum Speed (km/h)	105	105
Passenger Trains		
No. of Trains*	14	1
No. of Locomotive	2	2
No. of Cars	10	10
Maximum Speed (km/h)	161**	161**

* Data provided by CN applicable to Year 2020. These volumes have been escalated by 2.5% per annum for 10 years in the analysis.

** A speed of 150 km/h used in the analysis as this is the maximum speed input in the Stamson noise model.

TABLE 2

PROPOSED RESIDENTIAL DEVELOPMENT

1381 LAKESHORE ROAD EAST

CITY OF MISSISSAUGA

REGION OF PEEL

SUMMARY OF PREDICTED SOUND LEVELS
OUTDOORS DUE TO ROAD AND RAIL TRAFFIC

Location*	Source	Distance (m)	Leq (dBA)			
			Day		Night	
			Separate	Combined	Separate	Combined
South Wall 8th Floor	Lakeshore Road (WB)	11.0	69	71	62	64
	Lakeshore Road (EB)	22.0	66		59	
North Wall 15th Floor	Dixie Road	15.5	62	67	55	63
	Rail Corridor	278.0	65		63	
East Wall 8th Floor	Lakeshore Road (WB)	11.0	66	69	59	63
	Lakeshore Road (EB)	22.0	63		56	
	Rail Corridor	291.5	62		59	
West Floor 15th Floor	Lakeshore Road (WB)	16.0	64	70	58	64
	Lakeshore Road (EB)	27.0	62		56	
	Dixie Road	17.0	65		58	
	Rail Corridor	278.0	62		60	

* 8th floor location taken 25.5 m above ground. 15th floor location taken 46.5 m above grade. Ground level outdoor amenity, rooftop outdoor amenity and private terrace locations taken in the middle of the space and 1.5 m above ground/structure.

TABLE 2 - Continued

PROPOSED RESIDENTIAL DEVELOPMENT

1381 LAKESHORE ROAD EAST

CITY OF MISSISSAUGA

REGION OF PEEL

SUMMARY OF PREDICTED SOUND LEVELS
OUTDOORS DUE TO ROAD AND RAIL TRAFFIC

Location*	Source	Distance (m)	Leq (dBA)			
			Day		Night	
			Separate	Combined	Separate	Combined
Ground Level Outdoor Amenity	Dixie Road	71.5	43	50	--	--
	Rail Corridor	288.5	49		--	
5th Floor Private Terrace	Lakeshore Road (WB)	15.0	60	65	--	--
	Lakeshore Road (EB)	26.0	64		--	
Rooftop Outdoor Amenity	Lakeshore Road (WB)	24.5	47	64	--	--
	Lakeshore Road (EB)	35.5	47		--	
	Dixie Road	67.0	44		--	
	Rail Corridor	301.5	64		--	

* 8th floor location taken 25.5 m above ground. 15th floor location taken 46.5 m above grade. Ground level outdoor amenity, rooftop outdoor amenity and private terrace locations taken in the middle of the space and 1.5 m above ground/structure.

TABLE 3

PROPOSED RESIDENTIAL DEVELOPMENT

1381 LAKESHORE ROAD EASTD

CITY OF MISSISSAUGA

REGION OF PEEL

SUMMARY OF MINIMUM NOISE MITIGATION MEASURES*

Condominium Building	Air Conditioning(1)	Exterior Wall(2)	Windows(3)	Exterior Doors(3)	Warning Clause(4)
All residential units	Mandatory	Up to STC 41	Up to STC 38	Up to STC 38	A, B, C, D, E

* A 1.8 m high acoustic railing is proposed for the 9th floor rooftop outdoor amenity space. See Section 7.1.2 and Figure 2 for details.

A 1.07 m high acoustic railing is proposed for the three (3) 5th floor south facing private terraces. See Section 7.1.2 and Figure 2 for details.

See Notes to Table 3 on following pages.

NOTES TO TABLE 3

1. Means must be provided to allow windows to remain closed for noise control purposes. The air conditioning system should be designed to meet the MOE NPC-300 noise guideline limits.

2. STC - Sound Transmission Class Rating (Reference ASTM-E413). Values shown are based on preliminary calculations using the standard assumptions. See Section 7.1.1 for details.

3. STC - Sound Transmission Class Rating (Reference ASTM-E413). Values shown are based on preliminary calculations using the standard assumptions. See Section 7.1.1 for details. A sliding glass walkout door and exterior doors having glass components should be considered as a window and be included in the percentage of glazing.

4. Suggested warning clauses to be included in the development agreement and to be included in offers of purchase and sale or lease agreements on designated residential units:

   A. "Purchasers/tenants are advised that despite the inclusion of noise control features in this development area and within the dwelling units, noise due to increasing road and rail traffic may continue to be of concern, occasionally interfering with the activities of the occupants as the sound level may exceed the noise criteria of the Municipality and the Ontario Ministry of the Environment, Conservation and Parks. I, the purchaser hereby agree to place this clause in all subsequent offers of purchase and sale when I sell the property."

   B. “Purchasers/tenants are advised that the residential unit is fitted with a central air conditioning system in order to permit closing of windows for noise control. (Note: for residential lots, 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 residential unit is in proximity to the existing commercial and industrial facilities whose activities and/or equipment may at times be audible.”

D. “Purchasers/tenants are advised that CN or its assigns or successors in interest has or have a right-of-way and facilities within 300 m from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuation measures in the design of the development and individual dwelling(s). CN will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid facility and right-of-way.”

E. “Purchasers/tenants are advised that GO Transit/Metrolinx or its assigns or successors in interest has or have a right-of-way and facilities within 300 m from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuation measures in the design of the development and individual dwelling(s). GO Transit/Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid facility and right-of-way.”

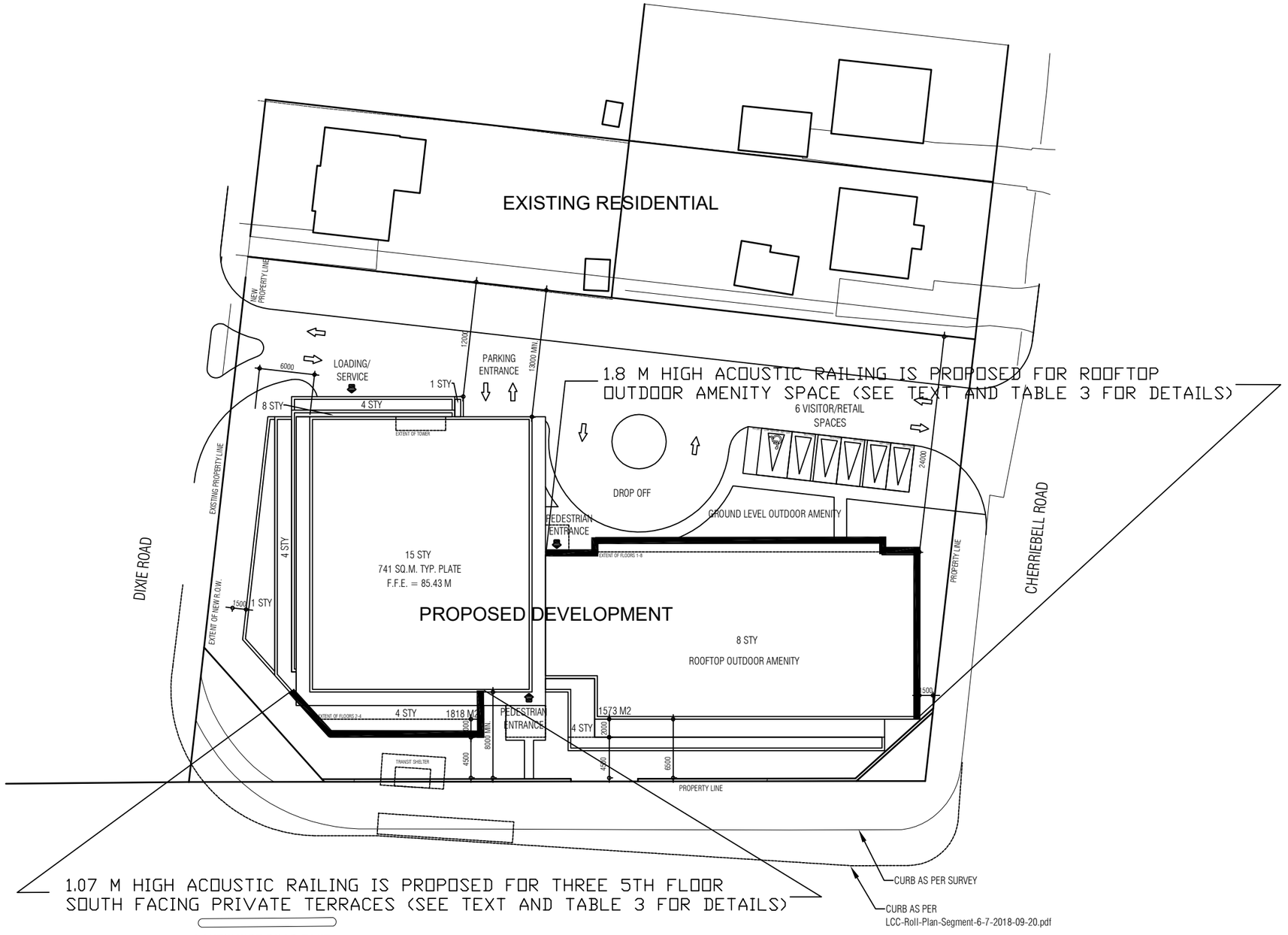
N.T.S.

Proposed Residential Development
1381 Lakeshore Road East
City of Mississauga

Date: August 2020 **File: 19-085**

KEY PLAN
FIGURE 1

JADE ACOUSTICS



N.T.S

NOTES:

1. BASED ON PREDICTED SOUND LEVELS, ALL RESIDENTIAL UNITS REQUIRE MANDATORY CENTRAL AIR CONDITIONING AND A WARNING CLAUSE (SEE TEXT AND TABLE 3 FOR DETAILS)
2. WINDOWS AND EXTERIOR DOORS NEED TO BE UP TO STC 38 AND EXTERIOR WALLS NEED TO BE UP TO STC 41 (SEE TEXT AND TABLE 3 FOR DETAILS)
3. ALL RESIDENTIAL UNITS REQUIRE PROXIMITY WARNING CLAUSE "C" TO ADDRESS EXISTING COMMERCIAL AND INDUSTRIAL FACILITIES (SEE TEXT AND TABLE 3 FOR DETAILS)
4. ALL RESIDENTIAL UNITS REQUIRE PROXIMITY WARNING CLAUSES "D" AND "E" TO ADDRESS RAIL TRAFFIC ON GO LAKESHORE WEST LINE AND CN OAKVILLE SUBDIVISION (SEE TEXT AND TABLE 3 FOR DETAILS)

PROPOSED RESIDENTIAL DEVELOPMENT
1381 Lakeshore Road East
City of Mississauga

Date: August 2020 Our File: 19-085

JADE ACOUSTICS

PLAN OF DEVELOPMENT SHOWING MINIMUM NOISE MITIGATION MEASURES

FIGURE 2

APPENDIX A

CORRESPONDENCE REGARDING ROAD AND RAIL TRAFFIC DATA

Date:	09-Jun-20

NOISE REPORT FOR PROPOSED DEVELOPMENT

REQUESTED BY:	
Name:	Davor Sikic
Company:	Jade Acoustics Inc.

PREPARED BY:	
Name:	Bertuen mickle
Tel#:	(905) 615-3200

Location:	Lakeshore Road East, west of Dixie Road Lakeshore Road East, east of Dixie Road
ID#:	472

ON SITE TRAFFIC DATA

Specific	***Street Names***				
	Lakeshore E of Dixie	Lakeshore W of Dixie			
AADT:	41,000	34,100			
# of Lanes:	4 Lanes	4 Lanes			
% Trucks:	6%	5%			
Medium/Heavy Trucks Ratio:	55/45	55/45			
Day/Night Traffic Split:	90/10	90/10			
Posted Speed Limit:	50 km/h	50 km/h			
Gradient of Road:	<2%	<2%			
Ultimate R O W:	30m	30m			

Comments:	Ultimate Traffic Data Only

Davor Sikic

From: Kuczynski, Roman <roman.kuczynski@peelregion.ca>
Sent: June 10, 2020 8:30 AM
To: Davor Sikic
Cc: Mannie, Sharon
Subject: RE: Road Traffic Data, 1381 Lakeshore Road East, Mississauga (19-085)

Davor,

In this case the Ultimate (Planned) AADT volumes are intentionally listed the same as existing volumes (16,678) since the road is at/near capacity and thus future growth is assumed to be constrained. We recommend to use this value instead of a theoretical value calculated using assumption of 8,100 AADT per lane. This road is planned (at this time) to stay as a 2-lane road so the AADT would be 16,200.

Regards,

Roman Kuczynski, MA, MCIP, RPP
Supervisor, Transportation System Planning
Region of Peel
Public Works Services
Transportation Division
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, Ontario L6T 4B9
Tel. (905) 791-7800 ext. 4381
Cell (289) 541-8156
Fax: (905) 791-1442
E-Mail: roman.kuczynski@peelregion.ca

From: Davor Sikic <davor@jadeacoustics.com>
Sent: June 9, 2020 4:20 PM
To: Mannie, Sharon <sharon.mannie@peelregion.ca>; Kuczynski, Roman <roman.kuczynski@peelregion.ca>
Subject: RE: Road Traffic Data, 1381 Lakeshore Road East, Mississauga (19-085)

Hi Sharon,

Please confirm that we can use the volumes included in your email as an ultimate AADT.

Date: June 8, 2020
From: Davor Sikic, Jade Acoustics Inc.
Re: Dixie Road – 1.27 km north of Lakeshore Road (the closest to the intersection with Lakeshore Rd.)

Davor,
As per your request, we are providing the following 2019 traffic data:

	Existing	Ultimate
24 Hour Traffic Volume[1] [2]	16,678	16,678
# of Lanes	2	2
Day/Night Split	92/8	92/8
Day Trucks (% of Total Volume)	5.27% Medium 0.63% Heavy	5.27% Medium 0.63% Heavy
Night Trucks (% of Total Volume)	7.15% Medium 0.73% Heavy	7.15% Medium 0.73% Heavy
Right-of-Way Width	20 meters	
Posted Speed Limit[3]	50/60 km/h	

Notes:

[1] - The current (existing) 24 Hour Traffic Volume is not the Annual Average Daily Traffic, but the averaged raw volumes over three data collection days. If you need the Annual Average Traffic Volume, please visit the Peel Open Data website below: http://opendata.peelregion.ca/data-categories/transportation/traffic-count-stations.aspx

[2] - The ultimate volume is the planned volume during a level of service 'D' where a 2 second vehicle headway and a volume to capacity ratio of 0.9 is assumed. Traffic signals and hourly variations in traffic are also incorporated into the ultimate volume. In this case the Ultimate (Planned) volumes are intentionally the same as Existing volumes since the road is at/near capacity and thus future growth is assumed to be constrained.

[3] - The speed limit of 50 km/ha is posted for the section between Lakeshore Road and the CN Rail. The speed of 60 km/ha is posted for the section north of CN Rail (ATR station is located within this section).

If you require further assistance, please contact me at (905) 791-7800 ext. 4381

Regards,

Roman Kuczynski, MA, MCIP, RPP
Supervisor, Transportation System Planning
Transportation Division, Region of Peel

10 Peel Centre Drive, Suite B, 4th Floor
Brampton, Ontario L6T 4B9
Tel. (905) 791-7800 ext. 4381
Cell (289) 541-8156
E-Mail: roman.kuczynski@peelregion.ca

Davor Sikic

From: Rail Data Requests <RailDataRequests@metrolinx.com>
Sent: June 23, 2020 5:42 PM
To: Davor Sikic
Subject: RE: Rail Traffic Data, 1381 Lakeshore Road East, Mississauga (Jade File: 19-085)

Good Afternoon Davor,

Further to your request dated June 8th, 2020 the subject property (northeast corner of Lakeshore Road East and Dixie Road in the City of Mississauga) is located in proximity to Metrolinx's Oakville Subdivision which carries Lakeshore West GO Train service.

It's anticipated that GO service on these lines will be comprised of a mix of both diesel and electric trains within (at least) a 10-year time horizon. The combined preliminary midterm weekday train volume forecast at this location, including both revenue and equipment trips is in the order of 238 trains – (54 diesel: 45 day, 9 night; 184 electric: 147 day, 37 night). Trains will be comprised of a single locomotive and up to 12 passenger cars.

The maximum track design speed at this location on this corridor is 95 mph (153 km/h).

There are no anti-whistling by-laws in place around the subject property.

With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO and UP Express rail network and we are currently working towards the next phase. Metrolinx has not made a final decision regarding the electric train technology or technologies to be deployed. We can, however, provide the following interim information which may be helpful;

1. At lower speeds, train noise is dominated by the powertrain. At higher speeds, train noise is dominated by the wheel- track interaction. Hence, at higher speeds, the noise level and spectrum of electric trains is expected to be very similar, if not identical, to those of equivalent diesel trains.

2. Along with electrification, Metrolinx will intensify service levels along all of its corridors to deliver the promised GO Expansion service. Everything else being equal, this will likely result in an overall increase in train noise emissions.

Given the above considerations, it would be prudent, for the purposes of acoustical analyses, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability, and passenger demand.

It should be noted that this information is only as it pertains to Metrolinx trains. It would be prudent to contact other rail operators in the area directly for their rail traffic information.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

Best Regards,

Terri Cowan
Project Manager
Third Party Projects Review| Capital Projects Group
Metrolinx | 20 Bay Street, Suite 600 |Toronto, Ontario|M5J 2W3
T: 416-202-3903 C: 416-358-1595

System Engineering
Engineering Services

1 Administration Road
Concord, ON, L4K 1B9
T: 905.669.3264
F: 905.760.3406

Train Count Data

TRANSMITTAL

To: *Destinataire :*	Jade Acoustics 411 Confederation Parkway Unit 119 Concord ON L4k 0A8	*Project :*	Oakville-10.18 – Dixie Rd Mississauga ON
Att'n:	Davor Sikic	*Routing:*	davor@jadeacoustics.com
From: *Expéditeur :*	Michael Vallins	*Date:*	2020/07/10
Cc:	Adjacent Development CN via e-mail		

☐ Urgent ☐ For Your Use ☐ For Review ☐ For Your Information ☐ Confidential

Re: Train Traffic Data – CN Oakville Subdivision near Lakeshore Rd E/Dixie Rd, Mississauga ON

Please find attached the requested Train Traffic Data; this data does not reflect GO Metrolinx Traffic. The application fee in the amount of **$500.00** +HST will be invoiced.

Should you have any questions, please do not hesitate to contact the undersigned

Sincerely,
CN Design & Construction

Michael Vallins P.Eng
Manager, Public Works – Eastern Canada
permits.gld@cn.ca

Date: 2020/07/10 Project Number: Oakville-10.18 –Dixie Rd Mississauga ON

Hello Davor:

Re: Train Traffic Data – CN Oakville Subdivision Lakeshore Rd E/Dixie Rd, Mississauga ON

The following is provided in response to Davor's 2020/06/08 request for information regarding rail traffic in the vicinity of Dixie Rd, Mississauga ON at approximately Mile 10.18 on CN's Oakville Subdivision.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

Typical daily traffic volumes at this site location are as follows:

***Maximum train speed is given in Miles per Hour**

	0700-2300			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	65	4
Way Freight	2	25	65	4
Passenger	14	10	100	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	65	4
Way Freight	5	25	65	4
Passenger	1	10	100	2

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN's Oakville Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are three (3) at-grade crossing Mile10.59 Hiang Blvd Xing, Mile 10.85 Ogden Ave. Xing and Mile 11.03 Alexandria Xing in the immediate vicinity of the study area. Anti-whistling bylaws are in effect at all three crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 286,000 lbs.

The triple mainline track is considered to be continuously welded rail throughout the study area.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Adjacent Development, Canadian National Railway Properties at Proximity@cn.ca should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,

Michael Vallins P.Eng
Manager, Public Works - Eastern Canada
permits.gld@cn.ca

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 (LLM, 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 (LLM, 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.

ENVIRONMENTAL NOISE CRITERIA

REGION OF PEEL

Reference: "General Guidelines for the Preparation of Acoustical Reports in the Region of Peel", November, 2012.

ROAD TRAFFIC NOISE

TYPE OF SPACE	TIME PERIOD	SOUND LEVEL LIMIT Leq*
Outdoor living area	7 am – 11 pm	Leq (16 hr) = 55 dBA
Outside bedroom window	11 pm – 7 am	Leq (8 hr) = 50 dBA
Indoor (bedrooms, hospitals)	11 pm – 7 am	Leq (8 hr) = 40 dBA
Indoor (living rooms, hotels, private offices, reading rooms)	7 am – 11 pm	Leq (16 hr) = 45 dBA
Indoor (general offices, shops)	7 am – 11 pm	Leq (16 hr) = 50 dBA

* Leq, measured in A-weighted decibels (dBA), is the value of the constant sound level which would result in exposure to the same total sound level as would the specified time varying sound, if the constant sound level persisted over an equal time interval.

CITY OF MISSISSAUGA

Reference: City of Mississauga Official Plan – Chapter 6, "Value the Environment", City of Mississauga, March 13, 2019.

Outdoor and Indoor Sound Level Limits – Road and Rail			
Type of Space	**Time Period**	**Equivalent Sound Level *Leq** (Time Period) (*dBA*)****	
		Road	**Rail**
Outdoor Living Areas (OLA)	0700 – 23:00, 16 hours	55	55
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	0700 – 23:00, 16 hours	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycares)	23:00 – 7:00, 8 hours	45	40
Sleeping quarters	0700 – 23:00, 16 hours	45	40
	23:00 – 7:00, 8 hours	40	35
Sleeping quarters of hotels/motels	23:00 – 7:00, 8 hours	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	23:00 – 7:00, 8 hours	40	35
General offices, reception areas, retail stores, etc.	0700 – 23:00, 16 hours	50	45
Nursing/retirement homes, theatres, places of religious assembly, libraries	0700 – 23:00, 16 hours	45	40
Individual or semi-private offices, conferences rooms, reading rooms, etc.	0700 – 23:00, 16 hours	45	40

* Leq – The A-weighted sound level of a steady sound carrying the same total energy in the specified time period as the observed fluctuating sound.

*****dBA*** –The A-weighted sound pressure level. Noise measured in decibels weighted to express loudness as perceived by human hearing.

Note: Outdoor and Indoor Sound Level Limits – Road and Rail (adapted from Environmental Noise Guideline, Publication NPC-300)

CN / GO TRANSIT / METROLINX

RAILWAY NOISE AND VIBRATION GUIDELINES

Mitigation measures are required to achieve the following standards for noise for residential uses.

		Leq (dBA)	
		Day (16 hr.)	Night (8 hr.)
Noise	Sleeping Quarters	35	35
	Living Room	40	40
	Outdoor	55	50

Vibration

Groundborne vibration transmission to be estimated through site testing and evaluation to determine if dwellings within 75 m of the Railway right-of-way will be impacted by overall vertical vibration velocities in excess of 0.14 mm/sec. RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, $\pm$ 3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec. RMS on and above the first floor of the dwellings within 75 m of the nearest track.

APPENDIX C

SAMPLE CALCULATION OF PREDICTED SOUND LEVELS DUE TO ROAD AND RAIL TRAFFIC

APPENDIX C-1
SAMPLE CALCULATION OF SOUND LEVEL

FILE: 19-058
NAME: 1381 Lakeshore Road East
REFERENCE DRAWINGS: Site Plan
LOCATION: North Wall, 15th Floor

Noise Source:	Dixie Road	Rail Corridor (Locomotive)	Rail Corridor (Wheel)
Time Period:	16 hr. (day)	16 hr. (day)	16 hr (day)
Segment Angle:	0 to 90	-90 to 90	-90 to 90
Distance (m):	15.5	278.0	278.0
CALCULATION SOUND LEVEL*			
Reference Leq (dBA)*:	65.16	80.67	73.42
Distance Correction (dBA):	-0.14	-12.68	-12.68
Finite Element Correction (dBA):	-3.01	0.00	0.00
Row of Houses Correction (dBA):	0.00	-3.38	-3.38
Allowance for Future Growth (dBA):	incl.	incl.	incl.
LeqDay (dBA):	62.01	64.60	57.36
Combined LeqDay (dBA):		67.00	

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

APPENDIX C-2
SAMPLE CALCULATION OF SOUND LEVEL

FILE: 19-058
NAME: 1381 Lakeshore Road East
REFERENCE DRAWINGS: Site Plan
LOCATION: North Wall, 15th Floor

Noise Source:	Dixie Road	Rail Corridor (Locomotive)	Rail Corridor (Wheel)
Time Period:	8 hr. (night)	8 hr. (night)	8 hr. (night)
Segment Angle:	0 to 90	-90 to 90	-90 to 90
Distance (m):	15.5	278.0	278.0
CALCULATION SOUND LEVEL*			
Reference Leq (dBA)*:	58.59	78.00	70.61
Distance Correction (dBA):	-0.14	-12.68	-12.68
Finite Element Correction (dBA):	-3.01	0.00	0.00
Row of Houses Correction (dBA):	0.00	-3.38	-3.38
Allowance for Future Growth (dBA):	incl.	incl.	incl.
LeqNight (dBA):	55.04	61.94	54.54
Combined LeqNight (dBA):		63.36	

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

```
STAMSON 5.0        NORMAL REPORT        Date: 18-06-2020 16:37:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: nw_rd.te             Time Period: Day/Night 16/8 hours
Description: North wall, 15th floor, road traffic, daytime only

Road data, segment # 1: Dixie Road (day/night)
----------------------------------------------
Car traffic volume  : 14438/1256  veh/TimePeriod  *
Medium truck volume :   809/70    veh/TimePeriod  *
Heavy truck volume  :    97/8     veh/TimePeriod  *
Posted speed limit  :    50 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):  16678
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.27
    Heavy Truck  % of Total Volume     :   0.63
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Dixie Road (day)
--------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  15.50  m
Receiver height           :  46.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Dixie Road (day)
--------------------------------------

Source height = 0.89 m

ROAD (0.00 + 62.01 + 0.00) = 62.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  65.16   0.00  -0.14  -3.01   0.00   0.00   0.00  62.01
-------------------------------------------------------------------------------

Segment Leq : 62.01 dBA

Total Leq All Segments: 62.01 dBA
```

STAMSON 5.0 NORMAL REPORT Date: 18-06-2020 16:39:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: nwn_rd.te Time Period: Day/Night 16/8 hours
Description: North wall, 15th floor,road traffic,nighttime only

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

Car traffic volume : 14135/1229 veh/TimePeriod *
Medium truck volume : 1097/95 veh/TimePeriod *
Heavy truck volume : 112/10 veh/TimePeriod *
Posted speed limit : 50 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): 16678
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.15
Heavy Truck % of Total Volume : 0.73
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dixie Road (night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.50 m
Receiver height : 46.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dixie Road (night)

Source height = 0.93 m

ROAD (0.00 + 55.04 + 0.00) = 55.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	58.19	0.00	-0.14	-3.01	0.00	0.00	0.00	55.04

Segment Leq : 55.04 dBA

Total Leq All Segments: 55.04 dBA

STAMSON 5.0 NORMAL REPORT Date: 13-07-2020 15:24:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: nw_rl.te Time Period: Day/Night 16/8 hours
Description: North wall, 15th floor, rail traffic

Rail data, segment # 1: Rail Corr. (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1. GO	192.0/46.0	150.0	1.0	12.0	Diesel	Yes
* 2. Way Freight	2.6/6.4	105.0	4.0	25.0	Diesel	Yes
* 3. Passenger	17.9/1.3	150.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

No	Train type: Name	Unadj. Trains	Annual % Increase	Years of Growth
1.	GO	192.0/46.0	0.00	10.00
2.	Way Freight	2.0/5.0	2.50	10.00
3.	Passenger	14.0/1.0	2.50	10.00

Data for Segment # 1: Rail Corr. (day/night)

Angle1 Angle2	-90.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	2 / 2	
House density	40 %	
Surface	1	(Absorptive ground surface)
Receiver source distance	278.00 / 278.00 m	
Receiver height	46.50 / 46.50 m	
Topography	1	(Flat/gentle slope; no barrier)
No Whistle		
Reference angle	0.00	

Results segment # 1: Rail Corr. (day)

LOCOMOTIVE (0.00 + 64.60 + 0.00) = 64.60 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	80.67	-12.68	0.00	0.00	-3.38	0.00	64.60

WHEEL (0.00 + 57.36 + 0.00) = 57.36 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	73.42	-12.68	0.00	0.00	-3.38	0.00	57.36

Segment Leq : 65.35 dBA

Total Leq All Segments: 65.35 dBA

```
Results segment # 1: Rail Corr. (night)
---------------------------------------

LOCOMOTIVE (0.00 + 61.94 + 0.00) = 61.94 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  78.00 -12.68   0.00   0.00  -3.38   0.00  61.94
-------------------------------------------------------------------------

WHEEL (0.00 + 54.54 + 0.00) = 54.54 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  70.61 -12.68   0.00   0.00  -3.38   0.00  54.54
-------------------------------------------------------------------------

Segment Leq : 62.67 dBA

Total Leq All Segments: 62.67 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 65.35
                           (NIGHT): 62.67
```

APPENDIX C-3
SAMPLE CALCULATION OF SOUND LEVEL

FILE: 19-085
NAME: 1381 Lakeshore Road East
REFERENCE DRAWINGS: Site Plan
LOCATION: 5th Floor Private Terrace

Noise Source:	Lakeshore Road E. (WB)	Lakeshore Road E. (EB)
Time Period:	16 hr. (day)	16 hr. (day)
Segment Angle:	-90 to 90	-90 to 90
Distance (m):	15.0	26.0

CALCULATION OF SOUND LEVEL*

Reference Leq (dBA)*:	67.65	67.65
Distance Correction (dBA):	0.00	-2.91
Finite Element Correction (dBA):	-0.58	-0.58
Barrier Adjustment (dBA):	-7.54	0.00
Allowance for Future Growth (dBA):	incl.	incl.
LeqDay (dBA):	59.54	64.17
Combined LeqDay (dBA):	65.46	

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

```
STAMSON 5.0        NORMAL REPORT        Date: 25-06-2020 08:25:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5t_rd.te             Time Period: Day/Night 16/8 hours
Description: 5th floor private terrace, road traffic

Road data, segment # 1: Lakeshore WB (day/night)
-----------------------------------------------
Car traffic volume  : 17343/1927  veh/TimePeriod  *
Medium truck volume :   609/68    veh/TimePeriod  *
Heavy truck volume  :   498/55    veh/TimePeriod  *
Posted speed limit  :    50 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):  20500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.30
    Heavy Truck  % of Total Volume     :   2.70
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Lakeshore WB (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  :  15.00 m
Receiver height           :   1.50 m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Elevation                 :  15.00 m
Barrier receiver distance :   2.50 m
Source elevation          :   0.00 m
Receiver elevation        :  15.00 m
Barrier elevation         :  15.00 m
Reference angle           :   0.00

Road data, segment # 2: Lakeshore EB (day/night)
-----------------------------------------------
Car traffic volume  : 17343/1927  veh/TimePeriod  *
Medium truck volume :   609/68    veh/TimePeriod  *
Heavy truck volume  :   498/55    veh/TimePeriod  *
Posted speed limit  :    50 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):  20500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.30
    Heavy Truck  % of Total Volume     :   2.70
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 2: Lakeshore EB (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  :  26.00 m
Receiver height           :   1.50 m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Elevation                 :  15.00 m
Barrier receiver distance :   2.50 m
Source elevation          :   0.00 m
Receiver elevation        :  15.00 m
Barrier elevation         :  15.00 m
Reference angle           :   0.00

Results segment # 1: Lakeshore WB (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 !       -1.04 !        13.96

ROAD (0.00 + 59.54 + 0.00) = 59.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.22  67.65   0.00   0.00  -0.58   0.00   0.00  -7.54  59.54
-------------------------------------------------------------------------------

Segment Leq : 59.54 dBA

Results segment # 2: Lakeshore EB (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 !        0.04 !        15.04

ROAD (0.00 + 64.17 + 0.00) = 64.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.22  67.65   0.00  -2.91  -0.58   0.00   0.00  -4.99  59.18*
   -90     90   0.22  67.65   0.00  -2.91  -0.58   0.00   0.00   0.00  64.17
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 64.17 dBA

Total Leq All Segments: 65.46 dBA
```

APPENDIX D

SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION

APPENDIX D-1
SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION*

FILE: 19-085
NAME: 1381 Lakeshore Road East
REFERENCE DRAWINGS: Site plan
LOCATION: 15th Floor

ROAD

Room:	Corner Bedroom	
Exterior Wall area as a percentage of Floor Area:	North:	20%
	West:	20%
Window/Exterior Door area as a percentage of Floor Area:	North:	60%
	West:	60%
Number of components:	4	
Outdoor Nighttime Leq:	North: 55 (+3 for reflection) =	58 dBA
	West: 62 (+3 for reflection) =	65 dBA
Indoor Nighttime Leq:	40	
Angle Correction:	3	
Noise Reduction (dBA):	North:	21
	West:	28
Noise Spectrum:	Road	
Absorption:	Medium	

APPROPRIATE ELEMENTS

		STC Rating
Exterior Wall	North	STC 28
	West	STC 35
Window/Exterior Door	North	STC 28
	West	STC 34

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

APPENDIX D-2
SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION*

FILE: 19-085
NAME: 1381 Lakeshore Road East
REFERENCE DRAWINGS: Site plan
LOCATION: 15th Floor

RAIL

Room: Corner Bedroom

Exterior Wall area as a percentage of Floor Area:	North:	20%
	West:	20%
Window/Exterior Door area as a percentage of Floor Area:	North:	60%
	West:	60%
Number of components:	4	
Outdoor Nighttime Leq:	North: 63 (+3 for reflection) =	66 dBA
	West: 60 (+3 for reflection) =	63 dBA
Indoor Nighttime Leq:	35	
Angle Correction:	0	
Noise Reduction (dBA):	North:	31
	West:	28
Noise Spectrum:	Diesel Locomotive	
Absorption:	Medium	

APPROPRIATE ELEMENTS

		STC Rating
Exterior Wall	North	STC 41
	West	STC 38
Window/Exterior Door	North	STC 38
	West	STC 35

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

APPENDIX D-3

SUMMARY OF COMBINED STC RATING REQUIREMENTS

1381 LAKESHORE ROAD EAST

15th FLOOR CORNER BEDROOM

COMBINED	REQUIRED STC BASED ON ROAD TRAFFIC ONLY	REQUIRED STC BASED ON RAIL TRAFFIC ONLY	COMBINED REQUIRED STC RATING*
North Wall	28	41	41
West Wall	35	38	40
North Window/ Exterior Door	28	38	38
West Window/ Exterior Door	34	35	38

* An STC 41 rating for the exterior wall and an STC 38 rating for the window/exterior door exceed construction which comply with the minimum structural and safety requirements of standard construction.

APPENDIX E

SAMPLE CALCULATION OF SOUND BARRIER ANALYSIS

```
STAMSON 5.0        NORMAL REPORT        Date: 18-06-2020 15:01:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5tola_rd.te          Time Period: Day/Night 16/8 hours
Description: 5th floor private terrace, road traffic

Road data, segment # 1: Lakeshore WB (day/night)
-----------------------------------------------
Car traffic volume  : 17343/1927  veh/TimePeriod  *
Medium truck volume :   609/68    veh/TimePeriod  *
Heavy truck volume  :   498/55    veh/TimePeriod  *
Posted speed limit  :    50 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):  20500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.30
    Heavy Truck  % of Total Volume     :   2.70
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Lakeshore WB (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  :  15.00 m
Receiver height           :   1.50 m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.07 m
Elevation                 :  15.00 m
Barrier receiver distance :   2.50 m
Source elevation          :   0.00 m
Receiver elevation        :  15.00 m
Barrier elevation         :  15.00 m
Reference angle           :   0.00

Road data, segment # 2: Lakeshore EB (day/night)
-----------------------------------------------
Car traffic volume  : 17343/1927  veh/TimePeriod  *
Medium truck volume :   609/68    veh/TimePeriod  *
Heavy truck volume  :   498/55    veh/TimePeriod  *
Posted speed limit  :    50 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):  20500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.30
    Heavy Truck  % of Total Volume     :   2.70
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 2: Lakeshore EB (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  :  26.00 m
Receiver height           :   1.50 m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.07 m
Elevation                 :  15.00 m
Barrier receiver distance :   2.50 m
Source elevation          :   0.00 m
Receiver elevation        :  15.00 m
Barrier elevation         :  15.00 m
Reference angle           :   0.00

Results segment # 1: Lakeshore WB (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 !       -1.04 !        13.96

ROAD (0.00 + 55.66 + 0.00) = 55.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.15  67.65   0.00   0.00  -0.42   0.00   0.00 -11.57  55.66
-------------------------------------------------------------------------------

Segment Leq : 55.66 dBA

Results segment # 2: Lakeshore EB (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 !        0.04 !        15.04

ROAD (0.00 + 55.89 + 0.00) = 55.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.15  67.65   0.00  -2.75  -0.42   0.00   0.00  -8.59  55.89
-------------------------------------------------------------------------------

Segment Leq : 55.89 dBA

Total Leq All Segments: 58.79 dBA
```